4.1 INTRODUCTION

Demand management programs have the objective of reducing wastewater flows and/or loadings in the service area, reducing the required capacity of treatment and conveyance facilities. Through flow reduction and load minimization, these programs may reduce capital and operating costs, delay the need for facility expansions, improve regulatory compliance, or better ensure system costs are equitably distributed among wastewater generators. Most demand management alternatives are programmatic in nature, involving economic incentives, revisions to sewer ordinances, public education or operational practices. However, some alternatives involve significant capital expenditures to upgrade deteriorating infrastructure or retrofit homes or businesses with devices that reduce wastewater discharges.

4.1.1 Load Reduction Versus Load Diversion Programs

Demand management alternatives may be divided into two general categories: load reduction and load diversion.

Load reduction measures are aimed at (1) minimizing wasteload generation at the source or (2) preventing extraneous flows from entering the conveyance system enroute to treatment facilities. A number of load reduction measures were identified during the alternatives brainstorming workshop (see Chapter 3). Most of these ideas survived the initial screening step and are evaluated in this chapter.

Load diversion alternatives involve rerouting all or part of the generated wasteload to another method of treatment or disposal. During the alternatives brainstorming workshop, a number of load diversion alternatives were identified, but were subsequently screened out as being undesirable or impractical (see Chapter 3). Examples are listed below:

- **Continue Partial Use of Septic Tanks.** A suggestion was made to sewer only densely populated areas, allowing low-density areas within the County's service area to remain on septic tanks. This idea was eliminated because it is inconsistent with the County's septic tank abatement program and its Comprehensive Plan.
- **Implement Graywater Disposal Systems.** In this concept, houses would be retrofitted to divert flow from washing machines, showers, and lavatories to onsite or regional graywater disposal systems. The idea was eliminated because it directs nutrient loadings to the aquifer, which is contrary to the objectives of the County's aquifer protection program.
- **Ban Garbage Disposals.** The idea to eliminate garbage disposals was considered impractical to implement. Also, treating this material at a wastewater plant can produce a reusable end product (biosolids). Diverting this material to the regional incinerator was viewed as a less beneficial outcome.
- **Promote Use of Composting Toilets.** While individuals may find this approach appropriate for their lifestyles, implementation of composting toilets on a wide scale was considered impractical.

4.1.2 Organization of the Chapter

The demand management alternatives that survived the screening process may be organized into the following groups: water conservation, infiltration/inflow control, and industrial/commercial load reduction. The following sections describe alternatives within each group by presenting the basic concept, discussing the applicability of the idea to Spokane County, identifying key implementation requirements or issues, and projecting the anticipated results that would be achieved by implementing the idea. In the final section, the alternatives are compared against the array of evaluation criteria developed for the facility plan. The demand management measures recommended for implementation are described in Chapter 9, Recommended Plan.

4.2 WATER CONSERVATION ALTERNATIVES

Typically, water conservation measures are driven by a desire to extend available water supplies in water-short areas. Conventional water conservation programs may address both external water uses (such as landscaping irrigation) and internal water uses (such as water consumption through plumbing fixtures or commercial and industrial processes). From a wastewater management perspective, reduction of internal uses is the principal objective.

Across the nation, communities have used a variety of approaches to water conservation, including the four methods examined in this section: public education, economic incentives, metering, and physical devices. Most successful programs employ a combination of measures to achieve effective conservation.

Cooperation with Water Purveyors

Successful implementation requires full coordination and participation of local water utilities. If there is little incentive for the water utility to embark on an aggressive water conservation program, then financial incentives would need to be funded by the beneficiary of such a program, specifically the wastewater agency. For the Spokane County wastewater service area, there are approximately 25 water purveyors. This large number complicates water conservation program coordination. Since some water purveyors are investor owned utilities, dependent on commodity sales, with an extensive water supply (Spokane Valley Aquifer), some utilities may have little near-term incentive to embark on an aggressive water conservation program. In fact, some private utilities may actually promote increased water use, as it results in greater revenues.

The Spokane County Coordinated Water System Plan1 has general recommendations for water conservation programs, depending on utility size. However, these are general recommendations and not actual requirements. Adoption of a conservation plan is left to the discretion of the individual water purveyor.

1 Spokane County, *Coordinated Water System Plan Update, Final*, Economic and Engineering Services, June 1999.

4.2.1 Water Conservation – Public Education

Concept

The objective of a public education program for homeowners and businesses is to instill the conservation ethic among the customers. Communication approaches that have proven successful include newsletters, radio announcements, press releases, and school education programs. Most utilities have found that a continuous ongoing program is necessary to avoid reversion to pre-conservation habits.

