EFFLUENT DISCHARGE REPORT TO ACCOMPANY

NEVADA GROUNDWATER DISCHARGE PERMIT APPLICATION

WOLF RUN GOLF COURSE

RENO, NEVADA

Prepared For

Golf Vision
1400 Wolf Run Road
Reno, Nevada 89511

Job No. 2281.17B

June 23, 2000

Pezonella Associates, Inc.
Consulting Engineers and Geologists
520 EDISON WAY • RENO, NEVADA 89502 • (775) 856-5566

Permit: NEV98018

Nevada Division of Environmental Protection

AUTHORIZATION TO DISCHARGE

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

University of Nevada-Reno Athletic Association
Wolf Run Golf Course
1400 Wolf Run Road
Reno, Nevada

is authorized to use treated effluent at a facility located at

Wolf Run Golf Course
1400 Wolf Run Road
City of Reno, Washoe County, Nevada 89511
Longitude: 119° 50' W, Latitude: 39° 23' N
Township 18 N., Range 20 E., Section 19

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 _____.

This permit and the authorization to discharge shall expire at midnight,_____.

Signed this ____ day of _____, 2001.

_____
Joseph L. Maez, P.E.
Bureau of Water Pollution Control

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PART I

Introduction: The Wolf Run Golf Course is an 18-hole course located near the Field Creek Subdivision in south Reno. The course covers 82 acres and is characterized by crossings of Steamboat Ditch and Whites Creek. Annual water usage for the course is estimated to be around 390 (126.1 million gallons) acre-feet per year.

337.1 AF per service agreement

Reclaimed water is provided by the South Truckee Meadows Water Reclamation Facility which is owned by Washoe County. This facility provides reclaimed water that meets Category C quality (NAC 445A.276) and has total nitrogen levels below 10 mg/l.

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 use reclaimed water from the South Truckee Meadows Water Reclamation Facility on the Wolf Run Golf Course

I.A.2. Flow monitoring shall be recorded at the magnetic flow meter on the irrigation delivery line prior to reuse. Reclaimed water quality shall be in accordance with the limits set forth in Permit NEV40024 for the South Truckee Meadows Water Reclamation Facility.

The discharge shall be limited and monitored by the permittee as specified below:

TABLE I.1

PARAMETERS	EFFLUENT DISCHARGE LIMITATIONS		MONITORING REQUIREMENTS	
	30 Day Annual Average	Monthly Maximum	Measurement Frequency	Sample Type
Flow, Million Gallons per Month (MGM)	M & R	M & R[3]	Continuous	Flow meter
Annual Application Volume (AF)	424 Acre-Feet (AF) (Volume determined from Consumptive Use Balance)[2]		Cumulative	Flow Meter
Fecal Coliform[1] (CFU, MPN)	2.2 CFU (MPN)/100 ml	23 CFU(MPN) /100 ml	Weekly	Discrete

1 Sample results to be recieved from NEV40024. Permittee does not need to provide this data.
2. Annual application volume is based upon 110% of the application volume determined in the EMP.
3. Monthly application rates in the EMP should be used as a guide.

390
39
429

I.B. EFFLUENT MANAGEMENT

I.B.1. The irrigation storage pond, distribution system, and ancillary facilities shall be operated in accordance with the Effluent Management Plan (EMP). The EMP must be submiteed to this Division within 90 days of permit issuance. The EMP shall contain the information required to comply with this permit. It is recommended that the Permittee utilize "WTS-1B: General Criteria for Preparing an Effluent Management Plan" (NDEP 2000), as a guidance 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 affected personnel. Copies shall be included in the EMP.

I.B.3. If the actual annual application volume exceeds the calculated annual application limit, the Permittee shall prepare a report which includes an evaluation of the application rates in the EMP, an explanation of conditions (overseeding, reseeding, weather conditions, etc.) which led to the exceedance, and any planned changes the Permittee deems necessary. This evaluation shall be submitted with the quarterely discharge monitoring report (DMR).

I.B.4. The effluent irrigation system and effluent storage pond shall not cause objectionable odors on or off the site.

I.B.5. The irrigation system, storage pond, 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.6. The irrigation areas and the storage pond shall be posted with conspicuous warning signs clearly stating that reclaimed water is utilized and to avoid contact. Ancillary equipment used for effluent shall be clearly marked to indicate use with effluent. Notification signs shall be placed at the First and Tenth Tee's.

I.B.7. Drinking water fountains shall be covered during effluent irrigation.

I.B.8. Irrigation of the golf course shall be performed in such a manner as to reduce standing water to a minimum and to prevent run-off of effluent to any creeks or ditches.

I.B.9. The permittee shall maintain a 2-foot minimum freeboard in the storage pond.

I.B.10. 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 reuse as detailed in the schedule of compliance.

I.B.11. All terms and conditions stated herein shall not supercede the requirements of the Nevada Division of Water Resources.

I.C. GENERAL CONDITIONS

I.C.1. There shall be no discharge of substances that would cause a violation of water quality standards of the State of Nevada.

I.C.2. The permittee shall remit an annual review and services fee in accordance with NAC 445A.232 starting **July 1, 2001** and every year thereafter until the permit is terminated.

I.C.3. The Discharge Monitoring Reports (DMRs) must be signed by the facility's highest ranking officer. 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. Item I.B.3 of this permit must be addressed in the DMRs.

I.D. SCHEDULE OF COMPLIANCE

I.D.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 flow monitoring requirements upon issuance of the permit.

b. A final Effluent Management Plan (EMP) shall be prepared by a qualified professional and submitted to the Division within (90 days of permit issuance/date).

c. **Prior to use of treated effluent**, the Permittee shall submit the cross-connection control documentation required by part I.B.10.

I.E. MONITORING AND REPORTING

I.E.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.E.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 annual application volume. If the annual application volume exceeds the limit listed in Table I.1, an evaluation shall be submitted with the fourth quarter report in accordance with the requirements listed in permit condition I.B.3.

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

b. Quarterly Report

i. 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, 2001). 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 - Jennifer McMartin
333 West Nye Lane
Carson City, Nevada 89706-0851

ii. If the monthly maximum volume exceeds the limit listed in Table I.1, an evaluation shall be submitted with the fourth quarter report in accordance with the requirements listed in permit condition I.B.3.

I.E.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.

g. "cfu" means colony forming units.

I.E.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.E.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.E.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.E.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.E.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.E.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, conveyance facilities, or holding ponds 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:

(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.

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:

(1) The facility was at the time being properly operated as required in paragraph II.A.2. above; and

(2) 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.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. **Storage Pond Conditions**

If any effluent is placed in ponds, such 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 the once-in-one-hundred year flood of said location without physical damages to berms and other pond structures;

c. prevent escape of treated effluent by leakage other than as authorized by this permit;

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

NEVADA DIVISION OF ENVIRONMENTAL PROTECTION
FACT SHEET
(pursuant to NAC 445A.236)

Permittee: University of Nevada-Reno Athletic Association

Permit Number: NEV98018

Description of Discharge:

Use of reclaimed water for irrigation at the Wolf Run Golf Course. Reclaimed water meets Category C (NAC445A.276) standards. Reclaimed water is going to be supplied by the South Truckee Meadows Water Reclamation Facility.

Location: 1400 Wolf Run Road, Reno

Latitude: 39° 23' N
Longitude: 119° 50' W

Golf Course is located in southwest Reno, between Zollezi Lane and Arrow Creek Parkway

Operation Description:

The Wolf Run Golf Course is switching from irrigation with surface water from Whites Creek and Steamboat Ditch to irrigation with reclaimed water. The course consists of 18-holes plus a driving range, covering a total area of approximately 82 acres. It is characterized by Whites Creek traversing through the course area.

Flow:

The average annual application rate at the course is 390 acre-feet (126 million gallons). The peak usage month is July, with an average monthly demand of 26 million gallons. Irrigation will occur from mid- March to mid- October.

Quantities:

Following is a list of the parameters to be monitored in the effluent from this facility.

Flow (via influent flow meter)

Reclaimed water quality data is supplied by the South Truckee Meadows Water Reclamation Facility owned by Washoe County. This facility is permitted under NEV40024. Permit limits and historical averages are:

Parameter	Permit Limits	Historical Average
CBOD	30 mg/l	4 mg/l
TSS	30	5 mg/l
Fecal Coliform:	2.2 mpn/100ml	2 mpn/100ml
TKN-N	No Limit	2.0 mg/l
Nitrate-N	No Limit	2.0 mg/l

Receiving Water Characteristics:

The application of reclaimed water shall be conducted to reduce the potential of discharge to surface waters and ground waters. Depth to ground water is approximately 150 feet.

Procedures for Public Comment:

The Notice of the Division's intent to issue a permit authorizing the facility to discharge to the surface water of the State of Nevada subject to the conditions contained within the permit, is being sent to the **Reno Gazette Journal** for publication. The notice is being mailed to interested persons on our mailing list. Anyone wishing to comment on the proposed permit can do so in writing for a period of 30 days following the date of publication of the public notice. All comments must be received by 5:00 PM ***April 3, 2001***. The comment period can be extended at the discretion of the Administrator.

A public hearing on the proposed determination can 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 be filed within the comment period and must indicate the interest of the person filing the request and the reasons why a hearing is 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 determined to be appropriate. All public hearings must be conducted to 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 Determination:

The Division has made the tentative determination to issue the proposed permit.

Proposed Effluent Limitations, Schedule of Compliance, and Special Conditions

See proposed permit.

Rationale for Permit Requirements:

Part I.A.1. - This part of the permit includes the limitation and monitoring requirements for the discharge.

FLOW - The flow quantity in the permit is based upon the water requirement determined for the course irrigation. The annual volume of water applied is given a limit of 424 acre-feet. Monthly maximum limits are based upon the monthly water requirement determined in the water budget with a 10% exceedance factor.

Reclaimed water will be applied in a manner to minimize ponding and prevent run-off from the site. Irrigation after a significant rainfall event will not be conducted.

TOTAL SUSPENDED SOLIDS- The limit of 30 mg/l is met by NEV40024

BOD5 - The limit of 30 mg/l is met by NEV40024

FECAL COLIFORM- The limit of 2.2/100 ml is met by NEV40024

pH - The limit of 6 to 9 S.U. is met by NEV40024

NITROGEN- A nitrogen budget will be conducted each year as part of the effluent management plant (EMP). This budget will help to control the amount of nitrogen entering the subsurface.

Prepared by: Joseph Maez
February 2001

i:/wpdata/watrpoll/permits/wolf/wolf.fct

PUBLIC NOTICE OF PROPOSED ACTION

The Administrator, Division of Environmental Protection, Carson City, Nevada is issuing the following notice of proposed action under the Nevada Revised Statutes.

The Administrator has received a complete application for a water pollution control discharge permit (NEV98018) from the following applicant:

University of Nevada - Reno Athletic Association
Wolf Run Golf Club
1400 Wolf Run Road
Reno, Nevada 89511

seeking authorization to reuse reclaimed water for golf course irrigation at an 18-hole golf course located at:

Longitude: 119° 50' W
Latitude: 39° 23' N

The applicant operates the Wolf Run Golf Club, located in south Reno, between Zollezi Lane and Arrow Creek Parkway. The course is 18-holes, covering approximately 82 acres. The reclaimed water that will be used for irrigation is going to be supplied from the Washoe County South Truckee Meadows Water Reclamation Facility. Reclaimed water quality will meet secondary treatment standards and a fecal coliform limit of 2.2 mpn/100ml.

The permit for this facility will include sampling requirements to assure maintenance of the ground water quality goals for Nevada and management tasks to control run-off of pollutants to surface waters (Whites Creek). The permit will be issued for a five (5) year period.

On the basis of preliminary review of the requirements of the Nevada Revised Statutes (NRS) as amended, and implementing regulations, the Administrator proposes to issue a permit to discharge, subject to certain effluent limitations and special conditions.

Persons wishing to comment upon or object to the proposed determinations by the Administrator regarding permit issuance or request a hearing pursuant to the Nevada Administrative Code, Water Pollution Control should submit their comments or request, in writing, within thirty (30) days of publication of the public notice by either in person or by mail to:

Department of Conservation and Natural Resources
Division of Environmental Protection
Bureau of Water Pollution Control
333 West Nye Lane
Carson City, Nevada 89706-0851
ATTN: Joe Maez

The request must be filed within the comment period and must indicate the interest of the person filing the request and the reasons why a hearing is warranted. All comments or objections received by **April 3, 2001** will be considered in the formulation of final determinations regarding the application. If written comments indicate a significant degree of public interest in the proposed permit, the Administrator shall hold a public hearing. A public notice of such hearing will be issued not less than thirty (30) days prior to the hearing date.

If no hearing is held and the determinations of the Administrator are substantially changed from the tentative determinations, the Administrator will give public notice of the revised determinations. Additional comments and objections will be considered at that time.

The application, proposed permit, comments received, and other information are on file and may be copied or copies may be obtained by writing to the above address or by calling Mr. Joe Maez, Bureau of Water Pollution Control at (775) 687-4670 ext. 3151.

Please bring the foregoing notice to the attention of all persons whom you know would be interested in this matter.

Washoe County Department of Water Resources
4930 Energy Way
Reno, NV 89502-4106
Tel: (775) 954-4600
Fax: (775) 954-4610

May 3, 2001

Department of Conservation and Natural Resources
Division of Environmental Protection
Bureau of Water Pollution Control
333 West Nye Lane
Carson City, NV 89706-0851
ATTN: Joe Maez

Subject: Reuse of Reclaimed Water at Wolf Run Golf Course

Dear Mr. Maez:

The Utility Services Division as the water purveyor of potable water has reviewed the subject application and has the following comments:

The applicant has satisfied our requirements pertaining to cross connection control. Coordinated shut down tests will be periodically required of the applicant to verify that no cross connections between the reclaim system and the potable water system have been inadvertently made.

Our other concern is protection of the groundwater and wellhead protection of the South Truckee Meadows General Improvement District wells. Today, most golf courses in Washoe County are subjected to a requirement for a "water quality management plan" reporting requirement with the special use permit conditions. This is not only for fertilizer, but inclusive of pesticide and herbicide application and storage. In the case of Wolf Run, the special use permit approval predates the implementation of that condition. Therefore, for the benefit of the wellhead protection program and as the water purveyor, we impose the following condition upon the applicant in conjunction with NDEP's approval of the "effluent management plan":

1. Location of the maintenance facilities or storage of pesticides, herbicides, solvents, fertilizers or similar materials shall be located outside the capture zone of any existing or planned well.

2. A "water quality management plan" must be developed for the golf course addressing both the protections of ground and surface waters. The plan shall be submitted to the Department of Water Resources for review and approval. Application rates of fertilizers, pest management and chemical applications shall be included. The plan shall identify location of monitoring points, schedule of sampling and parameters for analysis.

If you have any questions, please call me at 954-4649.

Sincerely,

E. Terri Svetich

E. Terri Svetich, P.E.
Licensed Engineer

ETS/

c: John Collins, P.E., Manager, Utility Services Division
Paul Orphan, P.E., Senior Utility Engineer
Ron Gribble, Wolf Run Golf Course
Nevan Kane, NDEP

Permit: NEV98018

Nevada Division of Environmental Protection

AUTHORIZATION TO DISCHARGE

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

University of Nevada-Reno Athletic Association
Wolf Run Golf Course
1400 Wolf Run Road
Reno, Nevada

is authorized to use treated effluent at a facility located at

Wolf Run Golf Course
1400 Wolf Run Road
City of Reno, Washoe County, Nevada 89511
Longitude: 119° 50' W, Latitude: 39° 23' N
Township 18 N., Range 20 E., Section 19

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 _____.

This permit and the authorization to discharge shall expire at midnight, _____.

Signed this ____ day of _____, 2001.

_____
Joseph L. Maez, P.E.
Bureau of Water Pollution Control

I:\WPFILES\BWPC\PERMITS\WOLFRUN\WOLF.PMT

PART I

Introduction: The Wolf Run Golf Course is an 18-hole course located near the Field Creek Subdivision in south Reno. The course covers 82 acres and is characterized by crossings of Steamboat Ditch and Whites Creek. Annual water usage for the course is estimated to be around 390 (126.1 million gallons) acre-feet per year.

Reclaimed water is provided by the South Truckee Meadows Water Reclamation Facility which is owned by Washoe County. This facility provides reclaimed water that meets Category C quality (NAC 445A.276) and has total nitrogen levels below 10 mg/l.

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 use reclaimed water from the South Truckee Meadows Water Reclamation Facility on the Wolf Run Golf Course

I.A.2. Flow monitoring shall be recorded at the magnetic flow meter on the irrigation delivery line prior to reuse. Reclaimed water quality shall be in accordance with the limits set forth in Permit NEV40024 for the South Truckee Meadows Water Reclamation Facility.

The discharge shall be limited and monitored by the permittee as specified below:

TABLE I.1

PARAMETERS	EFFLUENT DISCHARGE LIMITATIONS		MONITORING REQUIREMENTS	
	30 Day Annual Average	Monthly Maximum	Measurement Frequency	Sample Type
Flow, Million Gallons per Month (MGM)	M & R	M & R[3]	Continuous	Flow meter
Annual Application Volume (AF)	424 Acre-Feet (AF) (Volume determined from Consumptive Use Balance)[2]		Cumulative	Flow Meter
Fecal Coliform[1] (CFU, MPN)	2.2 CFU (MPN)/100 ml	23 CFU(MPN) /100 ml	Weekly	Discrete

1 Sample results to be recieved from NEV40024. Permittee does not need to provide this data.
2. Annual application volume is based upon 110% of the application volume determined in the EMP.
3. Monthly application rates in the EMP should be used as a guide.

I.B. EFFLUENT MANAGEMENT

I.B.1. The irrigation storage pond, distribution system, and ancillary facilities shall be operated in accordance with the Effluent Management Plan (EMP). The EMP must be submiteed to this Division within 90 days of permit issuance. The EMP shall contain the information required to comply with this permit. It is recommended that the Permittee utilize "WTS-1B: General Criteria for Preparing an Effluent Management Plan" (NDEP 2000), as a guidance 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 affected personnel. Copies shall be included in the EMP.

I.B.3. If the actual annual application volume exceeds the calculated annual application limit, the Permittee shall prepare a report which includes an evaluation of the application rates in the EMP, an explanation of conditions (overseeding, reseeding, weather conditions, etc.) which led to the exceedance, and any planned changes the Permittee deems necessary. This evaluation shall be submitted with the quarterely discharge monitoring report (DMR).

I.B.4. The effluent irrigation system and effluent storage pond shall not cause objectionable odors on or off the site.

I.B.5. The irrigation system, storage pond, 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.6. The irrigation areas and the storage pond shall be posted with conspicuous warning signs clearly stating that reclaimed water is utilized and to avoid contact. Ancillary equipment used for effluent shall be clearly marked to indicate use with effluent. Notification signs shall be placed at the First and Tenth Tee's.

I.B.7. Drinking water fountains shall be covered during effluent irrigation.

I.B.8. Irrigation of the golf course shall be performed in such a manner as to reduce standing water to a minimum and to prevent run-off of effluent to any creeks or ditches.

I.B.9. The permittee shall maintain a 2-foot minimum freeboard in the storage pond.

I.B.10. 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 reuse as detailed in the schedule of compliance.

I.B.11. All terms and conditions stated herein shall not supercede the requirements of the Nevada Division of Water Resources.

I.C. GENERAL CONDITIONS

I.C.1. There shall be no discharge of substances that would cause a violation of water quality standards of the State of Nevada.

I.C.2. The permittee shall remit an annual review and services fee in accordance with NAC 445A.232 starting **July 1, 2001** and every year thereafter until the permit is terminated.

I.C.3. The Discharge Monitoring Reports (DMRs) must be signed by the facility's highest ranking officer. 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. Item I.B.3 of this permit must be addressed in the DMRs.

I.D. SCHEDULE OF COMPLIANCE

I.D.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 flow monitoring requirements upon issuance of the permit.

b. A final Effluent Management Plan (EMP) shall be prepared by a qualified professional and submitted to the Division within (90 days of permit issuance/date).

c. **Prior to use of treated effluent,** the Permittee shall submit the cross-connection control documentation required by part I.B.10.

I.E. MONITORING AND REPORTING

I.E.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.E.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 annual application volume. If the annual application volume exceeds the limit listed in Table I.1, an evaluation shall be submitted with the fourth quarter report in accordance with the requirements listed in permit condition I.B.3.

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

b. Quarterly Report

i. 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, 2001). 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 - Jennifer McMartin
333 West Nye Lane
Carson City, Nevada 89706-0851

ii. If the monthly maximum volume exceeds the limit listed in Table I.1, an evaluation shall be submitted with the fourth quarter report in accordance with the requirements listed in permit condition I.B.3.

I.E.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.

g. "cfu" means colony forming units.

I.E.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.E.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.E.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.E.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.E.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.E.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, conveyance facilities, or holding ponds 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:

(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.

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:

(1) The facility was at the time being properly operated as required in paragraph II.A.2. above; and

(2) 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.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. **Storage Pond Conditions**

If any effluent is placed in ponds, such 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 the once-in-one-hundred year flood of said location without physical damages to berms and other pond structures;

c. prevent escape of treated effluent by leakage other than as authorized by this permit;

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

PUBLIC NOTICE OF PROPOSED ACTION

The Administrator, Division of Environmental Protection, Carson City, Nevada is issuing the following notice of proposed action under the Nevada Revised Statutes.

The Administrator has received a complete application for a water pollution control discharge permit (NEV98018) from the following applicant:

University of Nevada - Reno Athletic Association
Wolf Run Golf Club
1400 Wolf Run Road
Reno, Nevada 89511

seeking authorization to reuse reclaimed water for golf course irrigation at an 18-hole golf course located at:

Longitude: 119° 50' W
Latitude: 39° 23' N

The applicant operates the Wolf Run Golf Club, located in south Reno, between Zollezi Lane and Arrow Creek Parkway. The course is 18-holes, covering approximately 82 acres. The reclaimed water that will be used for irrigation is going to be supplied from the Washoe County South Truckee Meadows Water Reclamation Facility. Reclaimed water quality will meet secondary treatment standards and a fecal coliform limit of 2.2 mpn/100ml.

The permit for this facility will include sampling requirements to assure maintenance of the ground water quality goals for Nevada and management tasks to control run-off of pollutants to surface waters (Whites Creek). The permit will be issued for a five (5) year period.

On the basis of preliminary review of the requirements of the Nevada Revised Statutes (NRS) as amended, and implementing regulations, the Administrator proposes to issue a permit to discharge, subject to certain effluent limitations and special conditions.

Persons wishing to comment upon or object to the proposed determinations by the Administrator regarding permit issuance or request a hearing pursuant to the Nevada Administrative Code, Water Pollution Control should submit their comments or request, in writing, within thirty (30) days of publication of the public notice by either in person or by mail to:

Department of Conservation and Natural Resources
Division of Environmental Protection
Bureau of Water Pollution Control
333 West Nye Lane
Carson City, Nevada 89706-0851
ATTN: Joe Maez

The request must be filed within the comment period and must indicate the interest of the person filing the request and the reasons why a hearing is warranted. All comments or objections received by **April 3, 2001** will be considered in the formulation of final determinations regarding the application. If written comments indicate a significant degree of public interest in the proposed permit, the Administrator shall hold a public hearing. A public notice of such hearing will be issued not less than thirty (30) days prior to the hearing date.

If no hearing is held and the determinations of the Administrator are substantially changed from the tentative determinations, the Administrator will give public notice of the revised determinations. Additional comments and objections will be considered at that time.

The application, proposed permit, comments received, and other information are on file and may be copied or copies may be obtained by writing to the above address or by calling Mr. Joe Maez, Bureau of Water Pollution Control at (775) 687-4670 ext. 3151.

Please bring the foregoing notice to the attention of all persons whom you know would be interested in this matter.

NEVADA DIVISION OF ENVIRONMENTAL PROTECTION
FACT SHEET
(pursuant to NAC 445A.236)

Permittee: University of Nevada-Reno Athletic Association

Permit Number: NEV98018

Description of Discharge:

Use of reclaimed water for irrigation at the Wolf Run Golf Course. Reclaimed water meets Category C (NAC445A.276) standards. Reclaimed water is going to be supplied by the South Truckee Meadows Water Reclamation Facility.

Location: 1400 Wolf Run Road, Reno

Latitude: 39° 23' N
Longitude: 119° 50' W

Golf Course is located in southwest Reno, between Zollezi Lane and Arrow Creek Parkway

Operation Description:

The Wolf Run Golf Course is switching from irrigation with surface water from Whites Creek and Steamboat Ditch to irrigation with reclaimed water. The course consists of 18-holes plus a driving range, covering a total area of approximately 82 acres. It is characterized by Whites Creek traversing through the course area.

Flow: The average annual application rate at the course is 390 acre-feet (126 million gallons). The peak usage month is July, with an average monthly demand of 26 million gallons. Irrigation will occur from mid- March to mid- October.

Quantities:

Following is a list of the parameters to be monitored in the effluent from this facility.

Flow (via influent flow meter)

Reclaimed water quality data is supplied by the South Truckee Meadows Water Reclamation Facility owned by Washoe County. This facility is permitted under NEV40024. Permit limits and historical averages are:

Parameter	Permit Limits	Historical Average
CBOD	30 mg/l	4 mg/l
TSS	30	5 mg/l
Fecal Coliform:	2.2 mpn/100ml	2 mpn/100ml
TKN-N	No Limit	2.0 mg/l
Nitrate-N	No Limit	2.0 mg/l

Receiving Water Characteristics:

The application of reclaimed water shall be conducted to reduce the potential of discharge to surface waters and ground waters. Depth to ground water is approximately 150 feet.

Procedures for Public Comment:

The Notice of the Division's intent to issue a permit authorizing the facility to discharge to the surface water of the State of Nevada subject to the conditions contained within the permit, is being sent to the **Reno-Gazette Journal** for publication. The notice is being mailed to interested persons on our mailing list. Anyone wishing to comment on the proposed permit can do so in writing for a period of 30 days following the date of publication of the public notice. All comments must be received by 5:00 PM ***April 3, 2001***. The comment period can be extended at the discretion of the Administrator.

A public hearing on the proposed determination can 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 be filed within the comment period and must indicate the interest of the person filing the request and the reasons why a hearing is 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 determined to be appropriate. All public hearings must be conducted to 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 Determination:

The Division has made the tentative determination to issue the proposed permit.

Proposed Effluent Limitations, Schedule of Compliance, and Special Conditions

See proposed permit.

Rationale for Permit Requirements:

Part I.A.1. - This part of the permit includes the limitation and monitoring requirements for the discharge.

FLOW - The flow quantity in the permit is based upon the water requirement determined for the course irrigation. The annual volume of water applied is given a limit of 424 acre-feet. Monthly maximum limits are based upon the monthly water requirement determined in the water budget with a 10% exceedance factor.

Reclaimed water will be applied in a manner to minimize ponding and prevent run-off from the site. Irrigation after a significant rainfall event will not be conducted.

TOTAL SUSPENDED SOLIDS- The limit of 30 mg/l is met by NEV40024

BOD5 - The limit of 30 mg/l is met by NEV40024

FECAL COLIFORM- The limit of 2.2/100 ml is met by NEV40024

pH - The limit of 6 to 9 S.U. is met by NEV40024

NITROGEN- A nitrogen budget will be conducted each year as part of the effluent management plant (EMP). This budget will help to control the amount of nitrogen entering the subsurface.

Prepared by: Joseph Maez
February 2001

i:/wpdata/watrpoll/permits/wolf/wolf.fct

Pezonella Associates, Inc.
Geotechnical & Environmental Engineers & Geologists
520 EDISON WAY • RENO, NEVADA 89502 • (775) 856-5566
FAX • (775) 856-6042

June 23, 2000
Job No. 2281.17-B

Golf Vision
1400 Wolf Run Road
Reno, Nevada 89511

Attn: Mr. Ron Gribble

Nevada Groundwater Discharge Permit Application and Attachments
Wolf Run Golf Course
1400 Wolf Run Road
Reno, Nevada

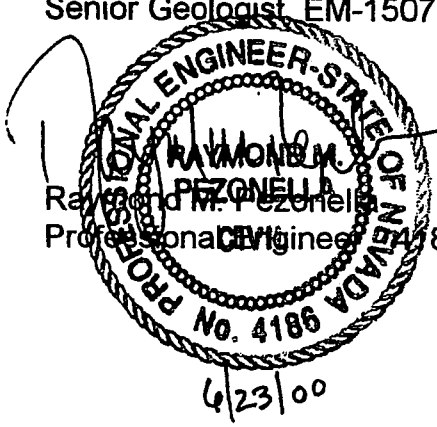
Please find attached a *Nevada Groundwater Discharge Permit Application* for the use of treated effluent for irrigation at the Wolf Run Golf Course. In addition to the *Application*, this packet includes attachments concerning site-specific issues raised during the investigation phase of the project. The *Application* and attachments should be forwarded to the Nevada Division of Environmental Protection for review.

We appreciate having been selected to prepare this application and trust that the results meet your needs at this time. If you have any questions or require further information, please do not hesitate to contact us.

Respectfully,

PEZONELLA ASSOCIATES, INC.

John H. Johnson
Senior Geologist, EM-1507



Raymond M. Pezonella
Professional Civil Engineer #4186

EFFLUENT DISCHARGE REPORT TO ACCOMPANY

NEVADA GROUNDWATER DISCHARGE PERMIT APPLICATION

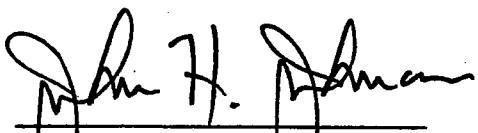
WOLF RUN GOLF COURSE

RENO, NEVADA

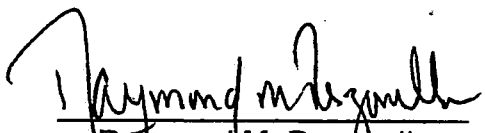
Prepared For

Golf Vision
1400 Wolf Run Road
Reno, Nevada 89511

By



John H. Johnson
Senior Geologist, EM - 1507



Raymond M. Pezonella
Professional Engineer - 4186

Pezonella Associates, Inc.
520 Edison Way
Reno, Nevada 89502
(775) 856-5566

June 23, 2000

Job No. 2281.17-B

CONTENTS

TABLES

I. Introduction:

Wolf Run Golf Course is located at 1400 Wolf Run Road, Reno, Washoe County, Nevada (Property). The Property lies between Zolezzi Lane to the north and Arrowcreek Parkway to the south. It is approximately one mile west of South Virginia Street. The Property lies entirely within Section 19, Township 18 North, Range 20 East, Mount Diablo Baseline & Meridian, and is on the *Mount Rose NE Quadrangle*, of the United States Geological Survey (USGS) 7.5-minute topographic map series.

The Property lies in the eastern foothills of the Carson Range, near the boundary between the Sierra Nevada and the Basin Ranges. Regionally, the geology is composed of regionally and thermally metamorphosed and eroded basement rocks overlain by Cenozoic age volcanic and sedimentary rocks. Basement rocks are most likely Mesozoic in age. Regional Cenozoic igneous rocks are present in the form of the Hartford Hill rhyolite tuff, the Alta Formation, the Davidson Granodiorite, and the Kate Peak Formation. The sedimentary, Pliocene age Truckee Formation was deposited in structural basins in and around the volcanic hills. The later volcanic events including the Lousetown Formation were probably completed by late Pliocene or early Pleistocene time. At least four glaciation events occurred in the Carson Range, depositing along the range front the alluvium and landslide debris on which the golf course now rests (Thompson & White, 1964).

The golf course was built in 1996 and includes approximately 81 acres of irrigated turf. Water for culinary and irrigative uses is currently supplied through Washoe County, and is supplemented with water from the Steamboat Ditch and White's Creek, both of which flow through the Property. It is, however, the intention of Washoe County Utility Services Division to conserve the potable water supply for domestic use, and see the golf course use reclaimed water for irrigation. The source of the reclaimed water will be the South Truckee Meadows Sewer Treatment Plant currently in operation on Arrowcreek Parkway, a few hundred yards southeast of the golf course. The use of reclaimed water for irrigation is addressed in the Nevada Administrative Code (NAC) 445A.275 to 445A.280 inclusive. General requirements and restrictions for reclaimed water use include the approval of an effluent management plan, and acquisition of a discharge permit in compliance with NAC 445A.228 to 445A.263, inclusive. This report presents information regarding issues concerning the use of treated effluent at Wolf Run Golf Course, and is submitted in support of the application for a discharge permit.

Wolf Run is an 18-hole championship golf course that includes approximately 3.5 acres of bent grass (*Argrostis capillaris*); 18 acres of rye grass (*Lolium perenne*), and 59.5 acres of a blue grass (*Poa pratensis*) and rye grass blend. Approximately 4,500 feet of White's Creek flows through the eastern portion course from south to north. Approximately 4,200 feet of the Steamboat Ditch flows through the north half of the Property from west to east. The ditch carries water only part of each year, typically May through October. White's Creek crosses the Steamboat Ditch through a corrugated steel culvert near the center of the golf course. A

pond used to store irrigation water is also located in this area, near the center of the golf course. The location of the Property is depicted on Plate 1. Details of the Property are depicted on Plates 2 & 3. An aerial photograph of the golf course is attached.

II. Issues of Concern:

A *Nevada Groundwater Discharge Permit Application Form* and fee in the name of the Wolf Run Golf Club at Fieldcreek Ranch were submitted to the Nevada Division of Environmental Protection, Bureau of Water Pollution Control on September 3, 1998. Review and assessment of the *Application* raised a number of issues related to the use of reclaimed water at the Property. These issues include: the proximity of culinary water supply wells and White's Creek to areas of proposed reclaimed water use; the location of the irrigation storage reservoir within the 100-year floodplain; and the differentiation of stormwater discharge to White's Creek between runoff from Fieldcreek Ranch and Wolf Run Golf Course. It is the purpose of this document to address these issues in a manner sufficient to satisfy the requirements of the Bureau of Water Pollution Control and allow the discharge permit to be issued.

A. Water Supply Wells

According to documentation available from the NDEP Bureau of Water Quality Planning, the State Wellhead Protection Program "...is a voluntary program that encourages local governments, communities, and utility companies to take systematic preventative measures to protect their underground drinking water sources. The basic idea of wellhead protection is to reduce the risk of ground water contamination by managing potential sources of contamination. A community must determine the land surface area around a water supply well, called the wellhead protection area (WHPA), that should be protected. Before a plan or program can be developed, it is important to identify the existing and potential threats to the ground water. Then the WHPA should be managed to protect the ground water."

On and adjacent to the golf course are three water supply wells operated by the South Truckee Meadows General Improvement District (STMGID). One of the wells (STMGID #3) is located on the golf course property north of the irrigation pond near the crossing of White's Creek and the Steamboat Ditch. The other two wells are located off the golf course property, slightly to the east. Well STMGID #1 is located immediately south of Zolezzi Lane, approximately 500 feet east of the 11th green. Well STMGID #2 is located approximately 2,000 feet south of Zolezzi Lane, and approximately 600 feet east of the 13th tee.

It is our understanding that the lead agency for the State Wellhead Protection Program as it may relate to the STMGID wells and the Wolf Run Golf Course is the Washoe County Department of Water Resources (WCDWR). As part of this investigation, that agency was contacted concerning possible WHPA issues arising from the proposed use of treated

effluent at the Property. WCDWR personnel indicated that the presence of the STMGID wells on and adjacent to the golf course does not preclude the use of treated effluent. WCDWR requested an accounting of fertilizers regularly used at the golf course that they can be identified and monitored at the Property and its environs.

STMGID #3 is on golf course property. Both STMGID #1 and STMGID #2 are hydraulically downgradient of portions of the golf course. A map prepared by WCDWR indicating approximate 2-year, 5-year, and 10-year capture zones for the STMGID wells is attached as Plate 4. In addition to golf course property, the capture zones indicated on the WCDWR map also include approximately 150 residential lots and 1½ miles of streets in the Fieldcreek development.

An investigation into the lithology and construction of the STMGID wells was recently conducted at the Nevada Division of Water Resources office in Carson City, Nevada. According to records at that office, the three STMGID wells were drilled and installed by Charles Sargent Irrigation, Inc. in 1984. Lithologic and well construction details are included below. Copies of the well logs obtained from the Office of the State Engineer in Carson City are attached.

Records concerning fertilizer use on the golf course during the past year were obtained from Wolf Run Golf Course personnel. That information is also detailed below.

1. Lithology and Well Construction

The boring for well STMGID #1 was installed in March, 1984 and was drilled to a total depth of 620 feet. The well was installed to a total depth of 530 feet. It is 12-inches in diameter, and is screened from 260 to 520 feet below land surface. It was tested to 600 gallons per minute with a drawdown of 110 feet after 48 hours. The lithology is consistent with the expected fan-type deposit – a mixture of material sizes from silts and sands to boulders. The well driller's log notes water-bearing strata from approximately 200 to 540 feet below land surface. The well has a surface seal of 54 feet.

The boring for well STMGID #2 was installed in April, 1984 and was drilled to a total depth of 715 feet. The well was installed to a total depth of 515 feet. It is 22-inches in diameter, and is screened from 255 to 505 feet below land surface. It was tested to 179 gallons per minute with a drawdown of 92½ feet after 23½ hours. The lithology is similar to that from STMGID #1. The well driller's log notes water-bearing strata from approximately 135 to 680 feet below land surface. The well has a surface seal of 88 feet.

The boring for well STMGID #3 was installed in August and September, 1984 and was drilled to a total depth of 590 feet. The well was installed to a total depth of 580 feet. It is 14-inches in diameter, and is screened from 240 to 580 feet below land surface. It was tested to 385 gallons per minute, and had a drawdown of 73 feet after 43½ hours at 300 gallons per

minute. The lithology of the materials encountered in STMGID #3 includes finer material than that from STMGID #1 and #2. similar to that from STMGID #1. The well driller's log notes water-bearing strata from approximately 135 to 680 feet below land surface. The well has a surface seal of 88 feet.

The *Mt. Rose NE Quadrangle Geologic Map* (Bonham & Rogers, 1983) indicates the Property is located on Quaternary period fan sediments. The vast majority of the Property, including the three STMGID wells, is located on *Qdm*, or Donner Lake Outwash – Mount Rose Fan Complex. This unit is composed of "pediment and thin fan deposits from major streams draining alpine glaciers on Mount Rose; brown to brownish-gray, sandy, muddy, poorly sorted large pebble gravel; cobbles and small boulders common. Clasts dominantly volcanic (porphyritiic andesite and latite); surface granitic clasts rare. Deeply weathered, strongly developed soil profile...well cemented and/or hydrothermally altered in Steamboat Hills area."

