VILLAGE OF TAOS SKI VALLEY

PRELIMINARY ENGINEERING REPORT

EXPANSION/UPGRADE

OF

WASTEWATER TREATMENT FACILITY

TAOS COUNTY, NEW MEXICO

McLaughlin Water
ENGINEERS LTD.

August 2011

06-09-12P

McLaughlin Water
ENGINEERS LTD.

August 29, 2011

Village of Taos Ski Valley
c/o Mr. Mark Fratrick, Administrator
P.O. Box 100
7 Firehouse Road
Taos Ski Valley, New Mexico 87525

RE: Letter of Transmittal/Executive Summary
Preliminary Engineering Report
Wastewater Treatment Facilities

Dear Mr. Fratrick:

Submitted attached is our Preliminary Engineering Report "*Expansion/Upgrade of the Village's Wastewater Treatment Facility*". Following is an executive type summary of the Report.

I. The existing Taos Ski Valley facility was constructed in 1982, and improved in 2004. The intended nominal capacity was 200,000 gpd (gallons per day); however, the plant rating has been downgraded to 167,000 gpd. The 2004 project was executed as a "correctional" project, with a limited budget; no provisions were made for future improvements or expansion. The primary purpose of this Report is to provide a long-range Master Plan for the Village's wastewater treatment facility.

II. The plant discharges to the Rio Hondo, a high quality mountain stream. Increasingly stringent effluent standards are predicted. The plant must produce a clear, sterile product, with almost all nutrients and organic contaminants removed. A study of probable long range Village development indicates that the ultimate plant capacity should be in the range of 400,000 gpd, or about 1,800 EQR (equivalent single family residential units).

III. The existing plant has proven difficult to operate during high load periods. Analysis of the existing facilities showed that they are not amenable to expansion or upgrading (for a higher quality product); however, most of the existing facilities are physically sound – so that they can be used for reliability dedicated capacity.

IV. Comparative evaluations of alternative process configurations resulted in the selection of SBR (sequencing batch reactor) technology. This would be followed by chemical

precipitation, multi-media filtration, and UV disinfection. A plant site Master Plan is shown on Drawing IV-4, at the back of the Report. It is planned that the ultimate plant facility will consist of two identical (200,000 gpd) treatment trains.

V. The proposed initial project would provide one SBR treatment train, along with necessary support facilities. The existing pretreatment works, Flow Leveling (Eq) basins, and sludge dewatering facilities would be incorporated into the initial plant. The proposed main plant building is illustrated on Drawing V-1. The existing treatment train would be kept operational, representing standby capacity. The estimated project budget is $3,460,000.

VI. The proposed plant design features innovative energy conservation ("green") features. The use of submerged turbine aerators increases oxygen transfer efficiency and increases system heat energy. (This maximizes biological activity which is temperature dependent.) Also, it is proposed to heat the building with recoverable energy. A heat pump is to be used, with the effluent, providing the heat source. This will also lower the temperature to near the Rio Hondo winter ambient level.

The result of this initial project would be a plant having a firm capacity of 200,000 gpd, or approximately 900 EQR. A planned expansion would be required when actual loads approach that level. Using recent growth trends, this will not likely occur before 2030; however, Master Plan implementation can accommodate any reasonable development rates. In the event of minimal growth, it may be found necessary to construct the ultimate tertiary filters, replace an Eq basin, or upgrade solids handling facilities – but investment for such would not likely be necessary for over 10 years.

The proposed project schedule is for construction to be during the 2013 summer season. Financial information is furnished in a separate supplement; rate/fee analyses will likely be revised when firm project financing is established.

We will be available to review the Report with you, at your request.

Respectfully submitted,
McLaughlin Water Engineers, Ltd.

Ronald C. McLaughlin, P.E. Terrence P. Kenyon R. James McLaughlin

VILLAGE OF TAOS SKI VALLEY

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TAOS COUNTY, NEW MEXICO

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SECTION I
INTRODUCTION

BACKGROUND

The Village's wastewater system was earlier owned and managed by the Twining Water and Sanitation District. The District was dissolved in 2001, when the water and sewer utilities became the responsibility of the Village.

Most of the incorporated Village now has sewer service available – with the exception of the Amizette area. All of the collected wastewater is treated at one site, the existing plant. It has been previously determined that, when a community sewer system is constructed for Amizette, the wastewater will be pumped back to the existing site for treatment. This plan was found preferable to operating two facilities, or the relocation of the main plant to below Amizette. Therefore, the Village's current site, located on Federal land pursuant to a special use permit, will continue to be the location of the single plant.

The treatment facilities were expanded and upgraded in 1982[1]. The nominal plant capacity was then 95,000 gal/day.

The 1982 improvements were found to have some operating deficiencies[4]. A major project was undertaken in 2004 and 2005[5][6]. This was designed to increase nominal capacity to 200,000 gal/day.

Although a new treatment facility was considered, that selected plan primarily modified the then existing facilities. It is generally recognized that the 2004 project represented an interim solution – not a long range plan. With additional upstream growth, operating problems have since become evident. The increased loadings are due

to some continuing new development and to the Village's campaign to connect residences on the mountain, previously using individual septic tank systems.

The result is the need for the Village to develop additional treatment capacity – and to improve operability, primarily because of extreme load variations.

PURPOSE

The purpose of this Report is to provide the preliminary design basis for an optimum next phase, near future, plant expansion/upgrade project. Since wastewater treatment facilities for growing communities can usually be built in phases (to match the actual growth rate as close as practicable), it is necessary to Master Plan the projected ultimate plant – then build only that part needed for a reasonable growth period.

SCOPE

It is given that the Village's permanent treatment facilities are to be located at the present site. The scope of this Report is limited to treatment of collected Wastewater at this site. The collection system is thought generally adequate for present use; and can be evaluated separately, when needed.

REFERENCES

1. Specifications and Contract Documents, with Contract Drawings, for Twining Water and Sanitation District Wastewater Treatment Facilities Improvements, dated June 1982, Burton Leyendecker & Leyendecker, Inc.

2. Twining Water and Sanitation District, Preliminary Design Report, Wastewater Treatment Facility Improvements, dated March 1996. (No author shown – presumed to be Ken Shuey, P.E.

3. Village of Taos Ski Valley WWTP, Biosolids Study, dated June 2001, The Engineering Company.

4. Wastewater Treatment Plant Performance Evaluation for the Village of Taos Ski Valley, dated June 2003, The Engineering Company.

5. Wastewater Treatment Plant Preliminary Engineering Report for the Village of Taos Ski Valley, dated May 2004, the Engineering Company.

6. Project manual with Drawing set, Village of Taos Ski Valley Wastewater Treatment Plant Improvements, dated March 2005, The Engineering Company.

7. Sewer Plant Flow Calculations, prepared by District staff, during 2005.

8. Waster System Master Plan for the Village of Taos Ski Valley, date June 2007, McLaughlin Rincon, Ltd.

9. Contract Documents for Centrifuge Purchase, dated August 2009, McLaughlin Water Engineers, Ltd.

SECTION II
DESIGN CRITERIA

GENERAL

Design criteria conventionally involve:

- **Capacity** – nominal design loads are given as gallons per day (flow rate); lbs. BOD_5/day (organic).

- **Product Quality** – the allowable contaminant concentrations in the treated wastewater in order to discharge the effluent into the Rio Hondo.

- **Minimize Energy Requirements** – as well as other ongoing Operation and Maintenance expense. "Green" design techniques are to be used to reduce energy costs. Such techniques should include: efficient, non-cooling, aeration systems; ventilation air heat recovery; and heat pump use of effluent energy. These traits are particularly appropriate for treatment facilities that both operate in a cold climate and experience high winter loadings.

It is noted that the Village's water rights provide for minimal consumptive use; therefore, discharge of return flows is the only option available.

Wastewater treatment facilities serving recreational ski areas, such as for the Village of Taos Ski Valley, require special design considerations, not typical of most municipal type plants. Biological treatment processes are more stable when applied organic loads are reasonably consistent. However, recreational ski areas typically experience highly variable daily loads – with very low loads during late spring, summer and fall seasons. Also, flow variations during each season are usually more erratic than for systems serving a mostly full-time residential, mostly working, population. Treatment design

criteria should feature longer solids residence times and/or flow leveling storage in order to attain process reliability.

Biological treatment kinetics are also a function of temperature. Biological and (to a lesser extent, physical chemical) processes slow with temperature drop. This is especially critical for ski areas where loads peak during cold weather. Design criteria should be to conserve heat – and to account for the resulting slower reaction rates.

EFFLUENT QUALITY

Present regulatory requirements are defined in the Village's existing discharge permit. The Rio Hondo is a high quality mountain stream, requiring advanced treatment processes.

Critical effluent quality requirements at a 0.167 MGD design flow contained in the present permit (see Appendix, NPDES No. NM 0022101) are listed following. This new permit becomes effective October 1, 2011, and expires September 30, 2016.

Contaminant	30 Day Average (mg/l unless noted)	7 Day Average (mg/l unless noted)	TMDL 30 Day lbs/day
BOD_5	30	45	23.8
Total Suspended Solids	30	45	23.8
Ammonia Nitrogen	3.2	3.2	5.34
Total Nitrogen (Phase IV)*	8.2	12.3	13.65
Total Phosphorous (critical period)	0.5	0.75	0.8
E Coli Bacteria	126 MPN/100 ml	126 MPN/100 ml	---

*Additional Nitrogen permitted with septic tank connections.

Note that effluent acceptability is also subject to whole effluent toxicity (WET) test success.

The above criteria describe mostly a secondary level effluent – with the additional requirements of: a very strict phosphorous limit; low allowable bacterial count; and total nitrogen limits.

Information requests to the New Mexico Environmental Department have resulted in the following probabilities:

Probable Governing (Critical Period) Effluent Characteristics

(for 2011 Permit with New Plant)

Design Flow	200,000 gpd
BOD_5	30 mg/l
Total Suspended Solids	30 mg/l
Ammonia Nitrogen	3.2 mg/l
Total Nitrogen	8.2 mg/l
Phosphorous	0.5 mg/l
E-Coli	126 MPN/100 ml

Possible Future Governing Effluent Characteristics

(for projected ultimate capacity – Plant process to be planned so as to be adaptable to the following, if later required)

Design Flow	400,000 gpd
BOD_5	15 mg/l
Total Suspended Solids	15 mg/l
Ammonia Nitrogen	1.6 mg/l
Total Nitrogen	4.1 mg/l
Phophorous	0.25 mg/l
E-Coli	126 MPN/100 ml

As both plant flow and regulatory pressure increase, it is probable that future effluent limitations will be more stringent.

PROJECTED LOADS

Typically, recreation based/ski areas involve many types of customers; examples are single family residences, condominium/apartment units, hotel/lodge rooms, ski shops, offices, public restrooms (day skiers), and restaurants. To characterize design wastewater flows, it is convenient to use a "common denominator" unit to relate wastewater flows from the different types of customers. The Village has adopted the EQR (Equivalent Single Family Residential) unit. This unit is defined as resulting in the average wastewater loads generated from an occupied single-family (2 bedroom) residence. Typical values used for design purposes at Taos Ski Valley are:

220 gallons/day/EQR
0.6 lbs BOD_5/day/EQR

Peak design rates are estimated from experience, using the average rate for the peak day as a base.

The EQR approach is also rational and useful for allocating income rates and charges for sewer service.

As wastewater treatment facilities must be designed to successfully treat the peak day loads, load projections will be developed only for a design peak day.

Present Load Levels

Experienced maximum daily flows have been in the range of 115,000 gpd. As these peak flows occurred during the December – January period, it can be assumed that

inflow and groundwater infiltration contributions were minimal. Also BOD_5 concentrations were high, indicating little dilution.

Table II-A is an EQR schedule thought to most rationally represent relative usage at Taos Ski Valley. The basics for this table have been developed from other ski area communities, with some modifications made for the Village of Taos Ski Valley.

The Village's inventory for 2010 showed the following:

Existing Unites	No.	Estimated Average EQR	Actual EQR
Single Family Residence	134	1.3	172
Condos/Rentals	324	0.9	300
Restaurants (Identified - Separate)	3	8.0	26
Commercial/Other	13	6.0	80
Estimated Total EQR			578

Total existing customers have generated peak day flows in the range of 115,000 gallons or 200 gpd/EQR. During the cold weather peak period, there was probably minimal infiltration/inflow.

TABLE II-A
EQUIVALENT RESIDENTIAL UNIT (EQR) SCHEDULE
FOR THE
VILLAGE OF TAOS SKI VALLEY
(Modified to use floor area base)

General Notes:

1. An EQR is defined as a unit which exerts approximately equivalent water demands, and discharges approximately equivalent wastewater flows, as expected from an average (small) single family residence.

2. No individual customer may be assigned an EQR value of less than 1.0

3. EQR values are to be calculated by Village staff to the nearest 1/10th accuracy.

CUSTOMER CLASSIFICATIONS	UNIT EQR

A. Residential Classification

1. Single Family Residential Units

   Single family homes (small), each unit of a duplex dwelling, town house or similar type multi-family units with individual services, individually billed mobile homes, mobile homes on a single lot, and mobile homes established as permanent residences. Each small single-family residence shall not have more than 1800 sq. ft. of gross floor area 1.00

   NOTES: Occupation of the dwelling or a portion of the dwelling by more than one family is not included in the base EQR value. Swimming pools and hot tubs are additive.

   Add for each additional 250 sq. ft. of floor area, or fraction thereof: 0.20

2. Multi-family Residential Units

   Apartments, condominiums, town houses with common services, and similar dwellings in the same complex, additional apartments in single family units and small cabins in courts not associated with motels.

NOTE: Only one kitchen is permitted per unit. A kitchen is defined as any area having facilities for cooking, and associated dishwashing facilities. Includes common laundry facilities or individual laundry hook ups. Swimming pools and hot tubs are additive in accordance with classification D.1.. Common club house facilities are additive in accordance with classification A.2.f..

a. Small unit, having not more than 1,200 sq. ft. of floor area 0.65

b. Medium unit, having not more than 1,500 sq. ft. of floor area 0.80

c. Large unit having not more than 1,800 sq. ft. of floor area 1.00

e. Add for each additional 250 sq. ft. of floor area, or fraction, thereof 0.20

e. Common club house or recreation room facilities, not including commercial classification areas such as banquet rooms, bars or lounges, or customer laundry areas, or swimming pool and hot tub areas (per 1,000 square feet of gross floor area) 0.35

3. Transient Residential Units

Hotels, motels, mobile home parks, dormitories, bed and breakfast establishments, recreational vehicle parks, and similar facilities.

