

***North Valleys Water  
Supply Comparison  
Executive Summary***

**Prepared for**  
**Washoe County**  
**Regional Water Planning Commission**

by

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# **NORTH VALLEYS WATER SUPPLY COMPARISON**

## **1.0 Introduction**

ECO:LOGIC has been retained by the Washoe County Regional Water Planning Commission (RWPC) to perform 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 current scope of work includes three major components: 1) develop facility requirements, opinions of probable cost and preliminary implementation schedules for two water importation projects to supply the Stead / Lemmon Valley area, including the northern Vidler Water Company / Intermountain Pipeline groundwater supply and the southern TMWA Truckee River based supply, 2) develop facility requirements and an opinion of probable cost to provide additional water supplies to support the build-out of potential land uses in the Cold Springs Valley, and 3) determine the operational and distribution system improvements necessary to maximize the use of existing facilities and water resources in the Stead / Lemmon Valley area until such time as an import supply can be constructed.

## **2.0 Water Importation Project Components**

The importation projects considered are 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). Figures 1 and 2 summarize the major facilities and approximate alignment for each of the options evaluated.

### **2.1 Build-out Water Demands**

The demand projections in this report represent a “snap-shot in time”, and are based predominantly on current planned land uses. The demand projections are used as a planning tool to size facilities and estimate costs in order to compare project alternatives. The demand projections are not intended to define water resource availability or to allocate water resources to specific parcels in the North Valleys.

The projected build-out water demand for the Stead / Lemmon Valley area is 12,923 acre-feet (AF), including 1,000 AF for supplemental water resource needs. With estimated long-term groundwater withdrawals of 2,189 AF based on present 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.

**FIGURE 1**

**FIGURE 2**

The build-out water demand for Cold Springs is estimated at 4,220 AF. The methodology used to develop water demands for Cold Springs is consistent with that used for the Stead / Lemmon Valley area, with the exception that additional demands were added in areas that have the potential to undergo a land use plan amendment (per input from Washoe County Community Development) with subsequent development to higher density uses. It is assumed that future groundwater withdrawals are limited to the current annual withdrawal of 1,020 AF. Table 1 summarizes the estimated build-out demand for each area.

**Table 1 – Build-out Demand Summary**

	Stead / Lemmon Valley (acre-feet)*	Cold Springs (acre-feet)
Existing Demand	4,000	1,020
Additional Future Demand	8,923	3,200
Total Demand	12,923	4,220
Groundwater Supply	2,189	1,020**
Total Import Supply Required	10,734	3,200

\* Existing surface water rights = 4,347 acre-feet, existing groundwater rights = 2,189 acre-feet

\*\* Cold Springs has approximately 2,403 acre-feet of groundwater rights.

## 2.2 Import Supply Development and Delivery Assumptions

The water importation supply main, either from the north or the south, is planned to supply a constant flow of water throughout the year to meet build-out demands. This method of operation will minimize the size, quantity and cost of facilities necessary to meet annual demands. Planning for a constant supply will require seasonal storage to balance demands that are many times less in the winter than in the summer. Without seasonal storage, the import supply main and appurtenant infrastructure would require expensive peaking capacity that would not be used during most of the year. According to existing information and discussions with TMWA and Washoe County personnel, seasonal storage can be provided in the form of active groundwater recharge during low demand periods in the Stead / Lemmon Valley region.

The import projects are planned to provide a year round continuous flow rate of 6,800 gallons per minute (9.8 million gallons per day) at build-out without Cold Springs demands, or 8,800 gallons per minute (12.7 million gallons per day) at build-out with Cold Springs demands.

## 2.3 Water Supply Scenarios

Currently, two entities are interested in participating in an importation project from the north. Vidler Water Company owns groundwater rights in and around Fish Springs Ranch, approximately 30 miles north of the Stead Airport. Intermountain Pipeline has groundwater resources along a similar pipeline alignment as Vidler in the vicinity of Dry Valley, Newcomb Lake, Bedell Flat and Warm Springs. A total of three importation

supply scenarios from the north were developed. Scenarios 1 and 2 were developed to evaluate variations in facilities and costs associated with maximizing the use of either Vidler or Intermountain Pipeline groundwater resources to meet build-out demands in the Stead / Lemmon Valley area only. Scenario 4 was developed to determine required facilities and costs to supply both the Stead / Lemmon Valley and Cold Springs areas at build-out, and involves the full utilization of all potential importation supplies from both Vidler and Intermountain Pipeline.

