AMENDMENT TO THE REGIONAL WATER MANAGEMENT PLAN TO INCLUDE THE STEAD / LEMMON VALLEY WASTEWATER DISPOSAL PLAN

Purpose

The Regional Water Management Plan (Plan) recommends that Reno and the Regional Water Planning Commission (RWPC) should continue to investigate and pursue treatment and disposal options for Reno Stead Water Reclamation Facility (RSWRF) that support an integrated plan for the region's limited water resources, particularly water supply, effluent management and flood plain management strategies for this closed basin. Plan Action Item 12.B, "Continue to investigate phased wastewater treatment and disposal options that are consistent with the plans for the region", is the subject of this Regional Water Management Plan Amendment.

As stated in Plan Section 9.3, Municipal Water Resources in the Stead / Lemmon Valley, the RWPC performed a detailed analysis of water supply alternatives that will support the build-out land uses in the Stead, Lemmon Valley, and Cold Springs regions of Washoe County. Growth in these areas is currently constrained by existing water infrastructure that imports water from the Truckee Meadows and local groundwater supplies. The importation projects evaluated include 1) a combined Vidler Water Company / Intermountain Pipeline importation project consisting of groundwater from Fish Springs Ranch, Dry Valley, Newcomb Lake, Bedell Flat and Warm Springs (northern option), and 2) increased TMWA Truckee River based water supply that would necessitate the replacement of the existing Stead Main with a larger pipe and pump station (southern option).

The projected build-out water demand for the Stead / Lemmon Valley area is 12,923 acre-feet (AF), which includes 1,000 AF for supplemental water resource needs. With estimated long-term municipal groundwater withdrawals of 2,189 AF based on present Truckee Meadows Water Authority (TMWA) and Washoe County groundwater rights holdings, there is a need to import a total of 10,734 AF to meet potential build-out demands in the Stead / Lemmon Valley area. From a long-term water supply perspective, development of a northern importation project to serve the Stead / Lemmon Valley area would provide greater benefits for the region compared to the Stead Main alternative, at a lower overall cost.

Facility planning for the Stead / Lemmon Valley area has identified a potential long-term imbalance between water supply needs and wastewater disposal capacity. Plan Issue 9.12, Wastewater Management in the Stead / Lemmon Valley, states that the City of Reno is currently under final design of the RSWRF Phase 2 improvements, which will increase treatment and disposal capacity to 2.0 MGD, with specific improvements sized to accommodate flows up to 4.0 MGD. Any new potable water source brought into the Stead or Lemmon Valley area that increases wastewater flow to the RSWRF above 2.0 MGD will necessitate the implementation of additional effluent management techniques, such as exportation from the hydrographic basin or irrigation reuse.

The Recommendations Section under each issue in Plan Chapter 9 contains a summary of the recommendations from work that was performed in response to issues identified in the 1995–2015 version of the Plan. In many cases, these studies resulted in further analyses to refine the recommendations and identified needs for additional work that has yet to be performed. Furthermore, the RWPC has identified new issues that need to be resolved in future work. Combined, this work is identified as a numbered item under "Subsequent Activities and Additional Work Needed". These numbered items form the basis of the Action Plan for the Regional Water Management Plan.

The purpose of the Action Plan is to present the significant water management activities that the RWPC has identified as a need or action item for the planning period. The Action Plan seeks to provide guidance and emphasis for the future work of the RWPC, water purveyors, wastewater treatment providers, and local and regional governments with respect to the management of the Region's water resources.

This Amendment addresses wastewater disposal planning for the Stead / Lemmon Valley area. It does not address wastewater disposal planning for Cold Springs, which is the subject of future work to be undertaken and/or reviewed by the RWPC at a future date.

Background

The Regional Water Planning Commission and the City of Reno have continued to evaluate effluent disposal strategies in the North Valleys. The RWPC work focuses on long-term issues associated with management of wastewater in this closed basin such as water quality, viability of in-basin effluent disposal strategies, summarized reporting of water / wastewater / flood control infrastructure costs and coordination with ongoing flood control planning. The City of Reno work is more detailed, including an update to the projected wastewater flows and collection system model, comprehensive examination of different effluent disposal strategies both in-basin and via exportation to other basins, and investigation of wastewater treatment technologies that might be required for different effluent disposal strategies.

This Amendment to the Regional Water Management Plan presents the findings and recommendations from this ongoing work, and sets forth the objectives and strategy to address wastewater disposal planning for the Stead / Lemmon Valley area. The supporting document for this proposed amendment is called "North Valleys Effluent Disposal Options", prepared by ECO:LOGIC Engineering for the RWPC and the City of Reno, dated September 2005.

Updated Wastewater Flow Projections

The RWPC and the City of Reno have conducted planning analyses for long-range wastewater treatment and disposal needs for the Stead / Lemmon Valley area, which includes lands within the City of Reno, recently annexed property and unincorporated areas.

No analysis is provided with respect to the Cold Springs Water Reclamation Facility, or the portions of Cold Springs that would remain in the unincorporated area after completion of the proposed Cold Springs annexation.