NOTE: Includes laundry facilities in mobile homes; laundry facilities (except those in mobile homes) are additive in accordance with classification A.3.g. Swimming pools and hot tubs are additive in accordance with classification D.1. Each complex shall have a minimum of one manager's unit; room counts shall include rooms furnished to employees. Bed space determination shall be as follows: one bed space for twin bed or roll-a-way bed; two bed spaces for double, queen or king-size bed. Recreational vehicle parks include central bath house facilities but do not include laundry facilities or retail spaces.

a. Manager's unit (per unit)

Use multi-family or single family residential unit classification as applicable

b. Motels, hotels and rooming houses without kitchen facilities

(1) Rooms having not more than two bed spaces (per rental unit) 0.25

(2) Rooms having more than two bed spaces per rental unit (per additional bed space 0.10

c. Motels/Hotels with kitchen facilities in the rental unit and rental rooms with common eating facilities (e.g., "bed and breakfast" rooms)

(1) Rooms having not more than two bed spaces (per rental unit) 0.35

(2) Rooms having more than two bed spaces per rental unit (per additional bed space)..... 0.15

d. Dormitories (per each rental bed space)..... 0.15

e. Mobile home parks (per each available space)..... 0.75

f. Recreational vehicle parks (each available space)

(1) Camping or vehicle space without utility hook ups (per space)..... 0.30

(2) Camping or vehicle space with utility hook ups (per space)..... 0.35

NOTE: Spaces which have year-round mobile homes are to be assessed per mobile home park classification.

g. Add for laundry facilities in the billing unit complex (per washing machine or available hook up)..... 1.05

h. Common club house or recreation room facilities not including commercial classification areas such as banquet rooms, bars or lounges, customer laundry areas, or swimming pool and hot tub areas (per 1,000 square feet of gross floor area) 0.35

B. Commercial Classification

1. Restaurants bars, food and drink preparation and service

Restaurants, take out food services, food delivery service, delicatessen, bakery, bars, lounges, banquet rooms, and drive-ins

NOTE: Seating count to be based on the maximum number of interior seats; outside seats are not to be counted. Bench seating shall be determined to be 24 lineal inches per seat along the bench. Take out or delivery service is additive in accordance with the applicable classification of category B.1. Large commercial bakeries are not included but shall be assessed in accordance with category E.

a. Restaurant and bars (includes first 20 seats).....1.00

b. For each additional 10 seats block 040

c. Banquet rooms (per block of 20 seats).....0.40

d. Take out service when associated with a restaurant use.....0.50

e. Commercial kitchen for delivered or take out foods including catering (per kitchen or business).....1.00

f. Bakery or delicatessen in conjunction with other commercial category (per kitchen or use) 0.50

2. Commercial Buildings

Office buildings, retail sales buildings, multiple use buildings, laundromats, service stations, shops, garages, and similar facilities.

NOTE: Washing machines used in conjunction with the business shall be additive in accordance with classification B.2.e. Gross

occupied area shall be defined as the total area for that particular use within the billing unit, including rest rooms. Only unoccupied areas that are common to more than one tenant in a multiple use building shall not be included (i.e., common hallways, common mechanical rooms, or common cleaning closets).

a. Offices, office buildings, barber shops, and hair styling salons (per 1,000 s.f. of gross occupied area) 0.50

b. Retail sales area (per 1,000 square feet of gross occupied area) 0.30

c. Non-retail work area such as garages, vehicle/equipment repair service bays, machine shops, fire station bays, warehouses, stocking/receiving area in conjunction with a retail establishment, and similar other uses (per 1,000 s.f. of gross floor area) 0.20

d. Laundromats (per washing machine or available hook up) 1.20

e. Laundry facilities associated with other commercial-type use (per washing machine or available hook up) 0.80

f. Service stations and other gasoline retail customers 0.30

(1) Base Rate for Station, including 4 vehicle fueling stations 1.0

(2) Bid for each additional fueling space 0.20

NOTE: Office space, retail space, and service garage space is additive in accordance with the applicable category in the schedule.

g. Bay or area where cars, trucks, construction machinery, or similar equipment can be washed (per bay/area) 1.50

NOTE: A bay or area shall include a floor drain and an apparatus for washing such as a spray washer or hoses and nozzles.

h. Process water from commercial establishments discharged to the collection system shall be evaluated based on estimated peak day metered inflow (per 1,000 gpd, maximum daily flow) 2.50

C. Church and School Classifications

1. Churches (per 100 seats) 1.50

NOTE: Seat count shall include all sanctuary, classroom, meeting room, and general assembly area seating. Bench or pew seating shall be determined to be 24 lineal inches per seat along the bench. Rectories or other living areas are additive in accordance with the appropriate residential classification.

2. Schools

Day care centers, public and private day schools, adult night schools

NOTE: Includes teachers, librarians, custodians, and administrative personnel associated with the school function. Administrative centers, warehouses, equipment or machinery repair and/or storage centers (such as bus barns), swimming pools, and similar facilities are additive. Student count is to be the design student capacity of the building. EQR's shall only be assigned to a school with a gymnasium if locker rooms with showers are installed.

a. Without gym and without cafeteria (per 50 students) 1.50

b. Without gym and with cafeteria or with gym and without cafeteria (per 50 students) 1.85

c. With gym and with cafeteria (per 50 students 2.10

D. Miscellaneous Classifications

1. Swimming Pools

Swimming pools, wading pools, and hot tubs

NOTE: A permanent sign must be placed prominently at all filter installations stating that pools are not to be drained without the permission of the Village Director of Public Works, that pool draining rates will be subject to the approval of the Joint Authority Superintendent, and that draining shall be limited to the hours between 11 p.m. and 6 a.m. the next day.

a. private pools associated with a single family residential unit (per 40,000 gallons of pool volume).....0.55

b. Pools associated with multi-family or transient residential units (per 40,000 gallons of pool volume).....1.05

c. Commercial and public pools

NOTE: Total EQR assessment is to be computed from pool volume as follows:

(1) Per 40,000 gallons of pool volume 1.05

d. Hot tubs or similar water using tanks when associated with multi-family or transient residential complexes or with commercial or public uses (per 300 gallons or fraction thereof).....0.20

2. Public building meeting rooms including associated kitchen facilities (per 1,000 s.f. of gross floor area).....0.35

3. Public rest rooms when not associated with other customer uses (per pair of toilets or urinals).....0.40

4. Recreational vehicle waste disposal stations.....3.00

NOTE: The Village Director of Public Works has the authority to deny waste disposal at the plant if the waste to be dumped would cause plant operational problems.

5. Septic waste and other batch waste disposal

NOTE: The Village will establish a per dump charge for operations and maintenance purposes. Dumps shall occur only at the waste water treatment plant. The Village Director of Public

Works will have authority to deny waste disposal at the plant should the waste receiver be full or if the waste to be dumped will cause plant operational problems. The Village reserves the right to not accept such wastes at any time.

E. Other Classifications

NOTE: The Village shall evaluate and establish rates for any and all users not identified in the Use Classifications A., B., C., or D on an individual basis.

Projected Ultimate Loads

Maximum projected wastewater loads will occur at planned buildout of the Service Area. The Service Area boundaries used are the same as for the Water Master Plan. These are shown on Drawing II-A, at the back of this Report.

The 2004 Preliminary Engineering Report predicted growth for both 10 ("near term") and 20 year ("long term") development; a projection was not made for build-out conditions. The predicted flows were:

Year 2014	-	150,000 gpd
Year 2024	-	190,000 gpd

Since well-designed treatment facilities should have a useable life of over 50 years, it is advisable to develop probable maximum loads – so that later phase upgrades/expansions can integrate efficiently with the next phase investment. The following projections are intended to account for reasonable potential buildout of the study area.

Base Village. This service area is defined as the development above the wastewater treatment plant site, being mostly in the base "Red" Pressure Zone as shown in the Water Master Plan. It includes all the high density residential and commercial area associated with the Ski Area Base.

The Village had developed comprehensive planning guidance (HDR-2009). However, this did not provide specific enough information to project probable land use. Base Area planning is now being developed. Using that information, the following estimate of developed wastewater loads has been made.

Present EQR in Base Area	420 EQR
Estimate by Core Village Renovation Developers (Net Increase)	363 EQR
Estimate, other Development in Base Area	150 EQR
Total Estimated Ultimate Development, Base Area	**933 EQR**

Intermediate Zone. This is the area above the Base, but below Kachina Village. This area is mostly residential; most of the area has been platted – it does include the recent 22 lot plat submitted by the Ski Corporation.

This zone contains approximately 155 buildable lots; the estimated buildout EQR is 200.

Kachina Village. This study sub-area includes all of the developable area above (south of) the existing Red Zone water tank. Extensive projections of the probable ultimate developed EQRs were made in 2007 – which were fundamental to financing the water supply improvements needed to develop the Kachina area. The Village had prepared a Land Use and Conceptual Density Analysis (Comet Studies, 03-16-07).

Kachina Village is to be mixed use; it includes a tow base, the Bavarian Restaurant and Lounge. Since that time, Taos Holdings has acquired some of the Pattison holdings in this area, and has significantly lowered planned density in the upper region. Using the base data from that study (max buildout = 430 EQR), but adjusting probable densities to reasonable levels, results in an estimate of 350 EQRs at buildout. This value includes the existing development in Kachina Village.

Amizette. This area is below the plant site. However, it is in the incorporated area of the Village. As development proceeds, installation of a community sewer system will be necessary. The area is now served using holding vaults (truck off) and individual septic tank systems.

It has been determined feasible to construct a lift station at Amizette and return the flow to the present plant site (as opposed to constructing a satellite plant). Therefore, projected Amizette loads must be accounted for when planning the ultimate plant. The 2004 Preliminary Engineering Report contained a detailed development projection for Amizette – which has been used to estimate EQRs following:

Development Description	Estimated EQR
Amizette Inn – 10 rooms (B & B)	7
Austinghouse/Columbine – 53 rooms (B & B)	40
Taos Mountain Lodge – 10 rooms	6
Existing Residences – 25	35
Residential Lots – 16	24
Commercial Lots – 22	(Approximately) 50
Restaurant	4
TSV, Inc., Burroughs, 200 Condo Units	160
Total Potential EQR	326
	(Use 300)

SUMMARY

The ultimate treatment facility should be master planned using the following design criteria. It is recognized that both required effluent quality and plant capacity will likely be modified during the next 50+ years; therefore, process and facility flexibility is also a design criterion.

The provisions for accepting vault and septage wastes from users within the Village limits would be beneficial (until such users can be connected).

Effluent Quality:

BOD	<10 mg/l
Suspended Solids	<10 mg/l
Phosphorous	<0.25 mg/l
Ammonia	3.2 or Minimum Practical
Nitrogen	<4.0 mg/l

Treatment Plant Sizing:

Potential EQR:

Base Village	930 EQR
Intermediate Zone	200 EQR
Kachina Village	350 EQR
Amizette	300 EQR
Total	**1,780 EQR**

Max Daily Flow = 392,000 gpd – use 400,000 gpd

Max Day Organic Load ≈ 1,070 lb. BOD_5

SECTION III
EXISTING FACILITIES

GENERAL

Most of the plant structures now in use were built as a part of the 1982 project[1]. A new pretreatment building and extensive modifications were undertaken in the 2005 Improvements contract[6]. Drawing III-A is the Site Plan, locating exiting facilities. Drawing III-B is a Flow Diagram showing existing unit processes and flow patterns; Drawing III-C illustrates the existing plant hydraulic profile.

Overall design capacity for the 2005 Improvements was:

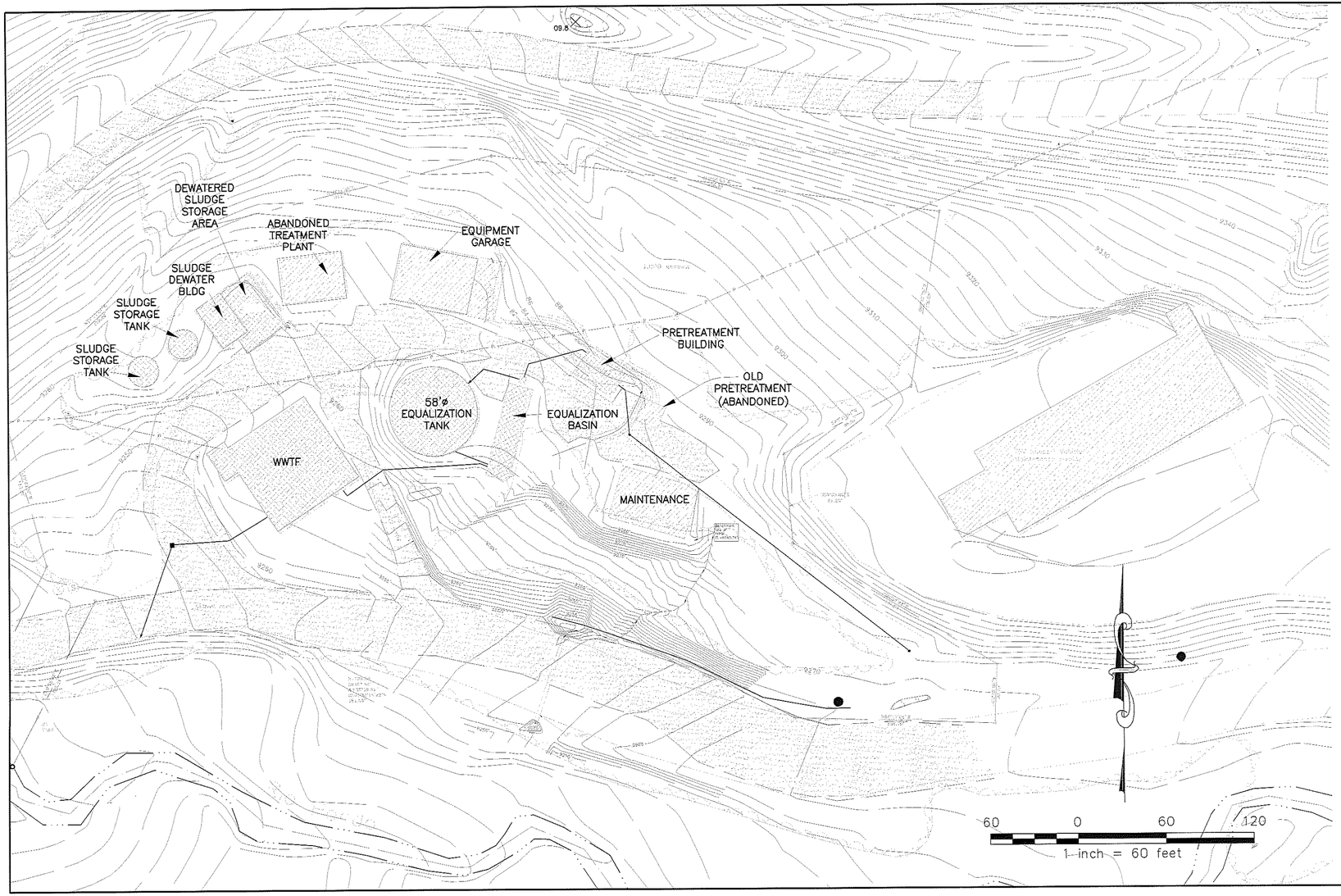
Average rate, maximum month	200,000 gpd
Max hourly rate	400,000 gpd
	(500,000 gpd pretreat)
Organic Load	416 lb. BOD_5/day

Using the unit EQR values given in Section II, this plant was designed to treat wastes from about 900 EQR. The plant has since been down-rated to 167,000 gpd, or 720 EQR.

UNIT DESCRIPTIONS

Influent Sewer

A new 10" DIP influent sewer was installed in 2005. At the as-built grade of 0.85%, this sewer should have a capacity of 1.3 MGD, or in the range of 1,800 – 2,000 EQR.



Base Topography by
Red Tail Surveying, Inc.