Scenarios 3 and 5 were developed for the Stead Main supply option. Scenario 3 assumes that the import supply facility will be designed to meet only the Stead / Lemmon Valley area build-out demands. Scenario 5 includes build-out demands associated with the Cold Springs area. Table 2 summarizes the water supplies provided from each source.

**Table 2 – Water Supply Components**

	<b>Scenario 1 – Maximize Intermountain Pipeline, without Cold Springs</b>	<b>Scenario 2 – Maximize Vidler, without Cold Springs</b>	<b>Scenario 3 – Stead Main, without Cold Springs</b>	<b>Scenario 4 – Use All Import Supplies, with Cold Springs</b>	<b>Scenario 5 – Stead Main, with Cold Springs</b>
Total Import Supply Required	10,734 AF	10,734 AF	10,734 AF	13,934 AF	13,934 AF
<b>Groundwater Supplies</b>					
<u>Vidler Supply</u>	5,234 AF	8,000 AF		8,434 AF	
<u>Intermountain Pipeline</u> Dry Valley Bedell Flat Newcomb Lake Warm Springs	3,500 AF 650 AF 350 AF 1,000 AF	2,734 AF		3,500 AF 650 AF 350 AF 1,000 AF	
<b>Truckee River Based Supplies</b>					
Stead Main			10,734 AF		13,934 AF

### **3.0 Facilities and Costs – Stead / Lemmon Valley Water Supply**

Three water supply scenarios have been developed that will provide the build-out water needs for the Stead / Lemmon Valley area. Two of the scenarios are variations of the Vidler Water Company / Intermountain Pipeline groundwater sources, the third being replacement of TMWA’s Stead Main. Issues such as water distribution system improvements and estimated cost of water rights are discussed below, followed by the total estimated costs for each of the water supply scenarios.

### 3.1 Build-out Water Distribution System Requirements

Table 3 summarizes the differences in water distribution system requirements associated with a northern importation supply versus replacement of the Stead Main.

<b>Table 3 – Build-out Water Distribution System Summary</b>		
	<b>Stead Main Supply</b>	<b>North Supply</b>
Tanks	\$12,365,000	\$12,365,000
Wells	\$2,735,000	\$2,735,000
Pump Stations	\$2,312,000	\$1,660,500
Distribution and Transmission	\$5,206,500	\$5,894,400
Contingency (20%)	\$4,523,700	\$4,531,000
<b>Total Cost</b>	<b>\$27,142,000</b>	<b>\$27,186,000</b>

Although there are significant differences between the two build-out distribution systems, the probable cost for the major backbone facilities is essentially equal. Therefore, for comparing the water supply scenarios for the Stead / Lemmon Valley area, distribution system improvements and costs are not considered further. However, Washoe County and TMWA must consider the cost of the necessary distribution system improvements when establishing “connection fees” for the area.

### 3.2 Water Rights

The cost of water rights will significantly affect the overall cost of either importation project. The values shown are estimates of current water rights costs provided by TMWA, Vidler Water Company and Intermountain Pipeline. The TMWA value includes costs for water rights, return flow requirements, the meter retrofit fund and the Newlands fee.

The cost of water rights is a preliminary estimate used to compare the different projects. Water rights costs for the northern importation project will ultimately depend upon total project costs, financing plans, project timing, dedicated Truckee River rights in Stead that are displaced by the new import supply, contracted water supplies at startup, wholesale rates, etc. Water rights costs for the Stead Main Replacement will depend upon project timing, water rights availability and current market price. Currently, TMWA estimates that water rights costs from the Truckee River basin may continue to increase at a rate of 4% per year.

