RECLAIMED WATER USE STUDY

Prepared for:
Spokane County
Division of Utilities
1026 West Broadway Avenue
Spokane, WA 99260

FINAL REPORT
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Introduction

Spokane County Utilities provides wastewater management for residential, commercial and industrial customers in the Spokane Valley and North Spokane service areas through an inter-local agreement with the City of Spokane. Currently, wastewater generated in the County is sent, via a sewer network, to the Riverside Park Water Reclamation Facility (RPWRF), which is operated by the City of Spokane. A 1980 inter-local agreement established the basis for the City to treat up to 10 million gallons per day of County generated wastewater. The County expects to exceed that capacity by the end of 2013. Due to physical, environmental and implementation constraints, additional capacity at the RPWRF may not be available for use by the County, or may be insufficient for the County's long-term needs.

The County's sewer service area is projected to experience significant growth over the next twenty years to meet growth management requirements. As a result of a septic tank elimination program and the projected growth, the population served by the County sewer system may double by 2030 from 80,000 to over 167,000 people. Both factors will sharply increase the quantity of wastewater that must be responsibly managed.

Given this situation, the County has conducted a wastewater facilities planning process to develop long-term wastewater management strategies that will provide reliable service, protect the environment and be economical to local ratepayers.

2006 Wastewater Facilities Plan Amendment

The *2006 Wastewater Facilities Plan Amendment* is focused on updating the previously published and conditionally approved *Wastewater Facilities Plan* and the *Facilities Plan Amendment*. The 2006 Wastewater Facilities Plan Amendment updates the recommendations of the original *Wastewater Facilities Plan* and the *Final Wastewater Facilities Plan Amendment* (2003) to meet the expected requirements of the Washington State Department of Ecology's (Ecology's) Dissolved Oxygen Total Maximum Daily Load (TMDL) which is expected to be finalized in late 2009 or early 2010. The June 30, 2006 *Foundational Concepts for the Spokane River TMDL Managed Implementation Plan* (a.k.a., *Foundational Concepts*) provides Spokane County a wasteload allocation and identifies the effluent phosphorus requirements for a separate Spokane County discharge to the Spokane River. This is allowed through a combination of treatment technology and other offset actions to achieve compliance with the seasonal average 10 µg/l phosphorus target. The *Foundational Concepts* document requires the County to develop a comprehensive program for reclaimed water production, reuse, and aquifer recharge of effluent. The County's State Revolving Fund loan for low interest wastewater infrastructure financing also requires the County to evaluate reclamation alternatives. The *Foundational Concepts* document may be revised or replaced when the TMDL study is completed.

This Reclaimed Water Use Study (Study) identifies reasonable opportunities to use reclaimed water and/or recharge the aquifer rather than directly discharge reclaimed water from the future Spokane County Regional Water Reclamation Facility (SCRWRF) to the River, particularly from April to October. It also estimates the phosphorus waste load reduction to the river resulting from reuse. The SCRWRF will be located within the City of Spokane at the location of the old stockyards site (See Figure 1), and is scheduled to produce Class A reclaimed water by 2012. The characteristics of the classes of reclaimed water as defined by the State of Washington are described in Table 1 on page 6.

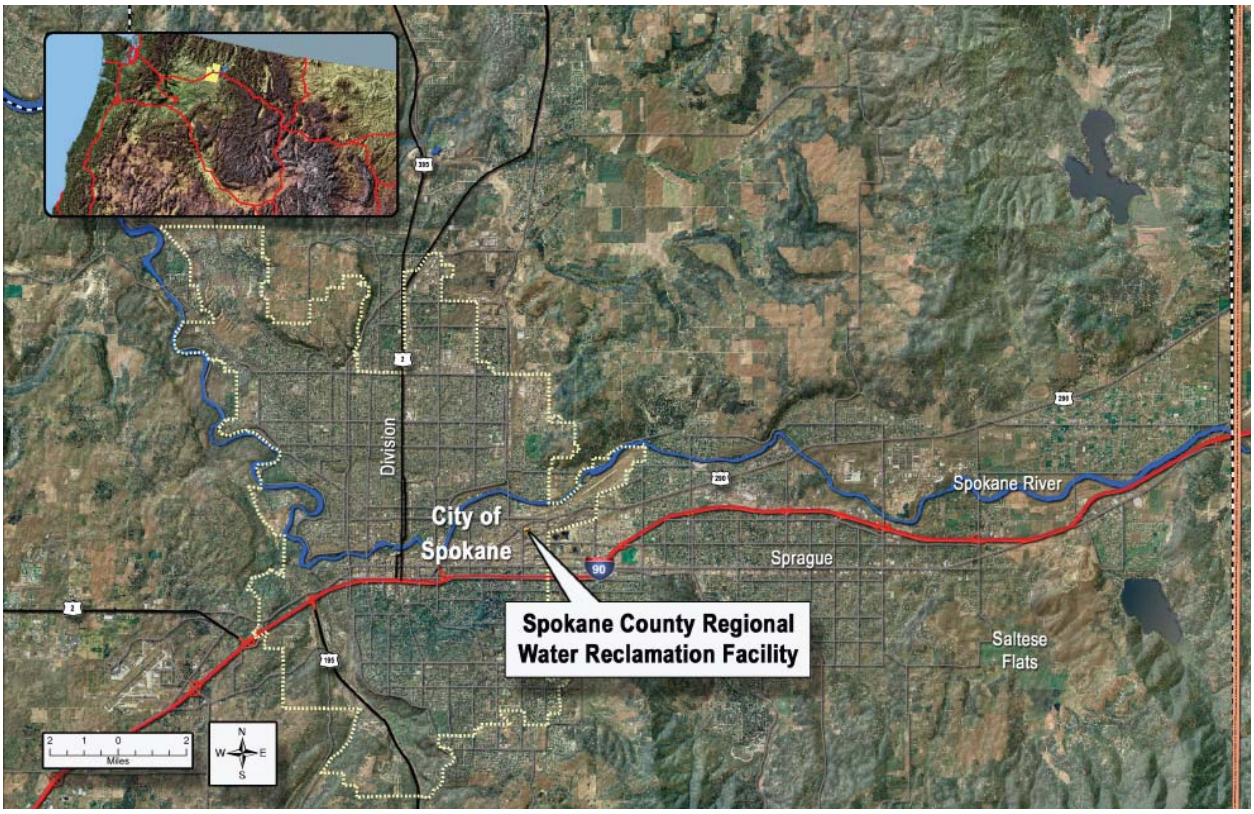

Figure 1. Future Site of the Spokane County Regional Water Reclamation Facility

This Reclaimed Water Use Study is contingent upon State approval of the update to the County's *2006 Wastewater Facilities Plan Amendment*. Spokane County received conditional approval of the *2006 Wastewater Facilities Plan Amendment* from the Ecology on March 14, 2008 pending finalization of the Spokane River Dissolved Oxygen TMDL. State agencies are expected to support the implementation of a reclaimed water program by Spokane County. The Reclaimed Water Act adopted by the Washington State Legislature in 2007 calls for water reuse programs to focus on:

- Areas that experience diminished streamflows or aquifer levels;

- Regional areas that the Governor has identified as a high priority for investments in improved water quality and quantity, including the Spokane River and other specific areas in the State; and
- Areas where projected water needs, including those for in-stream flows, exceed available supplies.

In January 2009, the Board of County Commissioners of Spokane County (BoCC) resolved to pursue the following alternatives to discharge for the SCRWRF:

1. "Aquifer Recharge. Take all necessary steps to complete the feasibility study and present the feasibility study to the Ecology and Health. Subsequent to receipt of their respective reviews, pursue other steps in conjunction with this option.

2. Industrial Reclamation. Initiate discussions with Inland Paper Company. If there is mutual interest, draft appropriate agreement and seek review/approval from the Ecology.

3. Saltese Flats. Take appropriate steps to pursue negotiations with appropriate property owners to acquire the necessary property and to pursue a wetlands reclamation project."

The BoCC's resolution is contained within Appendix A.

The purpose of this Reclaimed Water Use Study is to prepare a technical report that identifies the potential demand for reclaimed water, customers and their needs, potential program impediments, costs, conveyance routes, and funding resources for evaluating, planning, and constructing infrastructure reclaimed water system. If determined by the County to be feasible, a water reuse program may provide the County with an alternative to seasonal surface water discharge to the Spokane River, and allow the County to accommodate increases in flows to the reclamation facility while complying with TMDL limitations on the Spokane River.

The Study employs a systematic planning approach that builds upon the planning phase model for reuse programs developed by the Environmental Protection Agency (EPA) as published in September 2004 (EPA/625/R-04/108). The planning model consists of three key steps. The three-phase process used in development of reclaimed water use plan is as follows:

<u>Step 1</u> – Preliminary Investigation

- Much of this preliminary investigation analysis was completed in the Wastewater Facilities Plan evaluation of reuse opportunities, which can be used as the basis for furthering the development of the reuse plan.

- *Foundational Concepts* states that the County will "develop a comprehensive program for reclaimed water production, reuse and aquifer recharge of effluent." In accordance with this statement, the County is proceeding with Steps 2 and 3.
- Meetings were held with the Ecology and Health to discuss regulatory issues or constraints related to aquifer recharge.
- Groundwater recharge concepts were discussed with the Spokane Aquifer Joint Board.

Step 2 – Screen Potential Markets/Alternatives

- Potential markets and alternatives were initially described in the Wastewater Facilities Plan and Amendments.
- Meetings were conducted with managers of the Painted Hills Golf Course, the Spokane County Fair and Expo Center, and Inland Empire Paper to discuss reclaimed water use opportunities. Spokane County also discussed reuse with City of Spokane golf course and parks management. Comments about the receptivity of the concept of water reuse were noted in preparation for a future public information program.
- Potential reuse systems suitable for the type of customers that exist were identified and associated costs were developed.
- Alternative facility plans were conceptualized and evaluated in terms of their individual economic implications.

Step 3 – Develop Detailed Reuse Strategy

- Potential customers and customer classes were evaluated for reclaimed water service opportunity based upon relative monetary impacts. Support the development of reclaimed water use policy requirements and a potential reclaimed water use plan.
- The potential for water rights impairment were evaluated.

Water reclamation and reuse represents a potential benefit for the region's water supply because it is continuously available, relatively unaffected by climatic conditions, and its implementation improves the quality of an important surface water resource. Aquifer recharge with highly treated reclaimed water has the potential to reliably augment the regional water supply during periods of low surface water flows.

With the constantly increasing demand for water in Spokane County and the low probability of acquiring additional surface or groundwater supplies, it is necessary that water reclamation and aquifer recharge be considered as part of a comprehensive water resource management plan. Aquifer recharge, which is one such technique, is a water management strategy that supplements the natural water supply in subsurface aquifers. Groundwater is no longer considered an endless resource and over-drafting

an aquifer can have detrimental impacts. The purpose of an aquifer recharge program for Spokane County would be to augment surrounding groundwater levels with a highly reliable, high quality source of replenishment while providing a cost-effective use of reclaimed water. The general process would call for reclaimed water to augment or bolster the Spokane Aquifer system with highly treated Class A reclaimed water.

The Ecology is preparing a dissolved oxygen Total Maximum Daily Load (TMDL) for the Spokane River. Depending on the final requirements of the TMDL, Spokane County may need to reduce or eliminate the quantity of water delivered to the Spokane River during the summer permit season. Given this situation, the County has elected to conduct a Reclaimed Water Use Study, including a preliminary evaluation of aquifer recharge with reclaimed water, in a system that has the potential to augment the region's water supply.

This report presents the findings of a first-stage comprehensive review of the feasibility of using reclaimed water to supplement water supplies and offset water demand. The remainder of this report will summarize a concept for the use of reclaimed water in Spokane County in terms of facility requirements, configuration and capital and operating costs.

This technical report has been organized into the following sections:

1. **Conceptual Approach to Reclaimed Water Use.** Presents a generalized description of potential uses of reclaimed water.
2. **Reclaimed Water Use Opportunities.** Provides an evaluation of alternative reuse opportunities.
3. **Assessment of Reclaimed Water Use Potential.** Presents an assessment of the reclaimed water use opportunities in and around the Spokane County service area.
4. **Implementation of Reclaimed Water Use.** Presents a concept for the implementation of reclaimed water use by Spokane County including potential water rights impairment and utility management considerations for implementing a reclaimed water use program.

Conceptual Approach to Reclaimed Water Use

Classes of Reclaimed Water

In 1992, the Washington State Legislature passed the Reclaimed Water Act to provide a regulatory structure to more wisely use the state's water supply. As part of this act, the legislature directed the Ecology and Health to jointly administer a set of standards for reclaimed water use. One of the specific goals recognized by the Ecology and Health is that wastewater that has been adequately and reliably treated to a high quality is an

asset and can be reused in a wide variety of ways. In 2007, the Legislature updated and re-enacted the Reclaimed Water Act.

The Water Reclamation and Reuse Standards establish four classes of reclaimed water with respect to both treatment methodology and reclaimed water quality (see Table 1).

Table 1. Characteristics of the Four Classes of Reclaimed Water

Class	Characteristics
A	▪ Class A reclaimed water will at all times be oxidized, coagulated, filtered, and disinfected wastewater. State water reclamation and reuse standards call for Class A reclamation water to be filtered to a turbidity level which does not exceed an average operating turbidity of 2 nephelometric turbidity units (NTU), determined monthly, and which does not exceed 5 NTU at any time. Filtration can be achieved by passing oxidized wastewater through natural undisturbed soils or through filter media such as sand or anthracite. ▪ Class A reclaimed water must be disinfected such that the median number of total coliform organisms in the wastewater after disinfection does not exceed 2.2 per 100 milliliters, as determined from the bacteriological results of the last seven days for which analyses have been completed, and such that the number of total coliform organisms does not exceed 23 per 100 milliliters in any sample. ▪ Class A reclaimed water is currently the only reclaimed water class for which the Ecology requires coagulation and filtration. Further, the disinfection requirements for Class A reclaimed water are more stringent than for Class C or D reclaimed water (the disinfection requirements for Class B reclaimed water are identical to those for Class A). Class A reclaimed water must be used where the potential for public exposure to reclaimed water is high.
B	▪ Class B reclaimed water will at all times be oxidized and disinfected wastewater. The wastewater will be considered adequately disinfected if the median number of total coliform organisms in the wastewater after disinfection does not exceed 2.2 per 100 milliliters, as determined from the bacteriological results of the last seven days for which analyses have been completed, and the number of total coliform organisms does not exceed 23 per 100 milliliters in any sample.
C	▪ Class C reclaimed water will at all times be oxidized and disinfected wastewater. The wastewater will be considered adequately disinfected if the median number of total coliform organisms in the wastewater after disinfection does not exceed 23 per 100 milliliters, as determined from the bacteriological results of the last seven days for which analyses have been completed, and the number of total coliform organisms does not exceed 240 per 100 milliliters in any sample.
D	▪ Class D reclaimed water will at all times be oxidized and disinfected wastewater. The wastewater will be considered adequately disinfected if the median number of total coliform organisms in the wastewater after disinfection does not exceed 240 per 100 milliliters, as determined from the bacteriological results of the last seven days for which analyses have been completed.

Allowable Uses of Reclaimed Water

Reclaimed water generation and use are authorized by reclaimed water permits issued jointly by the Ecology and Health. Reclaimed water use applications in the State are addressed in the Water Reclamation and Reuse Standards, established in 1997 under RCW 90.46 (Reclaimed Water). These reclaimed water use standards are not rules, but are used as guidance for best management practices and development of reclaimed water permit conditions. New reclaimed water rules and guidelines are currently in development by the Ecology, Health, and interested stakeholders. The rules and guidelines are scheduled for adoption in 2010.

The State of Washington Water Reclamation and Reuse Standards allow for many uses of reclaimed water, including irrigation, impoundments, groundwater recharge, commercial uses, and industrial uses. Generally, applications with potentially high human contact require the use of Class A reclaimed water; whereas applications with low likelihood of human contact can utilize Class D reclaimed water. Under no circumstances may reclaimed water be used for food preparation or be incorporated into food or drink for human consumption. Table 2 provides more information regarding types of use and classes of reclaimed water allowed by the Ecology and Health.

Table 2. Allowable Uses of Reclaimed Water and Required Water Quality

	Type of Reclaimed Water Allowed			
Use	**Class A**	**Class B**	**Class C**	**Class D**
Irrigation of Nonfood Crops				
▪ Trees and Fodder, Fiber, and Seed Crops	YES	YES	YES	YES
▪ Sod, Ornamental Plants for Commercial Use, and Pasture to Which Milking Cows or Goats Have Access	YES	YES	YES	NO
Irrigation of Food Crops				
Spray Irrigation				
▪ All Food Crops	YES	NO	NO	NO
▪ Food Crops Which Undergo Physical or Chemical Processing Sufficient to Destroy All Pathogenic Agents	YES	YES	YES	YES
Surface Irrigation				
▪ Food Crops Where There is No Reclaimed Water Contact With Edible Portion of Crop	YES	YES	NO	NO
▪ Root Crops	YES	NO	NO	NO
▪ Orchards and Vineyards	YES	YES	YES	YES
▪ Food Crops Which Undergo Physical or Chemical Processing Sufficient to Destroy All Pathogenic Agents	YES	YES	YES	YES
Landscape Irrigation				
▪ Restricted Access Areas (e.g., Cemeteries and Freeway Landscapes)	YES	YES	YES	NO
▪ Open Access Areas (e.g., Golf Courses, Parks, Playgrounds, School Yards and Residential Landscapes)	YES	NO	NO	NO
Impoundments				
▪ Landscape Impoundments	YES	YES	YES	NO
▪ Restricted Recreational Impoundments	YES	YES	NO	NO
▪ Non-restricted Recreational Impoundments	YES	NO	NO	NO
Fish Hatchery Basins	YES	YES	NO	NO
Decorative Fountains	YES	NO	NO	NO
Flushing of Sanitary Sewers	YES	YES	YES	YES

	Type of Reclaimed Water Allowed			
Use	**Class A**	**Class B**	**Class C**	**Class D**
Street Cleaning				
▪ Street Sweeping, Brush Dampening	YES	YES	YES	NO
▪ Street Washing, Spray	YES	NO	NO	NO
Washing of Corporation Yards, Lots, and Sidewalks	YES	YES	NO	NO
Dust Control (Dampening Unpaved Roads and Other Surfaces)	YES	YES	YES	NO
Dampening of Soil for Compaction (at Construction Sites, Landfills, etc.)	YES	YES	YES	NO
Water Jetting for Consolidation of Backfill Around Pipelines				
▪ Pipelines for Reclaimed Water, Sewage, Storm Drainage, and Gas, and Conduits for Electricity	YES	YES	YES	NO
Fire Fighting and Protection				
▪ Dumping from Aircraft	YES	YES	YES	NO
▪ Hydrants or Sprinkler Systems in Buildings	YES	NO	NO	NO
Toilet and Urinal Flushing	YES	NO	NO	NO
Ship Ballast	YES	YES	YES	NO
Washing Aggregate and Making Concrete	YES	YES	YES	NO
Industrial Boiler Feed	YES	YES	YES	NO
Industrial Cooling				
▪ Aerosols or Other Mist Not Created	YES	YES	YES	NO
▪ Aerosols or Other Mist Created (e.g., Use in Cooling Towers, Forced Air Evaporation, or Spraying)	YES	NO	NO	NO
Industrial Process				
▪ Without Exposure of Workers	YES	YES	YES	NO
▪ With Exposure of Workers	YES	NO	NO	NO
Wetlands				
▪ All Wetlands	YES	YES	YES	YES
▪ Non-contact Recreational or Educational Use With Restricted Access	YES	YES	YES	NO
▪ Fisheries Use, or Non-contact Recreational or Educational Use with Open (Unrestricted) Access	YES	YES	NO	NO
▪ Potential Human Contact Recreational or Educational Use	YES	NO	NO	NO
Ground Water Recharge	YES	NO	NO	NO
Indirect Potable Reuse	YES	NO	NO	NO
Stream Flow Augmentation	YES	NO	NO	NO

Setback Distances

To protect public health and safety, setbacks are required for transport and distribution of reclaimed water. Table 3 lists the required setback distances.

Table 3. Required Setback Distance for Reclaimed Water

Conditions	Setback Distance (Feet) By Type of Reclaimed Water			
	Class A	Class B	Class C	Class D
Minimum Distance between any reclaimed water pipeline and potable water supply well.	50	100	100	300
Where reclaimed water is used for spray or surface irrigation, minimum distance between the area subject to irrigation, and any potable water supply well.	50	100	100	300
Where reclaimed water is used for spray irrigation, minimum distance between the area subject to irrigation and areas accessible to the public and the use area property line.	0	50	50	100
Where reclaimed water is used for an impoundment that is not lined or sealed to prevent measurable seepage, minimum distance between the perimeter of the impoundment and any potable water supply well.	500	500	500	*n/a
Where reclaimed water is used for an impoundment that is lined or sealed to prevent measurable seepage, minimum distance between the perimeter of the impoundment and any potable water supply well.	100	100	100	*n/a
Where reclaimed water is used for a storage pond that is not lined or sealed to prevent measurable seepage, minimum distance between the perimeter of the pond and any potable water supply well.	500	500	500	1,000
Where reclaimed water is used for a storage pond that is lined or sealed to prevent measurable seepage, minimum distance between the perimeter of the pond and any potable water supply well.	100	100	100	200

* Not Applicable

Reclaimed Water Use Opportunities

This section describes the major opportunities for the use of reclaimed water in Spokane County. These opportunities are categorized as follow:

- Irrigation of Urban Green Spaces;
- Industrial Reclaimed Water Use;
- Wetlands Creation and Enhancement;
- Aquifer Recharge; and
- Other Reclaimed Water Use Opportunities.

Irrigation of Urban Green Spaces

Urban irrigation involves use of reclaimed water as an irrigation supply for golf courses, school grounds, parks, roadway landscaping and cemeteries. Urban irrigation typically occurs during the drier summer months when the need for water exceeds precipitation. The basic concept is illustrated in Figure 2.

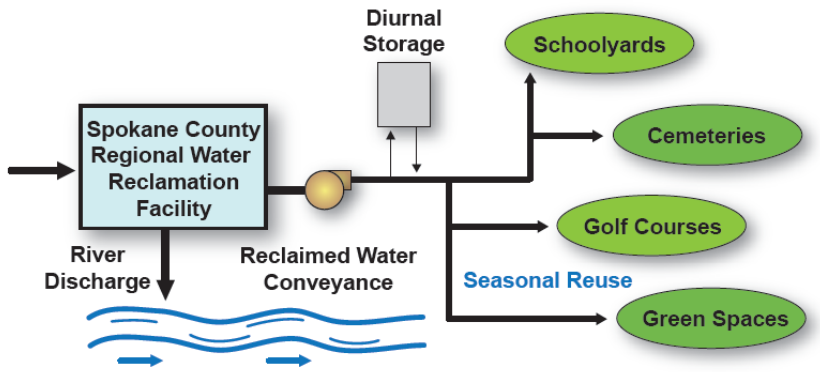

Figure 2. Irrigation of Urban Green Spaces

Urban irrigation using reclaimed water has been practiced for decades across the nation and in the Northwest. There are over 1,200 water reuse utilities in the United States, delivering billions of gallons of reclaimed water to customers who use it for a variety of purposes, but most significantly irrigation. In Oregon, Clean Water Services of Washington County has been irrigating school grounds and golf courses with reclaimed water for over 20 years. In Washington, urban irrigation is included in several demonstration projects administered by the Ecology and Health. Reclaimed water is used for landscape irrigation by the City of Sequim; for irrigation at local churches, city parks, and a private residence in the City of Yelm; and for irrigation of city parks in downtown Olympia.

Implementation

Urban irrigation programs using reclaimed water are currently administered by the Ecology and Health, and require an Engineering Report presenting design, operational and compliance information.

The required application rate, based upon a detailed water balance, must be determined for urban irrigation. The water balance defines the agronomic rate at which the reclaimed water is applied through each irrigation cycle. The application rate must assure:

- Reclaimed water is applied at a rate determined by the evapotranspiration requirements of the crop
- Reclaimed water application rate is a balance between, and limited by, the hydraulic and nutrient (nitrogen and phosphorous) demands of the crop

- Reclaimed water application is limited to no more than 50% to 80% of the water-holding capacity of the soil so that the reclaimed water is kept in the root-zone and does not pass into the aquifer

In addition to determining the application rate for each urban irrigation site as defined above, key implementation steps include:

- Conducting a needs survey/feasibility study to define potential demand and customer requirements.
- Providing clear and timely information about the demonstrated safe practice of water reuse, and adequately addressing all initial concerns raised by potential customers.
- Developing long-term agreements with private entities or acquiring sufficient land to meet the program requirements.
- Developing an organizational structure to manage the reclaimed water use program.
- Siting and permitting critical infrastructure components such as reservoirs and pipelines.
- Preparing pre-design and subsequent detailed design for all facilities.
- Conducting environmental assessments necessary to meet regulatory requirements.
- Developing operational plans, including reliability and emergency response measures.
- Developing and implementing monitoring plans.
- Implementing a comprehensive public education program.
- Obtaining permits from regulatory agency(ies).

Reclaimed water application at County facilities or school grounds can allow a single agreement to cover use on multiple sites, whereas reclaimed water use on private property such as private golf courses typically requires negotiation of a separate agreement for each application site.

Public acceptance and public safety will be a possible concern for some owners of urban green space. Based upon the comments and questions raised during initial meetings with potential customers, the County has begun to implement a public information program to educate both landowners and facility users regarding the safety and benefits of urban irrigation with reclaimed water.

It is unlikely that customers will be willing or able to pay the full cost of producing and delivering reclaimed water since it will cost substantially more than the water supply they currently use. Consequently, the cost of the program would be subsidized in part by wastewater and/or water ratepayers that indirectly benefit from the use of reclaimed water. This is an appropriate approach within the context of integrated water resources planning to ensure long term safety and reliability of water supply to meet specific water

demands of a community. Revenue from the sale of reclaimed water when combined with various incentives and subsidies offsets the cost of reclaimed water capital, operations and maintenance to some extent. There are few successful water reuse programs nationwide that do not involve some additional financial support from external sources.

Reclaimed Water Quality Requirements – Urban Irrigation

Reclaimed water used for landscape irrigation of open public access areas must be treated to Class A reclaimed water standards. As urban reclaimed water use sites are generally located over the Spokane Aquifer (a significant regional source of drinking water), a 10 mg/L reclaimed water nitrate-nitrogen guideline will also be used, unless the rate of irrigation is limited to the irrigation water requirement for the landscape vegetation (agronomic hydraulic loading rate).

Industrial Reclaimed Water Use

For industrial use, reclaimed water would be routed to an industry for use in cooling or process applications as shown in Figure 3. Depending on site-specific needs, supplemental treatment may be needed to meet water quality objectives for industrial use. Pretreated wastewater from the industries may be discharged directly to receiving waters or routed to a municipal sewer system for treatment at a water reclamation facility.

Implementation

Industrial reclaimed water use programs are permitted by the Health through the Ecology's waste discharge permit program. Key implementation steps include:

- Conducting pilot tests to determine the potential impacts of using reclaimed water on the industrial process.
- Conducting detailed studies of the individual piping systems to determine how to segregate any uses that must continue to rely upon potable water.
- Addressing permitting issues for the industry's pretreated wastewater since the industrial wastewater may alter the reclaimed water quality.