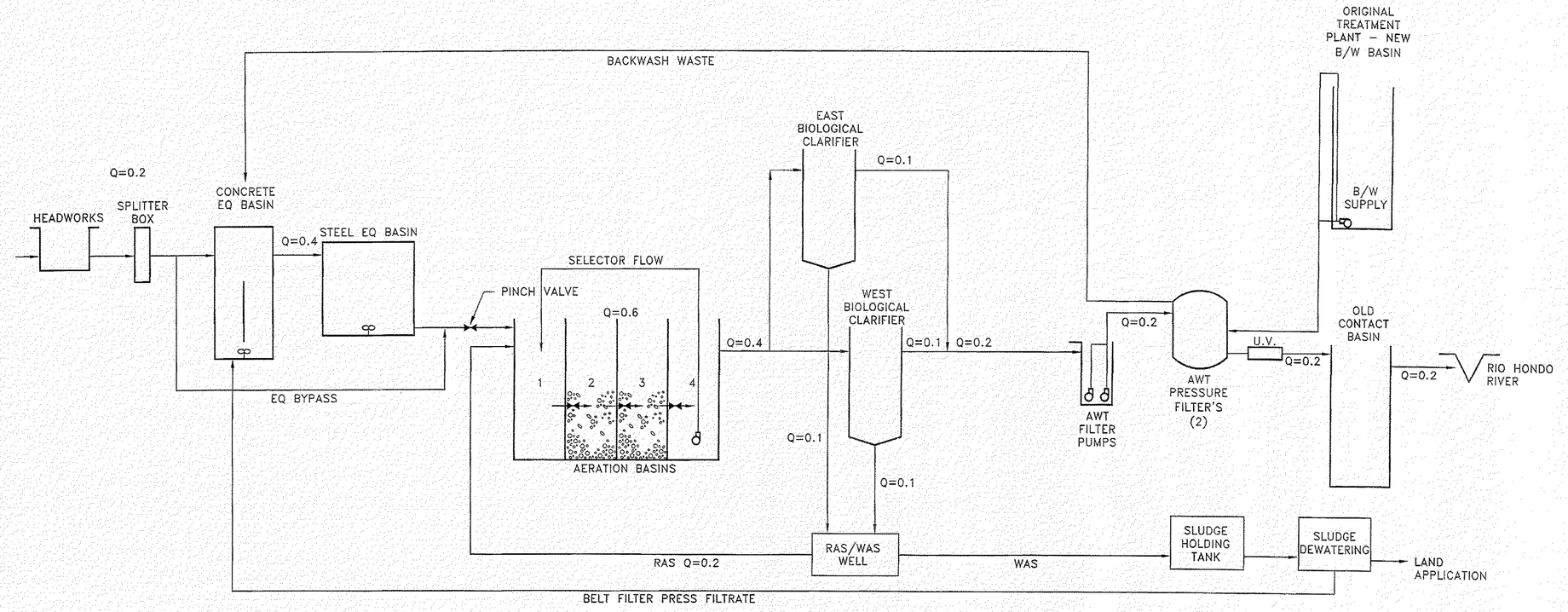
Village of Taos Ski Valley

Site Plan - Existing Wastewater Treatment Facilities

McLaughlin Water Engineers, Ltd.
2420 Alcott Street
Denver, Colorado 80211
T 303.964.3333
F 303.964.3335

Drawing III-A

TAOS SKI VALLEY / MWE TAOS SITE 3-A_3-B.DWG / JUNE 22, 2011 / PROJ. 06-09-06



PLANT FLOW SCHEMATIC

NTS

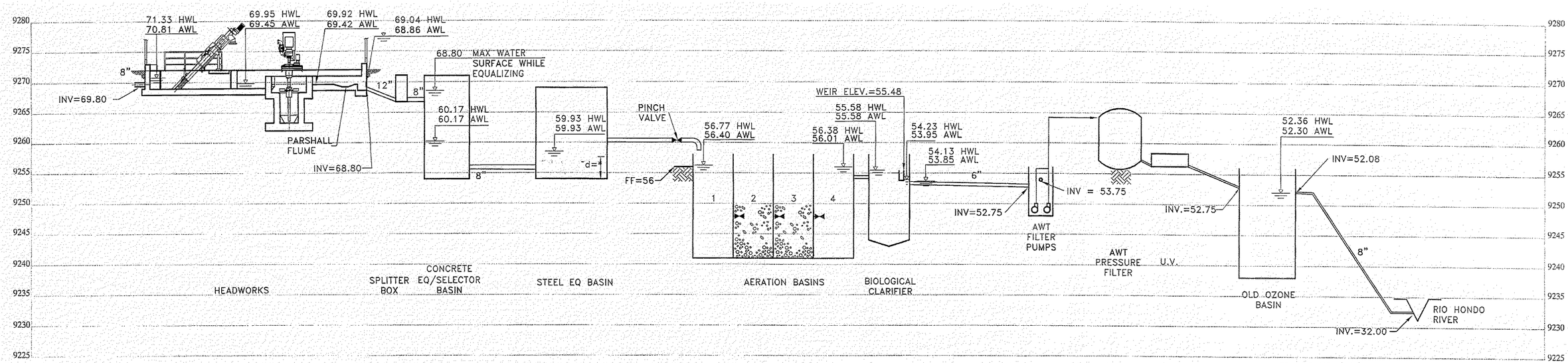
DESIGN CRITERIA

- HEADWORKS PEAK HOUR = 0.5MGD
- PLANT PEAK HOUR = 0.4MGD
- MAX MONTH AVERAGE DAILY FLOW = 0.2MGD
- BOD = 250 MG/L
- TSS = 275 MG/L

This drawing is from TEC, 2005 contract documents.

Drawing III-B

TAOS SKI VALLEY / TAOS III-B AND III-C.DWG / JUNE 24, 2001 / PROJ. 06-09-12P



* DRAIN LINE 4" ABOVE FF

EQ LINE AND INLET "TO BE FIELD DETERMINED"

FEMA PANEL 3500780275C, NO KNOWN FLOOD PLAIN ELEVATION

HWL = 0.4 MGD
AWL = 0.2 MGD

HYDRAULIC PROFILE

This drawing is from TEC, 2005 contract documents.

Drawing III-C

TAOS SKI VALLEY / TAOS III-B AND III-C.DWG / JUNE 24, 2001 / PROJ. 06-09-12P

Pretreatment

This is a separate building constructed in 2005. Design capacity was for a 500,000 gpd peak rate, (200,000 gpd average rate). Components include:

- Raw sewage cylindrical screen with spiral screenings compactor/bagger.
- Non-aerated Pista grit separation basin.
- Grit classifier and washer.
- 3"Parshall measuring flume.

This facility is in good condition, of reasonable design, and has an expected useable life in the range of over 40 additional years (assuming capacity adequacy).

There are no provisions for receiving septage or vault wastes.

Equalization Basins

There are two Equalization ("Eq") Basins, which normally operate in series. These basins receive the pretreated flow and partially flow level (attenuate peak rates) wastewater before proceeding to the biological process.

The circular steel tank was constructed prior to 1982. It is second in the series. Per the 2005 TEC drawings, it has a total capacity of about 300,000 gallons; however, the useable variable volume is only about 220,000 gallons.

Four 5.4 HP submersible mixers were installed on this tank in 2005. The condition of this tank is thought to be poor – with the tank having a projected limited useful life (probably in the range of 10 years).

The concrete equalization basin was constructed as part of the 1982 project. It is rectangular; it had a submersible mixer at the inlet (which is no longer in service) and a

row of air diffusers near the outlet. The 1982 drawings (hydraulic profile and structure) are not consistent. The total liquid volume is 102,000 gal; the useable volume (for flow leveling) is approximately 83,000 gallons.

This basin should still be in good condition, suitable for continued use for a reasonable period.

Biological/Aeration Basins

The biological reaction basins are of reinforced concrete, and enclosed in the main plant building. The basins were constructed as part of the 1982 project, but extensively modified in 2005. Flow into Basin 1 from the Eq basins is automatically regulated using a motor operated pinch valve, paced by a flow meter.

The overall basin is rectangular. It has been divided into four similar compartments, each having dimensions of 15 ft. sq. by 15 ft+/- water depth. Each compartment provides approximately 25,000 gallons reaction volume, or 100,000 gallons capacity total.

The processes feature biological oxidation, including nitrification, and denitrification. Phosphorous removal is achieved chemically by adding polyaluminum chloride to Basin 1. Following are descriptions of each basin, as modified in 2005.

Basin 1. This compartment receives:

- Incoming raw sewage.
- Return activated sludge (RAS).
- Recycled mixed liquor from Basin 4 (selector).
- Polyaluminum chloride for phosphorous precipitation.
- Soda Ash for process alkalinity.

The basin was originally equipped with fine bubble diffusers. These have been left in place, but are not used as this basin is to be anoxic. It was equipped with a 2.3 HP mixer; this has since failed and staff replaced it with a 1 HP submersible, which appears to be adequate.

Basin 2. Moving bed media (Kaldness) was added to this compartment in 2005. Approximately 90% of the media is in Basin 2. A coarse bubble diffusion system replaced the original fine bubble diffusers – to both provide dissolved oxygen and scour the new media. Two stainless steel effluent screens were installed near the surface of the basin to prevent media migration. Biological carbon and nitrogenous oxidation is to primarily take place in Basin 2 – which, at design flow, has an average EBCT (empty bed contact time) of 3 hours. Additional oxidation can take place in Basin 3; however, recycle flows drastically reduce raw sewage residence time.

Basin 3. This basin contains about 10% of the Kaldness media. It has been equipped with coarse bubble aeration and outlet screens, similar to Basin 2. This Basin provides additional oxidation time – but only low D.O. levels should be maintained in order to attain anoxic status in Basin 1. However, screens at the top have plugging problems when aeration is reduced. (Most of media has been removed to reduce plugging problems.)

Basin 4. This basin has been separated further into two compartments (10'-4" and 3'-8"). The first compartment is approximately 17,200 gallons. It is termed a "selector" basin and houses three pumps which recycle nitrified (anoxic) mixed liquor back to Basin 1 for nitrate reduction. The original fine bubble diffusion system remains in place, although not normally used. The selector pumps are equipped with VFDs (variable frequency drives). Pump capacities were not specified; however, the reported available recycle rate is 5 to 1. Each pump is driven by a 5 HP motor.

Compartment "4B" is separated as an anoxic zone; it receives the product mixed liquor for transfer to the clarifiers. Its maximum liquid volume is 6,100 gallons. It now has the

previous flocculator mixer installed. There is a 12" square opening at the floor of the selector where a carbon source can be fed, if needed (now using "Micro C").

Clarifiers

Mixed liquor solids are settled in two circular clarifiers, now operating in parallel. These are of reinforced concrete, constructed in 1982. They were originally operated in series, with one being a "chemical" clarifier for precipitate removal. In 2005, they were refitted so both function for mixed liquor. There was an hydraulic problem involving flow splitting, but this was corrected by adding a weir box in 2009. At the same time control of sludge pumping was improved.

The clarifiers are 15'-0" I.D. with a side water depth of 12'-0". Volume of each is 15,800 gallons, providing an average day detention time of 3.8 hours. Overflow rate would be 568 gpd, which is usually marginal for a small clarifier; however, the problem can be mitigated by reducing the peak flow rate (through operation of Eq tank storage).

The chemical clarifier was preceded by a rapid mix and flocculation tank; these were abandoned in place during the 2005 project – but have since been converted for backwash water storage for the pressure filters.

New sludge collectors, walk ramp, troughs and baffles were installed in one clarifier in 2005. The clarifiers are now in good physical condition.

Tertiary Filtration/Disinfection

Secondary denitrified effluent flows to the tertiary filtration system, which was constructed in 1982. These facilities consist of:

Filter Feed Pumps. Two new pumps were installed in 2005. Specified capacity was 600 gpm (860,000 gpd each) at 29 ft. head. Pumps are equipped with VFDs, which should maintain a constant filter rate.

Pressure Filters. There are two pressure filters. Specifications for these filters are not available. Filters are approximately 6'-10" I.D. At a flux rate of 4 gpm/sq. ft., nominal capacity of each should be approximately 400,000 gpd. It is noted that the flow diagram (2005 project) indicates a design flow to the filters of 200,000 gpd – but the design point given for each filter feed pump is over 800,000 gpd.

Filter backwash water was stored in a rectangular steel tank. This tank was the original treatment plant (before 1982). It was rehabilitated in 1982 and 2005 for backwash water storage. However, this tank collapsed. Staff has equipped the original Chemical Clarifier Mixing/Flocculation Compartments for use as a backwash water holding tank. Backwash water is now pumped from those compartments. Backwash waste is delivered to the concrete Eq Tank.

UV Disinfection. The 1982 plant incorporated a concrete tank designed as an ozone contact tank. Ozone use was discontinued, with the addition of an in-pipeline UV disinfection unit Circa 1986. This is a UVPS – Infilco pipeline unit, with a design capacity of 300 gpm (400,000 gpd). It has successfully disinfected the effluent since. This unit is out-of-date and should be replaced as soon as practicable.

Waste Sludge

Return activated sludge (RAS) from both clarifiers is pumped to the Aeration Basins inlet (Basin 1).

Waste activated sludge (WAS) is pumped to two 20 ft. diameter, 52,000 gallons each, aerated steel sludge holding tanks. These tanks are located adjacent to the sludge

dewatering building. They were probably built in 1999, and are in poor condition. They need to be replaced if such capacity is needed.

As part of the 1982 project, a vacuum assisted sludge drying bed was constructed. The 2005 project drawings did not include any sludge treatment improvements. Evidently, the vacuum drying bed was found to be inadequate and a sludge treatment building constructed in 1999[3]. A belt filter press was installed. Ancillary equipment included a polymer feeder, progressing cavity feed pump, and a conveyor which transferred dewatered sludge to a dumpster. Dewatered sludge was then trucked to the Town of Taos plant for disposal.

The belt filter press experienced operating problems, and produced excessive filtrate waste water. In 2009, the belt filter was replaced by a centrifuge[9]. The centrifuge package was designed so that, if found desirable, it could be relocated. It has adequate dewatering capacity for the future, expanded plant. It has since operated successfully, and is in good condition.

Standby Power

A diesel powered standby generator was installed in 2005. It was specified as producing a minimum of 302 KW at the plant site.

Support Facilities

The existing operating office and laboratory are confined and poorly equipped. An upgraded new laboratory and operational space are needed.

SECTION IV
PLANT SITE MASTER PLAN

OVERVIEW

The projected buildout maximum plant capacity (nominal 0.40 MGD) dictates that the ultimate treatment facility should have two identical trains. Two of each process units is the minimum number required for practical plant reliability, and is in conformance with State Standards. Thus, the Master Plan should provide for two, 200,000 gpd treatment trains. The initial program will have one train, using the existing plant as backup for system reliability.

At a rated capacity of 200,000 gpd, the effluent quality standards – which are based on TMDLs (Total Maximum Daily Limits), will not be as stringent as will be required for the future 400,000 gpd plant capacity. However, the initial plant should be designed to produce the higher quality effluent which is expected to be required at the predicted future 400,000 gpd design capacity. As described in Section II, for the critical high load period, the design effluent quality criteria are:

BOD_5	15 mg/l
Ammonia Nitrogen	1.6 mg/l
Total Nitrogen	4.1 mg/l
Phosphorous	0.25 mg/l

As stated, other significant design criteria include:

- Minimal Odors. The plant is located near to the Village, and its access road.
- Operational Flexibility. The need to reasonably handle highly variable load rates.
- Weatherproof. The plant must operate reliably during extreme cold weather.