Due to these variables, which cannot be accurately quantified at this time, water rights costs are presented based on their current value for this evaluation. Due consideration should be given to the future cost of water rights when comparing the water supply options.

### 3.3 Water Supply Scenarios and Estimated Costs

Table 4 summarizes the key facility design parameters and probable costs for each water supply scenario.

<b>Table 4 – Opinion of Probable Cost for Supply Scenarios 1 Through 3</b>			
	Scenario 1 - Maximize Intermountain, w/o Cold Springs	Scenario 2 - Maximize Vidler, w/o Cold Springs	Scenario 3 - Stead Main w/o Cold Springs
Annual Import Volume (AF)	10,734	10,734	10,734
<b>Import Facility Costs</b>			
Vidler Water Company			
Fish Springs Well Field	\$3,110,000	\$4,880,000	\$0
Fish Springs Booster	\$3,480,000	\$4,080,000	\$0
Power Production	\$5,070,000	\$5,850,000	\$0
Sub-Total =	\$11,660,000	\$14,810,000	\$0
Intermountain Pipeline			
Wells	\$6,850,000	\$2,720,000	\$0
Sub-Total =	\$6,850,000	\$2,720,000	\$0
North Transmission Pipeline	\$20,400,000	\$19,080,000	\$0
Stead Main & Pump Station	\$0	\$0	\$10,880,000
Terminal Storage	\$1,200,000	\$1,200,000	\$1,200,000
TMWA Treatment Capacity Cost	\$0	\$0	\$9,470,000
EIS	\$1,000,000	\$1,000,000	\$0
Environmental Mitigation	\$2,000,000	\$1,750,000	\$0
Construction Sub-Total =	\$43,110,000	\$40,560,000	\$21,550,000
<b>Other Costs</b>			
Permit/Engr./Const. Mgmt.	\$5,900,000	\$5,510,000	\$2,530,000
Contingency	\$8,020,000	\$7,560,000	\$2,420,000
Subtotal =	\$13,920,000	\$13,070,000	\$4,950,000
<b>Total =</b>	<b>\$57,030,000</b>	<b>\$53,630,000</b>	<b>\$26,500,000</b>
<b>Capital Cost per Acre-Foot of New Demand</b>			
North Valleys	\$5,140	\$4,650	\$3,000
<b>Water Rights Cost (\$/AF)</b>			
	\$4,000	\$4,000	\$7,860
<b>Total Cost per Acre-Foot</b>			
North Valleys	\$9,140	\$8,650	\$10,860

## 4.0 Facilities and Costs – Cold Springs Water Supply

Facility requirements and estimated costs have been developed for two water supply options to provide the projected build-out water needs for the Stead / Lemmon Valley area, and provide Cold Springs with an additional water supply of 3,200 acre-feet. The proposed northern importation and the Stead Main replacement projects have been modified to incorporate an additional 2,000 gallon per minute water supply capacity.

### 4.1 Stead / Lemmon Valley Distribution System Modifications

Additional distribution system improvements and estimated costs to deliver water from Stead to Cold Springs have been developed. Table 5 summarizes required improvements and probable costs for modifications to provide Cold Springs with a continuous supply of 2,000 GPM. Costs for “upsizing” or “increasing capacity” are based upon the incremental cost of oversizing planned future facilities. Depending on timing, Cold Springs may need to construct these facilities independently, at a greater initial cost, and be reimbursed as future development occurs in Stead / Lemmon Valley.

<b>Table 5 – Cold Springs Distribution System Improvements</b>		
	<b>Stead Main Supply</b>	<b>North Supply</b>
Transmission Main to Cold Springs	\$2,080,000	\$1,585,000
North Valleys Distribution System Modifications	\$1,010,000	\$505,000
<b>Total =</b>	<b>\$3,090,000</b>	<b>\$2,090,000</b>

## 4.2 Water Supply Scenarios and Estimated Costs

Table 6 summarizes the key facility design parameters and probable costs for each water supply scenario.