Figure 1 shows the planning area used for this analysis, the Truckee Meadows Service Areas (TMSA) boundary, and locations of existing wastewater treatment facilities. Previous facility planning for this region was limited to lands within the TMSA boundary. In the current planning effort, additional properties that are the subject of a proposed annexation into the City of Reno are also included. The land use density used to evaluate the annexation area is that proposed by the developers and does not imply any local or regional government approval.

Within the TMSA boundary, there are some properties where developers have proposed to intensify land uses. A parallel analysis was performed for these properties to include wastewater flows generated from approved land uses, as well as the potential additional flow that could be generated with approval of the intensifications.

Using parcel based projections of number of units and number of employees, projected wastewater flows have been reevaluated at the parcel level of detail. The base data was provided by the Truckee Meadows Regional Planning Agency (TMRPA) and includes all existing and approved development as of July 2004. The projected number of units and number of employees for non-residential land uses was calculated by TMRPA staff. Wastewater flow factors, wastewater flows, and planned treatment location were added to the TMRPA database by ECO:LOGIC.

Based on current projections, total wastewater flows within the Lemmon Valley hydrobasin at build-out of approved land uses will be approximately 4.8 MGD. This amount includes potential septic tank conversions and the future diversion of the Lemmon Valley Wastewater Treatment Plant (LVWWTP) flows to the Reno-Stead Water Reclamation Facility. Proposed land use intensifications within this basin as well as those associated with the recent City of Reno annexation in Cold Springs, would add another 2.2 MGD, for a total potential build-out flow of 7.0 MGD.