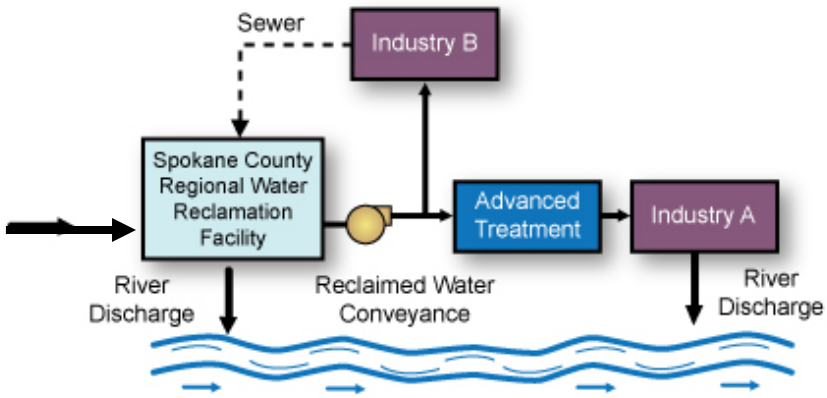

Figure 3. Industrial Reclaimed Water Use

- Educating staff and managers at the industries to gain acceptance for using reclaimed water.
- Developing a long-term agreement between the County and industry for use of the reclaimed water, particularly if either party is required to make substantial investment.
- Obtaining permits from regulatory agency(ies).

Reclaimed Water Quality Requirements – Industrial

Reclaimed water quality requirements vary depending on the specific use at each industrial facility. For instance, reclaimed water used for concrete manufacturing would need to be treated to at least Class C reclaimed water standards, whereas other uses such as process water for electronics manufacturing may require Class A reclaimed water, and subsequent advanced water treatment processes to remove salts or low concentrations of dissolved metals or organic compounds. Unless a major demand emerged for lower quality water, it is likely that the County would provide Class A water to all industrial users.

A market assessment was prepared during the development of the *Wastewater Facilities Plan* and updated during the development of the *2006 Wastewater Facilities Plan Amendment*. The assessment showed that Inland Empire Paper (IEP) has the most significant reclaimed water use potential within reasonable proximity to the Spokane County Regional Water Reclamation Facility. Because of this the discussion of reclaimed water quality requirements is primarily focused on issues of concern to their paper processing operation. These include temperature, color, total suspended solids, and total dissolved solids.

Temperature In recent years, reclaimed water temperature has become a key area of regulatory focus, particularly for industries. At IEP, the groundwater used for non-contact cooling and other process needs is supplied at 55°F (13°C). Even with this low-temperature water, discharge temperatures at paper mills can reach 90°F. When considering alternative water supplies such as reclaimed water, the prospect of further increasing the temperature of the discharge is a concern. Reclaimed water temperatures from the County's water reclamation facility are likely to be similar to those from the Riverside Park Water Reclamation Facility (RPWRF), formerly known as the Spokane Advanced Water Treatment Plant (SAWTP). From May through October, historical reclaimed water temperatures at the RPWRF exceed groundwater temperature by as much as 15°F (3°C).

Color Based on discussions with IEP, color is not anticipated to be a problem; however, the County's reclaimed water must not result in the need for additional brighteners to be added to the process. If color is determined to have an impact, activated carbon treatment of the County's reclaimed water would be required. This concern does not apply to non-contact cooling water.

Total Suspended Solids (TSS) Studies with mills in the Tacoma, Washington area indicated a need for total suspended solids (TSS) of less than 1 mg/L for cooling system components such as vacuum pumps and steam condensers, and for sealing services such as pump seals and other equipment.

Total Dissolved Solids (TDS) The Tacoma studies also indicated a potential concern regarding the concentration of both organic and inorganic TDS. However, a newsprint mill in Pomona, California (with much higher background TDS in water supply) uses reclaimed water with no reduction in dissolved solids. The projected TDS from the new SCRWRF would need to be compared to current raw water TDS of approximately 125 mg/L to determine whether TDS would be an issue. Dissolved solids generation through consumptive use is typically in the 250-300 mg/L range.

Wetlands Creation and Enhancement

From a regulatory framework perspective, reclaimed water could be used to create constructed wetlands or as a reliable source of water to restore degraded natural wetlands. However, it is noteworthy that there has been no permitted delivery of reclaimed water to a wetland in Washington, so the regulatory process is untested and the results are not predictable.

Implementation

For approval of reclaimed water use in wetlands, the County will need to perform sufficient background studies to:

- Identify beneficial uses to be attained;
- Determine the hydrologic regime of the proposed systems;
- Identify the water quality to be provided and the annual loading rates;
- Determine potential groundwater impacts;
- Provide an estimated description of the mature biological structure for the wetland; and
- Support any claims of net environmental benefit.

Subsequent project implementation steps include:

- Project approval and funding;
- Property acquisition;
- Pre-design and design;
- Obtain permits;
- Environmental assessments necessary to meet regulatory and permitting requirements;
- Monitoring plan development and implementation; and
- Public education program implementation.

Reclaimed Water Quality Requirements – Wetlands

Washington State reclaimed water use standards establish conditions under which reclaimed water may be used to create wetlands. Because constructed wetlands that receive reclaimed water are considered waters of the State, the requirements of constructed wetlands are dictated by anticipated beneficial use. To minimize public concern, it is assumed that any constructed wetlands would be designed for potential human contact. This means that the reclaimed water would need to meet Class A treatment standards, as well as the following specific Water Reclamation and Reuse Standards:

- BOD_5 and TSS of less than 20 mg/L (annual average) each;
- Total Kjeldahl nitrogen (TKN) of less than 3 mg/L (annual average);
- Total phosphorus of less than 1 mg/L (annual average);
- Un-ionized ammonia less than State chronic toxicity standards; and
- Metals concentrations less than State surface water standards.

The quality of the reclaimed water produced by the SCRWRF will meet or exceed these standards. Meeting the annual average TKN limit of 3 mg/L is of particular interest, so the following brief discussion of how it will be met is provided. To allow for maximum flexibility in the use of reclaimed water, a basis for design of the SCRWRF will be that it must produce finished water with less than 10 mg/L of total nitrogen during the critical summer permit season. It would also produce water with less than 0.25 mg/L of ammonia during that same time period. To achieve the required TKN for wetlands application, organic nitrogen and ammonia combined must be less than 3 mg/L. Based on the projected effluent ammonia levels, organic nitrogen must be less than 2.75 mg/L.

The source of organic nitrogen in municipal wastewater effluent is contained within the effluent suspended solids. In typical municipal wastewater effluent, volatile suspended solids account for approximately 75 percent of the total suspended solids (Metcalf and Eddy) and the volatile suspended solids are approximately 7 to 12 percent organic nitrogen depending upon sludge age (McGraw Hill). Based upon these empirically derived ranges, it can be expected that the total suspended solids from the SCRWRF will contain between 1.0 and 1.8 mg/L of organic nitrogen, assuming an annual average TSS of less than 20 mg/L. Therefore, the projected range of organic nitrogen (1.0 to 1.8 mg/L) in the finished water of the SCRWRF is less than what it needs to be (2.75 mg/L) to ensure that the TKN limit of 3 mg/L for wetlands application will be met.

A hydro-geologic evaluation must also be conducted to determine whether the wetland is in an area that provides groundwater recharge. If this is the case, reclaimed water conveyed to the wetland must “exhibit parameter concentrations 50 percent or lower than the groundwater quality criteria”, or must otherwise demonstrate that local groundwater quality will not be degraded.

Wetlands offer additional phosphorus and ammonia removal above and beyond that provided through the SCRWRF treatment processes through vegetative uptake.

Wetlands also offer the potential for flow equalization for downstream opportunities, such as aquifer recharge.

Aquifer Recharge

The regulatory environment for water use and management includes an extensive framework of federal, state, and local agencies with responsibilities for public health, environmental resources, water rights, land use, water use, water quality, and water supply. The State of Washington Reclamation and Reuse Standards specify appropriate locations and quality for aquifer recharge with reclaimed water.

The quality of reclaimed water used for aquifer recharge is not necessarily required to be protective of ground water quality under WAC 173-200. Also, the use of reclaimed water does not need to specifically comply with the anti-degradation policies of WAC 173-200. RCW 90.46 allows for two methods of aquifer recharge - direct recharge and surface percolation.

Direct recharge is defined as controlled subsurface addition of water to the groundwater basin (RWC 90.46.010(7)). Direct recharge projects must conform to the 1997 Water Reclamation and Reuse Standards (Standards), Section III to be permitted. The current standards require conformance with the more stringent standard from either the state's drinking water maximum contaminant levels (MCLs) (WAC 246-290) or ground water quality criteria (WAC 173-200). Specific criteria for total coliform, total nitrogen, turbidity and total organic carbon must also be met. The standard also requires reverse osmosis treatment. A number of representatives of large water purveyors have expressed concern about the possibility of direct recharge of aquifers using reclaimed water immediately upgradient from their supply wells. Spokane County is not considering direct recharge, but discussion and cost estimates are provided in this report for evaluation purposes.

Surface percolation is defined as controlled application to the ground surface (RCW 90.46.010(18)). Water quality for surface percolation is required to conform to the "groundwater recharge criteria" (RCW 90.46.080(1)), defined as being drinking water contaminant criteria as adopted by the State Board of Health and the Health (RCW 90.46.010(9)). If the groundwater recharge criteria do not contain a standard or constituent, Ecology is authorized to establish a discharge limit consistent with the goals of the chapter, which implies recovery as a potable water supply as the highest use.

The significance of these two requirements is that the drinking water MCLs and state's groundwater quality standards do not list the same constituents. In many instances, when a chemical is on both lists, the water quality limit is not the same. Often, the laboratory analysis techniques requirements are not the same either. The Health anticipates that the discrepancy that may cause the greatest confusion in the future is with discharge limits for total nitrogen and nitrate. The groundwater recharge criteria limit nitrogen as nitrate to less the 10 mg/L, consistent with the drinking water MCLs. The anti-degradation policy (WAC 173-200) limits nitrate discharge to background levels

in the groundwater, which is generally much lower than 10 mg/L. Because statutory authority supersedes regulatory limits, the current limit is 10 mg/L.

The anti-degradation policy regarding the use of reclaimed water is established in RCW 90.46.005. This section states that the legislature declares that "use of reclaimed water is not inconsistent with the policy of anti-degradation of state waters amounts in other state statutes, including the water pollution control act, chapter 90.48 RCW and the water resources act, chapter 90.54 RCW." Thus, the legislature has deemed that use of reclaimed water is in the public interest of the state. Reclaimed water, which is adequately and reliably treated to assure the water quality limits as determined by the statutes and the *Standards* is acceptable under those standards.

Surface Percolation

Reclaimed water may be used for surface percolation (through infiltration ponds, for example) if it meets the groundwater recharge criteria as measured in the aquifer beneath or down-gradient of the recharge project site. Figure 4 illustrates this concept. Reclaimed water must fully protect public health and the quality of waters of the State. Until Ecology and Health develop final groundwater recharge standards, the water quality criteria in Table 4 are to be used as a basis for planning.

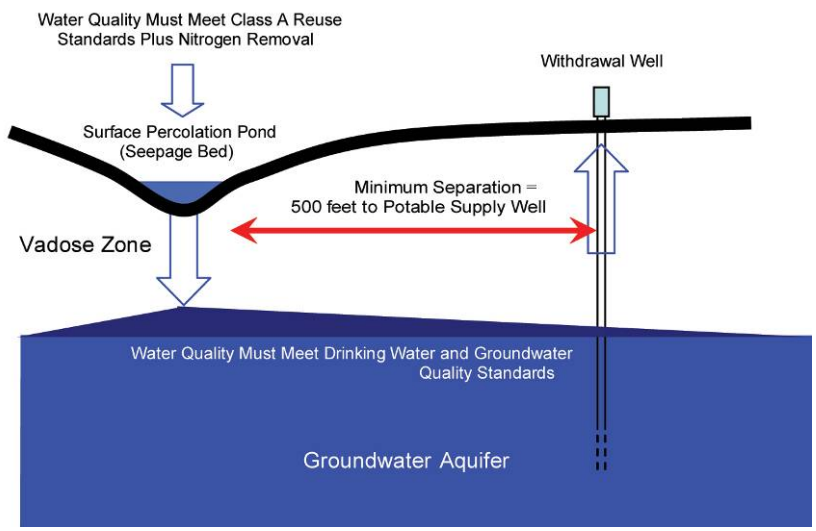

Figure 4. Schematic of Surface Percolation System

Table 4. Treatment and Water Quality Requirements for Surface Percolation

Direct Use	Treatment Requirements	Quality Requirements
All Aquifers	Class A reclaimed water treatments: ▪ Oxidation ▪ Coagulation ▪ Filtration ▪ Disinfection Plus: ▪ Nitrogen reduction	General: ▪ Meet groundwater recharge criteria. Disinfection: ▪ For chlorine as disinfectant: 1 mg/L residual after 30 min ▪ Chlorine residual of 0.5 mg/L from reclamation plant to point of use ▪ The Health may require higher CT values for ground water recharge with reclaimed water ▪ Non-chlorine disinfection approved on case-by-case basis

The key guidelines for determining potential locations for infiltration ponds in potable water aquifers include:

- Reclaimed water shall be retained underground for a minimum of 12 months prior to being withdrawn as a source of drinking water supply.
- The minimum horizontal separation distance between the point of direct recharge and withdrawal as a source of drinking water supply shall be 500 feet for infiltration ponds.
- Minimum reclaimed water quality requirements for surface percolation are addressed in the general requirements of the State's reclaimed water use standards. These rules specify Class A reclaimed water quality plus nitrogen removal. However, the combination of the water reclamation facility and the soil treatment provided in the unsaturated zone must produce a water quality meeting both drinking water and groundwater quality requirements.

Direct Injection

For direct aquifer recharge, water quality and treatment requirements depend on whether the aquifer is a potable or non-potable water source. The Spokane Valley Aquifer is a potable water source. Figure 5 presents a schematic of the system. Specific minimum criteria are summarized in

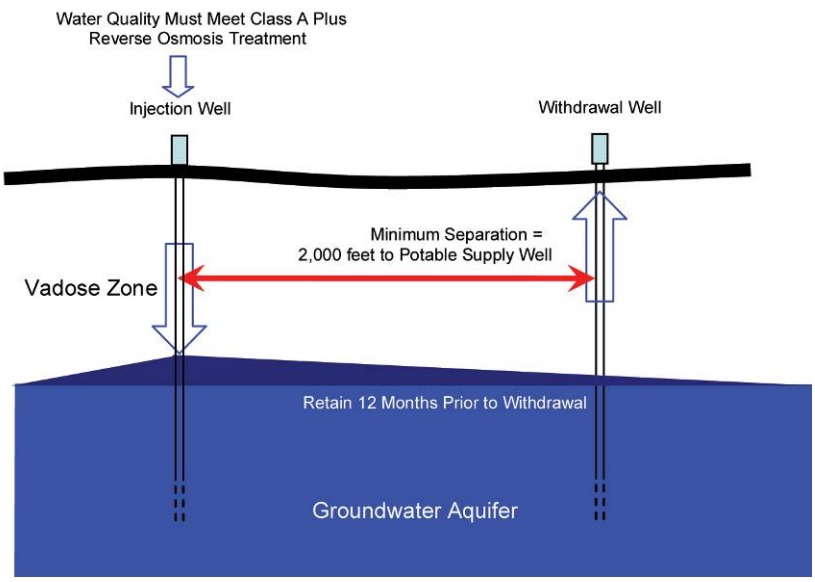

Figure 5. Schematic of Direct Injection System

Table 5 below. Additional water quality criteria may be necessary and will be determined on a case-by-case basis.

Several key considerations specific to direct injection include terminating the injection well below the static water level to maintain continuous positive pressures.

Table 5. Treatment and Water Quality Requirements for Direct Injection[1]

Direct Use	Treatment Requirements	Quality Requirements
Non-potable Aquifers	▪ Class A reclaimed water treatment	▪ Class A reclaimed water quality requirements ▪ BOD < 5 mg/L (24-hour composite samples collected daily) ▪ TSS < 5 mg/L (24-hour composite samples collected daily)
Potable Aquifers	▪ Oxidation ▪ Coagulation ▪ Filtration ▪ Reverse osmosis ▪ Disinfection	▪ Class A reclaimed water quality requirements (except for total coliform organisms) ▪ Drinking water quality criteria for primary contaminants (except nitrate), secondary contaminants, radio-nuclides, and carcinogens listed in Table 1 in Chapter 173-200 WAC ▪ Other drinking water Maximum Contaminant Levels ▪ Turbidity < 0.1 NTU[2] ▪ Total nitrogen < 10 mg/L (as N)[3] ▪ TOC < 1.0 mg/L[4]

Notes:

1. In a letter to Spokane County from the Health dated January 8, 2009, the Health noted the following: “Reclaimed water is a water supply resource. Provisions in statute trump rule (regulation) requirements. That is, RCW 90.46.005 (statute) overrides conflicting requirements in WAC 173-200 (regulation). WAC 173-200 draws authority from RCW 90.48, which establishes requirements for permits to discharge waste material. Waste material is deemed in regulation as "any discarded, abandoned, unwanted or unrecovered material(s)". Since reclaimed water is "no longer considered wastewater" (RCW 90.46.010(14)), and is definitely not discarded, and not abandoned, and is still wanted and will be recovered, the provisions of RCW 90.48 and WAC 173-200 do not apply.”
2. Turbidity less than or equal to 0.1 NTU (average) and 0.5 NTU (maximum). Turbidity analysis shall be performed by a continuous recording turbidimeter. Turbidity measurements shall be read at least every four hours. Compliance with the average operating turbidity requirement shall be determined monthly, based on the arithmetic mean of all measurements read during the month.
3. Total nitrogen less than or equal to 10 mg/L. Samples for total nitrogen shall be grab or 24-hour composite samples. Samples for total nitrogen shall be collected at least weekly. Compliance with the total nitrogen requirement shall be determined annually, based on the arithmetic mean of all samples collected during the previous 12 months.
4. TOC less than or equal to 1.0 mg/L. Samples for TOC shall be 24-hour composite samples. Samples for TOC shall be collected at least daily. Compliance with the TOC requirement shall be determined daily, based on the arithmetic mean of all daily samples collected during the last 30 days of operation.

The key guidelines for determining potential locations for injection wells in potable water aquifers include:

- Reclaimed water shall be retained underground for a minimum of 12 months prior to being withdrawn as a source of drinking water supply.
- The minimum horizontal separation distance between the point of direct recharge and withdrawal as a source of drinking water supply shall be 2,000 feet for injection wells.
- For groundwater injection, the state regulations establish both water quality and specific treatment techniques.

Implementation

For a groundwater recharge project, an Engineering Report must be prepared that provides a complete hydro-geologic characterization of the project site. Specific requirements of this report are specified in the State's reclaimed water use standards (Washington State Department of Ecology publication number 97-023).

Implementation of groundwater recharge will require public support. To achieve this, the County will need to implement a comprehensive, long-term public education program to clearly define the benefits and risks associated with the approach. To aid in public education, a pilot project of any proposed treatment/recharge system could be conducted to demonstrate the ability of the process to protect the area's drinking water supply.

Other Reclaimed Water Use Opportunities

Two additional methods of reclaimed water use, namely irrigation of agricultural land and irrigation of poplar farms, were identified in the initial reclaimed water use opportunities alternative screening. They are briefly described below. These methods, however, were judged to be less cost effective for Spokane County and were removed from further consideration.

Irrigation of Agricultural Land

This option would employ reclaimed water for irrigation of agricultural properties in Spokane County. Reclaimed water would be used for irrigation on a seasonal basis to match crop demand. For the remainder of the year, reclaimed water would be discharged to surface water. The concept is illustrated in Figure 6.

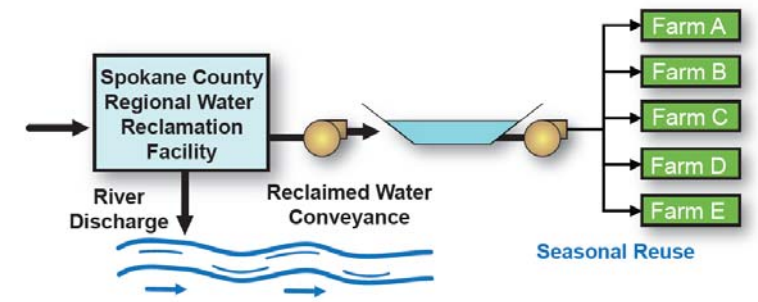

Figure 6. Irrigation of Agricultural Land

Irrigation of Poplar Farms

Irrigation of poplar trees is an agricultural reuse in which hybrid poplars would be grown. From a reclaimed water seasonal management perspective, poplars are attractive because they have a high water demand. Also, the harvested poplars may produce revenue for the wastewater utility.

The irrigation of poplars is an accepted seasonal management practice for avoiding non-beneficial discharges to surface water. In the Northwest, several communities are in various stages of implementation. The most established program is in Woodburn, Oregon and Hayden, Idaho where poplars have been grown for over a decade.

In the Spokane climate, poplars would have an estimated water consumption rate of approximately 5 feet per year. If this water were applied over the six-month summer growing season, the required area of trees under irrigation would be 2,400 acres in 2025 and 3,000 acres by 2050. Taking into consideration buffers, harvesting requirements and other property management functions, the total property requirements would increase about 50 percent to 3,600 and 4,500 acres in 2025 and 2050, respectively. The land area requirements and cost of this management practice increases dramatically if storage is required to hold reclaimed water during the non-growing season, such as if a river discharge is not available during the winter months. If storage is necessary in the winter and irrigation occurs only in the summer, land requirements could double for irrigation and storage requirements could be as much as 500 acres. To maintain control of the irrigation and harvesting operations, the County would most likely need to purchase the property and operate the facility.

Assessment of Reclaimed Water Use Potential

Irrigation of Urban Green Spaces

Points of Application

Using the County's land use information system, an investigation was conducted to identify green space that could potentially be included in an urban reclaimed water irrigation program. In the Spokane area, the most significant green spaces that are currently irrigated with potable water and could be irrigated with recycled water are those associated with golf courses, parks, cemeteries and schoolyards.

Golf courses are typically the most attractive reuse customers because of their large water demand and ability to store water on-site. Areas with multiple golf courses include Liberty Lake, along the Little Spokane River in North Spokane, near Latah Creek at the south end of the City, and along the Spokane River near the western boundary of the City.

In some communities, green space at industrial parks offer important reclaimed water use opportunities. Based on discussions with County personnel, industrial campuses with significant green space are limited to the Liberty Lake area.

To initially screen candidate reuse sites, two criteria were used:

- Proximity to the planning area
- Complexity vs. benefit of administering reclaimed water use

The first criterion was used to rule out sites such as the Sundance and Fairways Golf Courses (located 15-20 miles from the planning area). The second criterion was used to eliminate sites with small demand potential, such as individual, small private schools.

Potential Reclaimed Water Demand

Urban demand for irrigation with reclaimed water has been assessed where demand can be based on turf requirements. Washington State University has published consumption data for various crops, including pasture and turf grass. Turf grass irrigation requirements would approximate the uptake rates for lawns, golf courses, and parks. The irrigation uptake rates for turf grass vary from zero in April to a peak rate of 8.88 inches in July, and reduce to zero again after October 10th.

Table 6 illustrates the monthly uptake rate for pasture and turf grass in Spokane County. This translates to an urban irrigation demand ranging between 1,000 (Oct) and 8,000 (July) gallons per day per acre as shown in Figure 7.

Table 6. Pasture and Turf Grass Irrigation

Month	Uptake Rate, Inches	Percent of Total
Mid Oct. – mid May	0.00	0
May (mid - end)	1.85	6.6
June	5.78	20.5
July (peak month)	8.88	31.5
August	7.11	25.2
September	4.35	15.4
October (1st – mid)	0.25	0.9
Total Uptake	28.22	100

On the basis of WSU irrigation data, the peak uptake month (July) an estimated 8 mgd of water is required for 1,030 acres of irrigated turf grass. This equates to approximately ten 18-hole golf courses (at 100 acres each) or nearly 22,500 residential lots, each having 2,000 square feet of irrigated lawn.

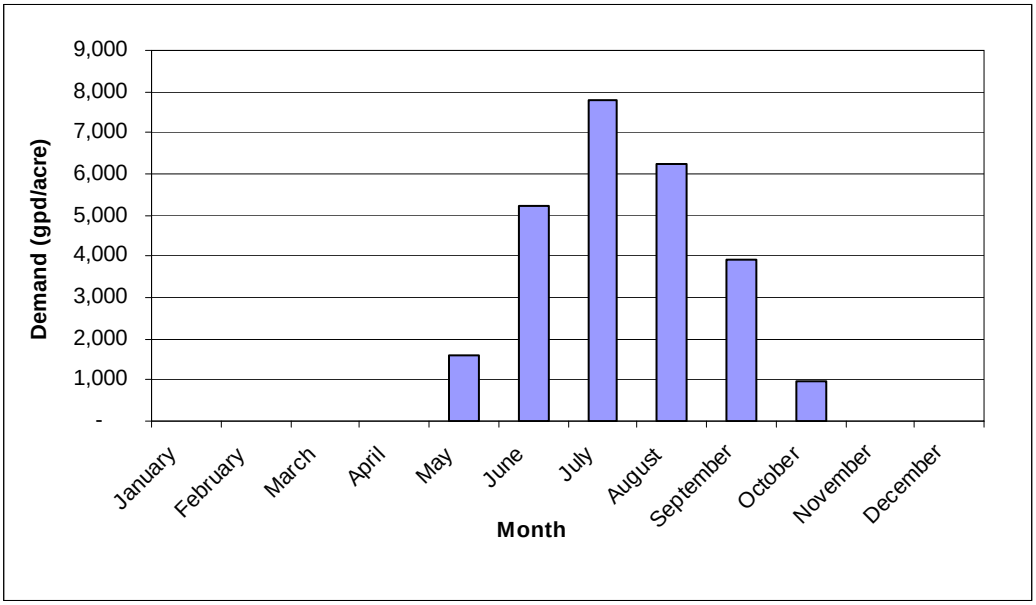

Figure 7. Water Demand for Urban Irrigation

Note that all of remaining months in the irrigation season have considerably lower irrigation requirements. Therefore, either significantly more land is needed to ensure that 8 mgd does not get released to the Spokane River throughout the irrigation season, or less water can be applied to the irrigated land during the months before and after July. Table 7 summarizes the amount of land required for irrigation using 8 mgd of reclaimed water for each summer month. This table also shows the amount of water that can be applied to 1,028 acres per month. This is the area of land necessary to irrigate up to 8.0 mgd. Also, listed is the resultant phosphorus load reduction to the River, assuming a reclaimed water phosphorus concentration of 50 µg/L.

Table 7. Relative Water Application Rates Compared by Month

Month	Land Required for 8 mgd (acres)	Rate of Flow on 1,028 Acres (mgd)	Phosphorus Load Reduction (lbs)[a]	Phosphorus Load Reduction (lbs/day)[a]
May (15th – 31st)	2,707	3.0	12	1.25
June	1,529	5.4	67	2.25
July (peak month)	1,028	8.0	103	3.34
August	1,284	6.4	83	2.67
September	2,032	4.0	51	1.67
October (1st-10th)	11,784	0.7	4	0.29
		Total	320	

a) Calculated based on 50 µg/L at rate of water volume applied. Irrigation season is 149 days from May 15 to October 10. Season defined in the Spokane River TMDL Managed Implementation Plan is April through October (214 days).

To put potential urban irrigation demand in perspective, an average 154-acre golf course would have a maximum monthly demand in July that averages 1.20 mgd. This demand represents approximately 15 percent of the anticipated production rate of 8 mgd from the County's water reclamation facility. During other summer months, a much smaller portion of flow would be used. On a seasonal basis, a single 154-acre course would represent about 3 percent (0.25 mgd average) of potential daily supply.

Golf Courses

Thirteen golf courses were evaluated as potential urban reclamation water use sites. These are shown in Table 8. Ninety-eight percent of the total golf course area is assumed to be irrigable.

