Table of Contents

List of Tables

List of Figures – Included at End of Section

Section 2 - Spring Mountain TMSA

2.1 STUDY AREA DESCRIPTION AND DEVELOPMENT CONSTRAINTS

Winnemucca Ranch (AKA Spring Mountain) planned development includes approximately 6,120 acres of property in the Warm Springs and Dry Valley hydrographic basins. The property was added to the Truckee Meadows Service Areas (TMSA) in 2006. The Spring Mountain TMSA is shown on Figure 2-1 (see figures at end of section) and is within the jurisdiction of the City of Reno.

Spring Mountain will be a master planned community with residential, retail, office, civic and recreational land uses. Approximately half of the project acreage is designated for park and open space uses with an extensive community trail system. Water conservation, reclaimed water and low impact development (LID) techniques will be utilized in the project. Spring Mountain is designed to offer healthy living, unprecedented outdoor recreational opportunities, quality design and a small town atmosphere blended with big-city conveniences.

Development statistics are estimated as follows:

- ±23,200 population at buildout;
- ±9,500 standard residential dwelling units;
- ±2,500 age-qualified residential dwelling units;
- ±600,000 square feet of retail floor area;
- ±800,000 square feet of professional office floor area;
- ±600,000 square feet of light industry/office flex floor area.

Areas that are potentially limited or constrained for future development include areas with slopes greater than thirty percent, lakes, stream environments, wetlands and drainage ways. These areas are shown on Figure 2-2. Surface runoff within the Dry Creek hydrobasin flows to Dry Creek. Surface runoff within the Warm Springs hydrobasin flows to an unnamed drainage way.

TAZ data was not used for Spring Mountain planning. More detailed land use information provided by the developer's representative was used. For planning purposes, the proposed development was assumed to be built out by 2030.

2.2 CONCLUSIONS AND SUMMARY RECOMMENDATIONS

The water supply for Spring Mountain can potentially be derived from several sources, including both on-site resources and imported resources. Additional study of the long term reliability and yield of the on-site spring resources and the Dry Valley and Black Canyon resources is needed to assess their reliability and municipal water supply yield. Use of reclaimed water and/or imported water, in addition to the on-site resources, will likely be required to help meet projected water

demands. An estimated 1,115-1,674 AF of new residential irrigation demand may be served by reclaimed water.

The water distribution facility recommendations presented in this plan will need to be refined when additional water supply and capacity information for the on-site resources is available. Furthermore, the tanks were located to serve the entire elevation range of the property, in many instances on property administered by the BLM. The tanks may be able to be relocated to on-site locations once development plans are finalized.

A pond-type reclamation facility is proposed to be constructed for the eastern TMSA, sized for the projected capacity of up to 2.0 MGD. The capacity of this water reclamation facility will be limited to the extent that sufficient infiltration areas can be developed, primarily in the meadow and open space areas, to dispose of the effluent during the non-irrigation season.

A second tertiary reclamation facility is proposed to be constructed in the central TMSA. This plant would serve the growth in both the Central and Western areas, and would also serve as a "polishing plant" for excess effluent generated from the Eastern area. Reclaimed water would be used to the extent practical in the Central and Western areas, and disposed of within areas suitable for infiltration. Excess effluent may be discharged into the Dry Creek drainage.

A summary of the estimated water and wastewater costs for the proposed infrastructure is listed in Table 2.1.

Table 2.1 - Infrastructure Costs (a)

Facility Description	Total Cost ($M)
Water (b)	$64.4
Wastewater	$157.8

(a) 20 Cities ENRCCI = 7,942 May 2007

(b) Imported water and on-site water supply and treatment costs are unknown at this time

2.3 DESCRIPTION OF SERVICE PROVIDERS

There are no current service providers for water, wastewater and stormwater. New systems will be created to provide service for the Spring Mountain TMSA. Stormwater management and flood control are discussed in Section 14.

2.4 STATUS OF INFRASTRUCTURE PLANNING

The Spring Mountain TMSA is a new area of development and little facility planning has been done. The most recent facility plans for water and wastewater that have potential applicability to Spring Mountain are listed in Table 2.2.