Applicability to Spokane County

Public education approaches would be feasible in Spokane County. The County's long-term communication program to promote awareness for protection of the Spokane Valley Aquifer has been effective and demonstrates what can be accomplished with a well-conceived public communications approach.

It may be possible to link water conservation to energy conservation, a topical subject during the energy price increases of 2000/2001. Higher water consumption requires increased energy for conveyance and also leads to increased hot water consumption. By reducing water use, energy is conserved.

Also, the dry winter of 2000/2001 has resulted in drought conditions during Summer 2001. Water conservation to extend resources will become typical. The expected drought would make it easier to implement water conservation.

Implementation

Preferably, the County and the water purveyors would jointly develop an education program. Since water conservation may be contrary to the desire of local investor-owned water purveyors to sell more water, there may not be support for a formal conservation program. Conservation could lead to decreased sales and reduced profits. The County could elect to implement an education program on its own, focusing on measures that reduce wastewater generation. However, this result is likely to be less effective than conservation programs developed by purveyors.

Anticipated Results

Historically, the greatest challenge in designing demand management alternatives has been in estimating the relative success of demand management programs. Many of the programs depend on voluntary efforts.

The most effective water conservation programs have been initiated in the arid regions of the western United States. During the extreme California drought of the late 1970s, voluntary conservation and high water rate charges resulted in significant reductions in wastewater flow during the course of the drought. This experience reveals that under some circumstances, public education, voluntary conservation, and economic factors can reduce wastewater flow.

Implementation of a public education conservation program in the Spokane area would be projected to have minimal impact on wastewater generation under normal conditions. However, a conservation program may be effective during drought conditions. Voluntary

conservation is most likely to reduce consumptive uses, such as irrigation, that don't generate domestic wastewater.

4.2.2 Water Conservation – Economic Incentives

Concept

In this approach, utilities would discourage intensive water use by charging the customer a higher unit rate as their water consumption increases over a preset threshold. This is essentially a cost penalty for excessive consumption.

Applicability to Spokane County

Most water utilities in Spokane County do not charge on a sliding-rate basis. Currently, supplies from the Spokane Valley Aquifer are plentiful, providing little incentive to change the billing basis.

Implementation

Full implementation of this concept would require that all water purveyors convert to a sliding rate unit cost. The County currently has no direct control over water use charges. The County would need to request that water purveyors adopt this program.

Anticipated Results

With respect to wastewater reduction, experience at other locations has shown that the portion of water demand reduced by this approach is typically lawn watering and car washing, uses which do not return wastewater to the sanitary sewers. Summer water use in the Spokane area is as much as ten times greater than winter consumption, reflecting these non-wastewater return uses. Also, the impact of economic approach is usually slow to be realized. Most area utilities invoice no more frequently than bimonthly. Therefore, most customers don't realize the financial impact of their water consumption until several months after the water has been consumed, often after the peak seasonal demand has passed.

The benefits to the wastewater utility of a sliding scale water commodity charge are anticipated to be minimal.

4.2.3 Water Conservation – Metering

Concept

In this approach, all water customers would have meters installed, with billing based on actual water consumption.

Applicability to Spokane County

In the Spokane County service area, most business and residences already have water meters, and the consumer can therefore monitor water use.

Implementation

If water meters are not available in specific areas, the County could encourage water purveyors to install them, but would have no significant control unless it was willing to fund the meter program.

Anticipated Results

Like economic incentives, installation of water meters has the most impact on high-volume external water uses such as landscape irrigation or car washing. Some small level of wastewater reduction would likely occur, but it would be insufficient to warrant the cost of meter installation.

4.2.4 Water Conservation – Physical Devices

Concept

Water conservation can be implemented by installing plumbing devices that use minimal water quantities. These devices include ultra-low use toilets, front-loading washing machines, and flow-restricting faucets and showers.

Current state law requires that low-flow plumbing fixtures be installed in all new construction and all remodeling involving replacement of plumbing fixtures in all residential, hotel, motel, school, industrial, commercial use, or other occupancies which use significant quantities of water. State-mandated low-flow fixture consumption requirements are shown in Table 4-1 (Low-Flow Fixture Requirements).