Table 8. Urban Golf Course Sites

Name	Total Acres	Irrigable Acres
Indian Canyon Golf Course	210	205
Spokane Country Club	188	184
Hangman Valley Golf Course	174	171
Esmeralda Golf Course	165	162
Wandermere Golf Course	159	156
Downriver Golf Course	158	155
Manito Golf Club	139	136
The Creek at Qualchan Golf Course	138	135
Meadow Wood Golf Course	144	141
Liberty Lake Golf Course	125	123
Painted Hills Golf Course	89	87
Sundance Golf Course Inc.	87	85
Valley View Golf Course	61	60
Total	**2,046**	**2,005**
Average	**157**	**154**

To evaluate the geographical distribution of reclaimed water demand from golf courses, ten of the courses listed in Table 8 were separated into six regions:

- North Spokane: Wandermere
- East County: Valley View, Liberty Lake, Meadow Wood
- South Spokane: Manito, The Creek at Qualchan
- West Spokane: Indian Canyon, Downriver
- Esmeralda
- Painted Hills

The projected reclaimed water demand for the golf courses within each region is presented in Table 9. The Spokane Country Club was excluded from the demand projections based upon discussions with a representative from the club, who indicated that they irrigate using water from a private well, have very low irrigation costs, and are not likely to consider replacing this source with reclaimed water. The Hangman Valley Golf Course and Sundance Golf Course were also excluded given their relatively remote locations.

Table 9. Monthly Irrigation Demand for Golf Courses

Month	Potential Irrigation Demand (mgd)						
	North Spokane	East County	South Spokane	West Spokane	Painted Hills	Esmeralda	Total
Jan. – April	-	-	-	-	-	-	-
May	0.25	0.53	0.44	0.58	0.14	0.26	2.20
June	0.82	1.69	1.42	1.88	0.46	0.85	7.11
July	1.21	2.52	2.11	2.80	0.68	1.26	10.58
August	0.97	2.02	1.69	2.24	0.54	1.01	8.47
September	0.61	1.28	1.07	1.42	0.34	0.64	5.35
October	0.15	0.31	0.26	0.35	0.08	0.16	1.32
Nov. - Dec.	-	-	-	-	-	-	-
Average, mgd	.033	0.70	0.58	0.77	0.19	0.35	2.92
Total, MG/yr	122	254	212	282	68	127	1,066
Total, AFY	375	780	650	865	210	390	3,270

Figure 8 presents a graph of the reclaimed water demand for golf courses versus the average reclaimed supply assuming all of the golf courses received reclaimed water. During the winter months, water demand of the golf courses is very low or non-existent. The reclaimed water during these low demand periods could be used for aquifer recharge or delivery to the river. During the summer months, the water demand of the golf courses exceeds the possible supply of the reclaimed water. The volume of water necessary to meet summertime demand could be recovered from aquifers or provided by other supplemented sources.

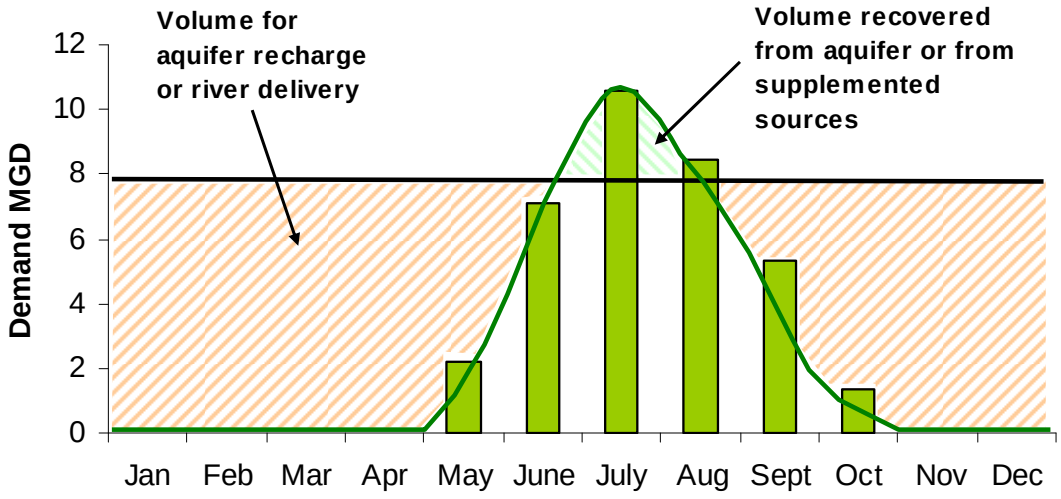

Figure 8. Monthly Irrigation Demand vs. Average Reclaimed Supply for Golf Courses

The Spokane County Parks Department would be willing to use reclaimed water for irrigation of County-owned golf courses; however, two of their courses (Liberty Lake and Meadow Wood) are located in an area that is being annexed by Liberty Lake and is within the Liberty Lake Water and Sewer District. Spokane County could implement reclaimed water use for irrigation of these courses if it maintains ownership of them. However, the Liberty Lake Water and Sewer District may also be interested in irrigating these areas in the future, should it have trouble expanding discharge to the Spokane River. Similarly, the City of Spokane owns and operates golf courses and may be interested in irrigating them in the future for the same reasons as Liberty Lake.

Comparing water demands in Table 9 with future SCRWRF production of the 8 mgd demonstrates that if all golf courses in the Spokane region were served by reclaimed water, their maximum seasonal monthly demand would exceed available supply unless seasonal recharge and recovery of the water were implemented. Average demand over the summer season would be about 73 percent of the anticipated supply available. If only one of the areas were served, approximately 10 to 15 percent of the County's average summer reclaimed water production could be used for golf course irrigation.

Parks, Schools, and Cemeteries

The Spokane area includes many parks, schools, and cemeteries.

Table 10 summarizes information on these facilities with respect to size range, number of sites, total area, and irrigable area. The parks category includes urban parks in the City of Spokane, Spokane Valley, and Spokane County, and Washington State Parks. The estimates of irrigable area are based on the percent impervious grid derived from the 2001 national land cover dataset. The data in includes parks, schools, and cemeteries within a 12 mile radius of the SCRWRF. While use of reclaimed water to many of these parks may not be feasible due to factors such as dense urban construction, proximity to the river, or dry land vegetation with no demand for irrigation water, this table gives an indication as to the potential for urban irrigation in the vicinity of the SCRWRF.

Table 10. Urban Parks, Schools, and Cemeteries

Category	No. of Sites	Total Area	Irrigable Area
0-5 Acres			
Parks	227	247	188
Schools	58	103	52
Cemeteries	5	13	7
Sub-total (0-5 ac)	290	364	248
5-10 Acres			
Parks	36	258	219
Schools	18	142	90
Cemeteries	1	6	5
Sub-total (5-10 ac)	55	406	315
10-20 Acres			
Parks	32	453	406
Schools	19	260	181

Cemeteries	2	34	29
Sub-total (10-20 ac)	53	747	617
20-50 Acres			
Parks	30	950	859
Schools	13	381	268
Cemeteries	-	-	-
Sub-total (20-50 ac)	43	1,330	1,127
Over 50 Acres			
Parks	37	12,938	12,629
Schools	1	111	48
Cemeteries	-	-	-
Sub-total (>50 ac)	38	13,049	12,677

The City of Spokane has expressed no interest in using reclaimed water for irrigation of City parks. However, the Spokane County Parks Department has expressed an interest in using reclaimed water. Additionally, Health's Office of Drinking Water has implemented new water efficiency requirements (WAC 246-290-800) that would appear to be drivers for the City of Spokane to consider the use of reclaimed water. Therefore, Spokane County will continue to engage the City of Spokane in discussions regarding opportunities for water reuse. The County recently developed Plante's Ferry Park near Trent Avenue. This park contains 90 acres of irrigated land served by a local irrigation district. The Parks Department is amenable to using reclaimed water for irrigating the Park if it would help eliminate part or the entire $10-15 thousand annual budget for purchasing potable water through the irrigation district.

Transportation Corridors

The Washington State Department of Transportation (WSDOT) was contacted to determine the potential for use of reclaimed water for irrigation of rights-of-way (ROW), including medians, open space associated with arterial intersections, and slopes associated with on- and off-ramps. At the Spokane Area management level, WSDOT gave permission to Spokane County to consider the use of reclaimed water for irrigation of ROW. Approximately 45 miles of I-90 runs through Spokane County, which includes 18 major interchanges with a combined 292 acres of irrigable area.

However, along I-90 there is currently very little irrigation of ROW with potable water, as most of the ROW is planted with native grasses and shrubs that do not require supplemental irrigation and are chosen based upon their ability to prevent erosion. Only the ROW in the east and west gateway areas of the City of Spokane is irrigated. Irrigation application rates in these areas are not monitored, and the irrigation systems are 40 years old and in need of replacement or removal. Eventually, the median areas that still exist within I-90 as it traverses Spokane County will be consumed with additional traffic lanes, so installation of irrigation systems in medians is not cost effective. Currently, WSDOT personnel prefer to continue to make use of native grasses because of the low installation and maintenance costs.

A more feasible use of reclaimed water associated with a transportation corridor in Spokane County is with the planned North Spokane Corridor, which is currently under design. Figure 9 below was borrowed from the WSDOT website and is an aerial photo with the North Spokane Corridor indicated in yellow. The project will have approximately 5 miles of 60 foot wide median, ten interchanges, and numerous storm water retention basins. While a drivable link of the Corridor will be completed in 2008, the landscaping has not been designed for this link. The total project will not be completed for 20 years, giving Spokane County time to jointly plan for water reuse with WSDOT. The North Spokane Corridor represents an opportunity for Spokane County to install a reclaimed water transmission spine and irrigation system along the Corridor, and provide for opportunities for additional nearby reclaimed water use.

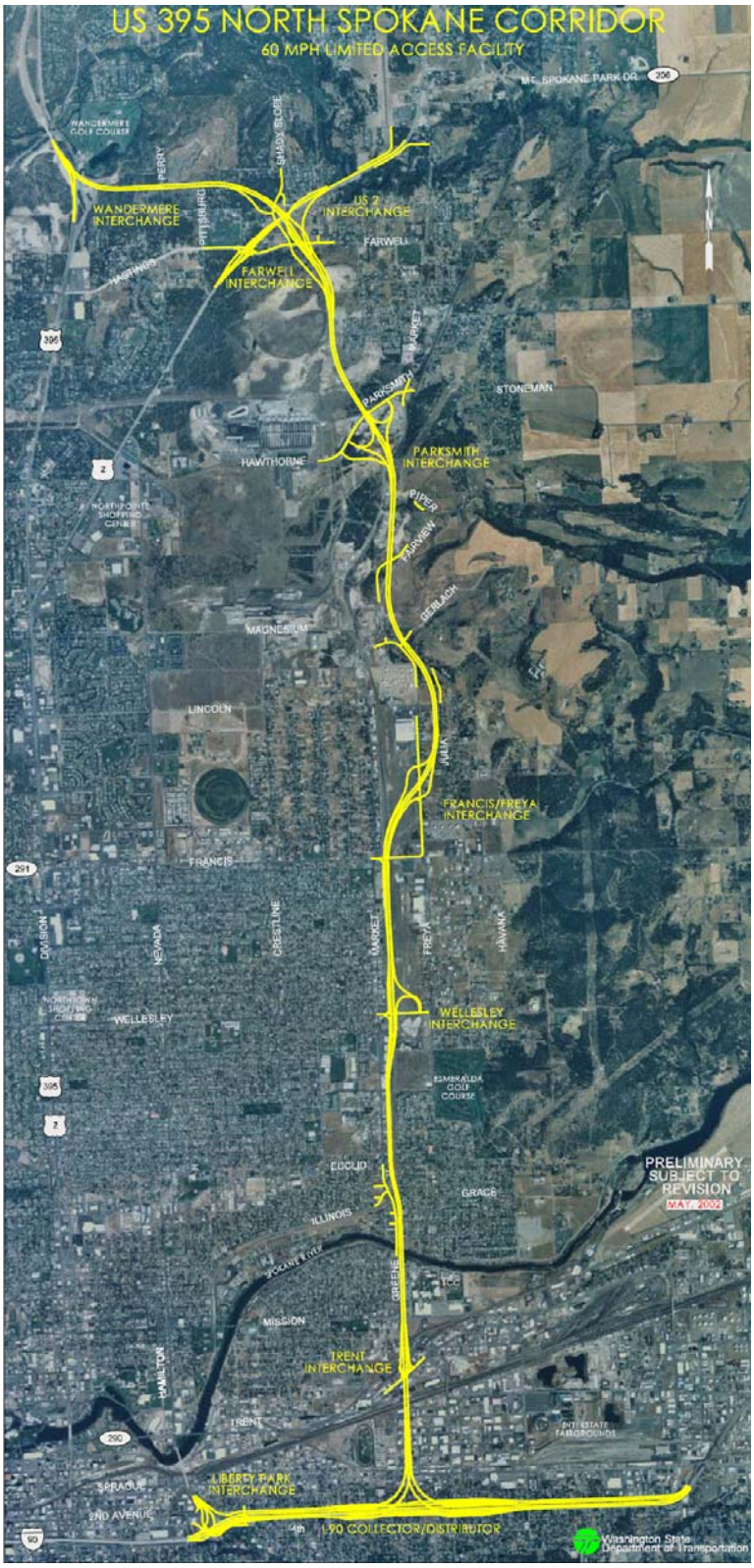

Figure 9. WSDOT North Spokane Corridor Route

Potential Urban Reclaimed Water Customers

In the summer of 2006, Spokane County Division of Utilities had sent 'Statements of Interest/Requests for Information' letters to four potential urban reclaimed water customers. These letters were intended to introduce potential reclaimed water customers to the County's plans for water reclamation and solicit potential interest in an alternative water supply for non-potable uses. The four potential urban reclaimed water customers and corresponding targeted reclaimed water sites for urban reclaimed water use are:

- Spokane County Interstate Fair and Expo Center
- City of Spokane Parks Department (Esmeralda Golf Course)
- Spokane County Parks Department (Plante's Ferry Park)
- Painted Hills Golf Course

The potential reclaimed water use sites are shown in Figure 10 through Figure 13.

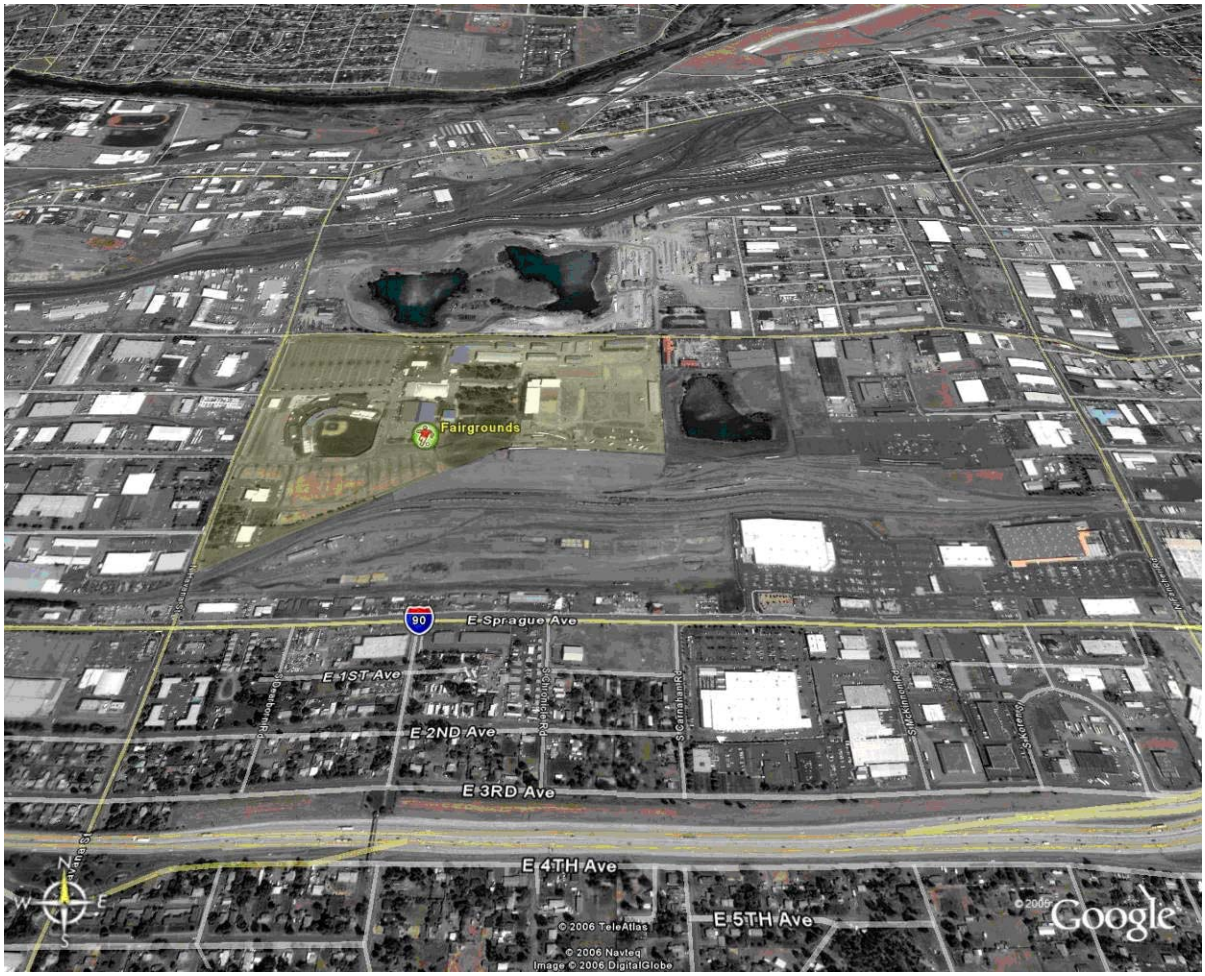

Figure 10. Spokane County Interstate Fair and Expo Center (Viewing north)

Figure 11. City of Spokane Parks Department Esmeralda Golf Course (Viewing North)

Figure 12. Spokane County Parks Department Plante's Ferry Park (Viewing North)

Figure 13. Painted Hills Golf Course (Viewing North)

At this time, urban reclaimed water use sites have not been secured. However, three of the potential urban reclaimed water use sites – Esmeralda Golf Course, Painted Hills Golf Course, and Plante's Ferry Park – are 2 miles, 7 miles, and 6 miles, respectively, from the SCRWRF. Also, the Spokane County Fair and Expo Center is located within 1 mile of the SCRWRF and along the potential route to the Painted Hills Golf Course. These sites account for an approximate total irrigable area of 350 acres and an average demand of 1.5 mgd through the summer months (19 percent of the average reclaimed water production), and 2.8 mgd maximum monthly demand (35 percent of SCRWRF reclaimed water production capacity).

Note that at the time this Reclaimed Water Use Study was being prepared, the City of Spokane expressed no interest in using reclaimed water from the Spokane County Regional Water Reclamation Facility at Esmeralda Golf Course.

Table 11. Urban Irrigation Reclaimed Water Use Sites and Seasonal Phosphorus Load Reduction

Reuse Site	Irrigable Area (acres)	Peak Day Demand (gpd)[a]	Average Daily Demand (gpd)	Seasonal Phosphorus Load Reduction (lbs)[b]
Esmeralda Golf Course	162	2,560,000	696,000	51.8
Painted Hills Golf Course	87	1,380,000	374,000	27.8
Plante's Ferry Park	90	1,420,000	387,000	28.8
Spokane County Interstate Fair and Expo Center	15	236,000	64,000	4.8
Total	**354**	**5,596,000**	**1,521,000**	**113.2**

a) Peak day demand was estimated by multiplying the maximum monthly demand by a factor of 2.0.

b) Calculated based on 50 µg/L at rate of water volume disposed. Irrigation season is 149 days from May 15 to October 10. Season defined in the Spokane River TMDL Managed Implementation Plan is April through October (214 days).

Capital Requirements

Based on the evaluation of potential demand, it appears that an urban reclaimed water use program would use only a portion of the reclaimed water produced by Spokane County. Consequently, the program could be served "on demand" with storage requirements limited to those needed for operational fluctuations in supply and demand.

Initial estimates of facility requirements and cost are based on serving the Painted Hills and Esmeralda golf courses, Plante's Ferry Park, and the Interstate Fair and Expo Center from the SCRWRF. This would produce a maximum monthly water demand of 2.8 mgd in July and an average demand of about 1.5 mgd over the six summer months. Storage volumes are based on two days of storage at the maximum month distribution rate. Booster pump stations would be required to increase the discharge pressure to 50-60 psi for medium pressure irrigation systems, and to convey flow for the reclaimed water use sites.

Table 12. Estimated Reclaimed Water Distribution Costs for Urban Irrigation Use Sites

Irrigation Use Site and Distribution Facility	Facility Size	Preliminary Cost Opinion, $1000[1]
Esmeralda Golf Course	11,600 LF of 12-in pipe	2,200
Painted Hills Golf Course	40,130 LF of 8-in pipe	5,700 [2]
Plante's Ferry Park	36,950 LF of 8-in pipe	5,250
Spokane County Interstate Fair and Expo Center	4,750 LF of 8-in pipe	675 [2]
RW Pump Station	1,950 gpm at 180TDH	450
RW Storage Tank	5.5 MG	5,500
Appurtenances	(12% of other costs)	1,125
Total		$21,000

1. Costs based on $142 per LF of 8-in pipeline and $190 per LF to construct 12-inch pipeline. (ENR 20-City Cost Index = 8,007.48; August 2007). Conceptual planning-level cost opinion.
2. Spokane County Interstate Fair and Expo Center and Painted Hills Golf Course sites are located along potential alternative pipeline routes to the Saltese Flats area.

At a planning level, the preliminary opinion of capital cost to convey 2.8 mgd of reclaimed water during the peak demand month (July) to four urban landscape irrigation sites is approximately $21 million. Amortizing distribution costs for reclaimed water service to the four landscape irrigation sites identified above over a 30-year period at 5 percent interest results in a unit capital cost of $6.00 per thousand gallons conveyed or $1,960 per acre-foot used. The extensive pipeline system (over 17 miles of 8 to 12-inch pipe) necessary for distribution to limited seasonal demands of 1.5 mgd averaged over a 5-month period (700 AFY) represents the primary cost impediment. A rough 'rule-of-thumb' expression, indicative of economically viable reclaimed water use projects, for 8 to 12-inch diameter pipe is less than 150 lineal feet per million gallons of annual use (50 LF/AF of annual yield). The individual urban irrigation projects above present unit values (feet of pipeline per quantity of water used) which are 2.5 to 3 times this general indicator of economic feasibility.

Potential pipelines for the conveyance of reclaimed water are shown in Figure 14, Figure 15, Figure 16, Figure 17, and Figure 18. A potential North Reclaimed Water Pipeline which connects the Water Reclamation Facility with the Esmeralda Golf Course to the north, crossing the Spokane River is shown in Figure 14. Figure 15 shows a potential Valley Reclaimed Water Pipeline route connecting the Water Reclamation Facility with the Plante's Ferry Park, passing the Inland Empire Paper Company

immediately south of a Spokane River crossing. Interest in obtaining reclaimed water was low for Inland Empire Paper due to existing readily available and sufficient supplies. However, should interest increase in the future, reclaimed water would be readily available to IEP if this pipeline were constructed along the route shown in Figure 15.

Figure 16 presents potential pipeline routes for the South Valley Reclaimed Water Pipeline. The South Valley Reclaimed Water Pipeline connects the Water Reclamation Facility to the south with the Painted Hills Golf Course, passing the Spokane County Interstate Fair and Expo Center and running along the north and east side foothills of the Dishman Hills.

Figure 17 and Figure 18 shows alternative routing of a pipeline to the Saltese Flats wetlands. Conveyance to Saltese Flats could be provided through an extension of the South Valley Pipeline, running east from the Painted Hills Golf Course to the Saltese Flats wetlands. As an alternative, the Valley Pipeline at Plante's Ferry Park could be extended, connecting the wetlands from the north. This northern pipeline routing could potentially pass near the Spokane Industrial Park and Kaiser Aluminum. Similarly to Inland Empire Paper, both Kaiser Aluminum and Spokane Industrial Park show little interest in obtaining reclaimed water due to existing readily available and sufficient supplies. However, should interest increase in the future, reclaimed water would be readily available to either entity if this pipeline were constructed along the route shown in Figure 17.