<b>Table 6 – Opinion of Probable Cost for Supply Scenarios 4 and 5</b>		
	Scenario 4 - Use All North Import Supplies, w/ Cold Springs	Scenario 5 - Stead Main w/ Cold Springs
Annual Import Volume (AF)	13,934	13,934
<b>Import Facility Costs</b>		
Vidler Water Company		
Fish Springs Well Field	\$4,880,000	\$0
Fish Springs Booster	\$4,110,000	\$0
Power Production	\$5,850,000	\$0
Sub-Total =	\$14,840,000	\$0
Intermountain Pipeline		
Wells	\$6,850,000	\$0
Sub-Total =	\$6,850,000	\$0
North Transmission Pipeline	\$22,250,000	\$0
Stead Main & Pump Station	\$0	\$11,830,000
Terminal Storage	\$1,200,000	\$1,200,000
Dist. System Improvements	\$2,090,000	\$3,090,000
TMWA Treatment Capacity Cost	\$0	\$13,880,000
EIS	\$1,000,000	\$0
Environmental Mitigation	\$2,000,000	\$0
Construction Sub-Total =	\$50,230,000	\$30,000,000
<b>Other Costs</b>		
Permit/Engr./Const. Mgmt.	\$6,650,000	\$2,710,000
Contingency	\$9,860,000	\$3,220,000
Subtotal =	\$16,510,000	\$5,930,000
<b>Total =</b>	<b>\$66,740,000</b>	<b>\$35,930,000</b>
<b>Capital Cost per Acre-Foot of New Demand</b>		
North Valleys	\$4,140	\$2,780
Cold Springs	\$5,200	\$3,720
<b>Water Rights Cost (\$/AF)</b>		
	\$4,000	\$7,860
<b>Total Cost per Acre-Foot</b>		
North Valleys	\$8,140	\$10,640
Cold Springs	\$9,200	\$11,580

## 5.0 Regional Issues

From a long-term, water supply perspective, development of a northern importation project to serve the Stead / Lemmon Valley area provides greater benefits for the region compared to the Stead Main alternative. Table 7 summarizes identified benefits and drawbacks associated with each importation project.

<b>Table 7 – REGIONAL BENEFIT COMPARISON</b>	
<b><i>North Importation Project (Intermountain Pipeline and Vidler)</i></b>	<b><i>Stead Main Replacement</i></b>
<b><i>Benefits</i></b>	
Total cost of water supply improvements and water rights is less than the Stead Main Replacement project	Lower energy costs
Private funding is proposed to construct the improvements, limiting public risk	Proposed alignment follows established route, easier to permit and construct
No increase in the exportation of water from the Truckee Meadows Basin associated with growth in the Stead / Lemmon Valley area	Easy access for maintenance and repairs
Potential displacement and return of up to 4,300 acre-feet of Truckee River water rights to the Truckee Meadows basin, providing short-term stability to the water rights market	New main could supplement the N. Virginia pump zone
Potential increase of 1,500 acre-feet of return flow to the river	Avg. day demand can be met with local wells, meeting emergency supply requirements
Potential savings of \$4 million to existing customers by not replacing the Stead Main	
Defers construction of 10 MGD additional TMWA treatment / peaking capacity	
Diversifies the regional water supply and extends the Truckee River supply	
No arsenic treatment is required based on available water quality data	
Avg. day demand can be met with local wells, meeting emergency supply requirements	
Existing Stead Main could be used to defer N. Virginia pump zone improvements	
Willing sellers of groundwater rights	
<b><i>Drawbacks</i></b>	
Higher construction costs	Continues the current practice of exporting water from the Truckee River Basin
Higher pumping / energy costs	Substantially increases Truckee River water exportation from the basin in the future
Remote location and limited access during winter months	Use of Truckee River water rights requires dedication of additional return flow rights
Testing / monitoring required to verify long-term yield of groundwater sources	Truckee River water rights could significantly increase in price in the future
Permitting will be more complex and time consuming	Does not allow for diversification of water supplies away from the Truckee River
Brings more Total Dissolved Solids into the basin	Requires TMWA to construct additional water treatment plant and well peaking capacity
	Potential lack of willing sellers of Truckee River water rights

## 6.0 Permitting Requirements / Timing for Construction

The permitting process for the north and south importation projects are significantly different. The North Importation Project will require the development, review and approval of an Environmental Impact Statement (EIS). In addition, it will require a Washoe County Special Use Permit, and review and approval by the RWPC, the Board of County Commissioners and the Truckee Meadows Regional Planning Commission. It is estimated that if the EIS process is initiated by April 2003, construction of the project could be completed by May 2007.