Table 4-1. Low-Flow Fixture Requirements

Fixture	Water Consumption
Tank-type toilets	1.6 gallons per flush
Flushometer-tank toilets	1.6 gallons per flush
Electromechanical hydraulic toilets	1.6 gallons per flush
Urinals	1.0 gallons per flush
Shower heads	2.5 gallons per minute
Bathroom faucets	2.5 gallons per minute
Lavatory faucets	2.5 gallons per minute
Kitchen faucets	2.5 gallons per minute
Replacement aerators	2.5 gallons per minute
Flow requirements per RCW 19.27.170 [2] *and WAC 51-46-0402.*[3] *Requirements effective as of July 1, 1993.*	

2 Revised Code of Washington 19.27.170, *Water Conservation Performance Standards – Testing and Identifying Fixtures That Meet Standards – Marking and Labeling Fixtures*.

3 Washington Administrative Code 51-46-0402, *Water Conserving Fixtures and Fittings*.

Toilets consume a significant portion of the domestic water supply. Until 1990, toilets used 5 to 7 gallons per flush. From 1990 to 1993, units were designed to use 3.5 gallons per flush. In 1993, ultra-low flush units using 1.6 gallons per cycle were introduced.

Conventional, vertical axis washing machines use significant quantities of water, making clothes washing a major household water consumer. Horizontal axis machines, which are popular in Europe, use considerably less water. Through a demonstration project conducted in Bern, Kansas in 1997 4 it was found that vertical axis machines used 42 gallons per water per load, while horizontal axis machines used only 26 gallons per load, a savings of 38 percent. Secondary benefits of the horizontal axis machine is that energy use is also reduced, due to reduced hot water consumption, higher efficiency motors and reduced moisture of the washed load. The last item translates to lower drying costs. Horizontal washers cost more than conventional units, and range upwards from $600. Horizontal washers require the use of special, low-suds detergent.

Another means to reducing wastewater generation is to install low-flow showerheads and flow restricting faucets. Older showerheads used about 4.5 gallons per minute, while new fixtures use 2.5 gpm. Flow restrictors may also be mounted in faucets to reduce water consumption.

The most common approach to fixture replacement is to select a desired flow reduction and replace fixtures over a period of several years to meet the objective. This approach has been adopted in other water conservation programs associated with wastewater facilities planning efforts.[5, 6]

LOTT Experience

The Lacey-Olympia-Tumwater-Thurston County Alliance (LOTT), the wastewater utility serving the state capital, has implemented a particularly effective fixture replacement program[7]. Their program focuses on toilet replacement, but also includes replacement showerheads and faucet aerators, as well as $100 rebates on front-loading washers. Through May 2001, LOTT has expended $2,018,000 on fixture replacement and reduced wastewater flow by an estimated value of 310,000 gallons per day. The cost has been $6.50 per gallon per day of wastewater reduction, which is less than their estimated cost of constructing wastewater treatment plant capacity, which was $12.87 per gallon per day in 1998.

Karla Fowler of the LOTT Alliance states [8] that the program has been effective and well received by the public. There was initial skepticism that low-flow toilets would be acceptable. LOTT researched available units for their giveaway program and selected models with proven performance. They have retained a plumber to correct deficiencies as they occur. Ms. Fowler stated that the public satisfaction with the fixture replacement

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4 Pugh, Clifford A., Technical Specialist, United States Bureau of Reclamation, and Tomlinson, John J., Residential Program Manager, Oak Ridge National Laboratory, *High-Efficiency Washing Machine Demonstration*, Bern, Kansas

5 LOTT Wastewater Management Partnership, *Wastewater Resource Management Plan*, November 1998.

6 Pierce County Utilities, Unified Sewerage Plan, HDR Engineering, 1998.

7 Flow Reduction Cost-Effectiveness Overall, Karla Fowler, LOTT Program Manager, May 21, 2001.

8 Personal Communication with Karla Fowler, LOTT Program Manager, June 29, 2001.

program is greater than 90 percent, and that for LOTT, economics justify conservation as a preferred approach over construction of new treatment plant capacity.

Flow Reduction

Fixture replacement measures could result in reduction in the average daily sanitary wastewater quantity of 5 to 20 percent, depending on the measures implemented, i.e., whether a low, moderate, or aggressive program is adopted.

- A low-level approach would be based solely on enforcement of plumbing codes for new construction and major remodeling projects. Existing system retrofits would be by voluntary compliance for a low-level scenario. Low-level conservation measures are estimated to result in existing system retrofits of 0.5 to 1.5 percent annually (based on enforcement of existing plumbing codes), which corresponds to a minimum 5 percent reduction of wastewater flows over 10 years.
- Moderately aggressive conservation measures would result in retrofits of 3 to 5 percent of the existing households each year over 10 years, with a corresponding 9 percent total wastewater flow reduction.
- An aggressive program could result in fixture retrofits of 10 percent per year and a corresponding wastewater flow reduction of 20 percent or more.