- Energy Conservation. Minimize energy requirements for both environmental and cost reasons.
- Visual Aesthetics. It is likely that the Village entrance road will be rerouted with the location being adjacent to the treatment site.

PRETREATMENT

The present pretreatment facility should be adequate until a future plant expansion.

The master plan envisions a future separate enclosed pretreatment structure. The projected capacity is 0.4 MGD (nominal) or 1.0 MGD (peak rate). This facility would include:

- Flow Measurement – 6" Parshall Flume
- Debris Removal – Autoscreen with Compactor
- Grit Removal – aerated grit chamber. Aerated to preclude odors.

Pretreatment to be designed to facilitate downstream flow leveling basins.

FLOW LEVELING

The existing facilities have two flow leveling "Eq" basins. Operators have found them to be very useful for stabilizing downstream biological processes since the Village facility experiences highly variable diurnal (and weekly) influent rates. The site affords adequate differential elevations so that gravity based influent flow leveling is possible.

The Master Plan assumes the later construction of one concrete, insulated, flow leveling tank, having a useable capacity of approximately 100,000 gallons. The existing tanks can be used for several years, so that their replacement need not be a part of the proposed initial project.

The Eq tank should be aerated and mixed to minimize odors and solids depositions, and to result in a more consistent feed strength to the biological processes.

BIOLOGICAL PROCESSES

It was first determined that biological phosphorous removal would be advantageous – but that downstream physical chemical processes must be relied upon to attain the low product level specified. The biological processes are, then, designed primarily for carbonaceous BOD removal, ammonia oxidation, and denitrification.

Based on engineering and operational experience in similar situations, three forms of biological treatment have been selected for predesign and evaluation. Only alternatives that are thought appropriate for the design criteria have been developed.

In particular, all three alternatives have these characteristics:

- Can reasonably produce the design effluent qualities without highly sophisticated operational control.
- Have a small footprint to facilitate structural enclosure – for weather protection, and to conserve heat energy.
- Are likely to be reasonably reproducible within a 20-50 year time span – so that the second train can be similar to the first.
- Amenable to handling varying load rates.
- Will result in reasonable capital and O & M costs.

Alternate 1 - Conventional Activated Sludge

Alternative 1 is conventional activated sludge, modified to incorporate nitrification and denitrification. Carbonaceous and nitrogenous oxidation is achieved in the first compartment. Using either pretreated waste or return activated sludge for a carbon source (can be supplemented), denitrification is achieved in the second, anoxic cell.

Although consumed alkalinity is recovered during denitrification, it will probably still be necessary to add alkalinity to the aeration compartment.

The Flow Diagram and Hydraulic Profile for this alternate are illustrated on Drawing IV-1.

Specific relative advantages for this alternate include:

a. Well established process. Does not require proprietary equipment. Reproduction in distant future (for plant expansion) has the most probability of still being appropriate.

b. Minimal head loss; with the existing site, no main flow pumping required.

c. Primarily utilizes the natural waste load for the carbon source during denitrification.

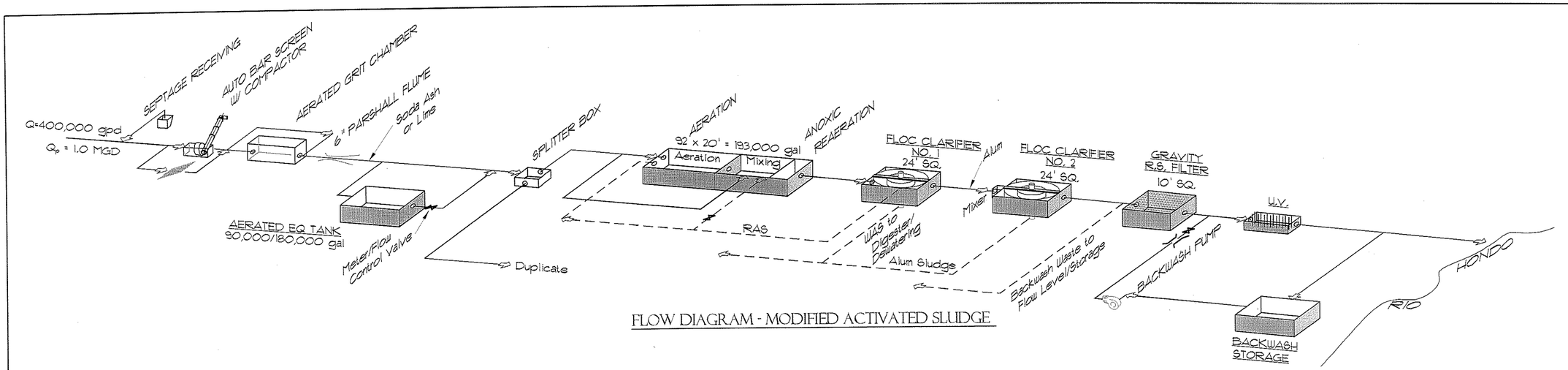
Relative disadvantages include:

d. Necessity to control/pump RAS (return activated sludge).

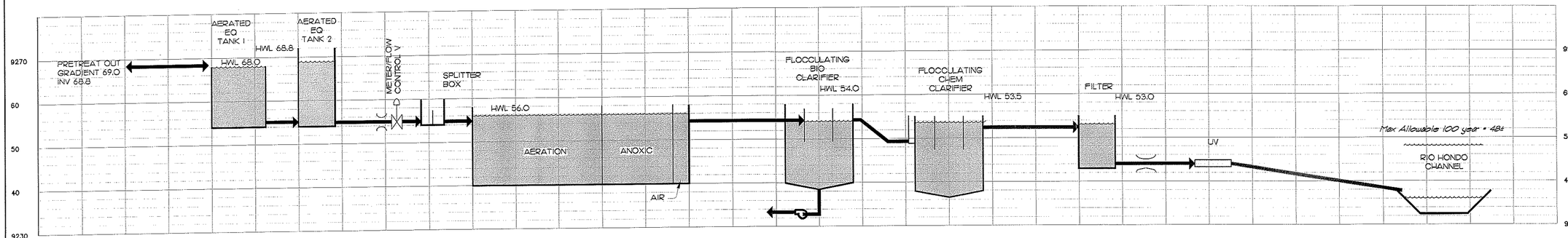
e. The need to control sludge quality so as to maintain settleability.

Alternate 2 – Sequencing Batch Reactor

Alternate 2 utilizes the Sequencing Batch Reactor (SBR) form of the activated sludge process. In this process, all three biological reactions, as well as sludge separation, take place in the same basin – thus eliminating the need for a separate clarifier and return activated sludge pumping. As predesigned for Taos Ski Valley, process sequences would be programmed and automated.



FLOW DIAGRAM - MODIFIED ACTIVATED SLUDGE



HYDRAULIC PROFILE

VILLAGE OF TAOS SKI VALLEY - PROTOTYPE DESIGN WWTP @ 400,000 GPD
ALTERNATE 1 MODIFIED ACTIVATED SLUDGE

McLaughlin Water Engineers, Ltd.

DRAWING
IV-1

The sequences would be:

1. Fill with aeration. Maintain time for near complete carbonaceous and ammonia oxidation.

2. Anoxic reaction. Mix basin without aeration. Allow small amount of inflow – only as needed for a carbon source. Nitrate is reduced to form nitrogen gas.

3. Brief aeration. Optional – add aeration as needed to prevent anaerobic reaction during the subsequent settling mode.

4. Settling. The activated sludge settles, leaving a relatively clear, low solids, supernatant.

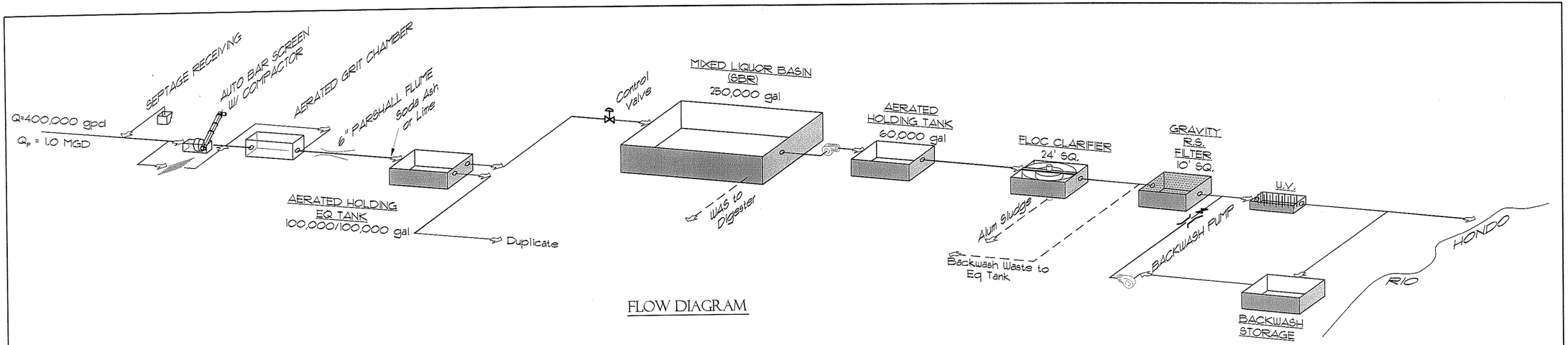
5. Decant. A special decanter retrieves the supernatant for discharge from the basin. Sludge wasting also occurs near the end of the decant cycle.

The preliminary flow diagram and hydraulic profile are shown on Drawing IV-2. A downstream aerated holding tank is needed to increase main stream dissolved oxygen, while leveling flow to result in operating economy for the downstream processes (since the decant step is intermittent).

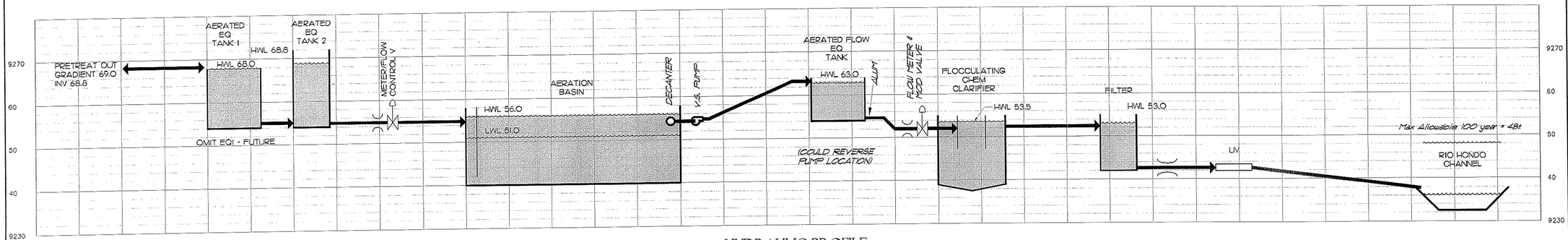
Relative advantages for this alternative include:

a. Elimination of the biological clarifier reduces capital costs and the resulting operating complexity of managing return activated sludge.

b. Very flexible operation. Can accommodate varying load rates through cycle adjustment. Although cycle control is complex, modern SCADA systems, using dissolved oxygen, ammonia, and ORP probes can effectively match system operations to actual loadings.



FLOW DIAGRAM



HYDRAULIC PROFILE

VILLAGE OF TAOS SKI VALLEY - PROTOTYPE DESIGN WWTP @ 400,000 GPD
ALTERNATE 2 SEQUENCING BATCH REACTOR

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F 303.292.4585

DRAWING
IV-2

c. Although most SBR systems involve proprietary equipment a plant using SBR technology can be designed to use competitive equipment.

Relative disadvantages for this alternative include:

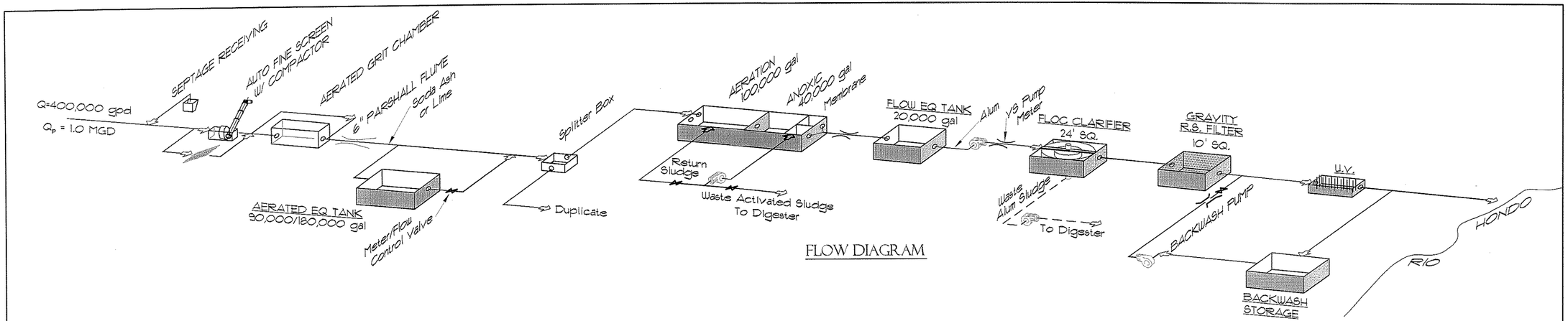
d. Discontinuous process flow. Intermittent operation (with one SBR train) requires storage of influent when not in the fill cycle. Similarly, the decant cycle is intermittent, having peak rates much higher than normal influent peak rates; the result is the need for placing a flow equalization basin to efficiently accommodate downstream physical / chemical processes. This problem is reduced when there are two SBR trains, operating on opposite timed cycles.

e. Good decanters are difficult to purchase as independent items of equipment.

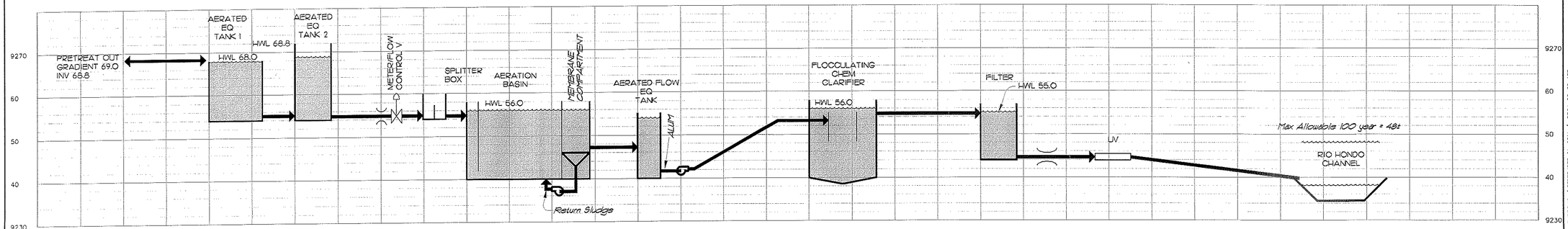
f. Operations are complex and frequent, requiring continuous, reliable performance of the SCADA system.

Alternate 3 – Membrane Bio Reactor

The MBR is another form of activated sludge. In this form, a membrane filter replaces the secondary clarifier. A small aerated Eq basin is located after the MBR to both elevate effluent D.O. (dissolved oxygen) and equalize the feed rate to the tertiary processes – since membrane flushing would otherwise vary the feed rate. A preliminary flow diagram and hydraulic profile for this option is shown on Drawing IV-3.