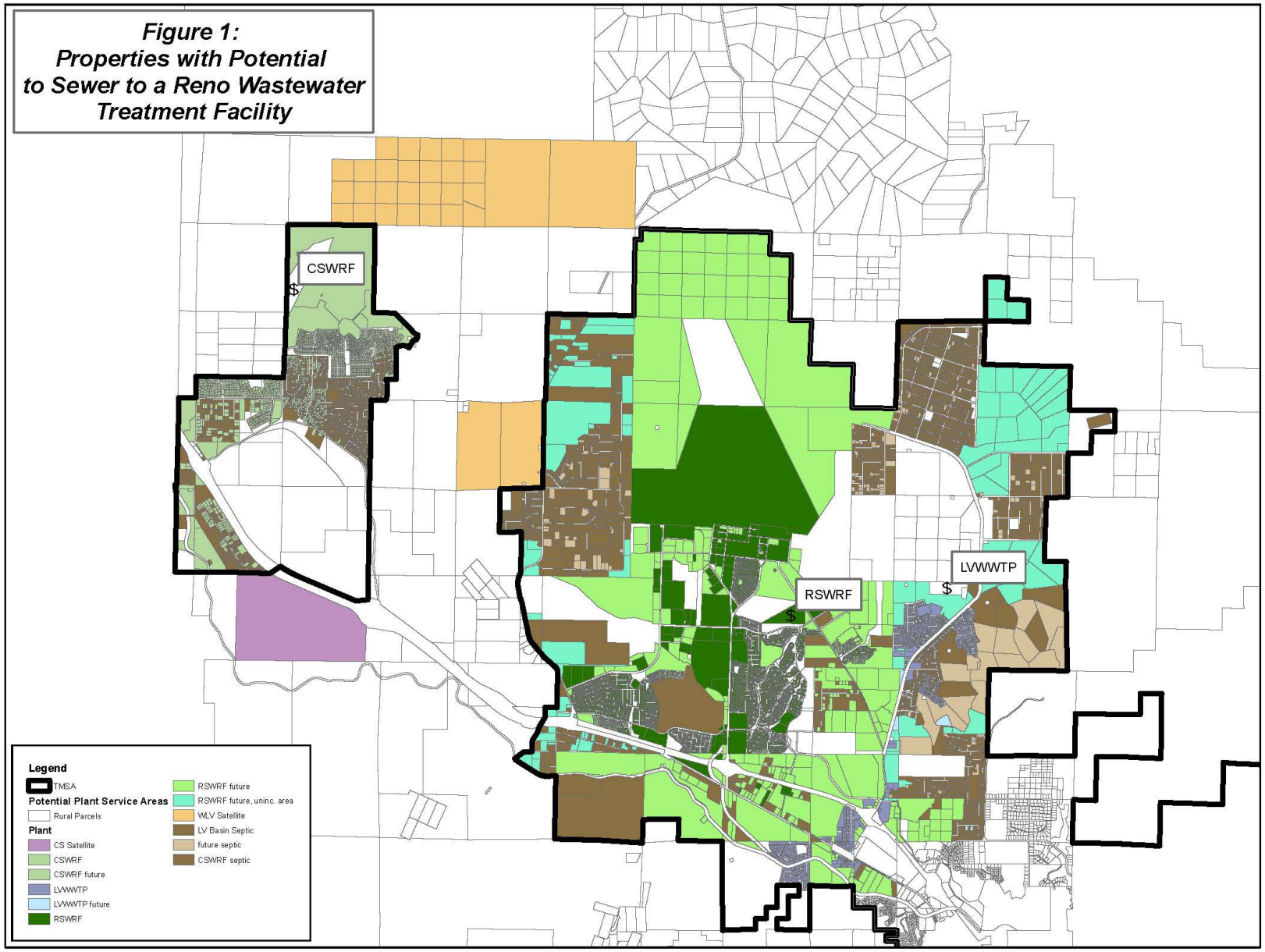


Figure 1:
Properties with Potential
to Sewer to a Reno Wastewater
Treatment Facility
CSWRF
$
RSWRF
$
LVWWTP
$
Legend
TMSA
Potential Plant Service Areas
Rural Parcels
Plant
CS Satellite
CSWRF
CSWRF future
LVWWTP
LVWWTP future
RSWRF
RSWRF future
RSWRF future, uninc. area
WLV Satellite
LV Basin Septic
future septic
CSWRF septic

Wastewater Disposal Options

The RSWRF is currently under expansion to a capacity of 2.0 MGD. Disposal methods for the treated effluent from RSWRF presently include discharge to Swan Lake and effluent reuse. The recently constructed solids pump station and waste activated sludge pipelines tie to the collection system serving the Truckee Meadows Water Reclamation Facility (TMWRF). These facilities add capacity for indirect effluent disposal, and provide up to 0.9 MGD of capacity to pump raw wastewater from RSWRF to TMWRF.

Nine options have been evaluated for the disposal of the remaining effluent that could potentially be generated. Figure 2 depicts the general locations of facilities for these options. The options include:

Option 1 - Expanded Effluent Reuse: Presently, it does not appear to be practical to extend effluent reuse facilities throughout the area for the purpose of serving all potential effluent demands. A more reasonable course of action would be to supply on-demand effluent reuse (no seasonal storage) where it makes sense, and continue permitted discharges to the wetlands and Swan Lake. Potential new reuse customers include J.C. Penney and a local elementary/middle school, as the existing reuse pipeline is located near these two sites. Conversion of TMWA's Stead Main to an effluent reuse main would also allow RSWRF to serve sites outside of the Stead / Lemmon Valley area, such as Rancho San Rafael Park. The Stead Main is scheduled to be replaced by TMWA as early as 2007.

Option 2 - Rapid Infiltration Basins: Review of slopes, geology, locations of municipal and domestic wells, runway setbacks, land use, and land ownership have resulted in the identification of areas with potential for location of rapid infiltration basins (RIBs) generally north of the airport on Washoe County, Airport Authority or Bureau of Land Management (BLM) land. One limitation to the potential use of RIBs is the land requirement for the disposal area.

Option 3 - Direct Injection / Aquifer Storage and Recovery: There are several potential advantages to direct injection of effluent over RIBs in this area. There are a couple of options that have emerged with respect to sites. One is a canyon in private ownership on the north end of Lemmon Valley where injection and recovery wells could be placed about a mile apart. Another possibility is to locate a well injection field on the Airport Authority property where there is adequate distance from domestic and municipal production wells. Injection wells could be designed with the intent to minimize direct mixing of effluent and potable water bearing strata. State regulatory requirements are not clear (there are no currently permitted direct injection facilities in Nevada). The assumption is that advanced tertiary treatment would be required (i.e. membrane bio-reactor with ultra-violet disinfection).

Option 4 - Vadose Zone Infiltration Wells: Review of slopes, geology, locations of municipal and domestic wells, runway setbacks, land use, and land ownership have resulted in the identification of an area with potential for location of vadose zone wells that is generally east and north of the airport on Washoe County, Airport Authority, or BLM land. Vadose zone wells may be more favorable than RIBs since the land requirement for the disposal facilities is significantly less.