A thin strip of alluvial bajada deposit (*Qa*) is present on the Property along the bed of White's Creek. Bonham & Rogers describe this deposit as "thin sheet-like aprons of fine- to medium-grained clayey sand and intercalated muddy, medium pebble gravel; deposits of low gradient streams that reworked older gravelly outwash and alluvial fan deposits; weakly weathered and largely undissected. Little or no soil development (entisols)."

At the south boundary of the Property, where White's Creek enters the golf course, is a wedge of *Qtm*, or Tahoe Outwash – Mount Rose Fan Complex. This unit is described as "glacial outwash stream deposits of volcanic and granitic composition; light yellowish- to orange-brown; sandy large cobble to boulder gravel containing characteristically fresh granitic lag gravel. Strongly developed 1 m (3 ft) thick soil profile; dark yellowish-brown, prismatic argillic B-horizon; typically no siliceous or calcic duripan development; granitic boulders partly to thoroughly decomposed where buried in soil. Deposits locally only thin veneers; some undifferentiated areas."

Studies completed by the U.S. Department of Agriculture Soil Conservation Service, indicate that the native soils at the Property are predominantly of the Oest Series. This is a deep, well-drained soil on terraces, alluvial fans, and escarpments formed in alluvium derived from mixed rock sources. Oest Series soil on the golf course prior to construction would typically have had 15 to 50 percent of the surface covered with stones. The surface layer is a grayish-brown extremely stony to very bouldery sandy loam 8 to 15 inches thick. The subsoil is a brown very gravelly sandy loam approximately 25 to 32 inches thick. The substratum is a pale brown very gravelly loamy sand that extends to approximately 60 inches (Soil Conservation Service, 1983).

2. Fertilizer Use

As mentioned above, the golf course consists of approximately 81 irrigated acres. These acres are planted with three types of grass. Greens (3.5 acres) are bent grass; tee boxes (18 acres) are rye grass; fairways (59.5 acres) are a blue grass/rye grass blend. Each of these grass types is fertilized at different rates. The fertilizing season at Wolf Run Golf Course normally starts in March and extends through October. Greens are fertilized on a two-week interval from March through October for a total of sixteen fertilizing episodes. Tees are fertilized every three weeks from April through October for a total of approximately ten fertilizing episodes. Fairways are fertilized monthly from April through October for a total of seven fertilizing episodes. Fertilizers include a wide variety of brands and nitrogen sources. Both organic and synthetic fertilizers are consistently used.

Fertilizers are generally identified by the nitrogen, phosphorus, and potassium (NPK) content as the primary components. For example, a fertilizer identified as 24-5-11 contains 24% nitrogen, 5% phosphorus, and 11% potassium. Secondary nutrients include calcium, magnesium, sulfur, iron, manganese, boron, zinc, copper, and chlorine. Fertilizer application rates are determined by the amount of nitrogen desired for each grass type. According to information provided by Wolf Run Golf Course personnel, greens are fertilized at a rate of one-half pound nitrogen per 1,000 square feet of turf per fertilizing episode. Tees and fairways are fertilized at a rate of one pound nitrogen per 1,000 square feet of turf per fertilizing episode. During the past year, fertilizer formulations used on greens included 6-2-0, 14-2-14, 13-2-13, 19-5-19 and 5-11-0. Formulations used on tees included 25-5-11, 14-2-14, 21-0-0, 25-5-5, 16-6-8, 15-15-15, and 6-2-0. Formulations used on fairways included 24-5-11, 21-0-0, 25-5-5, 16-6-8, and 15-15-15. The table below summarizes fertilizer use over the past year at Wolf Run Golf Course.

Table 1: Approximate annual nitrogen application rate

	Acres	*Square feet (1000's)*	*Nitrogen per 1000 square feet (pounds)*	*Total Nitrogen per fertilizing episode (pounds)*	*Fertilizing episodes per year*	*Total Nitrogen per year (pounds)*
Greens	3.5	152	0.5	76	16	1,216
Tees	18	784	1.0	784	10	7,840
Fairways	59.5	2,592	1.0	2,592	7	18,144
TOTAL						**27,200**

The approximate amount of phosphorus and potassium applied to the golf course over the past year can be estimated from the fertilizer formulations and the nitrogen application rate. Since the exact weight of each formulation used over the past year is not known, an average phosphorus and potassium weight percent is used in the calculations. The average weight percent nitrogen was calculated for each grass type. The number of pounds of fertilizer applied to arrive at the required weight of nitrogen was then calculated. The weight of

phosphorus and potassium for that weight of fertilizer was used to estimate annual phosphorus and potassium application rates. Tables summarizing those calculations are included below.

Table 2: Normalized annual weight of fertilizer

	Annual Nitrogen requirement (pounds)	*Average fertilizer Nitrogen concentration (%)*	*Weight of fertilizer required to provide annual Nitrogen requirement (pounds)*
Greens	1,216	11	11,054
Tees	7,840	17	46,117
Fairways	18,144	20	90,720

Table 3: Approximate annual phosphorus and potassium application rates

	Normalized annual weight of fertilizer (pounds)	*Average fertilizer Phosphorus concentration (%)*	*Average fertilizer Potassium concentration (%)*	*Total Phosphorus per year (pounds)*	*Total Potassium per year (pounds)*
Greens	11,054	4	9	442	995
Tees	46,117	5	8	2,305	3,689
Fairways	90,720	6	8	5,443	7,258
TOTAL				**8,190**	**11,942**

Based on the calculations presented above, it appears that approximately 27,200 pounds of nitrogen, 8,200 pounds of phosphorus, and 11,900 pounds of potassium were delivered to the golf course turf through fertilizer application last year.

B. White's Creek

White's Creek rises from White's Canyon on the north flank of Mt. Rose in the Carson Range. There are also contributions from drainages on the east flank of Alpine Walk Peak immediately north of Mt. Rose. The creek debouches onto the Pre-Lake Lahontan alluvial fan approximately ½-mile north of the Mt. Rose Highway (Nevada 431), and flows slightly north of east in a single channel for approximately 3 miles. The natural channel divides into four smaller channels at this point in the eastern portion of Section 30, Township 18 North, Range 20 East at White's Creek Park. However, a concrete flow control structure restricts creek flow into just two of the channels. One of these flows north-northeast along the base of a small bluff for approximately ½ mile before passing through culverts under Arrowcreek Parkway and onto the Wolf Run Golf Course.

The NAC defines water quality standards for various bodies of water in the State of Nevada. *Class B waters* are defined in NAC 445A.125 as "waters of portions of waters which are

located in areas of light or moderate human habitation, little industrial development, light-to-moderate agricultural development and where the watershed is only moderately influenced by man's activity. Class B waters include standards for floating and settleable solids, sludge deposits, sewage, industrial wastes, odor-producing substances, toxic materials, pH, dissolved oxygen, temperature, fecal coliform, phosphates, and total dissolved solids. The definition of Class B waters from NAC 445A.125 is attached.

White's Creek is designated as Class B waters from below the east line of Section 33, Township 18 North, Range 19 East, Mount Diablo Baseline & Meridian. This designation includes the portions of the creek present on the Wolf Run Golf Course.

Wolf Run Golf Course was provided with analytical data by WCDWR from water samples collected from the South Truckee Meadows Sewer Treatment Plant (STMWTP). The data includes temperature, pH, biochemical oxygen demand, carbonaceous biochemical oxygen demand, total suspended solids, fecal coliform, nitrogen as ammonia, nitrogen as nitrate, total kjeldahl nitrogen, and total phosphorus. The samples were collected and analyzed between April, 1997 and March, 1998. Ditch temperatures did not exceed 70 degrees Fahrenheit during the period over which data is available. The pH did not exceed 8.0 or fall below 7.1. Samples were analyzed for nitrogen and phosphorus on a monthly basis. The table below lists the analytical results for pH, fecal coliform, total coliform, total nitrogen, and total phosphorus. Total nitrogen is composed of nitrite, nitrate, ammonia, and organic nitrogen. Where total nitrogen was not explicitly stated on the laboratory report, it was calculated. Laboratory reports are attached.

Table 4: South Truckee Meadows Sewer Treatment Plant effluent analytical data April, 1997 through March, 1998

Date	*pH*	*Fecal Coliform (#/100ml)*	*Total Coliform (MPN/100ml)*	*Total Nitrogen (mg/l)*	*Total Phosphorus (mg/l)*
4/1/97	7.5	2			
4/7/97		<2		1.4	3.44
4/8/97	7.7				
4/15/97		<1			
4/25/97		<1			
4/29/97	7.6	<1			
5/1/97				4.1	4.05
5/5/97		<1			
5/6/97	7.4				
5/13/97	7.6	<1			
5/19/97		<1			
5/20/97	7.6				
5/27/97	7.4	<1			
6/3/97	7.6				
6/5/97		<1			3.9

Table 4: South Truckee Meadows Sewer Treatment Plant effluent analytical data April, 1997 through March, 1998 (continued)

Date	pH	Fecal Coliform (#/100ml)	Total Coliform (MPN/100ml)	Total Nitrogen (mg/l)	Total Phosphorus (mg/l)
6/9/97		<1			
6/10/97	7.6				
6/16/97		<1			
6/17/97	7.5				
6/24/97	7.7				
6/25/97		<1			
6/30/97		<1			
7/1/97	7.8			3.0	3.3
7/7/97		<1			
7/8/97	7.6				
7/15/97	7.6	<1	5.1		
7/21/97		<1	9.2		
7/22/97	8.0				
7/28/97		1	23		
7/29/97	7.4				
8/5/97	7.7				
8/6/97		1	3.6	6.4	4.04
8/12/97	7.6				
8/13/97		<1	<2		
8/19/97	7.7				
8/22/97		<1	<2		
8/25/97		<1	<1.1		
9/2/97	7.6	<1	2.2		
9/8/97		4	12		
9/9/97	7.8				
9/16/97		<1	<1.1		
9/18/97	7.5				
9/23/97		1.1	6.9	2.9	3.68
9/25/97	8.0				
10/2/97	7.4			3.2	4.2
10/6/97		1.1	5.1		
10/9/97	7.5				
10/14/97		<1	2.2		
10/16/97	7.5				
10/22/97		4	<1.1		
10/23/97	7.5				
10/29/97	7.6				
11/5/97		<1.1	2.2		
11/6/97	7.1				
11/10/97		<1.1	2.2	1.41	3.73
11/13/97	7.8				
11/17/97		<1	6		
11/20/97	7.5				
11/25/97		<2			
11/27/97	7.8				
11/28/97	7.8				

Table 4: South Truckee Meadows Sewer Treatment Plant effluent analytical data April, 1997 through March, 1998 (continued)

Date	*pH*	*Fecal Coliform (#/100ml)*	*Total Coliform (MPN/100ml)*	*Total Nitrogen (mg/l)*	*Total Phosphorus (mg/l)*
12/1/97		1			
12/3/97	7.6			3.34	2.33
12/9/97		4.7			
12/11/97	7.7				
12/15/97		<1.1			
12/18/97	7.5				
12/22/97		<1			
12/26/97	7.4				
12/30/97		3			
1/5/98		<1			
1/9/98	7.4				
1/12/98		<1.1		2.51	2.33
1/15/98	7.7				
1/22/98	7.6				
1/23/98		8			
1/27/98		3			
1/29/98	7.6				
2/3/98		<1.1			
2/6/98	7.5				
2/10/98		<1.1			
2/12/98	7.7				
2/16/98		1		1.9	4.53
2/19/98	7.7				
2/24/98		<1			
2/26/98	7.8				
3/2/98		1			
3/5/98	7.5				
3/9/98		<2		2.48	4.45
3/10/98		<1			
3/12/98	7.4				
3/19/98	7.6				
3/26/98		<1			
3/30/98		<1			

The average total nitrogen concentration over the period was 2.47 mg/l. The average phosphorus concentration over the same period was 3.67 mg/l.

The irrigation schedule at Wolf Run Golf Course generally runs from March through October. During the 1999 irrigation season, the golf course used approximately 130 million gallons of water. A table indicating daily and monthly averages for that season is below.

Table 5: Wolf Run water use during 1999 irrigation season

Month	*Water Use (gallons)*	*Daily Average (gallons)*
January	0	0
February	0	0
March	2,350,000	76,000
April	3,750,000	125,000
May	19,200,000	619,000
June	22,600,000	753,000
July	28,100,000	906,000
August	25,500,000	823,000
September	17,100,000	570,000
October	9,300,000	300,000
November	2,500,000	83,000
December	666,000	21,000
TOTAL	**131,066,000**	**359,000**

The average concentrations of nitrogen and phosphorus from Table 4 and the volume of water used during the 1999 irrigation season can be used to calculate the amount of those nutrients available to the irrigated turf from effluent supplied by the STMWTP. Table 6 below summarizes the calculation and estimates the weights of nitrogen and phosphorus from the proposed effluent use.

Table 6: Annual nitrogen and phosphorus available from effluent

Gallons/year	*liters/year*	*Total N (mg/l)*	*Total P (mg/l)*	*N (mg)*	*P (mg)*	*N (lbs.)*	*P (lbs.)*
131,066,000	496,138,780	2.47	3.67	1,225,462,789	1,820,829,326	2,702	4,014

Based on fertilizer application rate and water use information from the 1999 season, and available analytical data from STMWTP, it appears that approximately one-tenth of the nitrogen demand and one-half of the phosphorus demand can be supplied through the use of treated effluent on the golf course.

1. Sprinkler Use

Irrigation cycles at Wolf Run are from 9:00 PM to 7:00 AM seven days per week. Hand watering is done during the day on an as-needed basis. The irrigation system consists of approximately 2,000 valve-in-head sprinklers using 62 controllers separated into 4 separate zones. Sprinkler times range from 3 to 25 minutes per station depending on evapotranspiration rates.

A variety of sprinklers are in use at the golf course. Communication with representatives of Wolf Run indicate that the majority are manufactured by Toro Irrigation Products, and are the 650/670 Series or equivalent. At this writing, most of the sprinklers are of the full-circle type.

Based on information published by the manufacturer and provided by Wolf Run Golf Course personnel, the sprinklers each distribute water at approximately 40 gallons per minute (gpm).

At this writing, approximately 100 of the sprinkler heads are within a water distribution radius of White's Creek. Irrigation water can consequently be introduced directly to the creek during watering cycles. These sprinklers will eventually be changed by the golf course to half- or quarter-circles to prevent irrigation water discharge to the creek.

At a sprinkler rate of 40 gpm, 100 sprinklers distribute 4,000 gpm. A sprinkler cycle of 20 minutes per day through a 10 month irrigation season would yield approximately 4,500 minutes of irrigation, or a total of 24 million gallons. Should 10% of the irrigation water be discharged directly to White's Creek, approximately 2.4 million gallons enter the creek through irrigation. Using the average concentration of phosphorus from above, this equates to an annual contribution of approximately 74 pounds of phosphorus to White's Creek from irrigation with treated effluent. Using the low average flow rate of 6.5 cfs from the USGS gaging station data (see *Irrigation Schedule*, below), over the 10-month irrigation season this 74 pounds would be distributed through approximately 1.5 billion gallons of water. Evenly distributed over this time frame, the average concentration would be approximately 0.007 mg/l, approximately 3 orders of magnitude below the total phosphates limit for Class B waters from NAC 445A.125. It is our opinion that this is a conservative estimate in that we have used a relatively long sprinkler cycle time (20 minutes per station), a relatively low flow rate for White's Creek (6.5 cfs). Should the calculation be performed at a sprinkler cycle time of 25 minutes with 100% of the flow entering White's Creek, The average phosphorus concentration over the 10-month irrigation season would still be only approximately 0.08 mg/l. Calculation sheet is attached.

1. Run-off & Storm Drains

As can be see on the Plates, White's Creek is downslope from the majority of the golf course and will therefore receive run-off from the golf course during storm or flood events. Irrigation is performed in such a manner as to minimize run-off of irrigation water to the creek.

The portion of White's Creek that flows through the Wolf Run Golf Course also receives stormwater from the Fieldcreek Ranch subdivision. There are four outfalls from the subdivision into the creek on the golf course. The upstream outfall is located near the south property line on the creek at the bank supporting Arrowcreek Parkway. The second is located approximately 1,000 feet downstream, adjacent to the 15th fairway. The third outfall is located immediately east of the storage reservoir. The downstream outfall is located approximately 500 feet farther downstream, near the White's Creek crossing between the 12th and 18th holes.

Dissolved or suspended material entering White's Creek during precipitation events on the Wolf Run Golf Course can therefore be attributable to both the golf course and the subdivi-

sion. Should it be desirable to differentiate between contributions from the golf course and the subdivision, surface water sampling should be performed. Background samples can be collected at the upstream entrance of White's Creek to the golf course. Additional sampling can occur along the reach of the creek near the stormwater outfalls. During a precipitation event, the sampling can be duplicated, with additional samples collected directly from outfall discharge to the creek.

C. Storage Reservoir

Near the center of the golf course property is a storage reservoir used as a distribution point for irrigation water. The reservoir is located very near the crossing of Steamboat Ditch by White's Creek. Information provided by Wolf Run Golf Course personnel indicates the reservoir has a usable capacity of is approximately 2 million gallons. Water is introduced to the reservoir through either a gate from Steamboat Ditch or through a diversion from White's Creek. Should effluent use be approved at the golf course, effluent will be supplied through a pipeline from the STMWTP. Construction on the line is scheduled to start this fall and should be completed by December 31, 2000.

The Federal Emergency Management Agency (FEMA) administers the National Flood Insurance Program. Part of this program includes the identification and delineation of Special Flood Hazard Areas. These areas are those that are inundated by a 100-year flood, which is a flood volume that has a 1% chance of occurring during any year. Special Flood Hazard Areas are identified on Flood Insurance Rate Maps published by FEMA.

The portion of White's Creek on the Wolf Run Golf Course can be located on FEMA Flood Insurance Rate Map 32031C3170E, effective September 30, 1994. A copy of the map is attached as Plate 5. The area in the vicinity of the crossing of Steamboat Ditch by White's Creek is identified on the map as being in Zone A. Zone A is a Special Flood Hazard Area in which no base flood elevations have been determined. Consequently, the 100-year flood zone is more loosely defined in this area (Zone A) than in an area where base flood elevations have been determined (Zone AE). The exact boundaries of Zone A and the fact that base flood elevations have not been determined in this area may be a moot point since the golf course did not exist when the map was compiled. Grading associated with golf course construction has most likely altered the drainage into White's Creek on the golf course property. Nonetheless, the proximity of the reservoir to White's Creek ensures that it is most likely in the 100-year flood zone.

Should effluent be used for irrigation purposes at the Wolf Run Golf Course, it will be stored in the reservoir. The issues posed by this storage are that the effluent could negatively impact ground water quality, and may be released directly to White's Creek during a flood event.

1. Lining

The storage reservoir has an areal extent of approximately ½-acre. The elevation of the bottom of the pond is approximately 4758 feet above mean sea level (AMSL). The normal pool elevation is approximately 4765 feet AMSL. The elevation of the top of the berm protecting the reservoir on the downslope side is approximately 4768 feet AMSL; leaving approximately 3 feet of freeboard between normal pool elevation and an overflow condition. An overflow channel is set in to the berm southeast of the reservoir, between the reservoir and White's Creek.

The reservoir was lined after construction with a 40 mil lining manufactured by Barber-Webb of Los Angeles, California. The lining is approximately 91,000 square feet in area and was installed on April 1, 1997. The purpose of the lining is to make the reservoir impervious to prevent leakage. The lining extends above normal pool elevation to the top of the berm. It was completely inspected and re-sealed in 1998. The inspection is performed every 3 years, and will next occur during the winter months of 2001.

2. Irrigation Schedule

Investigation into "normal" flow volumes in White's Creek was conducted through the United States Geologic Survey (USGS) database. Two gaging stations were identified in the Truckee drainage basin on White's Creek. Daily flow volumes from the first station (Station No. 10349700) were available from October 1, 1961 through September 30, 1966. Daily flow volumes for the second (Station No. 10349710) were available from May 1, 1982 through September 30, 1982. Flow volumes at the first station ranged from 1.9 cubic feet per second (cfs) to one reading of 100 cfs. The average flow rate from the first station was 6.5 cfs. Flow volumes at the second station ranged from 7.0 cfs to 60 cfs. The average flow rate from the second station was 16.6 cfs. The USGS gaging station data is attached.

A copy of the *Preliminary White's Creek Basin Management Study (Second Draft)* was provided this office by a representative of the WCDWR. The study was performed by Cella Barr Associates of Sacramento, California and is dated April 4, 1994. The study area includes the portion of White's Creek from its bifurcation at White's Creek Park east to (then proposed) U.S. Highway 395. The study indicates that discharge during a 100-year flood event would be approximately 700 cubic feet per second in the branch of White's Creek that flows through Wolf Run Golf Course. The study indicates a zone approximately 250 feet wide along the creek would be flooded at depths of greater than 1 foot. It should be noted that the golf course was not in place during the study. A copy of the study is attached.

As indicated above, the reservoir is located very near the crossing of Steamboat Ditch and White's Creek. Although flood elevations for the FEMA map were generated using approximate methods only, the reservoir is most likely in the 100-year flood zone. The reservoir has a usable capacity of approximately 2 million gallons. Relocating the reservoir is problematic

and Wolf Run wishes to avoid that avenue if possible. It is our understanding that the threat of release of effluent from the reservoir during flood events can be minimized through management. That is, the reservoir can be allowed to remain in place, and the release threat can be minimized by maintaining a low volume of effluent in the reservoir during the flood-prone winter and early spring seasons. It is also our understanding that irrigation is not generally required during these months, which will allow the reservoir level to be lowered without an adverse effect on the golf course.

As indicated in Table 5, the irrigation intensive months are March through October. During these months the storage reservoir will be in use and at or near capacity. During the winter and early spring (the season when flood potential is at its highest) the storage reservoir will be drawn down to approximately half its capacity. This will leave approximately 1 million gallons in the reservoir. Using the average phosphorus concentration from above, 1 million gallons of effluent contains approximately 31 pounds of phosphorus. If the reservoir were to overflow during a flood event, it would first fill to capacity, then overflow. The 31 pounds of phosphorus would be distributed through approximately 2 million gallons prior to overflow. The Cella Barr Associates study referenced above indicates a flow volume of 700 cfs through the Wolf Run Golf Course during a 100-year flood event. It is assumed that during a 100-year flood event the reservoir would fill and then be mixed with the 700 cfs of White's Creek flow. Should this flood event occur, it would take approximately 2 hours of flood flow to dilute the phosphorus concentration in the storage reservoir to below the 0.1 mg/l limit for Class B waters. Calculations are attached

III. Conclusions:

The use of effluent as irrigation water is a necessity for the future of Wolf Run Golf Course. It is our opinion and the opinion of regulatory and affected agencies contacted concerning this project that the physical circumstances of the golf course should not preclude the use effluent for irrigation. This report has attempted to provide information intended to be supportive of the *Nevada Groundwater Discharge Permit Application*. Should the *Application* be approved, it will be included in an *Effluent Management Plan* also to be submitted to the NDEP for approval prior to the use of treated effluent at the golf course.

It is our understanding that in addition to the information provided herein, groundwater monitoring should be performed at the property prior to effluent use. Correspondence with representatives of Wolf Run Golf Course indicates that it is their understanding that three monitoring wells will be required. One of the monitoring wells will be installed near the entrance of White's Creek to the golf course property, the second will be installed near STMGID #3 near the center of the course. The third will be installed near the exit of White's Creek from the golf course. The installation and construction of the monitor wells will be in compliance with applicable regulations. The frequency and analytical methods of groundwater sampling is left to the discretion of the NDEP.

IV. Permit Application:

NEVADA GROUNDWATER DISCHARGE PERMIT APPLICATION FORM Permit #_____
(Must be accompanied by the appropriate fee as described in NAC445A.232)

1. **Owner/Responsible Party Information**

Name of Organization Athletic Association University of Nevada

Contact person(s) Rick Reviglio Phone number(s) 784-6900 Fax 784-4497

Mailing address University of Nevada, Intercollegiate Athletics/232

City Reno County Washoe State Nevada Zipcode 89557

NOTE: A separate permit application form must be completed for each discharging facility operated by the applicant.

2. **Facility/Site Information**

Facility name Wolf Run Golf Course

Contact person(s) Ron Gribble Phone number(s) 851-7720 Fax 851-4403

Street address/location 1400 Wolf Run Road

City Reno County Washoe State Nevada Zipcode 89511

Latitude _____ Longitude _____

Township 18 North MDBM Range 20East MDBM Section 19

If you are supplying effluent or biosolids to other sites, please provide the location for each:

Name _____ Permit # _____

Street Address/location _____

City _____ County _____ State _____ Zipcode _____

3. **Maps:** please include a topographic map and a site map showing the location of the proposed discharge and location of any existing or proposed groundwater monitoring wells.

4. 30 day average flow of discharge up to 1 in MGD (million gallons/day) _____ in gpm (gallons/min)

Maximum design flow _____ in MGD _____ in gpm

Does the 30 day average flow exceed 85% of the design flow? N/A If yes, then: Have plans for expansion been submitted for approval by the NDEP? _____ Date of submittal _____

If plans for expansion have not been submitted, please explain why: _____

5. Describe the activity producing the discharge. (Example - wastewater treatment, dewatering, cooling,manufacturing Also provide a Process Flow Diagram. Golf Course irrigation. Effluent supplied by South Truckee Meadows Water Treatment Plant

6. Describe the method of disposal or reuse application method (irrigation, percolation, evaporation, spray, disk, inject, etc.)

Spray & drip irrigation

7. Describe the treatment or process that will be used to meet the discharge limits. **For Biosolids Application only:** describe pathogen and vector control. N/A

A. Has NDEP approved the design of this treatment works? Yes_____ No _____

B. Does this facility have an approved Operations and Maintenance Manual or Effluent Management Plan?
Yes_____ No XX Date approved_____

8. Enter the average annual results of the parameters listed below **that may be present in the discharge and in the monitoring wells. Also attach copies of all Lab Analysis Reports. (For Biosolids Application only:** An analysis of arsenic, cadmium, chromium, copper, lead, mercury, molybdenum, nickel, selenium and zinc on a dry weight basis must accompany this application). From 4/97 to 3/98 STMWTP

BOD_5	2.5	Total Nitrogen as N	2.7
Total Suspended Solids	3.8	Kjeldahl Nitrogen as N	1.2
Total dissolved solids	N/A	Nitrate as N	1.4
Fecal coliform	1.3	Cyanide (as applicable)	N/A
pH (standard units)	7.6	Total Phosphorous	3.7
Chloride	N/A	Other	

Also include: Depth to groundwater Approximately 150' to 300'
Groundwater elevation Approximately 4550' to 4700'
GW flow direction Generally northeast

If lab reports indicate the presence of any of any **toxic materials** in the discharge – organics, solvents, total metals, petroleum products(this includes BTXE, MTBE and TPH) or other contaminants and pollutants – please complete **the attached sheet.** This table is a compilation of the materials listed in NAC445A.144 and the standards found in 40 CFR 141.

9. If, to the best of your knowledge, you expect that none of the analytes listed above will be present in your discharge and a lab analysis was not conducted, then please provide a brief explanation why you believe the listed analytes will not be present: The service area is primarily commercial and residential. There are no heavy industrial or agricultural contributions to the wastewater stream.

*RENEWAL APPLICANTS ONLY: Permittees renewing existing permits must also complete items 10 - 12.

List and briefly describe any changes to the production, treatment or disposal processes of the facility since the issuance of the last permit: N/A

11. List Discharge Monitoring Report (DMR) dates and parameters where the facility exceeded the permitted discharge limits (attach additional sheets if necessary): N/A

12. Submit graphs of the monitored parameters in the discharge and in the groundwater wells over the time period of the existing permit (e.g. - plot BOD_5 vs. month). The time scale should not be less frequent than the permitted sampling frequency. N/A

I certify that I am familiar with the information contained in the application and that to the best of my knowledge and ability such information is true, complete and accurate.

Richard J. Revicki — Print Name of Applicant

Mgr President — Title

Richard J. Revicki — Signature of Applicant

7/17/00 — Date of Signature

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 NAC 445.131 to 445.354, 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 NAC 445.131 to 445.354, 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 in the county jail for not more than 1 year, or by both fine and imprisonment.

Nevada Division of Environmental Protection
Bureau of Water Pollution Control Attention: Permitting
333 W. Nye Lane
Carson City, NV 89706-0851

V. References:

Bonham, H. F. *Geology and Mineral Deposits of Washoe and Storey Counties, Nevada.* Reno: Nevada Bureau of Mines & Geology, University of Nevada, Reno, 1969.

Bonham Jr., H.F. and David K. Rogers. *Mt. Rose NE Quadrangle Geologic Map.* Reno: Nevada Bureau of Mines & Geology, University of Nevada, Reno, 1983.

Cella Barr Associates. *Preliminary Whites Creek Basin Management Study (Second Draft).* Sacramento: Cella Barr Associates. 1994

Federal Emergency Management Agency. *Flood Insurance Rate Map, Washoe County, Nevada and Incorporated Areas.* Panel 3170 of 3350. 1994.

Jackson, Julia A., ed. *Glossary of Geology.* Alexandria: American Geological Institute, 1997.

Thompson, G.A. and D.E. White. *Regional Geology of the Steamboat Springs Area Washoe County, Nevada.* Geological Survey Professional Paper 458-A. Washington: U.S. Government Printing Office, 1964.

The Toro Company. *Toro Irrigation Products Catalog 1998-1999.* Riverside: The Toro Company. 1997.

The Toro Company. *Toro Irrigation Division Irrigation Products Illustrated Parts Breakouts 1999.* Riverside: The Toro Company. 1999.

United States Department of Agriculture, Soil Conservation Service. *Soil Survey of Washoe County, Nevada, South Part.* Washington: U. S. Government Printing Office, 1983.

———. *Mt. Rose NE Folio Soil Map.* Reno: Nevada Bureau of Mines & Geology, University of Nevada, Reno, 1977.

United States Geological Survey. *Mount Rose NE Quadrangle.* 7.5 Minute Series Map (Topographic). 1:24,000. Denver: USGS, 1994.

VI. Distribution:

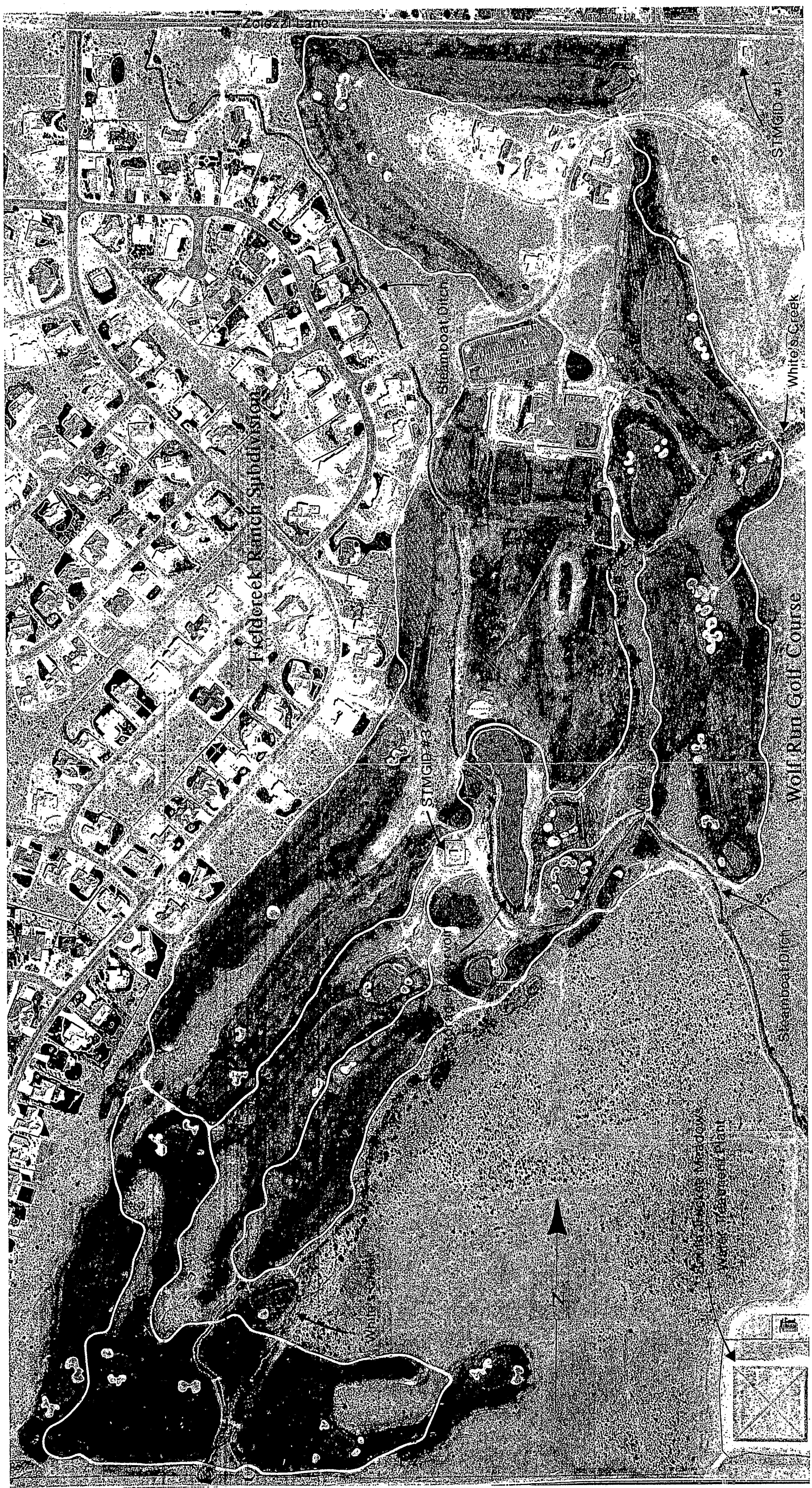
2 copies:
Mr. Ron Gribble
Golf Vision
1400 Wolf Run Road
Reno, Nevada 89511
TEL (775) 851-7720
FAX (775) 851-4403

1 original, 1 copy:
Ms. Jennifer Carr
Nevada Division of Environmental Protection
Bureau of Water Pollution Control
333 West Nye Lane
Carson City, Nevada 89706-0851
TEL (775) 687-4670, Ext. 3141
FAX (775) 687-5856

1 copy:
Ms. Sylvia Harrison
McDonald Carano Wilson McCune
Bergin Frankovich & Hicks LLP
241 Ridge Street
Reno, Nevada 89509
TEL (775) 788-2000
FAX (775) 788-2020

VII. Attachments:

Attachment 1: Aerial Photograph
Attachment 2: STMGID Well Logs
Attachment 3: Class B waters from *NAC 445A.125*
Attachment 4: STMWTP Laboratory Reports
Attachment 5: USGS White's Creek Flow Data
Attachment 6: Phosphorus concentration calculation sheet
Attachment 7: *Preliminary White's Creek Basin Management Study (Second Draft)*



Arrowcreek Parkway

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

STATE OF NEVADA
DIVISION OF WATER RESOURCES

WELL DRILLERS REPORT

Please complete this form in its entirety

PRINT OR TYPE ONLY

OFFICE USE ONLY
Log No. 25725
Permit No. 47066, 52504
Basin TR. MEADOWS 6-57
Permit 52862

SOUTH TRUCKEE
NOTICE OF INTENT NO. 2571

OWNER MEADOWS GENERAL IMPROVEMENT DISTRICT
MAILING ADDRESS DEPT OF PUBLIC WORKS
1205 MILL STREET RENO, NV 89520

ADDRESS AT WELL LOCATION STMGID #3
1½ miles west on Zolezzi Lane

2. LOCATION NW ¼ NE SE ¼ Sec. 19 T. 18 (N) S R. 20 E WASHOE County
PERMIT NO. 47066 (Issued by Water Resources) | Parcel No. | Subdivision Name

3. TYPE OF WORK: New Well ☒ Recondition ☐ Deepen ☐ Other ☐

4. PW #3 PROPOSED USE: Domestic ☐ Irrigation ☐ Test ☐ Municipal ☒ Industrial ☐ Stock ☐

5. TYPE WELL: Cable ☐ Rotary ☒ Other ☐ REVERSE

6. LITHOLOGIC LOG

Material	Water Strata	From	To	Thickness
silt, sand, & boulders		0	130	130
hard drlg, silts, sand & boulders		130	160	30
silt to boulders		160	190	30
silty sand & gravel		190	220	30
mixed sand, gravel & boulders	XX	220	280	60
silt to med sand	XX	280	300	20
fine sand to fine gravel	XX	300	325	25
fine silt to coarse sand	XX	325	335	10
silt to fine gravel	XX	335	370	35
silty sand	XX	370	375	5
silt to fine gravel, minor clay - intermittent	XX	375	470	95
clayey, silty sand	XX	470	490	20
decreasing clay, coarse sand	XX	490	500	10
silty sand to med gravel	XX	500	545	45
dirty silty sand	XX	545	580	35
clay, silt, sand, gravel		580	590	10
Lost Circulation Zone		50	200	

Date started AUGUST 6, 1984
Date completed SEPTEMBER 10, 1984

7. WELL TEST DATA

Pump RPM	G.P.M.	Draw Down	After Hours Pump
1000	120	23	1½
1200	245	46	1½
1350	385	73	1
1300	300	73	43½

BAILER TEST
G.P.M. ____ Draw down ____ feet ____ hours
G.P.M. ____ Draw down ____ feet ____ hours
G.P.M. ____ Draw down ____ feet ____ hours

8. WELL CONSTRUCTION

Diameter hole 22 inches Total depth 590 feet
Casing record 14" od x .375 wall
Weight per foot 54.57 Thickness

Diameter	From	To
14 / 22 inches	+2 feet	590 feet
inches	feet	feet
inches	feet	feet
inches	feet	feet
inches	feet	feet
inches	feet	feet

Surface seal: Yes ☒ No ☐ Type cement slurry
Depth of seal 70' pumped under pressure feet
Gravel packed: Yes ☒ No ☐
Gravel packed from 70 feet to 590 feet
Monterey Sand 8 x 16

Perforations:
Type perforation JOHNSON SCREEN 14" HY-CAP
Size perforation 50 SLOT STANDARD WEIGHT
From 240 feet to 580 feet
From ____ feet to ____ feet
From ____ feet to ____ feet
From ____ feet to ____ feet
From ____ feet to ____ feet

9. WATER LEVEL

Static water level 160 feet below land surface
Flow ____ G.P.M. ____ P.S.I.
Water temperature bottom 67 °F. Quality good

10. DRILLERS CERTIFICATION

This well was drilled under my supervision and the report is true to the best of my knowledge.