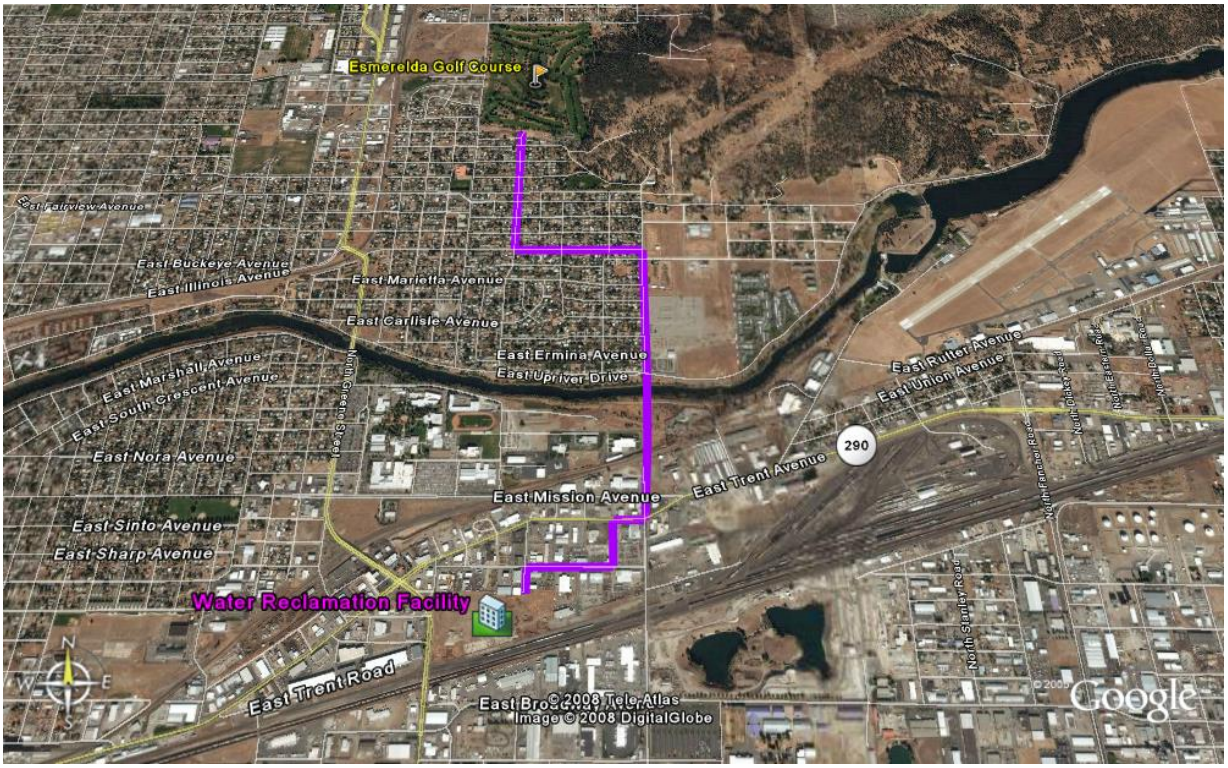

Figure 14. North Reclaimed Water Pipeline to Esmeralda Golf Course

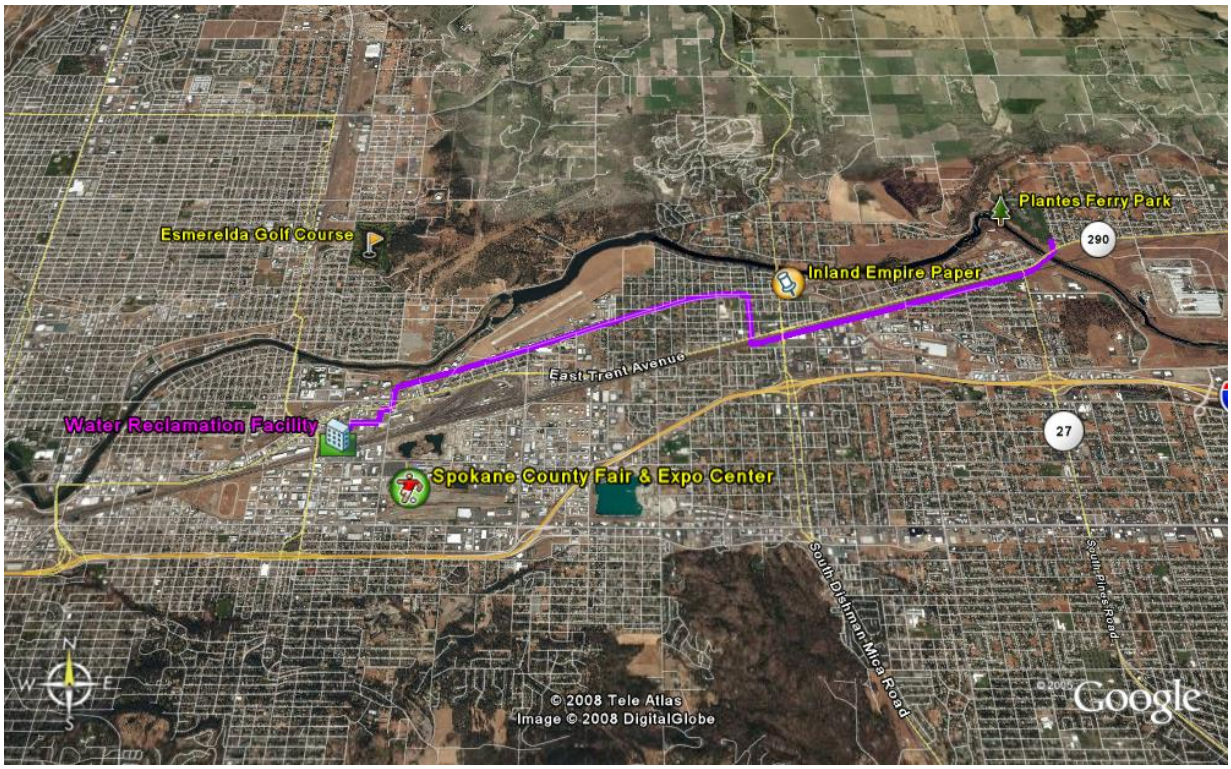

Figure 15. Valley Reclaimed Water Pipeline to Plante's Ferry Park

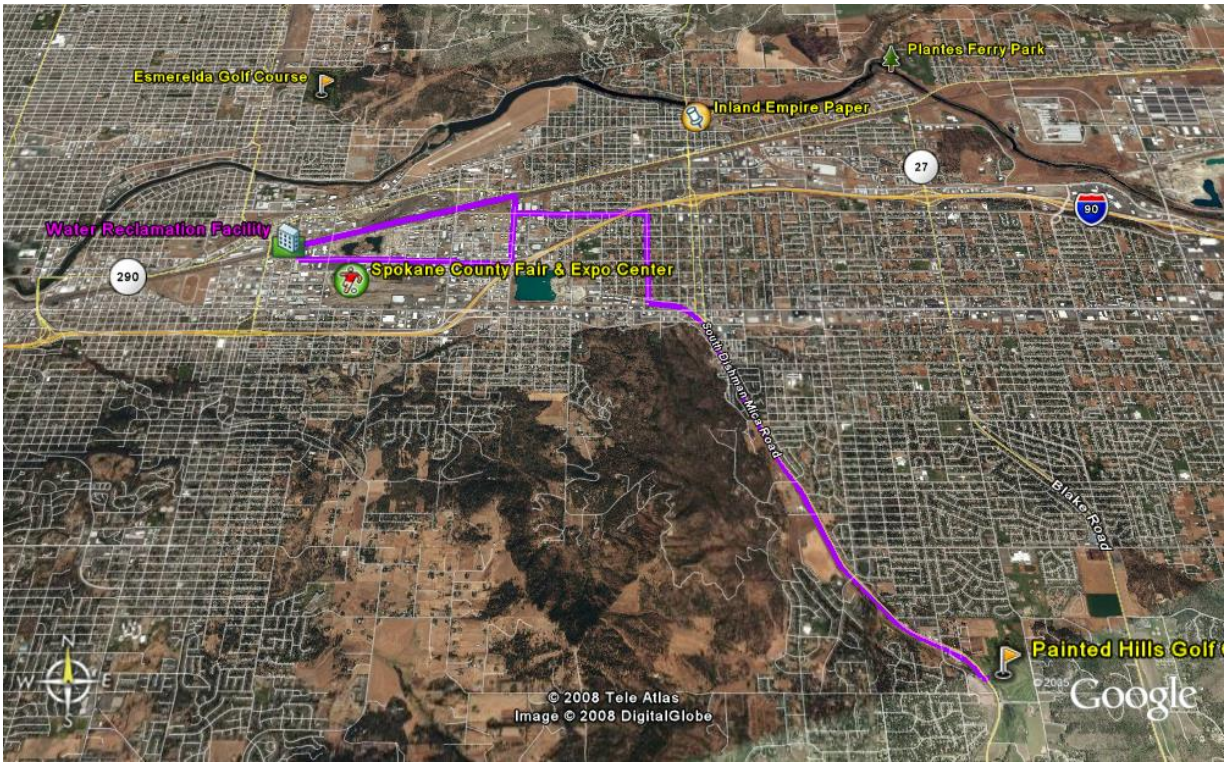

Figure 16. South Valley Reclaimed Water Pipeline to Painted Hills Golf Course

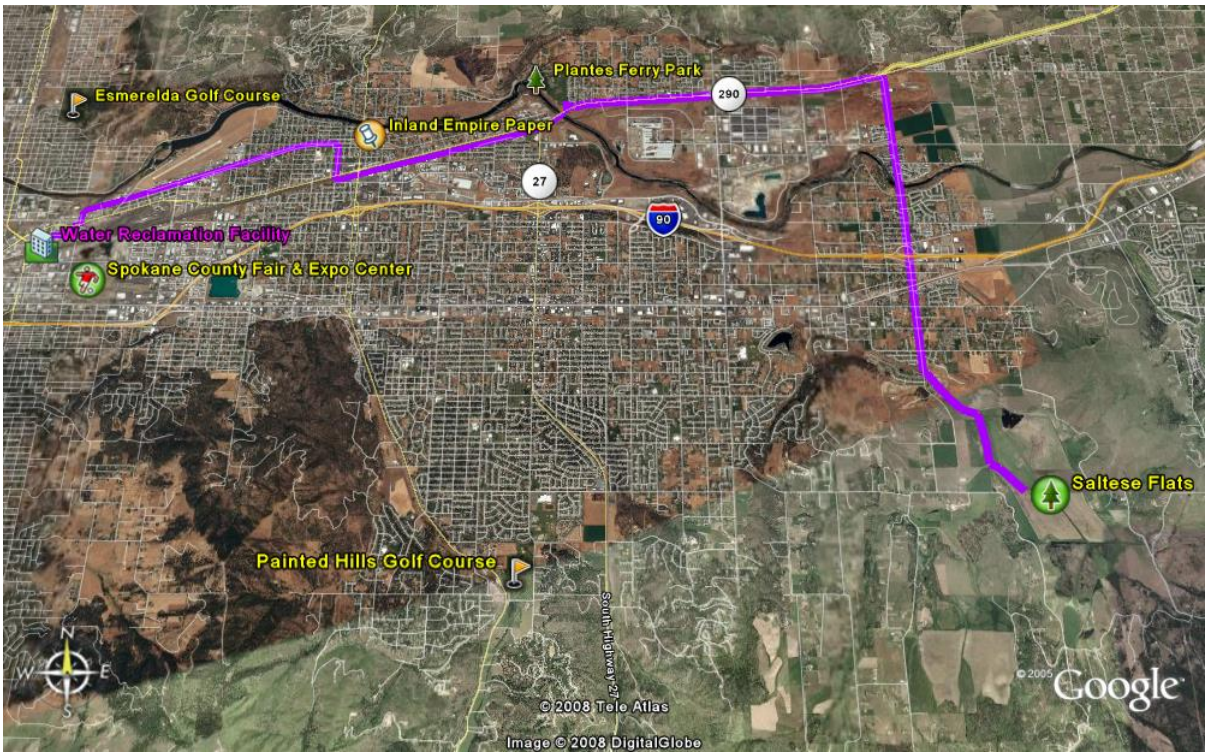

Figure 17. Saltese Reclaimed Water Pipeline (North) to Saltese Flats Wetlands

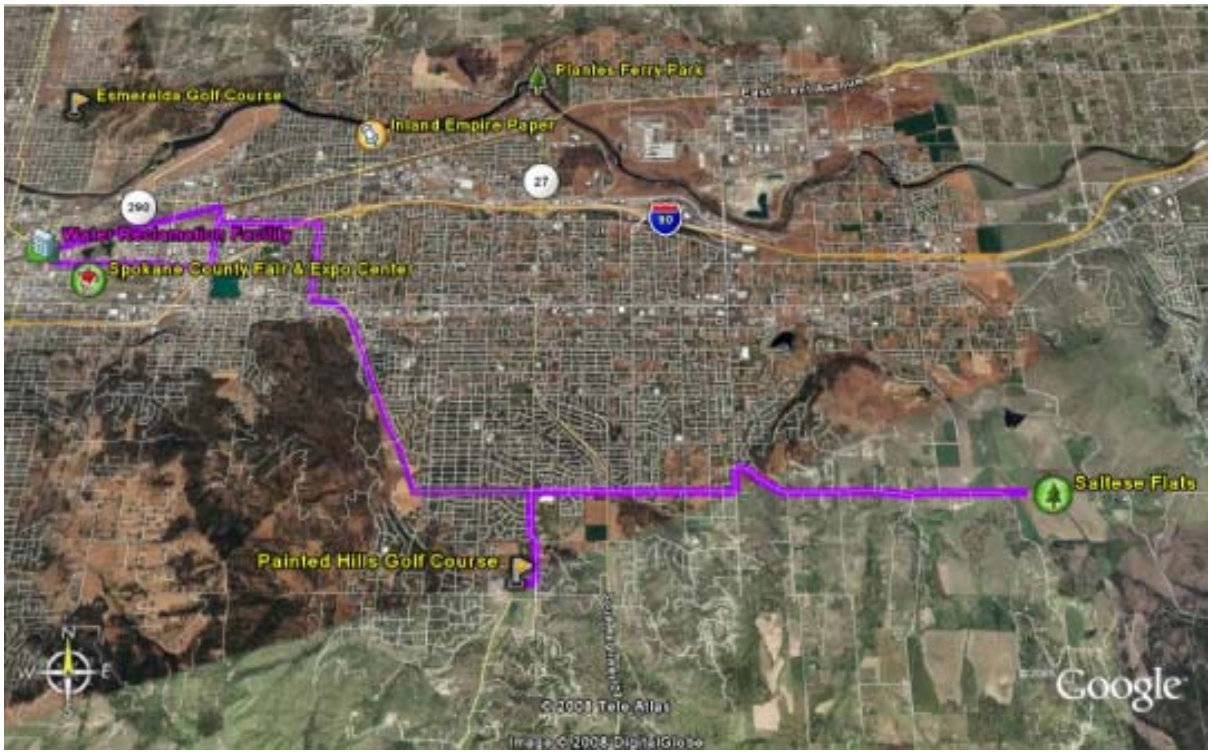

Figure 18. Saltese Reclaimed Water Pipeline (South) to Saltese Flats Wetlands

A possible alternative to installing over 18 miles of reclaimed water distribution piping would be to construct satellite water reclamation facilities adjacent to wastewater sources within the collection system but also near potential areas of reuse. In recent years, vendors of membrane bioreactor (MBR) units have developed small, package treatment plants capable of producing Class A reclaimed water. These package MBR plants are manufactured in sizes ranging from 5,000 gpd to 40,000 gpd for pre-assembled units and up to 100,000 gpd for larger pre-engineered units. Opinion of facility costs range from $7 to $20 per gpd, depending on plant size, biosolids processing, discharge constraints and site-specific conditions.

Effluent from three small County-owned wastewater treatment facilities is currently conveyed to either community drain fields or infiltration ponds. These treatment facilities are being phased out as the County extends its sewer system into outlying areas. An infiltration pond (or drain field) typically requires much more space than a MBR package plant, so adequate space at such sites would likely to available to construct small MBR units. These facilities could be located higher in the collection system, as long as there was adequate minimum flow for processing, and in closer proximity to identified reclaimed water use sites. This satellite or sub-regional configuration can reduce the extent of reclaimed water transmission and pumping when compared to a centralized regional water reclamation facility, however operational costs for processing can be considerably greater.

Table 13. Package MBR Opinion of Cost for Urban Irrigation Site Use

Reuse Site	Average Demand, gpd	Cost for MBR Units, $1000[b]	
		at $7/gpd[a]	at $20/gpd[a]
Esmeralda Golf Course	696,000	4,872	13,920
Painted Hills Golf Course	374,000	2,618	7,480
Plante's Ferry Park	387,000	2,709	7,740
Spokane County Interstate Fair and Expo Center	64,000	448	1,280
Total	1,520,000	10,640	30,400

a) Cost range based on US Filter information presented on website (2007$). http://www.water.siemens.com/en/product_lines/envirex_products/Envirex_Products/Pages/envirex_mbr_xpress_packaged_plant.aspx. Cost includes a predesigned system with prefabricated steel tanks, screening equipment, skid-mounted pumps, aeration equipment, and submerged membranes.

b) Conceptual planning-level cost opinion.

Figure 19. Example US Filter Package MBR

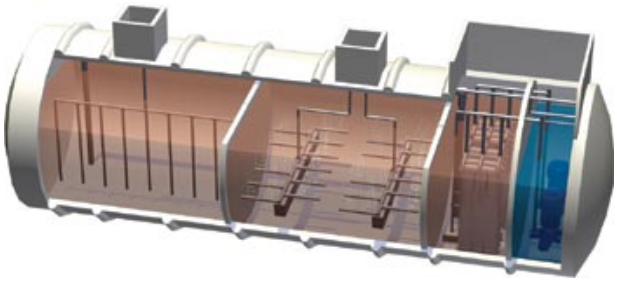

Figure 20. Example Zenon Environmental Package MBR

Figure 21. Example Kubota Package MBR Units

For purposes of comparing alternative urban reclaimed water use concepts, costs are based upon providing the same amount of reclaimed water (2.5 mgd peak summertime demand) to the four identified landscape irrigation sites. Cost estimates for the two alternative approaches to urban green space irrigation are shown in Table 14.

Table 14. Alternative Urban Reclaimed Water Use Cost Comparison

Cost Component	Alternative A Reclaimed Water Distribution System	Alternative B MBR Systems
Capital, $M	21	15.0 – 32.0
Operation and Maintenance, $1000/yr	220	175 - 230
Total Annual Cost, $1000/yr [a]	1,590	1,480 - 3,015
Unit Cost, $/thousand gallons used [b]	7.00	6.50 - 13.20
Unit Cost, $/AF of yield	2,270	2,115 - 4,300
Relative Difference	-	-7% to 90%

a) Amortized capital at 5% over 30 years for pipelines and 20 yrs for MBR units plus annual O&M.
b) Both alternatives assume 1.5 mgd average reclaimed water use over 5 month period (700AFY).

The magnitude of total cost (capital and O&M) associated with either alternative is considerable. Locating small MBR treatment systems in the general vicinity of the reclaimed water use sites does not indicate that there would be any significant reduction in costs. Assuming mid-range MBR development costs, Alternative B (MBR system) presents approximately 40 percent greater costs for comparable yield than does Alternative A (reclaimed water pipeline distribution). Neither system would be

considered economically feasible due to the seasonal nature of demands as well as the large capital expenditure for construction of the conveyance or treatment facilities. Unit costs for economically viable or feasible projects are typically one-third to one-fourth the magnitude of these two urban irrigation use concept alternatives.

Industrial Reclaimed Water Use

Points of Application

Efforts to investigate potential industrial reclaimed water use have been focused on four primary opportunities:

- Concrete manufacturing plants
- Kaiser Aluminum Facilities
- Inland Empire Paper
- Spokane Industrial Park

The locations of these industries are shown in Figure 22.

Concrete Plants

Central Pre-Mix and Western Concrete Products are the primary owners of concrete premix facilities in the County. Of these, only Western Concrete Products has shown any interest in using reclaimed water to replace City water for concrete processing. Central Pre-Mix uses private well water that they obtain inexpensively and is not interested in reclaimed water.

Western Concrete Products operates three plants in the City of Spokane that manufacture concrete products. Based on water consumption records, an estimate of the potential reclaimed water demand was developed assuming that 80% of current water use could be met by reclaimed water. Demand would typically be 37,000 gpd with

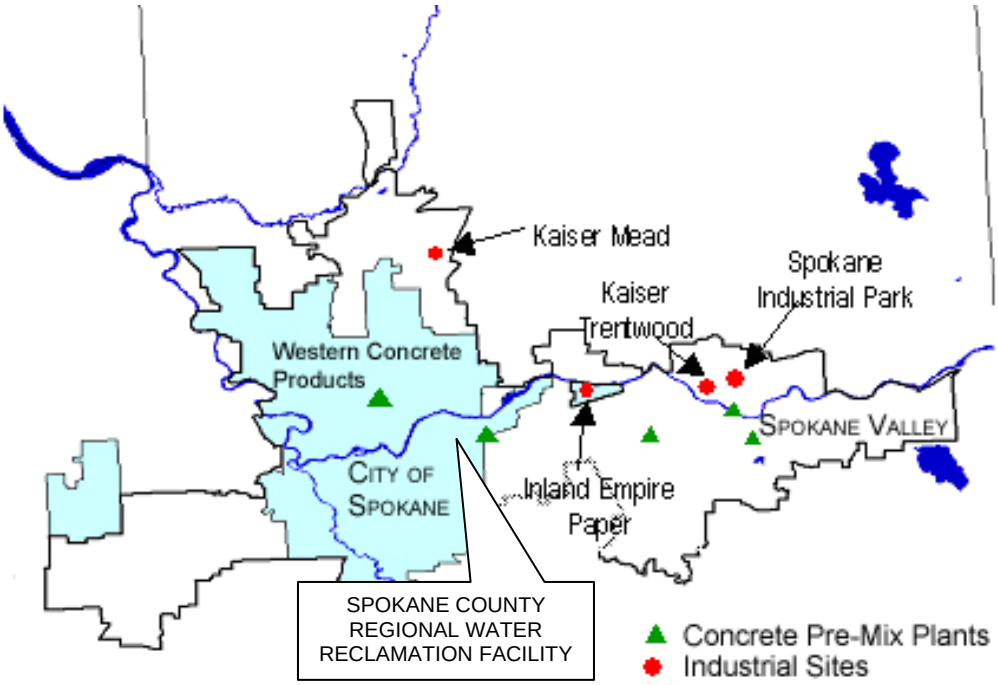

Figure 22. Potential Industrial Reclaimed Water Use Sites

occasional peak demands of up to 200,000 gpd. This volume of reclaimed water use could be met "on demand" without the need for storage.

Kaiser Aluminum

Kaiser Aluminum operates a manufacturing facility in the Spokane area: the Trentwood facility along the Spokane River in the Valley. Kaiser is in the process of making changes in their water systems, and is not interested in considering use of reclaimed water at this time. While there may be more interest in using reclaimed water in the future, the facilities are likely to continue to use private well water for process needs in the near term.

Spokane Industrial Park

The Spokane Industrial Park (SIP) manages four on-site wells, with a total production of 1.8 mgd. Industrial tenants purchase water from the Park for cooling and process water. Cooling water is discharged to drywells for infiltration and wastewater is routed to the Spokane County collection system for treatment. The Industrial Park manages over 100 industries with seven requiring a significant volume of water for cooling.

Interest in the use of reclaimed water by SIP management was low. Concerns were expressed regarding the temperature and water quality of the reclaimed water relative to the current groundwater source. Specific industries have not been contacted to determine individual interest, or to ascertain whether their agreements with the Industrial Park would allow them to engage in an agreement to accept reclaimed water from the County.

Inland Empire Paper Company

Inland Empire Paper (IEP) Company produces newsprint at their Spokane mill. The current total water use is 4.3 mgd, with the potential to increase to 5.6 mgd if paper production capacity increases to 900 tons per day. Of the current water use, approximately 1.2 mgd is used for non-contact cooling purposes. The mill operates 7 days per week, 24 hours per day except for a 32-hour shutdown December 24 & 25 each year. The company currently uses water from a private well that produces high-quality process water at a constant 55°F temperature. IEP treats wastewater onsite and discharges to the Spokane River through an impoundment located upstream of the Upriver Dam. Figure 23 shows the location of Inland Empire Paper, viewing north.

Figure 23. Inland Empire Paper (Viewing North)

Potential reclaimed water use scenarios at IEP depend on whether the reclaimed water could be used for part or all of the plant water needs, and whether additional treatment of the reclaimed water is needed for use in the paper processing operation. Based on these considerations, four scenarios were identified during initial discussions with IEP:

- Use of 1.2 mgd of filtered reclaimed water for non-contact cooling uses (requires significant piping changes)
- Use of 4.3 mgd of filtered reclaimed water for general mill use (requires minimum piping changes)
- Use of 4.3 mgd of filtered and activated carbon-treated reclaimed water for general mill use (if color reduction is required)
- Use of 3.1 mgd of filtered and activated carbon-treated reclaimed water for general mill use and 1.2 mgd of filtered reclaimed water for non-contact cooling use (needs significant piping changes)

IEP had developed a strategy to contain, treat, and reuse its entire paper production process water flow, except for approximately 1 mgd. Their objective was to limit the non-potable water demand at IEP to approximately 1 mgd, and to meet the demand with their groundwater source. However, the pilot testing conducted by IEP to reduce phosphorus in its waste stream did not yield desired results. Thus, interest by IEP management in obtaining and using reclaimed water was originally low, but may have increased recently. Discussions between the County and IEP are ongoing.

Facility Requirements and Cost

Facility requirements vary for the four IEP scenarios identified earlier. All of the scenarios require treatment to at least Class A reclaimed water standards and conveyance of the reclaimed water from the SCRWRF. Internal piping changes at IEP would depend on whether the reclaimed water can be applied for general use or can only be used for the cooling operation. The general use scenarios would require minimal piping changes, whereas the cooling-water only scenario would require extensive re-plumbing to separate this water use from the other plant uses. For all alternatives, some level of storage would be needed. Initial cost estimates are based on 6 hours of storage. For those scenarios that involve reducing the color of the reclaimed water prior to its use in the paper processing operation, it has been assumed that activated carbon treatment would be provided downstream of the SCRWRF. The estimated capital costs of the four scenarios are presented in Table 15.

Table 15. Capital Cost of Reclaimed Water Use at Inland Empire Paper Company

Cost Component	Alternative Capital Costs ($1000)[c]			
	A - Cooling Water Only [a]	B- General Use–No Treatment [b]	C - General Use–w/ Treatment [b]	D - Split Use–w/ Treatment [b]
Post-Class A Treatment (on site)	0	0	4,240	3,140
Conveyance (20,350 LF pipeline)	6,285	8,215	8,215	8,215
Booster Pump Station	455	750	750	750
Site Development (piping changes)	180	160	160	180
On-site Storage/Appurtenances	290	365	475	315
Total	7,210	9,490	13,840	12,600

a) Alternative A can utilize 1.2 mgd year-round (1,300 AFY) with a 12-inch pipeline.

b) Alternatives B, C and D can utilize 4.3 mgd year-round (4,800 AFY) with an 18-inch pipeline.

c) Conceptual planning-level cost opinion.

Overall capital costs associated with Alternative A (cooling water only) are estimated at $7.2 million, translating to a unit cost of $1.10 per 1000 gallons used ($360/AF) exclusive of annual O&M costs. Increasing yield to 4,800 AFY for general use under alternatives B through D would reduce the unit cost of capital from $0.40 to $0.58 per 1000 gallons used ($130-185/AF) excluding O&M cost. Assuming O&M costs in the $1.00 to 1.50 per 1000 gallons ($240-360/AF) range inclusive of post-Class A treatment indicates that industrial reclaimed water use at IEP could represent a more economically attractive opportunity than seasonal urban landscape irrigation. The greatest impediment to implementing such a project, irrespective of possible cost

savings, is the willingness of the potential user to convert from an existing dependable and reliable source of water supply to a new source with which they have no experience and for which the water chemistry is unproven in their industrial process.

Wetlands Creation or Enhancement

Points of Application

The State of Washington reclaimed water use standards dictate the wetted wetland area required for a given volume of reclaimed water be based on both hydraulic loading and water level. The criteria for constructed beneficial use wetlands are:

- Maximum annual average hydraulic loading rate of 5 cm/day (calculated as the ratio of average annual flow rate of reclaimed water to the effective wetted area of the wetland).
- Average monthly water level elevations under the reclaimed water wetland hydrologic regime are not to increase by more than 10 cm compared to the average pre-augmentation monthly water level.

According to a wetland inventory conducted for Spokane County in 1991, the majority of natural wetlands are located in the western and southwestern portions of the county, and along the lower portion of the Little Spokane River. In the Spokane Valley, there are few wetlands due to the permeable nature of the soils. Given this situation, developing created beneficial wetlands or augmenting existing wetlands of the magnitude required for 100 percent of the flow from the SCRWRF would be problematic. The wetlands would need to be spread out over long distances, and conveyance costs would be high.

While current standards do not require created wetlands to be lined, it may be prudent to consider a lining based site-specific issues including those related to interaction with potable aquifers Unlined wetlands may be acceptable along gaining stretches of the river where the water is allowed to infiltrate and move laterally to the surface water. Unfortunately, in Spokane, many locations where such systems could occur are already developed. However, there may be opportunities to locate or augment smaller wetlands along the River in areas where shoreline setback requirements make the property immediately adjacent to the River un-developable. Other potential sites would be along the Little Spokane River north of the North Spokane area. Most of the Little Spokane River is recharged from the Aquifer in this section, so unless there are drinking water wells located between the wetlands site and the river, the risk of impacting water quality in a subsurface aquifer is minimal. Such sites would be conveniently located for discharge from a North Spokane area water reclamation facility, but would require pumping reclaimed water 12-15 miles from the site of the SCRWRF.

Reclaimed water provides a reliable water supply for restoring degraded wetlands, so there may be some opportunities for the County to partner with the Department of Fish and Wildlife to restore natural wetlands. This alternative would not significantly impact the need for or size of the facilities necessary for conveyance of reclaimed water to the

river when it cannot otherwise be beneficially reused and it would provide an opportunity to enhance natural resources in the area.

One location where wetlands restoration or enhancement is possible is south of the Painted Hills Golf Course within the vicinity of Chester Creek. The potential wetlands area is approximately 40 acres. A reclaimed water pipeline would convey water to the Painted Hills Golf Course for irrigation and the pipeline would continue past the golf course to the area of wetlands enhancement.

The County is also considering use of reclaimed water to restore the wetlands at Saltese Flats (Figure 24). Saltese Flats is located approximately 3 miles south of Interstate 90 from the Barker Road exit. In the late 1800's or early 1900's, approximately 342 acres of historic wetlands were drained to develop agricultural land. These lands are located immediately down-gradient from existing wetlands. Under this concept, reclaimed water from the SCRWRF would be pumped approximately 15 miles to Saltese Flats, some 9.1 miles beyond Plante's Ferry Park or 6.5 miles beyond the Painted Hills Golf Course, where it would be used to renew (via re-hydration) the wetlands area. Prior to developing the Saltese Flats wetlands, an evaluation of the soil chemistry should be prepared to account for the potential build-up of nitrates, dissolved salts, and other constituents which could have accumulated over the decades of agricultural use of the land.

An annual average hydraulic loading rate of 8 mgd over 342 acres is 2.19 cm/day (0.86 in/day). Phase 2 of the Spokane County Regional Water Reclamation Facility will be designed for an annual average of 12 mgd. The annual average hydraulic loading rate of 12 mgd over 342 acres is 3.29 cm/day (1.29 in/day). The annual average hydraulic loading rates for 8 mgd and 12 mgd of reclaimed water production capacity are well within the maximum annual average hydraulic loading rate of 5 cm/day (<1.98 in/day) defined in Washington's Water Reclamation and Reuse Standards. Therefore, sufficient land likely exists within the 342 acres to beneficially reuse reclaimed water for wetlands enhancement and provide space for service roads, buffer areas, and storage facilities as may be required.