Applicability to Spokane County

Plumbing fixture replacement would be applicable to Spokane County. For new construction and major remodels, these measures would be implemented through the plumbing code. Outdated fixtures would be replaced with low-use units as remodeling occurs.

Implementation

For existing homes and businesses, either voluntary or mandatory retrofit programs could be implemented. Many utilities implementing a replacement program have recognized the potential public resistance to a mandatory fixture replacement program, and have adopted voluntary programs for fixture replacement. A voluntary program could be supplemented by utility rebates. Typically the water purveyor has initiated most of the successful water conservation programs. However, a joint County/water purveyor program may be appropriate.

Total cost to completely upgrade toilets, washers, showerheads, and faucets in an average residence is estimated at $1,150, based on the following assumptions:

- Toilet replacement cost of $500 per residence, based on a new unit cost of $150 each, with two toilets per residence, installation, old fixture disposal, and administration.
- A median cost of $600 for purchase of a front-loading washer. Cost for a front-loading washer can be as much as $1,000.
- Total estimated cost per home for showerhead and faucet restrictors is $50, with a showerhead replacement cost of $20 and flow restrictor cost of $10 each for two bathrooms and one kitchen.

Anticipated Results

The effectiveness of conservation programs may be estimated by examining potential water consumption reductions, as shown in Table 4-2 (Flow Reduction and Costs of Plumbing Fixture Replacement).

Table 4-2. Flow Reduction and Costs of Plumbing Fixture Replacement

Residential Water Use	Wastewater Flow Attributed to Water Use (percent) [a]	Current Wastewater Flow (gallons per person per day)[b]	Wastewater Flow Eliminated (gallons per person per day)	Wastewater Flow Eliminated (gallons per ERU per day) [c]	Cost (dollars)	Cost (dollars per gallon per day removed)
With Washers at Full Cost:						
Toilets	28.5%	22.8	16.4 [d]	41.0	$500 [e]	$12.20
Washing machine	21.3%	17.0	6.5 [f]	16.2	$600	$36.97
Showers	21.1%	16.9	7.5 [g]	18.8	$20	$1.07
Faucets	11.6%	9.3	4.1	10.3	$30	$2.91
Baths	9.1%	7.3	0.0	0.0	$0	N/A
Toilet leakage	5.3%	4.2	0.0	0.0	$0	N/A
Dishwashers	3.1%	2.5	0.0	0.0	$0	N/A
Total	100%	80	35	86	$1,150	$13.33
With Washers at $100 Rebate:						
Toilets	28.5%	22.8	16.4	41.0	$500	$12.20
Washing machine	21.3%	17.0	6.5	16.2	$100	$6.16
Showers	21.1%	16.9	7.5	18.8	$20	$1.07
Faucets	11.6%	9.3	4.1	10.3	$30	$2.91
Baths	9.1%	7.3	0.0	0.0	$0	N/A
Toilet leakage	5.3%	4.2	0.0	0.0	$0	N/A
Dishwashers	3.1%	2.5	0.0	0.0	$0	N/A
Total	**100%**	**80**	**35**	**86**	**$650**	**$7.53**

a Percentage from Gambrell Urban, 1987 (Reference 9).

b 80 gallons per capita from current information (Basis of Planning Report).

c ERU = Equivalent Residential Unit. 2.5 capita per ERU.

d Existing toilets assumed to use 5.7 gallons per flush, as compared to 1.6 gallons per flush after 1993.

e Assumes cost of new toilets are $150 each, with two toilets per residence, installation, old fixture disposal, and administration, for a total cost of $500 per residence.

f Existing washers assumed to use 42 gallons per load, compared with 26 gallons per load for horizontal washers.

g Existing showers assumed to use 4.5 gallons per minute compared to 2.5 gallons per minute after 1993.

9 Gambrell Urban, *Untitled Technical Memorandum*, 1987.

Table 4-3 (Project Water Conservation Effectiveness) shows that the estimated cost of wastewater reduction is $13.33 per gallon per day, when the full cost of washers is considered, or $7.53, when only the cost of a $100 rebate is considered in the analysis. The LOTT Alliance has adopted the second scenario, and has not considered the bulk of the cost to the individual customer for the washing machine. The estimated cost of $7.53 per gallon per day of wastewater eliminated compares favorably with LOTT's estimate of $6.50 per gallon per day.