Name CHARLES SARGENT IRRIGATION, INC. (Contractor)
Address P. O. BOX 2480 RENO, NEVADA 89505 (Contractor)
Nevada contractor's license number 21246
Nevada contractor's drillers number 1391 LARRY WHITESEL
Nevada driller's license number 1413 MERRICK WHITESEL (Actual Driller)
Signed Gene Mayer (Contractor)
Date SEPTEMBER 10, 1984

USE ADDITIONAL SHEETS IF NECESSARY

(Rev. 6-81) O-627 CR434

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

STATE OF NEVADA
DIVISION OF WATER RESOURCES

WELL DRILLERS REPORT

Please complete this form in its entirety

OFFICE USE ONLY
Log No. 25321
Permit No.
Basin TR. MEADOWS 6-87

PRINT OR TYPE ONLY
SOUTH TRUCKEE

TEST 2567
NOTICE OF INTENT NO. 2570

OWNER MEADOWS GENERAL IMPROVEMENT DISTRICT
MAILING ADDRESS DEPT OF PUBLIC WORKS
1205 MILL STREET RENO, NV 89520

ADDRESS AT WELL LOCATION
3/4 mile west on Zolezzi Lane
STMGID #2

2. LOCATION SE ¼ NE ¼ Sec. 19 T. 18 N/S R. 20 E WASHOE County

PERMIT NO. 46778 (Issued by Water Resources) | Parcel No. | Subdivision Name

3. TYPE OF WORK
New Well ☒ Recondition ☐
Deepen ☐ Other ☐

4. PROPOSED USE
Domestic ☐ Irrigation ☐ Test ☐
Municipal ☒ Industrial ☐ Stock ☐

5. TYPE WELL
Cable ☐ Rotary ☒
Other ☐ Reverse

6. LITHOLOGIC LOG

Material	Water Strata	From	To	Thickness
silty sand, gravel, cobbles & boulders		0	40	40
cobbles & boulders		40	60	20
silty sand & gravel		60	70	10
silty sand to boulders		70	80	10
mixed clay to boulders		80	100	20
silty sand & gravel, some cobbles		100	125	25
gravel & cobbles		125	135	10
silty sand w/fine pebbles	xx	135	360	225
silty sand & fine pebbles mixed w/clay	xx	360	390	30
silty to coarse sand	xx	390	400	10
silty to coarse sand mixed w/clay	xx	400	490	90
silty to coarse sand	xx	490	520	30
silty sand w/light blue clay		520	540	20
silty to med sand w/some clay; volcanic & mica rich	xx	540	580	40
fine to med sand	xx	580	590	10
med grained sand clean	xx	590	640	50
fine to med sand	xx	640	660	20
silty to fine sand	xx	660	680	20
weathered andesite		680	710	30
andesite flow		710	715	5

Date started APRIL 2, 1984
Date completed APRIL 25, 1984

7. WELL TEST DATA

Pump RPM	G.P.M.	Draw Down	After Hours Pump
1200	109	42	1½
1300	152	65	23½
1400	179	92½	23½

BAILER TEST
G.P.M. ____ Draw down ____ feet ____ hours
G.P.M. ____ Draw down ____ feet ____ hours
G.P.M. ____ Draw down ____ feet ____ hours

8. WELL CONSTRUCTION

Diameter hole 22 inches Total depth 515 feet
Casing record 14" x .312
Weight per foot 45.61 Thickness

Diameter	From	To
22 inches	+2 feet	515 feet
inches	feet	feet
inches	feet	feet
inches	feet	feet
inches	feet	feet
inches	feet	feet

Surface seal: Yes ☒ No ☐ Type sand-cement grout
Depth of seal 88 feet
Gravel packed: Yes ☒ No ☐
Gravel packed from 88 feet to 515 feet
Monteray 8 x 16

Perforations:
Type perforation Johnson Screen 14" Hycap
Size perforation 50 slot
From 255 feet to 505 feet
From feet to feet
From feet to feet
From feet to feet
From feet to feet

9. WATER LEVEL

Static water level 132 feet below land surface
Flow bottom G.P.M. P.S.I.
Water temperature 68 ° F. Quality good

10. DRILLERS CERTIFICATION

This well was drilled under my supervision and the report is true to the best of my knowledge.

Name CHARLES SARGENT IRRIGATION, INC. (Contractor)
Address P. O. BOX 2480 RENO, NV 89505 (Contractor)
Nevada contractor's license number 21246
Nevada contractor's drillers number 1391 LARRY WHITESEL
Nevada driller's license number 1388 GENE MAPEL (Actual Driller)
Signed Gene Mapel (Contractor)
Date APRIL 30, 1984

USE ADDITIONAL SHEETS IF NECESSARY

(Rev. 6-81) O-627 CR434

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

STATE OF NEVADA
DIVISION OF WATER RESOURCES

WELL DRILLERS REPORT

Please complete this form in its entirety

PRINT OR TYPE ONLY

OFFICE USE ONLY
Log No. 25322
Permit No. 42878, 57213
Basin TR. MEADOWS 6-87
TEST 2566
NOTICE OF INTENT NO. 2569

SOUTH TRUCKEE
OWNER MEADOWS GENERAL IMPROVEMENT DISTRICT
MAILING ADDRESS DEPT OF PUBLIC WORKS
1205 MILL STREET RENO, NV 89520
ADDRESS AT WELL LOCATION 3/4 mile west of Zolezzi Lane STMGID #1

2. LOCATION NE ¼ NE ¼ Sec. 19 T 18 N/S R. 20 E WASHOE County
PERMIT NO. 46421 (Issued by Water Resources) | Parcel No. | Subdivision Name

3. TYPE OF WORK: New Well ☒ Recondition ☐ Deepen ☐ Other ☐

4. PROPOSED USE: Domestic ☐ Irrigation ☐ Test ☐ Municipal ☒ Industrial ☐ Stock ☐

5. TYPE WELL: Cable ☐ Rotary ☒ Reverse Other ☐

6. LITHOLOGIC LOG

Material	Water Strata	From	To	Thickness
cobbles & boulders		0	30	30
cobbles, silty sand		30	40	10
silty sand, gravels, cobbles		40	120	80
mostly silty sand & gravel, some cobbles		120	160	40
mostly silty sand & gravel		160	200	40
clay lenses w/silty sand & gravel	xx	200	260	60
mixed clay, sand & pebbley gravel	xx	260	320	60
cleaner gravel, cobbles	xx	320	340	20
silty sand & cobbles	xx	340	360	20
silty clay & gravels or cobbles	xx	360	400	40
mixed silt & gravels	xx	400	420	20
clays, silts, & sand	xx	420	440	20
silty sands & clay	xx	440	540	100
sands disappear		540	550	10
lenses of blue clays, light brn clays		550	570	20
mostly light brn clay, some blue clays		570	620	50
purplish clay weathered andesite	flow	620	645	25

Date started March 5, 1984
Date completed March 28, 1984

7. WELL TEST DATA

Pump RPM	G.P.M.	Draw Down	After Hours Pump
1400	600	110	48

BAILER TEST
G.P.M. ..... Draw down ..... feet ..... hours
G.P.M. ..... Draw down ..... feet ..... hours
G.P.M. ..... Draw down ..... feet ..... hours

8. WELL CONSTRUCTION

Diameter hole 20 inches Total depth 530 feet
Casing record 12" x .250 wall
Weight per foot 33.38 Thickness

Diameter	From	To
12 inches	+2 feet	530 feet
inches	feet	feet
inches	feet	feet
inches	feet	feet
inches	feet	feet
inches	feet	feet

Surface seal: Yes ☒ No ☐ Type sand-cement grout
Depth of seal 54 feet
Gravel packed: Yes ☒ No ☐
Gravel packed from 54 feet to 530 feet
Monteray Sand 8 x 16
Perforations:
Type perforation Johnson Screen 12" Hycap
Size perforation 50 slot
From 260 feet to 520 feet
From ..... feet to ..... feet
From ..... feet to ..... feet
From ..... feet to ..... feet
From ..... feet to ..... feet

9. WATER LEVEL

Static water level 90 feet below land surface
Flow bottom G.P.M. P.S.I.
Water temperature 68 ° F. Quality good

10. DRILLERS CERTIFICATION

This well was drilled under my supervision and the report is true to the best of my knowledge.

Name CHARLES SARGENT IRRIGATION, INC. (Contractor)
Address P. O. BOX 2480 RENO, NV 89505 (Contractor)
Nevada contractor's license number 21246
Nevada contractor's drillers number 1391 LARRY WHITESEL
Nevada driller's license number 1388 GENE MAPEL (Actual Driller)
Signed Gene Mapel (Contractor)
Date APRIL 30, 1984

USE ADDITIONAL SHEETS IF NECESSARY

(Rev. 6-81) O-627 CR434

NAC 445A.125 Class B waters: Description; beneficial uses; quality standards.

1. Class B waters include waters or portions of waters which are located in areas of light or moderate human habitation, little industrial development, light-to-moderate agricultural development and where the watershed is only moderately influenced by man's activity.

2. The beneficial uses of class B water are municipal or domestic supply, or both, with treatment by disinfection and filtration only, irrigation, watering of livestock, aquatic life and propagation of wildlife, recreation involving contact with the water, recreation not involving contact with the water, and industrial supply.

3. The quality standards for class B waters are:

Item	Specifications
(a) Floating solids, settleable solids or sludge deposits.	Only such amounts attributable to man's activities which will not make the waters unsafe or unsuitable as a drinking water source, injurious to fish or wildlife or impair the waters for any other beneficial use established for this class.
(b) Sewage, industrial wastes or other wastes.	None which are not effectively treated to the satisfaction of the department.
(c) Odor-producing substances.	Only such amounts which will not impair the palatability of drinking water or fish or have a deleterious effect upon fish, wildlife or any beneficial uses established for waters of this class.
(d) Toxic materials, oil, deleterious substances, colored or other wastes, or heated or cooled liquids.	Only such amounts as will not render the receiving waters injurious to fish or wildlife or impair the receiving waters for any beneficial uses established for this class.
(e) pH.	Range between 6.5 to 8.5.
(f) Dissolved oxygen.	For trout waters, not less than 6.0 milligrams/liter; for nontrout waters, not less than 5.0 milligrams/liter.
(g) Temperature.	Must not exceed 20° C for trout waters or 24° C for nontrout waters. Allowable temperature increase above natural receiving water temperatures: None.

(h) Fecal coliform.	The fecal coliform concentration, based on a minimum of 5 samples during any 30-day period, must not exceed a geo-metric mean of 200 per 100 milliliters, nor may more than 10 percent of total samples during any 30-day period exceed 400 per 100 milliliters.
(i) Total phosphates.	Must not exceed 0.3 mg/l.
(j) Total dissolved solids.	Must not exceed 500 mg/l or one-third above that characteristic of natural con-ditions (whichever is less).

Sierra Environmental Monitoring, Inc.

Laboratory Analysis Report

Date : 4/14/97
Client : SPB-491
Taken by: CLIENT-KANOFF
Report : 19371
PO# :

Page: 1

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Sample	Collected Date Time	AMMONIA-N MG/L	NITRATE-N MG/L	NITRITE-N MG/L	KJELDAHL-N MG/L	PHOSPHORUS -TOTAL MG/L	TOTAL NITROGEN MG/L
STM SAD9 EFFLUENT	4/07/97 :	0.22	0.8N	<0.1N	0.57	3.44	1.4

RECEIVED
APR 15 1997

Approved By: [signature]
This report is applicable only to the sample received by the laboratory. The liability of the laboratory is limited to the amount paid for this report. This report is for the exclusive use of the client to whom it is addressed and upon the condition that the client assumes all liability for the further distribution of the report or its contents.

William F. Pillsbury
President

John C. Seher
Manager

1135 Financial Blvd.
Reno, NV 89502
Phone (702) 857-2400
FAX (702) 857-2404

SOUTH TRU[illegible]EE MEADOWS STP — TRANSFERRING FROM [illegible] — MONTH OF APRIL 199[illegible]

END	RAW 571137	EFF 569740	RES DEPTH	END 4459.6	DEEP WELL WATER USE	END	Gal	Hrs
START	RAW 556819	EFF 544442		START 4465.3		START	Gal	Hrs
TOTAL	RAW 14,318,000	EFF 25298,000		TOTAL 5.7		TOTAL	Gal	Hrs

DATE	FLOW INF	FLOW EFF	[illegible]	[illegible]	[illegible]	pH INF	pH EFF	BOD INF	BOD EFF	TSS INF	TSS EFF	MLSS VOL	SETT. AER.	SVI	NITROGEN NH3	NITROGEN NO3	NITROGEN TOTAL	BIOLOGICAL EXAM.
1	451	419	(56)		.3						-	2727	410	150	.70	.24	.94	Pulling 2 - ribbons mostly - Section [illegible]
2	496	779	55	5.3		7.8	7.5	208	2.43	336	3.2	2611	390	142	.90	.26	1.16	mostly ribbons - [illegible]
3	430	947	55									-	-	-	-	-	-	Pull 4
4	504	885	56									-	-	-	-	-	-	Pull 3
5	523	1013	56							100% ribbons		2533	360	142	.70	.58	1.28	Pull 1 ribbons sluggish
6	555	884	56												~~.90~~	~~.18~~	~~1.08~~	
7	361	324	56		.3							2474	340	137	.80	.28	1.08	mostly ribbons Pull 2
8	526	966	57			8.0	7.7	173	2.11	116	3.4				~~.90~~	~~.2~~		Pull 4
9	512	989	56									2341	340	145	.90	.35	1.15	Same (SNOW)
10	427	930	56									-	-	-	-	-	-	Pull 3
11	521	1055	56									2241	320	140	.90	.48	128	Pull 1 mostly ribbons
12	559	1037																
13	431	396																
14	431	397	57		.4							2338	382	163	.70	.22	.92	Same biology
15	435	995	59		.2	8.0	7.6	276	1.8	328	3.8	2370	360	152	1.00	.00	1.00	Same
16	440	896	59									2373	365	154	.90	.16	1.06	Same biology - [illegible]
17	429	939	59									-	-	-	-	-	-	
18	435	940	59									2520	480	186	1.00	.32	1.42	Same
19	437	1144																
20	437	395																
21	437	395										2819	555	197	1.0	.12	1.12	
22	456	414	60			7.7	7.7	338	2.4	266	4.6	-	-	-	-	-	-	Pull 4
23	541	1142	60	~~9~~	.4							2660	520	195	.70	.14	.84	mostly ribbons Pull 1
24	493	992	59									-	-	-	-	-	-	Same Pull 2
25	527	1114	60		.5							2427						Same Pull 3
26	503	1178	60															
27	449	387																
28	448	386	60									2571	440	171	1.00	.10	1.10	Same Pull 4
29	533	1087	60		.5					278	2.9	-	-	-	-	-	-	Pull 1
30	533	1059	60									2323	380	164	.65	.50	1.10	Same Pull 2
31																		
TOTAL																		
AVG																		

Laboratory
Analysis Report

Sierra
Environmental
Monitoring, Inc.

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 4/17/97
Client : SPB-491
Taken by: CLIENT-KANOFF
Report : 19457
PO# :

Sample	Collected Date	Time	FECAL COLIFORM #/100ML					
STM SAD9 EFFLUENT	4/15/97	8:15	<1					

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William F. Pillsbury
President

1135 Financial Blvd.
Reno, NV 89502
Phone (702) 857-2400
FAX (702) 857-2404

John C. Seher
Manager

Laboratory
Analysis Report

Sierra
Environmental
Monitoring, Inc.

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 4/09/97
Client : SPB-491
Taken by: CLIENT-KANOFF
Report : 19373
PO# :

Sample	Collectnd Date	Time	FECAL COLIFORM #/100ML					
STM SAD9 EFFLUENT	4/07/97	8:00	<2					

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This report is applicable only to the sample received by the laboratory. The liability of the laboratory is limited to the amount paid for this report. This report is for the exclusive use of the client to whom it is addressed and upon the condition that the client assumes all liability for the further distribution of the report or its contents.

William F. Pillsbury
President

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John C. Seher
Manager

Laboratory
Analysis Report

Sierra
Environmental
Monitoring, Inc.

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 5/01/97.
Client : SPB-491
Taken by: CLIENT-KANOFF
Report : 19617
PO# :

Sample	Collected Date	Time	FECAL COLIFORM #/100ML					
STN SAD9	4/29/97	10:00	<1					

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John C. Seher
Manager

Laboratory
Analysis Report

Sierra
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SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 4/28/97
Client : SPB-491
Taken by: CLIENT
Report : 19580
PO# :

Sample	Collected Date	Time	FECAL COLIFORM #/100ML					
STN SAD9	4/25/97	7:30	<1					

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President

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John C. Seher
Manager

SPB UTILITY SERVICES INC.

South Truckee Meadows Laboratory Analysis Report

Date: May 7, 1997	Taken By: Ken Kanoff
Client: South Truckee Meadows STP	% SPB Utility Service 430 Stoker Avenue, Suite 202 Reno, NV 89503
Attn: Kirk Peterson	

SAMPLE I.D. Sample Collection Date	Time	Location	Parameter BOD_5 mg/l	Parameter CBOD mg/l	Parameter TSS mg/l	Parameter pH S.U.
4-1-97	1115	Influent	208		336	7.8
4-1-97	1115	Effluent		3	3	7.5
4-8-97	1115	Influent	173		116	8.0
4-8-97	1115	Effluent		2	3	7.7
4-15-97	1115	Influent	276		328	8.0
4-15-97	1115	Effluent		2	4.3	7.6
4-22-97	1115	Influent	338		226	7.7
4-22-97	1115	Effluent		2	5	7.7
4-29-97	1115	Influent	401		278	7.5
4-29-97	1115	Effluent		2	3	7.6
Average Influent			279		257	
Average Effluent				2	4	

*BOD_5 - Standard Methods - 5210
*CBOD - Standard Methods - 5210B
*TSS - Standard Methods - 2540D
*pH - Standard Methods - 4500H-B

Analysis By: Ken Kanoff

Approved By: Kirk Peterson

430 Stoker Avenue Suite 202 Reno, Nevada 89503
Phone (702) 329-7757 FAX (702) 329-6457

Laboratory Analysis Report

Sierra Environmental Monitoring, Inc.

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 4/03/97
Client : SPB-491
Taken by: CLIENT-KANOFF
Report : 19311
PO# :

Sample	Collected Date	Time	FECAL COLIFORM #/100ML					
STH EFFLUENT	4/01/97	10:00	2					

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APR - 4 1997

Approved By: [signature]

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President

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John C. Seher
Manager

Laboratory
Analysis Report

Sierra
Environmental
Monitoring, Inc.

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 5/09/97
Client : SPB-491
Taken by: CLIENT-KANOFF
Report : 19674
PO# :

Sample	Collected Date	Time	FECAL COLIFORM #/100ML					
STN SAD9	5/05/97	8:10	<1					

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FAX (702) 857-2404

John C. Seher
Manager

Laboratory
Analysis Report

Sierra
Environmental
Monitoring, Inc.

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 5/29/97
Client : SPB-491
Taken by: CLIENT-KANOFF
Report : 19905
PO# :

Sample	Collected Date	Time	FECAL COLIFORM #/100ML					
STN SAD9	5/27/97	9:00	<1					

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John C Seher
Manager

Laboratory
Analysis Report

Sierra
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Monitoring, Inc.

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 5/14/97
Client : SPB-491
Taken by: CLIENT
Report : 19644
PO# :

Sample	Collected Date	Time	AMMONIA-N MG/L	NITRATE-N MG/L	NITRITE-N MG/L	KJELDAHL-N MG/L	PHOSPHORUS -TOTAL MG/L	TOTAL NITROGEN MG/L
S. TRUCKEE MEADOWS EFFLUENT	5/01/97	8:45	<0.1	2.4N	<0.1N	1.7	4.05	4.1

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John C. Seher
Manager

Laboratory
Analysis Report

Sierra
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Monitoring, Inc.

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 5/15/97
Client : SPB-491
Taken by: CLIENT-KANOFF
Report : 19763
PO# :

Sample	Collected Date	Time	FECAL COLIFORM #/100ML					
STN SAD9	5/13/97	9:00	<1					

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John C. Seher
Manager

Laboratory
Analysis Report

Sierra
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Monitoring, Inc.

SPB UTILITY SERVICES
GEORGE SHAW
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 5/21/97
Client : SPB-491
Taken by: CLIENT
Report : 19828
PO# :

Page: 1

Sample	Collected Date	Time	FECAL COLIFORM #/100ML					
STH SAD9	5/19/97	8:10	<1					

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John C. Seher
Manager

SPB UTILITY SERVICES INC.

SPB Laboratories - Analysis Report

Date: June 5, 1997	**Taken By: Ken Kanoff**
Client: South Truckee Meadows STP	% SPB Utility Service 430 Stoker Avenue, Suite 202 Reno, NV 89503
Attn: Kirk Peterson	

SAMPLE I.D. Sample Collection Date	Time	Location	Parameter BOD, mg/l	Parameter CBOD mg/l	Parameter TSS mg/l	Parameter pH S.U.
5-6-97	1115	Influent	276		226	7.6
5-6-97	1115	Effluent		2	3	7.4
5-13-97	1115	Influent	257		354	7.6
5-13-97	1115	Effluent		2	3	7.6
5-20-97	1115	Influent	306		274	7.8
5-20-97	1115	Effluent		2	3	7.6
5-27-97	1115	Influent	331		362	7.7
5-27-97	1115	Effluent		2	2	7.4
	1115	Influent				
	1115	Effluent				
Average Influent			293		304	
Average Effluent				2	3	

*BOD$_5$ - Standard Methods - 5210
*CBOD - Standard Methods - 5210B
*TSS - Standard Methods - 2540D
*pH - Standard Methods - 4500H-B

Analysis By: Ken Kanoff

Approved By: _____

430 Stoker Avenue Suite 202 Reno, Nevada 89503
Phone (702) 329-7757 FAX (702) 329-3218

Laboratory
Analysis Report

Sierra
Environmental
Monitoring, Inc.

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 6/13/97
Client : SPB-491
Taken by: CLIENT-KANOFF
Report : 19995
PO# :

Sample	Collected Date	Time	AMMONIA-N MG/L	NITRATE-N MG/L	KJELDAHL-N MG/L	PHOSPHORUS -TOTAL MG/L		
STH PLANT EFFLUENT	6/05/97	7:45	0.60	<0.2N	1.2	3.9		

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JUN 16 1997

Approved By: _____

William F Pillsbury
President

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FAX (702) 857-2404

John C. Seher
Manager

Laboratory
Analysis Report

Sierra
Environmental
Monitoring, Inc.

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 6/09/97
Client : SPB-491
Taken by: CLIENT-KANOFF
Report : 19994
PO# :

Sample	Collected Date	Time	FECAL COLIFORM #/100ML					
STH SAD9 EFFLUENT	6/05/97	7:45	<1					

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JUN 10 1997

Approved By: _____

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President

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FAX (702) 857-2404

John C Seher
Manager

Laboratory
Analysis Report

Sierra
Environmental
Monitoring, Inc.

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 7/02/97
Client : SPB-491
Taken by: CLIENT-KANOFF
Report : 20296
PO# :

Sample	Collected Date	Time	FECAL COLIFORM #/100ML					
STH SAD9	6/30/97	8:00	<1					

Approved By:

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John C Seher
Manager

Laboratory
Analysis Report

Sierra
Environmental
Monitoring, Inc.

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 6/18/97
Client : SPB-491
Taken by: CLIENT-KANOFF
Report : 20085
PO# :

Sample	Collected Date	Time	FECAL COLIFORM #/100ML					
STH SAD9 EFFLUENT	6/16/97	8:50	1					

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President

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FAX (702) 857-2404

John C Seher
Manager

Laboratory
Analysis Report

Sierra
Environmental
Monitoring, Inc.

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 6/11/97
Client : SPB-491
Taken by: CLIENT-KANOFF
Report : 20016
PO# :

Page: 1

Sample	Collected Date	Time	FECAL COLIFORM #/100ML					
STH SAD9 EFFLUENT	6/09/97	8:55	<1					

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William F. Pillsbury
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John C. Seher
Manager

Laboratory
Analysis Report

Sierra
Environmental
Monitoring, Inc.

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 6/27/97
Client : SPB-491
Taken by: CLIENT-KANOFF
Report : 20224
PO# :

Page: 1

Sample	Collected Date	Time	FECAL COLIFORM #/100ML					
STH SAD9 EFFLUENT	6/25/97	10:30	<1					

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William F. Pillsbury
President

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Reno, NV 89502
Phone (702) 857-2400
FAX (702) 857-2404

John C. Seher
Manager

SPB

UTILITY SERVICES INC.

SPB Laboratories - Analysis Report

Date: July 10, 1997	**Taken By: Ken Kanoff**
Client: South Truckee Meadows STP	% SPB Utility Service 430 Stoker Avenue, Suite 202 Reno, NV 89503
Attn: Kirk Peterson	

SAMPLE I.D. Sample Collection Date	Time	Location	Parameter BOD, mg/l	Parameter CBOD mg/l	Parameter TSS mg/l	Parameter pH S.U.
6-3-97	1115	Influent	401		646	7.7
6-3-97	1115	Effluent		2	2	7.6
6-10-97	1115	Influent	242		528	7.8
6-10-97	1115	Effluent		2	3	7.6
6-17-97	1115	Influent	273		294	7.4
6-17-97	1115	Effluent		2	5	7.5
6-24-97	1115	Influent	312		282	7.6
6-24-97	1115	Effluent		4	3	7.7
	1115	Influent				
	1115	Effluent				
Average Influent			307		438	
Average Effluent				2.5	3	

*BOD, - Standard Methods - 5210
*CBOD - Standard Methods - 5210B
*TSS - Standard Methods - 2540D
*pH - Standard Methods - 4500H-B

Analysis By: Ken Kanoff

Approved By: Kirk Peterson [signature]

430 Stoker Avenue Suite 202 Reno, Nevada 89503
Phone (702) 329-7757 FAX (702) 329-3218

SOUTH TRUCKEE MEADOWS STP — MONTH OF May 1997

END RAW 596539 — EFF 587807 — RES DEPTH — END empty — DEEP WELL WATER USE
START RAW 571137 — EFF 569740 — START 4459.6
TOT RAW 15,401,000 — EFF 18,067,000 — TOTAL

Transferring [illegible]

Laboratory Analysis Report

Sierra Environmental Monitoring, Inc.

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 7/07/97
Client : SPB-491
Taken by: CLIENT-KANOFF
Report : 20316
PO# :

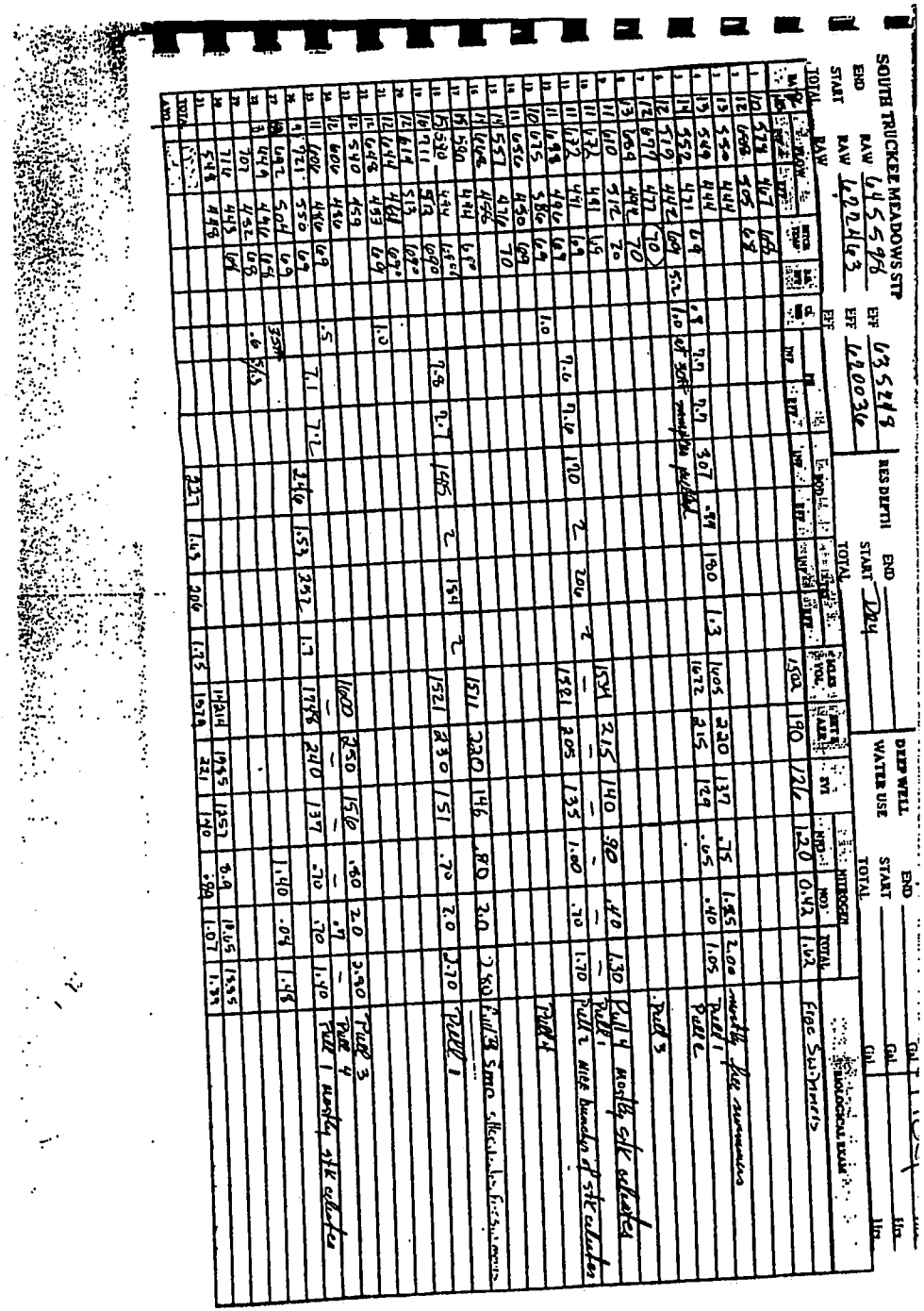
Sample	Collected Date	Time	AMMONIA-N MG/L	NITRATE-N MG/L	NITRITE-N MG/L	KJELDAHL-N MG/L	PHOSPHORUS -TOTAL MG/L	
SOUTH TRUCKEE MEADOWS EFFLUENT	7/01/97	8:00	0.61	0.9N	<0.1N	1.5	3.3	

Approved By:

William F. Pittsbury
President

1135 Financial Blvd.
Reno, NV 89502
Phone (702) 857-2400
FAX (702) 857-2404

John C. Seher
Manager



Laboratory Analysis Report

Sierra Environmental Monitoring, Inc.

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 7/10/97
Client : SPB-491
Taken by: CLIENT-KANOFF
Report : 20367
PO# :

Sample	Collected Date	Time	FECAL COLIFORM #/100ML					
STH EFFLUENT	7/07/97	8:30	<1					

Approved By: _____

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William F. Pillsbury
President

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Reno, NV 89502
Phone (702) 857-2400
FAX (702) 857-2404

John C. Seher
Manager

Laboratory Analysis Report

Sierra Environmental Monitoring, Inc.

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 8/01/97
Client : SPB-491
Taken by: CLIENT
Report : 20570
PO# :

Sample	Collected Date	Time	FECAL COLIFORM #/100ML	TOTAL COLIFORM MPN/100ML				
STH EFFLUENT	7/28/97	7:45	1	23				

Approved By: _____

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William F. Pillsbury
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John C. Seher
Manager

Laboratory Analysis Report

Sierra Environmental Monitoring, Inc.

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 7/25/97
Client : SPB-491
Taken by: CLIENT
Report : 20504
PO# :

Sample	Collected Date	Time	FECAL COLIFORM #/100ML	TOTAL COLIFORM MPN/100ML				
STH EFFLUENT	7/21/97	9:30	<1	9.2				

Approved By: _____

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William F Pillsbury
President

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Phone (702) 857-2400
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John C. Seher
Manager

Laboratory Analysis Report

Sierra Environmental Monitoring, Inc.

SPB UTILITY SERVICES
KIRK PETERSON
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 7/21/97
Client : SPB-491
Taken by: CLIENT
Report : 20447
PO# :

Sample	Collected Date	Time	FECAL COLIFORM #/100ML	TOTAL COLIFORM MPN/100ML				
STH EFFLUENT	7/15/97	9:30	<1	5.1				

Approved By: _____

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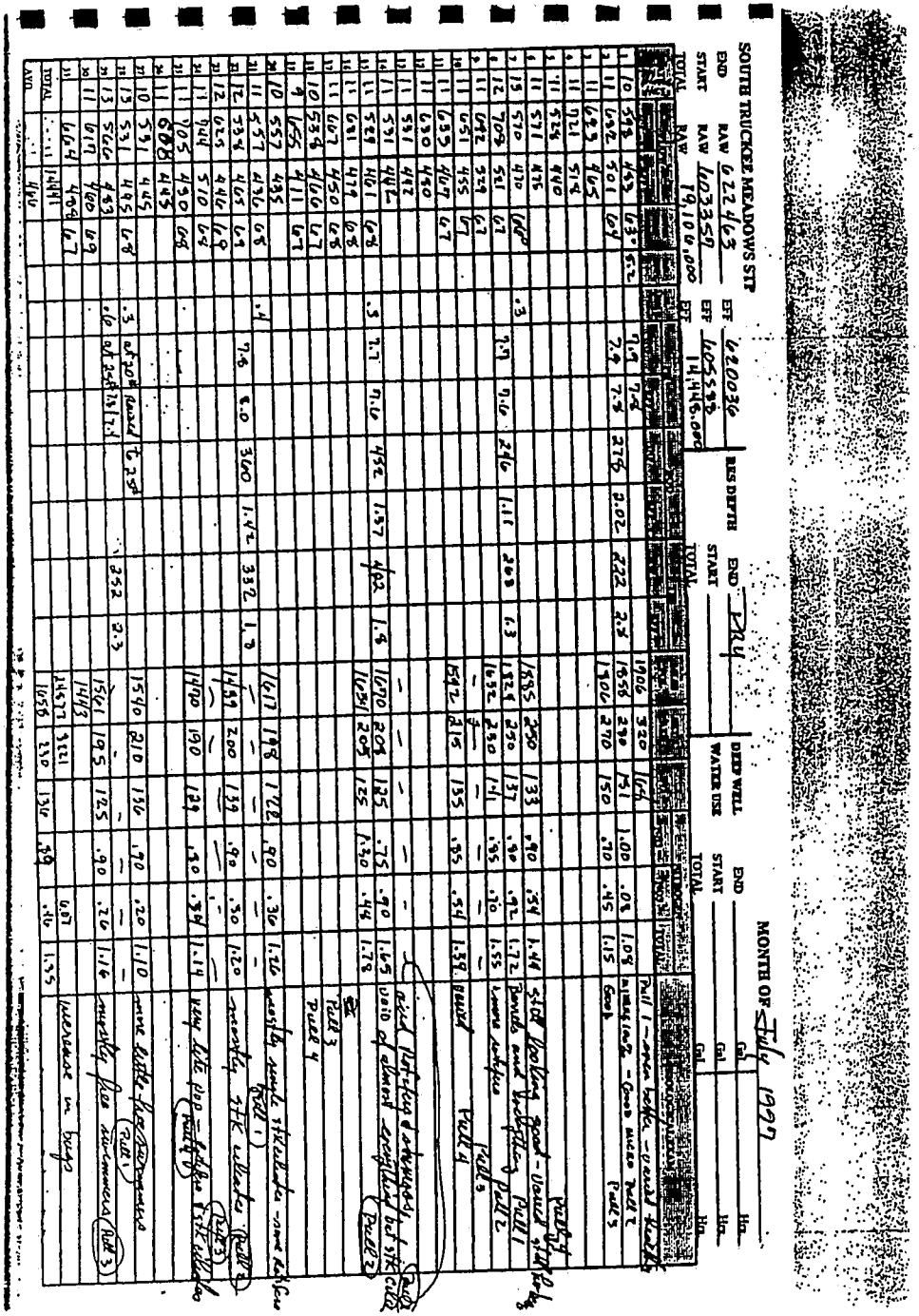
Reno, NV 89502
Phone (702) 857-2400
FAX (702) 857-2404

John C. Seher
Manager



SPB

UTILITY SERVICES INC.

SPB Laboratories - Analysis Report

Date: August 6, 1997	**Taken By: Ken Kanoff**
Client: South Truckee Meadows STP	% SPB Utility Service 430 Stoker Avenue, Suite 202 Reno, NV 89503
Attn: Kirk Peterson	

SAMPLE I.D. Sample Collection Date	Time	Location	Parameter BOD, mg/l	Parameter CBOD mg/l	Parameter TSS mg/l	Parameter pH S.U.
7-1-97	1115	Influent	278		222	7.9
7-1-97	1115	Effluent		2	3	7.8
7-8-97	1115	Influent	246		268	7.7
7-8-97	1115	Effluent		2	1	7.6
7-15-97	1115	Influent	452		422	7.7
7-15-97	1115	Effluent		2	2	7.6
7-22-97	1115	Influent	360		332	7.8
7-22-97	1115	Effluent		2	2	8.0
7-29-97	1115	Influent	226		252	7.8
7-29-97	1115	Effluent		2	2	7.4
Average Influent			313		299	
Average Effluent				2	2	

*BOD, - Standard Methods - 5210
*CBOD - Standard Methods - 5210B
*TSS - Standard Methods - 2540D
*pH - Standard Methods - 4500H-B

Analysis By: Ken Kanoff

Approved By: Kirk Peterson

430 Stoker Avenue Suite 202 Reno, Nevada 89503
Phone (702) 329-7757 FAX (702) 329-3218

Laboratory Analysis Report

Sierra
Environmental
Monitoring, Inc.

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 8/29/97
Client : SPB-491
Taken by: CLIENT-KANOFF
Report : 20805
PO# :

Sample	Collected Date	Time	FECAL COLIFORM #/100ML	TOTAL COLIFORM MPN/100ML				
STM EFFLUENT	8/25/97	8:20	<1	<1.1				

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Approved By: _____

William F. Pillsbury
President

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John C. Sehe
Manager

Tom K-
Jess C-

Laboratory Analysis Report

Sierra
Environmental
Monitoring, Inc.