Implementation of the Saltese Flats wetlands restoration option could include providing an additional water supply to Shelley Lake in the South Valley region. Shelley Lake is located 1.5 miles west of Sullivan Road and 1 mile south of Interstate 90. This water body was once stream-fed, but flows to the lake have decreased as the area has developed. A home developer near the lake currently pumps water during the summer in order to maintain lake level. The quantity of water added to the lake is not known, nor have specific developments around the lake been evaluated to determine how much land may be available for constructed wetlands. While the Saltese Flats project is intended for wetlands restoration, the site could also be used for aquifer recharge. However, because these are different beneficial uses of reclaimed water and afford the County different benefits, the amount of water delivered to a constructed beneficial use wetland, natural wetland, or to aquifer recharge would have to be measured and carefully managed separately if the site is intended to be used for both purposes.

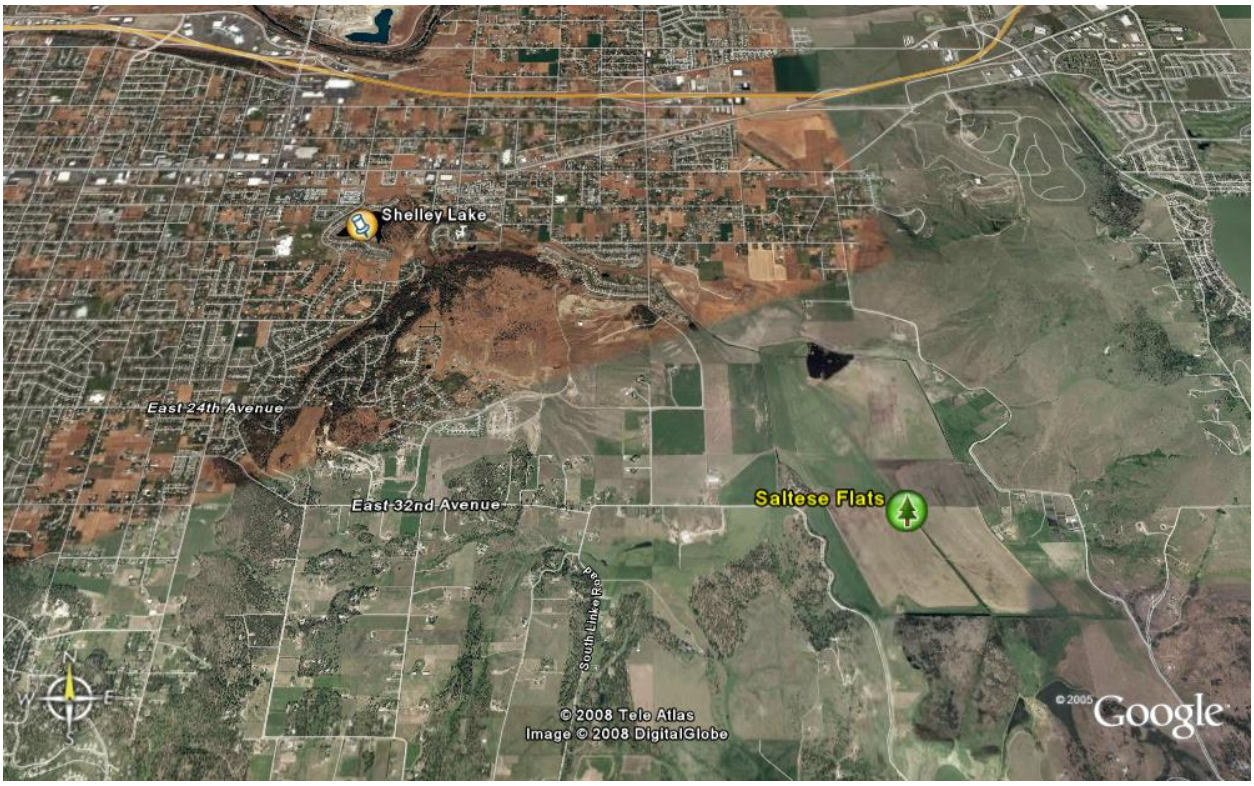

Figure 24. Saltese Flats (View to North)

Facility Requirements and Cost

Preliminary evaluation of facility requirements and costs are based on two alternatives. Alternative A, creation of 40 acres of wetlands to handle 2 mgd (3 cfs) of flow upstream of the Painted Hills golf course and Alternative B, development of a 342 acre Saltese Flats site to accommodate 8 mgd (12 cfs). Provisions for future flows from Phase 2 of the SCRWRF could be designed into this conveyance infrastructure, as well. Costs include conveyance (estimated at 7.7 miles for Alt. A and 14 miles for Alt. B and C); a pump station capable of lifting 1,400 to 5,600 gpm of flow at a total dynamic head of 280 to 320 feet, respectively for Alternative A and Alternative B, and up to 8,330 gpm for Alternative C; construction of liners; and land acquisition. Table 16 summarizes the estimated capital costs associated with these three wetland alternatives.

Table 16. Opinion of Capital Cost for Wetlands Restoration and Enhancement

Cost Component	Alt. A Cost [a,d] ($1000)	Alt. B Cost [b,d] ($1000)	Alt. C Cost [c,d] ($1000)
Wetlands Location	Upstream of Painted Hills Golf Course	Saltese Flats (Phase 1)	Saltese Flats (Phase 2)
Area, acres	40	342	342
Conveyance (40,500 LF of 18-in pipeline)	9,900	-	-
Conveyance (74,000 LF of 24-in pipeline)	-	25,000	
Reclaimed Water Booster Pump Station (1,400 gpm at 280' TDH) [a]	600	-	-
Reclaimed Water Booster Pump Station (5,600 gpm at 320' TDH) [b]	-	2,000	2,000
Reclaimed Water Booster Pump Station (Add another 2,730 gpm for a total of 8,330 gpm at 320' TDH) [c]	-	-	1,000
Site Development/Restoration	1,000	4,700	-
Upstream Land Purchase	300	1,400	-
Total	11,800	33,100	3,000

a) Alternative A sized to accommodate 1.5 mgd year-round (1,600 AFY).
b) Alternative B facilities sized to accommodate 8 mgd year-round (8,900 AFY).
c) Alternative C facilities sized to accommodate 12 mgd year-round (13,400 AFY).
d) Conceptual planning-level cost opinion.

Overall capital costs associated with Alternative A, involving a 40-acre site south of Painted Hills Golf Course, are estimated at $11.8 million, translating to a unit cost of $0.80 to $1.45 per 1000 gallons delivered ($480/AF) exclusive of treatment and annual O&M costs. Capital costs associated with Alternative B, involving a 342-acre site at Saltese Flats, are estimated at $33.1 million, translating to a unit cost of $0.60 to $1.00 per 1000 gallons ($330/AF) excluding treatment and annual O&M costs. Capital costs associated with executing Alternative C, to increase the flow of reclaimed water to a 342-acre site at Saltese Flats, are estimated at $3 million, translating to a unit cost of $0.10 to $0.18 per 1000 gallons ($60/AF) for the additional 4 mgd (8 mgd expanded to 12 mgd) excluding treatment and annual O&M costs. Assuming comparable O&M costs for distribution (pumping) and wetland maintenance in the $200-240/AF range indicates that wetlands enhancement may represent a viable reuse opportunity when considered in conjunction with seasonal urban landscape irrigation and potential groundwater recharge projects. An advantage of this approach is diversion of a much greater quantity of reclaimed water flow during the TMDL period of April-October with a subsequent net reduction of phosphorus discharge to the Spokane River.

Aquifer Recharge

Points of Application

Figure 25 shows the wellhead capture zones of the Spokane Valley Aquifer east of the City of Spokane to the Idaho border. The figure illustrates required separation based upon on the criterion of 1-year time of travel. This figure was derived from the City's Wellhead Protection Program Phase I Technical Assessment Report (CH2M Hill, 1998) as provided by the Spokane Aquifer Joint Board. Given the rapid movement of the Spokane Aquifer, the 1-year residence criterion requires an extensive separation distance between a reclaimed water recharge location upgradient from a withdrawal well. Since the time that the City's Wellhead Protection Program Phase I Technical Assessment Report was prepared, the USGS prepared a new Spokane Valley Aquifer hydrogeologic model. This new model could potentially be used to more accurately depict groundwater movement in the SVRP.

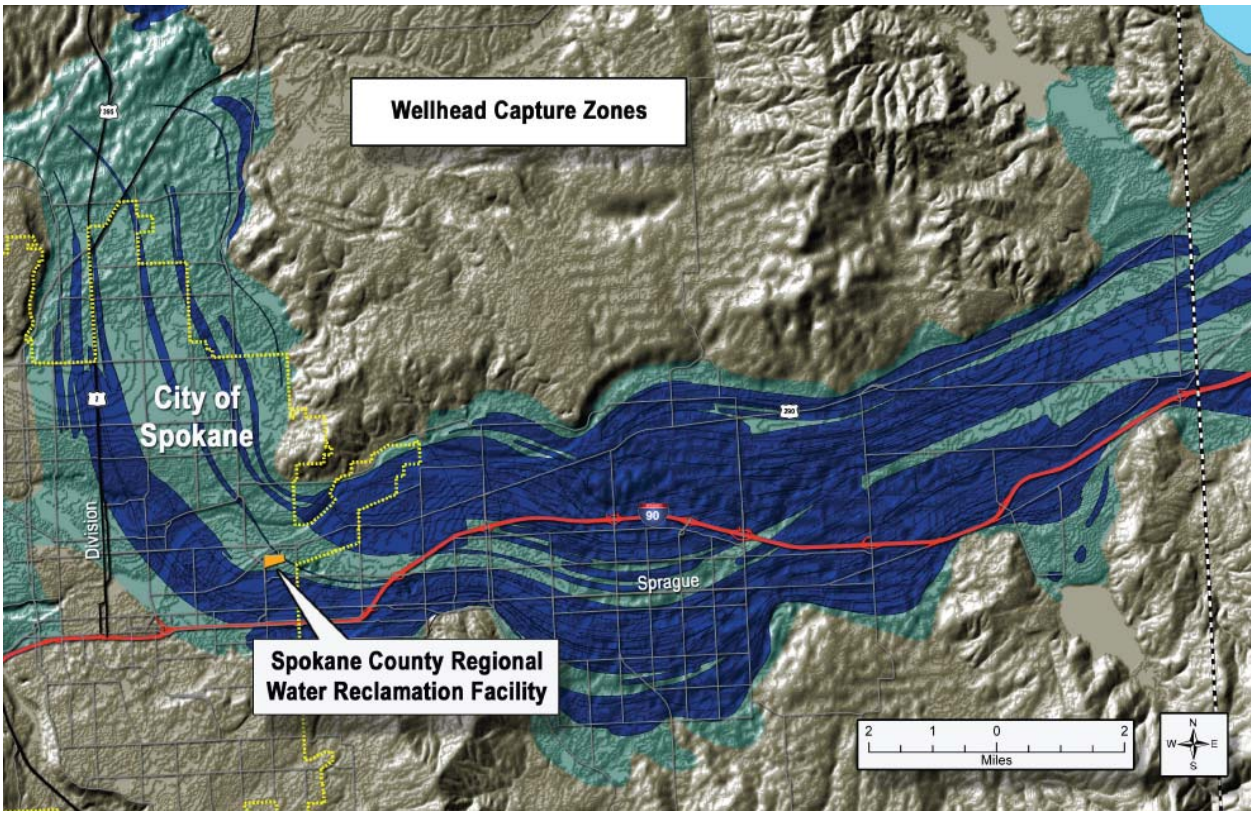

Figure 25. Aquifer and Well Locations

Facility Requirements and Costs

The key facility requirements associated with treatment, storage and the method of recharge are as follows:

Treatment

In addition to treatment technology considerations listed under Quality Requirements, redundancy is needed at the treatment facility. All key treatment processes (biological treatment, clarifiers, coagulation facilities, filtration, reverse osmosis, and disinfection) must have redundant units such that the entire flow can be treated at all times with one unit out of service.

With reverse osmosis, a major cost consideration is brine disposal. Given the inland location of Spokane County, low cost solutions such as ocean disposal are unavailable. Mechanical evaporation of this waste stream may be required.

Storage

According to the Washington State Water Reclamation and Reuse Standards, “at a minimum, system storage capacity must be the volume equal to three times that portion of the average daily flow of reuse capacity for which no alternative reuse or disposal system is permitted.” Therefore, a conservative estimate (“worst case”) of required system storage if aquifer recharge (or any single reuse system) were the only method employed to manage reclaimed water would be 24 MG, 36 MG, and 72 MG for 8 mgd, 12 mgd, and 24 mgd of SCRWRF flow, respectively. There are a number of ways the required storage volume can be achieved.

Surface Percolation (Alternative A)

The Process Design Manual for Land Treatment of Municipal Wastewater (USEPA, 1981) suggests surface percolation basins designed to maximize infiltration typically apply effluent over 1 to 3 days with a 3 to 6 day drying period in the summer months (or a 1 to 1 ratio of drying to flooding). For the winter months, basins designed to maximize infiltration should apply effluent over 1 to 3 days with a 5 to 10 day drying period. However, data from other surface percolation basins already in operation in Washington indicate flooding and drying cycles of 4 days year round is sufficient.

Provided the soil saturated hydraulic loading rate and the average reclaimed water daily flow are known, the area required for infiltration can be calculated. This calculation is simply the daily wastewater flow divided by the long term average surface hydraulic conductivity. The saturated hydraulic conductivity rates could vary from 30 ft/day to 150 ft/day in the area of the SCRWRF. The next step is to determine the long-term average infiltration rates with the required drying times. This is done by dividing the long-term hydraulic loading by the number of days for the flooding (3 days) and drying (4 days) cycle. This results in a long-term hydraulic loading rate of approximately 4 to 21 ft/day. If the County determines winter infiltration is desired, the infiltration rate typically decreases by 40 to 50 percent resulting in a hydraulic loading rate of 2 to 10 ft/day.

Using the lowest hydraulic loading rate of 2 ft/day, 12.2 acres of surface percolation basins are required at all times. It is estimated that service roads, distribution equipment, and buffer areas will require an additional 20% of land area. Therefore,

approximately 15 acres of land will be needed to recharge 8 mgd of reclaimed water based upon the assumed winter saturated hydraulic loading rate.

Because the Pilot Project is to be located on the SCRWRF site, only 3.5 acres is available to construct the basins. This results in an effective hydraulic loading rate of 6 ft/day which is on the low end of the estimated range. For the purposes of sizing the full scale project without additional hydraulic loading data, the lowest winter infiltration rate has been used.

The detailed design process for surface percolation basins will be centered on both the actual determined surface hydraulic conductivity and the soil treatment capacity for phosphorus removal. Thus, the key criteria necessary for a detailed design will include the following:

- Field hydrogeotechnical analysis and testing to verify the long term infiltration rate and hydraulic conductivity of the site.
- Empirical bench studies using native soil and/or an engineered media to determine the expected phosphorus adsorption capacity.

The field analysis to determine the long term infiltration rate and hydraulic conductivity is essential to provide an accurate hydraulic throughput on which sizing criteria can be based. The phosphorus adsorption capacity of the soil could dictate the hydraulic capacity of the basins as constituent overloading of the soil may be the limiting factor in the final design.

Direct Injection (Alternative B)

Direct injection into a potable water aquifer has never been demonstrated in Washington. However, if water quality standards can be fully met and adequate separation from drinking water wells is maintained, the infrastructure needs are relatively uncomplicated. Design considerations specific to aquifer recharge wells include (Groundwater and Wells, 1986):

- Terminating the injection tube below the static water level and maintaining positive pressure at all times.
- Maintaining full flow to the injection well at all times to eliminate air entrainment.
- Controlling injection pressure to avoid fracture of the formation.
- Providing adequate screens and pumping capacity to accommodate a decrease in recharge rate over time due to clogging.

Cost

The estimated cost for aquifer recharge is driven by the cost of reverse osmosis treatment and brine disposal for direct injection and the location of effective surface percolation areas for infiltration pond systems. The estimated capital cost for brine disposal is projected to range from $2 to $5 per gallon of treatment capacity. Cost

estimates for two groundwater recharge methods (A-Surface Percolation and B-Direct Injection) are presented in Table 17.

Table 17. Capital Cost of Groundwater Recharge Opportunities

Cost Component	Capital Cost ($1000) [a,b]	
	Alternative A Surface Percolation	Alt. B Direct Injection
Incremental Treatment and Brine Disposal	0	34,000
Conveyance (74,000 LF of 24-in pipe)	25,000	25,000
Pump Station	4,400	4,400
Site Development	2,400	7,100
Land	4,400	500
Total	**36,200**	**71,000**

a) For comparison purposes both alternatives are sized to recharge 8 mgd of reclaimed water year-round (8,900 AFY)
b) Conceptual planning-level cost opinion.

Capital costs associated with a surface percolation system (Alternative A at $36.2M) are approximately one-half those for construction of a direct injection groundwater recharge system (Alternative B at $71M). Both systems have been sized to handle the same amount of reclaimed water. O&M costs for direct injection are typically 3 to 5 times more than associated with surface percolation systems due to greater energy consumption and labor requirements for both treatment and injection. Unit capital cost for a surface percolation system is estimated at $0.80 per 1000 gallons ($264/AF). Overall unit costs (capital and O&M) for direct injection are estimated at $4.60 per 1000 gal ($1,500/AF); approximately three times the cost of surface percolation.

Due to the very high capital and O&M costs, Spokane County is not considering direct injection.

Monitoring and Maintenance Requirements

- Basic maintenance criteria for the operation of an infiltration pond providing treatment are as follows: Soil, influent, and reclaimed water monitoring to ensure treatment goals are being met and soil conditions (pH) are stable.
- Periodic scarification, scraping, or harrowing of the basin surface, at least every 6 months, to maintain adequate infiltration rates. If engineered media is used, replacement may also be necessary. In addition, as the Spokane County system will be designed to avoid overflow under peak operating conditions, if overflow does occur or water remains in the basin for excessive retention times, and normal drying cycles do not restore the design infiltration rate, scraping or harrowing should be performed as soon as possible. The

development of a thin bio-film on the soil/water interface that would clog the basin bottoms could lead to the reduction of the infiltration rate to 90 percent of its design value. This is a typical monitoring standard that can be used to assess the need for basin maintenance.

- Any erosion of the side slopes greater than 2 inches deep will require repair, and may be difficult when the source of the erosion is still present.
- Any discernable flow through berms or basin separation walls should be repaired immediately.
- Any control valves on the influent piping structure will require basic maintenance and replacement. The flow spreader should be monitored and cleaned as necessary to ensure efficient operation and even spreading of the influent flows.

Implementation of Reclaimed Water Use

This section of the report presents an analysis of potential water rights impairment for reclaimed water use, a conceptual description of phased expansion of integrated reuse projects and their probable costs and lastly, a general discussion of the implementation steps considered necessary for successfully managing a new utility.

Water Rights Impairment Analysis

The purpose of this section is to describe whether water rights in the Spokane River basin would be impaired by the proposed reclaimed water projects. The purpose of an impairment analysis, as described by the Ecology (Ecology), is to evaluate the potential impairment of water right holders when a new facility begins to use reclaimed water rather than discharge it (Ecology, 2006). Water rights laws are of critical importance to reclaimed water projects, because the laws can either promote or restrain plans depending upon whether reclaimed water is considered part of the in-stream flow and has a downstream right to its use, or if it is considered to be owned, or to have the right to be used, by the entity which produced it.

Foundational Concepts and State Law

Reclaiming wastewater has been strongly encouraged in the Spokane River basin by the Ecology as well as environmental groups. The use of Class A reclaimed water by publicly owned dischargers was considered an Available Action within the “Foundational Concepts for the Spokane River TMDL Managed Implementation Plan,” a.k.a., Foundational Concepts. The Foundational Concepts states:

> *“All reasonable efforts to re-use and/or recharge the aquifer rather than directly discharging it to the River, particularly in the April-October timeframe, are strongly encouraged consistent with circumstances and opportunities.”*

The Washington State legislature modified the Reclaimed Water Use Act (RCW 90.46) on April 11, 2007. This act states that the proposed facility has the exclusive right to any reclaimed water it generates (WA Legislature, 2007). By replacing potable water used for non-potable purposes such as irrigation, reclaimed water use has the effect of reducing the stress upon water supply sources. With the exclusive right to any reclaimed water it generates, Spokane County is in the unique position to reduce the demand on potable water supplies in the Spokane River basin while contributing to improvements in water quality in the Spokane River.

Existing Downstream Water Rights

The 7Q10 flow (low flow) of the Spokane River was approximately 610 cfs in 2006. During Phase 1 of the SCRWRF project through approximately the year 2029, the flow of reclaimed water will average 8 mgd (12 cfs), which is less than two percent of the river's low flow. Future phased discharge production of reclaimed water from the SCRWRF project could increase to an ultimate annual average flow of 24 mgd (36 cfs), or 5.9% of the 2006 7Q10 flow. However, the Avista Corporation was recently granted Federal Energy Regulatory Commission (FERC) relicensing for the Post Falls project, and as a result of this relicensing, the minimum release rate from the Post Falls dam will increase from 300 cfs to 600 cfs. This will result in a reduction to approximately 4% of river flow from the SCRWRF.

The SCRWRF site is located in Township 25 North, Range 43 East, Section 15, at the location of the old stockyards site. The proposed point of discharge from the facility is located in the same township and range in Section 10. Four different categories of water rights have been identified by Ecology downstream of the proposed discharge.

- Out-of-stream consumptive use rights
- Out-of-stream consumptive use rights subject to low flow provisions
- In-stream non-consumptive power rights
- In-stream minimum flow

Out-of-stream Consumptive Use Rights

Given the quantities of water available in the Spokane River (even during the summer low flow months) and the potential volume of water no longer delivered directly to the river from the SCRWRF, out-of-stream consumptive use rights will not be impaired by the proposed project. In other words, existing diversionary rights will still be able to physically pump their allocated quantities of water from the river. Use of the reclaimed water produced by the SCRWRF would not impair this right.

Out-of-stream Consumptive Use Rights Subject to Low Flow Provisions

Eight surface water rights located downstream from the SCRWRF are conditioned with Spokane River low-flow provisions (Table 18). The low-flow provision attached to these rights indicate that the diversions should be regulated whenever the flow in the Spokane

River below Little Falls Dam falls below 200 cfs year-round and 500 cfs whenever the elevation of Franklin D. Roosevelt Reservoir (Lake Roosevelt) is at or below 1281 feet, in accord with the Little Falls Settlement Agreement.

Table 18. Little Falls Dam Low Flow Provisions

Right Holder	Priority Date	Qi (units) [a]	Qa [b] (Acre-ft)	County	Location	Source
Stevens PUD1	12/27/1993	5,000 gpm	1,000	Spokane	27N 42E 31	Well
Spokane Hutterian Brethren	1/3/1994	15.6 cfs	3,810	Lincoln	27N 39E 16	Spokane River
Hanson Ronald	8/30/1994	0.02 cfs	1	Spokane	28N 41E 30	Spokane River
Irish David	3/3/1995	0.02 cfs	1	Spokane	26N 42E 07	Spokane River
Rocky Point Irrigation System	4/24/1997	0.89 cfs	192.6	Lincoln	27N 39E 24	Spokane River
Morris Bob	10/08/1997	140 gpm	36.8	Spokane	26N 42E 21	Well
Cutler Maynard	2/25/1998	500 gpm		Spokane	27N 41E 21	Well
Spokane Hutterian Brethren	5/19/1999	26.67 cfs	2,700	Spokane	27N 40E 21	Spokane River

a) Qi – instantaneous flow
b) Qa – average annual flow

In-stream Non-Consumptive Power Rights

Below the SCRWRF, six water right claims are on file and one water right certificate has been issued for non-consumptive power generation on the Spokane River (Table 19). These seven rights are held by Avista Utilities for the Nine Mile Dam, Long Lake Dam, and Little Falls Dam projects. The quantity of water associated with these rights entitles Avista to non-consumptive power in the following quantities:

- Nine Mile Dam – 5,300 cfs
- Long Lake Dam – 6,300 cfs
- Little Falls Dam – 7,500 cfs.

Flow in the Spokane River at Spokane has been less than 5,300 cfs approximately 88 percent of days from July through January during the previous 50 years, averaging about 3,150 cfs or 2,150 cfs less than the lowest instantaneous power right quantity.

Table 19. Power Water Rights

Right Holder	Priority Date	Qi (cfs)	Qa (Acre-ft)	County	Location	Source
WWPC [a]	1915		253,960	Stevens	27N 39E 13	Spokane River
WWPC	1915	6,300	3,750,000	Stevens	27N 39E 13	Spokane River
WWPC	1908		4,600	Spokane	26N 42E 06	Spokane River
WWPC	1908	3,000	2,070,000	Spokane	26N 42E 06	Spokane River
WWPC	1911	7,500	4,250,000	Lincoln	27N 39E 20	Spokane River
WWPC	1911		2,220	Lincoln	27N 39E 20	Spokane River
WWPC	12/14/1965	2,300		Spokane	26N 42E 06	Spokane River

a) Washington Water and Power Company
b) Qi – instantaneous flow
c) Qa – average annual flow

In-stream Minimum Flow

The Watershed Planning process for the Spokane River (WRIAs 57, 54) will be adopting in-stream minimum flows for the River. Once the Watershed Planning process is completed the adopted in-stream minimum flows will be incorporated into the WAC. Below is an excerpt from RCW 90.82.080 regarding priority dates for instream flow rules:

(2)(a) Notwithstanding RCW 90.03.345, minimum instream flows set under this section for rivers or streams that do not have existing minimum instream flow levels set by rule of the department shall have a priority date of two years after funding is first received from the department under RCW 90.82.040, unless determined otherwise by a unanimous vote of the members of the planning unit but in no instance may it be later than the effective date of the rule adopting such flow.

According to the WRIA 55/57 Watershed Plan Spokane County applied for and received funding for watershed planning under RCW 90.82.040 in June 1998. Therefore, this minimum flow will have a priority date that could be as old as the year 2000, but no later than the date of adoption of the rule.

Hydrology of Reclaimed Water

Currently, groundwater is pumped from the Spokane Valley Aquifer by dozens of water districts for the beneficial uses allowed under their municipal water rights. Wastewater generated from the use of municipal water is then collected and conveyed to the RPWRF, treated, and the reclaimed water delivered to the Spokane River or discharged through onsite sewage disposal systems (septic systems) into the aquifer.

Once the SCRWRF is constructed and begins operation, Class A reclaimed water will become available for uses allowed by Washington State law. Under proposed conditions, wastewater collected from the use of potable water (extracted groundwater)

would be treated by the facility and pumped through a new, separate water delivery system for use as irrigation water and other non-potable uses.

While the design of an irrigation system using Class A reclaimed water must be based on a detailed water balance with the intent to maintain all of the water in root zone of the crop, a portion of the water may percolate into the aquifer just as current irrigation water does and gradually return to the Spokane River via groundwater (USGS, 2005). A portion of this Class A reclaimed water will also evaporate when used for irrigation, however the evaporative losses under this scenario would remain equal to the evaporative losses from existing irrigation practices unless more irrigable area is developed and irrigated. If so, demands from these areas would be met by the potable water available through existing municipal water rights and the evaporative losses from irrigating with reclaimed water would still equal the evaporative losses from irrigating with potable water.

In some prior appropriation states, water agencies have been granted deference for use of water within an agency's boundaries provided it has a consumptive right to use the water. This includes the agency benefiting from water for more than a single use. With this in mind, Spokane County will not be impairing downstream water rights through the use of reclaimed water.

Concept for Reclaimed Water Use

A description of a concept for reclaimed water use is provided below including estimated costs for facility construction and project operations over the next 20 years. Based on evaluation of potential use opportunities in the previous section, a summary of alternative independent reclaimed water use projects is provided for comparison to a recommended integrated series of projects that can permit a phased approach for implementation.