Table 2.2 - Recent Facility Plans

Plan Name	Date	Description
Water		
Fish Springs Ranch Facility Plan Reference: ECO:LOGIC	Sept. 2005	Construction of the Fish Springs Water Supply Project to meet future water demands for the Stead, Silver Lake and Lemmon Valley area (North Valleys) within the Truckee Meadows Services Area. The project consists of a new electrical substation off of the Alturas Transmission Line, groundwater production wells, a pump station, a transmission pipeline and terminal water storage tank to convey water from Fish Springs Ranch to the North Valleys. The facilities will be sized to supply 8,000 AF of water per year (AFA).
Wastewater		
Draft Washoe County 208 Water Quality Plan Version 3 Reference: Truckee Meadows Regional Planning Agency	January 2007	Per section 208 of the Clean Water Act this report provides the planning and management of all sources of water pollution and defines the parameters for area-wide wastewater management plans.

2.5 WATER

The projected water demands and required infrastructure are developed in this section.

2.5.1 Assumptions, Planning Criteria and Methodology

Water demand factors used to estimate potential demand are based on TMWA Rule 7 demand factors. It is assumed that this new development will dedicate water resources in accordance with TMWA water rights dedication policies.

In the case of non-residential development, the demand factor used represents an average number for planning purposes only. When TMWA or Washoe County receives a request for water service on a non-residential property, the actual water rights dedication requirement would be based on a project-specific analysis of the number of fixture units and the specific landscaping plan. This level of detail is not available for this analysis.

2.5.2 Existing and Future Water Demand

There is no existing water use beyond the current ranching operation.

Based on the land use analysis, projected water demands for Spring Mountain are listed in Table 2.3. The irrigation demand component is projected assuming that 6,000 gallons per month of water is consumed within a typical house, and the remainder is used for irrigation. The irrigation demand range is based on front yard only irrigation, or the combined front and back yard irrigation. Irrigation demand was also included for irrigating schools and parks assuming 3.5 AFA. Mixed use includes a combination of residential and commercial land uses. Irrigation

demand for the mixed use areas was accounted for as part of the residential demand. Other than the mixed use areas, no other commercial land uses are projected; therefore, no other commercial recycled water irrigation demands were projected. The total demands include both indoor and outdoor water use.

Table 2.3 - Spring Mountain Water Demands

Area	2030 Irrigation Demand Range (AFA) (b)	2030 Total Demands Including Irrigation (AFA) (c)
East	476-727	2,468
Central	279-472	1,636
West	361-475	770
Total	1,116-1,674	4,874

(a) Based on land use analysis.

(b) Based on residential, parks, and school irrigation.

(c) Based on 12,000 dwelling units, 206 acres of mixed residential and commercial use, and 10 acres of commercial use.

2.5.3 Water Resources

The water supply for Spring Mountain can potentially be derived from several sources, including on-site resources and imported resources. The project proponents acquired the rights to 300 AF of groundwater within the Dry Valley Basin. Washoe County also owns the water rights that have been used to irrigate the agricultural lands on the Spring Mountain project site. The long term reliability and yield of the spring resources are currently under investigation by Washoe County. Additional study of the Dry Valley and Black Canyon resources is needed to assess their reliability and municipal water supply yield. For purposes of this analysis, it has been assumed that these water rights can be developed and reliably support 1,700 to 2,200 AF of municipal demand.

Additional water resources potentially available to the area include water rights in the Smoke Creek Basin and Duck Lake Basin to the north of Spring Mountain, and the Fish Springs and Intermountain water projects. The developers of Spring Mountain own and/or control water rights in Smoke Creek Basin and Duck Lake Basin. More detailed information on these potential water resources can be found in Section 12. The Fish Springs Water Supply Project also crosses the western portion of the project area, and two taps have been provided in the pipeline for future use. The use of Fish Springs water resources in the Spring Mountain area would, if used, require approval by the State Engineer to change to the Place of Use for the water rights. The 300 AF in the Dry Valley basin was acquired from the Intermountain project.

Substantial amounts of reclaimed water could be available from the future wastewater reclamation facilities. This high quality reclaimed water would be suitable for landscape irrigation, including residential areas, and could be used to extend the available potable water supplies. Current landscaping practices account for approximately half of the total water demand

for a typical residential unit. Water demands could be further reduced by implementing water conserving landscaping practices and/or xeriscaping.

Existing and potentially available water resources to serve the Spring Mountain area are presented in Table 2.4.