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 8/25/97
Client : SPB-491
Taken by: CLIENT-KANOFF
Report : 20803
PO# :

Sample	Collected Date	Time	FECAL COLIFORM #/100ML	TOTAL COLIFORM MPN/100ML				
STM EFFLUENT	8/22/97	7:30	<1	<2				

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William F. Pillsbury
President

John C. Seher
Manager

SPB Laboratories - Analysis Report

Date: August 27, 1997	Taken By: Ken Kanoff
Client: South Truckee Meadows STP Attn: Kirk Peterson	% SPB Utility Service 430 Stoker Avenue, Suite 202 Reno, NV 89503

SAMPLE I.D. Sample Collection Date	Time	Location	Parameter BOD_5 mg/l	Parameter CBOD mg/l	Parameter TSS mg/l	Parameter pH S.U.
8-5-97	1115	Influent	307		180	7.7
8-5-97	1115	Effluent		2	1	7.7
8-12-97	1115	Influent	170		206	7.6
8-12-97	1115	Effluent		2	2	7.6
8-19-97	1115	Influent	185		184	7.8
8-19-97	1115	Effluent		2	2	7.7
8-26-97	1115	Influent				
8-26-97	1115	Effluent				
	1115	Influent				
	1115	Effluent				
Average Influent						
Average Effluent						

*BOD_5 - Standard Methods - 5210
*CBOD - Standard Methods - 5210B
*TSS - Standard Methods - 2540D
*pH - Standard Methods - 4500H-B

Analysis By: Ken Kanoff

Approved By Kirk Peterson

Laboratory Analysis Report

Sierra Environmental Monitoring, Inc.

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 8/25/97
Client : SPB-491
Taken by: CLIENT-KANOFF
Report : 20803
PO# :

ample	Collected Date	Time	FECAL COLIFORM #/100ML	TOTAL COLIFORM MPN/100ML				
TM EFFLUENT	8/22/97	7:30	<1	<2				

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President

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John C. Seher
Manager

SPB UTILITY SERVICES INC.

SPB Laboratories - Analysis Report

Date: September 3, 1997	Taken By: Ken Kanoff
Client: South Truckee Meadows STP	% SPB Utility Service 430 Stoker Avenue, Suite 202 Reno, NV 89503
Attn: Kirk Peterson	

SAMPLE I.D. Sample Collection Date	Time	Location	Parameter BOD, mg/l	Parameter CBOD mg/l	Parameter TSS mg/l	Parameter pH S.U.
8-5-97	1115	Influent	307		180	7.7
8-5-97	1115	Effluent		2	1	7.7
8-12-97	1115	Influent	170		206	7.6
8-12-97	1115	Effluent		2	2	7.6
8-19-97	1115	Influent	185		184	7.8
8-19-97	1115	Effluent		2	2	7.7
8-26-97	1115	Influent	246		254	7.1
8-26-97	1115	Effluent		2	2	7.2
	1115	Influent				
	1115	Effluent				
Average Influent			227		206	
Average Effluent				2		

*BOD$_5$ - Standard Methods - 5210
*CBOD - Standard Methods - 5210B
*TSS - Standard Methods - 2540D
*pH - Standard Methods - 4500H-B

Analysis By: Ken Kanoff

Approved By _____

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Laboratory Analysis Report

Sierra Environmental Monitoring, Inc.

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 8/15/97
Client : SPB-491
Taken by: CLIENT-KANOFF
Report : 20726
PO# :

Page: 1

Sample	Collected Date	Time	FECAL COLIFORM #/100ML	TOTAL COLIFORM MPN/100ML				
STN EFFLUENT	8/13/97	9:30	<1	<2				

Approved By: _____

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William F. Pillsbury
President

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John C. Seher
Manager

Laboratory Analysis Report

Sierra Environmental Monitoring, Inc.

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 8/29/97
Client : SPB-491
Taken by: CLIENT-KANOFF
Report : 20805
PO# :

Page: 1

Sample	Collected Date	Time	FECAL COLIFORM #/100ML	TOTAL COLIFORM MPN/100ML				
STN EFFLUENT	8/25/97	8:20	<1	<1.1				

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William F. Pillsbury
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John C. Seher
Manager

Laboratory Analysis Report

Sierra Environmental Monitoring, Inc.

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 8/13/97
Client : SPB-491
Taken by: CLIENT-KANOFF
Report : 20671
PO# :

Page: 1

mple	Collected Date	Time	AMMONIA-N MG/L	NITRATE-N MG/L	NITRITE-N MG/L	KJELDAHL-N MG/L	PHOSPHORUS -TOTAL MG/L	
UTH TRUCKEE MEADOWS EFFLUENT	8/06/97	13:30	0.11	4.7N	<0.1N	1.6	- 4.04	

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John C. Seher
Manager

Laboratory Analysis Report

Sierra Environmental Monitoring, Inc.

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 8/12/97
Client : SPB-491
Taken by: CLIENT-KANOFF
Report : 20672
PO# :

Page: 1

Sample	Collected Date	Time	FECAL COLIFORM #/100ML	TOTAL COLIFORM MPN/100ML				
STH EFFLUENT	8/06/97	8:30	1	3.6				

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John C. Seher
Manager

Laboratory Analysis Report

Sierra Environmental Monitoring, Inc.

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 9/10/97
Client : SPB-491
Taken by: CLIENT-KANOFF
Report : 20965
PO# :

ple	Collected Date	Time	FECAL COLIFORM #/100ML	TOTAL COLIFORM MPN/100ML				
EFFLUENT	9/08/97	8:00	4	12.0				

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John C. Seher
Manager

SPB UTILITY SERVICES INC.

SPB Laboratories - Analysis Report

Date: October 7, 1997	Taken By: Ken Kanoff
Client: South Truckee Meadows STP	% SPB Utility Service 430 Stoker Avenue, Suite 202 Reno, NV 89503
Attn: Kirk Peterson	

SAMPLE I.D. Sample Collection Date	Time	Location	Parameter BOD, mg/l	Parameter CBOD mg/l	Parameter TSS mg/l	Parameter pH S.U.
9-2-97	1115	Influent	245		232	7.7
9-2-97	1115	Effluent		<2	16	7.6
9-9-97	1115	Influent	206		198	7.5
9-9-97	1115	Effluent		<2	1	7.8
9-18-97	1115	Influent	272		122	7.9
9-18-97	1115	Effluent		2	2	7.5
9-25-97	1115	Influent	206			7.9
9-25-97	1115	Effluent		2		8.0
	1115	Influent				
	1115	Effluent			18	
Average Influent			232		184	
Average Effluent				2	6	

*BOD_5 - Standard Methods - 5210
*CBOD - Standard Methods - 5210B
*TSS - Standard Methods - 2540D
*pH - Standard Methods - 4500H-B

Analysis By: Ken Kanoff

Approved By_____

430 Stoker Avenue Suite 202 Reno, Nevada 89503
Phone (702) 329-7757 FAX (702) 329-3218

Laboratory
Analysis Report

Sierra
Environmental
Monitoring, Inc.

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 9/08/97
Client : SPB-491
Taken by: CLIENT
Report : 20875
PO# :

ple	Collected Date	Time	FECAL COLIFORM #/100ML	TOTAL COLIFORM MPN/100ML				
ITH TRUCKEE MEADOWS EFFLUENT	9/02/97	7:40	<1	2.2				

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John C. Seher
Manager

Laboratory
Analysis Report

Sierra
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SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 9/24/97
Client : SPB-491
Taken by: CLIENT-KANOFF
Report : 21043
PO# :

Sample	Collected Date	Time	FECAL COLIFORM #/100ML	TOTAL COLIFORM MPN/100ML				
STM EFFLUENT	9/16/97	8:10	<1	<1.1				

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John C. Seher
Manager

Laboratory
Analysis Report

Sierra
Environmental
Monitoring, Inc.

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 9/30/97
Client : SPB-491
Taken by: CLIENT-KANOFF
Report : 21113
PO# :

Page: 1

ple	Collected Date	Time	TOTAL COLIFORM MPN/100ML	FECAL COLIFORM MPN/GRAM				
I EFFLUENT	9/23/97	9:00	6.9	1.1				

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William F. Pillsbury
President

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John C. Seher
Manager

Laboratory
Analysis Report

Sierra
Environmental
Monitoring, Inc.

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 9/05/97
Client : SPB-491
Taken by: CLIENT
Report : 20876
PO# :

Page: 1

Sample	Collected Date	Time	AMMONIA-N MG/L	NITRATE-N MG/L	NITRITE-N MG/L	KJELDAHL-N MG/L	PHOSPHORUS TOTAL MG/L	
SOUTH TRUCKEE MEADOWS EFFLUENT	9/02/97	7:40	0.37	0.5N	<0.1N	2.0	3.68	

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John C. Seher
Manager

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DEPT. OF WATER RESOURCES

UTILITY SERVICES INC.

SPB Laboratories - Analysis Report

Date: November 7, 1997	**Taken By: Ken Kanoff**
Client: South Truckee Meadows STP Attn: Kirk Peterson	% SPB Utility Service 430 Stoker Avenue, Suite 202 Reno, NV 89503

Sample Collection SAMPLE I.D. Date	Time	Location	BOD_5 mg/l	CBOD mg/l	TSS mg/l	pH S.U.
10-2-97	1115	Influent	207		132	8.0
10-2-97	1115	Effluent		<2	5	7.4
10-9-97	1115	Influent	217		170	7.9
10-9-97	1115	Effluent		5	9	7.5
10-16-97	1115	Influent	212		100	7.7
10-16-97	1115	Effluent		<2	3	7.5
10-23-97	1115	Influent	319		208	7.5
10-23-97	1115	Effluent		<2	3	7.5
10-29-97	1115	Influent	361		250	7.7
10-29-97	1115	Effluent		<2	4	7.6
Average Influent			203	5	172	
Average Effluent				3	5	

*BOD_5 - Standard Methods - 5210
*CBOD - Standard Methods - 5210B
*TSS - Standard Methods - 2540D
*pH - Standard Methods - 4500H-B

Analysis By: Ken Kanoff

Approved By Kirk Peterson

430 Stoker Avenue Suite 202 Reno, Nevada 89503
Phone (702) 329-7757 FAX (702) 329-3218

Laboratory Analysis Report

Sierra
Environmental
Monitoring, Inc.

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 10/20/97
Client : SPB-491
Taken by: CLIENT-KANOFF
Report : 21325
PO# :

Sample	Collected Date	Time	TOTAL COLIFORM MPN/100ML	FECAL COLIFORM MPN/GRAM				
STM EFFLUENT	10/14/97	8:00	2.2	<1.1				

Approved By:

William F. Pillsbury

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John C. Se

Laboratory Analysis Report

Sierra
Environmental
Monitoring, Inc.

SPB UTILITY SERVICES
KIRK PETERSON
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 10/10/97
Client : SPB-491
Taken by: CLIENT
Report : 21241
PO# :

Sample	Collected Date	Time	TOTAL COLIFORM MPN/100ML	FECAL COLIFORM MPN/GRAM				
STM EFFLUENT	10/06/97	8:00	5.1	1.1				

Approved By: [signature]

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William F. Pillsbury

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John C. Seher

Laboratory Analysis Report

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Monitoring, Inc.
1135 Financial Blvd.
Reno, NV 89502
Phone (702) 857-2400

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 10/27/97
Client : SPB-491
Taken by: CLIENT-KANOFF
Report : 21406
PO# :

Sample	Collected Date	Time	FECAL COLIFORM #/100ML	TOTAL COLIFORM MPN/100ML				
STM EFFLUENT	10/22/97	9:30	4	<1.1				

Approved By: _____

William F. Pillsbury
President

John C. Seh

Laboratory Analysis Report

Sierra
Environmental
Monitoring, Inc.

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 10/07/97
Client : SPB-491
Taken by: CLIENT-KANOFF
Report : 21228
PO# :

Sample	Collected Date	Time	AMMONIA-N MG/L	NITRATE-N MG/L	NITRITE-N MG/L	KJELDAHL-N MG/L	PHOSPHORUS -TOTAL MG/L	
SOUTH TRUCKEE MEADOWS EFFLUENT	10/02/97	9:00	1.1	1.7N	<0.1N	1.1	4.2	

Approved By

William F. Pillsbury

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Phone (702) 857-2400

John C. Set

SPB UTILITY SERVICES INC.

SPB Laboratories - Analysis Report

Date: December 11, 1997	Taken By: Ken Kanoff
Client: South Truckee Meadows STP Attn: Kirk Peterson	% SPB Utility Service 430 Stoker Avenue, Suite 202 Reno, NV 89503

Sample Collection SAMPLE I.D. Date	Time	Location	BOD_5 mg/l	CBOD mg/l	TSS mg/l	pH S.U.
11-6-97	1115	Influent	406		320	8.0
11-6-97	1115	Effluent		2	2	7.1
11-13-97	1115	Influent	333		118	7.7
11-13-97	1115	Effluent		3	2	7.8
11-20-97	1115	Influent	437		140	8.0
11-20-97	1115	Effluent		2	2	7.5
11-27-97	1115	Influent	222		154	7.9
11-27-97	1115	Effluent		4	5	7.8
11-28-97	1115	Influent	298		246	7.5
11-28-97	1115	Effluent		5	6	7.8
Average Influent			339	3	196	
Average Effluent					3	

*BOD_5 - Standard Methods - 5210
*CBOD - Standard Methods - 5210B
*TSS - Standard Methods - 2540D
*pH - Standard Methods - 4500H-B

Analysis By: Ken Kanoff

Approved By Kirk Peterson

430 Stoker Avenue Suite 202 Reno, Nevada 89503
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Laboratory Analysis Report

Sierra
Environmental
Monitoring, Inc.

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 11/20/97
Client : SPB-491
Taken by: CLIENT-KANOFF
Report : 21589
PO# :

Sample	Collected Date	Time	AMMONIA-N MG/L	NITRATE-N MG/L	NITRITE-N MG/L	KJELDAHL-N MG/L	PHOSPHORUS -TOTAL MG/L
SOUTH TRUCKEE MEADOWS EFFLUENT	11/10/97	8:45	<0.1	1.3N	<0.1N	0.11	3.73

Approved By: _____

William F. Pillsbury

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Phone (702) 857-2400

John C. Sch

Laboratory Analysis Report

Sierra
Environmental
Monitoring, Inc.

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 11/10/97
Client : SPB-491
Taken by: CLIENT-KANOFF
Report : 21549
PO# :

Sample	Collected Date	Time	TOTAL COLIFORM MPN/100ML	FECAL COLIFORM MPN/100ML				
STM EFFLUENT	11/05/97	8:20	2.2	<1.1				

Approved By:

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Phone (702) 857-2400

William F. Pillsbury

John C. Sch

Laboratory Analysis Report

Sierra
Environmental
Monitoring, Inc.

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 11/14/97
Client : SPB-491
Taken by: CLIENT-KANOFF
Report : 21590
PO# :

Page:

Sample	Collected Date	Time	TOTAL COLIFORM MPN/100ML	FECAL COLIFORM MPN/100ML				
STM EFFLUENT	11/10/97	8:45	2.2	<1.1				

Approved By: _____

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FAX (702) 857-2404

William F. Pillsbury
President

John C. Seh

Laboratory Analysis Report

Sierra Environmental Monitoring, Inc.

SPB UTILITY SERVICES
KIRK PETERSON
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 11/19/97
Client : SPB-491
Taken by: CLIENT
Report : 21666
PO# :

Sample	Collected Date	Time	TOTAL COLIFORM #/100ML	FECAL COLIFORM #/100ML				
STM EFFLUENT	11/17/97	8:00	6	<1				

Approved By: _____

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President

John C. Sel

Laboratory Analysis Report

Sierra
Environmental
Monitoring, Inc.

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 12/01/97
Client : SPB-491
Taken by: CLIENT-J. WHITE
Report : 21757
PO# :

Page:

Sample	Collected Date	Time	FECAL COLIFORM #/100ML					
STM EFFLUENT	11/25/97	:	<2					

Approved By:

1135 Financial Blvd.
Reno, NV 89502
Phone (702) 857-2400
FAX (702) 857-2404

William F. Pillsbury
President

John C. Seh
Manager

UTILITY SERVICES INC.

SPB Laboratories - Analysis Report

Date: January 5, 1998	Taken By: Ken Kanoff
Client: South Truckee Meadows STP Attn: Kirk Peterson	% SPB Utility Service 430 Stoker Avenue, Suite 202 Reno, NV 89503

Sample Collection SAMPLE I.D. Date	Time	Location	BOD_5 mg/l	CBOD mg/l	TSS mg/l	pH S.U.
12-3-97	1115	Influent	269		300	8.1
12-3-97	1115	Effluent		3	3	7.6
12-11-97	1115	Influent	199		176	7.8
12-11-97	1115	Effluent		2	3	7.7
12-18-97	1115	Influent	323		202	7.5
12-18-97	1115	Effluent		2	2	7.5
12-26-97	1115	Influent	353		170	7.3
12-26-97	1115	Effluent		2	2	7.4
	1115	Influent				
	1115	Effluent				
Average Influent			286		212	
Average Effluent				2	3	

*BOD_5 - Standard Methods - 5210
*CBOD - Standard Methods - 5210B
*TSS - Standard Methods - 2540D
*pH - Standard Methods - 4500H-B

Analysis By: Ken Kanoff

Approved By Kirk Alter

Laboratory Analysis Report

Sierra
Environmental
Monitoring, Inc.

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 12/17/97
Client : SPB-491
Taken by: CLIENT-KANOFF
Report : 21927
PO# :

Sample	Collected Date	Time	AMMONIA-N MG/L	NITRATE-N MG/L	NITRITE-N MG/L	KJELDAHL-N MG/L	PHOSPHORUS -TOTAL MG/L	
SOUTH TRUCKEE MEADOWS EFFLUENT	12/09/97	7:50	0.24	2.0N	<0.1N	1.1	2.33	

Approved By:

1135 Financial Blvd.
Reno, NV 89502
Phone (702) 857-2400

William F. Pillsbury

John C. S

Laboratory Analysis Report

Sierra
Environmental
Monitoring, Inc.

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 12/22/97
Client : SPB-491
Taken by: CLIENT-KANOFF
Report : 22020
PO# :

Sample	Collected Date	Time	FECAL COLIFORM #/100ML					
STM EFFLUENT	12/15/97	8:00	<1.1					

Approved By:

1135 Financial Blvd.
Reno, NV 89502
Phone (702) 857-2400

William F. Pillsbury

John C. Seh

Laboratory Analysis Report

Sierra Environmental Monitoring, Inc.

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 12/12/97
Client : SPB-491
Taken by: CLIENT-KANOFF
Report : 21925
PO# :

Page:

Sample	Collected Date	Time	FECAL COLIFORM #/100ML					
STM EFFLUENT	12/09/97	7:00	4.7 E5					

Approved By:

1135 Financial Blvd.
Reno, NV 89502
Phone (702) 857-2400

William F. Pillsbury

John C. Seh

Laboratory Analysis Report

Sierra
Environmental
Monitoring, Inc.

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 12/03/97
Client : SPB-491
Taken by: CLIENT
Report : 21809
PO# :

Sample	Collected Date	Time	FECAL COLIFORM #/100ML					
STM EFFLUENT	12/01/97	9:30	1					

Approved By: _____

1135 Financial Blvd.
Reno, NV 89502
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William F. Pillsbury
President

John C. Seh
Manager

Laboratory Analysis Report

Sierra Environmental Monitoring, Inc.

SPB UTILITY SERVICES
KIRK PETERSON
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 12/24/97
Client : SPB-491
Taken by: CLIENT
Report : 22109
PO# :

Sample	Collected Date	Time	FECAL COLIFORM #/100ML					
STM EFFLUENT	12/22/97	9:05	<1					

Approved By:

1135 Financial Blvd.
Reno, NV 89502
Phone (702) 857-2400

William F Pillsbury

John C. Se

Laboratory Analysis Report

Sierra
Environmental
Monitoring, Inc.

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 7/00/98
Client : SPB-491
Taken by: CLIENT-KANOFF
Report : 22168
PO# :

Sample	Collected Date	Time	FECAL COLIFORM #/100ML					
STM EFFLUENT	12/30/97	8:15	3					

Approved By: _____

William F. Pillsbury
President

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sem@powernet.net

John Kobza, Ph.
John C. Seher
Managers

SPB

UTILITY SERVICES INC.

SPB Laboratories - Analysis Report

Date: February 4, 1998	Taken By: Ken Kanoff
Client: South Truckee Meadows STP Attn: Kirk Peterson	% SPB Utility Service 430 Stoker Avenue, Suite 202 Reno, NV 89503

Sample Collection SAMPLE I.D. Date	Time	Location	BOD, mg/l	CBOD mg/l	TSS mg/l	pH S.U.
1-9-98	1115	Influent	238		216	7.4
1-9-98	1115	Effluent		3	7	7.4
1-15-98	1115	Influent	322		206	7.6
1-15-98	1115	Effluent		2	7	7.7
1-22-98	1115	Influent	264		186	7.5
1-22-98	1115	Effluent		2	4	7.6
1-29-98	1115	Influent	361		232	7.7
1-29-98	1115	Effluent		2	4	7.6
	1115	Influent				
	1115	Effluent				
Average Influent			296		210	
Average Effluent					5.5	

*BOD, - Standard Methods - 5210
*CBOD - Standard Methods - 5210B
*TSS - Standard Methods - 2540D
*pH - Standard Methods - 4500H-B

Analysis By: Ken Kanoff

Approved By [signature]

This report is applicable only to the sample received by the laboratory. The liability of the laboratory is limited to the amount paid for this report. This report is for the exclusive use of the client to whom it is addressed and upon the condition that the client assumes all liability for the further distribution of the report or its contents.

430 Stoker Avenue Suite 202 Reno, Nevada 89503
Phone (702) 329-7757 FAX (702) 329-3218

SOUTH TRUCKEE MEADOWS STP — MONTH OF January 1998

	RAW	EFF	RES DEPTH	
END	734022	747816	END	4469.3
START	716973	710740	START	4464.2
TOTAL	17,049,000	37,076,000 AF	TOTAL	5.1

WATER USE: END ___ Gal ___ Hrs; START 6477980 Gal ___ Hrs; TOTAL ___ Gal ___ Hrs

DATE	[illegible]	FLOW INF	FLOW EFF	[illegible] TEMP	D.O. EFF	CL RES	PH INF	PH EFF	BOD INF	BOD EFF	TSS INF	TSS EFF	MLSS VOL	SETT AER.	SVI	NH3	NO3	TOTAL	BIOLOGICAL EXAM
1	9	606	524	55															
2	10	492	485	55	5.2		7.4	7.4	345	1.9	182	1.6	2305	360	156	1.00	.10	1.10	
3	9	693	561	54															
4	9	516	526																
5	5	503	496	53		.6							2378	410	172	.90	.10	.90	wide variety - active - healthy
6	9	522	485	58															
7	7	608	1514	54				2 hr mud on blowers					2325	390	168	1.60	.12	1.72	
8	8	642	1410	54			7.4	7.4	238	3.1	216	6.7							
9	7	678	1788	55									2176	350	160	.90	.14	1.04	Good but filaments present
10	8	594	1380																
11	7	506	1527																
12		507	1526	55		.6	no sampled						2275	450	178	1.00	.19	1.19	
13	10	522	1650	55															10 hrs Day Blowers Pull
14	10	530	1465	55									2569	390	152	.70	.20	.90	filaments present Pull
15	10	538	1405	55			7.6	7.7	322	2.3	204	7							
16	10	580	1800	55									2367						
17	11	608	1780	55															
18	11	557	1381	55															Rain event
19	10	556	1390	55									2689	380	141	.60	(.50)	1.16	lots of clay
20	10	569	1839	54										330					
21	10	621	1744	53									2657	350	132	1.30	.08	1.38	lots of clay - filaments present
22	10	596	658	53			7.5	7.6	264	1.54	186	4.4	—	—	—	—	—	—	
23		514	515	55		1.5							2954	410	190	.90	.32	1.22	
24		533	547																
25		537	546																
26		537	546	55									—	—	—	—	—	—	
27	14	533	519	55		.7							2919	470	161	1.00	.90	1.90	little flock lots filaments
28	11	611	1811	56									2882	510	177	.80	1.00	1.90	small flock - filaments lots of [illegible]
29	11	610	1920	55			7.7	7.6			232	4.4	—	—	—	—	—	—	
30	10	649	2017	54									2598	410	158	.50	.58	1.08	Small floc & filaments - bugs ok
31	10	612	1666	54															
TOTAL													33064	5210	1915	11.10	4.8	15.28	
AVG													2755	400	160	.93	.35	1.27	

Laboratory Analysis Report

Sierra Environmental Monitoring, Inc.

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 1/22/98
Client : SPB-491
Taken by: CLIENT-K. KANOFF
Report : 22290
PO# :

Sample	Collected Date	Time	AMMONIA-N MG/L	NITRATE-N MG/L	NITRITE-N MG/L	KJELDAHL-N MG/L	PHOSPHORUS -TOTAL MG/L	
SOUTH TRUCKEE MEADOWS EFFLUENT	1/12/98	8:00	0.51	0.4N	<0.1N	1.6	2.33	

RECEIVED
JAN 23 1998

Approved By:

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William F Pillsbury
President

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John Kobza, Ph.D.
John C. Seher
Managers

Laboratory Analysis Report

Sierra Environmental Monitoring, Inc.

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 1/09/98
Client : SPB-491
Taken by: CLIENT-KANOFF
Report : 22211
PO# :

Sample	Collected Date	Time	FECAL COLIFORM #/100ML					
STH EFFLUENT	1/05/98	8:00	<1.1					

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JAN 12 1998

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William F. Pillsbury
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John Kobza, Ph.D.
John C. Seher
Managers

Laboratory Analysis Report

Sierra Environmental Monitoring, Inc.

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 1/16/98
Client : SPB-491
Taken by: CLIENT-K. KANOFF
Report : 22291
PO# :

Page: 1

Sample	Collected Date	Time	FECAL COLIFORM #/100ML					
STM EFFLUENT	1/12/98	8:00	<1.1					

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John Kobza, Ph.D.
John C. Seher
Managers

Laboratory Analysis Report

Sierra Environmental Monitoring, Inc.

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 1/26/98
Client : SPB-491
Taken by: CLIENT-K. KANOFF
Report : 22399
PO# :

Page: 1

Sample	Collected Date	Time	FECAL COLIFORM #/100ML					
STM EFFLUENT	1/23/98	7:50	8					

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JAN 27 1998

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President

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John Kobza, Ph.D.
John C. Seher
Managers

Laboratory Analysis Report

Sierra Environmental Monitoring, Inc.

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 1/30/98
Client : SPB-491
Taken by: CLIENT-K. KANOFF
Report : 22430
PO# :

Sample	Collected Date	Time	FECAL COLIFORM #/100ML					
STM EFFLUENT	1/27/98	10:00	3					

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FEB 02 1998

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President

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John Kobza, Ph.D.
John C. Seher
Managers

SPB UTILITY SERVICES INC.

SPB Laboratories - Analysis Report

Date: March 9, 1998	**Taken By: Ken Kanoff**
Client: South Truckee Meadows STP	% SPB Utility Service 430 Stoker Avenue, Suite 202 Reno, NV 89503
Attn: Kirk Peterson	

Sample Collection SAMPLE I.D. Date	Time	Location	BOD_5 mg/l	CBOD mg/l	TSS mg/l	pH S.U.
2-6-98	1115	Influent	310		218	8.0
2-6-98	1115	Effluent		2	4	7.5
2-12-98	1115	Influent	283		216	7.8
2-12-98	1115	Effluent		2	2	7.7
2-19-98	1115	Influent	255		162	7.6
2-19-98	1115	Effluent		2	5	7.7
2-26-98	1115	Influent	362		288	7.9
2-26-98	1115	Effluent		2	4	7.8
	1115	Influent	303		321	
	1115	Effluent				
Average Influent						
Average Effluent						

*BOD_5 - Standard Methods - 5210
*CBOD - Standard Methods - 5210B
*TSS - Standard Methods - 2540D
*pH - Standard Methods - 4500H-B

Analysis By: Ken Kanoff

Approved By: _____

This report is applicable only to the sample received by the laboratory. The liability of the laboratory is limited to the amount paid for this report. This report is for the exclusive use of the client to whom it is addressed and upon the condition that the client assumes all liability for the further distribution of the report or its contents.

430 Stoker Avenue Suite 202 Reno, Nevada 89503
Phone (702) 329-7757 FAX (702) 329-3218

Sierra Environmental Monitoring, Inc.

Laboratory Analysis Report

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 2/18/98
Client : SPB-491
Taken by: CLIENT-K. KANOFF
Report : 22624
PO# :

Sample	Collected Date	Time	FECAL COLIFORM #/100ML
STH EFFLUENT	2/16/98	8:00	1

FEB 19 1998

Approved By: [signature]

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William F. Pillsbury
President

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John Kobza, Ph.D.
John C. Seher
Managers

1Ac ft = 325,800 gal

MONTH OF Feb 98

SOUTH TRUCKEE MEADOWS STP

END RAW 750934 EFF 778859
START RAW 734022 EFF 747816
TOTAL RAW 16,912,000 EFF 31043,000

RES DEPTH END 4471.8 START 4469.3 TOTAL 2.5

WATER METER END ___ Gal ___ Hrs. START ___ Gal ___ Hrs. TOTAL ___ Gal ___ Hrs.

DATE	BLWR HRS	FLOW METERS INF	EFF	AC FT/ MGAL	EFF NET	DITCH TEMP	D.O. EFF	CL RES	PH INF/EFF	BOD INF	BOD EFF	TSS INF	TSS EFF	MLSS VOL	SET S AER	SVI	NITROGEN NH3	NO3	TOTAL	BIOLOGICAL EXAM
1	12	570	1668	3.190	689	55		0						2964	570	199	.50	.95	1.45	small floc lots of rotifers
2	10	549	1413	3.190	374	54		3.0						2977 / 3030	450	180	.60	.18	.79	ess stk ciliates / same
3	10	651	2104	4.410	648	54		[illegible]												
4	10	649	2085	4.400	586	54														
5	10	608	2018	4.434	426	54			4.3/.5	310	1.3	218	4	2814	410	116	.80	1.00	1.80	
6	10	615	1918	4.436	473	54														
7	10	607	2104	4.425	662															lots of bugs
8	10	536	1885	4.426	443									2814	480	171	.75	1.00	1.75	small flock - more st ciliat
9	10	536	1884	4.425	442	54														
10	10	545	1980	4.440	520	54		.2		233	4.6			2793	420	151	.70	.50	1.20	small flock filaments
11	10	586	1574	3.975	579	54									~~400~~		~~1.20~~	~~.50~~	~~1.~~	
12	10	570	679	.443	535	54	CR pump off		7.?/7.1	233	1.6	214	2	2792	400	143	1.20	.50	1.70	maybe less filaments - good bug life - still small floc
13	10	593	512	0	512	(55)														
14	10	692	633	—																
15	10	569	610	—				.2	Sent in same sample to S.E.					3036	490	179	.60	.46	1.06	small floc & filaments - good
16	10	475	498	—		54														
17	10	609	633	—		54								2780	390	140	.60	.10	.70	
18	10	722	616	—		54														
19	10	667	575	—		54			7.4/7.9	255	2	162	5.2	2755	390	142	.60	.56	1.16	
20	10	631	576	—		54														
21	10	622	628																	
22	10	622	628																	colonies of over 100 rotifers
23	10	622	628											2860	422	147	.50	1.00	1.50	small flock good bugs
24	10	580	620			53		.30						2930	420	143	.80	.48	1.28	but filaments present
25	11	683	597			54														same
26	10	551	553			54			7.9/7.8			289	3.8	2846	340	119	.65	.42	1.07	small floc & filaments
27	10	646	595			54														
28	10	600	514			54														
29																				
30																				
31														31013	5192	1830	930	713	1545	
TOTAL														2919	432	153	.69	.59	1.29	
AVG																				

Laboratory Analysis Report

Sierra Environmental Monitoring, Inc.

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 2/13/98
Client : SPB-491
Taken by: CLIENT-K.KANOFF
Report : 22554
PO# :

Sample	Collected Date	Time	FECAL COLIFORM #/100ML					
STH EFFLUENT	2/10/98	8:30	<1.1					

Approved By: _____

William F. Pillsbury
President

1135 Financial Blvd.
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John Kobza, Ph.D.
John C. Seher
Managers

Laboratory Analysis Report

Sierra Environmental Monitoring, Inc.

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 2/09/98
Client : SPB-491
Taken by: CLIENT-KANOFF
Report : 22494
PO# :

Sample	Collected Date	Time	FECAL COLIFORM #/100ML					
STH EFFLUENT	2/03/98	8:30	<1.1					

Approved By: _____

William F. Pillsbury
President

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John Kobza, Ph.D.
John C. Seher
Managers

Laboratory
Analysis Report

Sierra
Environmental
Monitoring, Inc.

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 2/26/98
Client : SPB-491
Taken by: CLIENT-KANOFF
Report : 22700
PO# :

Sample	Collected Date	Time	FECAL COLIFORM #/100ML					
STH EFFLUENT	2/24/98	9:15	<1					

Approved By:

William F. Pillsbury
President

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John Kobza, Ph.D.
John C. Seher
Managers

Laboratory
Analysis Report

Sierra
Environmental
Monitoring, Inc.

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 2/23/98
Client : SPB-491
Taken by: CLIENT-K. KANOFF
Report : 22623
PO# :

Sample	Collected Date	Time	AMMONIA-N MG/L	NITRATE-N MG/L	NITRITE-N MG/L	KJELDAHL-N MG/L	PHOSPHORUS -TOTAL MG/L	
SOUTH TRUCKEE MEADOWS EFFLUENT	2/16/98	:	<0.1	0.9N	<0.1N	1.0	4.53	

Approved By:

William F. Pillsbury
President

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sem@powernet.net

John Kobza, Ph.D.
John C. Seher
Managers

Sierra Environmental Monitoring, Inc.

Date : 3/16/98
Client : SPB-491
Taken by: CLIENT-K. KANOFF
Report : 22873
PO# :

Page: 1

Laboratory Analysis Report

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Sample	Collected Date	Time	AMMONIA-N MG/L	NITRATE-N MG/L	NITRITE-N MG/L	KJELDAHL-N MG/L	PHOSPHORUS -TOTAL MG/L	
SOUTH TRUCKEE MEADOWS EFFLUENT	3/09/98	8:00	0.58	0.5W	<0.1W	1.6	4.45	

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MAR 17 1998

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John C. Seher
Managers

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Phone (702) 857-2400
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sem@powernet.net

William F. Pillsbury
President

SOUTH TRUCKEE MEADOWS STP

MONTH OF MARCH 1998

		RAW	EFF
END	RAW	774341	EFF 797298
START	RAW	750934	EFF 778859
TOTAL	RAW	23407.000	EFF 18439.000

RES DEPTH END 4469.3
START 4471.8
TOTAL (2.5)

WATER METER END Gal Hrs
START Gal Hrs
TOTAL Gal Hrs

DATE	DLWR HRS	FLOW METERS INF	EFF	SLOUG	NET	DITCH TEMP	D.O. EFF	CL RES	PH INF/EF	MOD INF	MOD EFF	TSS INF	TSS EFF	MLSS VOL	SET S AER	SVI	NITROGEN NH3	NO3	TOTAL	BIOLOGICAL EXAM
	10	606	637							Blowers	1	1 DAY		from 2-28						
	10	438	451			56	5.2	.3				Pull	3	2764	570	206	1.00	.20	1.26	small floc - weak
	9	691	568			56														bugs - turned 1 filter on
	8	773	512			56								2644	398	151	1.40	.10	1.50	same
	10	653	518			55			7.3/7.3	341	3.9	277	2.3				1.00	.20	1.20	
	11	587	587			54								2427	340	140	1.00	.50	1.50	looks better (floc) bugs same
	11	608	550											2613						
	10	613	579																	
	10	613	579			55		.6						2671	405	152	1.00	.30	1.30	still small floc
	10	705	656			56								—	—	—	—	—	—	
	10	581	594			56								3599	400	154	1.00	.42	1.42	same
	10	956	564			56			7.3/7.4	213	3.3	212	5	—	—	—	—	—	—	
	10	847	533			56								2740	345	141	1.00	.20	1.20	still small floc & foam
	10	686	566											2570						
	12	649	570			57														
	11	607	546			57		4	up Blowers					2604	425	163	1.10	.18	1.28	floc looks like - mostly stra...
	8	557	560			57			on Blowers					—	—	—	—	—	—	
	10	839	564			57								2636	360	137	1.40	.06	1.46	floc looks better
	9	929	559			57		4.0/4.6	7.3/7.4	179	5	120	4							
	10	739	541			57														
	9	827	565																	
	10	730	556																	
	11	736	557			57						376	7.1	2504	340	136	1.00	.06	1.06	
	9	1602	802			57			inf meter stuck					2600	340	131				
	9	1078	1092			56								2812	350	124	.90	.30	1.10	RAIN EVENT - MUD
	10	1973	667			56	2.6	.2	7.3/7.3			340	10.3							DIRTY - BUGS on TOP
	10	791	588			56				61 SOLIDS 100%				2932	360	123	.90	.20	1.10	
	9	699	572			56			cold weather					2606	300	115	.80	.22	1.02	extra dirt
	9	754	654			55														inf. flow stop, small floc
	10	590	549			54		.5						2540	320	126	.70	.20	.90	dirt, mostly straw debris
		876	650			56														
														36785	5253	1999	14.10	3.20	19.30	
														3028	375	143	1.007	.228	1.256	

Laboratory Analysis Report

Sierra Environmental Monitoring, Inc.

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 3/18/98
Client : SPB-491
Taken by: CLIENT-K. KANOFF
Report : 22972
PO# :

Sample	Collected Date	Time	FECAL COLIFORM #/100ML
STH EFFLUENT	3/16/98	8:00	<1

Approved by: _____

This report is applicable only to the sample received by the laboratory. The liability of the laboratory is limited to the amount paid for this report. This report is for the exclusive use of the client to whom it is addressed and upon the condition that the client assumes all liability for the further distribution of the report or its contents.

William F. Pillsbury
President

1135 Financial Blvd.
Reno, NV 89502
Phone (702) 857-2400
FAX (702) 857-2404
sem@powernet.net

John Kobza, Ph.D.
John C. Seher
Managers

Laboratory Analysis Report

Sierra Environmental Monitoring, Inc.

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 3/04/98
Client : SPB-491
Taken by: CLIENT-K. KANOFF
Report : 22772
PO# :

Sample	Collected Date	Time	FECAL COLIFORM #/100ML
STH EFFLUENT	3/02/98	9:40	1

Approved By: _____

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Reno, NV 89502
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sem@powernet.net

John Kobza, Ph.D.
John C. Seher
Managers

UTILITY SERVICES INC.