FLOW DIAGRAM



HYDRAULIC PROFILE

VILLAGE OF TAOS SKI VALLEY - PROTOTYPE DESIGN WWTP @ 400,000 GPD
ALTERNATE 3 MEMBRANE BIOREACTOR

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DRAWING
IV-3

Features particular to an MBR include:

- The membranes could be flat plate (e.g. Kruger) or hollow fiber (e.g. Koch, Zenon). Additional air is required for continuous cleaning. Cleaning is also through periodic backwash, and relatively infrequent chemical applications. Most manufacturers claim an average 10 year membrane life.
- The recommended maximum mixed liquor solid is in the range of 8,000 mg/l. This permits smaller aeration basin volume to attain the desired F:M (food to microorganism) ratio.
- Some proposed configurations place the membrane modules in the mixed liquor basin; others provide separate cells to house the membranes. In the separate configuration, some return sludge accommodations are necessary.

Relative advantages for this alternative include:

a. It is not mandatory to maintain a well settling sludge to attain liquid-solid separation.

b. The aeration/mixed liquor basin can be smaller.

c. RAS facilities / controls are either not required or are simpler.

Relative disadvantages for this alternative include:

d. The need to replace the existing automatic bar screen as fine screening is required before membranes (cost approximately $90,000).
e. The need to periodically clean and replace the membranes. It is generally acknowledged that the continuous coarse bubble cleaning adds about 30% to the plant air requirements.

RELATIVE CAPITAL COST COMPARISON

Preliminary capital cost estimates have been made for the three alternative plans. These are relative costs for comparison; they do not include the components that are common to all alternatives, i.e.: pretreatment, advanced physical/chemical treatment (for final phosphorous removal), disinfection or waste solids handling. Since, in all cases, the future second module is to be similar to the first, the estimates only apply to the first module, as shown on the individual alternative flow diagrams.

Alternate 1 – Modified Activated Sludge

	Item Description	Estimated Cost
1.	Flow Leveling Tank (use existing 20-year+/-)	$0
2.	New Rate of Flow Controller/Splitter	$60,000
3.	Biological Reaction Basin (sludge reaeration, mixed liquor, anoxic, reaeration compartments with diffusers and rate controls), with superstructure	$797,000
4.	Secondary Flocculating Clarifier, 24 ft, with superstructure	$220,000
5.	Equipment Room, approximately 720 s.f. w/ RAS pump, 2 WAS pumps, 1 spare pump; w/ 3 blowers, 1 – 50 HP; 1 – 50 HP Standby; 1 small reaeration blower w/ VFD	$347,000
6.	Chemical Flocculating Clarifier, with superstructure	$231,000
7.	Office/Laboratory, constructed above Equipment Room	$210,000
Total Estimate Construction Cost, Biological Treatment Facilities		$1,865,000
Allow 25% for Contingencies, Engineering, Inspection and Miscellaneous		$466,000
Total Estimated Comparative Alternative 1 Capital Budget		**$2,331,000**

Alternate 2 – Sequencing Batch Reactor

	Item Description	Estimated Cost
1.	Flow Leveling (use existing 20-year+/-)	$0
2.	Splitter Box for future use	$46,000
3.	SBR Basin, approximately 250,000 gallons, with superstructure, including 2 mixer-aerators and decanter	$904,000
4.	Eq Basin, with aeration system	$160,000
5.	Equipment Room, approximately 720 ft. sq. w/ 2 large blowers; 1 small blower w/ 2 waste sludge pumps; 1 chem waste pump; w/ 2 transfer pumps with meter	$405,000
6.	Office/Laboratory, constructed above Equipment Room	$240,000
Total Estimate Construction Cost, Biological Treatment Facilities		$1,755,000
Allow 25% for Contingencies, Engineering, Inspection and Miscellaneous		$439,000
Total Estimated Comparative Alternative 2 Capital Budget		**$2,194,000**

Alternate 3 – Membrane Bio Reactor

	Item Description	Estimated Cost
1.	Pretreatment – replace existing screen w/ fine screen	$90,000
2.	Flow Leveling (existing adequate)	$0
3.	Splitter with rate of flow controller	$60,000
4.	Membrane Equipment Package (based on flat plate choices), including aeration blower and mixer	$910,000
5.	Concrete Tankage and Superstructure for anoxic basins, aeration basin and MBRs	$299,000
6.	Installation of MBR equipment and piping	$285,000
7.	Eq Basin, 20,000 gallon with effluent rate of flow controller	$49,000
8.	Flocculating Clarifier, with superstructure and 24 ft. circular collector	$220,000
9.	Equipment Room below – approximately 1,500 s.f. with 780 s.f. superstructure	$182,000
10.	Office/Laboratory, approximately 720 s.f.	$210,000
Total Estimate Construction Cost, Biological Treatment Facilities		$2,305,000
Allow 25% for Contingencies, Engineering, Inspection and Miscellaneous		$576,000
Total Estimated Comparative Alternative 3 Capital Budget		**$2,881,000**

WASTE BIOSOLIDS MANAGEMENT

The existing facilities have been adequate for the present plant. The recent centrifuge addition operates intermittently and has adequate capacity for the projected ultimate 400,000 gpd (max day) flow. A second, standby unit will not likely be needed; the unit can be overhauled when necessary during the low-flow summer season.

For this size facility, aerobic digestion is the only practical choice. At predicted ultimate plant loading, the design projected waste sludge loading will be approximately 20,500 lbs waste biosolids per month. Conservative design results in two aerobic digesters of 80,000 gallons capacity each.

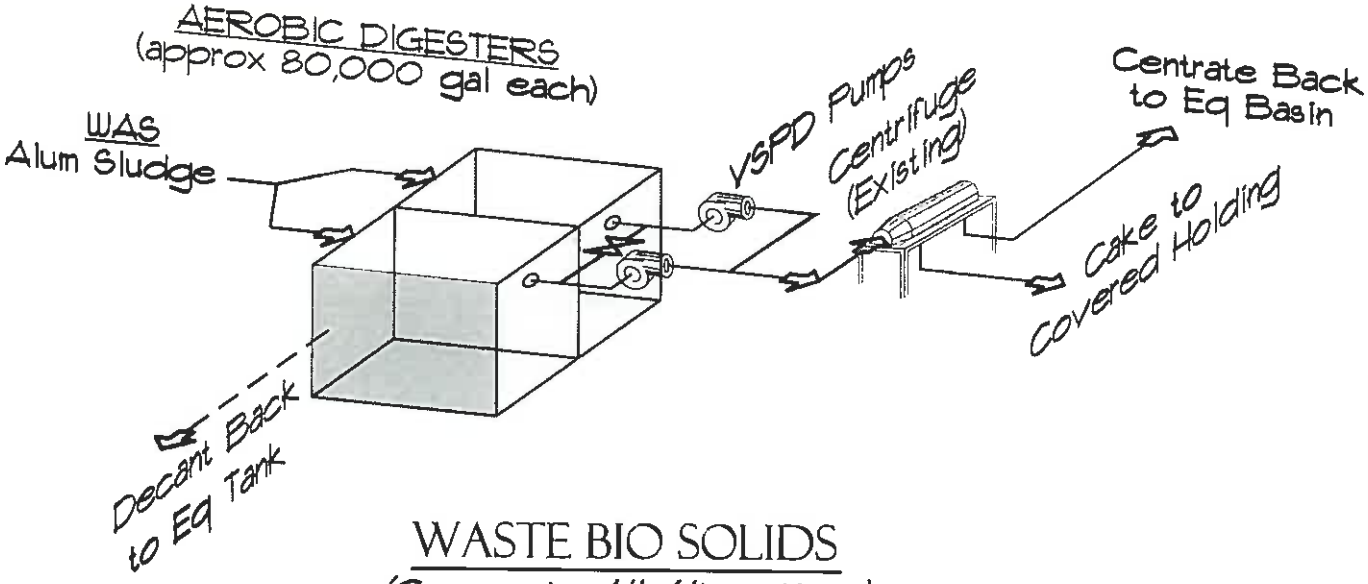
The Flow Diagram is shown on Drawing IV-4.

OPERATING COST COMPARISON

Operational cost comparisons are also used to select the optimum biological treatment method. Most operational costs will be similar for the three alternatives. Although the use of membrane filters results in the need for periodic cleaning, such work will not be significantly more than that required for clarifier cleaning.

Electric power consumption will be a significant operational cost component. Comparative monthly costs were estimated under the following conditions:

- Maximum day in month = 180,000 gallons
- Monthly loads averaged 140,000 gpd
- Demand charge of $16.00/month/connect HP
- Commodity charge of 4.5¢/KWH



WASTE BIO SOLIDS

(Common to All Alternatives)

FLOW DIAGRAM
WASTE BIO SOLIDS
MANAGEMENT

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DRAWING
IV-4

Using the above assumptions, the comparative monthly costs are as follows:

	Demand	Commodity	Total
Alternative 1 – Activated Sludge	$562	$710	$1,272
Alternative 2 – Sequencing Batch Reactor	$1,296	$679	$1,975
Alternative 3 – Membrane Bio Reactor	$933	$922	$1,915

It is noted that the above calculations are based on using 1 - 200,000 gpd module. The comparison for the ultimate plant (2 modules) will be more favorable for the SBR alternate since the demand portion will not change significantly (same blowers supply each train alternately).

MASTER PLAN

As stated, the development of a plant site Master Plan is a fundamental prerequisite to the optimal design of the improvements needed now. This is particularly applicable to the Taos Ski Valley site where useable area is limited.

The biological treatment processes are the subject of alternatives study, as developed in this Section. Ideally, future treatment expansion must feature the same treatment approach as predesigned for early construction.

To select the optimum of the three developed alternatives, a comparison matrix has been prepared. Significant alternative characteristics are listed; each characteristic is assigned a relative weighing factor. Scores for each alternative were then assigned – these scores representing the judgment of three engineers (all experienced in both the design and operation of wastewater treatment facilities). The Matrix is presented on the following page.

MATRIX

COMPARISON OF ALTERNATIVES – BIOLOGICAL PROCESSES

FOR

TAOS SKI VALLEY WASTEWATER TREATMENT PLANT

		Alt. 1 – Mod A.S.		Alt. 2 – SBR		Alt. 3 - MBR	
Characteristic	**Weight**	**Score**	**Total**	**Score**	**Total**	**Score**	**Total**
Aeration System Heat Conservation	1	9	9	9	9	6	6
Capital Construction Cost	5	8	40	9	45	7	35
Adaptability to Site/Existing Facility	2	8	16	8	16	9	18
Probable Ability to Duplicate Next 30 years	3	10	30	9	27	5	15
Operability at Variable Load Rates	2	7	14	9	18	10	20
Operation Complexity/Cost	3	7	21	8	24	7	21
Operating Costs* (Power)	3	9	27	7	21	5	15
Equipment Replacement Costs (Depreciation)	2	10	20	9.5	19	6	12
TOTAL			177		179		142

*Considers ultimate plant capacity.

Note: Scores are the average of 3 reviewers (all sanitary engineers) with 0 being worst and 10 perfect.

Conclusions from analysis of this Matrix are:

- The selection between Alternative 1 (Modified Activated Sludge), and Alternative 2 (Sequencing Batch Reactor) is very close. Although the Matrix favors slightly Alternative 2, the difference in score does not result in a conclusive decision.

- Alternative 3 (Membrane Bio Reactor) is clearly the third choice for Taos Ski Valley – and was eliminated from further consideration.

Based on alternative discussions with staff, it was concluded that Alternative 2 would be preferable for the Taos Ski Valley plant – and should be incorporated into the preliminary design.

The resulting plant site Master Plan is illustrated on Drawing IV-A, at the back of this Report. A summary of the proposed ultimate plant is:

- Two identical SBR basins, designed to achieve carbonaceous oxidation, nitrification and denitrification. The two SBR basins would receive inflow alternatively.

- Flow equalizing storage preceeding physical chemical treatment. This will permit a constant flow load to the tertiary treatment processes.

- Chemical addition and mixing to precipitate remaining phosphorous – followed by two identical flocculating clarifiers.

- Final polishing by two identical gravity multimedia filters.

- Disinfection, using two UV units.

- A new pretreatment facility, sized to handle maximum rate influent flows.

- A buried, insulated, aerated Eq basin, sized to level out extreme high peak loads, while conserving liquid heat.

- Two aerobic digesters, normally operated in series, with a centrifuge sludge dewatering unit. Design may incorporate waste sludge thickening by gravity/decant – or feature a second, centrifuge thickener (to be resolved later).

SECTION V

PRELIMINARY DESIGN – PHASE 1

OVERVIEW

The initial, "Phase 1" project is to feature one – 200,000 gpd module, designed as one-half of the future facility. The existing 200,000 gpd module is to remain operational during the interim period. The existing module, then, will provide standby reliability capacity as required by State design criteria. It is not intended that the useable permitted capacity would exceed 200,000 gpd until the second module is constructed.

It is now projected that future loads will not exceed 400,000 gpd during peak load periods. Unless development planning is revised, when actual loads increase to the 200,000 gpd range, the second module should be scheduled.

The existing (relatively new) pretreatment works are sized to accommodate 200,000 gpd. These need not be modified for Phase 1. Similarly, the present Eq basins (with some modifications) should accommodate Phase 1 loads.

A new aerobic digester is included in Phase 1, with one existing steel tank serving as supplemental storage.

PRELIMINARY DESIGN

The preliminary design of the base Phase 1 facility is illustrated on Drawing V-A, at the back of this Report. Brief descriptions of plant components follows.

Pretreatment: Use existing – no changes.

Eq Basins:	Extend diffusers in existing rectangular basin. Add submerged turbine aerator, with supports in circular steel basin.
Influent Hydraulics:	Install 8-inch pipe to SE corner of new module. Construct flow control vault with motor operated valve.
Secondary Process:	Construct SBR basin No. 1 with aerator, decant and controls. Include Eq Basin with fine bubble diffusers.
Tertiary Process:	Construct flocculating clarifier. During 1st Phase, pump clarified water to existing pressure filters.
	Improve existing pressure filters. Replace media.
	Install new (replacement) UV unit.
Support Facilities:	Two story rooms as shown on Drawing V-1.
	New Conference/Lunch room upstairs. Laboratory and Operational Control room on operating floor.
	Equipment Room in lower floor to house: chemical storage and feed; blowers for secondary treatment; waste activated sludge pumps; influent pumps to flocculating clarifier and chemical waste sludge pumps.
	Upgrade building heating system by adding heat pump, using effluent energy as the source. (Note: This will also cool effluent in winter – closer to Rio Hondo ambient temperature).

Waste Solids Treatment: Demo one existing steel digester.

Construct new 80,000 gallon concrete digester with submerged turbine aerator and decant provisions. Install air line from existing PD blowers in existing plant. Use existing centrifuge. Provide cover for dewatered sludge storage pad. Extend dewatered sludge augur.

Yard Piping: No changes to effluent line required.

New waste sludge lines to new digester.

Connect digester decant piping to existing lines back to Influent Eq basins.

Controls: Provide centralized SCADA system, located in new Operations/Office area.

PRELIMINARY CAPITAL COST ESTIMATE

The Phase 1 project budget is estimated following, based on 2011 dollar value. This budget should be adjusted (probably using the New Mexico CPI) depending on the actual time of construction.