Table 2.4 - Potentially Available Water Resources

Source Description	Supply (AFA)
On-site Resources	
Springs, Dry Valley Creek, Black Canyon, Dry Valley groundwater	1,700 - 2,200 (a)
Reclaimed Water	(b)
Total	1,700 – 2,200
Potential Imported Resources	
Fish Springs Water Supply Project	8,000 (c)
Intermountain Water Supply Project	2,000 (c)
Smoke Creek	6,000 (d)
Duck Lake Basin	3,000 (d)
Total	10,000 – 19,000

(a) The long term reliability and yield of the resources are currently under investigation. Additional study is ongoing to assess their reliability and municipal water supply yield.

(b) Reclaimed water may be used to supplement water resources for non-potable uses.

(c) Water resources potentially available to Stead, Lemmon Valley, Cold Springs and Winnemucca Ranch.

(d) Refer to Section 13 for additional information on these future potential resources. The long term reliability and yield of the resources are currently under investigation. Additional study is ongoing to assess their reliability and municipal water supply yield.

A comparison of the available resources in the water demand for 2030 is shown in Table 2.5. On-site resources and reclaimed water will satisfy much of the projected demand. Imported water, including either the Fish Springs or Intermountain Water Supply, or water from Smoke Creek or Duck Lake basin, will likely be required to meet a portion of the 2030 projected demand.

Table 2.5 - Water Demand and Resources Comparison

Condition	Potential On-Site Supply (AFA)	Other Potential Supply (AFA)	Spring Mountain Demand (AFA)
2030	1,700 – 2,200	10,000 – 19,000	4,875

2.5.4 Planned Facilities

Backbone distribution system facilities were developed to supply demands for the proposed Spring Mountain development. These facilities appear in Figure 2-3.

On-site water supplies for the Spring Mountain development include groundwater, springs and surface water. The long term reliability and yield of these resources is unclear, and further study is needed to assess their reliability and municipal water supply yield. As such, the potential water supply capacity from these water resources is unknown. For planning purposes, it is assumed that the Spring Mountain development will receive some of its supply from the Fish Springs transmission main, or an alternative importation project.

The Fish Springs transmission main crosses the western portion of Spring Mountain, as shown in Figure 2-3. For sizing transmission mains, a maximum day demand of 9,040 gpm is assumed to be supported by this water supply connection. The water distribution facility recommendations presented in this plan will need to be re-evaluated when additional water supply and capacity information for the on-site resources is available.

From this point of connection, water flows through a 30-inch backbone main east to a storage tank near the Central area. An additional 450,000 gallons is included in this tank volume for operational storage. The proposed pad elevation of 5515 feet is approximate and is based on the hydraulic grade line of the Fish Springs water supply. The actual pad elevation will require a more detailed analysis prior to a final design.

Geographically, the Central and East areas are separated by a pass, with an elevation of 5475 feet. A booster pump station may be required to maintain sufficient distribution system pressures at this high point. The West area is supplied from a 16-inch transmission main that branches from the 30-inch main. No pump stations are required for this area. The recommended water facility infrastructure for the West, Central and East Spring Mountain areas is summarized in Table 2.6.

Table 2.6 - Water Facility Totals

	Total Transmission Main Length (Linear Feet)	Total number of Pump Stations	Number of Tanks / Total Storage Volume (MG)
West Spring Mountain	41,760	0	2 / 1.85
Central Spring Mountain	60,650	2	3 / 3.4
East Spring Mountain	60,150	4	4 / 4.25

Service elevation ranges for the proposed West, Central and East areas is shown in Table 2.7. The tanks were located to serve this entire elevation range of the property, in many instances on property administered by the BLM. The tanks may be relocated to on-site locations once development plans are finalized. Pressure zones for Spring Mountain are presented in Figure 2-3.

Table 2.7 – Service Elevation Ranges

Area	Service Elevation Range (Feet)
West	4,510 – 4,940
Central	5,150 – 5,800
East	4,800 – 5,820

2.5.5 Water Facility Cost Estimates

The recommended water infrastructure costs are summarized in Table 2.8, and are listed in more detail in Appendix B. Costs of the proposed transmission mains, pump stations and storage tanks are included. Individual pressure reducing stations are not included in the cost estimates, as these facilities are generally considered development specific, on-site improvements.
In addition, the cost of purchasing water rights is not included.