SPB Labdratories - Analysis Report

Date: April 1, 1998	Taken By: Ken Kanoff
Client: South Truckee Meadows STP	% SPB Utility Service 430 Stoker Avenue, Suite 202 Reno, NV 89503
Attn: Kirk Peterson	

Sample Collection SAMPLE I.D. Date	Time	Location	BOD, mg/l	CBOD mg/l	TSS mg/l	pH S.U.
3-5-98	1115	Influent	391		274	7.7
3-5-98	1115	Effluent		3	2	7.5
3-12-98	1115	Influent	213		212	7.5
3-12-98	1115	Effluent		3	5	7.4
3-19-98	1115	Influent	177		120	8.0
3-19-98	1115	Effluent		5	4	7.6
3-26-98	1115	Influent	208		340	7.9
3-26-98	1115	Effluent		7	10	7.3
	1115	Influent				
	1115	Effluent				
Average Influent			247	5	237	
Average Effluent					5	

*BOD_5 - Standard Methods - 5210
*CBOD - Standard Methods - 5210B
*TSS - Standard Methods - 2540D
*pH - Standard Methods - 4500H-B

Approved By: Kirk Peterson

Analysis By: Ken Kanoff

430 Stoker Avenue Suite 202 Reno, Nevada 89503
Phone (702) 329-7757 FAX (702) 329-3218

Laboratory Analysis Report

Sierra Environmental Monitoring, Inc.

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 3/13/98
Client : SPB-491
Taken by: CLIENT-K. KANOFF
Report : 22872
PO# :

Sample	Collected Date	Time	FECAL COLIFORM #/100ML					
STH EFFLUENT	3/09/98	8:00	<2					

Approved By:

William F. Pillsbury
President

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John Kobza, Ph.D.
John C. Seher
Managers

Laboratory Analysis Report

Sierra Environmental Monitoring, Inc.

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 4/01/98
Client : SPB-491
Taken by: CLIENT-K. KANOFF
Report : 23156
PO# :

Sample	Collected Date	Time	FECAL COLIFORM #/100ML					
STH EFFLUENT	3/30/98	8:00	<1					

RECEIVED
APR 0 2 1998

Approved By: _____

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John C. Seher
Managers

Laboratory Analysis Report

Sierra Environmental Monitoring, Inc.

SPB UTILITY SERVICES
430 STOKER AVE, SUITE 202
RENO NV 89503

Date : 3/30/98
Client : SPB-491
Taken by: CLIENT-K. KANOFF
Report : 23105
PO# :

Sample	Collected Date	Time	FECAL COLIFORM #/100ML					
STH EFFLUENT	3/26/98	9:30	<1					

RECEIVED
APR 2 1998

Approved By: _____

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FAX (702) 857-2404
sem@powernet.net

John Kobza, Ph.D
John C. Seher
Managers

```
# US GEOLOGICAL SURVEY
# DAILY MEAN DISCHARGE DATA
#
# Station name  : Whites C Nr Steamboat, Nv
# Station number: 10349700
# latitude (ddmmss)..... 392304
# longitude (dddmmss)..... 1195021
# state code..... 32
# county..... Washoe
# hydrologic unit code..... 16050102
# basin name..... Truckee
# drainage area (square miles)..... 8.02
# contributing drainage area (square miles).....
# gage datum (feet above NGVD)..... 5955
# base discharge (cubic ft/sec).....
# WATSTORE parameter code..... 00060
# WATSTORE statistic code..... 00003
# Discharge is listed in the table in cubic feet per second.
#
# Daily mean discharge data were retrieved from the
# National Water Information System files called ADAPS.
#
# Format of table is as follows.
# Lines starting with the # character are comment lines describing the data
# included in this file.  The next line is a row of tab-delimited column
# names that are Date and Discharge.  The next line is a row of tab-delimited
# data type codes that describe a 10-character-wide date (10d) and an
# 8-character-wide numeric value for discharge (8n).  All following lines are
# rows of tab-delimited data values of date (year.month.day) and discharge.
# A value of "E" or "e" in the Flags field indicates that the discharge for
# this day was estimated.  Any other values shown in this field are irrelevant.
#
# NOTE this file was requested from the NWIS-W software package
# on Fri Jun 16 18:45:44 2000
#       Dates are now in YYYY.MM.DD format.
#
# ----Date Range In File----
# 1 1961.10.01-2000.01.30
Date  Discharge   Flags
10s   8n    2s
1961.10.01  3.1   0
1961.10.02  3.1   0
1961.10.03  3.1   0
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1961.10.13  3.1   0
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1961.10.15  3.1   0
1961.10.16  3.1   0
1961.10.17  3.1   0
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1962.09.23	2.5	0
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1962.09.26	3.8	0
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1966.09.30	3.4	0

```
# US GEOLOGICAL SURVEY
# DAILY MEAN DISCHARGE DATA
#
# Station name  : Wc-2 Whites C Nr Steamboat, Nv
# Station number: 10349710
# latitude (ddmmss)..... 392305
# longitude (dddmmss)..... 1195013
# state code..... 32
# county..... Washoe
# hydrologic unit code..... 16050102
# basin name..... Truckee
# drainage area (square miles).....
# contributing drainage area (square miles).....
# gage datum (feet above NGVD).....
# base discharge (cubic ft/sec).....
# WATSTORE parameter code..... 00060
# WATSTORE statistic code..... 00003
# Discharge is listed in the table in cubic feet per second.
#
# Daily mean discharge data were retrieved from the
# National Water Information System files called ADAPS.
#
# Format of table is as follows.
# Lines starting with the # character are comment lines describing the data
# included in this file.  The next line is a row of tab-delimited column
# names that are Date and Discharge.  The next line is a row of tab-delimited
# data type codes that describe a 10-character-wide date (10d) and an
# 8-character-wide numeric value for discharge (8n).  All following lines are
# rows of tab-delimited data values of date (year.month.day) and discharge.
# A value of "E" or "e" in the Flags field indicates that the discharge for
# this day was estimated.  Any other values shown in this field are irrelevant.
#
# NOTE this file was requested from the NWIS-W software package
# on Fri Jun 16 18:48:46 2000
#       Dates are now in YYYY.MM.DD format.
#
# ----Date Range In File----
# 1 1982.05.01-1982.09.30
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Calculation Sheet:
Phosphorus concentration in White's Creek due to sprinklers

Sprinkler flow rate: 40 gpm
Number of sprinklers: 100
Minutes of flow per day: 20
Irrigation days per year: 300
White's Creek flow: 6.5 cfs

Gallons of irrigation water per year:
(40 gpm)(100 heads)(20 minutes)(300 days/irrigation year) = 24,000,000 gallons/irrigation year

10% of which is discharged directly to creek:
(24,000,000)(0.10) = 2,400,000 gallons/irrigation year

In liters:
(2,400,000)(3.7854 liters/gallon) = 9,084,960 liters/irrigation year

Amount of phosphorus:

(9,084,960 liters/irrigation year)(3.67 mg/l P) = 33,341,803 mg P

White's Creek Flow:
(6.5 cfs)(60 sec/min)(60 min/hour)(24 hrs/day)(365 days/year) = 204,984,000 cf/year
(204,984,000 cf/year)(7.4805 gallons/cubic foot) = 1,533,386,805 gallons/year

(1,533,386,805 gallons/year)(3.7854 liters/gallon) = 5,804,482,412 liters
(5,804,482,412 liters)(300 irrigations days/365 days per year) = 4,770,795,038 liters/irrigation year

Total Flow in an Irrigation year (Irrigation water to creek + creek flow):
9,084,960 liters + 4,770,795,038 liters = 4,779,879,998 liters/irrigation year

Phosphorus concentration in White's Creek during an irrigation year:
(33,341,803 mg P) /(4,770,795,038 liters) = 0.007 mg/l

Calculation Sheet:
Phosphorus concentration in White's Creek due to reservoir overflow

Phosphorus in 1 million gallons of reservoir effluent:
(1 million gallons)(3.7854 liters/gallon)(3.67 mg/l P) = 13,893,461 mg P

White's Creek 100-year flood event:
(700 cfs)(60 sec/ min)(60 min/ hour)(7.4805 gallons/cf)(2 hours) = 37,701,720 gallons
(37,701,720 gallons)(3.7854 liters/gallon) = 142,716,535 liters

Phosphorus content in creek after 2-hour event:
(13,893,461 mg P) /(142,716,535 liters) = 0.0974 mg/l

PRELIMINARY WHITES CREEK BASIN MANAGEMENT STUDY

(SECOND DRAFT)

Prepared For:

WASHOE COUNTY

DEPARTMENT OF PUBLIC WORKS

By:

CBA
CELLA BARR ASSOCIATES
777 Campus Commons Road, Suite 200
Sacramento, California 95825

April 4, 1994
CBA File No. 530013-01

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April 4, 1994
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PROFESSIONAL ENGINEER STATE OF NEVADA
JAMES H. NELSON
CIVIL
No. 8810

4-4-94

TABLE OF CONTENTS

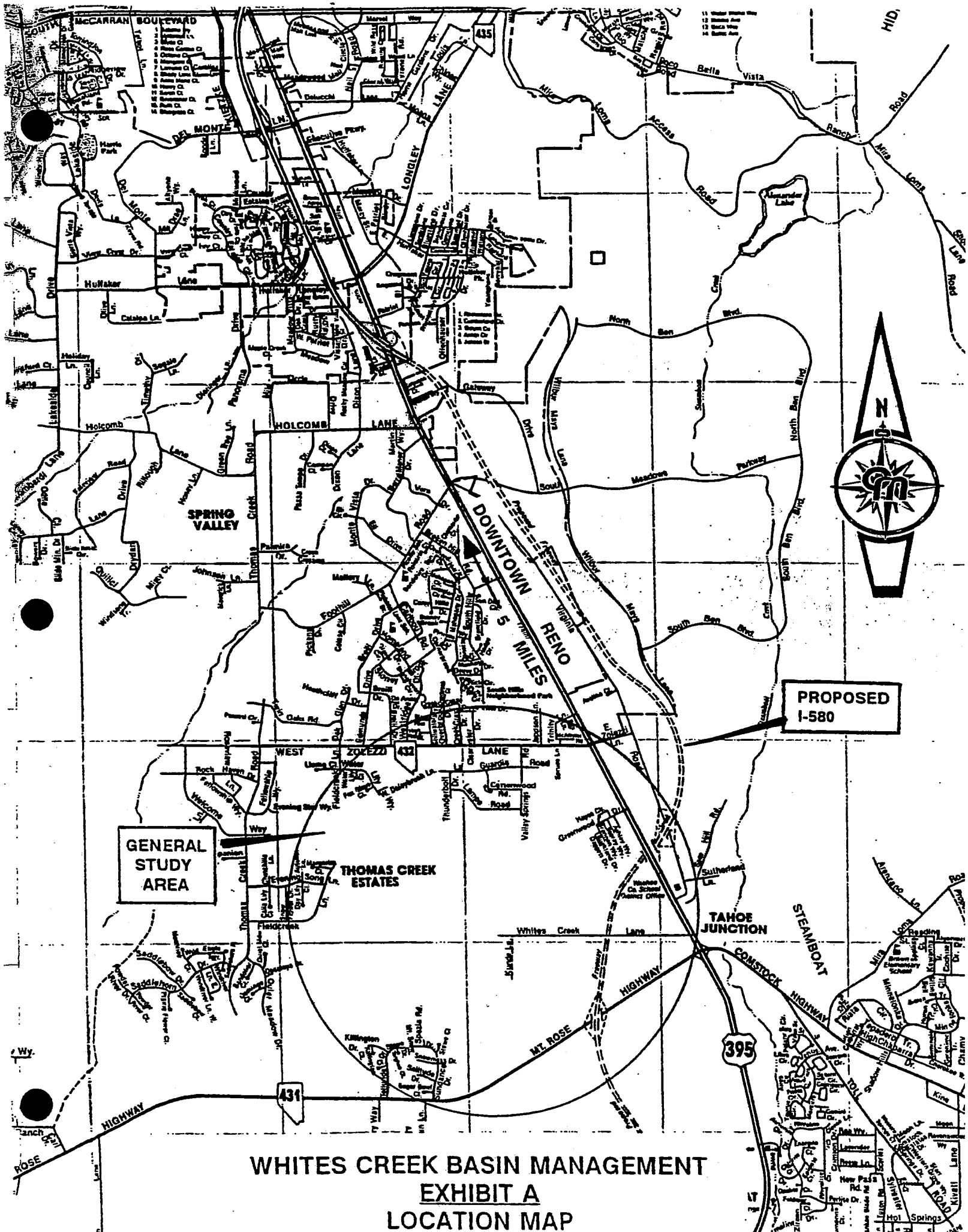
LIST OF EXHIBITS

INTRODUCTION

This document is the second draft of a Preliminary Basin Management Study performed for the lower Whites Creek watershed located approximately five (5) miles south of downtown Reno, Nevada (see Exhibit A, Location Map). This Preliminary Basin Management Study has been formulated in response to active new development and infrastructure construction occurring within the area and the existence of a unique set of flood hazards. Conclusions and recommendations provided herein have been based upon a review of available information, discussions with several key individuals, workshops, field reconnaissance and cursory calculations.

The purpose of this Preliminary Basin Management Study is to derive a unified set of conclusions with respect to existing flood hazards and develop interim policies for new development and infrastructure improvements within the watershed. Conceptual flood control measures are also recommended, as appropriate.

Much of the information presented herein is envisioned to be subsequently enhanced and supplemented by more detailed studies, which will undoubtedly serve to revise some of its conclusions and recommendations. Until such studies are performed or until other factors impact the information presented in this document, the interim policies shall be utilized for regulating the drainage design of new development and infrastructure projects, once this draft report becomes finalized.



WHITES CREEK BASIN MANAGEMENT

EXHIBIT A

LOCATION MAP

I. DATA COLLECTION AND RECONNAISSANCE

A. Literature Review

In accordance with the Whites Creek Basin Management Scope of Work, the studies, reports and plans listed below were reviewed. Following each listing is a brief and general description of the pertinent information contained therein.

- **Regional Water Study: Concept Level Report - Washoe County Flood Control Master Plan, Volumes I and II; prepared by Kennedy/Jenks/Chilton in association with Kato & Warren, Inc. and FCS Group, Inc.; January, 1991.**
  - Conceptual level flood control master plan for Washoe County intended to provide an estimate of the overall program costs, establish the general level of long-term capital needed, and develop a recommended institutional structure and funding plan.

  - Existing hydrologic data were used to develop a regional relationship between watershed area, average stream slope, 100-year rainfall depth, and 100-year peak discharge, resulting in a 100-year peak discharge of 3100 cfs for the Whites Creek watershed. Flood control improvements identified include a detention site on Whites Creek at the location where Whites Creek divides into four (4) distinct channels, and replacement of existing structures with improved culverts at Thunderbolt Street, La Guardia Road, Zolezzi Lane, U.S. 395 and Old Virginia Road for a total cost of $345,000.

- **I-580 Concept Drainage Study prepared for the Nevada Department of Transportation (NDOT); Plans for I-580 north of Highway 341.**
  - CBA has had several discussions with the Hydraulics Division of NDOT regarding the status of drainage structure design for I-580 along the base of the Whites Creek watershed and has reviewed current Plans for I-580. At this time the drainage design has not been finalized; however, it is proposed that several structures will be provided beneath I-580 to pass the projected 100-year flows resulting from splitting the total 100-year flow amongst the four (4) branches of Whites Creek.

- **Feasibility Study for Huffaker Detention Facility near the City of Reno, Washoe County, Nevada; prepared for Washoe County Public Works in cooperation with City of Reno Engineering by Nimbus Engineers; February, 1990.**
  - Examination of the feasibility of constructing a detention dam at the Huffaker Narrows, upstream of the proposed Mira Loma crossing of Steamboat Creek. A study of alternatives, resulting in the proposed detention site, was originally undertaken to provide all-weather access to the Truckee Meadows area east of Reno, including the Hidden Valley area. The analysis included development of detailed hydrology for the

109-square-mile Steamboat Creek watershed, which includes Whites Creek. The study states that the majority of flow from Whites Creek occurs as sheet flow across meadow or pasture land, with velocities ranging from one (1) to three (3) feet per second.

- **Whites Creek Detention Facility Feasibility Study, Washoe County, Nevada; prepared for the Nevada Department of Transportation by Nimbus Engineers; revised June, 1993.**
  - Evaluation of the benefits of a detention basin on Whites Creek at the existing major flow split at Shadowridge Park, including detailed development of a 100-year peak discharge and runoff hydrograph using the Corps of Engineers' hydrologic computer model, HEC-1.

    The resulting 100-year peak discharge of 5100 cfs at the flow split was distributed amongst the four downstream branches of Whites Creek based on a ratio of available conveyance. This ratio, in turn, was based on cross-sectional channel geometries, slopes, and resulting water surface elevations derived from the Corps of Engineers water surface program, HEC-2. One-hundred year peak discharges divided among the four branches were estimated as follows:

    Channel #1: 700 cfs (14%)
    Channel #2: 1950 cfs (38%)
    Channel #3: 1100 cfs (22%)
    Channel #4: 1350 Cfs (26%)

- **Hydrologic Analysis of Thomas Creek, Dry Creek and Evans Creek, Washoe County, Nevada; prepared for the Federal Emergency Management Agency by Nimbus Engineers; August, 1990.**
  - Evaluation of existing hydrology studies and development of rainfall-runoff models for Thomas Creek, Dry Creek and Evans Creek. The discharges resulting from these models were recommended for use in a Flood Insurance Restudy for Thomas Creek, Dry Creek, and Evans Creek in Washoe County and the City of Reno, instead of discharges previously developed by FEMA and the Corps of Engineers.

- **Thomas Creek Detention Basin Study; prepared for the Technical Advisory Committee, Washoe County Regional Flood Control Master Plan by Kennedy/Jenks/Chilton; May, 1990.**
  - Development of specific hydrologic modeling for the Thomas Creek drainage basin and analysis of several stormwater detention/debris basin sites within the watershed for the Washoe County Regional Flood Control Master Plan. The purpose of this study was threefold: 1) to determine whether detention could be utilized in the watershed to reduce the sizes of planned drainage conveyance structures for U.S. 395 and I-580; 2) to analyze the potential for reclassifying the FEMA-based designation of the Thomas Creek Watershed as an alluvial fan; and 3) to prepare preliminary

design parameters for the detention dam/debris basin and channel improvements.

- **Flood Insurance Study for Washoe County, Nevada Unincorporated Areas; prepared by the Federal Emergency Management Agency (FEMA); revised April 16, 1990.**
  - This Flood Insurance Study (FIS) establishes peak discharges, water surface elevations, and floodplain and floodway limits for portions of the Truckee River, Steamboat Creek, Bailey Canyon Creek, Boynton Slough, North Truckee Drain, Dry Creek, and the four playas in Lemmon Valley. The FEMA alluvial fan methodology was used to study Galena Creek, Thomas Creek and Evans Creek. Approximate methods were utilized to study flooding caused by several creeks along the northern shore of Lake Tahoe and to study those areas having a low development potential or minimal flood hazards. The resulting Flood Insurance Rate Maps are used to set local flood insurance rates and to guide land development with respect to flood hazards. In this study, the peak discharge - frequency relationships for Steamboat Creek and tributaries were determined from regional analyses based on 18 moderate-sized, natural drainage basins in the Truckee River and Carson River basins.

- **Washoe County Flood Control Master Plan - Draft Final Report on Meteorological Analysis; prepared for Kennedy/Jenks Consultants by Henz Meteorological Services; September 29, 1993.**
  - A detailed meteorologic analysis whose purpose was to provide a 100-year precipitation event for Washoe County to use in HEC-1 rainfall-runoff modeling. A review of the study has been performed by HYDMET, Inc. and states that it actually provides the following: 1) Annual and seasonal depth-duration-frequency (DDF) precipitation maps and intensity-duration-frequency analyses; 2) Areal Reduction Factors for 100-year summer thunderstorm events; and 3) Orographic and temporal variations in rain/snow line and snowpack for 100-year winter rain-on-snow events. Values represented are higher than depicted on current NOAA atlases. The study has not been accepted by Washoe County at present.

- **Flood Plain Information - Southwest Foothills Streams (Evans, Thomas, and Whites Creeks & Skyline Wash), Reno, Nevada; prepared for the Regional Planning Commission of Reno, Sparks and Washoe County by the Department of the Army, Sacramento District Corps of Engineers; June, 1974.**
  - Information on past floods, and maps, profiles, and cross sections that indicate the approximate extent and depth of inundation of Evans, Dry, Thomas and Whites Creeks and Skyline Wash from the Intermediate Regional and Standard Project Floods.

  - Intermediate Regional Flood values (equivalent to the 100-year discharge) for Whites Creek, developed by the Corps of Engineers from available

streamflow and precipitation records and synthesized from records of other similar watersheds, are as follows:

At Canyon Mouth:	3,000 cfs
At Divide (mile 4.99):	2,000 cfs
At Highway 395:	2,300 cfs

- **Water and Related Land Resources - Central Lahontan Basin, Truckee River Subbasin, Nevada...California: Flood Chronology, 1861-1976; based on a Cooperative Survey by the Nevada Department of Conservation and Natural Resources, the Resources Agency of California, and the United States Department of Agriculture; September, 1977.**
  - Presentation of a flood history of the Truckee River Subbasin of the Central Lahontan Basin, 1861-1976. This history is based on research of newspaper files and other historical archives and is concerned with three types of flood phenomena that have inflicted flooding and flood damage through the years of record: wet-mantle and rain-on-snow or frozen-ground events characteristic of late winter or early spring, and the dry-mantle event typical of localized summer thunderstorms.

- **Truckee River, California and Nevada - Hydrology; Office Report prepared by the Department of the Army, Sacramento District, Corps of Engineers; February, 1980.**
  - Presentation of basic hydrologic data and criteria for the Truckee River Basin for use in flood protection feasibility studies for the Truckee Meadows area near Reno, Nevada. The hydrologic characteristics of the basin are discussed, followed by analysis of flow frequencies and development of the Standard Project and Probable Maximum Floods resulting from winter type rain storms and summer-fall type cloudbursts. The peak flow for Whites Creek at Steamboat Ditch resulting from a Cloudburst Standard Project Flood, was estimated to be 8,700 cfs.

- **Flood Plain Information, Truckee River - Reno-Sparks-Truckee Meadows, Nevada; prepared for the Regional Planning Commission of Reno, Sparks, and Washoe County by the Department of the Army, Sacramento District, Corps of Engineers; October, 1970.**
  - Presentation of information on past floods, and maps, profiles and cross sections that indicate the depth and extent of flooding resulting from the Intermediate Regional and Standard Project Floods along the floodplains of the Truckee River; Steamboat Creek and its tributaries; Alum, Hunter, and Peavine Creeks; and the North Truckee Drain. The area covered extends northward from Huffaker Hills.

- **Flood Plain Information, Steamboat Creek and Tributaries, Steamboat & Pleasant Valleys, Nevada; prepared for the Regional Planning Commission of Reno, Sparks and Washoe County by the Department of the Army, Sacramento District Corps of Engineers; June, 1972.**
  - This report presents information on existing flood hazards along Steamboat Creek and tributary streams in Pleasant and Steamboat Valleys, including the portion of Steamboat Creek that drains Whites Creek and immediately downstream, and the Upper Truckee Meadows area of Washoe County, Nevada. The flood hazard maps produced are those resulting from the Intermediate Regional and Standard Project Floods.

- **Draft Development Standards and Design Guidelines; prepared for the Washoe County Department of Comprehensive Planning; July 6, 1993.**
  - Presentation of draft development standards and design guidelines for Washoe County, including Article 420, Storm Drainage Standards. This article provides general requirements regarding 10-year and 100-year storm runoff improvements; detention requirements; required drainage report contents for land development projects; and design requirements for different types of storm drainage systems. Emergency access roadway design requirements are contained in Article 408, Street Design Standards.

- **Flooding in Douglas County - Making Tough Choices (A Guide for Public Policy Dialogue); prepared by the Citizens Task Force on Flood Control.**
  - A publication written to serve as an educational guide for residents of Douglas County. Its purpose is to educate citizens about hazards from alluvial fan and riverine flooding; to pose alternative policy directions for citizens to consider and debate; and to serve as a basis for gathering public input and setting future County direction.

- **Pertinent Letters and Memoranda from Washoe County Files:**
  - 4/11/93 Memorandum and attachments from Craig V. McConnell, Public Works Director, to the Washoe County Commissioners and County Manager regarding actions taken concerning public discussion of the Whites Creek Detention Basin project at the location of the four-branch flow split. Attachments include the April, 1993 Agenda for the Southwest Truckee Meadows Citizens Advisory Board (CAB); the Presentation Agenda to the Southwest Truckee Meadows CAB regarding the detention basin; notification letter to local property owners regarding discussions held concerning the detention basin and schedule of subsequent meetings; and a description of key factors to consider regarding feasibility of the basin.

  - 4/23/93 Letter from the Southwest Truckee Meadows CAB to the Washoe County Commissioners informing them of the Board's unanimous denial of the Whites Creek Detention Basin project.

- 4/28/93 Letter from Craig McConnell to Garth Dull, Director of the Nevada Department of Transportation (NDOT), stating the County Commissioners' vote to not proceed with a joint County-NDOT detention basin on Whites Creek.

- 5/11/93 Letter from the Office of the Washoe County Clerk to Craig McConnell stating the Washoe County Commissioners' discussion and negative vote on the Whites Creek Detention Basin project.

- 5/11/93 Letter from Ronald W. Hill, Deputy Director of NDOT, to Mr. Brian Walters regarding factors considered in proposing the Whites Creek Detention Basin project.

- 7/26/93 Agenda for the 7/26/93 meeting of the Regional Water Planning and Advisory Board of Washoe County. Agenda Item No. 5 is a "Discussion on the Need for Whites Creek Drainage Basin Study".

- 7/29/93 Letter from David R. Roundtree, Regional Water Manager, to Mr. Keith Kellison, Chairman of the Southwest Truckee Meadows CAB regarding involvement of the CAB in development of a Whites Creek Basin Management Program.

- 8/17/93 List of private and public property owners within the Whites Creek Basin.

- 8/20/93 Sample Request for Proposals and schedule to consultants for the following items: (1) Formulation of an approach to stormwater management planning of the Whites Creek basin and its connection to Steamboat Creek; and (2) Development of interim policies for managing the basin.

- **Report on the February 1986 Flood in Western Nevada; prepared by Michael W. Ekern, National Weather Service Forecast Office; March 21, 1986.**
  - Summary of the meteorological conditions leading up to the mid-February, 1986 flooding along the Carson and Truckee Rivers, including precipitation records, and a description of the impacts of the flooding, including National Weather Service bulletins.

- **Current Plan Development Report, Truckee Meadows (Reno-Sparks-Metropolitan Area) Nevada; prepared by the Army Corps of Engineers, Sacramento District; July, 1990.**
  - Description of the "Current Plan" being developed by the Corps of Engineers for the Truckee River and tributaries from Reno downstream through Sparks and the Truckee Meadows area in Washoe County north of Huffaker Hills. The Plan includes the Huffaker Hills Dam, a

downstream high-flow channel, levees, floodwalls, excavation, and bridge replacements.

- **Refinement Study, Truckee Meadows (Reno-Sparks Metropolitan Area), Nevada; prepared by the Army Corps of Engineers, Sacramento District; February 1, 1989.**
  - A discussion of potential refinements to the Truckee Meadows project to be studied during the Preconstruction Engineering and Design phase of the project. The project refinements considered include: assessment of the consideration given the Brown Plan; incorporation of the UNAES detention basin into the project; possible reduction of levee freeboard; elimination of Standard Project Flood structural features; and location of marsh enhancement features. Discussion is also provided regarding the Corps' responsibilities in fulfilling requirements of the National Historic Preservation Act of 1966, an assessment of the downtown Reno floodwalls, and local cost share credit requests.

- **Hydrology Office Report Update for the Truckee Meadows, Nevada General Design Memorandum - Spanish Springs and Huffaker Hills Detention Facilities Site Evaluations; prepared by the Army Corps of Engineers, Sacramento District; January, 1989.**
  - A memorandum presenting the results of the revised hydrology for Spanish Springs Valley, including evaluation of two reservoir sites in Spanish Springs Valley and one at the Huffaker Hills Narrows.

- **Office Report for the Truckee Meadows, Nevada General Design Memorandum - Hydrology Review and Update; prepared by the Army Corps of Engineers, Sacramento District; May, 1989.**
  - Results of the hydrology review and update for the Truckee Meadows area and for Spanish Springs Valley, evaluation of the two reservoir sites in Spanish Springs Valley, and a project-level evaluation of the Huffaker Hills Dam site on Steamboat Creek.

- **Office Report: Truckee Meadows (Reno-Sparks Metropolitan Area), Nevada Project; prepared by the Army Corps of Engineers, Sacramento District; May, 1992.**
  - Update to prior reports dealing with proposed flood control and recreation improvements. New evaluations indicated that the project was economically unfeasible with a benefit-to-cost ratio (BCR) of 0.42 to 1. The project was correspondingly reclassified from an active to a deferred category.

- **Major Drainageways Plan, City of Reno**
  - This Plan identifies critical drainage areas in the City of Reno and surrounding area and presents strategies for their treatment and maintenance. The focus of the Plan is to address the visual appearance and uses of specific major drainageways. Of particular concern are those

drainageways that are important to public health, safety and welfare and those that retain additional public values. The document includes a resource analysis, policy analysis, implementation strategies and recommendations designed to preserve and improve these public resource areas.

- **"Draft" Preliminary Feasibility Analysis, Whites and Thomas Creeks Flood Control Detention Basins; prepared by Nimbus Engineers; March, 1994.**
  - Preliminary feasibility study for the construction of regional detention basins near the base of Mt. Rose at Timberline Road to attenuate flood discharges experienced in downstream reaches of Whites Creek and Thomas Creek.

B. Contacted Parties

The following individuals have been contacted on one or more occasions to discuss existing information and present preliminary findings and approaches:

- Craig McConnell, Washoe County Public Works
- David Price, Washoe County Public Works
- Leonard Crowe, Washoe County Comprehensive Planning
- Kirk Nichols, Washoe County Public Works
- David Roundtree, Regional Water Management Agency
- Peggy Bowker, Nimbus Engineers
- Mark Forest, Kennedy/Jenks Consultants
- Amir Soltani, NDOT
- Chris Miller, NDOT
- Paul Frost, NDOT
- Robert Sader, Attorney
- Alex Fittinghoff, CFA
- Samuel Chacon, CFA
- Participants of two (2) Initial Workshops

Several meetings have been held with the staff of Washoe County cited above, and a First Draft of the Preliminary Whites Creek Basin Management Study was prepared and submitted to Washoe County on December 7, 1993. It is anticipated that several additional interested parties will be brought into the review and evaluation process as a part of refining and finalizing this current draft of the Preliminary Whites Creek Basin Management Study.

C. Hydrologic and Hydraulic Reports for Development Projects

Numerous hydrologic and hydraulic reports prepared for existing and proposed development projects within the lower Whites Creek watershed have been reviewed, and information provided in said documents has been incorporated into the evaluation of existing conditions and formulation of interim policies.

D. Base Map

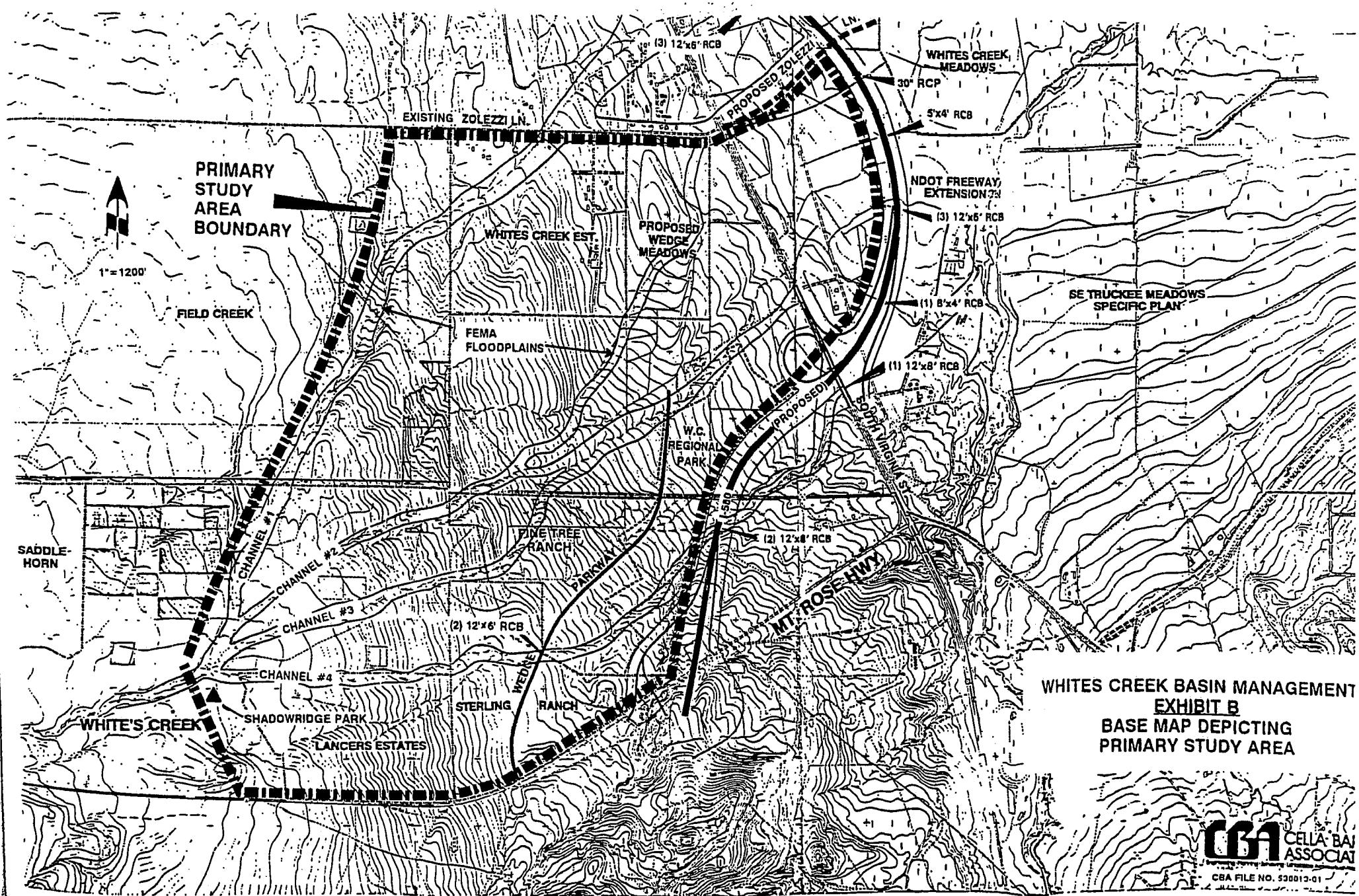
A base map has been prepared that assimilates the location of existing and proposed development projects, highway improvements, drainage structures, FEMA floodplain boundaries and other significant features within the primary study area comprising the lower Whites Creek watershed. The underlying information on the map consists of five foot (5') contour interval topography developed in 1966 by NDOT. Though the topography has been altered locally by improvements related to land development since 1966, much of the topographic features have essentially remained unchanged since that time, and the general overall topography of the lower watershed is substantially correct on the base map. This base map and pertinent information is represented as Exhibit B.

E. Geologic Mapping

The Nevada Bureau of Mines and Geology was contacted to determine the nature and extent of geologic mapping that has been performed in the lower Whites Creek watershed. In response, CBA acquired Map 4BG, the Mt. Rose NE Quadrangle Geologic Map prepared in 1983 by H.F. Bonham, Jr. and David K. Rogers. This map includes most of the Whites Creek watershed north of Mount Rose Highway and west of U.S. 395. Geologic units delineated on the map in the study area consist primarily of the Upper Pleistocene (greater than 10,000 years old) Tahoe Outwash-Mount Rose Fan Complex and Donner Lake Outwash-Mount Rose Fan Complex adjacent to the flow split near Shadowridge Park and covering large areas downslope, and younger Alluvial Bajada deposits of the Holocene age (less than 10,000 years old) along two of the four primary channels (Channels #2 and #4, Exhibit B) and adjacent to U.S. 395. Exhibit C depicts generalized surface geologic characteristics derived from soils information.

F. Field Investigations

Several field investigations have been performed within various portions of the Whites Creek watershed, with particular emphasis on the primary study area of the lower Whites Creek watershed. Information derived from these field investigations, as well as from the data collection effort and discussions with Washoe County staff and other key individuals, have facilitated the formulation of conclusions presented in this Preliminary Basin Management Study.



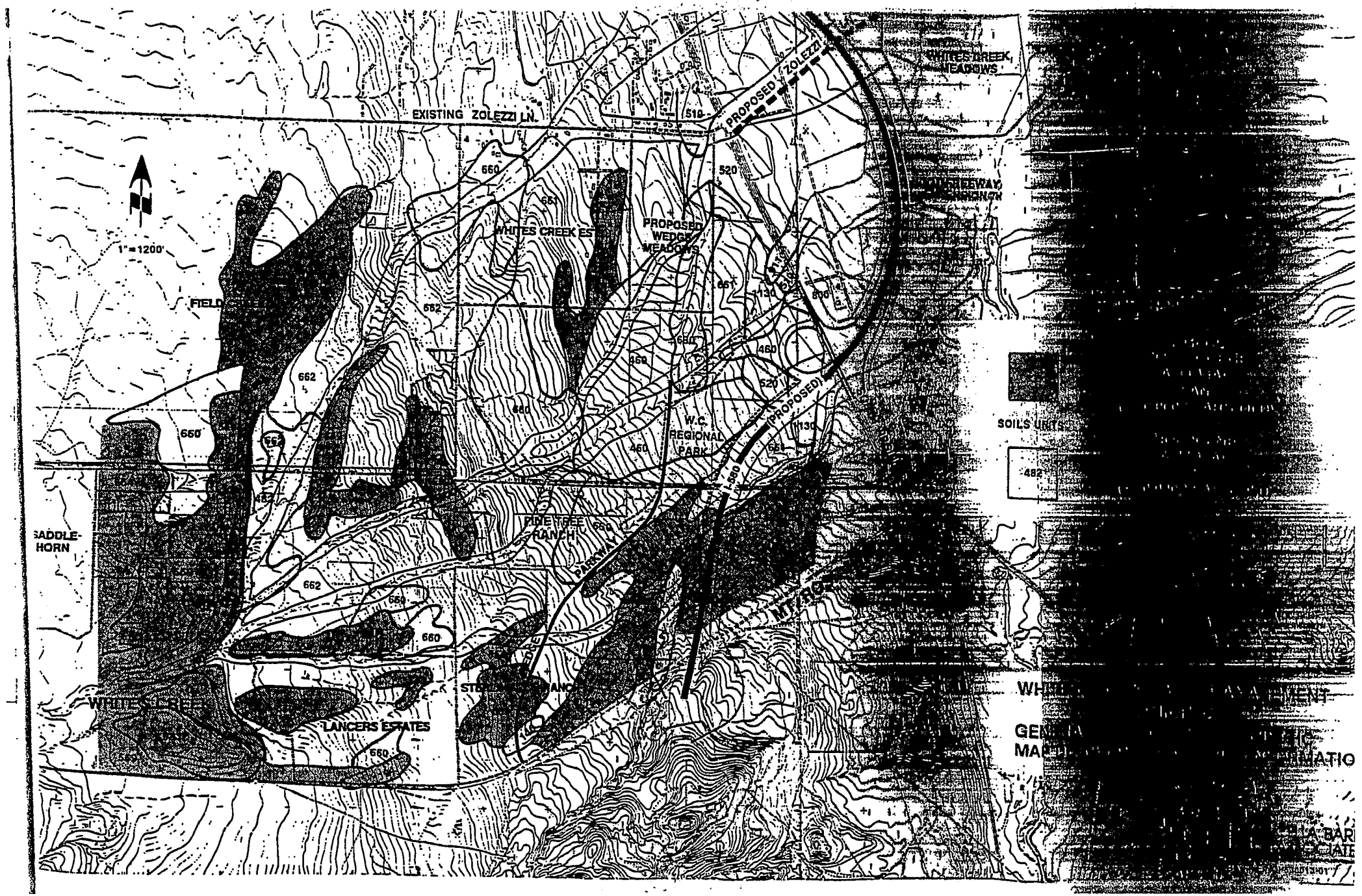
WHITES CREEK BASIN MANAGEMENT

EXHIBIT B

BASE MAP DEPICTING PRIMARY STUDY AREA

CBA CELLA BA ASSOCIAT

CBA FILE NO. 530013-01


EXISTING ZOLEZZI LN.
PROPOSED ZOLEZZI
WHITES CREEK MEADOWS
WHITES CREEK EST
PROPOSED WEDGE MEADOWS
1"=1200'
FIELD
W.C. REGIONAL PARK
SOILS UNITS
482
SADDLE-HORN
PINE TREE RANCH
PARKWAY
LANCERS ESTATES
660
662
520
460

II. OPINIONS, ACCEPTANCE AND CONCURRENCE PERTINENT TO EXISTING STUDIES

Based upon a review of existing studies and reports, field reconnaissance and discussions with Washoe County staff and other key individuals, the following fundamental conclusions have been drawn with regard to the lower Whites Creek watershed.