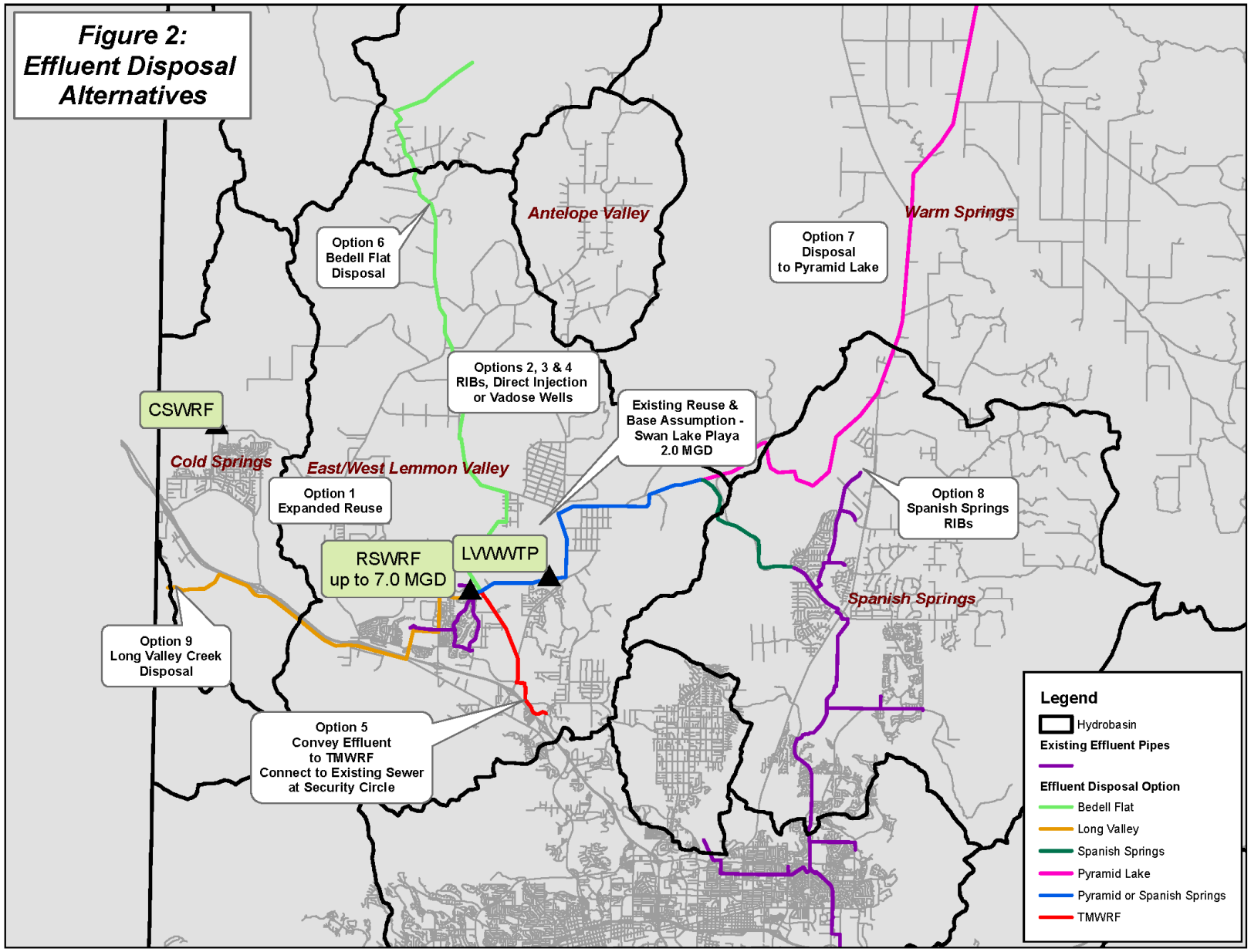


Figure 2:
Effluent Disposal
Alternatives
Antelope Valley
Warm Springs
Option 6
Bedell Flat
Disposal
Option 7
Disposal
to Pyramid Lake
Options 2, 3 & 4
RIBs, Direct Injection
or Vadose Wells
CSWRF
Existing Reuse &
Base Assumption -
Swan Lake Playa
2.0 MGD
Cold Springs
East/West Lemmon Valley
Option 1
Expanded Reuse
Option 8
Spanish Springs
RIBs
RSWRF
up to 7.0 MGD
LVWWTP
Spanish Springs
Option 9
Long Valley Creek
Disposal
Option 5
Convey Effluent
to TMWRF
Connect to Existing Sewer
at Security Circle
Legend
Hydrobasin
Existing Effluent Pipes
Effluent Disposal Option
Bedell Flat
Long Valley
Spanish Springs
Pyramid Lake
Pyramid or Spanish Springs
TMWRF

Option 5 - Convey Sewage to TMWRF: Presently, waste activated sludge is pumped through two parallel 8- and 6-inch mains from the existing clarifier No. 1 at the RSWRF and discharged into the City's existing collection system at Golden Valley. The solids are conveyed through the collection system and ultimately processed at TMWRF. The available capacity of these mains to convey WAS and raw or screened sewage to TMWRF is approximately 0.9 million gallons per day. The existing pump station and pipeline capacity could be expanded to send additional wastewater to TMWRF for treatment and disposal. The existing interceptor system through the City of Reno to TMWRF would likely need to be upgraded to accommodate these additional flows. The current TMWRF expansion will provide excess treatment capacity in the near-term to accommodate these additional flows. Permanent capacity could be provided in future planned TMWRF expansions.

Option 6 - Surface Discharge of Effluent to Bedell Flat: The proposed discharge point is located on Bureau of Land Management property (Bird Springs area) north of the Reno-Stead Airport and east of Red Rock Road. This location naturally drains into the top of the Bedell Flat hydrobasin, ultimately discharging to Long Valley Creek at North Red Rock Road and US 395, a very low probability event given that effluent discharged at this location would need to travel approximately 14 miles across relatively level terrain before entering California and Long Valley Creek.

A portion of the discharged water may be recoverable using groundwater wells with potential recovery for beneficial use in the future. Secondary treatment is all that should be required of this option; however, the RSWRF already meets tertiary treatment standards, so it is assumed that this level of treatment would be continued.