Table 4-3. Project Water Conservation Effectiveness

Item	Best Achievable Performance	Ten Percent Flow Reduction
No. of ERUs Affected	23,327	7,532
Flow Reduction	2.01 mgd	0.65mgd
Flow Reduction	31%	10%
Estimated Cost	$26,800,000	$8,700,000
Cost (per gallon per day)	$13.31	$13.38

The estimated cost of $13 per gallon per day is not strictly comparable with wastewater treatment costs, as the conservation approach affects only wastewater quantity and not organic and solids loadings. Approximately half of treatment plant costs can be allocated to flow quantity and nearly all of sewer construction. Demand management will be considered in the overall wastewater management program economics presented in Chapter 9. Elements of the overall program associated only with wastewater flow could be reduced in cost by lowering the volume of wastewater generated. Potential overall program impacts of demand management are shown in Table 4-3 (Project Water Conservation Effectiveness).

The largest flow reduction may be estimated by assuming that all current customers do not have low fixtures.10 As of April 2000, there were 23,327 equivalent residential units served by the Spokane County sewer system. The cost for replacing these fixtures is estimated to be $26.8 million. Best achievable flow reduction would be 35 gallons per day per day. Overall, the cost is $13 per gallon per day of flow reduction, with a maximum reduction of 2 mgd from the average existing flow of 6.5 mgd, equal to a 31 percent reduction. This approach assumes mandatory replacement of all existing plumbing fixtures. A ten-percent flow reduction goal is estimated to cost $8,700,000.

A low-effort program, relying on plumbing code enforcement, may be most appropriate for the Spokane County service area. This approach is estimated to reduce wastewater flow by 10 percent over the 20-year planning horizon. Continued monitoring of the numbers of

10 This approach likely overstates the potential flow reduction because some homes and businesses currently connected to the sewer system were built under the new code and use low-volume fixtures. Also, a prior energy conservation program conducted by Avista promoted the installation of low-flow showerheads and faucet adapters. It is not known how successful this program was in terms of the number of plumbing fixtures converted.

connections and wastewater flow should be practiced to determine the effectiveness of the fixture replacement program.

No literature reference information on water conservation impacts on peak wastewater flow has been identified. Likely, there would be minimal changes from current peak flow patterns.

4.2.5 Impact of Water Conservation on Wastewater Management

Water conservation may have a few negative impacts on wastewater management. Conservation will decrease the wastewater quantity, but not the mass of solids and organics. As a consequence, wastewater biochemical oxygen demand and total suspended solids concentrations may increase. Conveyance transport time may be increased. The higher strength and extended transport time may work to increase the potential for odor and corrosion in the collection system.

4.3 INFILTRATION AND INFLOW CONTROL

Infiltration is the unintentional entry of ground water into the wastewater collection system from surrounding soil. Infiltration is indicated when high wastewater flow is sustained for extended periods. Common points of entry typically include broken pipe and defective joints, as well as cracked manholes. For infiltration to occur, the ground water level must generally be situated above the collection system, so that water is forced into the sewer. This condition does not occur in most of Spokane County's collection system.

Inflow primarily consists of rainwater or snowmelt, which enters the collection system through roof drains, foundation and basement drains, catch-basin connections, and manholes cover holes in flooded streets. Inflow may also include cooling water discharges. Storm inflow is distinguished from infiltration by the rapidity with which inflow begins and ends after a period of rainfall.

Infiltration and inflow (I/I) are concerns because they consume useable capacity in the conveyance system and treatment facilities. Excessive levels may also dilute wastewater and cause treatment plant performance to deteriorate. Some communities have found that by reducing the quantity of I/I, sewer system and wastewater treatment hydraulic capacity can be extended.

However, Chapter 2 reveals that the County collection system has undetectable infiltration and minimal inflow. The programs described below would have marginal impact on current conditions, but may be appropriate to avoid future difficulties.

4.3.1 Sewer Rehabilitation

Concept

This approach involves rehabilitation to repair leaky sewers and service laterals to reduce current and future levels of I/I.

Applicability to Spokane County

As described in Chapter 2, no detectable amounts of infiltration have been identified in the existing Spokane County collection system. A minor amount of inflow has been detected. The source is thought to be basement sump pumps in a few limited areas (see next alternative). Minor amounts of infiltration may develop in the sewer system as the piping network reaches an age of 20 years.

Implementation

Rehabilitation measures, if needed, would be implemented by the County, either through its own forces or through construction contracts.