A. **Magnitude of the 100-Year Discharge for Whites Creek** - CBA reviewed the hydrologic analyses and various calculated values for the 100-year discharge for Whites Creek as presented in the background materials provided by Washoe County in an effort to establish a value that would be most appropriate for use in basin management planning activities. After completion of our review, we have concluded that the 100-year discharge magnitude of **5100 cfs** for Whites Creek at Shadowridge Park should be utilized for the current basin management planning activities, at least until such time that a detailed and comprehensive hydrologic analysis is performed. Our rationale for this recommendation is as follows:

1. The HEC-1 analysis presented in the Whites Creek Detention Feasibility Study for NDOT appears to be reasonable.

2. Although technically outside of CBA's Scope of Work for this Preliminary Basin Management Study, CBA modified selected parameters in the HEC-1 analysis cited above to determine their impact upon the calculated discharge for Whites Creek at Shadowridge Park. These modifications included the use of normal depth calculations with varying roughness values along routing reaches, adjustments to impervious cover and adjustments to lag time calculations. The result of these various modifications was that the calculated 100-year discharge for Whites Creek at Shadowridge Park was lowered by as much as 1000 cfs under certain sets of assumptions and elevated by as much as 1000 cfs under other sets of assumptions. Within this range of impacts it appears that the 5100 cfs value is reasonable.

3. Downstream drainage structures along I-580 are being sized in consideration of an upstream discharge of 5100 cfs at Shadowridge Park, thus providing support to this value in terms of system compatibility.

4. In the absence of detailed analyses that would be pertinent to the preparation of the actual Basin Management Plan or a specific and comprehensive hydrologic investigation, it is more prudent to utilize conservative base assumptions in the development of interim basin management policies. The 5100 cfs value appears to be reasonable, yet conservative, and it is the highest of the values calculated from the prior studies reviewed by CBA.

Updated meteorological analyses are currently being performed as a part of the Washoe County Flood Control Master Plan. Upon completion of the updated meteorological analyses and their acceptance by Washoe County, it may be advantageous to revisit the adopted 5100 cfs value to determine if a revision is warranted.

B. **Distribution of the 100-Year Discharge for Whites Creek Downstream of Shadowridge Park** - Whites Creek at Shadowridge Park represents the location where flows are initially distributed across the lower Whites Creek watershed area under investigation. Flow is distributed into one or more of essentially four (4) channels that traverse the lower Whites Creek watershed, ultimately delivering proportionate runoff to the Steamboat Creek area east of U.S. 395. The flow distribution in the Shadowridge Park vicinity is impacted by the following:

1. The magnitude of the discharge collected at said location.

2. The extent to which existing vegetation within the channel becomes denuded by flood flows.

3. The existence of debris flow during a characteristic flood event.

4. The topographic definition of flow paths that exists immediately downstream prior to and during a given flood event.

During a 100-year flood event, it is CBA's opinion that, under existing conditions, it is not possible to accurately predict the distribution of the total discharge that will be allocated to each of the channels forming downstream of the Shadowridge Park area. Perhaps the most significant variable that limits the predictability of the distribution is the potential occurrence of debris flow within Whites Creek. Evidence of prior debris flows is readily identifiable in the field and is characterized by numerous residual large boulders that have been transported from the defined channel upstream of Shadowridge Park to various locations along channels and other areas downstream within the lower Whites Creek watershed. The occurrence of a debris flow will result in a slug of concentrated boulders, sediment and vegetation moving down the defined channel to be distributed at varying locations downstream of the defined channel as flow depth and velocities are diminished through expansion of the flow width.

The potential for debris flow can significantly impact the initial flow distribution originating at Shadowridge Park by effectively diverting flows in a random manner from one downstream channel to another and blocking some of the available flow areas during a given flooding event. For this reason, it is most appropriate to examine the flow distribution in terms of preferential values of proportional discharges to be applied to each downstream channel, from a future planning perspective for new development and infrastructure improvements. The flow distribution presented in the Whites Creek Detention Feasibility Study for NDOT would appear to be reasonable in this regard, as proportional discharges

are somewhat equitably allocated to each of the four (4) downstream flow paths and as these distributions have been applied to the design of downstream drainage structures at I-580.

The distribution recommended for adoption by CBA for each of the four primary channels is represented below:

Channel	Allocated Discharge
#1	700 cfs
#2	1950 cfs
#3	1100 cfs
#4	1350 cfs
Total	5100 cfs

These values may be applied to each channel as a future design capacity goal, but are not representative of actual existing conditions due to the dynamic unpredictability of the flow distribution and potential for debris flow. For floodplain management purposes, a probabilistic approach must also be applied to facilitate the selection of a 100-year discharge rate that may enter each of the four (4) channels downstream of Shadowridge Park under existing conditions.

Based on an assessment of probability, CBA has concluded that a flow of approximately 3000 cfs has a one percent (1%) chance of being delivered to any of the four (4) available flow paths in any given year (i.e., a 100-year event). This conclusion was derived as follows:

- 5100 cfs has a 1 in 100 chance of occurring at Shadowridge Park (100-year event).
- Conservatively, there is a 1 in 4 chance of the entire flow at Shadowridge Park being delivered to any of the four (4) downstream flow paths.
- 3000 cfs has a 1 in 25 chance of occurring at Shadowridge Park (25-year event).
- The product of the probabilities of the 1 in 4 chance (flow paths) and the 1 in 25 chance (25-year discharge at Shadowridge Park) is a 1 in 100 chance for 3000 cfs to be delivered to any of the four (4) flow paths, or a 100-year event.

CBA derived the 3000 cfs value for the 25-year discharge at Shadowridge Park by applying 25-year precipitation values represented on available NOAA atlases

to the HEC-1 model presented in the Whites Creek Detention Feasibility Study for NDOT. Since the standard for floodplain management in Washoe County and per FEMA is the 100-year event, floodplain conditions along each of the four (4) flow paths downstream of Shadowridge Park need to be established under the assumption that 3000 cfs is initially delivered to them. Until such time as structural measures are implemented that will serve to establish the flow distribution desired for 5100 cfs at Shadowridge Park, a flow of 3000 cfs being delivered to each flow path must be considered in the design of development projects within the lower Whites Creek watershed.

C. **Existing Problem Areas** - As a part of the field investigations performed by CBA staff and the review of available information, several problem areas or potential problem areas were identified within the lower Whites Creek watershed in terms of flooding potential associated with development projects and existing infrastructure improvements. The following listing represents a preliminary identification of potential problem locations that may merit further investigation as a part of future studies. It must be noted that CBA's conclusions are not substantiated by detailed calculations, but have been based upon engineering judgement; hence, the following listing may not be complete and/or some of the listed locations may be determined to not have problems from a flood hazard or capacity perspective upon closer, more detailed examination.

1. **Existing Culverts Along U.S. 395** - All of the existing drainage structures that drain Whites Creek flows are substantially inadequate to convey distributed discharges underneath the roadway during a 100-year flood event. The existing highway will cause upstream ponding of stormwater runoff and, when ponded flood waters reach sufficient levels, sheet flooding across the highway will occur.

2. **Old Virginia Street Culverts** - Inadequate drainage structures exist across Old Virginia Street, and similar conditions will prevail as described for U.S. 395.

3. **Zolezzi Lane Drainage Structures** - The drainage structure crossing of Zolezzi Lane that serves Channel #1 is of substantially insufficient capacity to pass the proportioned 100-year discharge. The existing roadway will divert some of the flow east along the south side of Zolezzi Lane and some of the flow will spill northerly across the roadway. At the intersection of Zolezzi Lane and U.S. 395, there is virtually no provision for accommodating runoff originating from Channel #2 (with some spillover flow from Channel #3), and flooding of this intersection will occur during a 100-year event.

4. **Existing Residential Structures Immediately Downstream of the Defined Channel at Shadowridge Park** - Several existing residential structures at this location are subject to a high flood and debris flow hazard during a 100-year flood event.

5. **Whites Creek Estates** - Some of the existing residential structures adjacent to Channel #1 have a potential for flooding during a 100-year event as induced by spillover from the channel at subdivision street crossings or by limitations in channel capacity.

6. **Lancers Estate** - Some of the residential lots backing up adjacent to the south of Channel #4 have a potential for flooding during a 100-year event.

7. **Existing Residential Structures South of Whites Creek Lane, West of the Proposed Pine Tree Ranch Subdivision** - Several of these structures have a potential for flooding from Channels #2 and #3 during a 100-year flooding event.

8. **Wedge Parkway** - Wedge Parkway is elevated from one to several feet above existing grade and crosses the lower Whites Creek watershed somewhat transversely to the direction of drainage flow. The newly constructed segment of Wedge Parkway between the Mt. Rose Highway and Whites Creek Lane will have a tendency to impound runoff in excess of the proportioned discharge of 1350 cfs for Channel #4 on the upstream side of the roadway and divert flow northeasterly along the west side of the roadway toward Whites Creek Lane. The existing drainage structure under construction across Channel #4 appears to have adequate capacity for the proportioned discharge for this flow path, provided the flow is delivered to the drainage structure itself. Currently, it is proposed that the proportioned flow within Channel #4 be channelized and delivered to the drainage structure as a part of the future development of Sterling Ranch.

It should be reiterated that the above observations and conclusions of system capacity problems are based upon preliminary investigations, only, and will require further substantiation as additional more detailed studies are performed.

III. QUALITATIVE EVALUATIONS OF FLOODING CONDITIONS

To date, floodplain administration within the lower Whites Creek watershed has been based primarily upon floodplain information presented on the FEMA Flood Insurance Rate Maps for Washoe County, Panel Numbers 1501 (Effective date: August 1, 1984) and 1463 (Effective date: April 16, 1990). The floodprone areas depicted for the lower Whites Creek watershed are represented as "Zone A" which indicates that they were originally studied using approximate methods only. Based upon CBA's experience as a Flood Insurance Study Contractor with FEMA, the degree of detail that would have been inherent to these approximate Zone A designations was undoubtedly minimal and, per FEMA guidelines, would have been limited to a cursory review of USGS quad sheets, aerial photographs, and primary low flow paths. It is CBA's professional opinion that the extent of the floodplains represented on these FEMA Flood Insurance Rate Maps for the lower Whites Creek watershed is significantly understated.

In order to accurately delineate the extent and characteristics of flood hazard areas within the lower Whites Creek watershed, a detailed hydrologic and hydraulic analysis will be needed, which is outside the scope of the current study. Such an analysis will need to include the following:

1. Refinement of the total 100-year discharge value of 5100 cfs for Whites Creek at Shadowridge Park, if appropriate.

2. Acquisition of current topographic mapping of the lower Whites Creek watershed with a minimum contour interval of two feet (2').

3. Hydraulic evaluations of flow characteristics across the lower Whites Creek watershed utilizing a combination of HEC-2 evaluations, normal depth calculations, weir flow calculations and culvert capacity calculations.

The detailed floodplain analysis should be performed at the earliest possible date in order to supplement the information contained in the current study; to more accurately define floodplain limits and characteristics; and to provide better information to be utilized in the design of new development and infrastructure projects. The analysis should consider both of the following assumptions pertinent to the flow distribution originating at Shadowridge Park:

- The existing conditions which create a potential for the total discharge of 3000 cfs (or a revised number, if applicable) being delivered to any of the four (4) downstream channels (see Section II.B.).

- Future conditions that would prevail if the flow distribution becomes fixed at Shadowridge Park through the implementation of structural measures or if the overall flow in Whites Creek is attenuated through implementation of other upstream structural measures.

As a part of this study, CBA performed a very preliminary analysis to estimate the extent and magnitude of flooding that currently has a potential of occurring within the lower Whites Creek watershed during a 100-year storm event. This analysis utilized USGS quad sheets, current aerial photographs, field investigations, the 1966 topographic mapping acquired from NDOT and rough normal-depth calculations performed across hypothetical flat cross sections of varying widths and slopes. Based on evaluations of the above, it is CBA's opinion that, under existing conditions, much of the lower Whites Creek watershed would be subject to "shallow sheet flooding" during a 100-year event. Approximate flood zones and average 100-year flooding depths have been delineated and are represented on Exhibit D. The flood zone designations that have been utilized in the approximate floodprone area mapping represented on Exhibit D are:

- Minimal Flooding Potential, Average Depth Less Than 0.5 feet
- Sheet flow, Average Depth = 0.5 feet
- Sheet flow, Average Depth = 1 foot
- Sheet flow, Average Depth Greater Than 1 foot

The approximate floodprone areas have attempted to account for the impacts of the construction of Wedge Parkway and I-580. In determining the shallow flooding zones, CBA assumed that a discharge of 3000 cfs may be directed to any of the four (4) primary channels originating downstream of Shadowridge Park. At such time as structural measures are implemented to attenuate the total flow or define the flow distribution for the downstream flow paths originating near Shadowridge Park, the extent and severity of flooding for the downstream areas within the lower watershed will be appreciably reduced.


EXISTING ZOLEZZI LN.
HIGH FLOW
PROPOSED ZOLEZZI LN.
LOW FLOW
WHITES CREEK MEADOWS
NDOT FREEWAY EXTENSION
1"=1200'
FIELD CREEK
(PROPOSED)
Q = 700 CFS
Q = 1,550 CFS
Q = 1,100 CFS
Q = 1,350 CFS
ALL Q100 = 5,100 CFS
WHITE'S CREEK
SHADOWRIDGE PARK
LEGEND
DRAINAGE CORRIDOR/ CORRIDOR NUMBER
700 CFS
CORRIDOR DISCHARGE VALUE
AVERAGE DEPTHS
SHALLOW FLOODING *
(LESS THAN 0.5 FEET)
APPROXIMATE

IV. QUALITATIVE GEOMORPHOLOGY

CBA has performed a qualitative assessment of the types of fluvial processes that occur within the lower Whites Creek watershed downstream of the flow split at Shadowridge Park, in order to assist in the development of design requirements and policies for continued land development activities and infrastructure improvements proposed within the area. This assessment is based on field reconnaissance; the Soil Survey of Washoe County, Nevada, South Part prepared by the United States Department of Agriculture, Soil Conservation Service (August, 1983); geologic mapping of the Mt. Rose NE Quadrangle prepared by H.F. Bonham, Jr. and David K. Rogers (1983) and published by the Nevada Bureau of Mines and Geology; aerial photographs; and 1966 topography obtained from the Nevada Department of Transportation. In addition, two papers have been consulted extensively: "Alluvial Fan: Proposed New Process-Oriented Definitions for Arid Southwest" by Richard H. French, Jonathan E. Fuller, and Steve Waters (Journal of Water Resources Planning and Management, Vol.119, No. 5, September/October, 1993); and "Geologic Insights into Flood Hazards in Piedmont Areas of Arizona" by Philip A. Pearthree (Arizona Geology, Vol. 21, No. 4, Winter 1991, Arizona Geological Survey).

Alluvial fans are complex landforms. They are typically cone-shaped features containing boulders, gravel, sand and fine sediments that have been eroded from mountain watersheds and deposited on the adjacent piedmont or valley floor. In general, alluvial fans in the Southwest can be classified as active alluvial fans, distributary flow areas, and inactive alluvial fans (French, et al, 1993). A brief description of each type of fan is provided below to aid in understanding the geomorphic characteristics of the lower Whites Creek watershed.

Processes associated with active alluvial fans include rapid channel migration, debris flows, hyper-concentrated sediment transport, channel bank erosion, local bed scour and flash flooding. These fans are characterized by the following:

- Drastic changes in channel pattern and frequent channel movement;
- Bifurcating channel patterns that radiate outward in the downstream direction and that may be discontinuous;
- Low channel capacities with channel flow changing to sheetflow in the downstream direction;
- Recent and relatively uniform deposition of sediment across the fan surface;
- Debris flow levees;
- Weak soil development;
- Immature vegetative communities;
- Limited topographic relief; and,
- Lack of bedrock exposure.

In contrast, **inactive alluvial fans** are subject to sheet flooding, local deposition and scour within a stable channel pattern, extensive sediment transport, and flash flooding. Landforms associated with inactive alluvial fans include:

- Tributary drainage networks;
- Channel and/or overbank capacities adequate for significant flood events, and that increase in capacity in the downstream direction;
- Lack of recent deposition of sediment on the fan surface;
- No recent debris flow activity;
- Extensive soil profile development;
- Mature vegetative communities;
- Significant topographic relief; and,
- Bedrock outcropping within or between channels.

Distributary flow areas exhibit a channel pattern similar to active alluvial fans, but experience hydraulic processes more like those of inactive alluvial fans. Processes that occur in distributary flow areas include local scour and fill, divergent flow, stream capture, flash flooding, hyper-concentrated sediment transport, and shifting of runoff among existing channels. These areas can be identified according to the following characteristics:

- Bifurcating channels that radiate outward;
- Lack of channel capacity for significant flood events;
- Channels that are poorly defined and that may be discontinuous downstream;
- Sheet flooding;
- No debris flow activity below the fan apex;
- Broad floodplain with no apparent stream terraces;
- Low to variable topographic relief;
- Variable soil development;
- Immature and mature vegetation;
- Stable, although not completely predictable, flow paths.

Whites Creek originates on the eastern flank of Mount Rose (elevation 10,778 feet), from which it delivered to the base of the mountain front, at an elevation of approximately 6000 feet. From this location flow expands for a distance of approximately 3500 feet downstream from the mountain front, then becomes re-confined into a channel that is entrenched into an old alluvial fan surface. This alluvial fan surface is probably of Pleistocene age (greater than 10,000 years old), as upper piedmont areas near mountain ranges throughout the Southwest are often dominated by abandoned alluvial fans of this age. The entrenched Whites Creek channel continues in the downstream direction until it reaches a concrete, low flow splitter structure at Shadowridge Park. At this location flow exits the defined channel onto the lower Whites Creek basin, which is characterized by a radial, distributary flow network dominated by four channels. These channels are characterized by low, but variable flow capacity, resulting in generally unconfined distributary flow and alluvial-fan activity downstream of the concrete flow splitter.

Using the classification scheme outlined briefly above, the Whites Creek basin, below the flow split at Shadowridge Park, exhibits characteristics of both an active alluvial fan and a distributary flow system. Based on field reconnaissance, the lower Whites Creek basin displays the following characteristics:

- Radiating channel pattern from the apex (Shadowridge Park area) to the toe of the fan;
- Relatively stable channel pattern; we did not see any evidence of recently abandoned channels indicative of channel migration or avulsion (sudden changes in the course of a channel);
- Generally low channel capacities with no definite trend towards increases in channel capacity in the downstream direction; confinement of flow varies greatly, depending upon fan topography and Quaternary geologic faulting.
- Recent debris flow activity, as evidenced by debris flow deposits at the apex and downstream. One boulder train at the apex, between Channels #1 and #3, is located on a geologically young (Holocene) surface;
- Sheetflooding, increasing in the downstream direction and particularly adjacent to U.S. 395, resulting from poor channel definition and detention of flow created by U.S. 395 and adjacent development;
- Variable topographic relief across the fan;
- Relatively weak soil development throughout most of the fan.

Soil profile development provides a tool to use in determining how old an alluvial surface is, as such factors as silt, clay and calcium carbonate content tend to increase with age. Soils can be used, therefore, to determine approximate ages of surfaces and, therefore, which surfaces have been subject to recent flooding, erosion and deposition. The Soil Survey maps produced by the Soil Conservation Service depict much of the Whites Creek basin below the fan apex at Shadowridge Park as being occupied by Oest soils, described primarily as bouldery or sandy loams. Additional soil units adjacent to and immediately west of U.S. 395, the Surprise sandy loam and the Dithod sandy loam, are described mainly as coarse sandy loams that are subject to flooding. Based on the soil descriptions, the Oest, Surprise and Dithod units can be interpreted as being young soils of Holocene age (less than 10,000 years old) and younger (see Exhibit C).

The Whites Creek fan also contains remnants of Leviathan and Spasprey stony sandy loams, which make up the higher alluvial fan surface into which Whites Creek has entrenched its channel upstream of Shadowridge Park and which also exist on topographically high areas of the lower Whites Creek basin. These latter soil units can be interpreted as being of Pleistocene age (greater than 10,000 years) or older, and therefore, have not been subject to any significant flooding for at least 10,000 years (see Exhibit C). This corroborates well with the approximate floodplain information presented on Exhibit D.

With the exception of the Pleistocene-age alluvial deposits upstream of and adjacent to the fan apex, and the relatively high Pleistocene-aged remnants on the lower fan, it is our opinion that most of the lower Whites Creek basin has been and is currently subject to flooding, erosion and sediment deposition. This is in distinct contrast to the geologic mapping of the Whites Creek watershed published by the Nevada Bureau of Mines and Geology. As previously stated, this mapping shows most of the lower basin to be covered by Pleistocene-age Tahoe Outwash - Mount Rose Fan Complex and Donner Lake - Mount Rose Fan Complex alluvial deposits, with Holocene deposits located primarily along the toe of the fan adjacent to U.S. 395. It is our professional opinion, based on field reconnaissance, that the Soil Survey more accurately reflects current geomorphic processes within the lower basin than the geologic map.

In summary, the lower Whites Creek basin displays some characteristics typical of active alluvial fans and some characteristics typical of distributary flow areas. It is subject primarily to relatively unconfined flooding and sheetflow, and debris flow activity that will be most prevalent in the vicinity of the fan apex and immediately downstream. In our opinion, during significant flow events large quantities of sediment varying in size from small particles to boulders and other debris are likely to be carried by Whites Creek onto the alluvial surface downstream of the concrete flow splitter. Where this sediment and debris are deposited will impact where flooding occurs. It is likely that flow will spread out across the upper fan area immediately downstream of the concrete flow splitter, distributing itself initially among the three channels immediately below the fan apex (Channels #1, #3 and #4) and areas in between. (Channel #2 begins as a divergence from Channel #1 a short distance downstream from the apex.) Within a short distance downfan, topographic relief increases and likely constrains the extent of flooding until the toe of the fan is reached. Because the existing channel pattern appears to be fairly stable, in comparison to a classic, active alluvial fan, rapid channel migrations or avulsion are not anticipated. Shallow sheetflooding will dominate the lowermost part of the basin adjacent to U.S. 395 because of the lack of topographic relief in this area and because of the current detention effect produced by the roadway.

V. DOWNSTREAM CONDITIONS

CBA examined downstream channel, floodplain and riparian conditions along Steamboat Creek, including field review. This qualitative assessment was necessitated by the fact that different approaches to resolving flooding concerns within the Whites Creek watershed may impact downstream conditions along Steamboat Creek.

Steamboat Creek is the largest tributary to the Truckee River in the south Reno area. It originates from Washoe Lake, about 15 miles south of Reno, and drains the southern and eastern part of Truckee Meadows, entering the Truckee River near Vista about six (6) miles downstream from Huffaker Hills. The valley floor area is mostly improved meadowlands used for pasture, hay production, and other agricultural purposes. Rural residences are scattered throughout the area, primarily in the vicinity of U.S. 395 and at the higher elevations along the east side of Truckee Meadows. Existing commercial development is very limited.

Per the Washoe County Flood Control Master Plan, Volume I, Steamboat Creek is well defined until it reaches Highway 341. Downstream of this point flow becomes much shallower and wider. The portion of the Truckee Meadows area traversed by Steamboat Creek is subject to severe flooding during periods of high runoff.

Steamboat Creek appears to contain some level of runoff on a perennial basis, which has resulted in the development of wetlands adjacent to the stream channel and within portions of the Truckee Meadows. Approaches to controlling flows within the Whites Creek watershed will have to be examined closely from a water quantity and quality perspective, in order to have as little impact as possible on the existing wetlands and the larger Truckee Meadows area and in order to avoid increasing downstream flooding of existing roadways and structures.

There are two (2) large scale development proposals that cover properties east of I-580 downstream of the primary study area, including Steamboat Creek north to Huffaker Hills. These proposed development projects are named Damonte Ranch and Double Diamond Ranch. The drainage designs for these development projects, as they relate to the Whites Creek basin, will be facilitated by the concentration of runoff at known locations along proposed I-580 and will not be appreciably impacted by variable sheet flooding conditions that currently prevail upstream of proposed I-580.

VI. CONCEPTUAL APPROACHES TO FLOOD CONTROL

Based upon the review of available information and evaluations of existing conditions, it is CBA's recommendation that implementation of all or a combination of the following flood control measures will most effectively simplify continued development and infrastructure improvements within the lower watershed with a reasonable probability of local and community acceptance:

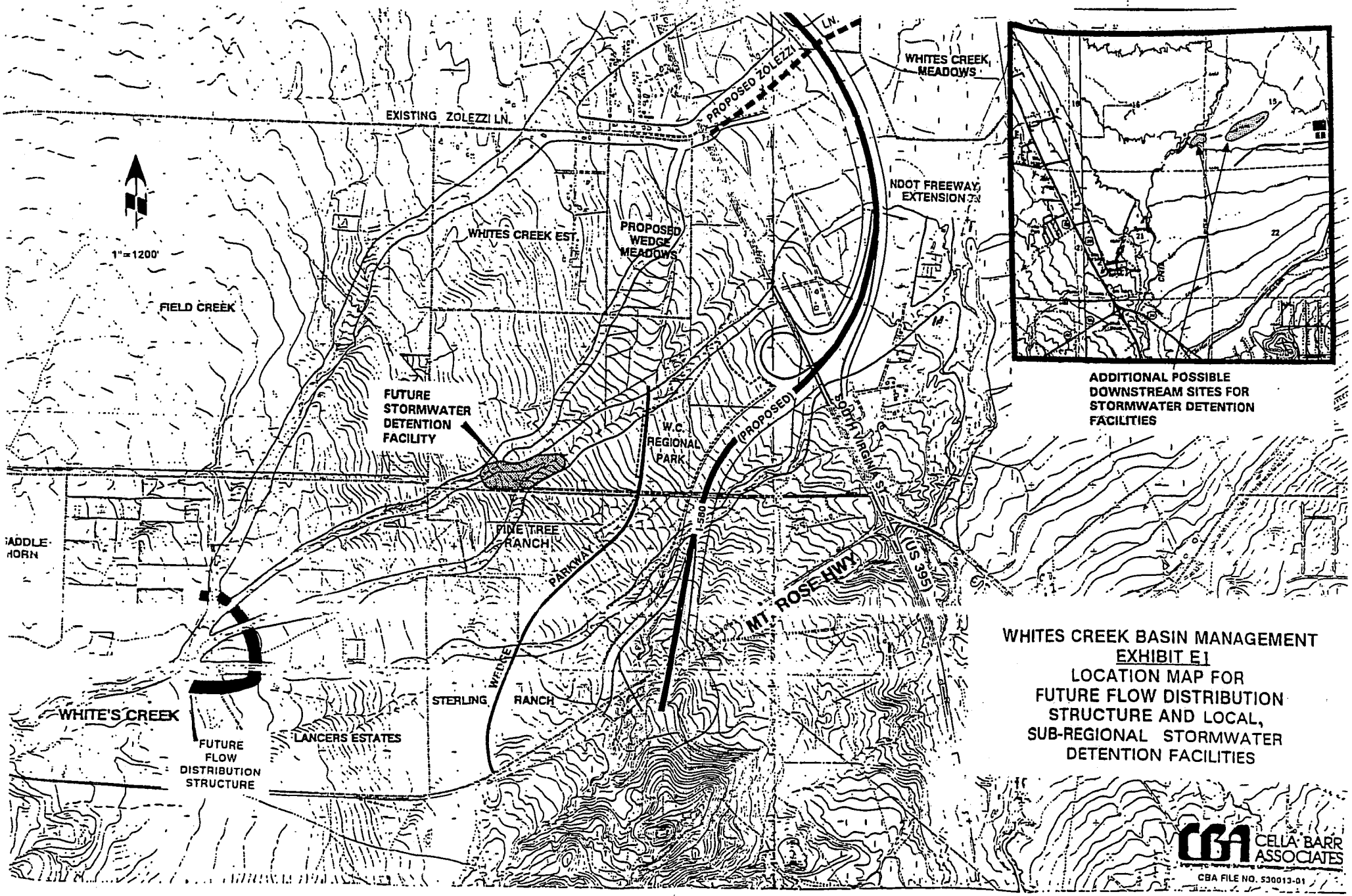
Flow Distribution Structure

Under existing conditions, the distribution of the 100-year discharge to channels downstream of Shadowridge Park is highly unpredictable. This condition produces a greater potential for flooding along and adjacent to each of the downstream channels within the lower Whites Creek watershed. Channels #1 and #4 are currently reasonably well defined or will become well defined with development and infrastructure improvement projects proposed in the near future downstream of Shadowridge Park. Significant co-mingling of flows between Channels #2 and #3 occurs downstream of the initial flow distribution at Shadowridge Park, and this condition is not foreseen to be corrected in the near future.

The establishment of a predictable flow distribution just downstream of Shadowridge Park to allocate applicable percentages of the total 100-year discharge of 5100 cfs to each of the four (4) primary downstream channels will serve to appreciably reduce the flood potential within the entire lower Whites Creek watershed. The greatest immediate benefit in flood hazard reduction will be realized along Channels #1 and #4 and adjacent areas. Channels #2 and #3 will also experience a significant reduction in flood hazard, initially, with further benefits being gained in the future as the co-mingling of flows between these two primary flow paths becomes eliminated as continued development occurs within the lower watershed.

It is recommended that a **flow distribution structure** be considered at the approximate location depicted on Exhibit E1 as soon as such a structure may be designed and funded, in order to proportionately distribute the total discharge for Whites Creek to each of the downstream channels at rates consistent with the values represented on Exhibit D and per the Whites Creek Detention Facility Feasibility Study prepared for NDOT. This flow distribution structure is recommended to consist of a reinforced ring levee with incremental openings at each of the four (4) primary channel areas. A typical schematic cross section of this ring levee is depicted on Exhibit E2.

Although the design cross section and height of the ring levee will need to be determined as a part of a detailed design process, it is our opinion that the required height and proposed slope reinforcement will be relatively visually unobtrusive once constructed. The slope treatment of soil cement depicted on Exhibit E2 is capable of having an earth-colored finish and natural appearance while providing a monolithic barrier that provides significant stabilization against erosion and impact by large boulders and other debris. This concept will also serve to maintain the integrity of the existing perennial nature of Channels #1 and #3, as all four (4) channels would be allowed to pass through the ring



WHITES CREEK BASIN MANAGEMENT
EXHIBIT E1
LOCATION MAP FOR
FUTURE FLOW DISTRIBUTION
STRUCTURE AND LOCAL,
SUB-REGIONAL STORMWATER
DETENTION FACILITIES

CBA CELLA BARR ASSOCIATES

CBA FILE NO. 530013-01

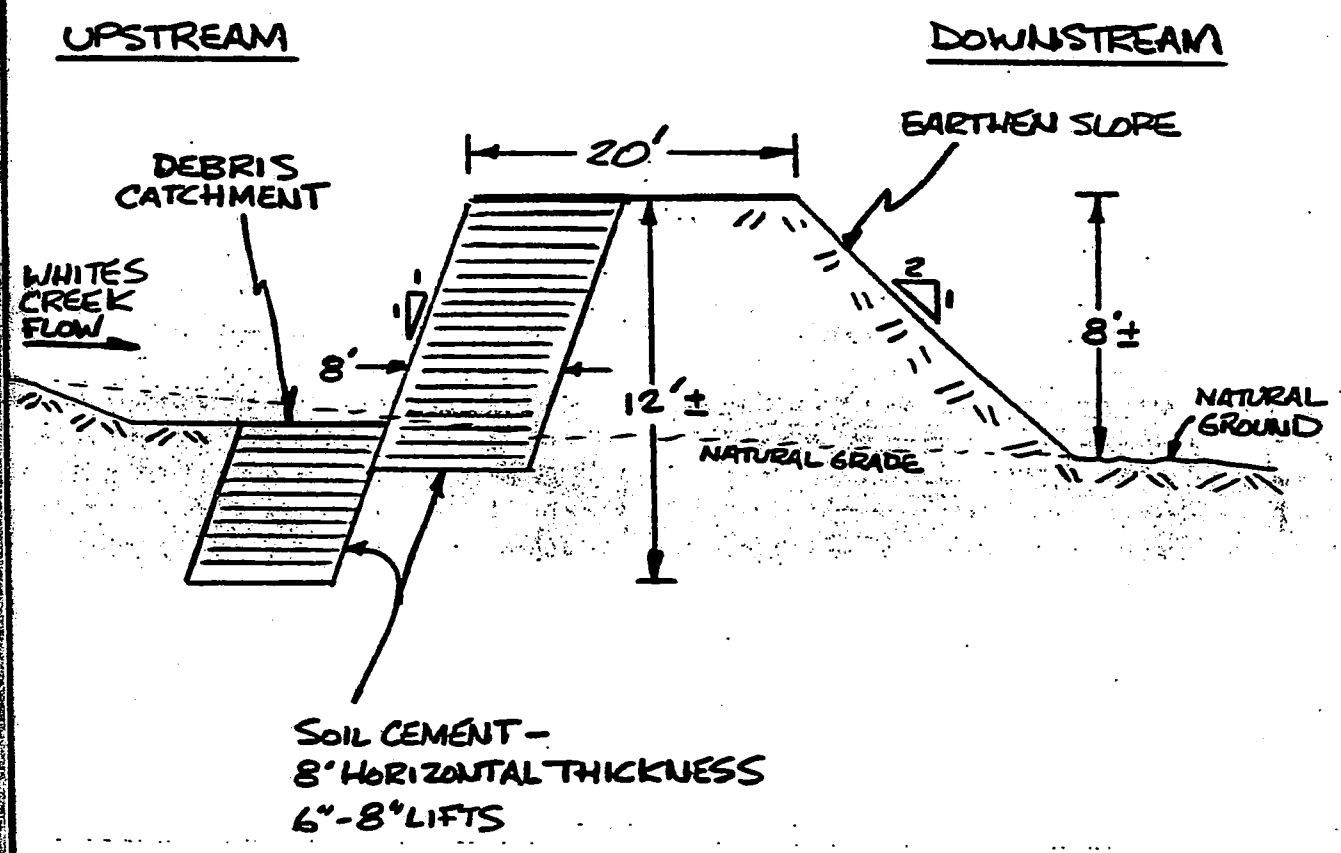
DESIGN NOTES AND COMPUTATIONS

SUBJECT:

EXHIBIT E2

JOB NO.: 530013-01·0930

CROSS-SECTION OF RING LEVEE COMPRISING FLOW DISTRIBUTION STRUCTURE



PREPARED BY: [signature] DATE: 12-6-93 CHECKED BY: SHEET NO.: 1 OF 1

CELLA BARR ASSOCIATES
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levee individually via designated openings. By avoiding structural obliteration of riparian zones inherent to Channels #1 and #3, construction of the ring levee will not fall under the jurisdiction of Section 404 of the Clean Water Act and essentially will allow for the preservation of this existing riparian feature and habitat.

It is envisioned that construction of a ring levee system to serve as a flow distribution structure will allow for an effective desired distribution of flows to occur, if stormwater runoff is designed to pass through the designated openings in the levee system as an equalized and distributed weir flow. In order for this to be accomplished, the alignment of the ring levee will need to be parallel with the existing contours downstream of Shadowridge Park as approximately located on Exhibit E1. Use of a flow distribution structure as described will provide appreciable flood relief for downstream properties at a cost that is significantly less than previous proposals, including the Whites Creek Detention Facility Feasibility Study proposal applicable to this location. It will also be much less visually obtrusive than the detention basin option and will not require the obliteration of existing riparian areas. Actual construction costs, right-of-way/easement requirements and design parameters associated with the flow distribution structure will be developed as a part of subsequent design activities if this approach to flood control is deemed acceptable; however, the total cost is expected to be less than $1,000,000.

Local, Sub-Regional Stormwater Detention Basins

As continued development occurs within the lower Whites Creek watershed, the introduction of impervious surfaces and improved flow conveyance mechanisms (such as streets and excavated channels) will cause increases in rates of runoff experienced downstream of the lower Whites Creek watershed. The quality of runoff, particularly "first flush" runoff, will also diminish as pollutants inherent to land development (such as petroleum products, heavy metals, etc.) will also increase. These increases may have an adverse impact upon flooding and upon existing wetland areas present downstream along Steamboat Creek.