	Improvement Item	Estimated Cost
1.	Influent Line and Flow Control Vault	$46,000
2.	Main Plant Substructure, approximately 560 c.y. of concrete; excavation and backfill with embankments.	$485,000

3.	Main Plant Superstructure with roof, heating and ventilation. Approximately 5,000 s.f. floor area.	$545,000
4.	SBR Decanter and Controls	$180,000
5.	Aeration Equipment – aerators, diffusers, blowers and piping. Includes Aerator and Modifications for Eq Basins.	$310,000
6.	Clarriflocculator	$220,000
7.	Chemical (alum, polymer) Storage and Feed Equipment	$48,000
8.	Pumps with Piping: Eq Pumps; Waste Activated Sludge Pumps; Waste Chemical Sludge Pumps	$265,000
9.	Office/Laboratory Equipment	$60,000
10.	Rapid Sand Filter Media Replacement	$14,000
11.	Replace UV Disinfection	$45,000
12.	Aerobic Digester with Aerator and Decant Piping (use existing blowers)	$120,000
13.	Electrical/Control System	$250,000
14.	Yard Piping (to/from digester) and Yard Work	$19,000
15.	Recommended heating upgrade to conserve energy. Install heat pump using effluent as heat source.	$80,000
	Total Estimated Construction Cost:	$2,687,000
	Allow 25% for Contingencies, Engineering, and Miscellaneous Expenses	$672,000
	Allowance for relocation of Overhead Power Line	$100,000
	Total Estimated Project Budget (2011 Cost Levels)	**$3,459,000**

IMPLEMENTATION SCHEDULE

The implementation schedule start is dependent primarily on the availability of firm project financing. The projected schedule, highlighting milestones, follows:

Activity	Scheduled Completion
Submission of Preliminary Engineering Report	09-01-11
State and Local Approval of the Preliminary Engineering Report	11-01-11
Firm Financing Established	07-01-12
Begin Final Design	08-01-12
Submit Final Design to State	01-15-13
Bidding Period	01-30-13 to 02-01-13
Contract Award	03-01-13
Construction Period	
Equipment fabrication	03-10-13 to 08-01-13
Construction of new plant	05-01-13 to 11-01-13
Project completion	12-01-13

APPENDIX A

NPDES DISCHARGE PERMIT

(PARTS I & II)

REGION 6
1445 ROSS AVENUE
DALLAS, TEXAS 75202-2733

NPDES Permit No NM0022101

AUTHORIZATION TO DISCHARGE UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Clean Water Act, as amended, (33 U.S.C. 1251 et. seq; the "Act"),

Village of Taos Ski Valley
38 Ocean Blvd.
Taos Ski Valley, NM 87525

is authorized to discharge to receiving waters named Rio Hondo, of the Rio Grande Basin in the Waterbody Segment Code No. 20.6.4.129, from a facility located at 38 Ocean Blvd., Taos Ski Valley, in Taos County, New Mexico.

The discharge is located on that water at the following coordinates:

Outfall 001: Latitude 36° 35' 46" North and Longitude 105° 27' 38" West

in accordance with this cover page and the effluent limitations, monitoring requirements, and other conditions set forth in Part I, Part II, Part III, and Part IV hereof.

This permit supersedes and replaces NPDES Permit No. NM0022101 issued February 27, 2006.

This permit shall become effective on October 1, 2011

This permit and the authorization to discharge shall expire at midnight, September 30, 2016

Issued on August 4, 2011

Miguel I. Flores
Division Director
Water Quality Protection Division (6WQ)

Prepared by

Scott W. Stine, Ph.D.
Life Scientist
Permits & Technical Section (6WQ-PP)

PART I – REQUIREMENTS FOR NPDES PERMITS

SECTION A. LIMITATIONS AND MONITORING REQUIREMENTS

1. Effluent Limits – 0.167 MGD Design Flow

Beginning the effective date of the permit and lasting through the expiration date of the permit (unless otherwise noted), the permittee is authorized to discharge treated municipal wastewater to the Rio Hondo, in Segment Number 20.6.4.129, from Outfall 001. Such discharges shall be limited and monitored by the permittee as specified below:

EFFLUENT CHARACTERISTICS		DISCHARGE LIMITATIONS Standard Units		MONITORING REQUIREMENTS	
POLLUTANT	STORET CODE	MINIMUM	MAXIMUM	MEASUREMENT FREQUENCY	SAMPLE TYPE
pH	00400	6.6	8.8	Three/Week	Grab

EFFLUENT CHARACTERISTICS		DISCHARGE LIMITATIONS lbs/day, unless noted			mg/L, unless noted (*1)			MONITORING REQUIREMENTS	
POLLUTANT	STORET CODE	30-DAY AVG	DAILY MAX	7-DAY AVG	30-DAY AVG	DAILY MAX	7-DAY AVG	MEASUREMENT FREQUENCY	SAMPLE TYPE
Flow	50050	Report MGD	Report MGD	Report MGD	N/A	N/A	N/A	Daily	Totalizing Meter
Biochemical Oxygen Demand, 5-day	00310								
November 1- April 30		23.8	N/A	35.7	30	N/A	45	Twice/Month (*2)	Grab
May 1 - October 31		23.8	N/A	35.7	30	N/A	45	Once/Month	Grab
Total Suspended Solids	00530								
November 1- April 30		23.8	N/A	35.7	30	N/A	45	Twice/Month (*2)	Grab
May 1 - October 31		23.8	N/A	35.7	30	N/A	45	Once/Month	Grab
E. coli Bacteria	51040	N/A	N/A	N/A	126 (*3)	235 (*3)	N/A	Twice/Month (*2)	Grab
Fecal Coliform Bacteria	74055	N/A	N/A	N/A	200 (*3)	400 (*3)	N/A	Twice/Month (*2)	Grab
Total Residual Chlorine	50060	N/A	N/A	N/A	N/A	19 µg/l	N/A	Daily	Instantaneous Grab (*4)

Ammonia-Nitrogen	00610								
November 1- April 30		5.34	N/A	5.34	3.2	N/A	3.2	Twice/Month (*2)	6-Hour Composite
May 1 - October 31		5.34	N/A	5.34	3.2	N/A	3.2	Once/Month	6-Hour Composite
Total Nitrogen (*5)	00600								
November 1- April 30		13.65	N/A	20.5	8.2	N/A	12.3	Once/Week	6-Hour Composite
May 1 - June 30		46.55	N/A	68.8	27.9	N/A	41.2	Once/Month	6-Hour Composite
July 1 - August 31		27.7	N/A	41.6	16.6	N/A	24.9	Once/Month	6-Hour Composite
September 1 - October 31		21.1	N/A	31.7	12.7	N/A	19	Once/Month	6-Hour Composite
Total Phosphorus	00665								
November 1- April 30		0.8	N/A	1.2	0.5	N/A	0.75	Twice/Month (*2)	6-Hour Composite
May 1 - June 30		1.6	N/A	2.4	1.0	N/A	1.5	Once/Month	6-Hour Composite
July 1 - August 31		1.2	N/A	1.8	1.5	N/A	2.25	Once/Month	6-Hour Composite
September 1 - October 31		0.8	N/A	1.2	2.5	N/A	3.75	Once/Month	6-Hour Composite

EFFLUENT CHARACTERISTICS	DISCHARGE MONITORING		MONITORING REQUIREMENTS	
WHOLE EFFLUENT TOXICITY TESTING (*6) (48-Hour Static Renewal)	30-DAY AVG MINIMUM	48-HR MINIMUM	MEASUREMENT FREQUENCY	SAMPLE TYPE
Daphnia pulex	Report	Report	1/12 months (*7)	24-Hr Composite
Pimephales promelas	Report	Report	1/12 months (*7)	24-Hr Composite

Footnotes:

*1 See Part II. Section A. Minimum Quantification Level (MQL) of permit.

*2 Sampling at least ten days apart.

*3 Colony forming units (cfu) per 100 ml.

*4 The effluent limitation for TRC is the instantaneous maximum grab sample taken during periods of chlorine use and can not be averaged for reporting purposes. Instantaneous maximum is defined in 40 CFR Part 136 as being measured within 15 minutes of sampling.

*5 Total Nitrogen is defined as the sum of Total Kjedhal Nitrogen (as N) and Nitrate-Nitrate (as N). See EPA Methods 351 and 353.

*6 Monitoring and reporting requirements begin on the effective date of this permit. See PART II, Whole Effluent Toxicity Testing Requirements for additional WET monitoring and reporting conditions.

*7 The discharge shall be tested between November 1 and April 30.

FLOATING SOLIDS, VISIBLE FOAM AND/OR OILS

There shall be no discharge of floating solids or visible foam in other than trace amounts. There shall be no discharge of visible films of oil, globules of oil, grease or solids in or on the water, or coatings on stream banks.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the discharge from the final treatment unit prior to the receiving stream.

B. SCHEDULE OF COMPLIANCE

None.

C. MONITORING AND REPORTING (MAJOR DISCHARGERS)

Monitoring information shall be on Discharge Monitoring Report Form(s) EPA 3320-1 as specified in Part III.D.4 of this permit and shall be submitted monthly.

1. The permittee shall effectively monitor the operations and efficiency of all treatment and control facilities and the quantity and quality of the treated discharge.

2. Monitoring results must be reported either using the electronic or paper Discharge Monitoring Report (DMR) approved formats to EPA. If using DMR forms, the report shall be also sent to NMED. See Part III, D.4 of the permit.

    a. Reporting periods shall end on the last day of the month.

    b. The permittee is required to submit regular monthly reports as described above postmarked no later than the 15th day of the month following each reporting period.

    c. The annual sludge report required in Part IV of the permit is due on February 19 of each year and covers the previous calendar year from January 1 through December 31.

3. If any 30 day average, monthly average or daily maximum value exceeds the effluent limitations specified in Part I.A, the permittee shall report the excursion in accordance with the requirements of Part III.D.

4. Any 30-day average, monthly average, or daily maximum value reported in the required Discharge Monitoring Report which is in excess of the effluent limitation specified in Part I.A shall constitute evidence of violation of such effluent limitation and of this permit.

5. Other measurements of oxygen demand (e.g., TOC and COD) may be substituted for five-day Biochemical Oxygen Demand (BOD_5) or for five-day Carbonaceous Biochemical Oxygen Demand ($CBOD_5$), as applicable, where the permittee can demonstrate long-term correlation of the method with BOD_5 or $CBOD_5$ values, as applicable. Details of the correlation procedures used must be submitted and prior approval granted by the permitting authority for this procedure to be acceptable. Data reported must also include evidence to show that the proper correlation continues to exist after approval.

6. The permittee shall report all overflows with the Discharge Monitoring Report submittal. These reports shall be summarized and reported in tabular format. The summaries shall include: the date, time, duration, location, estimated volume, and cause of the overflow; observed environmental impacts from the overflow; actions taken to address the overflow; and ultimate discharge location if not contained (e.g., storm sewer system, ditch, tributary). Any noncompliance which may endanger health or the environment shall also be orally reported to the Pueblo of Taos at (575) 751-4601 and the New Mexico Environment Department at (505) 827-0187, as soon as possible, but within 12 hours from the time the permittee becomes aware of the circumstance. A written report of overflows which endanger health or the environment shall be provided to EPA, Pueblo of Taos, and New Mexico Environment Department within 5 days of the time the permittee becomes aware of the circumstance.

7. The permittee shall submit a copy of an annual summary of the data that results from whole effluent toxicity testing to:

Field Supervisor
U.S. Fish and Wildlife Service
New Mexico Ecological Services Field Office
2105 Osuna NE
Albuquerque, NM 87113

And

EPA:
Compliance Assurance and Enforcement Division
Water Enforcement Branch (6EN-W)
U.S. Environmental Protection Agency, Region 6
1445 Ross Avenue
Dallas, TX 75202-2733

And

New Mexico:
Program Manager
Surface Water Quality Bureau
New Mexico Environment Department
P.O. Box 5469
1190 Saint Francis Drive
Santa Fe, NM 87502-5469

And

Pueblo of Taos:
Environmental Office Program Manager
Pueblo of Taos
P.O. Box 1846
Taos, NM 87571

D. OVERFLOW REPORTING

The permittee shall report all overflows with the DMR submittal. These reports shall be summarized and reported in tabular format. The summaries shall include: date, time, duration, location, estimated volume, and cause of the overflow. They shall also include observed environmental impacts from the overflow; actions taken to address the overflow; and, the ultimate discharge location if not contained (e.g., storm sewer system, ditch, tributary).

Overflows that endanger health or the environment shall be orally reported to EPA at (214) 665-6595, Pueblo of Taos at (575) 751-4601 and NMED Surface Water Quality Bureau at (505) 827-0187, within 12 hours from the time the permittee becomes aware of the circumstance. A written report of overflows that endanger health or the environment shall be provided to EPA, Pueblo of Taos, and NMED Surface Water Quality Bureau within 5 days of the time the permittee becomes aware of the circumstance.

E. POLLUTION PREVENTION REQUIREMENTS

The permittee shall institute a program within 12 months of the effective date of the permit (or continue an existing one) directed towards optimizing the efficiency and extending the useful life of the facility. The permittee shall consider the following items in the program:

a. The influent loadings, flow and design capacity;
b. The effluent quality and plant performance;
c. The age and expected life of the wastewater treatment facility's equipment;
d. Bypasses and overflows of the tributary sewerage system and treatment works;
e. New developments at the facility;
f. Operator certification and training plans and status;
g. The financial status of the facility;
h. Preventative maintenance programs and equipment conditions and;
i. An overall evaluation of conditions at the facility.
permit is re-issued.

PART II - OTHER CONDITIONS

A. MINIMUM QUANTIFICATION LEVEL (MQL)

See list of MQL's at Appendix A of Part II below. For pollutants listed on Appendix A of Part II below with MQL's, analyses must be performed to the listed MQL. If any individual analytical test result is less than the MQL listed, a value of zero (0) may be used for that pollutant result for the Discharge Monitoring Report (DMR) calculations and reporting requirements.

In addition, any additional pollutant sampling for purposes of this permit, including renewal applications or any other reporting, shall be tested to the MQL shown on the attached Appendix A of Part II. Results of analyses that are less than the listed MQL maybe reported as "non detect" (ND).

B. 24-HOUR ORAL REPORTING: DAILY MAXIMUM LIMITATION VIOLATIONS

Under the provisions of Part III.D.7.b.(3) of this permit, violations of daily maximum limitations for the following pollutants shall be reported orally to EPA Region 6, Compliance and Assurance Division, Water Enforcement Branch (6EN-W), Dallas, Texas, and concurrently to NMED and Pueblo of Taos within 24 hours from the time the permittee becomes aware of the violation followed by a written report in five days.

E. coli Bacteria
Fecal Coliform Bacteria
TRC

C. PERMIT MODIFICATION AND REOPENER

In accordance with 40 CFR Part 122.44(d), the permit may be reopened and modified during the life of the permit if relevant portions of the Pueblo of Taos and/or New Mexico's Water Quality Standards for Interstate and Intrastate Streams are revised, or new Pueblo of Taos and/or State of New Mexico water quality standards are established and/or remanded.

In accordance with 40 CFR Part 122.62(s)(2), the permit may be reopened and modified if new information is received that was not available at the time of permit issuance that would have justified the application of different permit conditions at the time of permit issuance. Permit modifications shall reflect the results of any of these actions and shall follow regulations listed at 40 CFR Part 124.5.