Option 7 - Pyramid Lake Discharge: The proposed discharge point is located immediately east of Warm Springs Valley. Effluent would discharge into a drainage that flows east into Pyramid Lake within approximately six miles from the discharge point. This project could be sized for different capacities depending on what phased or ultimate disposal capacity is required. There are several options for pipeline routing from Stead to Spanish Springs. Once in Spanish Springs, the pipeline would follow Pyramid Highway to the Pyramid Lake Paiute Tribe property.

Option 8 - Convey Effluent to Spanish Springs: Similar to RIBs in Lemmon Valley, the assumption is that the existing and planned level of wastewater treatment at the RSWRF would be continued. The plant would be expanded to 4.8 MGD with continuation of the existing tertiary treatment technologies.

The effluent pipeline to Spanish Springs would run along the Eagle Canyon Road alignment, connecting to the existing Sparks reclamation infrastructure near the Spanish Springs High School. From there, the existing 20" City of Sparks pipeline would convey effluent to RIBs at either the Martin Marietta property or the Boneyard Flat playa.

Option 9 - Surface Discharge of Effluent to Long Valley Creek: The proposed discharge point is located immediately south of Bordertown in Nevada. Effluent discharged into the drainage would flow north into Long Valley Creek in California within approximately one-half

mile from the discharge point. This project could be sized for different capacities depending on what phased or ultimate disposal capacity is required. It could also be combined with a seasonal storage reservoir that would allow continued discharges when natural flows in Long Valley Creek diminish.

The proposed pipeline alignment follows the existing effluent reuse piping from RSWRF through Sierra Sage Golf Course, and then parallels US 395 north toward Bordertown. The alignment diverges from US 395 south of Bordertown and heads west across undeveloped land ultimately discharging into a small drainage located in Nevada.

Evaluation and Ranking of Options

To compare the nine effluent disposal options, an evaluation and ranking matrix was developed, which considers such factors as cost, potential water resource benefits, operational flexibility, ease of implementation and requirements for agency/partner agreements.

The evaluation and ranking process identified the top three ranked disposal alternatives as:

Option 5: Convey a Portion of the Effluent to TMWRF, $41.159 million

Option 1: Expanded Effluent Reuse, $34.166 million

Option 4: Infiltration of Effluent with Vadose Zone Wells, $33.950 million

The above costs include both treatment plant expansion and effluent disposal infrastructure.

TABLE 1

ESTIMATED COSTS – 4.8 MGD DEVELOPMENT SCENARIO

	Disposal Option 1	Disposal Option 2	Disposal Option 3	Disposal Option 4	Disposal Option 5	Disposal Option 6	Disposal Option 7	Disposal Option 8	Disposal Option 9
	Expended Effluent Reuse	Rapid Infiltration Basin	Direct Injection/ASR	Vadose Zone Infiltration Wells	Convey Sewage above 2 MGD to TMWRF	Surface Discharge of Effluent to Bedell Flat	Pyramid Lake Discharge	Convey Effluent Directly to Spanish Springs	Surface Discharge of Effluent to Long Valley Creek
Assumed Treatment Level Required=>	Tertiary	Tertiary	MBR/UV	Tertiary	TMWRF Capacity	Tertiary	Tertiary	Tertiary	MBR/UV
Incremental treatment cost from 2 to 4.8 MGD [1]	$26,414,000	$26,414,000	$31,090,000	$26,414,000	$33,600,000	$26,414,000	$26,414,000	$26,414,000	$31,090,000
Disposal Piping/Pumping [1]	$7,752,000	$6,786,000	$6,786,000	$6,786,000	$7,559,000	$16,591,000	$29,678,000	$13,704,000	$10,964,000
Disposal Facilities [1]	n/a	$4,480,000	$4,500,000	$750,000	n/a	n/a	n/a	$4,480,000	n/a
Total	**$34,166,000**	**$37,680,000**	**$42,376,000**	**$33,950,000**	**$41,159,000**	**$43,005,000**	**$56,092,000**	**$44,598,000**	**$42,054,000**
Relative Rank	**2**	**4**	**5**	**3**	**1**	**7**	**8**	**6**	**9**

Notes:
[1] See Appendix J for Cost Estimate Details, April 2005 ENR 7355

Option 1, expanded effluent reuse and Option 4, vadose zone infiltration wells, are the lowest cost options. Expanded effluent reuse and vadose zone infiltration wells also rank high from a non-cost perspective. Effluent reuse would provide a non-potable irrigation supply and would lessen the demand on potable water resources in Stead. However, reuse is only a good disposal option during the irrigation season, and it would need to be combined with other disposal alternatives.

Vadose zone wells appear to be the best option for infiltrating effluent compared to RIBs and direct injection wells. From a water resource perspective, infiltrating a portion of the effluent would keep water in the basin to help balance the regional groundwater resource overdraft issue, and it may be possible to recover and use the water in the future. Vadose zone wells have a small land requirement and provide similar soil aquifer treatment benefits compared to RIBs.