The majority of new development that is expected to occur within the lower Whites Creek watershed will ultimately drain toward primary Channels #2 and/or #3, with little new development draining toward Channels #1 and #4. One approach to addressing the impacts of continued development upon runoff rates and water quality is to require on-site detention of stormwater runoff with each new development project. However, until such time as the flow distribution at the Shadowridge Park area becomes structurally defined and downstream flow paths become predictable, the potential exists for flooding (drowning out) and breaching of local on-site detention facilities during a major storm event that causes overflow of primary channels to occur, and this will tend to have a potential of exacerbating downstream flooding problems. Further, the construction of local on-site detention facilities with new development does not guarantee that the combined timing of regulated flows released from said facilities will provide a reduction in downstream discharges, and thus, the local on-site detention approach as a requirement for new development projects is not an ideal solution.

Instead, it is CBA's recommendation that **local, sub-regional stormwater detention basins** be considered at the approximate locations shown on Exhibit E1 as a more effective means of compensating for increases in runoff rates and for water quality issues associated with new development within upstream portions of the lower Whites Creek watershed. Hence, with the construction of such facilities, development within the lower Whites Creek watershed may occur without consideration of any on-site detention facilities, with the need for such detention being provided by local, sub-regional facilities that serve all of the contributing projects.

The cost, sizing, design requirements and permitting requirements for these local, sub-regional stormwater detention facilities will need to be established as a part of a subsequent detailed design process.

Upstream Regional Detention Basins

Another conceptual approach to providing flood control for the lower Whites Creek watershed is the construction of **upstream regional stormwater detention facilities.** An option under this approach is presented in the "Draft" Preliminary Feasibility Analysis, Whites and Thomas Creeks Flood Control Detention Basins report prepared by Nimbus Engineers (March, 1994). The "Draft" report examines a location that would capture flows from both Whites Creek and Thomas Creek on a 120 acre site near the base of Mt. Rose at Timberline Drive (see Exhibit E3 Location Maps).

The overall concept presented by Nimbus Engineers is to capture and attenuate the peak flows for Whites Creek and Thomas Creek and release them into the existing downstream channels at more manageable rates. The concept also includes a multi-use approach that incorporates passive recreation features, wetlands creation and a waterfowl and wildlife refuge into the flood control design. Groundwater recharge and fisheries enhancements are also being investigated.

Nimbus Engineers has made contact with a number of regulatory agencies and interested parties. All of the agencies contacted have given a positive response to the concept of the project. The agencies contacted to date are:

- U.S. Army Corps of Engineers (COE)
- Nevada State Historic Preservation Office
- Nevada Department of Wildlife
- Nevada Department of Environmental Protection
- Nevada Division of Water Resources
- Washoe County Public Works
- Washoe County Department of Comprehensive Planning
- Regional Water Board

Further input from these agencies and others will be sought as the concept continues to be refined by Nimbus Engineers. The project concept will also be presented to the Southwest Area Citizens Advisory Board (CAB) and the Regional Water Board Technical Advisory Committee (RWBTAC) for their review and comment. A Section 404 Permit

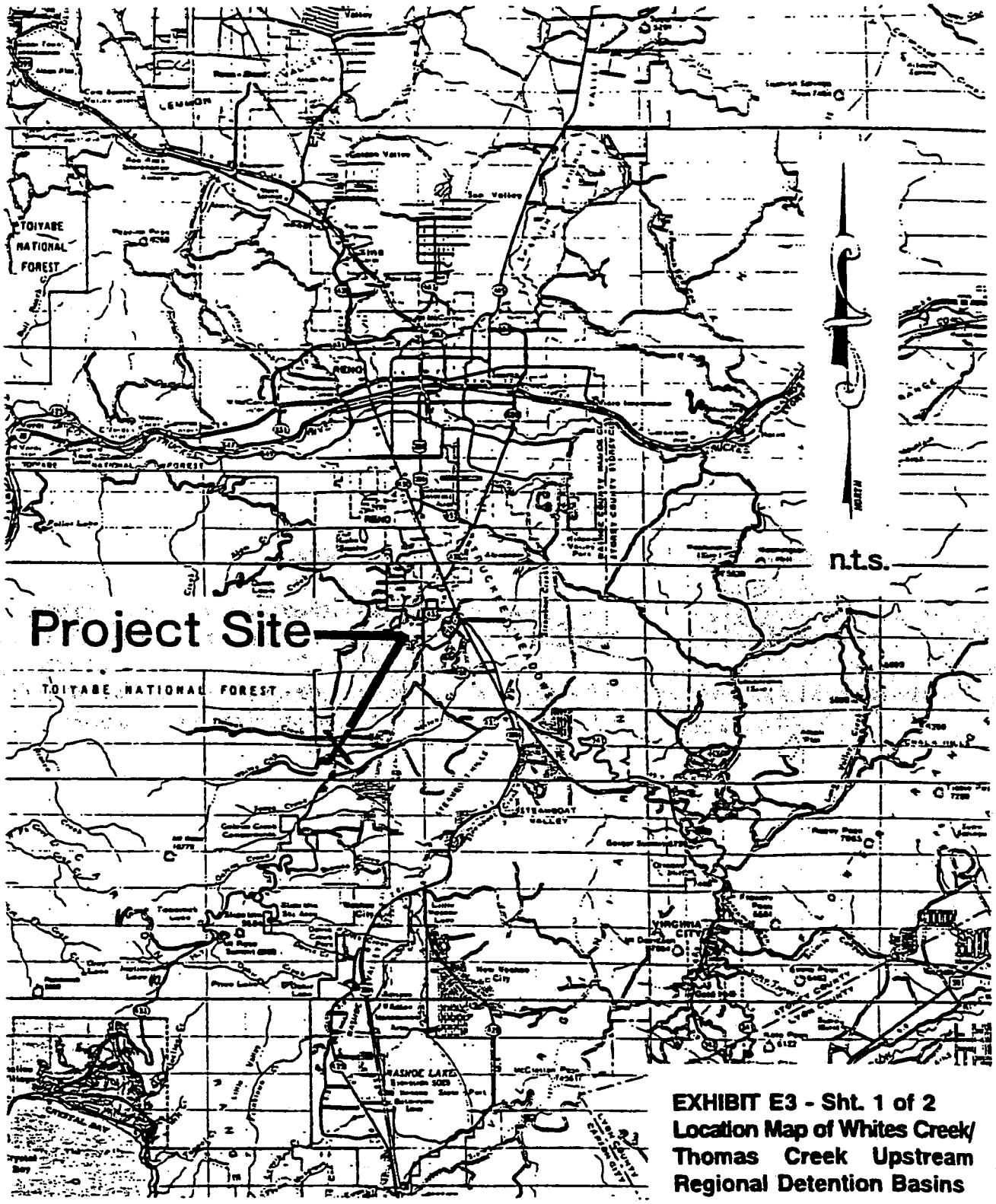
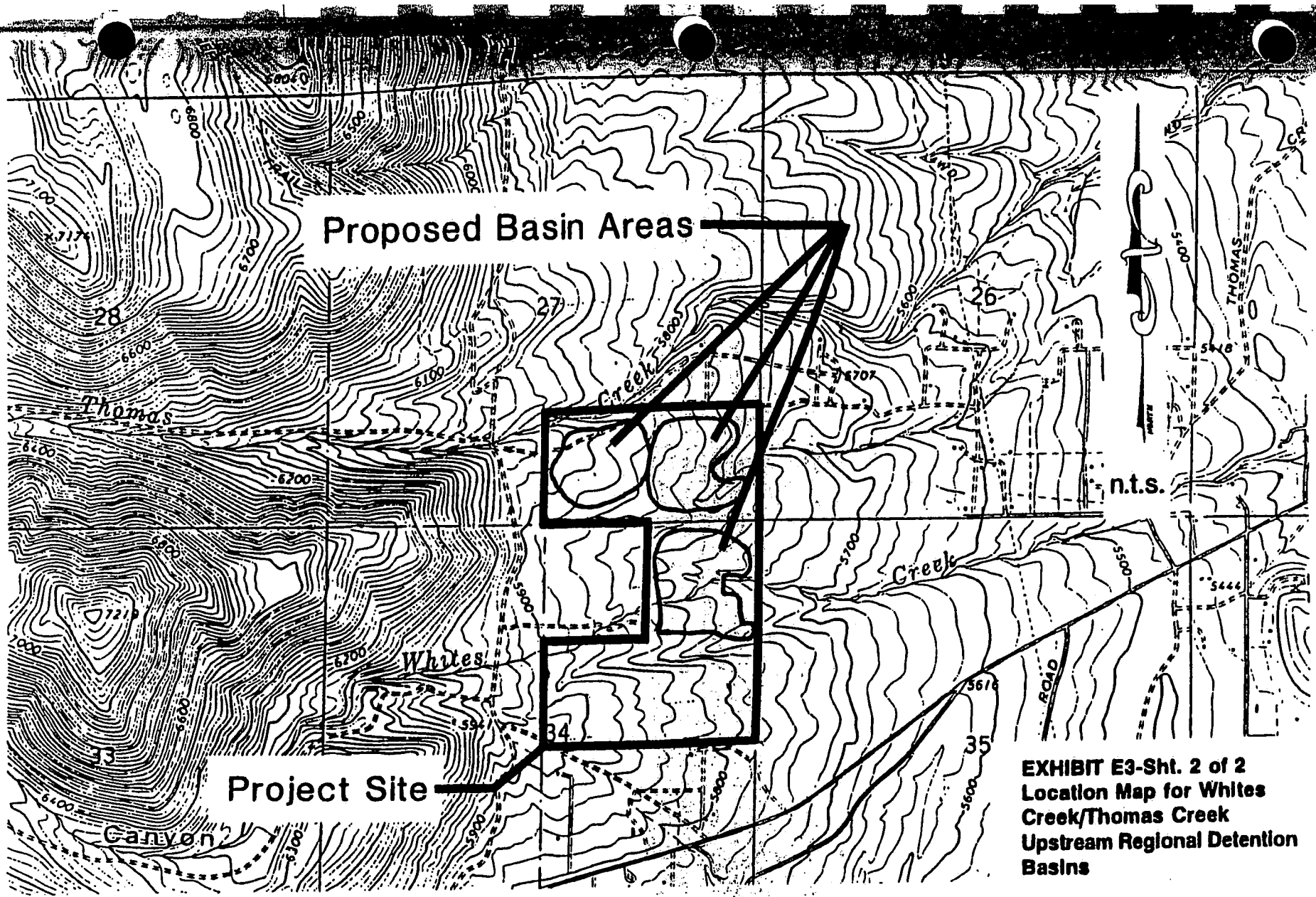


EXHIBIT E3 - Sht. 1 of 2
Location Map of Whites Creek/ Thomas Creek Upstream Regional Detention Basins

Nimbus Engineers
3710 Grant Dr., Suite D, Reno, NV 89509
Mail : P.O. Box 10220, Reno, NV 89510
(702) 689-8630

Location Map



Nimbus Engineers

Figure 1
Project Site

preapplication meeting is scheduled with the COE for April or early May to discuss the project.

Previously developed hydrologic studies of Whites Creek and Thomas Creek were utilized to develop a preliminary size of facilities. The studies used were the Thomas Creek Flood Insurance Study developed for FEMA and the Whites Creek Detention Facility Feasibility Study prepared for NDOT. The hydrologic models for these studies were slightly modified to determine the volume of runoff which would impact the Timberline Road area during a 100-year event.

A preliminary facility size and configuration was developed using the entire volume of flow at Timberline Road and considering the physical constraints of the available site. An initial configuration of three basins, one for Whites Creek and two in series for Thomas Creek was used as a basis for a further analysis and for developing quantities and costs.

The hydraulic characteristics of the regional detention facilities determined from the Nimbus Engineers analysis are as follows:

	Whites Creek	Thomas Creek
Maximum Stage	17.3 ft.	13.8 ft.
Maximum Volume	317 Ac-ft.	308 Ac-ft.
Maximum Outlet Discharge	301 cfs	256 cfs

The estimated 100-year peak flows experienced downstream for the with and without regional detention conditions are given below:

	Without Detention	With Detention
Thomas Creek at Virginia Street	2544 cfs	880 cfs
Whites Creek at Shadowridge Park	5115 cfs	589 cfs

The investigated regional detention basins will require a maximum excavation of 3.9 million cubic yards of material and an estimated construction cost of roughly $12,500,000. Indications are that the excavation quantities could be significantly reduced (and consequently the costs) with several iterations of cost/benefit analyses and better topographic information.

Additional information regarding this conceptual approach to flood control is provided in the Nimbus Engineers' report.

Drainage Crossings of Existing Roadways

Several existing drainage crossings of roadways should be enlarged or have drainage structures provided, in response to development activities and/or reducing current flood hazards in selected locations. The primary locations requiring drainage structure enlargement or new structure installation include:

- Zolezzi Lane crossing of Channel #1.
- U.S. 395 crossing of Channel #1.
- Zolezzi Lane and U.S. 395 Intersection; Drainage structure and outfall channel needed to accommodate flows from Channel #2.
- U.S. 395 crossing of Channel #3.

VII. INTERIM POLICIES FOR MANAGING THE BASIN

As a result of the reviews, discussions, evaluations and investigations performed as a part of this Preliminary Basin Management Study, several proposed interim policies have been formulated relating to new development and infrastructure improvement projects within the lower Whites Creek watershed. It is proposed that these interim policies be utilized until such time as more detailed basin management planning activities or structural improvements are completed at a later date.

1. Drainage Corridors

Open space will be established and retained along each of the four (4) drainage corridors represented on Exhibit D. The purpose of establishing these drainage corridors shall be twofold:

A. To provide a continuous means of conveyance of the proportional discharge for each of the primary channels originating from the flow split at Shadowridge Park downstream to I-580 or the limit of the primary study area.

B. To provide open space linkages and opportunities for passive recreation within the primary study area.

At locations where channel definition and/or capacity is insufficient to convey the desired proportionalized flow, a combination of excavation and adjacent filling will be needed to create a defined channel or conveyance area.

There are several issues associated with the establishment of drainage corridors that require resolution. They are:

- Who will retain ownership of drainage corridors?
- Will they be retained as easements or fee title right-of-way?
- What mechanism will be utilized to convey drainage corridors or easements to an appropriate authority?
- Who is responsible for maintenance?
- Should drainage corridors be natural to the extent feasible or modified by excavation and grading?
- What stabilization measures are deemed appropriate when needed?
- Should establishment of drainage corridors occur on a piecemeal basis in conjunction with new development or should an overall drainage improvement district be established?

2. Discharges

The following discharges shall be applied as the required design capacities, or incremental discharges, for each drainage corridor:

Drainage Corridor	Design Capacity
#1	700 cfs
#2	1950 cfs
#3	1100 cfs
#4	1350 cfs

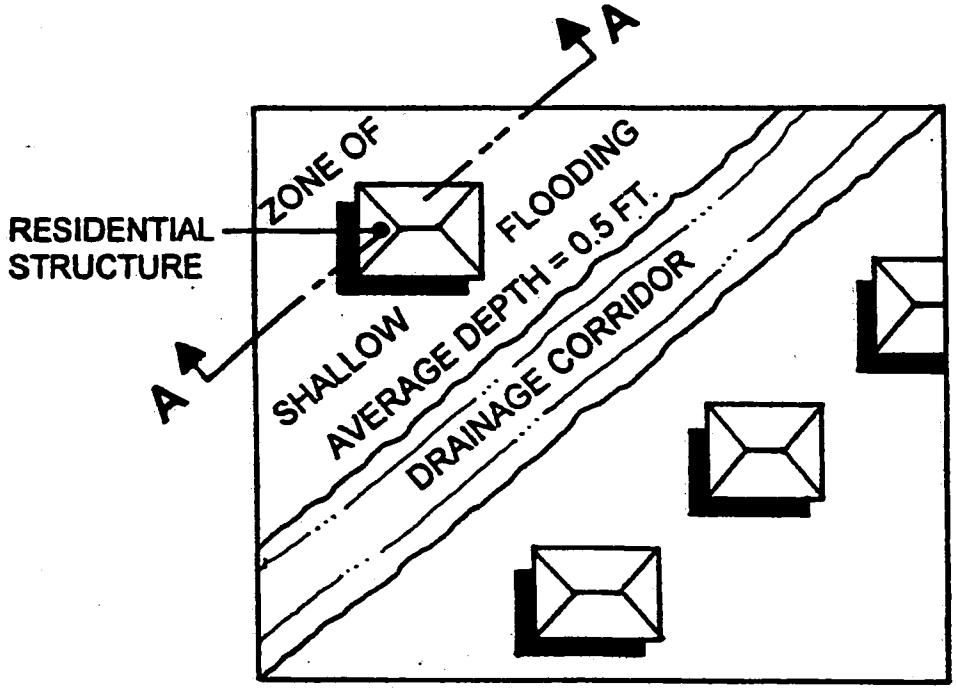
The value of the total 100-year discharge for Whites Creek at Shadowridge Park is 5100 cfs.

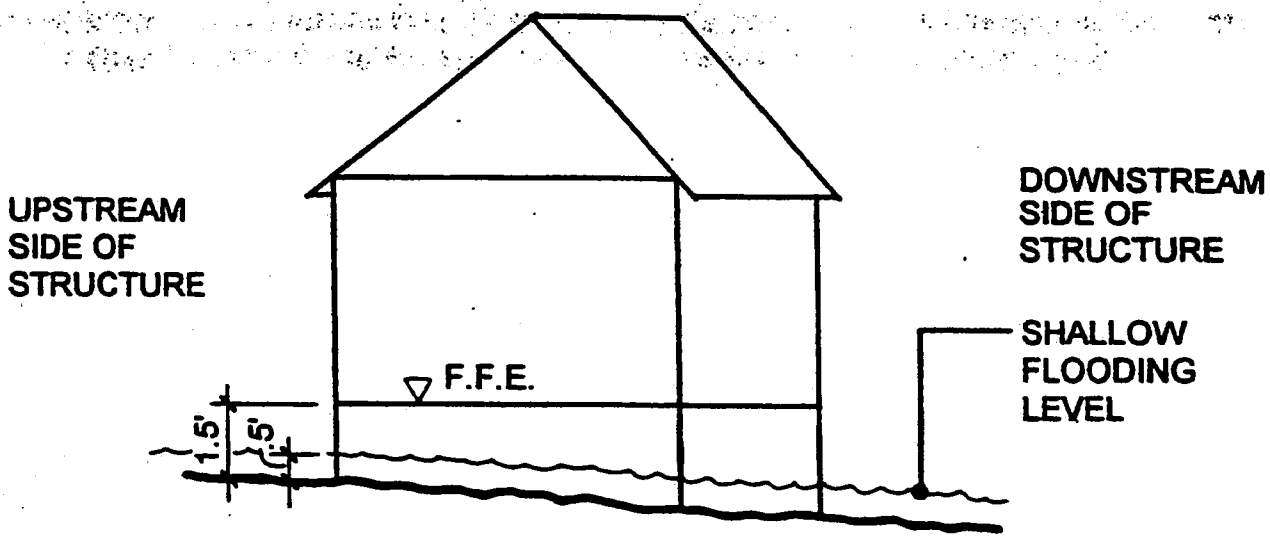
Until such time as flows are predictably distributed downstream of Shadowridge Park through the construction of a structural flow distribution facility or until upstream attenuation is provided, the design for downstream development projects and the elevating of building finished floors must consider the possibility of 3000 cfs entering any one of the four (4) drainage corridors (see Section II.B.). After construction of a flow distribution structure, the incremental discharges for individual drainage corridors will be applied. However, in certain instances, i.e., drainage corridors #2 and #3, the effect of co-mingling of flows will need to be considered for applicable downstream areas until such time as continuity exists along the applicable drainage corridors to a location downstream of a given point of interest.

3. Finished Floor Elevations

Finished floor elevations of new individual structures where mass grading has not occurred shall be established based upon the average flood depths represented on Exhibit D, until such time as more detailed floodplain mapping is performed for the lower Whites Creek watershed. The flood depths represented on Exhibit D may also be revised at any given location if substantiated by an acceptable site-specific engineering analysis. Average flooding depths represented on Exhibit D have been established under the assumption that 3000 cfs may enter any of the four (4) drainage corridors downstream of Shadowridge Park, causing flooding of the corridor itself and adjacent areas. Finished floor elevations of individual structures where no mass grading has occurred shall be set a minimum of one foot (1') above the estimated shallow flooding depths represented on Exhibit D for areas within, between or adjacent to drainage corridors. The one foot (1') criteria applies to the upstream side of a given structure (see Exhibit F1).

WHITES CREEK BASIN MANAGEMENT





SECTION A - A

EXHIBIT F1

EXAMPLE OF FINISHED FLOOR ELEVATION REQUIREMENTS IN SHALLOW FLOODING ZONES
(INDIVIDUAL BUILDING SITES - NO MASS GRADING)

For structures that are integrated into development projects where mass grading is proposed or has occurred, finished floors will be elevated a minimum of one foot (1') above the applicable water surface elevations calculated via a site specific engineering analysis. In such instances, spillover from drainage corridors will need to be conveyed in streets and/or drainage easements around and adjacent to structures. Provisions must be made to accept spillover runoff, convey it safely, and release it downstream in essentially the same manner as for existing conditions. The one foot (1') criteria applies to the upstream side of each structure. These concepts are graphically represented on Exhibit F2.

In areas of "minimal" flooding depicted per Exhibit D, finished floor elevations for structures shall be set a minimum of one foot (1') above the highest adjacent natural grade (individual building sites) or the adjacent top of curb (mass graded condition). These requirements may be waived if a site specific engineering analysis demonstrates that no flood hazard exists. Requirements for the elevating of structures in areas of "minimal" flooding are represented on Exhibit F3.

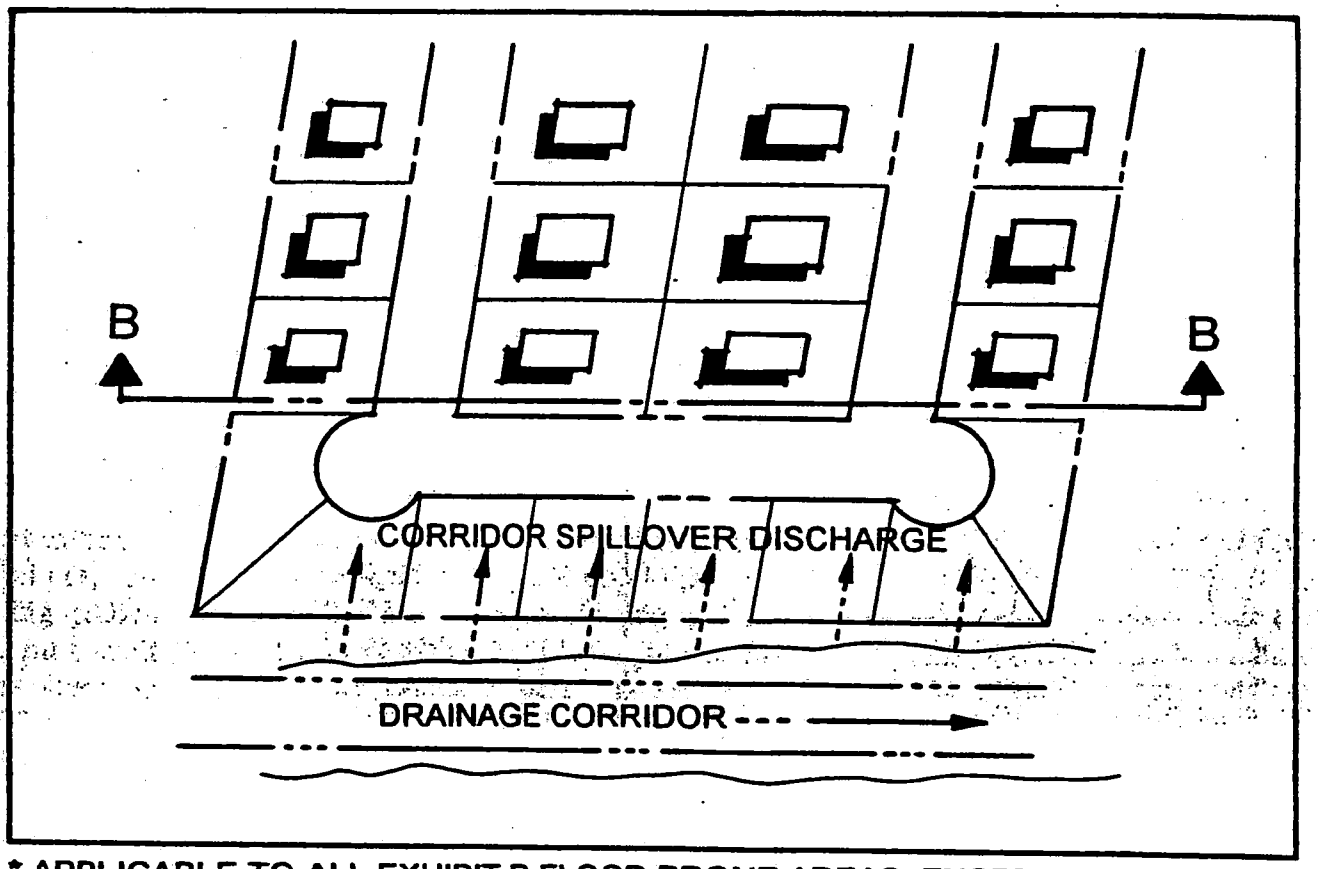
4. **Street Alignments**

In areas of "minimal" flooding, no special requirements apply pertinent to street alignments. In areas having flood depth designations on Exhibit D, an appropriate amount of streets will be aligned with the direction of existing grades to provide conveyance for shallow flooding (see Exhibit G), at least until such time as incremental discharges for individual drainage corridors become established through upstream structural measures. Appropriate means for inflow and outflow to and from the internal street conveyance systems for development projects shall be provided and applicable shallow flooding in excess of the corridor discharge must enter and exit developed properties in essentially the same manner as under existing conditions. Where possible, the outfall for runoff generated on-site within a development project should be the nearest drainage corridor.

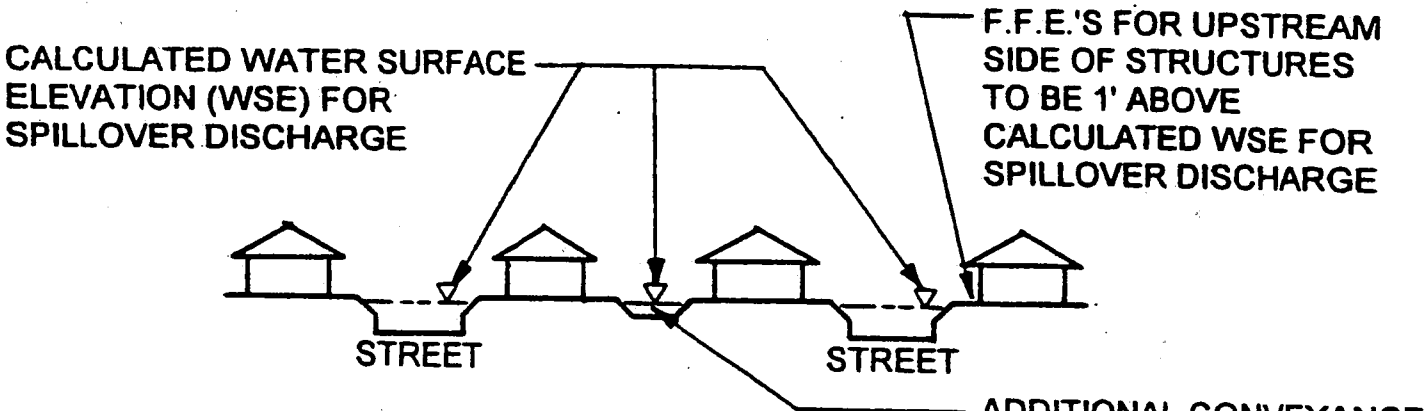
5. **Depth of Flow in Streets**

Streets utilized for overflow conveyance from drainage corridors shall have a maximum allowable depth of one foot (1') and must consider the flooding conditions that would be present assuming that 3000 cfs has entered the drainage corridor downstream of Shadowridge Park, until such time as the distribution of flows becomes fixed or attenuation occurs through upstream structural measures. Once upstream structural measures are implemented to distribute the flow, the incremental corridor discharges will govern, the potential for shallow flooding in streets will be appreciably reduced or eliminated, and this requirement will be waived, if appropriate.

WHITES CREEK BASIN MANAGEMENT



* APPLICABLE TO ALL EXHIBIT D FLOOD PRONE AREAS, EXCEPT AREAS WITH "MINIMAL" DEPTH DESIGNATION.



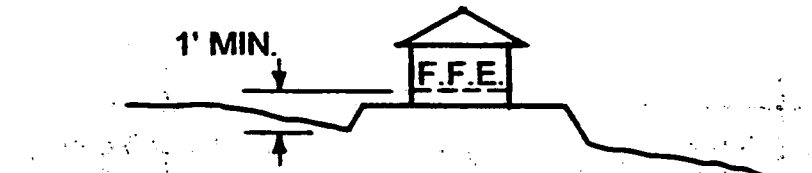
SECTION B - B

EXHIBIT F2

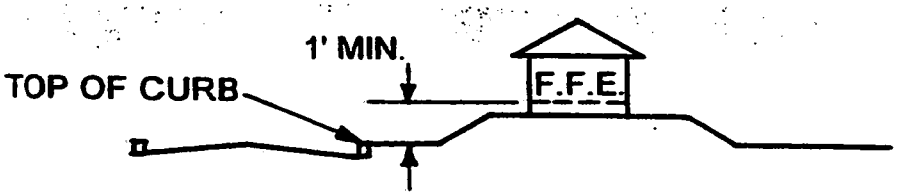
EXAMPLE OF FINISHED FLOOR ELEVATION REQUIREMENTS IN SHALLOW FLOODING ZONES * (MASS GRADED DEVELOPMENT PROJECTS)

WHITES CREEK BASIN MANAGEMENT

IN AREAS OF "MINIMAL" FLOODING PER EXHIBIT D, F.F.E.'S FOR STRUCTURES SHALL BE SET 1' OR MORE ABOVE THE HIGHEST ADJACENT NATURAL GRADE (INDIVIDUAL BUILDING SITES) OR 1' OR MORE ABOVE ADJACENT TOP OF CURB (MASS GRADED CONDITION).



INDIVIDUAL BUILDING SITE



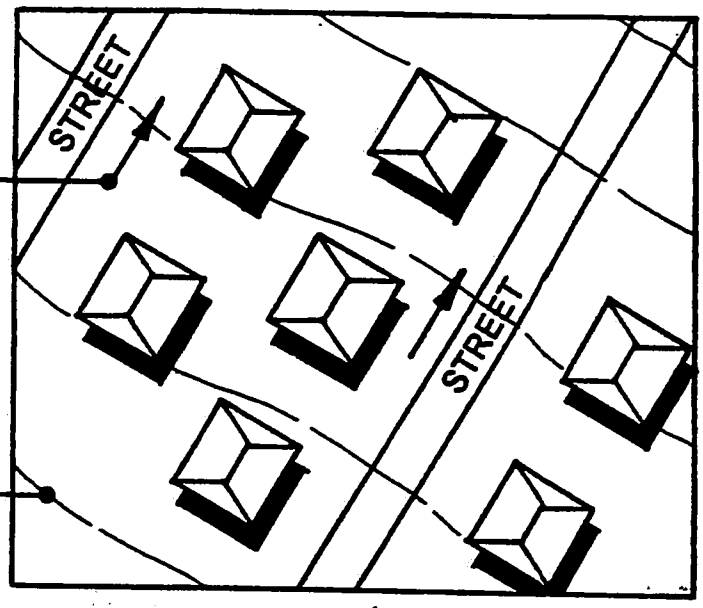
MASS GRADED CONDITION

THE ABOVE SPECIAL REQUIREMENTS MAY BE WAIVED IF A SITE SPECIFIC ENGINEERING STUDY DEMONSTRATES THAT NO FLOOD HAZARD EXISTS.

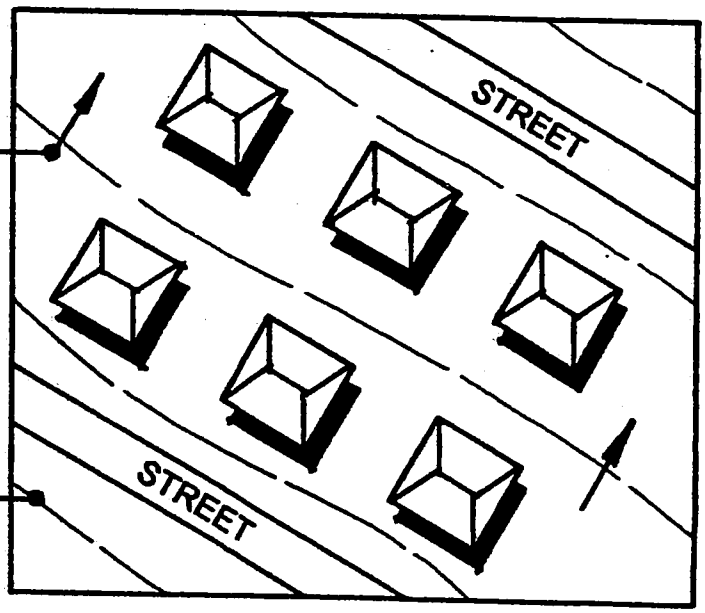
EXHIBIT F3

FINISHED FLOOR ELEVATION REQUIREMENTS IN ZONES OF "MINIMAL" FLOODING.

WHITES CREEK BASIN MANAGEMENT



ACCEPTABLE PREDOMINANT STREET ALIGNMENTS



UNACCEPTABLE PREDOMINANT STREET ALIGNMENTS

EXHIBIT G

STREET ALIGNMENTS IN SUBDIVISIONS LOCATED WITHIN SHALLOW FLOODING ZONES

6. **Drainage Structures**

Drainage structures for new roadways crossing drainage corridors will be sized to accommodate the applicable incremental corridor discharge. Where possible, a depressed section shall be provided within the roadway over the structure. Reinforcement of the adjacent fill slopes will also be required to minimize damage to the structure in the event that the roadway is overtopped, until such time as corridor discharges become predictably established through upstream structural measures.

7. **Transverse Roadway Grades**

Elevated roadways that extend perpendicular to flow directions are discouraged and will require prior approval of Washoe County, with consideration being given to any potential for obstructing, retarding or diverting said drainage flows when compared with existing conditions.

8. **Grading**

Lowering of existing grades for new development projects between or adjacent to drainage corridors will only be allowed if it can be demonstrated that additional flows are not diverted into the development project during a 100-year event as a result of site grading.

9. **Detention**

Based upon the evaluations and opinions discussed in Section VI of this Preliminary Basin Management Study, it has been concluded that attenuation of increased runoff produced by new development is needed to preclude the potential of significant increases in flooding and a deterioration in water quality experienced downstream within Steamboat Creek. It is also recommended that a preferred approach to providing attenuation of runoff and water quality storage is the construction of local sub-regional stormwater detention facilities, as opposed to requiring local on-site detention with each new development project.

Local, sub-regional detention facilities offer preferred benefits in terms of consolidated flood control and water quality treatment and the removal of requirements for setting aside lands within individual development projects to provide local on-site detention facilities. Also, until such time as incremental flows are successfully assigned to drainage corridors via upstream structural measures, the local on-site detention concept may serve to increase flood hazards due to a potential for overflow and breaching of said facilities during a major storm event. Hence, it is recommended that new development projects not include provisions for local on-site stormwater detention.

Until such time as local sub-regional detention facilities are built, the following options may be considered as an interim means of accounting for adverse impacts associated with the construction of development projects in the lower Whites Creek watershed:

- Impact fees
- Phased basin excavation/construction
- Temporary on-site detention facilities that do not have a potential for overflowing induced by drainage corridor spillovers
- Hold harmless agreements with downstream property owners

The approximate locations for local, sub-regional stormwater detention facilities are represented on Exhibit E1. Further evaluations will be necessary to design, size and prepare a cost estimate for these facilities.

Funding mechanisms to be considered for construction of these facilities may include:

- Drainage improvement district
- Impact fees for new development
- Property taxes
- Drainage utility
- Other alternatives presented in the Washoe County Flood Control Master Plan

10. Site-Specific Engineering Analyses

There are a number of circumstances where a site-specific engineering analysis will be required to supplement or amend the information contained in this study prior to commencing with a given development or infrastructure improvement project. The following situations will require such an analysis:

- A development project that includes mass grading in a portion of the watershed having a flood hazard designation other than "minimal" on Exhibit D.
- A development project that includes basements. Basements will not be allowed in flood hazard areas.

- Any design proposal to amend or that would otherwise alter the flood hazard information represented on Exhibit D.

- Any design proposal to waive the finished floor elevation requirements set forth for areas of "minimal" flooding per Exhibit F3.

- Any project that proposes modification to, constriction to, or realignment of a drainage corridor.

- Any roadway design project that impacts existing drainage patterns.

- Any other applicable set of circumstances where such an analysis is deemed appropriate by Washoe County.

PETER G. MORROS, Director
ALLEN BIAGGI, *Administrator*
(775) 687-4670
TDD 687-4678
Administration
Water Pollution Control
Facsimile 687-5856
Mining Regulation and Reclamation
Facsimile 684-5259

STATE OF NEVADA
KENNY C. GUINN
Governor

NOV 2 0 2000

Waste Management
Corrective Actions
Federal Facilities
Air Quality
Water Quality Planning
Facsimile 687-6396

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

November 17, 2000

Mr. Ray Pezonella, P.E.
Pezonella Associates, Inc.
520 Edison Way
Reno, Nevada 89502

RE: Wolf Run Golf Course Permit Application Information

Dear Mr. Pezonnella:

We have reviewed the report for the permit application to use reclaimed waste water for irrigation of the Wolf Run Golf Course. Based upon the review of this report, the following comments are offered:

1. Nitrogen Budget

   The supply of reclaimed water (RCW) contains a small percentage of nitrogen that will need to be accounted for in the fertilization practice. Enclosed is a copy of the Division's guidelines for conducting a nitrogen balance. Please use this guideline or a similar format to recalculate the nitrogen budget for the course.

2. Water Budget

   A water budget (factoring in ET, Leaching Requirements, Delivery Efficiencies, etc.) for the 81-acre golf course needs to be prepared. Again, we have enclosed our guideline for guidance in preparing a water budget for an irrigation site.

3. Impact on Phosphate Level in Whites Creek

   a. Sprinkler Heads

      The Division recommends that the course change all sprinkler heads whose water distribution radius intercepts Whites Creek to half or quarter circles (as listed in

page 11 of the report) so that spray is not directed over the creek. Additionally, controls for aerosol drift during high wind episodes should be implemented.

b. Phosphate Levels in Creek

Please provide information on the phosphate levels in Whites Creek at the course for the present time. In order to assure compliance with the 0.3 mg/l phosphate (PO_4) standard in the creek, the permittee may be required to sample the creek at designated station points. A method of determining the impacts of sources outside of the golf course will have to be developed (as discussed on pages 11-12 of the report).

c. Mass Balance Data

Please provide the location of the USGS station (on the site map) used in the phosphorous analysis. Is there any more recent data than 1982? The Division would prefer having the last ten years of flow data in order to determine the current average flows in the Creek.