D. CONTRIBUTING INDUSTRIES AND PRETREATMENT REQUIREMENTS

a. The following pollutants may not be introduced into the treatment facility:

(1) Pollutants which create a fire or explosion hazard in the publicly owned treatment works (POTW), including, but not limited to, wastestreams with a closed cup flashpoint of less than 140 degrees Fahrenheit or 60 degrees Centigrade using the test methods specified in 40 CFR 261.21;

(2) Pollutants which will cause corrosive structural damage to the POTW, but in no case discharges with pH lower than 5.0, unless the works are specifically designed to accommodate such discharges;

(3) Solid or viscous pollutants in amounts which will cause obstruction to the flow in the POTW, resulting in Interference;

(4) Any pollutant, including oxygen demanding pollutants (e.g., BOD), released in a discharge at a flow rate and/or pollutant concentration which will cause Interference with the POTW;

(5) Heat in amounts which will inhibit biological activity in the POTW resulting in Interference but in no case heat in such quantities that the temperature at the POTW treatment plant exceeds 40 degrees Centigrade (104 degrees Fahrenheit) unless the Approval Authority, upon request of the POTW, approves alternate temperature limits;

(6) Petroleum oil, nonbiodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or pass through;

(7) Pollutants which result in the presence of toxic gases, vapors, or fumes within the POTW in a quantity that may cause acute worker health and safety problems; and

(8) Any trucked or hauled pollutants, except at discharge points designated by the POTW.

b. The permittee shall require any indirect discharger to the treatment works to comply with the reporting requirements of Sections 204(b), 307, and 308 of the Act, including any requirements established under 40 CFR Part 403.

c. The permittee shall provide adequate notice of the following:

(1) Any new introduction of pollutants into the treatment works from an indirect discharger which would be subject to Sections 301 and 306 of the Act if it were directly discharging those pollutants; and

(2) Any substantial change in the volume or character of pollutants being introduced into the treatment works by a source introducing pollutants into the treatment works at the time of issuance of the permit.

Any notice shall include information on (i) the quality and quantity of effluent to be introduced into the treatment works, and (ii) any anticipated impact of the change on the quality or quantity of effluent to be discharged from the POTW.

E. WHOLE EFFLUENT TOXICITY TESTING (48-HOUR ACUTE NOEC FRESHWATER)

It is unlawful and a violation of this permit for a permittee or his designated agent, to manipulate test samples in any manner, to delay sample shipment, or to terminate or to cause to terminate a toxicity test. Once initiated, all toxicity tests must be completed unless specific authority has been granted by EPA Region 6 or the State NPDES permitting authority.

1. SCOPE AND METHODOLOGY

a. The permittee shall test the effluent for toxicity in accordance with the provisions in this section.

APPLICABLE TO FINAL OUTFALL(S): 001

REPORTED AS FINAL OUTFALL: 001

CRITICAL DILUTION (%): 44%

EFFLUENT DILUTION SERIES (%): 19%, 25%, 33%, 44%, 59%.

COMPOSITE SAMPLE TYPE: Defined at PART I

TEST SPECIES/METHODS: 40 CFR Part 136

Daphnia pulex acute static renewal 48 hour definitive toxicity test using EPA 821 R 02 012, or the latest update thereof. A minimum of five (5) replicates with eight (8) organisms per replicate must be used in the control and in each effluent dilution of this test.

Pimephales promelas (Fathead minnow) acute static renewal 48-hour definitive toxicity test using EPA 821 R 02 012, or the latest update thereof. A minimum of five (5) replicates with eight (8) organisms per replicate must be used in the control and in each effluent dilution of this test.

b. The NOEC (No Observed Lethal Effect Concentration) is defined as the greatest effluent dilution at and below which lethality that is statistically different from the control (0% effluent) at the 95% confidence level does not occur. Acute test failure is defined as a demonstration of a statistically significant lethal effect at test completion to a test species at or below the critical dilution.

c. This permit may be reopened to require whole effluent toxicity limits, chemical specific effluent limits, additional testing, and/or other appropriate actions to address toxicity.

d. Test failure is defined as a demonstration of statistically significant lethal effects to a test species at or below the effluent critical dilution.

e. This permit does not establish requirements to automatically increase the WET testing frequency after a test failure, or to begin a toxicity reduction evaluation (TRE) in the event of multiple test failures. However, upon failure of any WET test, the permittee must report the test results to NMED, Surface Water Quality Bureau, in writing, within 5 business days of notification the test failure. NMED will review the test results and determine the appropriate action necessary, if any.

2. REQUIRED TOXICITY TESTING CONDITIONS

a. Test Acceptance

The permittee shall repeat a test, including the control and all effluent dilutions, if the procedures and quality assurance requirements defined in the test methods or in this permit are not satisfied, including the following additional criteria:

i. Each toxicity test control (0% effluent) must have a sur¬vival equal to or greater than 90%.

ii. The percent coefficient of variation between replicates shall be 40% or less in the control (0% effluent) for: Daphnia pulex survival test; and Fathead minnow surviv¬al test.

iii. The percent coefficient of variation between replicates shall be 40% or less in the critical dilution, unless signifi¬cant lethal effects are exhibited for: Daphnia pulex survival test; and Fathead minnow survival test.

Test failure may not be construed or reported as invalid due to a coefficient of variation value of greater than 40%. A repeat test shall be conducted within the required reporting period of any test determined to be invalid.

b. Statistical Interpretation

For the Daphnia pulex survival test and the Fathead minnow survival test, the statistical analyses used to determine if there is a statistically significant difference between the control and the critical dilution shall be in accordance with the methods for determining the No Observed Effect Concentration (NOEC) as described in EPA 821 R 02 012 or the most recent update thereof.

If the conditions of Test Acceptability are met in Item 2.a above and the percent survival of the test organism is equal to or greater than 90% in the critical dilution concentration and all lower dilution concentrations, the test shall be considered to be a passing test, and the permittee shall report an NOEC of not

less than the critical dilution for the reporting requirements found in Item 3 below.

c. Dilution Water

i. Dilution water used in the toxicity tests will be receiving water collected as close to the point of discharge as possible but unaffected by the discharge. The permittee shall substitute synthetic dilution water of similar pH, hardness, and alkalinity to the closest downstream perennial water for;

(A) toxicity tests conducted on effluent discharges to receiving water classified as intermittent streams; and

(B) toxicity tests conducted on effluent discharges where no receiving water is available due to zero flow conditions.

ii. If the receiving water is unsatisfactory as a result of instream toxicity (fails to fulfill the test acceptance criteria of Item 3.a), the permittee may substitute synthetic dilution water for the receiving water in all subsequent tests provided the unacceptable receiving water test met the following stipulations:

(A) a synthetic dilution water control which fulfills the test acceptance requirements of Item 3.a was run concurrently with the receiving water control;

(B) the test indicating receiving water toxicity has been carried out to completion (i.e., 48 hours);

(C) the permittee includes all test results indicating receiving water toxicity with the full report and information required by Item 4 below; and

(D) the synthetic dilution water shall have a pH, hardness, and alkalinity similar to that of the receiving water or closest downstream perennial water not adversely affected by the discharge, provided the magnitude of these parameters will not cause toxicity in the synthetic dilution water.

d. Samples and Composites

i. The permittee shall collect two flow weighted composite samples from the outfall(s) listed at Item 1.a above.

ii. The permittee shall collect a second composite sample for use during the 24 hour renewal of each dilution concentration for both tests. The permittee must collect the composite samples so that the maximum holding time for any effluent sample shall not exceed 36 hours. The permittee must have initiated the toxicity test within 36 hours after the collection of the last portion of the first composite sample. Samples shall be chilled to 6 degrees Centigrade during collection, shipping, and/or storage.

iii. The permittee must collect the composite samples such that the effluent samples are representative of any periodic episode of chlorination, biocide usage or other potentially toxic substance discharged on an intermittent basis.

iv. If the flow from the outfall(s) being tested ceases during the collection of effluent samples, the requirements for the minimum number of effluent samples, the minimum number of effluent portions and the sample holding time are waived during that sampling period. However, the permittee must collect an effluent composite sample volume during the period of discharge that is sufficient to complete the required toxicity tests with daily renewal of effluent. When possible, the effluent samples used for the toxicity tests shall be collected on separate days. The effluent composite sample collection duration and the static renewal protocol associated with the abbreviated sample collection must be documented in the full report required in Item 3 of this section.

3. REPORTING

a. The permittee shall prepare a full report of the results of all tests conducted pursuant to this Part in accordance with the Report Preparation Section of EPA 821 R 02 012, for every valid or invalid toxicity test initiated, whether carried to completion or not. The permittee shall retain each full report pursuant to the provisions of PART III.C.3 of this permit. The permittee shall submit full reports upon the specific request of the Agency. For any test which fails, is considered invalid or which is terminated early for any reason, the full report must be submitted for agency review.

b. A valid test for each species must be reported during each reporting period specified in PART I of this permit unless the permittee is performing a TRE which may increase the frequency of testing and reporting. Only ONE set of biomonitoring data for each species is to be recorded for each reporting period. The data submitted should reflect the LOWEST Survival results for each species during the reporting period. All invalid tests, repeat tests (for invalid tests), and retests (for tests previously failed) performed during the reporting period must be attached for EPA review.

c. The permittee shall report the following results of each valid toxicity test. Submit retest information, if required, clearly marked as such. Only results of valid tests are to be reported.

i. Pimephales promelas (Fathead minnow)

(A) If the No Observed Effect Concentration (NOEC) for survival is less than the critical dilution, enter a "1"; otherwise, enter a "0" for Parameter No. TEM6C.

(B) Report the NOEC value for survival, Parameter No. TOM6C.

(C) Report the highest (critical dilution or control) Coefficient of Variation, Parameter No. TQM6C.

ii. Daphnia pulex

(A) If the NOEC for survival is less than the critical dilution, enter a "1"; otherwise, enter a "0" for Parameter No. TEM3D.

(B) Report the NOEC value for survival, Parameter No. TOM3D.

(C) Report the highest (critical dilution or control) Coefficient of Variation, Parameter No. TQM3D.

d. If retests are required by NMED, enter the following codes:

i. For retest number 1, Parameter 22415, enter a "1" if the NOEC for survival is less than the critical dilution; otherwise, enter a "0."

ii. For retest number 2, Parameter 22416, enter a "1" if the NOEC for survival is less than the critical dilution; otherwise, enter a "0."

APPENDIX A of PART II

The following Minimum Quantification Levels (MQL's) are to be used for reporting pollutant data for NPDES permit applications and/or compliance reporting.

POLLUTANTS	MQL µg/l	POLLUTANTS	MQL µg/l
METALS, RADIOACTIVITY, CYANIDE and CHLORINE			
Aluminum	2.5	Molybdenum	10
Antimony	60	Nickel	0.5
Arsenic	0.5	Selenium	5
Barium	100	Silver	0.5
Beryllium	0.5	Thalllium	0.5
Boron	100	Uranium	0.1
Cadmium	1	Vanadium	50
Chromium	10	Zinc	20
Cobalt	50	Cyanide	10
Copper	0.5	Cyanide, weak acid dissociable	10
Lead	0.5	Total Residual Chlorine	33
Mercury *1	0.0005 0.005		
DIOXIN			
2,3,7,8-TCDD	0.00001		
VOLATILE COMPOUNDS			
Acrolein	50	1,3-Dichloropropylene	10
Acrylonitrile	20	Ethylbenzene	10
Benzene	10	Methyl Bromide	50
Bromoform	10	Methylene Chloride	20
Carbon Tetrachloride	2	1,1,2,2-Tetrachloroethane	10
Chlorobenzene	10	Tetrachloroethylene	10
Clorodibromomethane	10	Toluene	10
Chloroform	50	1,2-trans-Dichloroethylene	10
Dichlorobromomethane	10	1,1,2-Trichloroethane	10
1,2-Dichloroethane	10	Trichloroethylene	10
1,1-Dichloroethylene	10	Vinyl Chloride	10
1,2-Dichloropropane	10		
ACID COMPOUNDS			
2-Chlorophenol	10	2,4-Dinitrophenol	50
2,4-Dichlorophenol	10	Pentachlorophenol	5
2,4-Dimethylphenol	10	Phenol	10
4,6-Dinitro-o-Cresol	50	2,4,6-Trichlorophenol	10

POLLUTANTS	MQL µg/l	POLLUTANTS	MQL µg/l
	BASE/NEUTRAL		
Acenaphthene	10	Dimethyl Phthalate	10
Anthracene	10	Di-n-Butyl Phthalate	10
Benzidine	50	2,4-Dinitrotoluene	10
Benzo(a)anthracene	5	1,2-Diphenylhydrazine	20
Benzo(a)pyrene	5	Fluoranthene	10
3,4-Benzofluoranthene	10	Fluorene	10
Benzo(k)fluoranthene	5	Hexachlorobenzene	5
Bis(2-chloroethyl)Ether	10	Hexachlorobutadiene	10
Bis(2-chloroisopropyl)Ether	10	Hexachlorocyclopentadiene	10
Bis(2-ethylhexyl)Phthalate	10	Hexachloroethane	20
Butyl Benzyl Phthalate	10	Indeno(1,2,3-cd)Pyrene	5
2-Chloronapthalene	10	Isophorone	10
Chrysene	5	Nitrobenzene	10
Dibenzo(a,h)anthracene	5	n-Nitrosodimethylamine	50
1,2-Dichlorobenzene	10	n-Nitrosodi-n-Propylamine	20
1,3-Dichlorobenzene	10	n-Nitrosodiphenylamine	20
1,4-Dichlorobenzene	10	Pyrene	10
3,3'-Dichlorobenzidine	5	1,2,4-Trichlorobenzene	10
Diethyl Phthalate	10		
	PESTICIDES AND PCBS		
Aldrin	0.01	Beta-Endosulfan	0.02
Alpha-BHC	0.05	Endosulfan sulfate	0.02
Beta-BHC	0.05	Endrin	0.02
Gamma-BHC	0.05	Endrin Aldehyde	0.1
Chlordane	0.2	Heptachlor	0.01
4,4'-DDT and derivatives	0.02	Heptachlor Epoxide	0.01
Dieldrin	0.02	PCBs	0.2
Alpha-Endosulfan	0.01	Toxaphene	0.3

(MQL's Revised November 1, 2007)

Footnotes:

*1 Default MQL for Mercury is 0.005 unless Part I of your permit requires the more sensitive Method 1631 (Oxidation / Purge and Trap / Cold vapor Atomic Fluorescence Spectrometry), then the MQL shall be 0.0005.

Village of Taos Ski Valley

Expansion /Upgrade
Wastewater
Treatment Facility

UTILITIES SERVICE AREA

AMIZETTE

RIO HONDO

BASE VILLAGE

Bull of the Woods

KACHINA VILLAGE

RIO HONDO

600 0 600 1200
1 inch = 600 feet

THIS DRAWING SHOWS THE APPROXIMATE SERVICE AREA LIMITS (- - - - -) FOR THE VILLAGE OF TAOS SKI VALLEY WATER & SEWER UTILITY SERVICE SYSTEMS.