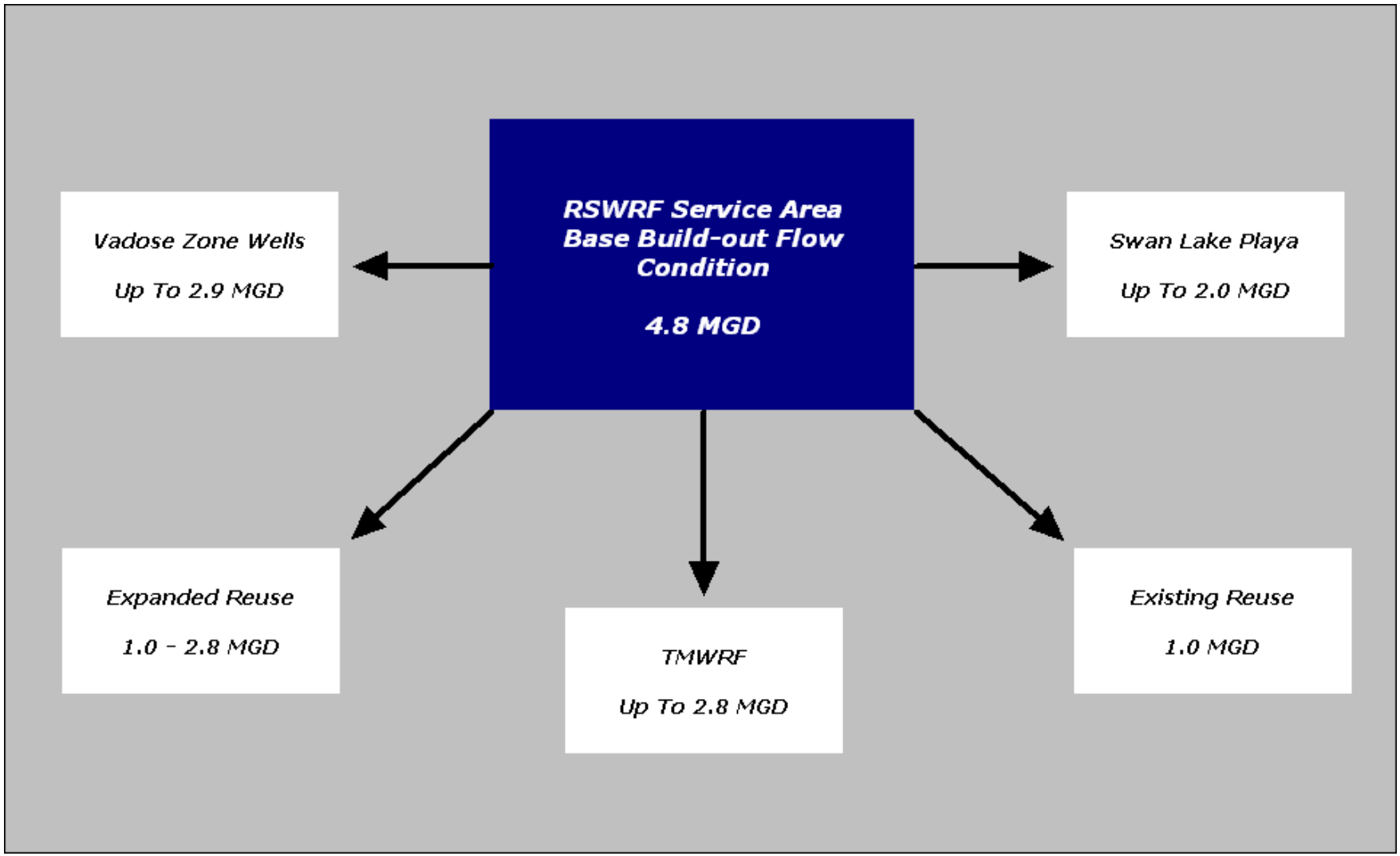
Option 5, conveying a portion of the effluent to TMWRF, is the least cost option that could be implemented independently to handle projected increases in wastewater flows.

From a non-cost perspective, conveying a portion of the effluent to TMWRF is also the highest ranked option. This option appears to provide the greatest potential water resource benefits, has clear regulatory implementation requirements, and offers flexibility as to phasing of facilities and volume that would be diverted. It is a good option for a portion of the effluent flow or as a stand alone option. One drawback to this option is that it would accelerate the time when TMWRF would need to make improvements to continue to comply with the TMDL limitations on the Truckee River. The TMWRF option may be very attractive as a short-term option until flow volumes justify implementation of a longer term disposal strategy as discussed below.

These disposal options, implemented in some combination with one another, together with discharge of up to 2 MGD to the Swan Lake Playa and continuation of the existing reuse program, provide the best opportunity in the short term to cost effectively manage effluent disposal in Stead. The existing and recommended disposal options are depicted in Figure 2.