Anticipated Results

Since I/I quantities are quite low, there is little incentive to implement pipeline rehabilitation measures in the near future. The return on investment in this area would be low. Infiltration is estimated to increase to 10 gallons per day per person as piping materials age. This remains quite low compared to national and regional experience.

4.3.2 Disconnect Sumps

Concept

There are anecdotal reports that discharges from basement sump pumps may be generating the modest inflow quantity observed in the collection system. With this approach, sump pump discharge would be routed to new or existing storm drainage facilities.

Applicability to Spokane County

Currently, no information is available that would allow the number of drainage sumps to be identified. However, based on the low magnitude of the observed inflow quantity, this issue is a relatively minor concern. Stormwater management program policies should be reviewed to ensure that basement drainage may be routed to storm drainage facilities.

Implementation

It may be most appropriate to address this issue as a component of the County's stormwater management planning. The public could be informed through the County's information newsletter. The homeowner would most likely be responsible for paying costs associated with sump pump modifications. A County ordinance bans the connection of sump pumps to the sanitary sewer system

Anticipated Results

The maximum effectiveness would be complete elimination of sewer system inflow. However, existing inflow is likely caused by a mixture of illegal connections, and not just sumps.

4.3.3 Review Codes, Inspection and Enforcement

Concept

This concept involves benchmarking the County's current codes and practices for sewer and lateral construction against best management practices developed by other utilities. The County's current prevention methods are focused on sewer construction quality control measures such as (1) design in accordance with industry standards, (2) testing and inspection of new sewer mains, and (3) testing and inspection of side sewers.

Applicability to Spokane County

The County has established rigid standards for sewer design and construction, which minimize the potential for infiltration and inflow. These standards are generally thought to be consistent with industry-wide practices used by other municipalities.

Implementation

This approach would involve a limited-scale study comparing the County's codes, construction requirements, inspection practices and enforcement with those used by other well-operated utilities.

Anticipated Results

Analysis of the County's current wastewater characteristics reveals that current infiltration quantities are nonexistent and inflow amounts are minimal, confirming that the current sewer construction practices are effective. The main benefits of a benchmark review are preventative and would minimize future infiltration and inflow.

4.4 INDUSTRIAL AND COMMERCIAL LOAD REDUCTION

Many industries generate wastewater that has a high strength (in terms of conventional pollutants such as biochemical oxygen demand (BOD), total suspended solids (TSS), nitrogen, and/or phosphorus) or potentially toxic pollutants incompatible with municipal wastewater treatment. Another wasteload reduction method is to minimize the quantity and strength of wastewater generated by industrial and commercial customers.

There are three feasible industrial/commercial load reduction approaches. The first is pretreatment requirements, which are mandatory limits imposed by ordinance or federal law. The goal of pretreatment requirements is to ensure effluent quality, protect beneficial biosolids use, and avoid process upsets.

The second approach is high strength surcharge fees. This concept targets industries that discharge wastewater with high levels of organic, solids, and nutrients. These materials are amenable to conventional treatment, but increases wastewater management costs. The goal is to recover costs from the contributors.

The third approach is industrial recycling and waste minimization. Some industries are finding it economical to minimize water reuse by recycling and to recover valuable chemicals previously discarded as waste.

4.4.1 Pretreatment Requirements

Concept

This alternative would establish pretreatment limits for industrial and commercial discharges. Typically, these "local limits" apply to pollutants that are incompatible with the treatment system and may result in (1) treatment process upsets, (2) effluent quality violations due to inadequate removal across the treatment process, or (3) unacceptable biosolids quality for the intended end use. Pretreatment targets toxic materials and very high strength wastes.

Through a sewer use ordinance, toxic materials are limited to an established standard. Most utilities have also established pretreatment limits for compatible pollutants in order to better define and control the wastewater strength that must be treated at the municipal plant.

Applicability to Spokane County

The regional treatment plant uses biological processes to treat wastewater and solids. Biosolids generated from the facility are beneficially used on agricultural lands. The Spokane River has elevated metal concentrations and total maximum daily loadings (TMDLs) have been established for cadmium, lead, and zinc. Wastewater dischargers are required to maintain discharges of these three metals at or below current levels. The existing regional plant, or any other biological treatment facility located in the basin, will therefore need to have industrial pretreatment limits for influent wastewater.

The County has adopted a sewer use ordinance that limits industrial and commercial wastewater strength and toxics. Industries are required to pretreat the wastewater if it exceeds the limits. To date, no industries are permitted to discharge significant high-strength wastewater into the County sewer system. There are a few metal and electronics fabricators that require attention to ensure low levels of metals in County wastewater.