Alternative Independent Use Projects

An opinion of capital and annual operational costs associated with four independent alternative reclaimed water use opportunities is provided in Table 20 below. A comparison of the individual unit costs, based on estimated annual yields of total cost and present worth values, is also provided. Compared to the least cost (most economical) opportunity (i.e., groundwater recharge with surface percolation ponds), pursuit of an independent wetlands enhancement plan is expected to cost from one-third more to more than twice as much to implement. The limited yield associated with cooling water use at IEP combined with distribution distance results in a project nearly three times as costly as groundwater recharge. The seasonal nature of urban green space irrigation demand combined with long distribution distances also results in much higher project costs than other opportunities.

Table 20. Alternative Reclaimed Water Use Opportunities Cost Summary

	Urban Green Space	IEP (Cooling Only)	Wetlands Enhancement	GW Recharge (Infiltration)
Daily Use, mgd	1.5 [a]	1.2	1.5 – 8.0	8.0
Annual Demand, AF	700	1,300	1,700 – 8,900	8,900
Capital, $M [e]	21.1	5.3	11.8 – 36.2	29.2
O&M, $1000/yr	120	550	485 – 1,960	2,225
Annual Cost, $1000/yr [b]	1,500	900	1,250 – 4,300	4,125
Present Worth, $M [c]	13.3	6.9	7.5 – 24.3	18.5
Unit Cost, $/1000 gal [d]	6.60	2.05	2.28 – 1.47	1.40
PW Unit Cost, $/AF yield	1,930	590	450 - 280	210
Relative Cost Factor	9.20	2.80	2.14 – 1.33	1.0

a) Assumes 1.5 mgd average reclaimed water use over 5-month period (700 AFY).
b) Amortized capital over 30 yrs at 5% plus annual O&M.
c) 20 yrs including salvage value
d) Total annual cost/total annual use
e) ENR 20-City Cost index = 8,007.48; August 2007

Integrated Reclaimed Water Use Plan

A general description of the facilities associated with the integrated (irrigation, recharge, and wetlands) reclaimed water use concept is provided below. The projects have been expressed in three phases for implementation:

- Phase 1 distribution system for landscape irrigation use
- Phase 1A wetlands enhancement project in the same area
- Phase 2 distribution system extensions for additional wetlands enhancement and groundwater recharge

List of Facilities

Urban Landscape Irrigation – Phase 1

Phase 1 consists of a *South Valley Reclaimed Water Pipeline* to the Interstate Fair and Expo Center and beyond to the Painted Hills Golf Course designed to meet peak flow (July) demands of 0.12 mgd and 0.68 mgd, respectively. It will also be designed to accommodate future flows for the wetlands projects in Phases 1A and 2.

- Length of pipe 5,820 feet to Fairgrounds; 41,190 feet from Fairgrounds to Painted Hills Golf Course; total of 47,000 feet
- Diameter 24 inches
- SCRWRF reclaimed water pumping: 400 gpm at 150 feet TDH

Wetlands Creation and Enhancement Project - Phase 1A

Phase 1A consists of an extension of the *South Valley Reclaimed Water Pipeline* to Chester Creek wetland restoration area, upstream of the Painted Hills Golf Course, to accommodate an average 1.5 mgd and a 2.0 mgd peak demand to the wetlands area.

- Length of pipe 47,000 feet (same as *South Valley Reclaimed Water Pipeline*)
- Diameter 24 inches
- SCRWRF reclaimed water pumping: 1,400 gpm at 300 feet TDH

Groundwater Recharge - Phase 2

Phase 2 consists of a new *Saltese Pipeline*, extending the previously constructed *South Valley Reclaimed Water Pipeline* to the Saltese Flats wetlands restoration/enhancement and groundwater recharge area, and adding a wetwell, booster pump station, and pipeline at Chester Creek to convey an average of 6.5 mgd to the wetlands and recharge area.

- Length of pipe 81,400 feet (15.4 mi) (approximately 47,000 feet for the *South Valley Reclaimed Water Pipeline* and 34,400 feet for the *Saltese Reclaimed Water Pipeline*)
- Diameter 24 inches
- SCRWRF reclaimed water pumping expansion: 4,500 gpm at 300 feet TDH (5,900 gpm total)
- Saltese Reclaimed Water Booster Pumping: 4,500 gpm at 175 feet TDH (Chester Creek to Saltese Flats)
- Saltese Reclaimed Water Booster Pumping Wetwell: 19,800 gallons

Figure 26 presents an overview of the three phases for the reclaimed water use concept.

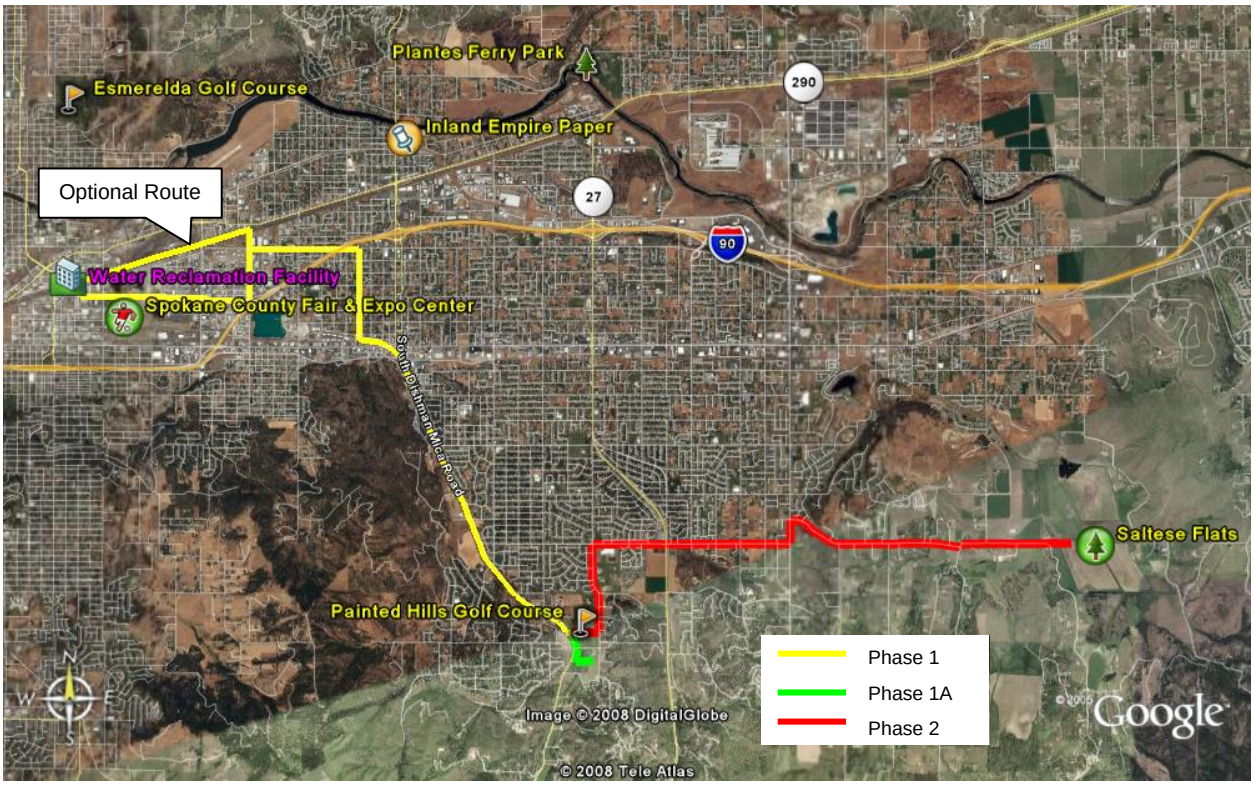

Figure 26. Reclaimed Water Use Concept

Concept Phasing and Costs

The estimated costs and timing of implementation of an integrated concept for reclaimed water use over a 20-year period (2010-2030) are presented in Table 21. Note that the column heading for Phase 2, "Groundwater Recharge and Wetlands (Infiltration)" is not intended to imply that Spokane County expecting to develop a project that is both a wetlands enhancement and a groundwater recharge project with the same volumes of water. Rather, it is descriptive of the planned Phase 2 facilities.

Table 21. Integrated Reclaimed Water Use Plan and Cost Summary

	Urban Green Space	Wetlands Enhancement	Groundwater Recharge and Wetlands (Infiltration)	Total
Phase	1	1A	2	(2010-2030)
Daily Use, mgd	0.5 [a]	1.5	6.5	8.0
Annual Demand, AF	300	1,700	6,900	8,900
Apportioned Capital, $M	1.2	6.7	27.1	35.0
O&M, $1000/yr	120	485	2,225	2,830
Annual Cost, $1000/yr [b]	198	920	3,987	5,105
Present Worth, $M [c]	0.7	4.5	14.8	20.0
Unit Cost, $/1000 gal [d]	2.71	1.68	1.68	1.75
PW[e] Cost, $/AF yield	284	277	218	228
Percent of Total PW[e], %	3.5	22.5	74.0	100

a) Assumes 0.5 mgd average reclaimed water use over 5-month period (300 AFY).
b) Amortized capital over 30 years at 5% interest plus annual O&M
c) 20 yrs including salvage
d) Total annual cost/total annual use
e) Present worth value of project
f) ENR 20-City Cost index = 8,007.48; August 2007

Utility Management Considerations for Reclaimed Water Use

To achieve sustainability, a sound reclaimed water use plan requires development of a comprehensive management strategy well in advance of project implementation. Establishment of a reclaimed water use plan is the establishment of a new water utility, and requires the same elements of business planning as would be applied for a potable water utility. It also requires a similar level of effort from a regulatory and compliance standpoint for the protection of public health and provision of a safe, reliable supply.

A number of otherwise well-conceived water reclamation plans have floundered because critical institutional issues were not addressed early in project planning, and could not be later overcome. No matter how sound a management strategy may be, if not established and agreeable to all applicable parties early in the process, plan implementation can be readily thwarted.

Successful management strategies consider broad issues early on and determine how to best address them. Key issues include:

- How can the County ***best integrate reclaimed water use operations*** with operations of other agencies and private parties regarding reclaimed water production, storage, and distribution, and purchase, sale and payment terms?
- What will be the various agencies' ***general policies*** regarding production, storage, distribution, and sale of reclaimed water?

- How should ***sustainability*** of reclaimed water use as a viable program be ensured over the long term?
- What will be the ***internal effects*** of the reuse operation on the organizational structure of the County's utility managers and their operating staffs?
- What will be the ***customers' responsibilities and rights*** (as specified by the program or as existing, pre-established practices)?
- Who ***pays for the system*** and associated operations and maintenance, and who are the beneficiaries of implementing water reuse?
- *How will reclaimed water stored in aquifers through recharge operations be managed and used, and* ***what are the priorities for the use of recharged water****?*
- What is an ***acceptable increase to monthly sewer service fees*** to implement the use of reclaimed water?

It is suggested that the County might best address these issues through two fundamental mechanisms:

- Configuring the utilities' ***organizational structure*** to accommodate reclaimed water use.
- Developing a ***business plan*** specifically for implementing reclaimed water use.

The following subsections cover key aspects of these essential mechanisms. Although these are indispensable to all water reclamation utilities, each utility is unique in its institutional structure, relationship with other agencies, management approach and goals, and operational requirements. Therefore, this discussion makes no "one size fits all" recommendation for managing the program, and should be considered only as a starting point for addressing institutional issues. However, it should be emphasized that perhaps the most crucial management-related element of a reclaimed water program is to initiate and maintain communication with other involved agencies and parties, particularly potable water purveyors and potential reclaimed water users.

Organizational Structure

The primary purpose of exploring the institutional structure of a reclaimed water use plan is to delineate the roles, responsibilities, and rights of the entities involved, as evidenced by the County's external and internal relationships.

A critical policy decision is in regard to where the reclaimed water use program will reside. Will the program be part of the Spokane County Division of Utilities or would it be best to structure it as a new stand-alone utility or under a new joint powers agency with other entities? Additionally, how will the new program relate to water purveyors within Spokane County?

Most reclaimed water use programs have an institutional structure that follows one of following basic models:

1. The first structure combines responsibilities for production, wholesale distribution, and retail distribution into a single water/wastewater utility;
2. A second structure keeps production and wholesale distribution under one wastewater utility, but has a separate utility for retail distribution.
3. A third model has a wastewater utility handle production, and combines both wholesale and retail distribution functions into one reclaimed water utility.
4. A fourth separates the main roles, assigning them to three separate utilities: a wastewater utility for production, a wholesale water distribution utility and a retail water utility serving water reuse customers.

Responsibilities for core aspects of a reclaimed water use program are generally allocated among existing or newly created utilities, based on the functional milieu of each candidate utility—i.e., its particular historical role, technical expertise, operational facilities, regulatory obligations, legal mandates, and political considerations. Any of these role allocation factors can drive selection of a certain institutional structure as the best fit. For example, a potential utility may be constrained by dedicated water service areas, water and wastewater ownership rights, surface water and groundwater standards, a legal mandate that prohibits a wastewater agency from distributing reclaimed water, or public opposition to using the same utility for both potable and reclaimed water. On the other hand, an alternative structure might be more attractive because of a utility's established network of existing water customers.

A wastewater utility often views reclaimed water as belonging within its mandate because the product is generated by the utility's waste stream as an extension of the waste treatment process. On the other hand, a water utility may be better suited to manage reclaimed water use because the water will be used by and sold to the same customer base that it has already established for potable water. However, equipment and supplies for operations, maintenance, repair and replacement are generally maintained separately for potable and reclaimed water systems to reduce the potential for cross contamination of the potable system.

Often the answer becomes clearer when the driving forces behind reclaimed water use are examined. If the program is motivated by the need to reduce potable water consumption by replacing potable supplies with reclaimed water for certain uses, the program probably best fits within a water utility. However, if the only reason to reclaim water is simply as an alternative to effluent disposal, then the wastewater facility may represent the best fit. Spokane County's proposed reclamation and reuse program is multi-faceted. It considers reclaimed water within the context of integrated water resources management, and will improve wastewater quality before discharge to the river while replacing a portion of potable water supply currently being used for non-potable uses. The water reuse program offers a reliable method of increasing stability in managing the region's precious groundwater supplies.

Another factor that may affect the choice of institutional structure is a perception (by the public and/or by elected officials) of reclaimed water as "just wastewater by another name" rather than as a valued resource. Such situations may require extensive and comprehensive evaluation and investigation, a public information campaign, and

thorough consideration of all possible alternatives before proceeding with significant project development.

Whatever the particular issues may be, to minimize future inter-departmental and inter-agency conflicts, the County's reclaimed water use program needs to establish the organizational framework very early in the implementation process. Upon selection of a structure, utilities engaged in reclaimed water programs will typically develop memoranda of understanding with other involved entities, such that roles, responsibilities, and expectations are clearly outlined.

Business Plan

Once the reclaimed water use program's institutional structures have been clearly established, the County should consider developing a Business Plan for implementing the program, over both the near and long term.

Long-Term Elements

Long-term management strategies must be tailored to the unique components of the reclaimed water use program. However, the following strategic elements are common to most reclamation and reuse programs, and can constitute the basis of the Business Plan.

- Definition of basic reclaimed water utility goals (possibly including a resource management mission statement), and development of a core message that summarizes these goals that will be used to consistently and firmly position reclaimed water use as an integral part of overall resource management.
- Specification of the physical facilities and development of detailed plans for marketing the reclaimed water to customers, constructing capital improvements, and arranging financing.
- Determination of service reliability and associated utility and customer infrastructure requirements (such as system looping, on/off site storage and pumping capabilities, and responses to system outages).
- Establishment of an ongoing dialogue between marketing staff and water utility planners, as appropriate, to identify emerging potential customers of reclaimed water and to prepare customer facilities to accommodate reclaimed water without costly system retrofitting.
- Projected costs of production, distribution, and delivery, so that the utility manager knows how much reclaimed water costs the customer in comparison with other sources of water and can more effectively market reclaimed water.
- Development of policies to address identified reclaimed water issues and functions, either as formal resolutions or ordinances or as management statements.

- Agreements and Contracts Development of long-term commitments from utility customers to buy reclaimed water and solidification of these commitments with legal agreements and contracts.
- Development of a reclaimed water allocation methodology and prioritization.
- Participation in these agreements by other utilities, agencies, stakeholders, and governmental entities, as appropriate, in order to address issues of mutual concern and responsibility (such as regulatory compliance, environmental impact mitigation, habitat conservation, joint construction and operation of facilities, and wholesale buying and selling of water).
- Performance Monitoring of the reuse program (including getting feedback through customer surveys), measurement of progress against the previously established goals (including water quality standards and regulatory compliance), and adjustments of the program and/or goals accordingly.
- Evaluation of County building codes and development policies, in order to identify and/or develop additional reclaimed water use markets.

Near-Term Elements

Based on overall program goals, the County's utility planners and managers will also need to develop strategic objectives for the day-to-day operation of the utility, and specify the short-term activities, system processes, and administrative procedures to achieve these objectives. The most common near-term components of a reclaimed water business plan are discussed below.

Financial Program elements typically include the following:

- A focus on capital improvements, budget development, funding sources, and rate and fee schedules, all of which are fundamental to implementing and sustaining the County's reclaimed water program.
- Financing methods and processes which are carefully conceived and fully developed, that can withstand monitoring, scrutiny, and critical comment by elected officials, agencies, customers, and the public.
- A pricing strategy that allows for recovery of a portion of the reclaimed water system cost, while maintaining an appropriate level of incentive for use. Recent surveys of utilities implementing reclaimed water programs indicate that the price for reclaimed water is typically established as 50-100 percent of the potable water rate (AWWA 2007). The County will need to carefully consider the charge rate of reclaimed water along with the amount of funding from other sources.

- Careful evaluation and balancing of the reuse program's responsibilities to its customers with those to regulatory agencies, stakeholders, and the public.
- A budgeting and accounting system that is separate and distinct from other water-related and/or utility functions to facilitate justifying user charges and assessing financial performance.

A preliminary financial model of the assumed expenditures and anticipated income associated with the conceptual reclaimed water use plan by phase over a 20 year period (2010-2030) is presented as a preview of a financial program in Figure 27. Phase 1 is near-term and Phase 2 is subsequent expansion. The expenditure-side cost components for capital investment, O&M and debt servicing are shown versus anticipated income derived from sales and incentives, low-interest capital loans, and from other potential funding sources.

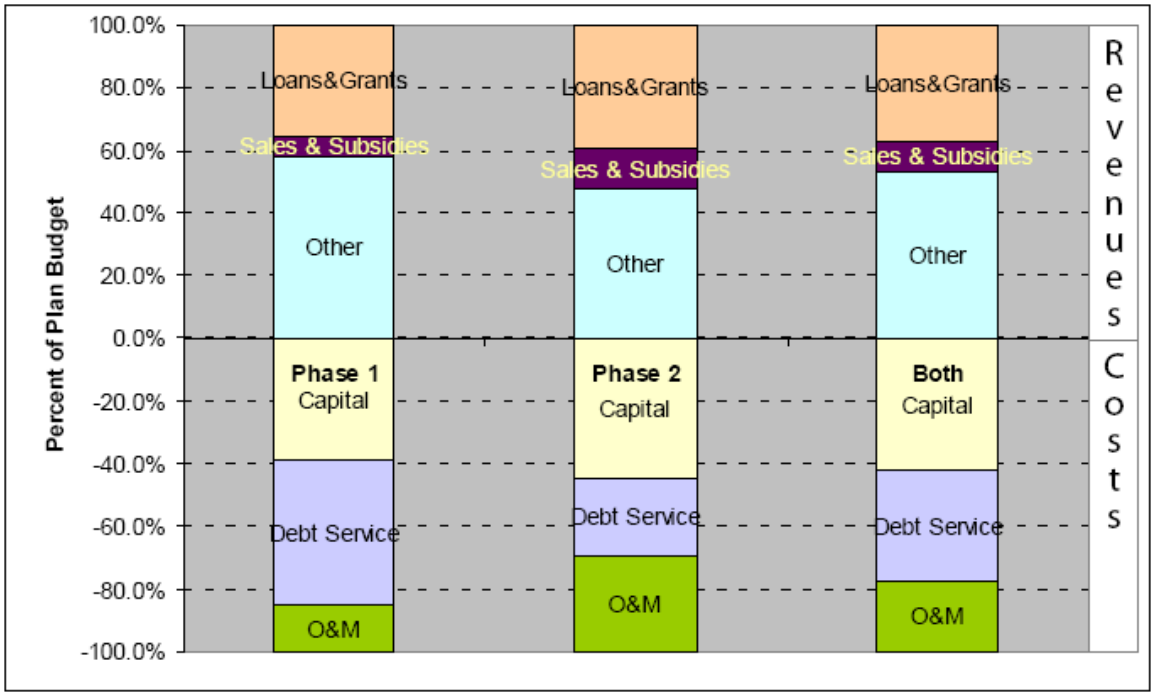

Figure 27. Conceptual Reclaimed Water Use Financial Projection

The first phase is expected to entail an estimated $2.5M in total annual expenditure (escalated dollars over 20 years) of which 39% would be associated with capital improvements (facility design and construction), 46% for debt servicing and the remaining 15% for O&M. Total annual expenditure for the first phase would be balanced from a low-interest SRF loan (36%), revenues derived from sales and subsidies (6%), and the remainder (58%) from other County fund sources amounting to an estimated $1.45M per year. SRF loan is a financing mechanism, and not revenue per se, but the loan is tracked as revenue while the debt service for the loan is tracked as annual burden.

Subsequent second phase expansion would result in annual expenditures for the plan totaling $5.2M of which 42% would be for capital, 35% for servicing debt and 23% for O&M. Anticipated annual revenues would be derived from sales and subsidies (9%), loans (38%) and the remainder (53% or $2.74M per year) from other County funding sources such as wastewater rate charges or a future water resources management development fee.

The estimated annual burden and annual revenues for the reclaimed water use concept presented in this study are presented below in 2007 dollars:

Assumed Annual Burden:
Phase 1 = $2.5 Million
Phase 2 = $2.7 Million
Both = $5.2 Million

Assumed Annual Revenues:
Phase 1 = $1.45 Million
Phase 2 = $1.29 Million
Both = $2.74 Million

Regulatory and Legal Compliance is of utmost importance and can be enhanced through the development of detailed internal requirements (e.g., goals, targets, and standards) to monitor operational performance and ensure full compliance with external requirements (such as pertinent agency regulations, government orders, court-mandated conditions, and water quality standards).

Construction Projects must be carefully managed and implemented to develop confidence in regulators, investors, stakeholders and the general public. Therefore, procedures and requirements for managing utility construction projects need to be established so as to have the least possible negative impact on the community. It will be necessary to ensure compliance with any agreements and commitments related to capital improvement projects.

Public Education and Outreach necessitates the development and maintenance of a continuing, proactive public education program, based on management's and the public's view of the utility as a community asset. Managers have the responsibility of shaping a positive opinion about reclaimed water and keeping the reuse program highly visible so that neither funding opportunities nor customers are lost. Based upon case study evaluations of other reclaimed water utility start ups, the County will need to demonstrate commitment to a continuing public education program. The program must continuously explain the need for and benefits of using reclaimed water. Care must be taken to translate the technical aspects of water reclamation and reuse into concepts the public can understand and appreciate, always with the recognition that there are varying capacities for understanding. It will be necessary to establish an education program for utility staff members (including customer service, engineering, development services, and field personnel) through formal training programs, as these staff members

often represent the utility to the public. Adequately informed staff members are more likely to promote the safe, reliable practice of water reuse.

Operational and Maintenance Functions are vital to the success of a reclaimed water use program and can significantly affect operating costs. Accounting for these day-to-day operations should be detailed in the Business Plan, and not be overshadowed by program planning for capital improvements and infrastructure.

Staffing Requirements will include personnel for water production, water quality monitoring, and planning and managing monitoring activities. Management and training responsibilities will be of particular importance because the utility will be introducing new technology and systems, hiring and training new staff, and retraining current staff. The water quality monitoring required for reclaimed water is greater than for a typical water supply system, as samples of reclaimed water for laboratory testing are usually collected at three locations: the generation site, inside the distribution pipeline, and at the point of delivery. Although a reuse utility must budget for the above expanded staffing and laboratory test costs, the impact on managers, other planners, engineers, and administrative staff is typically minimal, unless the reuse program is very large.

Terms and Conditions of Service establish the service level that customers can expect from the utility, and will be reflective of the goals and capital outlay program established by the utility. The most critical element of service for a reuse utility is reliability—whether the utility's equipment and processes ensure a non-interruptible supply of reclaimed water to the customers. Reliability can be ensured by building in redundancy to the treatment equipment and processes.

Different customers have different reliability requirements. An industrial process that relies upon a steady stream of reclaimed water in order to operate has a much higher reliability requirement than does a golf course that can adjust its irrigation levels to match a fluctuating or seasonal water supply.

The level of water supply reliability and basis of demand (i.e., focus upon base level or peak need) must be specified in all agreements and contracts with customers, especially for customers that have the option to retain connections to another (potable) water supply system as a backup if the reclaimed water supply is interrupted.

The County needs to continue its identification of customer requirements early in planning because certain variations (such as use of reclaimed water only during the summer) has a significant affect on program financing, engineering design, and operations.

Customer Responsibilities are different for users of reclaimed water from those who make use of solely potable water. Reclaimed water customers must often retrofit plumbing equipment to accommodate reclaimed water pressures or flows that are different from those of its existing water supplies, and make other system modifications as well (e.g., incorporation of purple pipe, taped pipe, and irrigation sprinkler heads).

A water reuse customer that retains a connection to a potable water supply must control cross connections, which usually requires installing, maintaining, and regularly testing a reduced pressure backflow assembly.

Other potential responsibilities of reclaimed water customer are storing water on-site, managing irrigation so as to prevent unsafe uses of or personal contact with the reclaimed water, and periodic reporting to regulatory agencies.

The reclaimed water customer usually has the financial responsibility for retrofitting onsite plumbing and controlling cross connections, which should be planned for early on and often involves a capital outlay.

Although the reuse utility usually has no financial or other responsibility for these customer system modifications, it is in the County's interest to assist each new reuse customer for them to be adequately prepared to accept reclaimed water and achieve a smooth and efficient transition to using it. Some utilities have accomplished this by engaging in cost-sharing arrangements to aid customers in converting their system from using potable water to reclaimed water.

Conclusion

The County's sewer service area is projected to experience significant growth over the next twenty years to meet growth management requirements. As a result of projected growth and Spokane County's septic tank elimination program, the population served by the County sewer system may double by 2030 from 80,000 to over 167,000 people. Both factors will sharply increase the quantity of wastewater that must be responsibly managed and places a strain on already limited water supplies.

The implementation of a reclaimed water program by Spokane County would provide a means of using water more efficiently as a secondary water supply for non-potable uses. This reduces demand on existing potable water supplies for higher, potable use. The region's water supply benefits from reclaimed water use because it is continuously available, relatively unaffected by climatic conditions, and its implementation protects the quality of an important surface water resource.

With the constantly increasing demand for water in Spokane County and the low probability of acquiring additional surface or groundwater supplies, it is necessary that water reclamation and aquifer recharge be considered as part of a comprehensive water resource management plan.

The Ecology is preparing a Dissolved Oxygen Total Maximum Daily Load (TMDL) for the Spokane River. The final TMDL may influence the future implementation of reclaimed water use.

This Reclaimed Water Use Study identifies the potential demand for reclaimed water, customers and their needs, potential program impediments, costs, conveyance routes, and funding resources for evaluating, planning, and constructing infrastructure for reclaimed water use. The investment in infrastructure to reclaim and use reclaimed water is considerably expensive. While the use of reclaimed water in Spokane County is feasible from a technical perspective, it could be infeasible from a financial perspective unless alternative funding sources become available, such as grants from the State of Washington, or financial partnerships with other public or private entities with an interest or demand for reclaimed water are realized.