FIGURE 3

RECOMMENDED DISPOSAL OPTIONS BASED ON 4.8 MGD DEVELOPMENT SCENARIO



Long Term Issues – Potential Land Use Intensification

The 9 effluent disposal options were compared and evaluated using the base case development scenario in Stead / Lemmon Valley, which results in a projected wastewater flow of 4.8 MGD. In the future, if proposed land use intensifications in Lemmon Valley and Cold Springs move forward and are ultimately approved, the potential wastewater flow generated in the RSWRF service area could approach 7.0 MGD. Other disposal options, such as conveying treated effluent to Spanish Springs for recharge and/or surface discharge of effluent to Bedell Flat should continue to be evaluated as long term alternatives for the efficient management of the wastewater effluent that may provide additional beneficial uses of the region's water resources.

Conveying treated effluent to Spanish Springs for infiltration by RIBs uses the water to help balance the regional water resource overdraft issue in Spanish Springs, but does nothing to address the same issue in Lemmon Valley where the water would originate. However, the effluent could be used to offset TMWRF reuse commitments, and may increase the water rights pool in the central Truckee Meadows for other regional benefits. Agreements with Sparks and Washoe County would be required to implement this option; however, negotiations are currently taking place for disposal of TMWRF effluent in Spanish Springs, which could also include effluent from RSWRF.

Conveying treated effluent outside of the basin, including discharge to Bedell Flat, Pyramid Lake and Long Valley Creek are the lowest ranked options. Although these options may provide good potential water resource benefits and operational flexibility as stand-alone alternatives, the permitting requirements and implementation agreements would be significant and time consuming. Of the three options, discharging effluent to Bedell Flat is the best ranked alternative. It would keep the water in Nevada, available for future use, and a large area is available to provide for long-term water storage. This option may require a commitment of water to support created wetlands and habitat, but it appears to be a good long-term alternative that would take time and effort to implement.

Long Term Issues - Total Dissolved Solids Accumulation

Recharge and reuse of treated effluent within the North Valleys will retain water resources within the valley, but will result in a slow buildup of salts within the aquifer. Currently, relatively low total dissolved solids (TDS) water is imported from the Truckee River, which when combined with the local groundwater resources, results in effluent containing approximately 420 mg/L of TDS. Imported groundwater will have a TDS concentration of about 275 mg/L, and is estimated to result in an effluent TDS concentration of approximately 600 mg/L.

A conceptual model of a portion of the Stead / Lemmon Valley area was developed in order to gain an "order of magnitude" estimate of the potential long-term accumulation of TDS within the local aquifer as a result of planned development[1]. The conceptual

[1] North Valleys Effluent Disposal Options, ECO:LOGIC Engineering, September 2005, Appendix I

model considers the Silver Lake sub-basin portion of the aquifer, since several of the potential effluent recharge sites are located within this area.

The conceptual model considers the following aquifer characteristics and recharge sources:

Transitional storage reserve - The transitional storage reserve for the Silver Lake sub-basin is defined as the quantity of water in storage in a groundwater reservoir that can be extracted and beneficially used during the transition period between equilibrium conditions under a state of nature and the new equilibrium conditions under the perennial yield concept of groundwater development. For the Silver Lake sub-basin, this quantity is estimated to be 90,000 acre feet. The current groundwater TDS concentration is approximately 220 mg/L.

Several of the estimated sources of annual water recharge and the respective TDS concentration of each component is summarized in Table 2. Recharge from treated effluent is based on an assumed amount of 2 MGD. The planning value of 2 MGD is based on a preliminary estimate of the available disposal capacity that vadose zone wells could provide and does not relate to any particular development scenario.

TABLE 2
POTENTIAL TDS INPUTS TO NORTH VALLEYS

Recharge Sources	Acre feet / Year	TDS (mg/L)	TDS (lb/Year)
Infiltration of Precipitation	1,500	25	100,000
Excess Irrigation Recharge	707	780	1,500,000
Septic Tank Infiltration	158	750	300,000
TMWA ASR Program in Stead	297	190	150,000
Treated Effluent Recharge	2,240	600	3,600,000
Totals	4,902		5,650,000

The above table is not a comprehensive TDS balance as it does not quantify aquifer discharge sources. Discharge sources incorporated in the conceptual model only take into consideration pumping from municipal and domestic wells. This amounts to approximately 900 acre feet per year. Little current information is available to estimate other potentially significant aquifer discharge components, such as evapo-transpiration, groundwater outflow to other basins, or future recovery of recharged effluent to help meet irrigation demands. These discharge components provide additional outlets for the groundwater system, and will tend to reduce the estimated increase in TDS concentration calculated from the conceptual model.

Based on the preceding aquifer characteristics and simplifying assumptions utilized in the conceptual model, over the long term, the TDS concentration within the Silver Lake sub-basin may increase up to 3 to 4 percent per year. This equates to an increase of up to 8 mg/L per year, on average.

Long term accumulation of TDS is a consequence of human activity; it is not an issue unique to the Stead / Lemmon Valley area. Many other communities and states also recognize this concern and are working toward sustainable, long-term solutions.