Implementation

The County's industrial wastewater treatment program is already in place and there is a designated coordinator for supervising compliance. This program will need to be maintained.

Anticipated Results

Since a pretreatment program is already in place, no revisions are anticipated.

4.4.2 High Strength Surcharges

Concept

The surcharge approach places a fee on dischargers that contribute wastewater with pollutant strength that is considerably higher than typical domestic sewerage. Typically a "cost per pound" of excess loading is applied in addition to the basic user charge. The surcharge program would apply to pollutants that are compatible with the wastewater treatment process, but which cost money to remove. This program is oriented towards industries with intermediate strength wastewater. The industry may either elect to pay the high strength surcharge or may construct pretreatment facilities to reduce wastewater strength prior to discharge to the municipal sewer system.

Applicability to Spokane County

Although the ordinance has provisions for a high strength surcharge fee, this element is not included in the current regulations. The County occasionally monitors wastewater quality of significant industrial and commercial dischargers.

Implementation

The County has authority to implement this program through its rate structure. Typically, a cost of service analysis is performed to determine an equitable system of charges.

To implement a high strength surcharge would require that the cost for treating the high strength be allocated to the wastewater components such as flow, BOD, and TSS. This formal allocation is usually performed in a rate study. The cost for each treatment or conveyance element is allocated to the applicable wastewater component. For example, sewer construction and operational costs are dictated by flow, whereas biological treatment costs are allocated to BOD. This type of cost analysis is not included in the rate study currently being prepared by the County.

Anticipated Results

Implementation of this measure would encourage industries to examine the cost of continued discharge versus the cost of pretreatment. This may lead to reduced pollutant loadings to the County system, although there is no guarantee that high-strength dischargers will take this course. Consequently, this alternative should be viewed as a cost recovery mechanism more than a pollutant reduction program.

Currently, there is inadequate data available to ascertain whether a high strength surcharge would generate additional revenue, or encourage industries to reduce loadings. The loading impact from new customers should be considered prior to completing a new sewer connection.

4.4.3 Water Recycling and Waste Minimization

Concept

The recycling approach would encourage industrial discharges to implement aggressive internal reuse and waste minimization programs. This would decrease both the quantity of flow and mass of pollutants discharged to the sewer system. Economic incentives or other enticements may be needed to implement this approach. Many high technology industries, such as pharmaceuticals, oil/gas, and electronics, are finding that valuable materials have been discharged to a sanitary sewer. These materials can often be economically recovered.

Applicability to Spokane County

The ten most significant industrial sources connected to the Spokane County sewer system are shown in Table 4-4 (Significant Industrial Sources). Most of the industries use modest water quantities. The exception is Honeywell (formerly Johnson Mathey), an electronics manufacturer, which uses 400,000 gallons per day (gpd). This industry and the metal fabricators are potential candidates for recycling.

Table 4-4. Significant Industrial Sources

Industry Name	Address	Type	Total Water Consumption (gpd)
Alloy Trailers	3808 N. Sullivan Rd.	Truck trailer manufacturer	Not identified
American Electronic Sign	3808 N. Sullivan Rd.	Electronic component manufacturer	Not identified
Ecolite Manufacturing	E. 9919 Montgomery	Louver manufacturer	Not identified
Honeywell	E. 15128 Euclid	Forming and fabrication of metal components	400,000
Mica Landfill	Hidden Hollow Rd.	Leachate from closed landfill	8,300
Novation	2616 N. Locust Rd.	Anodizing, electroplating, painting, powder coating	24,000
Pathology Associates Medical Laboratories	11604 E. Indiana	Clinical laboratory	15,000
Precision Machine and Supply	3808 N. Sullivan Rd.	Metal products machining	Not identified
Smiley's Cleaners	121 S. Sullivan Rd.	Laundromat	100
Wagstaff	3910 N. Flora Rd.	Machining, direct-chill casting for research and development	14,000
List was compiled in the spring of 2001.			

Implementation

The implementation approach would rely on each industry taking the initiative to recycle water. However, the County could consider establishing incentives, potentially financial, to encourage water recycling. An industry adopting water recycling would likely need to make a capital investment in new facilities. This approach is probably most effective with a new industrial facility.

Anticipated Results

Water recycling and waste minimization would be most effective with new industries locating to the service area. With a new industry, the process can be designed to incorporate cycling approaches. The County may consider working with any new industrial customer to determine whether water recycling has potential benefits.