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Appendix A: Board of County Commissioners Resolution

NO. 9-0045C

BEFORE THE BOARD OF COUNTY COMMISSIONERS
OF SPOKANE COUNTY, WASHINGTON

IN THE MATTER OF THE WASTEWATER TREATMENT DISCUSSION HELD BY THE BOARD OF COUNTY COMMISSIONERS DURING THE JANUARY 13, 2009, CEO BRIEFING	)	**RESOLUTION**

THIS MATTER being the consideration by the Board of County Commissioners of the above referenced matter, and the Board being fully briefed on the matter by Spokane County Utilities Director Bruce Rawls, the Board did unanimously by consensus agree to pursue the following three (3) discharge alternatives in conjunction with the Regional Wastewater Reclamation Facility:

1. Aquifer Recharge – take all necessary steps to complete the feasibility study and present the feasibility study to DOE and DOH. Subsequent to receipt of their respective reviews pursue other steps in conjunction with this option.

2. Industrial Reclamation – initiate discussions with Inland Paper Company. If there is mutual interest, draft appropriate agreement and seek review/approval from DOE.

3. Saltese Flats – take appropriate steps to pursue negotiations with appropriate property owners to acquire the necessary property and to pursue a wetlands reclamation project.

If any of the above alternatives become unviable, then the Board will meet to discuss other viable alternatives.

PASSED AND ADOPTED this 13th day of January 2009.

BOARD OF COMMISSIONERS SPOKANE COUNTY SEAL SPOKANE COUNTY, WA

Todd Mielke, Chair

Mark Richard, Vice-Chair

ATTEST:

Daniela Erickson
Clerk of the Board

Bonnie Mager, Commissioner

Page 1 of 1

Appendix B: Public Comments & Responses

Griggs, Jennifer

From: Moss, David [DMoss@spokanecounty.org]
Sent: Tuesday, May 06, 2008 8:25 PM
To: 'Aly Strappazon'
Cc: Rawls, Bruce; Ikuno Masterson; Clark, Dave; Keil, David
Subject: RE: Reclaimed Water Use Study

Hello Aly,

Thank you very much for your supportive comments.

Yes, we are aware of the Vancouver facility and we use it as a reference for our proposed facility (though our site isn't next to a river with lots of nice trees!).

We have a public meeting at Spokane Valley City Hall Council Chambers at 7pm on Wednesday, May 7th... hope to see you there.
Here is our website on the subject portion of our project: http://www.spokanecounty.org/utilities/reclaim/

Sincerely,

Dave Moss, MS, PE
Water Reclamation Manager
Spokane County Utilities
(509) 477-7268

From: Aly Strappazon [mailto:spokaneadopts@yahoo.com]
Sent: Monday, May 05, 2008 2:48 PM
To: Moss, David
Subject: Reclaimed Water Use Study

Dear Mr. Moss:

KUDOS! And congratulations!!!! My husband and I moved to Spokane from SW Washington (Vancouver) with our young family five and a half years ago. While we LOVE it here, we had a lot to get used to when it came to thoughts and behaviors regarding the environment. The water reclamation facility and grounds in Vancouver is a wonderful example of what it sounds like you are trying to do here in Spokane County. We are 1000% behind the development of such a plan. I know it has made a significant and positive impact on my former hometown (including the development of new jobs), and I am sure that it will have similar or better results here. The next big ticket item for the county after water reclamation will need to be better curb-side recycling!

Thanks for helping Spokane maintain its awesome livibility while keeping our negative impact on the environment to a minimum. I can't wait to see many more environmentally positive changes to this place we now call home!

Sincerly,
Aly Strappazon

Aly Strappazon, BA, WSRC
A Heart's Destiny Adoption & Family Services

PO Box 142185
Spokane Valley, WA 99214
(509) 218-4624 Office
spokaneadopts@yahoo.com

Griggs, Jennifer

From: Moss, David [DMoss@spokanecounty.org]
Sent: Monday, June 02, 2008 6:22 PM
To: Ikuno Masterson; Clark, Dave; Keil, David
Cc: Rawls, Bruce
Subject: FW: Reclaimed water use study comments

FYI, review, feedback, and follow-up... Thanks

Dave Moss
Water Reclamation Manager
Spokane County Utilities
(509) 477-7268

-----Original Message-----
From: Keith V Stracchino [mailto:keithvsg@yahoo.com]
Sent: Tuesday, May 27, 2008 10:44 AM
To: Moss, David
Subject: Reclaimed water

I wish to support the effort to install a reclaimed water system throughout the greater Spokane County area and offer the following comments:

1 It's not a question of whether we do this, it's a question of how soon can we do it. Water is a critical and finite resource being subjected to increasing and poorly planned use. Using potable water for tasks such as street cleaning, car washing, irrigation etc. is a near criminal waste of an under-valued resource. Past planning decisions seem to have treated water as yet another infinite resource, that short-sighted mindset has to be taken out and shot!

2 People being what they are, short-sighted and selfish being the norm, we have to introduce financial incentives to stop wasting potable water and divert usage to non-potable water where that quality of resource is sufficent to the purpose. I suggest that when you introduce your reclaimed water supply the reclaimed water should be priced below the price of potable water, even if that means raising the price of potable water to provide for a differential. Potable water should be priced on an exponentially rising scale to force conservation by the simplest and most effective means, impact on the pocket-book.

3 We should be reminding people loudly and often that there are four critical requirements for human, and other animal life. In order of significance they are:

breathable air, without it life ends within about two minutes.

drinkable water, without it, life ends within about one week.

nutritious food, without it life ends within about 30 days.

Shelter, without it life ends in the next cold spell.

4 As a species we have become criminally destructive of these essentials, we need to push these facts into the faces of the general public when we start trying to get people to vote money to install a water reclamation scheme. It's their future and their children's future that is at stake, not the people in the next county!

Griggs, Jennifer

From: Moss, David [DMoss@spokanecounty.org]
Sent: Monday, June 02, 2008 6:39 PM
To: Clark, Dave; Keil, David; Ikuno Masterson
Subject: FW: Reclaimed water use study

FYI, review, feedback, and follow-up... thanks

From: Koch, Richard A. (ECY) [mailto:RKOC461@ECY.WA.GOV]
Sent: Monday, May 05, 2008 4:23 PM
To: Moss, David
Cc: Clark, Dave
Subject: Reclaimed water use study

The capital cots on table 14, page 39 are surprising. Is the decimal point correct?

Richard A. Koch, P.E.

Water Quality Program/ERO

4601 N. Monroe Street

Spokane, WA. 99205-1295

(509)329-3519

rkoc461@ecy.wa.gov

Griggs, Jennifer

From: Moss, David [DMoss@spokanecounty.org]
Sent: Monday, June 02, 2008 6:40 PM
To: Clark, Dave; Keil, David; Ikuno Masterson
Subject: FW: reuse study report

FYI, review, feedback, and follow-up... thanks

Dave Moss
Water Reclamation Manager
Spokane County Utilities
(509) 477-7268

From: Koch, Richard A. (ECY) [mailto:RKOC461@ECY.WA.GOV]
Sent: Wednesday, May 07, 2008 4:36 PM
To: Moss, David; dclark@hdrinc.com
Subject: reuse study report

On page 14, the report gives criteria for reclaimed water discharged to a wetland.

TKN concentration is to be at or below 3 mg/L an organic N criterion. However, The SCRWRF design criterion is TN of 10 mg/L or less, an inorganic N criterion. While, some readers of the documents may understand the difference between organic nitrogen and inorganic nitrogen and the conversion in a treatment process what about the rest. Further clarifying discussion seems merited to avoid misunderstandings and misperception. Unfortunately compliance with an inorganic criterion doesn't automatically ensure compliance with an organic criterion and presently no bridge between the two exists other than in the minds of a few.

Richard A. Koch, P.E.

Water Quality Program/ERO

4601 N. Monroe Street

Spokane, WA. 99205-1295

(509)329-3519

rkoc461@ecy.wa.gov

Griggs, Jennifer

From: Moss, David [DMoss@spokanecounty.org]
Sent: Monday, June 02, 2008 7:07 PM
To: Clark, Dave; Keil, David; Ikuno Masterson
Cc: Rawls, Bruce
Subject: FW: Public Comment Phoned in -- Draft Reclaimed Water Use Study

FYI, review, feedback, and follow-up... thanks

Dave Moss
Water Reclamation Manager
Spokane County Utilities
(509) 477-7268

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lift, Lauri
ednesday, May 07, 2008 11:01 AM
s, David; 'Ikuno Masterson'
Public Comment Phoned in

I received the following comment (by phone) from someone who cannot make the meeting tonight:

Name: Fred Hoogendijk

Address: 10707 N Nelson Rd

Spokane, WA 99218

Phone: 509-466-7600

He read the newsletter and wanted to know if the "Toilet and Urinal flushing" (in the list on page 2) included residential toilets. If so, he does not want it at his home because he believes it will mean a tax increase which he does not want.

He also referred to a senior sewer rate reduction form he filled out and sent in, but got no response. I am referring this part to our sewer billing people.

Thanks Much,
Lauri Clift, Spokane County Utilities
509-477-7403

Griggs, Jennifer

From: Moss, David [DMoss@spokanecounty.org]
Sent: Wednesday, July 02, 2008 4:42 PM
To: 'Mike McGowan'
Cc: Brattebo, Ben; Ikuno Masterson; Keil, David
Subject: RE: reclaimed water use

Hello Mike,

Thank you very much for your comments below.

Our project website has other information, in addition to the newsletter:
http://www.spokanecounty.org/utilities/reclaim/
For example, the PowerPoint presentation given on May 7, 2008 is available for your review.

Let me know if you have any further questions.

In the meantime I have forwarded your e-mail to Ben Brattebo who will contact you for potential follow-up regarding the County's wetlands planning.

Sincerely,

Dave Moss, PE
Water Reclamation Manager
Industrial Pretreatment Coordinator
Spokane County Utilities
(509) 477-7268

-----Original Message-----
From: Mike McGowan [mailto:mcgowanm@evsd.org]
Sent: Tuesday, July 01, 2008 6:53 PM
To: Moss, David
Subject: reclaimed water use

Hello Mr. Moss,
I have just read the May Update containing the Draft Reclaimed Water Use Study. I am a new owner of one of the plots on the South end of Saltese Flats. I am very excited that you are considering using reclaimed water to help restore the wetlands there. The Saltese wetlands are the center of an ecosystem unique in the Inland Northwest and and an important factor in the success of both migratory birds and raptors. At the rate of current and planned building near the wetlands/floodplain it will soon be too late to save it.

Mike McGowan

Griggs, Jennifer

From: Moss, David [DMoss@spokanecounty.org]
Sent: Monday, November 10, 2008 1:41 PM
To: 'Neil Kersten'
Cc: Rawls, Bruce; 'Ikuno Masterson'; Clark, Dave; Keil, David
Subject: Draft Reclaimed Water Use Study & Programmatic EIS
Attachments: Kersten Letter - Reclaimed Water Use Study.pdf

Hello Neil,

This is follow-up to our brief discussion last Friday about the subject study.

Spokane County Utilities is preparing to finalize our efforts on the Reclaimed Water Use Study and Programmatic EIS.

I delivered these and related documents to you on April 25, 2008 *(see attached copy of my transmittal letter)*:

These documents can also be located on our project webpage: http://www.spokanecounty.org/utilities/reclaim/

If you need additional hard copies, have any questions, or wish to provide comments, please let me know.

Thanks ~

Dave Moss, PE
Water Reclamation Manager
Industrial Pretreatment Coordinator
Spokane County Utilities
(509) 477-7268

SPOKANE COUNTY

UTILITIES DIVISION
N. BRUCE RAWLS, P.E., DIRECTOR
A DIVISION OF THE PUBLIC WORKS DEPARTMENT

April 25, 2008

Neil Kersten
Director of Public Works
City of Spokane Valley
11707 East Sprague Avenue
Spokane Valley, WA 99206

Subject: **Reclaimed Water Use Study (Final Draft) - Apr 2008**
Draft Programmatic Environmental Impact Statement - Apr 2008

Dear Neil:

Spokane County Division of Utilities has prepared and herewith submits several documents relating to our proposed water reclamation program:

- Reclaimed Water Use Study (Final Draft) - Apr 2008
- Draft Programmatic Environmental Impact Statement - Apr 2008
- Newsletter - Draft Reclaimed Water Use Study - May 2008
- Newsletter - Reclaimed Water - May 2007

We will be holding a public meeting on the Study and Programmatic EIS on May 7, 2008 at 7:00PM at your City of Spokane Valley Council Chambers.

Please let me know if you have any comments or questions. The requested timeline for formal responses is through May 30, 2008. You are welcome to contact me at your convenience.

Sincerely,

K. David Moss, PE
Water Reclamation Manager

1026 WEST BROADWAY AVENUE, 4TH FLOOR • SPOKANE, WA 99260-0430
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Appendix C: Other Comments & Responses

STATE OF WASHINGTON
DEPARTMENT OF HEALTH
OFFICE OF SHELLFISH AND WATER PROTECTION
1500 West Fourth Ave • Suite 403 • Spokane, Washington 99204-1656
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January 8, 2009

Mr. Dave Moss, PE
Water Reclamation Manager
Spokane County Utilities
West 1026 West Broadway Avenue
Spokane, Washington 99260-0430

Dear Mr. Moss:

RE: Spokane County Utilities Department, Spokane County
2008 Reclaimed Water Plan

We have finished our review of the 2008 Reclaimed Water Plan. Overall, this is a well done plan, especially the Utility Management section of the plan. And, although the plan is very well done, as with all plans, the plan includes statements that are not strictly correct. There are two specific issues must be addressed for the plan to be approved. In addition, I would like you to consider several comments in the final revision of the plan. These comments are intended to assure that the plan contents are consistent with the current statute and requirements of the 1997 *Water Reclamation and Reuse Standards*.

In addition to greater specificity, I have included suggestions that I feel could strengthen the plan and hopefully make implementation easier. But, I also recognize that these issues may be better resolved in the more detailed engineering and planning necessary to design and implement the recommendations of this plan and am comfortable with deferring the considerations to the future. If you would like to discuss these comments and suggestions, please feel free to ask.

The two specific revisions necessary for approval are:

1. Specific recommendations for the reclaimed water plan and reclaimed water uses.
2. A copy of the plan stamped by a professional engineer.

Please note that this approval addresses issues of concern of this department and is not intended to either supersede or replace requirements of or approvals required from the Washington Department of Ecology.

Regulations establishing a schedule of fees for review and approval of planning, engineering and construction documents were adopted July 1, 1987 and revised in November 4, 1995. An itemized bill for $ 2,179.00 is enclosed.

If you have any questions, please feel free to contact me at (509) 456-2466 or though email at craig.riley@doh.wa.gov.

Sincerely,

Craig L. Riley, P.E.
Water Reclamation & Reuse Program
Division of Environmental Health

cc: Health District / Department
Dave Clark, HDR, Boise
Lucy Peterschmidt, Dept. of Ecology, ERO, Spokane
Scott Torpie, WDOH/ODW, ERO, Spokane

Spokane County Reclaimed Water Use Study
Comments, Clarifications and Suggestions

1. Page 1: The report states that the "*Fundamental Concepts* document and the State Revolving Fund loan ... requires the County to develop a comprehensive program for reclaimed water production, re-use, and aquifer recharge". The sentence appears to direct the County, through these agreements, to produce and reuse reclaimed water, and directs specifically that aquifer recharge be one of the beneficial uses. ***Please clarify whether or not these agreements commit the county to aquifer recharge of reclaimed water.***

2. Page 3: The report states "If a reclaimed water program is found to be feasible, reclaimed water may provide the County with an alternative to seasonal surface water discharge…." This is contradictory with the quote in comment #1.If a reclaimed water program is <u>not</u> technologically, economically and operationally feasible, it should <u>not</u> be pursued. ***What the County will use to determine that reclamation is "feasible" should be discussed in the plan.*** Factors may include:

   - Currently available technologies;
   - Operations limitations and challenges the county may face (e.g. should the County sell reclaimed water for residential irrigation; is a meter reading program developed and operated by the County reasonable);
   - An acceptable range of retail water rates to be able to sell reclaimed water in lieu of potable water as compared to current or future conservation rate structures;
   - Potential increases in the county's wastewater rates necessary to cover reclaimed water program budget short-falls.

3. Page 10: ***Please consider expanding the discussion of urban irrigation to include the potential for residential irrigation.*** Where the opportunity arises, residential irrigation can become a significant market for reclaimed water. Likely routes for transmission of the reclaimed water to various large use sites that are identified in this plan would accommodate significant urban residential uses, if allowed.

   I recommend that a future detailed engineering evaluation of potential additional reclaimed water uses and use areas assess the economics and the value of developing satellite water reclamation facilities to provide local user demands, without the need for large transmission and distribution piping.

4. Page 10: ***Please include the required application rate for urban irrigation in the implementation requirements.*** This is determined by a "detailed water balance" which is approved by both the departments of Health and Ecology. The water balance defines the agronomic rate at which the reclaimed water is applied through each irrigation cycle. The application rate must assure:

   - Reclaimed water is applied at a rate determined by the evapotranspiration requirements of the crop;
   - Reclaimed water application rate is a balance between, and limited by, the hydraulic and nutrient (nitrogen and phosphorous) demands of the crop;

- Reclaimed water application is limited to no more than 50% to 80% of the water-holding capacity of the soil so that the reclaimed water is kept in the root-zone and does not pass into the aquifer.

If the water does pass the root zone, it becomes a "wastewater" and is subject to the regulatory and permitting requirements of WAC 173-200.

We want to maximize the efficient use of the reclaimed water both in terms of water use and in the delivery and use of fertilizers. Active management of reclaimed water as an irrigation supply includes the potential benefit of reducing the amount of commercial fertilizer required, and reduces the potential for over-use of fertilizer over the aquifer.

5. Page 11: The plan states that "public acceptance and public safety will become a possible concern for some owners of urban green space". This concern emphasizes the need to implement a public outreach and acceptance program in Step 1 and 2 of water reuse development plan (Pages 3 & 4). The public outreach and acceptance plan is necessary to determine who and why they have or will raise concerns, and to address each at the beginning of the program.
6. Page 11: ***Please note that while reclaimed water revenues won't fully cover the costs of production and delivery, this shortfall is more pronounced in the beginning.*** It will decline as the utility matures, adding more customers and creating higher demand. In Washington, the City of Yelm has been distributing reclaimed water for nearly nine years. Due to increasing demand, the city is in the process of increasing reclaimed water rates from 80% of base water rates to 80% of conservation block rates.
7. Page 12 – Figure 3: ***Please clarify the term "river delivery".*** In the context of beneficial use of the water, this term implies delivery from the production plant to a user via the Spokane River in lieu of a pipeline. This is an acceptable method of transmitting reclaimed water, although the volume of water will be diminished through stream bed leakage and evaporation. Figure 3 does <u>not</u> include a point of delivery, which implies that "river delivery" is wastewater disposal to surface water, which requires a NPDES permit.
8. Page 13: At this time, <u>no</u> reclaimed water projects are permitted to discharge to wetlands in Washington. The City of Sequim is not permitted to augment wetlands with reclaimed water. The city augments flow in Bell Creek, which flows through a wetland that WSDOT is working to improve. The City of Yelm is permitted to send flow to wetlands as a demonstration facility. RCW 90.46.115 identified wetlands as a beneficial use for the City of Royal City in the funding authorization for that demonstration project. However, the city did not implement the wetland option, and therefore is not permitted to discharge to wetlands at this time. The City of Carnation, with King County, is in the process of developing the state's first wetland enhancement project using reclaimed water. That permit should be issued shortly.
9. Page 15: ***Please consider revising this report to be consistent with current statutory language.*** The quality of reclaimed water used for aquifer recharge is

not necessarily required to be protective of ground water quality under WAC 173-200. Also, the use of reclaimed water doesn't need to specifically comply with the anti-degradation policies of WAC 173-200.

RCW 90.46 allows for two methods of aquifer recharge – direct recharge and surface percolation.

Direct recharge is defined as controlled subsurface addition of water to the ground water basin (RWC 90.46.010(7)). Direct recharge projects must conform to the *1997 Water Reclamation and Reuse Standards (Standards)*, Section III to be permitted. The current standards require conformance with the more stringent standard from either the state's drinking water maximum contaminant levels (MCLs) (WAC 246-290) or ground water quality criteria (WAC 173-200). Specific criteria for total coliform, total nitrogen, turbidity and total organic carbon must also be met. The standard also requires reverse osmosis treatment.

Surface percolation is defined as controlled application to the ground surface (RCW 90.46.010(18)). Water quality for surface percolation is required to conform to the "groundwater recharge criteria" (RCW 90.46.080(1)), defined as being drinking water contaminant criteria as adopted by the State Board of Health and the Department of Health (RCW 90.46.010(9)). If the groundwater recharge criteria do not contain a standard or constituent, Ecology is authorized to establish a discharge limit consistent with the goals of the chapter, which implies recovery as a potable water supply as the highest use.

The significance of these two requirements is that the drinking water MCLs and state's groundwater quality standards do not list the same constituents. In many instances, when a chemical is on both lists, the water quality limit is not the same. Often, the laboratory analysis techniques requirements are not the same either.

The antidegradation policy regarding the use of reclaimed water is established in RCW 90.46.005. This section states that the legislature declares that "use of reclaimed water is not inconsistent with the policy of antidegradation of state waters announced in other state statutes, including the water pollution control act, chapter 90.48 RCW and the water resources act, chapter 90.54 RCW." Thus, the legislature has deemed that use of reclaimed water is in the public interest of the state. Reclaimed water, which is adequately and reliably treated to assure the water quality limits as determined by the statutes and the *Standards* is acceptable under those standards.

The most common conflict we see concerns discharge limits for total nitrogen and nitrate. The groundwater recharge criteria limit nitrogen as nitrate to less the 10 mg/L, consistent with the drinking water MCLs. The antidegradation policy (WAC 173-200) limits nitrate discharge to background levels in the groundwater, which is generally much lower than 10 mg/L. Because statutory authority supersedes regulatory limits, the current limit is 10 mg/L.

10. Page 15: The report notes "apparent opposition by drinking water supply managers" to direct recharge. ***Since this would pose a significant hurdle, please discuss how drinking water concerns have been and will be addressed.*** Please

note whether or not the Spokane Aquifer Joint Board has adopted a formal position on this issue and if so, what it is.

11. Page 18: The discussion regarding interpretation of the RCW 90.46 regarding antidegradation requirements appears to turn reclaimed water into wastewater rather than a beneficial resource. ***I recommend revising the discussion to make it clear that reclaimed water is a water supply resource.*** Provisions in statute trump rule (regulation) requirements; RCW 90.46.005 (statute) over-rides conflicting requirements in WAC 173-200 (regulation). See comment 9 above. WAC 173-200 draws authority from RCW 90.48, which establishes requirements for permits to discharge waste material. Waste material is defined in regulation as "any discarded, abandoned, unwanted or unrecovered material(s)". Since reclaimed water is "no longer considered wastewater" (RCW 90.46.010(14)), and is definitely <u>not</u> discarded, and <u>not</u> abandoned, and is still wanted and will be recovered, the provisions of RCW 90.48 and WAC 173-200 shouldn't apply.

    Also, the report should explain the County's intent in establishing critical aquifer recharge area (CARA) requirements. For example, did the County's conclusion in the case of the Mead School District support aquifer recharge within CARA boundaries and establish a County wide position? Wastewater management alternatives for the Mead Middle School project included ground water recharge with reclaimed water within CARA boundaries. County staff agreed to conformance with statutory requirements, which in this case would have set nitrate levels at 10 ppm.

12. Page 26: ***I recommend that the County talk to the City of Spokane again regarding using reclaimed water to irrigate parks and other open spaces, and possible industrial uses in the northeastern and eastern portion of their water service area.*** DOH's Office of Drinking Water has implemented new water efficiency requirements (WAC 246-290-800). Larger water systems, such as the City's, must identify:

    - Where reclaimed water could potentially be used, such as parks, golf courses, groundwater recharge facilities, and car washing facilities.
    - Where reclaimed water production facilities exist and the locations of reclaimed water distribution lines (purple pipes).
    - Any barriers to the use of reclaimed water, such as cost, permitting issues, water rights mitigation, and local regulations that govern the use of reclaimed water.
    - Contractual obligations and agreements that limit the use of reclaimed water.
    - Where reclaimed water is used or proposed within the water service area. Provide a description and estimate usage.
    - Water system's efforts to develop existing or new opportunities for the use of reclaimed water.

    Use of reclaimed water may fit these criteria at Minnehaha Park and Chief Garry Park .Other possibilities include use of reclaimed water from the city's facility on county lands west of the plant, such as the county's Off Road Vehicle Park.

13. Pages 33 & 34: *I recommend that commercial / industrial uses such as toilet and urinal flushing, grounds maintenance, and heating system makeup and cooling water at the Spokane Interstate Fairgrounds, Spokane Community College and city's fire training complex (including the Washington National Guard's Readiness Center) be re-evaluated.* 2ESSB 6117, passed into law by the 2007 legislature, requires that all state agencies and state facilities use reclaimed water for non-potable uses where reclaimed water is a feasible replacement source of water. Other state agency buildings may be located along the major routes identified in the plan that could also use reclaimed water for non-potable purposes.

14. Page 36 – Figure 15: I recommend approaching Felts Field, West Valley High School, Millwood School, Millwood Park, St. Paschal's Church, and Orchard Avenue School as potential large users along the Valley reclaimed water pipeline route to Plantes Ferry Park.

15. Pages 35 – 38; Figures 14-18: Each of the transmission main routes appears to provide ample opportunity for residential irrigation and other urban irrigation sites on relatively large parcels of open land (schools and churches). I recommend that this be investigated in further detail.

16. Page 38: *Please include the correct information on production: there are <u>no</u> county wastewater facilities permitted for, or producing reclaimed water.*

17. Page 43: In discussing the reclaimed water opportunity at Inland Empire Paper, the plan notes that the "greatest impediment to implementing such a project is the willingness of the potential user to convert…to a new and <u>unproven</u> source". This statement implies the county feels that reclaimed water is an unproven water supply. *Please explain further or clarify.*

18. Page 44: The report surmises that created wetland systems may be required to be lined depending on location and potential interaction with potable aquifers. *Please note that the current Standards do <u>not</u> include any requirements for lining wetlands.* Comment 27 addresses requirements for constructed beneficial use wetlands and constructed treatment wetlands that might drive engineering and water management decisions to line wetlands.

19. Pages 44& 45: *I recommend that future assessments on developing wetlands include an assessment of economic benefits.* Recharge through restoring natural wetlands or developing constructed beneficial use wetlands will provide additional flow into the aquifer that can benefit any of a number of downstream users seeking additional water rights capacity. A second consideration is the potential benefits of developing a wetland mitigation bank that could benefit continued development in the region.

20. Page 45: *Please clarify the intent of the discussion of wetland restoration at Saltese Flats and the impacts of Shelley Lake, especially the comment that the site could be used for aquifer recharge also.* Please see Comment 27 below regarding the differences in legal status between aquifer recharge and use in wetlands sites. Since these are different uses, with different benefits to the County, the amount of

water sent to a constructed beneficial use wetland, natural wetland, constructed treatment wetland or to aquifer recharge will have to be delineated and managed.

21. Pages 47 & 48: There are no requirements for either a one-year residence time or 2,000 feet between recharge site and extraction wells for surface percolation projects. These requirements would be applied to a direct recharge project, but as noted on Page 15, direct recharge is not being considered. *Please revise this section d to be consistent with current requirements.*

22. Pages 48 & 49: *Please note that in-plant storage requirements apply to <u>all</u> facilities that do not have an alternative permitted disposal system.* They aren't limited to direct recharge (injection) or aquifer recharge as is stated in the report.

23. Page 49: *Please note that the statement that "aquifer recharge as the only type of reclaimed water <u>disposal</u>" (emphasis added) confuses beneficial use of reclaimed water and waste disposal.* If the water is "disposed of", the water is then a wastewater and the discussion related to standards and requirements for reclaimed water are no longer valid. Reclaimed water is no longer considered "wastewater", and does not need to be "disposed", but rather a resource available to be put to beneficial use. See comment Number 7

24. Page 52: *The report should be corrected to note that RCW 90.46, the Reclaimed Water Use Act, was only revised in 2007.* RCW 90.46 was originally adopted in 1992 and has been modified multiple times since. The 1997 revision adopted language that provides the owner of the treatment plant exclusive right to the water. Modifications to RCW 90.46.120 that attempted to clarify the water rights impairment requirements in this section were passed by the 2007 legislative but vetoed by the governor.