Nevada regulations allow for manageable impacts to groundwater quality from wastewater disposal practices as long as drinking water quality standards are not impaired. Assuming continued recharge and reuse of treated effluent within the North Valleys, long term monitoring of groundwater quality is recommended. Depending on the rate and amount of total dissolved solids accumulation observed in the aquifer, effluent TDS reduction or other measures may ultimately be needed to help maintain groundwater quality.

Recommended Plan Objectives and Implementation Strategy

Based on the preceding information, a recommended wastewater disposal plan has been formulated to meet the following objectives:

- Develop a plan to address the potential imbalances between water supply and wastewater disposal capacity in the Stead / Lemmon Valley area;

- Document that there is an integrated wastewater treatment and disposal plan for each subsequent phase of capacity expansion at RSWRF, and;

- Adopt a plan to satisfy Exception 3 of the Regional Planning Commission conformance review of the 2004 – 2025 Regional Water Management Plan with respect to Lemmon Valley.

In summary, the recommended implementation strategy for the Stead / Lemmon Valley Wastewater Disposal Plan is:

- Aggressively pursue implementation of the top three ranked disposal alternatives, including conveying a portion of the effluent to TMWRF, expanded effluent reuse and feasibility / pilot testing of vadose zone infiltration wells;

- Continue to evaluate other viable long-term disposal options, such as disposal to Bedell Flat and conveying treated effluent to Spanish Springs for recharge.

- Coordinate ongoing long-term planning efforts to support an integrated plan for the region's limited water resources, particularly water supply, effluent management and flood plain management strategies.

Specific activities required to implement the recommended strategy include but are not limited to:

1) Amend the Regional Water Management Plan to include the Stead / Lemmon Valley Wastewater Disposal Plan, and recommend approval of the Regional Water Management Plan Amendment to the Washoe County Board of Commissioners.

2) Pursue implementation of short-term disposal to TMWRF, including the following elements:

- Determine the estimated costs and impacts to TMWRF from disposal of RSWRF treated effluent, including effects to the discharge permit and Total Maximum Daily Load (TMDLs) from accelerated flow increases, changes in timing of future improvements, and rate impacts. (The City of Reno does not plan to increase capacity of the existing solids pump-over facility to pump raw sewage. The additional flow diverted to TMWRF would be treated effluent.)
- Evaluate different capacity options and timing for the 4.8 MGD, 7.0 MGD or other development scenarios, considering operational flexibility and other potential benefits.
- Develop a capital improvement program for the North Virginia interceptor that can accommodate the timing of flows that would be diverted to TMWRF.
- Evaluate water rights strategies to maximize potential secondary water resource benefits.

3) Aggressively pursue implementation of expanded effluent reuse customers in Stead and elsewhere:

- Identify target effluent reuse customers to pursue, recognizing challenges of Nevada reuse permitting requirements.
- Establish policies that require the construction of effluent delivery infrastructure in conjunction with new development in targeted areas.
- Define facilities, estimated costs, and revenue requirements.
- Further evaluate the Stead Main conversion / Rancho San Rafael Park reuse option, quantify mutual benefits to Reno, Washoe County Parks Department and TMWA, and determine the necessary facilities and estimated capital and O&M costs.
- Continue to investigate other viable long-term disposal options, such as disposal to Bedell Flat, connection of the Stead Main to the existing effluent reuse system at Wildcreek, and conveyance of treated effluent to Spanish Springs for recharge. A disposal option which relies on effluent reuse must be implemented in conjunction with a winter-time disposal option to accommodate flows during the non-irrigation season.
- Reevaluate the feasibility of winter storage reservoirs if conditions warrant. Previous studies indicated that local reservoir construction may not be economically or environmentally practical.

4) Conduct feasibility / pilot testing of vadose zone infiltration wells:

- Obtain the right to perform well drilling and pilot testing on Airport Authority property, and conduct the pilot testing program.
- Based on results of pilot testing and as new information becomes available to estimate other potentially significant aquifer discharge components, prepare an updated estimate of the long-term disposal capacity and TDS accumulation in the local aquifer.

- Determine the need for additional effluent treatment to meet drinking water standards and/or reduce TDS to acceptable levels, i.e., Reverse Osmosis and electrodialysis reversal technologies.
- Evaluate the cost, feasibility and permitting requirements for a separate pipeline to the playa for disposal of concentrated effluent that might be generated as a result of TDS removal.

5) Coordinate ongoing long-term planning efforts:

- Initiate preliminary design for the next expansion at RSWRF. Effluent filtration and disinfection requirements will be key elements of design.
- Coordinate effluent playa disposal requirements with any proposed flood control mitigation plans and improvements and existing management plans for Swan Lake playa.
- Evaluate the feasibility, estimated costs and merits of implementing an effluent aquifer storage and recovery program in Lemmon Valley.
- Based on the above work, refine and periodically update the wastewater treatment and disposal plans, including required facilities, together with estimated costs, phasing and timing of improvements.