The permitting process for the Stead Main Importation Project is anticipated to be much shorter than the northern option. The new pipeline is proposed to parallel the existing Stead Main and be located in existing street right-of-ways. In addition, the project is located completely within the City of Reno. Major permitting requirements include a Special Use Permit from the City of Reno and required City and NDOT Encroachment Permits. Approval by the RWPC and the Truckee Meadows Regional Planning Commission will also likely be required. It is estimated that if the permitting process is initiated by January 2005, construction of the project could be completed by May 2007.

**Preliminary Project Timeline**

ID	Task Name	Calendar Days	2003			2004			2005			2006			2007		
			Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	
1	STEAD MAIN IMPORTATION PROJECT	840															
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2	PRELIMINARY DESIGN REPORT	126															
9	SPECIAL USE PERMITTING	147															
14	PROJECT DESIGN	308															
40	PROJECT CONSTRUCTION	238															
59	PROJECT STARTUP	0															◆ 5/1
2																	
3	NORTH IMPORTATION PROJECT	1460															
4	ENVIRONMENTAL IMPACT STATEMENT	598															
21	PRELIMINARY ALTERNATIVES ANALYSIS	175															
30	PRELIMINARY DESIGN REPORT	172															
39	SPECIAL USE PERMITTING	241															
46	PROJECT DESIGN	300															
90	PROJECT CONSTRUCTION	413															
127	PROJECT STARTUP	0															◆ 5/1

The proposed timelines allow for either project to begin operation in May of 2007. Based on the projected demands and the short-term water supply plan for the Stead / Lemmon Valley area, summarized below, additional import supplies may not be required until 2008. Therefore, the proposed timeline contains a contingency of about 1 year for any unforeseen permitting / construction delays in either proposed import supply project.

Several decision points are available throughout the project implementation timeframe. Assuming the northern importation project moves forward and proceeds with necessary permitting and preliminary design requirements, Washoe County and TMWA have the ability to monitor the progress of the project. If key milestones and/or approvals established for the project are not satisfied in a timely manner, TMWA could proceed with permitting and design of the Stead Main on a parallel track, as warranted.

## **7.0 Short-Term Water Supply Plan**

The anticipated timeframe to implement an importation project of this magnitude is at least several years. However, there is an immediate need to provide additional water supplies to the North Valleys while an importation project is constructed.

### **7.1 Concept**

Several studies have been completed since 1998 indicating the benefits of integrated operation of the TMWA and Washoe County water systems in the Stead / Lemmon Valley areas. Integrated water system operation alone does not provide sufficient capacity to meet projected build-out water needs. However, it does provide a short-term water supply while a long-term water importation project is implemented.

In concept, the TMWA and Washoe County water systems would be connected at key locations to allow the transfer or exchange of water between systems at different times of the year. During winter, low demand periods, TMWA would supply water for groundwater recharge through its existing Stead Main and the North Virginia Pump Zone. This water would be used to supply demands in both systems, allowing the municipal wells to rest, with a portion of the supply used for active recharge of TMWA and/or Washoe County wells. TMWA currently follows this operating practice within its own system, having recharged approximately 390 acre-feet in 2001. During the high demand periods when demand exceeds the present Stead Main supply capacity, groundwater production wells would be used to help meet peak demands. The water pumped from the wells would be a combination of recovered recharge water in addition to TMWA's and Washoe County's existing groundwater rights.

Based on this integrated operation, approximately 1,500 AFA of additional water demands can be supplied using this aquifer storage and recovery program. TMWA and Washoe County presented this short-term water supply plan to the State Engineer, and received his overall endorsement of the concept. Depending on the rate of growth, these relatively minor improvements will allow for growth to occur through 2007, the estimated date for completion of the importation project.