25. Page 54: *Referring to Comment #4 above, please consider revising the report to state that the design of an irrigation system using reclaimed water must be based on a detailed water balance.* The intent is to maintain all of the water in root zone of the crop, which prevents water from moving past the root zone and into the aquifer. The desired outcome is to make the most efficient use of the irrigation supply to reduce the overall use of potable water for irrigation in the area, and ultimately reduce demands on the aquifer.

26. Page 58 – Table 21: *Please clarify the intent of "groundwater recharge and wetlands (infiltration)" as a beneficial use.* RCW 90.46 identifies groundwater recharge and wetlands as separate beneficial uses. Even though an equivalent portion of the water from a wetland and aquifer recharge basin can end up in the aquifer, the final water quality requirements and legal status of the water is more complicated.

    The owner of the treatment plant producing the reclaimed water used for aquifer recharge has exclusive right to recover and use the recharge. However, reclaimed water that is released to constructed <u>beneficial use</u> wetlands is considered "waters of the state". The exclusive right granted to the treatment plant owner no longer exists.

The water quality of reclaimed water discharged to constructed beneficial use wetlands must to conform to Section II of the 1997 *Standards*. The water quality and loading limits included in the *Standards* are intended to assure adequate protection of surface and groundwater that could be recharged by the constructed beneficial use wetland. No further treatment is necessary. The water recharging ground water from the constructed beneficial use wetland is also considered "waters of the state".

Reclaimed water can also be discharged to constructed treatment wetlands, which by definition is used for treatment or polishing of reclaimed water. But, Section II of the 1997 *Standards* specifically exclude constructed treatment wetlands from the water quality requirements and wetland loading limits in these standards. Therefore only the final use(s) of the water will define the required water quality requirements after the treatment wetland. Thus, if the treatment wetland cannot produce sufficient water quality, additional treatment will be necessary. For aquifer recharge by surface percolation, the water quality will have to "at all times" conform to the groundwater recharge criteria (e.g. the drinking water MCL's). Because treatment wetlands have not been able to produce finished water quality that consistently conforms with all of groundwater recharge criteria, including microbial standards, additional treatment such as disinfection would likely be necessary..

27. Page 59: Additional key issues that need consideration include:

    - The ability to generate revenue from the sale of reclaimed water and an estimate of those revenues;
    - Specific intention for the fate of reclaimed water used for aquifer recharge for which the County is granted exclusive right for distribution and use – will the water be made available for public appropriation as "waters of the state" or does the County intend to maintain control over the water and administer a program to provide water for the benefit of regional users?

28. Page 60: The intended effect of "ownership rights" on utility operations needs clarification. The water within the state (surface water and groundwater) belongs to the people of the state. The beneficial use of these waters is authorized by the state (Department of Ecology) through the water rights process. In addition, once a reclamation permit is issued, the owner of the treatment plant that produces reclaimed water is granted the exclusive right to distribute and use the reclaimed water. Thus, reclaimed water can be transferred or sold just as drinking water is sold by public water systems. This allows the owner of the treatment plant to retain control over and generate revenue from the reclaimed water.

Spokane County Reclaimed Water Use Study

Responses to Comments, Clarifications and Suggestions:

1. *A copy of the plan stamped by a professional engineer.*

   The enclosed study has been stamped by a professional engineer.

2. *Page 1: The report states that the "Fundamental Concepts document and the State Revolving Fund loan ... requires the County to develop a comprehensive program for reclaimed water production, re-use, and aquifer recharge". The sentence appears to direct the County, through these agreements, to produce and reuse reclaimed water, and directs specifically that aquifer recharge be one of the beneficial uses. Please clarify whether or not these agreements commit the county to aquifer recharge of reclaimed water.*

   The Foundational Concepts document requires the County to develop a comprehensive program for reclaimed water production, reuse, and aquifer recharge of effluent. The County's State Revolving Fund loan for low interest wastewater infrastructure financing also requires the County to evaluate reclamation alternatives. The County therefore is obligated and committed to evaluate all opportunities for water reuse, including aquifer recharge, but is not obligated to implement anything in particular.

3. *Page 3: The report states "If a reclaimed water program is found to be feasible, reclaimed water may provide the County with an alternative to seasonal surface water discharge..." This is contradictory with the quote in comment #1. If a reclaimed water program is not technologically, economically and operationally feasible, it should not be pursued. What the County will use to determine that reclamation is "feasible" should be discussed in the plan. Factors may include:*

   - *Currently available technologies;*
   - *Operations limitations and challenges the county may face (e.g. should the County sell reclaimed water for residential irrigation; is a meter reading program developed and operated by the County reasonable);*
   - *An acceptable range of retail water rates to be able to sell reclaimed water in lieu of potable water as compared to current or future conservation rate structures;*
   - *Potential increases in the county's wastewater rates necessary to cover reclaimed water program budget short-falls.*

   The County will determine feasibility based upon factors that may include and not be limited to costs, costs to benefit, potential rate impacts, availability of reuse sites, political considerations, and other institutional factors at the discretion and pleasure of the County.

4. *Page 10: Please consider expanding the discussion of urban irrigation to include the potential for residential irrigation. Where the opportunity arises, residential irrigation can become a significant market for reclaimed water. Likely routes for transmission of the reclaimed water to various large use sites that are identified in this plan would accommodate significant urban residential uses, if allowed. I recommend that a future detailed engineering evaluation of potential additional reclaimed water uses and use areas assess the economics and the value of developing satellite water reclamation facilities to provide local user demands, without the need for large transmission and distribution piping.*

   Most streets in existing residential areas do not have adequate space to install new reclaimed water pipelines and maintain horizontal clearances recommended by the state. Additionally, retrofitting existing residential irrigation systems is prohibitively expensive and will not be

considered. The County's focus for initial phases of reuse is on large, single customer turf areas such as golf courses, cemeteries, and school grounds. If in the process of installing a reclaimed water distribution system that deploys water to large turf facilities the County becomes aware of opportunities to serve future residential subdivisions, the County will consider urban irrigation for the new residential lots on a case-by-case basis. The County anticipates updates to its plans for water reuse, and recognizes that other alternatives exist for how to produce and distribute reclaimed water based upon customer demand and County-determined service levels.

5. *Page 10: Please include the required application rate for urban irrigation in the implementation requirements. This is determined by a "detailed water balance" which is approved by both the departments of Health and Ecology. The water balance defines the agronomic rate at which the reclaimed water is applied through each irrigation cycle. The application rate must assure:*

   - *Reclaimed water is applied at a rate determined by the evapotranspiration requirements of the crop;*
   - *Reclaimed water application rate is a balance between, and limited by, the hydraulic and nutrient (nitrogen and phosphorous) demands of the crop;*
   - *Reclaimed water application is limited to no more than 50% to 80% of the water-holding capacity of the soil so that the reclaimed water is kept in the root-zone and does not pass into the aquifer.*

   If the water does pass the root zone, it becomes a "wastewater" and is subject to the regulatory and permitting requirements of WAC 173-200.

   We want to maximize the efficient use of the reclaimed water both in terms of water use and in the delivery and use of fertilizers. Active management of reclaimed water as an irrigation supply includes the potential benefit of reducing the amount of commercial fertilizer required, and reduces the potential for overuse of fertilizer over the aquifer.

   In this section of the study report, "Reclaimed Water Use Opportunities", the implementation steps and water quality requirements for different classes of reclaimed water application are generally described. In the following section of the report, "Assessment of Reclaimed Water Use Potential", the potential demand for reclaimed water of urban green spaces is described based upon the demand of turf on a seasonal basis. Projections for the amount of turf demand needed to make use of 8 MGD of reclaimed water were made based upon seasonal uptake rates data from Washington State University for pasture and turf grass in Spokane County. The description of the development of the site-specific application rate you provided has been added to the "Implementation" subsection of the "Irrigation of Urban Green Spaces" section of the report.

6. *Page 11: The plan states that "public acceptance and public safety will become a possible concern for some owners of urban green space". This concern emphasizes the need to implement a public outreach and acceptance program in Step 1 and 2 of water reuse development plan (Pages 3 & 4). The public outreach and acceptance plan is necessary to determine who and why they have or will raise concerns, and to address each at the beginning of the program.*

   As is stated in this section of the study, the County is implementing a public information program, and it is being developed using the input that was received from potential customers during the initial meetings with them.

7. *Page 11: Please note that while reclaimed water revenues won't fully cover the costs of production and delivery, this shortfall is more pronounced in the beginning. It will decline as the utility matures, adding more customers and creating higher demand. In Washington, the City of Yelm has been distributing reclaimed water for nearly nine years. Due to increasing demand, the city is in the process of increasing reclaimed water rates from 80% of base water rates to 80% of conservation block rates.*

   Thank you for the perspective.

8. *Page 12 - Figure 3: Please clarify the term "river delivery". In the context of beneficial use of the water, this term implies delivery from the production plant to a user via the Spokane River in lieu of a pipeline. This is an acceptable method of transmitting reclaimed water, although the volume of water will be diminished through stream bed leakage and evaporation. Figure 3 does not include a point of delivery, which implies that "river delivery" is wastewater disposal to surface water, which requires a NPDES permit.*

   The words in Figure 3 have been changed from “river delivery” to “river discharge”.

9. *Page 13: At this time, no reclaimed water projects are permitted to discharge to wetlands in Washington. The City of Sequim is not permitted to augment wetlands with reclaimed water. The city augments flow in Bell Creek, which flows through a wetland that WSDOT is working to improve. The City of Yelm is permitted to send flow to wetlands as a demonstration facility. RCW 90.46.115 identified wetlands as a beneficial use for the City of Royal City in the funding authorization for that demonstration project. However, the city did not implement the wetland option, and therefore is not permitted to discharge to wetlands at this time. The City of Carnation, with King County, is in the process of developing the state's first wetland enhancement project using reclaimed water. That permit should be issued shortly.*

   The final report has been modified to read, “From a regulatory framework perspective, reclaimed water could be used to create constructed wetlands or as a reliable source of water to restore degraded natural wetlands. However, it is noteworthy that there has been no permitted delivery of reclaimed water to a wetland in Washington, so the regulatory process is untested and the results are not predictable.”

10. *Page 15: Please consider revising this report to be consistent with current statutory language. The quality of reclaimed water used for aquifer recharge is not necessarily required to be protective of ground water quality under WAC 173-200. Also, the use of reclaimed water doesn't need to specifically comply with the anti-degradation policies of WAC 173-200.*

    RCW 90.46 allows for two methods of aquifer recharge - direct recharge and surface percolation.

    <u>Direct recharge</u> is defined as controlled subsurface addition of water to the groundwater basin (RWC 90.46.010(7)). Direct recharge projects must conform to the 1997 Water Reclamation and Reuse Standards (Standards), Section III to be permitted. The current standards require conformance with the more stringent standard from either the state's drinking water maximum contaminant levels (MCLs) (WAC 246-290) or ground water quality criteria (W AC 173-200). Specific criteria for total coliform, total nitrogen, turbidity and total organic carbon must also be met. The standard also requires reverse osmosis treatment.

<u>Surface percolation</u> is defined as controlled application to the ground surface (RCW 90.46.010(18)). Water quality for surface percolation is required to conform to the "groundwater recharge criteria" (RCW 90.46.080(1)), defined as being drinking water contaminant criteria as adopted by the State Board of Health and the Department of Health (RCW 90.46.010(9)). If the groundwater recharge criteria do not contain a standard or constituent, Ecology is authorized to establish a discharge limit consistent with the goals of the chapter, which implies recovery as a potable water supply as the highest use.

The significance of these two requirements is that the drinking water MCLs and state's groundwater quality standards do not list the same constituents. In many instances, when a chemical is on both lists, the water quality limit is not the same. Often, the laboratory analysis techniques requirements are not the same either.

The antidegradation policy regarding the use of reclaimed water is established in RCW 90.46.005. This section states that the legislature declares that "use of reclaimed water is not inconsistent with the policy of antidegradation of state waters amounts in other state statutes, including the water pollution control act, chapter 90.48 RCW and the water resources act, chapter 90.54 RCW." Thus, the legislature has deemed that use of reclaimed water is in the public interest of the state. Reclaimed water, which is adequately and reliably treated to assure the water quality limits as determined by the statutes and the Standards, is acceptable under those standards.

The most common conflict we see concerns discharge limits for total nitrogen and nitrate. The groundwater recharge criteria limit nitrogen as nitrate to less the 10 mg/L, consistent with the drinking water MCLs. The antidegradation policy (WAC 173-200) limits nitrate discharge to background levels in the groundwater, which is generally much lower than 10 mg/L. Because statutory authority supersedes regulatory limits, the current limit is 10 mg/L.

Thank you for these clarifications. We have incorporated most of your clarifications verbatim.

11. *Page 15: The report notes "apparent opposition by drinking water supply managers" to direct recharge. Since this would pose a significant hurdle, please discuss how drinking water concerns have been and will be addressed. Please note whether or not the Spokane Aquifer Joint Board has adopted a formal position on this issue and if so, what it is.*

    The report has been corrected to state: “A number of representatives of large water purveyors have expressed concern about the possibility of direct recharge of aquifers using reclaimed water immediately upgradient from their supply wells. Spokane County is not considering direct recharge, but discussion and cost estimates are provided in this report for evaluation purposes.”

12. *Page 18: The discussion regarding interpretation of the RCW 90.46 regarding antidegradation requirements appears to turn reclaimed water into wastewater rather than a beneficial resource. I recommend revising the discussion to make it clear that reclaimed water is a water supply resource. Provisions in statute trump rule (regulation) requirements; RCW 90.46.005 (statute) over-rides conflicting requirements in WAC 173-200 (regulation). See comment 9 above. WAC 173-200 draws authority from RCW 90.48, which establishes requirements for permits to discharge waste material. Waste material is deemed in regulation as "any discarded, abandoned, unwanted or unrecovered material(s)". Since reclaimed water is "no longer considered wastewater" (RCW 90.46.010(14)), and is definitely not discarded, and not abandoned, and is still wanted and will be recovered, the provisions of RCW 90.48 and WAC 173-200 shouldn't apply.*

Also, the report should explain the County's intent in establishing critical aquifer recharge area (CARA) requirements. For example, did the County's conclusion in the case of the Mead School District support aquifer recharge within CARA boundaries and establish a County wide position? Wastewater management alternatives for the Mead Middle School project included ground water recharge with reclaimed water within CARA boundaries. County staff agreed to conformance with statutory requirements, which in this case would have set nitrate levels at 10 ppm.

We agree wholeheartedly with your comments in the first paragraph and have modified the report accordingly. Again, thank you for the clarification.

With regard to your comments in the second paragraph, we have a different understanding of the Mead Middle School project and did not address your comments in the final report. The Mead Middle School project was not a water reclamation project. Under our CARA regulations, the school had to connect to the public sewer system, install a sealed lagoon, treat and discharge through an NPDES permit, or install a holding tank. None of these alternatives were determined to be viable. Therefore, Spokane County determined the school could install a state of the art treatment plant and employ subsurface disposal, consistent with anti-degradation standards. The school proposed MBR technology and subsurface disposal, and the Department of Ecology approved. This is not an aquifer recharge project, and there was never any intent for it to be considered a beneficial reuse through groundwater augmentation.

13. *Page 26: I recommend that the County talk to the City of Spokane again regarding using reclaimed water to irrigate parks and other open spaces, and possible industrial uses in the northeastern and eastern portion of their water service area. DOH's Office of Drinking Water has implemented new water efficiency requirements (WAC 246-290-800). Larger water systems, such as the City's, must identify:*

    - *Where reclaimed water could potentially be used, such as parks, golf courses, groundwater recharge facilities, and car washing facilities.*
    - *Where reclaimed water production facilities exist and the locations of reclaimed water distribution lines (purple pipes).*
    - *Any barriers to the use of reclaimed water, such as cost, permitting issues, water rights mitigation, and local regulations that govern the use of reclaimed water.*
    - *Contractual obligations and agreements that limit the use of reclaimed water.*
    - *Where reclaimed water is used or proposed within the water service area. Provide a description and estimate usage.*
    - *Water system's efforts to develop existing or new opportunities for the use of reclaimed water.*

    Use of reclaimed water may fit these criteria at Minnehaha Park and Chief Garry Park. Other possibilities include use of reclaimed water from the city's facility on county lands west of the plant, such as the county's Off Road Vehicle Park.

    The report was modified to include a reference to the new water efficiency requirements and how they serve as a driver toward implementation of water reuse. Spokane County will continue to engage the City of Spokane in discussions regarding opportunities for water reuse.

14. *Pages 33 & 34: I recommend that commercial/industrial uses such as toilet and urinal flushing, grounds maintenance, and heating system makeup and cooling water at the Spokane Interstate Fairgrounds, Spokane Community College and city's fire training complex (including the Washington National Guard's Readiness Center) be re-evaluated. 2ESSB 6117, passed into law by the 2007 legislature, requires that all state agencies and state facilities use reclaimed water for non-potable uses where reclaimed water is a feasible replacement source of water. Other state agency buildings may be located along the major routes identified in the plan that could also use reclaimed water for non-potable purposes.*

    The re-plumbing or retrofitting of very old facilities, and facilities with incomplete or inadequate records of original construction, is not feasible because of the complexity that would be involved with separating on-site plumbing and ensuring that no cross connection exists. At present, the cost and risk is not worth the reward, in most cases. At some locations, such as the fairgrounds, it may be feasible to separate the irrigation system from the potable system. These types of water reuse opportunities will be evaluated on a case-by-case basis in future planning updates, but are not considered at this time. No modifications were made to the final report based upon this comment.

15. *Page 36 - Figure 15: I recommend approaching Felts Field, West Valley High School, Millwood School, Millwood Park, St. Paschal's Church, and Orchard Avenue School as potential large users along the Valley reclaimed water pipeline route to Plantes Ferry Park.*

    After the County establishes a transmission route for reclaimed water, we will continue to explore and propose opportunities for additional reuse sites. No modifications were made to the final report based upon this comment.

16. *Pages 35 - 38; Figures 14-18: Each of the transmission main routes appears to provide ample opportunity for residential irrigation and other urban irrigation sites on relatively large parcels of open land (schools and churches). I recommend that this be investigated in further detail.*

    After the County establishes a transmission route for reclaimed water, we will continue to explore and propose opportunities for additional reuse sites. No modifications were made to the final report based upon this comment.

17. *Page 38: Please include the correct information on production: there are no county wastewater facilities permitted for, or producing reclaimed water.*

    The effluent from the three small County-owned wastewater treatment facilities was incorrectly described as reclaimed water. This has been corrected in the final report.

18. *Page 43: In discussing the reclaimed water opportunity at Inland Empire Paper, the plan notes that the "greatest impediment to implementing such a project is the willingness of the potential user to convert ... to a new and unproven source". This statement implies the county feels that reclaimed water is an unproven water supply. Please explain further or clarify.*

    The County does not feel that the reclaimed water is an unproven water supply. The statement was written from the perspective of the Inland Empire Paper Company. The report was modified to clarify this point.

19. *Page 44: The report surmises that created wetland systems may be required to be lined depending on location and potential interaction with potable aquifers. Please note that the current Standards do not include any requirements for lining wetlands. Comment 27 addresses requirements for constructed beneficial use wetlands and constructed treatment wetlands that might drive engineering and water management decisions to line wetlands.*

    The County is considering the creation of beneficial use wetlands and applying Class A reclaimed water to existing wetlands. The County is not proposing constructed treatment wetlands. The County's engineer has suggested in the report that it may be prudent to provide a liner in a constructed beneficial use wetland, depending upon the site-specific circumstances. Modifications to the final report have been made in this regard.

20. *Pages 44 & 45: I recommend that future assessments on developing wetlands include an assessment of economic benefits. Recharge through restoring natural wetlands or developing constructed beneficial use wetlands will provide additional flow into the aquifer that can benefit any of a number of downstream users seeking additional water rights capacity. A second consideration is the potential benefits of developing a wetland mitigation bank that could benefit continued development in the region.*

    We agree that future assessments of developing wetlands should include an assessment of economic benefits. The Saltese Flats Wetland Restoration project report will address benefits to be gained from that project. The County will address economic benefits of wetlands projects as part of the site-specific studies. No modifications were made to the final report based upon this comment.

21. *Page 45: Please clarify the intent of the discussion of wetland restoration at Saltese Flats and the impacts of Shelley Lake, especially the comment that the site could be used for aquifer recharge also. Please see Comment 27 below regarding the differences in legal status between aquifer recharge and use in wetlands sites. Since these are different uses, with different benefits to the County, the amount of water sent to a constructed beneficial use wetland, natural wetland, constructed treatment wetland or to aquifer recharge will have to be delineated and managed.*

    Saltese Flats is not over the Spokane Valley Aquifer. The Saltese Flats project is intended to be a wetlands restoration, not an aquifer recharge project. The discharge from the wetlands could flow through the ditch referred to by some as Saltese Creek, to Shelley Lake. The exfiltration from Shelley Lake is likely into the Spokane Valley Aquifer. Studies of the interaction of the Saltese Flats with the aquifer are on-going. The final report has been modified to clarify the intent of the project, and to acknowledge the different uses and benefits and associated management you described.

22. *Pages 47 & 48: There are no requirements for either a one-year residence time or 2,000 feet between recharge site and extraction wells for surface percolation projects. These requirements would be applied to a direct recharge project, but as noted on Page 15, direct recharge is not being considered. Please revise this section d to be consistent with current requirements.*

    This section has been corrected accordingly.

23. *Pages 48 & 49: Please note that in-plant storage requirements apply to all facilities that do not have an alternative permitted disposal system. They aren't limited to direct recharge (injection) or aquifer recharge as is stated in the report.*

    We do not find in the Washington State Water Reclamation and Reuse Standards any in-plant storage requirements for redundancy or emergencies ("off-specification" water). We understand there are system storage requirements such that system storage capacity must be, at a minimum, the volume equal to three times that portion of the average daily flow of reuse capacity for which no alternative reuse or disposal system is permitted, and that this requirement is true for any reuse or disposal method. The statements in the report do not state that the storage requirements are limited to direct recharge or aquifer recharge. However, modifications were made to the report to clarify the storage requirement if recharge (or any reuse method) was the only system or method employed to manage reclaimed water.

24. *Page 49: Please note that the statement that "aquifer recharge as the only type of reclaimed water disposal" (emphasis added) confuses beneficial use of reclaimed water and waste disposal. If the water is "disposed of", the water is then a wastewater and the discussion related to standards and requirements for reclaimed water are no longer valid. Reclaimed water is no longer considered "wastewater", and does not need to be "disposed", but rather a resource available to be put to beneficial use. See comment Number 7.*

    Agreed. The word "disposal" was removed in the context of beneficial reuse. However, the word "disposal" was retained in the context of the Washington State Reclamation and Reuse Standards reference to storage requirements.

25. *Page 52: The report should be corrected to note that RCW 90.46, the Reclaimed Water Use Act, was only revised in 2007. RCW 90.46 was originally adopted in 1992 and has been modified multiple times since. The 1997 revision adopted language that provides the owner of the treatment plant exclusive right to the water. Modifications to RCW 90.46.120 that attempted to clarify the water rights impairment requirements in this section were passed by the 2007 legislative but vetoed by the governor.*

    The report has been modified to reflect that the Act was modified in 2007.

26. *Page 54: Referring to Comment #4 above, please consider revising the report to state that the design of an irrigation system using reclaimed water must be based on a detailed water balance. The intent is to maintain all of the water in root zone of the crop, which prevents water from moving past the root zone and into the aquifer. The desired outcome is to make the most efficient use of the irrigation supply to reduce the overall use of potable water for irrigation in the area, and ultimately reduce demands on the aquifer.*

    The "Hydrology of Reclaimed Water" section of the report has been modified to state, "While the design of an irrigation system using Class A reclaimed water must be based on a detailed water balance with the intent to maintain all of the water in root zone of the crop, a portion of the water may percolate into the aquifer just as current irrigation water does and gradually return to the Spokane River via groundwater (USGS, 2005).

27. *Page 58 - Table 21: Please clarify the intent of "groundwater recharge and wetlands (infiltration)" as a beneficial use. RCW 90.46 identifies groundwater recharge and wetlands as separate beneficial uses. Even though an equivalent portion of the water from a wetland and aquifer recharge basin can end up in the aquifer, the final water quality requirements and legal*

status of the water is more complicated. The owner of the treatment plant producing the reclaimed water used for aquifer recharge has exclusive right to recover and use the recharge. However, reclaimed water that is released to constructed beneficial use wetlands is considered "waters of the state". The exclusive right granted to the treatment plant owner no longer exists.

The water quality of reclaimed water discharged to constructed beneficial use wetlands must to conform to Section II of the 1997 Standards. The water quality and loading limits included in the Standards are intended to assure adequate protection of surface and groundwater that could be recharged by the constructed beneficial use wetland. No further treatment is necessary. The water recharging ground water from the constructed beneficial use wetland is also considered "waters of the state".

Reclaimed water can also be discharged to constructed treatment wetlands, which by definition is used for treatment or polishing of reclaimed water. But, Section II of the 1997 Standards specifically exclude constructed treatment wetlands from the water quality requirements and wetland loading limits in these standards. Therefore only the final use(s) of the water will define the required water quality requirements after the treatment wetland. Thus, if the treatment wetland cannot produce sufficient water quality, additional treatment will be necessary. For aquifer recharge by surface percolation, the water quality will have to "at all times" conform to the groundwater recharge criteria (e.g. the drinking water MCL's). Because treatment wetlands have not been able to produce finished water quality that consistently conforms to all of groundwater recharge criteria, including microbial standards, additional treatment such as disinfection would likely be necessary.

The paragraph immediately preceding Table 21 has been modified to state, “The estimated costs and timing of implementation of an integrated concept for reclaimed water use over a 20-year period (2010-2030) are presented in Table 21. Note that the column heading for Phase 2, “Groundwater Recharge and Wetlands (Infiltration)” is not intended to imply that Spokane County expects to develop a project that is both a wetlands enhancement and a groundwater recharge project with the same volumes of water. Rather, it is descriptive of the planned Phase 2 facilities.”

28. *Page 59: Additional key issues that need consideration include:*

- *The ability to generate revenue from the sale of reclaimed water and an estimate of those revenues;*
- *Specific intention for the fate of reclaimed water used for aquifer recharge for which the County is granted exclusive right for distribution and use - will the water be made available for public appropriation as "waters of the state" or does the County intend to maintain control over the water and administer a program to provide water for the benefit of regional users?*

We believe that the first key issue you describe is inherent within the existing key issue, “What will be the various agencies’ general policies regarding production, storage, distribution and sale of reclaimed water?” Therefore, no modification to the final report was made in this regard. However, management and priority of use of the reclaimed water stored in aquifers through recharge operations was added as a key issue.

29. *Page 60: The intended effect of "ownership rights" on utility operations needs clarification. The water within the state (surface water and groundwater) belongs to the people of the state. The beneficial use of these waters is authorized by the state (Department of Ecology) through the water rights process. In addition, once a reclamation permit is issued, the owner of the treatment plant that produces reclaimed water is granted the exclusive right to distribute and use the reclaimed water. Thus, reclaimed water can be transferred or sold just as drinking water is sold by public water systems. This allows the owner of the treatment plant to retain control over and generate revenue from the reclaimed water.*

    This section of the report is intended to provide Spokane County with considerations for organizational structure of a new utility operation for the deployment of the reclaimed water as a new resource. The discussion on ownership rights is provided to stimulate thought about how control of the reclaimed water might direct or constrain the policies of a new water reuse utility. Specifically with regard to Spokane County, at such time as the County decides to implement a project and apply and receive a permit, the right to distribute and sell the water will be addressed.