Table 2.8 - Water Infrastructure Costs (a)

	Facility Cost ($ M)			
Facility	**Total**	**West Area**	**Central Area**	**East Area**
Supply/Treatment (b)	Insufficient Data			
Transmission	$51.1	$6.6	$15.3	$29.2
Storage	$13.3	$2.6	$4.4	$6.3
Total	$64.4	$9.2	$19.7	$35.5

(a) 20 Cities ENRCCI = 7,942 May 2007

(b) Imported water and on-site water supply and treatment costs are unknown at this time.

2.5.6 Water Planning Limitations

Specific limitations for the water planning in the Spring Mountain area are listed below.

- The potential water supply capacity from the on-site resources is under investigation and anticipated to be 1,700 to 2,200 AFA. The water distribution system facility recommendations will need to be refined when the water supply and capacity information for the on-site resources are more clearly defined.

- Single backbone mains were used to supply water throughout the TMSA. As development occurs, it is likely that an equivalent transmission capacity will be conveyed by a distribution network rather than by a single backbone main.

- Due to numerous pressure zones in the Spring Mountain development, transmission main pressures are proposed to exceed 100 psi in order to reduce facility costs and simplify system operation. In areas where transmission main pressures exceed 100 psi, connections from transmission mains to distribution system mains will require pressure

regulating valves or residences must be equipped with individual pressure regulating valves.

- The tanks were located to serve the entire elevation range of the property, in many instances on property administered by the BLM. The tanks may be able to be relocated to on-site locations once development plans are finalized.

2.6 WASTEWATER

The projected wastewater flows and required infrastructure for conveyance, treatment, and disposal are developed in this section.

2.6.1 Assumptions, Planning Criteria and Methodology

The wastewater flow factor for the Spring Mountain area was based on the 2007 Washoe County 208 Water Quality Management Plan. The flow factor for new development ranges from a low of 110 gallons per capita per day (gpcd) to 130 gpcd. An average of 120 gpcd was used for flow projection. All other wastewater planning assumptions are as stated in Appendix A.

2.6.2 Projected Wastewater Flow

Using the land use data, flow projections for Spring Mountain were developed. The wastewater treatment capacity projection for the three areas is presented in Table 2.9.

Table 2.9 - Spring Mountain Wastewater Projections

Area	**2030 Flows (MGD)** (a, b)
East	2.0
Central	1.1
West	0.4
Total	3.5

(a) Based on land use analysis.

(b) Based on 12,000 dwelling units, 206 acres of mixed residential and commercial use, and 10 acres of commercial use.

The 208 Plan had a projected 2030 wastewater flow range of 1.7 MGD to 2.4 MGD for Winnemucca Ranch. The 2030 total projected wastewater flow for the Spring Mountain TMSA is 3.5 MGD.

2.6.3 Water Reclamation and Disposal

Water reclamation would beneficially reuse a large portion of the effluent generated by Spring Mountain, and would provide a valuable water resource to help meet non-potable demands. Initial plans are to use reclaimed water to irrigate large portions of the open spaces and meadows throughout the community. The available acreage and amount of water that could be disposed of in these open spaces for each area is listed in Table 2.10.

Table 2.10 – Effluent Disposal

Area	Irrigated Acreage (a)	Potential Reclaimed Water Disposal (AFA) (b)
East	102	355
Central	63	221
West	0	0
Total	165	576

(a) Includes acreage of meadows and open spaces that could be irrigated.

(b) Based on 3.5 AFA per acre.

A review of the project site was conducted to evaluate the feasibility of seasonal storage for the reclaimed water. A good potential reservoir / disposal site exists at the Newcomb Lake playa, which is currently under the ownership of the project proponents. However, this site is several miles away from the development area, and would probably be better suited as an effluent land disposal area. Based on the surrounding topography and proposed land use plan for Spring Mountain, there do not appear to be suitable reservoir sites with sufficient capacity to store the anticipated quantity of effluent that will be generated by the project. Therefore, during the non-irrigation season, the proposed disposal option would be to infiltration areas, with discharge of the excess effluent into Dry Creek drainage. This is discussed further in the following section.

2.6.4 Proposed Wastewater Facilities

Based on the 2030 projected wastewater flows, recommendations for wastewater collection and treatment facilities are developed and shown on Figure 2-4. Wastewater reclamation facilities were planned for each of the three areas. Backbone reclaimed water facilities and disposal facilities are presented on Figure 2-5. More detailed sizing of the collection and reclaimed water facilities will be required as phasing plans and land uses are finalized.