4. Storage Reservoir

a. Stream Flow and Ditch Flow Controls

Could reclaimed water from the reservoir enter either Steamboat Ditch or Whites Creek via leaks in the diversions gates from Whites or Steamboat Ditch? Please evaluate this concern based on the highest water level attainable in the reservoir.

b. Liner

What is the liner material (HDPE, PVC, etc.) for this reservoir? Is it exposed or covered with soil? How can a leak in the liner be detected prior a significant impact to ground waters?

c. Flood Season Operations

The Division accepts the proposal to manage the pond levels to minimize the impact of a pond discharge during the 100-year flood event (as presented on page 14).

5. Backflow and Cross Connection Controls

Please be aware that the Washoe County Department of Water Resources must review any plans covering backflow and cross connection controls for the potable water system. The Division requests copies of all correspondences on this matter.

6. Ground Water Monitoring Wells

The design plans for all monitoring wells must be submitted to this office for review prior to installation. We recommend that the permittee coordinate the proposed well locations and design with the Washoe County Department of Water Resources.

These are the primary comments of review on this document. If there are any questions on this letter, 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
Jennifer Carr, P.E., NDEP
Ron Gribble, 1400 Wolf Run Road, Reno, Nevada 89511
Joe Howard, Washoe County Department of Water Resources, P.O. Box 11130, Reno, Nevada 89520

WTS-1A: APPENDIX TWO

NITROGEN LOADING LIMIT WORKSHEET

The nitrogen loading equation takes into account precipitation, evapotranspiration, plant nitrogen uptake, nitrogen content of the applied effluent, and allowable percolate nitrogen concentration. The equation included below is from Wastewater Engineering: Treatment, Disposal, and Reuse, (Metcalf and Eddy, 1991)

$$Lw_{(n)} = \frac{[(Cp, mg/l) \times (P\text{-}ET, in/yr)] + [(U, lb/acre\text{-}yr) \times (4.4)]}{[(1\text{-}f) \times (Cn, mg/l)] - (Cp, mg/l)}$$

where:

$Lw_{(n)}$ = Allowable Hydraulic Loading Rate Based on Nitrogen Loading rate (in/yr);
Cp = Total Nitrogen Concentration in Percolating Water (mg/l);
ET = Evapotranspiration Rate (in/yr);
P = Precipitation Rate (in/yr);
U = Nitrogen Uptake Rate by Crop (lb/acre-yr);
4.4 = Combined Conversion Factor;
Cn = Total Nitrogen Concentration in Applied Wastewater (mg/l); and
f = Fraction of Applied Total Nitrogen Removed by Denitrification and Volatilization.

"Cp" - Nitrogen in Percolating Water

A conservative value for Total N in the water that percolates past the root zone (Cp) is 7 mg/l, which is the first "red flag" value for Nitrate as N in monitoring well samples. Setting the Cp limit at a constant value aids in obtaining an hydraulic nitrogen loading rate ($Lw_{(n)}$) which should be protective of groundwater resources. The drinking water standard for Nitrate as N is 10 mg/l, which would be the maximum allowable value for Cp.

"ET" - Evapotranspiration

Evapotranspiration is defined as the "loss of water from the soil both by evaporation and by transpiration from the plants growing thereon" (Websters Dictionary, 1990). Since different plants transpire at different rates, a crop coefficient (Kc) can be used to modify the potential ET for a particular area. Values for Kc vary depending upon the geographical location of the crop, and the species grown. If a crop coefficient can be determined, when multiplied by the potential ET rate, the result is a more accurate estimate of ET for an irrigation site. The Division recommends that reusers contact local agriculture representatives identified in Appendix Six for further crop-specific and regional information.

"U" - Crop Nitrogen Uptake

Plant nitrogen uptake rates (U) are crop-specific, and can be obtained from the local Extension Service, literature, or other reputable sources. Using the accepted value for U in this equation assumes that the harvested portion of the crop is removed from the site. If plant cuttings are not removed from the area, then the amount of nitrogen removed by uptake should be offset by the amount of nitrogen returned to the soil by decomposing cutting materials. If alfalfa, or another legume, is the site's crop, then similar considerations should be made for atmospheric nitrogen which is fixed into the soil by alfalfa. A discussion with the local agricultural extension service is recommended prior to finalizing a "U" value.

"Cn" - Nitrogen in Applied Wastewater

The total nitrogen in the applied effluent water (Cn) can be obtained from the treatment plant that is supplying the effluent. For site design, an average value can be used. For completion of the required annual balance report, the actual analytical results from Discharge Monitoring Reports shall be used.

"f" - Nitrogen lost to Denitrification and Volatilization

The amount of nitrogen lost to denitrification and volatilization varies depending upon the nitrogen characteristics of the applied wastewater and the microbial activity in the soil. Microbial denitrification, in soils with a sufficient carbon source for the biological activity, may account for as much as 15 to 25 percent of the applied nitrogen during warm, biologically active months. Volatilization of ammonia may be as much as 10 percent, depending upon the ammonia fraction in the total nitrogen applied. (Metcalf & Eddy, 1991) For arid climates, such as Nevada, the value typically used for the "f" term is 0.2.

Nitrogen Addition by Chemical Fertilizers

If the allowable reuse water application volume is limited by plant consumptive use (Worksheet 1-A), nitrogen may need to be added by commercial fertilizer. In the design of a reuse site, this should be estimated to provide the site operator with a guideline for fertilizer application, in addition to the nitrogen being applied via the treated effluent. The application of fertilizer must then be incorporated into the required annual report to demonstrate that the application of commercial nitrogen and effluent nitrogen did not exceed the plant crop's uptake rate.

Worksheet 2-C is designed to be used to provide the Division with the required annual report of effluent and fertilizer usage. Worksheet 2-C can also be utilized as a site management tool to *estimate* the amount of commercial fertilizer which may be required in an upcoming month. However, use of the worksheet in this manner does not preclude the responsible use of good irrigation and nutrient management practices.

WTS-1A: APPENDIX ONE

PLANT CONSUMPTIVE USE WORKSHEET

The consumptive use equation for determining the crop's water requirement takes into account precipitation, evapotranspiration, the efficiency of the irrigation system, and the salt tolerance of plant species. The salt tolerance of the plant species is used to calculate the leaching requirement (Lr) to remove excess salts from the root zone. Excess salts within the soil cause the plant cells to expend more energy adjusting the salt concentration within the plant tissues, and therefore, less energy is available for vigorous plant growth. The hydraulic loading rate and the TDS to ECw conversion equation included below are derived from Wastewater Engineering: Treatment, Disposal, and Reuse, (Metcalf and Eddy, 1991), the equation for the leaching requirement is from the Nevada Irrigation Guide, (USDA, Soil Conservation Service, 1981).

$$Lw_{(c)} = \frac{(ET-P)}{[E \times (1-Lr)]} \qquad Lr = \frac{ECw}{[(5 \times ECe)-ECw]}$$

where:

- $Lw_{(c)}$ = Allowable Hydraulic Loading Rate Based on Crop Water Needs (in/yr);
- ET = Evapotranspiration Rate (in/yr);
- P = Precipitation Rate (in/yr);
- Lr = Leaching Requirement (%, expressed as a fraction);
- E = Efficiency of Irrigation System (%, expressed as a fraction)
  For example: 75% = 75/100 = 0.75; example efficiencies are included below;
- ECe = Salinity Tolerance of Plant Crop (mmho/cm or dS/m)[1];
- ECw = Salinity of Applied Effluent (mmho/cm); If TDS is supplied by the laboratory, see conversion below; and
- TDS = Average Total Dissolved Solids in Applied Effluent (mg/l).

"ET" - Evapotranspiration

Evapotranspiration is defined as the "loss of water from the soil both by evaporation and by transpiration from the plants growing thereon" (Websters Dictionary, 1990). Since different plants transpire at different rates, a crop coefficient (Kc) can be used to modify the potential ET for a particular area. Values for Kc vary depending upon the geographical location of the crop, and the species grown. If a crop coefficient can be determined, when multiplied by the potential ET rate, the result is a more accurate estimate of ET for an irrigation site. The Division recommends that reusers contact local agriculture representatives identified in Appendix Six for further crop-specific and regional information.

"E" - Irrigation Efficiency

The irrigation system efficiency is related to how effective the method is in delivering the irrigation water equally to all parts of the crop. Example values for efficiency are[4]:

Sprinkler Irrigation Type	Application Efficiency	Surface Irrigation Type	Application Efficiency
Solid Set	0.70 - 0.80	Narrow Graded Border (< 15' wide)	0.65 - 0.85
Portable Hand Move	0.70 - 0.80	Wide Graded Border (<100' wide)	0.65 - 0.85
Wheel Roll	0.70 - 0.80	Level Border	0.75 - 0.90
Center Pivot or Traveling Lateral	0.70 - 0.80	Straight or Graded Contour Furrows	0.70 - 0.85
Traveling Gun	0.70 - 0.80	Drip	0.70 - 0.85

"ECe" - Salinity Tolerance of Plant Crop

The plant salt tolerance is crop-specific, and can be obtained from the local Extension Service, literature, or other reputable sources. The low end of the range identifies the ECe value which would result in a 0% reduction of crop yield. The upper end of the range identifies the ECe value which could result in a 25% reduction of crop yield[4].

Example ECe's:

Annual Ryegrass[2] = 3 to 6 mmho/cm or dS/m
Perennial Ryegrass[2,4] = 5.6 to 8.9 mmho/cm or dS/m
Bermudagrass[2,4] = 6.9 to 10.8 mmho/cm or dS/m
Tall Fescue[2,4] = 3.9 to 8.6 mmho/cm or dS/m
Alfalfa[3,4] = 2.0 to 5.4 mmho/cm or dS/m

"ECw" - Salinity of Applied Effluent

Direct measurement of ECw is typically preferred. However, if the laboratory has supplied the reuser with a concentration of TDS, an approximate conversion[4] is ECw ≈ TDS ÷ 640. This conversion is considered accurate within 10%. The value for ECw or TDS is obtained from the treatment plant supplying the effluent. For site design, an average value can be used. For completion of the required annual balance report, the actual analytical results from Discharge Monitoring Reports should be used.

(1) For clarity in this document, the unit for electrical conductivity (EC) is expressed as mmho/cm. However, EC can also be expressed in decisiemens per meter, dS/m.
1 mmho/cm = 1 dS/m

(2) Wastewater Reuse for Golf Course Irrigation, US Golf Association, 1994.
(3) Nevada Irrigation Guide, USDA Soil Conservation Service, 1981.
(4) Wastewater Engineering: Treatment, Disposal, and Reuse, (Metcalf and Eddy, 1991)

Worksheet 1-A

CONSUMPTIVE USE REQUIREMENT WORKSHEET:
Maximum Loading Rate Based on Plant Water Use Requirements

Page _____ of _____ Crop Type = _____

$Lw_{(c)} = \frac{(ET-P)}{[E \times (1-Lr)]}$; $Lr = \frac{ECw}{[(5 \times ECe)-ECw]}$; $ECw \approx TDS \div 640$

(A) Annual Evapotranspiration (ET, in/yr) = _____
(Multiply by Crop Coefficient (Kc) if value is known)

(B) Annual Precipitation (P, in/yr) = _____

(C) (A) - (B) = _____ (in/yr)

(D) Salinity of Applied Effluent (ECw, mmho/cm) or ≈ (TDS, mg/l) ÷ 640 = _____
(Indicate which method was used to determine ECw, Direct Measurement or Approximation by Calculation.)

(E) Salinity Tolerance of Plant Crop (ECe, mmho/cm) = _____

(F) 5 x (E) = _____ (mmho/cm)

(G) (F) - (D) = _____ (mmho/cm)

(H) Leaching Requirement (Lr, %, expressed as a fraction) = (D) ÷ (G) = _____

(I) 1 - (H) = _____

(J) Efficiency of Irrigation System (E, %, expressed as a fraction) = _____

(K) (J) x (I) = _____

(L) (C) ÷ (K) = $Lw_{(c)}$ = _____ (inches/year)

If the Water Use Rate calculated in ("L") above is the lowest application volume calculated for the annual Consumptive Use Limit (This Worksheet), the Nitrogen Limit (Worksheet 2-A) or the Permeability Limit (Worksheet 3-A), then fill out Worksheet 1-B to estimate the planned maximum daily flow for the site.

Worksheet 1-B

CONSUMPTIVE USE REQUIREMENT WORKSHEET:
Maximum Loading Rate Based on Plant Water Use Requirements

Page _____ of _____ Crop Type = _____

$Lw_{(c)} = \frac{(ET-P)}{[E \times (1-Lr)]}$; $Lr = \frac{ECw}{[(5 \times ECe)-ECw]}$; $ECw \approx TDS \div 640$

Monthly values for evapotranspiration are dependent on the crop type and regional area of the site, as well as the crop coefficient if known. Monthly precipitation is also regional. The values for ET and P can be obtained from the local extension service, literature, or other reputable source. Please see the explanation in the "WTS-1A: Appendix One" text for further discussion of crop coefficients.

To calculate the monthly value for $Lw_{(c)}$, perform the calculation for each month as outlined in Worksheet 1-A, and input the result in the table below. Since this form is crop-specific, a value of zero is acceptable when the crop is not in season; however, use of a zero should be explained.

Million Gals/Mo = $Lw_{(c)}$ in/mo x _____ ac ÷ 12 in/ft x 43,560 ft^2/ac x 7.481 gals/ft^3 ÷ 1,000,000
(Enter and use the number of acres for the crop type being irrigated)

MGD (Million gallons/day) = M Gallons/mo ÷ Days/mo

Month	Days/Mo	ET (in/mo)	P (in/mo)	$Lw_{(c)}$ (in/mo)	M Gals/Mo	MGD
Jan	31					
Feb	28					
Mar	31					
Apr	30					
May	31					
Jun	30					
Jul	31					
Aug	31					
Sep	30					
Oct	31					
Nov	30					
Dec	31					
Totals (in/yr):					Note: These totals should approximate the annual values calculated in Worksheet 1-A	

Worksheet 2-A

WATER REQUIREMENT DESIGN WORKSHEET:
Maximum Hydraulic Loading Rate Based On Annual Nitrogen Balance Evaluation
Page _____ of _____ Crop Type = _____

$$Lw_{(n)} = \frac{[Cp \times (P\text{-}ET)] + (U \times 4.4)}{[(1\text{-}f) \times Cn] - Cp}$$

(A) Total Nitrogen in Percolating Water (Cp, mg/l) = _____

(B) Annual Precipitation (P, in/yr) = _____

(C) Annual Evapotranspiration (ET, in/yr) = _____
(Multiply by Crop Coefficient (Kc) if value is known)

(D) (B) - (C) = _____ (in/yr)

(E) (A) x (D) = _____

(F) Crop Nitrogen Uptake (U, lb/ac-yr) = _____

(G) (F) x 4.4 = _____

(H) (E) + (G) = _____

(I) Fraction of Applied Total Nitrogen Lost to Denitrification and Volatilization (f) = _____

(J) 1- (I) = _____

(K) Total Nitrogen in Applied Effluent (Cn, mg/l) = _____

(L) (J) x (K) = _____

(M) (L) - (A) = _____

(N) (H) ÷ (M) = $Lw_{(n)}$ (inches/year) = _____

If the Water Use Rate calculated in ("N") above is the lowest application volume calculated for the annual Consumptive Use Limit (Worksheet 1-A), the Nitrogen Limit (This Worksheet) or the Permeability Limit (Worksheet 3-A), then fill out Worksheet 2-B to estimate the planned maximum daily flow for the site.

Worksheet 2-B

WATER REQUIREMENT DESIGN WORKSHEET:
Maximum Hydraulic Loading Rate Based On Annual Nitrogen Balance Evaluation
Page _____ of _____ Crop Type = _____

$$Lw_{(n)} = \frac{[Cp \times (P-ET)] + (U \times 4.4)}{[(1-f) \times Cn] - Cp}$$

Monthly values for evapotranspiration are dependant on the crop type and regional area of the site, as well as the crop coefficient if known. Monthly precipitation is also regional. The values for ET and P can be obtained from the local extension service, literature, or other reputable source. Please see the explanation in the "WTS-1A: Appendix Two" text for further discussion of crop coefficients.

The monthly value of crop nitrogen uptake (U) can be calculated according to the equation included on the Table. Please see the discussion in the "WTS-1A: Appendix Two" text regarding "U" values for alfalfa crops or sites that do not remove crop cuttings. If a different distribution of monthly "U" is used, due to circumstances such as germination or dormancy periods, then provide documentation explaining the difference.

To calculate the monthly value for $Lw_{(n)}$, perform the calculation for each month as outlined in Worksheet 2-A, using the monthly values for "U", "P", "ET", and "Cn", and input the result in the table below. Since this form is crop-specific, a value of zero is acceptable when the crop is not in season; however, use of a zero should be explained.

Monthly U (lb/ac-mo) = U (lb/ac-yr) x ET(in/mo) ÷ ET (total in/yr)

Million Gallons Per Month = $Lw_{(c)}$ in/mo x _____ (ea. crop type) # acres ÷ 12 in/ft x 43,560 ft²/ac x 7.481 gallons/ft³ ÷ 1,000,000

MGD (Million gallons/day) = M Gallons/mo ÷ Days/mo

Month	Days/Mo	P (in/mo)	ET (in/mo)	U (lb/ac-mo)	$Lw_{(n)}$ (in/mo)	M Gals/Mo	MGD of Reclm'd Water
Jan	31						
Feb	28/29						
Mar	31						
Apr	30						
May	31						
Jun	30						
Jul	31						
Aug	31						
Sep	30						
Oct	31						
Nov	30						
Dec	31						
	Totals:					Note: The totals for P, ET and $Lw_{(n)}$ should approximate the annual values used or calculated in Worksheet 2-A	

Worksheet 2-C: *Regardless of the limiting hydraulic loading rate that was defined during the design phase, Worksheet 2-C is designed to be used to provide the Division with the required annual report of effluent and fertilizer usage.*

Effluent N Applied = _____ x _____ (mg/l) x 8.34 x _____ ÷ _____ x _____
(lb/ac-mo) MGD Applied Effluent N Conc. # days/mo # Acres (1 -"f") (i.e. 0.2.)

Fertilizer N Applied = _____ Monthly Fertilizer used (lbs/mo) x _____ % N in Fertilizer (as a fraction) ÷ _____ acres
(lb/ac-mo)

Crop Name and Nitrogen Uptake Requirement = _____ (lbs/ac-yr)

Month	Days/Mo	Million Gallons Applied (mo)	MGD of Irrigation Water Applied	Effluent N Concentration (mg/l)	Effluent N Applied (lb/ac-mo)	Fertilizer N Applied (lb/ac-mo)	Total N Applied (Effl. N + Fert. N) (lb/ac-mo)
Jan	31						
Feb	28/29						
Mar	31						
Apr	30						
May	31						
Jun	30						
Jul	31						
Aug	31						
Sep	30						
Oct	31						
Nov	30						
Dec	31						
						Total** =	

** The Total N Applied to the crop should be less than the crop's Nitrogen Uptake Requirement. Please see your permit for directions if it is not.

Plate 1: Property Location Map

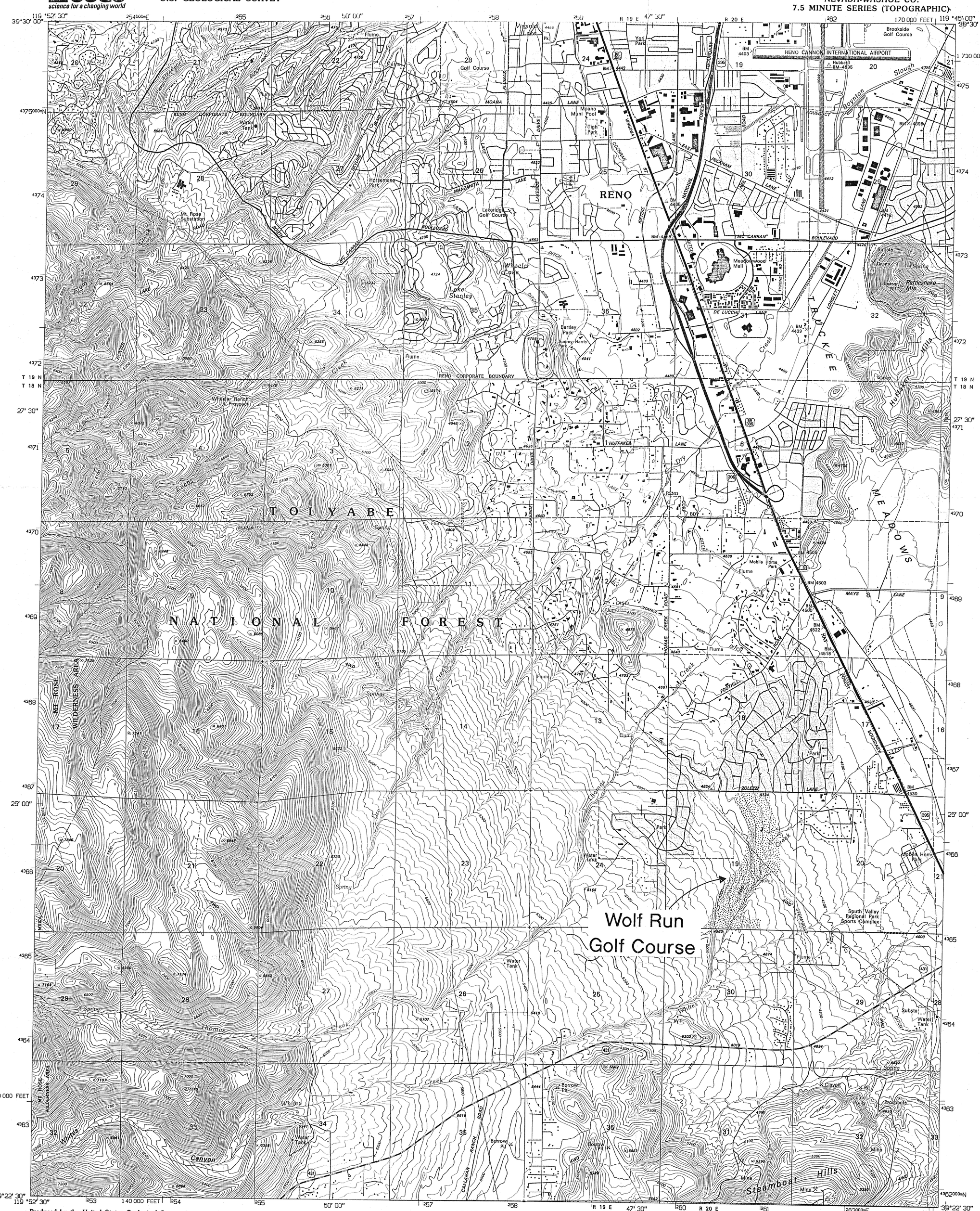
MOUNT ROSE NE QUADRANGLE

NEVADA-WASHOE CO.

7.5 MINUTE SERIES (TOPOGRAPHIC)

U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

USGS science for a changing world



Produced by the United States Geological Survey

Control by USGS and NOS/NOAA

Compiled from aerial photographs taken 1966. Field checked 1969
Revised from aerial photographs taken 1990 and other sources
Map edited 1994. Contours and land elevations have not been revised and may conflict with other content

North American Datum of 1927 (NAD 27). Projection and blue 1000-meter ticks: Universal Transverse Mercator, zone 11
10 000-foot ticks: Nevada Coordinate System, west zone

North American Datum of 1983 (NAD 83) is shown by dashed corner ticks
The values of the shift between NAD 27 and 83 for 7.5-minute intersections are obtainable from National Geodetic Survey NADCON software

There may be private inholdings within the boundaries of the National or State reservations shown on this map

Fine red dashed lines indicate selected fence and field lines where generally visible on aerial photographs. This information is unchecked

MN
GN
1°47'
32 MILS
15½°
276 MILS

UTM GRID AND 1994 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

1 .5 0 KILOMETERS 1 2
1000 0 METERS 1000 2000
1 .5 0 1
MILES
1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000
FEET

CONTOUR INTERVAL 20 FEET
SUPPLEMENTARY CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929
TO CONVERT FEET TO METERS MULTIPLY BY 0.3048
TO CONVERT METERS TO FEET MULTIPLY BY 3.2808

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U.S. GEOLOGICAL SURVEY, P.O. BOX 25286, DENVER, COLORADO 80225
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

NEVADA

QUADRANGLE LOCATION

1	2	3
4		5
6	7	8

1 Verdi
2 Reno
3 Vista
4 Mount Rose Nw
5 Steamboat
6 Mount Rose
7 Washoe City
8 Virginia City

ADJOINING 7.5' QUADRANGLE NAMES

INTERIOR - GEOLOGICAL SURVEY, RESTON, VIRGINIA - 1994

ROAD CLASSIFICATION

Primary highway hard surface ..... Light-duty road, hard or improved surface .....
Secondary highway hard surface ..... Unimproved road .....

Interstate Route U.S. Route State Route

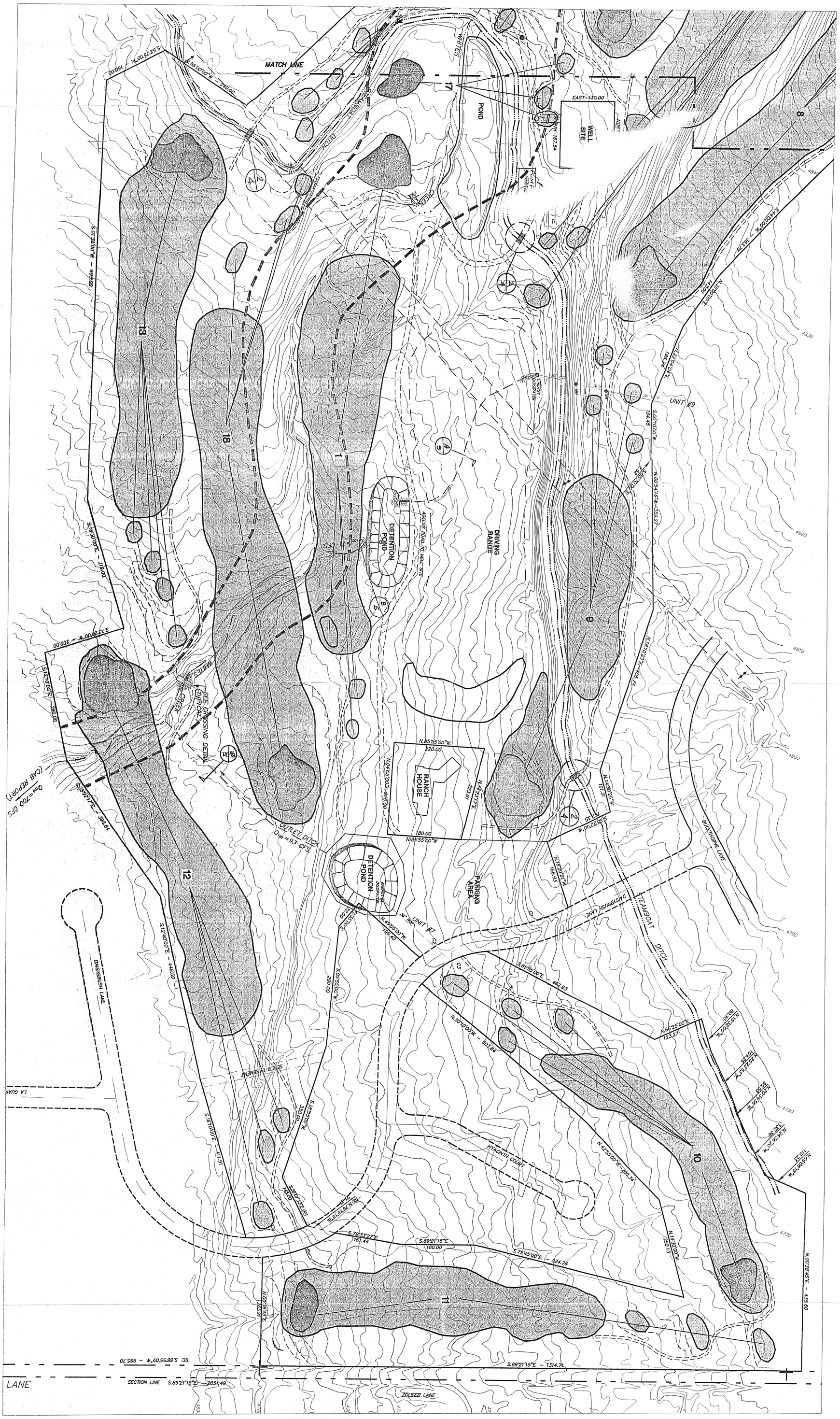
MOUNT ROSE NE, NV
39119-D7-TF-024

1994

DMA 2062 IV NE-SERIES V896

ISBN 0-607-39629-2
9 780607 396629

SHEET2.DWG



NORTH
SCALE 1"=100'

Plate 2: Wolf Run Golf Course – North Half

REGISTERED PROFESSIONAL ENGINEER STATE OF NEVADA No. 2170 DALE D. KULM CIVIL

WASHOE COUNTY BLDG. DEPT. APPROVED

FIELDCREEK RANCH GOLF COURSE
GRADING PLANS

SHEET 3/5

SCALE:

DATE: 10/11/96

DEVELOPER
NEV-CAL DEVELOPERS, INC.
P.O. BOX 950
VERDI, NV 89439

ENGINEER
DALE D. KULM & ASSOCIATES
140 SELLS ST.
SPARKS, NV 89431

Plate 3: Wolf Run Golf Course – South Half

ESTIMATE OF QUANTITIES

18 HOLE COURSE

GREENS--------	49,580 CU. YDS.
TEES----------	27,800 CU. YDS.
FAIRWAYS-----	48,300 CU. YDS.
TOTAL---------	125,680 CU. YDS.

ALL GOLF CART PATHS THROUGH DRAINAGE SWALES SHALL BE "DIP THROUGH"

NORTH
SCALE 1"=100'

WASHOE COUNTY APPROVED BLDG. DEPT.

CERTIFIED PROFESSIONAL ENGINEER — DALE D. KULM — CIVIL — NEVADA No. 2170 — DATE 10/1/96

ENGINEER
DALE D. KULM & ASSOCIATES
140 SELLS ST.
SPARKS, NV 89

DEVELOPER
NEV-CAL DEVELOPERS, INC.
P.O. BOX 950
VERDI, NV 89439

FIELDCREEK RANCH GOLF COURSE
GRADING PLANS

DATE: 10/1/96
SCALE:

SHEET
2 / 5

RESTROOM FACILITY

SECONDARY/OVERFLOW CHANNEL

RANCH HOUSE

TRASH ENCLOSURE ABOVE GROUND FUEL STORAGE

CARTBARN

STMGID 3
(PWS ID#0215-02)

STMGID 2
(PWS ID#0215-06)

STMGID 1
(PWS ID#0215-01)

Department of

NTS

Water Resources

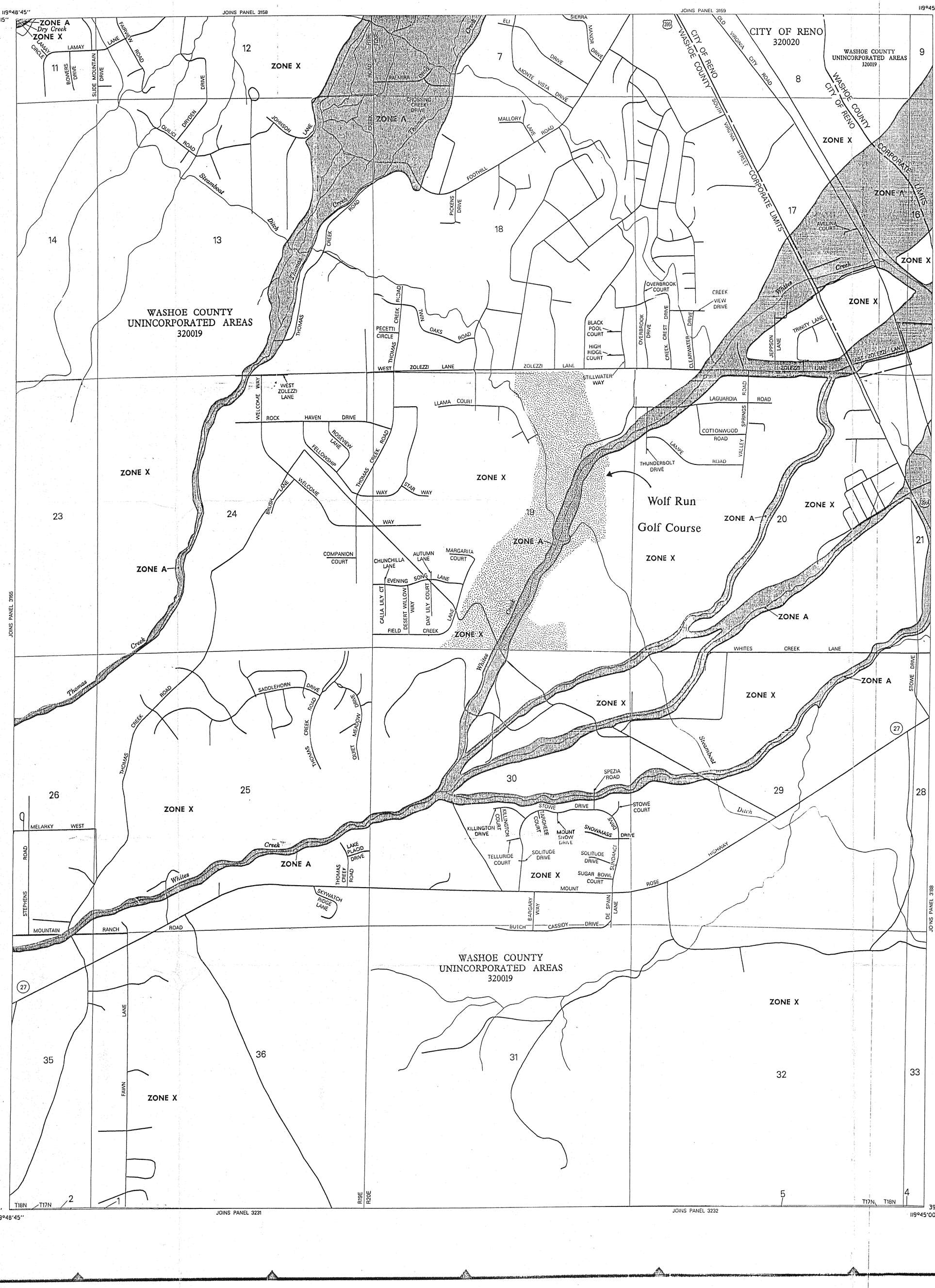
2 YEAR CAPTURE ZONE

5 YEAR CAPTURE ZONE

10 YEAR CAPTURE ZONE

WELL HEAD PROTECTION RELATIVE TO THE WOLF RUN GOLF COURSE

Plate 5: FEMA Map



LEGEND

SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100-YEAR FLOOD

- **ZONE A** No base flood elevations determined.
- **ZONE AE** Base flood elevations determined.
- **ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.
- **ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- **ZONE A99** To be protected from 100-year flood by Federal flood protection system under construction; no base elevations determined.
- **ZONE V** Coastal flood with velocity hazard (wave action); no base flood elevations determined.
- **ZONE VE** Coastal flood with velocity hazard (wave action); base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

OTHER FLOOD AREAS

- **ZONE X** Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood.

OTHER AREAS

- **ZONE X** Areas determined to be outside 500-year floodplain.
- **ZONE D** Areas in which flood hazards are undetermined.

UNDEVELOPED COASTAL BARRIERS

Identified 1983 | Identified 1990 | Otherwise Protected Areas

Coastal barrier areas are normally located within or adjacent to Special Flood Hazard Areas.

- Flood Boundary
- Floodway Boundary
- Zone D Boundary
- Boundary Dividing Special Flood Hazard Zones, and Boundary Dividing Areas of Different Coastal Base Flood Elevations Within Special Flood Hazard Zones.
- 513 — Base Flood Elevation Line; Elevation in Feet. See Map Index for Elevation Datum.
- D — D — Cross Section Line
- (EL 987) — Base Flood Elevation in Feet Where Uniform Within Zone. See Map Index for Elevation Datum.
- RM7 × — Elevation Reference Mark
- • M2 — River Mile
- 97°07'30", 32°22'30" — Horizontal Coordinates Based on North American Datum of 1927 (NAD 27) Projection.

NOTES

This map is for use in administering the National Flood Insurance Program; it does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size, or all planimetric features outside Special Flood Hazard Areas.

Coastal base flood elevations apply only landward of 0.0 NGVD, and include the effects of wave action; these elevations may also differ significantly from those developed by the National Weather Service for hurricane evacuation planning.

Areas of Special Flood Hazard (100-year flood) include Zones A, AE, AH, AO, A99, V, and VE.

Certain areas not in Special Flood Hazard Areas may be protected by flood control structures.

Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the Federal Emergency Management Agency.

Floodway widths in some areas may be too narrow to show to scale. Floodway widths are provided in the Flood Insurance Study Report.

This map may incorporate approximate boundaries of Coastal Barrier Resource System Units and /or Otherwise Protected Areas established under the Coastal Barrier Improvement Act of 1990 (PL 101-591).

Corporate limits shown are current as of the date of this map. The user should contact appropriate community officials to determine if corporate limits have changed subsequent to the issuance of this map.

For community map revision history prior to countywide mapping, see Section 6.0 of the Flood Insurance Study Report.

For adjoining map panels and base map source see separately printed Map Index.

MAP REPOSITORY
Refer to Repository Listing on Map Index

EFFECTIVE DATE OF
COUNTYWIDE FLOOD INSURANCE RATE MAP:
SEPTEMBER 30, 1994

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL:

Refer to the FLOOD INSURANCE RATE MAP EFFECTIVE DATE shown on this map to determine when actuarial rates apply to structures in zones where elevations or depths have been established.

To determine if flood insurance is available, contact an insurance agent or call the National Flood Insurance Program at (800) 638-6620.

APPROXIMATE SCALE IN FEET
1000 0 1000

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

WASHOE COUNTY, NEVADA AND INCORPORATED AREAS

PANEL 3170 OF 3350
(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS: COMMUNITY	NUMBER	PANEL	SUFFIX
RENO, CITY OF	320020	3170	E
WASHOE COUNTY, UNINCORPORATED AREAS	320019	3170	E

MAP NUMBER
32031C3170 E

EFFECTIVE DATE:
SEPTEMBER 30, 1994

Federal Emergency Management Agency