LEGEND

- 9500 INDEX CONTOUR
- INTERMEDIATE CONTOUR
- ROAD
- BUILDING

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DRAWING II-A

TAOS SKI VALLEY / TAOS SKI VALLEY WATER OVERALL SITE PLAN.DWG / JUNE 22, 2011 / PROJ. 05-09-12P

LEGEND

EXISTING ITEMS

- EXISTING INTERMEDIATE CONTOUR
- 5120 EXISTING INDEX CONTOUR
- EXISTING BUILDING
- GRAVEL SURFACE
- EXISTING BUILDING TO BE ABANDONED – PHASE 2

PROPOSED ITEMS

- INITIAL BUILDING/PHASE 1
- PROPOSED SEWER
- GRAVEL SURFACE
- FUTURE BUILDING/PHASE 2

State Rd. 150 (paved public road)

20 0 20 40
1 inch = 20 feet

N76°41'48"E
211.74'

N47°15'21"E
176.00'

N15°23'52"W
112.80'

S09°37'29"W
120.20'

S62°17'04"W
98.35'

S05°25'20"E
61.23'

S50°23'38"E
461.83'

4.000 acres±

building

retaining wall

slab

existing sludge dewatering

SLUDGE STORAGE AREA
COVER INITIAL PROJECT
ABANDON - FUTURE

AEROBIC DIGESTER NO. 1

FUTURE DEWATER BUILDING

AEROBIC DIGESTER NO. 2

tank

SBR BASIN NO. 1

SBR BASIN NO. 2

EQ BASIN NO. 1

EQ BASIN NO. 2

ADVANCED TREATMENT

SPLITTER/FLOW CONTROL

Existing WWTP

Existing No. 2 Eq Tank

FUTURE AERATED EQ BASIN

FUTURE PRETREATMENT BUILDING

EXISTING 12" INFLUENT SEWER

propane tank

gravel driveway

Benchmark
Iron w/ rebar
EL=9280.74

existing pretreatment

building

gravel road

TO RIO HONDO

9310 9300 9290 9280 9270 9260 9250 9240 9230 9220 9210 9200 9190 9180 9170 9160 9150 9140 9130 9120 9110 9100 9090 9080 9070 9060 9050 9040 9030 9020 9010 9000 8990 8980 8970 8960 8950 8940 8930 8920 8910 8900 8890 8880 8870 8860 8850 8840 8830 8820 8810 8800 8790 8780 8770 8760 8750 8740 8730 8720 8710 8700 8690 8680 8670 8660 8650 8640 8630 8620 8610 8600 8590 8580 8570 8560 8550 8540 8530 8520 8510 8500 8490 8480 8470 8460 8450 8440 8430 8420 8410 8400 8390 8380 8370 8360 8350 8340 8330 8320 8310 8300 8290 8280 8270 8260 8250 8240 8230 8220 8210 8200 8190 8180 8170 8160 8150 8140 8130 8120 8110 8100 8090 8080 8070 8060 8050 8040 8030 8020 8010 8000 7990 7980 7970 7960 7950 7940 7930 7920 7910 7900 7890 7880 7870 7860 7850 7840 7830 7820 7810 7800 7790 7780 7770 7760 7750 7740 7730 7720 7710 7700 7690 7680 7670 7660 7650 7640 7630 7620 7610 7600 7590 7580 7570 7560 7550 7540 7530 7520 7510 7500 7490 7480 7470 7460 7450 7440 7430 7420 7410 7400 7390 7380 7370 7360 7350 7340 7330 7320 7310 7300 7290 7280 7270 7260 7250 7240 7230 7220 7210 7200 7190 7180 7170 7160 7150 7140 7130 7120 7110 7100 7090 7080 7070 7060 7050 7040 7030 7020 7010 7000 6990 6980 6970 6960 6950 6940 6930 6920 6910 6900 6890 6880 6870 6860 6850 6840 6830 6820 6810 6800 6790 6780 6770 6760 6750 6740 6730 6720 6710 6700 6690 6680 6670 6660 6650 6640 6630 6620 6610 6600 6590 6580 6570 6560 6550 6540 6530 6520 6510 6500 6490 6480 6470 6460 6450 6440 6430 6420 6410 6400 6390 6380 6370 6360 6350 6340 6330 6320 6310 6300 6290 6280 6270 6260 6250 6240 6230 6220 6210 6200 6190 6180 6170 6160 6150 6140 6130 6120 6110 6100 6090 6080 6070 6060 6050 6040 6030 6020 6010 6000 5990 5980 5970 5960 5950 5940 5930 5920 5910 5900 5890 5880 5870 5860 5850 5840 5830 5820 5810 5800 5790 5780 5770 5760 5750 5740 5730 5720 5710 5700 5690 5680 5670 5660 5650 5640 5630 5620 5610 5600 5590 5580 5570 5560 5550 5540 5530 5520 5510 5500 5490 5480 5470 5460 5450 5440 5430 5420 5410 5400 5390 5380 5370 5360 5350 5340 5330 5320 5310 5300 5290 5280 5270 5260 5250 5240 5230 5220 5210 5200 5190 5180 5170 5160 5150 5140 5130 5120 5110 5100 5090 5080 5070 5060 5050 5040 5030 5020 5010 5000 4990 4980 4970 4960 4950 4940 4930 4920 4910 4900 4890 4880 4870 4860 4850 4840 4830 4820 4810 4800 4790 4780 4770 4760 4750 4740 4730 4720 4710 4700 4690 4680 4670 4660 4650 4640 4630 4620 4610 4600 4590 4580 4570 4560 4550 4540 4530 4520 4510 4500 4490 4480 4470 4460 4450 4440 4430 4420 4410 4400 4390 4380 4370 4360 4350 4340 4330 4320 4310 4300 4290 4280 4270 4260 4250 4240 4230 4220 4210 4200 4190 4180 4170 4160 4150 4140 4130 4120 4110 4100 4090 4080 4070 4060 4050 4040 4030 4020 4010 4000 3990 3980 3970 3960 3950 3940 3930 3920 3910 3900 3890 3880 3870 3860 3850 3840 3830 3820 3810 3800 3790 3780 3770 3760 3750 3740 3730 3720 3710 3700 3690 3680 3670 3660 3650 3640 3630 3620 3610 3600 3590 3580 3570 3560 3550 3540 3530 3520 3510 3500 3490 3480 3470 3460 3450 3440 3430 3420 3410 3400 3390 3380 3370 3360 3350 3340 3330 3320 3310 3300 3290 3280 3270 3260 3250 3240 3230 3220 3210 3200 3190 3180 3170 3160 3150 3140 3130 3120 3110 3100 3090 3080 3070 3060 3050 3040 3030 3020 3010 3000 2990 2980 2970 2960 2950 2940 2930 2920 2910 2900 2890 2880 2870 2860 2850 2840 2830 2820 2810 2800 2790 2780 2770 2760 2750 2740 2730 2720 2710 2700 2690 2680 2670 2660 2650 2640 2630 2620 2610 2600 2590 2580 2570 2560 2550 2540 2530 2520 2510 2500 2490 2480 2470 2460 2450 2440 2430 2420 2410 2400 2390 2380 2370 2360 2350 2340 2330 2320 2310 2300 2290 2280 2270 2260 2250 2240 2230 2220 2210 2200 2190 2180 2170 2160 2150 2140 2130 2120 2110 2100 2090 2080 2070 2060 2050 2040 2030 2020 2010 2000 1990 1980 1970 1960 1950 1940 1930 1920 1910 1900 1890 1880 1870 1860 1850 1840 1830 1820 1810 1800 1790 1780 1770 1760 1750 1740 1730 1720 1710 1700 1690 1680 1670 1660 1650 1640 1630 1620 1610 1600 1590 1580 1570 1560 1550 1540 1530 1520 1510 1500 1490 1480 1470 1460 1450 1440 1430 1420 1410 1400 1390 1380 1370 1360 1350 1340 1330 1320 1310 1300 1290 1280 1270 1260 1250 1240 1230 1220 1210 1200 1190 1180 1170 1160 1150 1140 1130 1120 1110 1100 1090 1080 1070 1060 1050 1040 1030 1020 1010 1000 990 980 970 960 950 940 930 920 910 900 890 880 870 860 850 840 830 820 810 800 790 780 770 760 750 740 730 720 710 700 690 680 670 660 650 640 630 620 610 600 590 580 570 560 550 540 530 520 510 500 490 480 470 460 450 440 430 420 410 400 390 380 370 360 350 340 330 320 310 300 290 280 270 260 250 240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0

VILLAGE OF TAOS SKI VALLEY

WASTEWATER TREATMENT FACILITY
SITE MASTER PLAN

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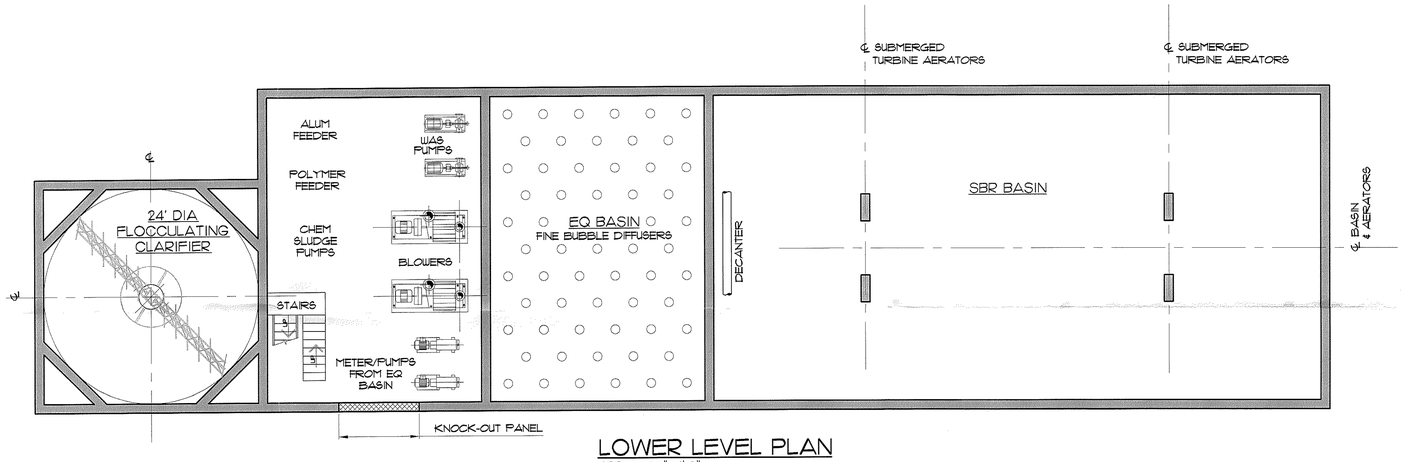
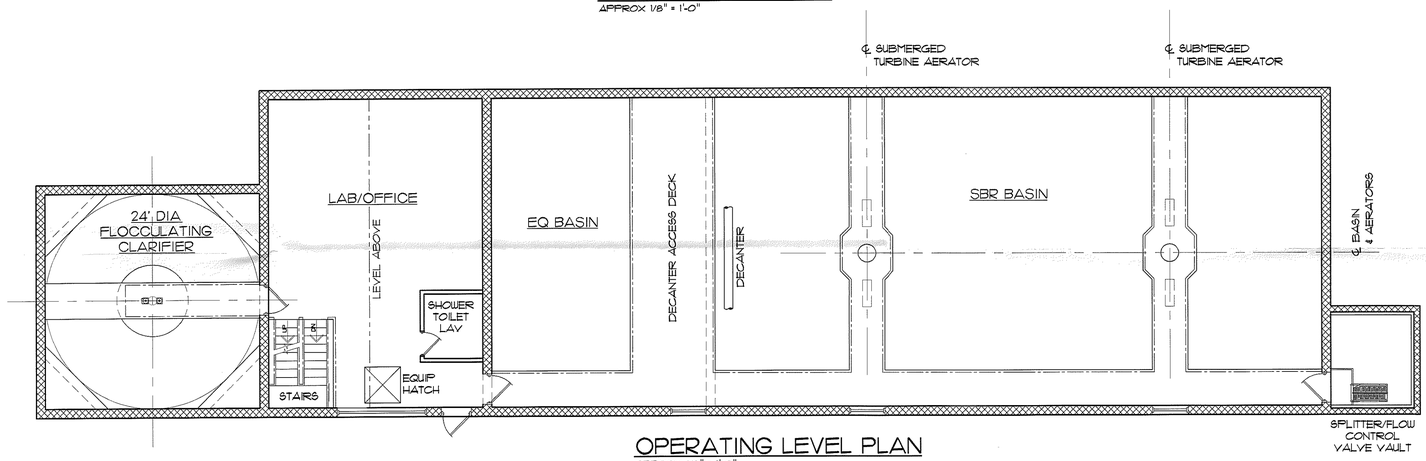
DRAWING
IV-A

Taos Ski Valley / TSV Site Proposal.DWG / SEPTEMBER 01, 2011 / PROJ. 06-09-12P



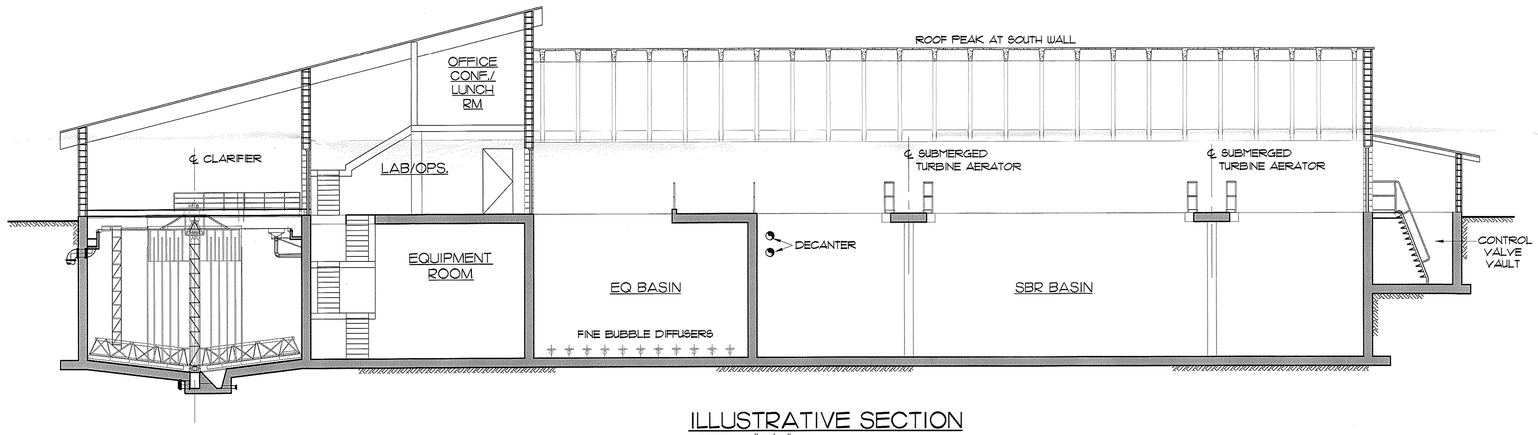
LOWER LEVEL PLAN

APPROX 1/8" = 1'-0"



OPERATING LEVEL PLAN

APPROX 1/8" = 1'-0"



ILLUSTRATIVE SECTION

APPROX 1/8" = 1'-0"

VILLAGE OF TAOS SKI VALLEY

PRELIMINARY DESIGN PHASE I WASTEWATER TREATMENT FACILITY

DRAWING
V-A

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