Anticipated Results

Water recycling and waste minimization would be most effective with new industries locating to the service area. With a new industry, the process can be designed to incorporate cycling approaches. The County may consider working with any new industrial customer to determine whether water recycling has potential benefits.

4.5 COMPARISON WITH EVALUATION CRITERIA

The demand management alternatives described in this chapter were evaluated with respect to the identified evaluation criteria, as summarized in Figure 4-1 (Evaluation of Demand Management Alternatives).

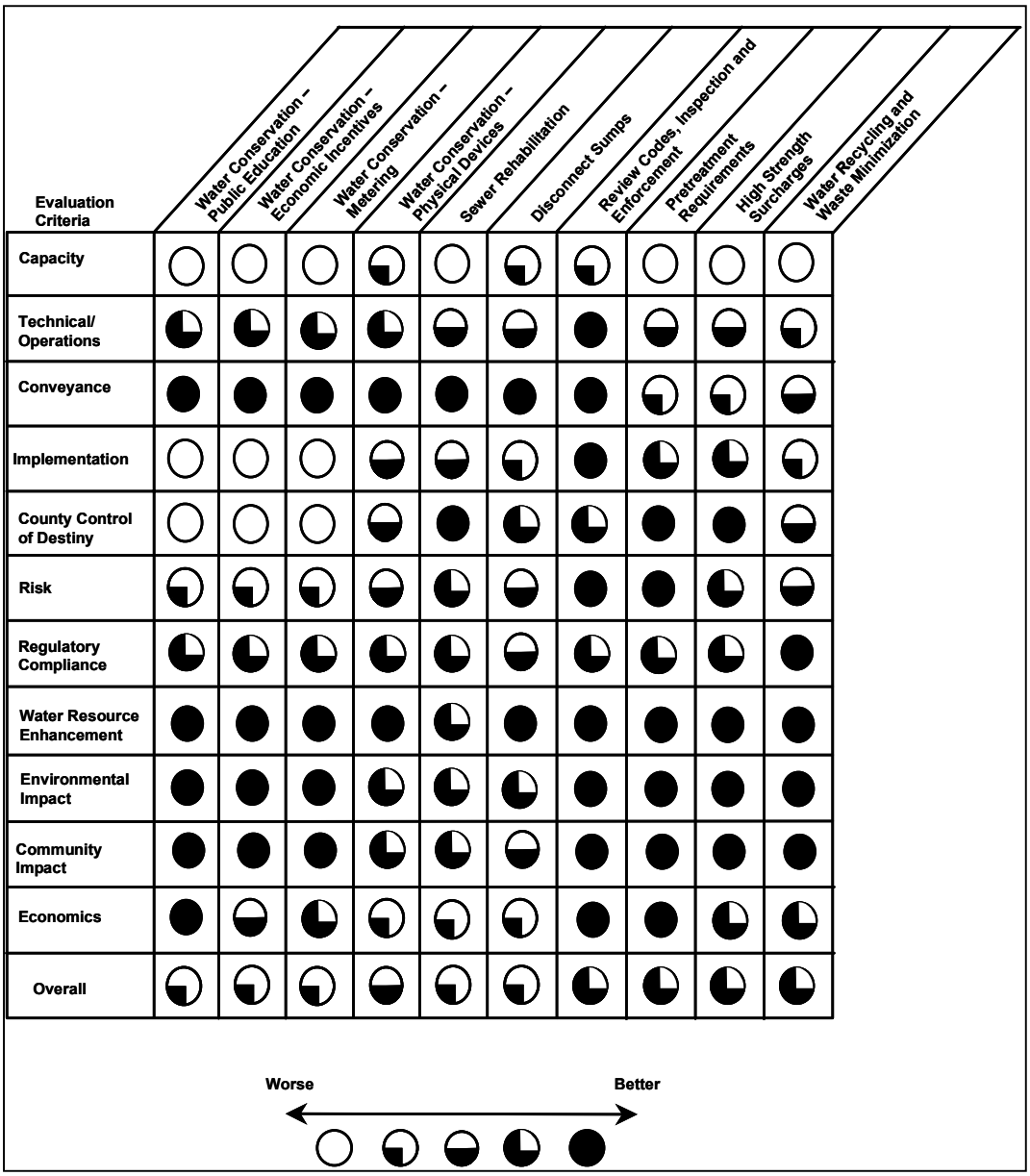

Figure 4-1. Evaluation of Demand Management Alternatives