The water reclamation facility construction would be staged to treat the increasing flows as project phases are constructed. Initially, a relatively low technology pond plant is proposed to be constructed for the Eastern area, sized for the projected capacity of up to 2.0 MGD. An enclosed headworks and odor control facility would be provided. Initially, wastewater would be treated and disposed of in areas with limited public access, such as the meadows and open spaces. As flow increases, the plant would be upgraded to a tertiary reclamation facility, where the filtered and disinfected effluent would also be used for unrestricted irrigation uses such as landscape medians, residential development and other open spaces. The capacity of this water reclamation facility will be limited to the extent that sufficient infiltration areas can be developed, primarily in the meadow and open space areas, to dispose of the effluent during the non-irrigation season. Determination of this infiltration disposal capacity is beyond the scope of this planning effort.

When the disposal capacity of the eastern water reclamation facility is reached, or when development occurs in the Central area, a second tertiary reclamation facility would be constructed. This plant would serve the growth in the Central and Western areas, and would also

serve as a "polishing plant" for excess effluent generated from the Eastern area. Reclaimed water would be used to the extent practical in the Central and Western areas, and disposed of within areas suitable for infiltration. Excess effluent may be discharged into Dry Creek drainage. A pipeline would be constructed between the eastern plant and the central plant so effluent may be disposed of in Dry Creek during the non-irrigation season from all areas.

Table 2.11 - Summary of Wastewater Infrastructure

Interceptors	67,800 feet
Force Mains	41,700 feet
Reclaimed/Disposal Pipe	136,100 feet
Wastewater Lift Stations	2 stations
Reclaimed Water Pump Stations	2 stations
2030 Capacity of East Reclamation facility	2 MGD
2030 Capacity of Central Reclamation facility (a)	1.5 MGD

(a) Central water reclamation facility may have supplemental capacity to treat excess flows from the east water reclamation facility.

2.6.5 Wastewater Facility Cost Estimates

The proposed wastewater facilities and estimated costs are summarized in Table 2.12, and are listed in more detail in Appendix C.

Table 2.12 - Wastewater Infrastructure Costs

Facility Description	Total Cost ($M)
Collection System	$19.9
Treatment	$115.3
Disposal/Reclaimed Water	$22.6
Total	$157.8

(a) 20 Cities ENRCCI = 7,942 May 2007

2.6.6 Wastewater Management Options

The potential exists for a coordinated wastewater treatment and disposal strategy with the planned Sage development, located south of Spring Mountain. The water and wastewater planning criteria for the Sage area is more fully described in Section 3. Because the developments are independent of one another, and the timing of one project may not be appropriate for the other, independent water and wastewater facility plans were developed for each area. However, the proposed land disposal option for Sage may also be a potentially viable option for Spring Mountain. This option, as well as use of the Newcomb Lake playa, are worthy of further consideration once more definitive development plans are available for both proposed projects.

2.6.7 Wastewater Planning Limitations

Specific limitations of the wastewater planning in the Spring Mountain area are listed below.

- Wastewater flow projections are conservative because a mid-range wastewater flow factor is used. The TMWA Rule 7 water demand projections are representative of actual demands. Therefore, the percentage of wastewater flow compared to the total water demand is more than the "typical" fifty percent reported in previous planning studies.

- More detailed sizing of the collection and reclaimed water facilities will be required as phasing plans and land uses are finalized.

- Effluent disposal planning for the Spring Mountain TMSA is conceptual. Additional evaluation will be required to determine the final effluent treatment and disposal strategy.

2.7 POLICY RECOMMENDATIONS (INCLUSIVE OF WATER, WASTEWATER)

Potentially available water resources have been identified to serve the projected 2030 demands in the Spring Mountain TMSA. However, a combination of imported and on-site water resources may be needed to satisfy the projected buildout demands. Expanded use of reclaimed water, such as front and/or back yard residential landscape watering, should be evaluated on a regional level and implemented where reasonable to extend available water supplies and help fulfill the development potential of the Spring Mountain TMSA.

Current landscaping practices account for approximately half of the total water demand for a typical residential unit. Water demands could be reduced by implementing water conserving landscaping practices and/or xeriscaping. However, water conserving landscape practices should be balanced with the need for disposal of reclaimed water.