The essential integration improvements have a probable cost of \$2,867,000. Additional facilities may be required depending upon the location of new development in the short-term. These facilities are included in the build-out water distribution costs, but will be required sooner than otherwise needed to enable up to 1,500 acre-feet of new demand in the Stead/Lemmon Valley area.

## **8.0 Conclusions**

This document provides the Regional Water Planning Commission, TMWA and Washoe County current information that is sufficient to compare the relative merits and probable cost of implementation of a new water supply project for the North Valleys, including Cold Springs.

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. The total cost per acre-foot to supply water to Cold Springs is higher than for Stead / Lemmon Valley. This is due to the additional facilities necessary to convey water from Stead to Cold Springs. Table 8 summarizes the key elements for each of the five water supply scenarios evaluated.

<b>Table 8 - Opinion of Probable Costs – North Valleys Water Supply Comparison</b>					
	Scenario 1 – Maximize Intermountain Pipeline, w/o Cold Springs	Scenario 2 – Maximize Vidler, w/o Cold Springs	Scenario 3 – Stead Main, w/o Cold Springs	Scenario 4 – Use all Import Supplies w/Cold Springs	Scenario 5 – Stead Main w/Cold Springs
<b>Annual Import Volume (AF)</b>	10,734	10,734	10,734	13,934	13,934
<b>Import Facility Costs</b>	\$57,030,000	\$53,630,000	\$26,500,000	\$66,740,000	\$35,930,000
<b>Water Rights Cost (\$/AF)</b>	\$4,000	\$4,000	\$7,860	\$4,000	\$7,860
<b>Capital Cost per Acre-Foot of New Demand</b>					
North Valleys	\$5,140	\$4,650	\$3,000	\$4,140	\$2,780
Cold Springs	n/a	n/a	n/a	\$5,200	\$3,720
<b>Total Cost per Acre-Foot</b>					
North Valleys	\$9,140	\$8,650	\$10,860	\$8,140	\$10,640
Cold Springs	n/a	n/a	n/a	\$9,200	\$11,580

Implementation of the northern importation project is substantially more complex than the Stead Main. Environmental and right-of-way approvals, permitting, design and construction are much more time consuming than that required for replacing the Stead Main. However, a short-term water supply program using aquifer storage and recovery could be implemented to allow a pre-determined amount of additional development to proceed in Stead / Lemmon Valley through 2007. Washoe County and TMWA would have the ability to monitor the timely progress of a northern importation project, and could proceed with permitting and design of the Stead Main on a parallel track, if warranted.

## 9.0 Additional Implementation Issues

Other issues must be taken into consideration that were not part of this evaluation. These issues include financing options, rate considerations, phasing of facilities, operation and maintenance costs, wastewater disposal options, and environmental / permitting issues. For example, actual demands at the time of project implementation may allow for phasing of facilities such that import supplies are brought into the North

Valleys incrementally. Furthermore, initial evaluation of the operating cost to import water into the North Valleys indicates that pumping costs associated with the Northern Importation Project may be greater than the Stead Main Facility. However, the higher pumping costs may be offset by TMWA's water treatment costs.

Consideration must also be given to wastewater treatment and disposal issues. Recent facility planning for the Stead / Lemmon Valley area has identified a potential long-term imbalance between water supply needs and wastewater disposal capacity. A potential wastewater flow of 7.3 MGD, or 8,200 AFA, may result from development of the planned land uses. This compares to potential reuse / disposal sites that have an estimated disposal capability of 5,800 AFA. A thorough feasibility-level evaluation of several effluent disposal options is being undertaken. The purpose of the evaluation is to quantify and compare the relative feasibility and costs of several disposal alternatives, and to identify the most feasible option(s) and disposal capacity relative to current water supply projections. The issue is that if there is a plan to bring in additional water supplies for the North Valleys, regardless of the source, there must also be a consistent plan for the treatment and disposal of the effluent.

These issues and others should be investigated in greater detail as part of an overall plan to implement a water supply project for the North Valleys.