Pierce County
Coordinated Water System Plan and Regional Supplement 2001

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GLOSSARY OF TERMS AND ACRONYMS

The following definitions are applicable to interpretation of the CWSP. Additional definitions may be found in WAC 246-290, "Rules and Regulations of the State Board of Health Regarding Public Water Systems," August 1983, Washington Department of Health, Water Supply and Waste Section, LD-11, Olympia, WA 98504.

Acronyms

APWA	The American Public Works Association
AWWA	The American Water Works Association
CFS	cubic feet per second
CWSP	Coordinated Water System Plan (70.116 and 90.54 RCW)
CWSSA	Critical Water Supply Service Area (70.116 RCW and WAC 246-293)
DOE	Department of Ecology, State of Washington
DOH	Department of Health, State of Washington
DOT/APWA	Combined standards for public works construction practices of the Washington Department of Transportation and the American Public Works Association, most recent Edition
EPA	United States Environmental Protection Agency
gpcd	gallons per capita per day
gpd	gallons per day
gped	gallons per employee per day
gpm	gallons per minute
mgd	million gallons per day
PALS	Pierce County Department of Planning and Land Services
PCDC	Pierce County Development Center
RWA	Regional Water Association of Pierce County
SSMA	Satellite System Management Agency. An organization, individual, or other entity which is prequalified, as provided in the CWSP, to render services such as operation, maintenance, development, or management of a satellite water system in Pierce County

SSMP	Satellite System Management Program.- A program established to provide for technical assistance,contract services,and other resources to meet longterm management needs of satellite systems. (See Satellite System)
TPCHD	Tacoma/Pierce County Health Department
USRP	Utility Service Review Procedure. An administrative procedure set up under local agency jurisdiction to identify the water purveyor best able to serve an area where new public water service is requested. (See Designated Purveyor)
WAC	Washington Administrative Code
WGP	Water General Plan
WRIA	Water Resource Inventory Area
WUCC	Pierce County Water Utilities Coordinating Committee

Terms

Approved Water System	A water system, or purveyor, which has received all necessary approvals from the Washington State Department of Health for the operation of a water system. This term has no relationship to the approval by DOH of a water system plan.
Designated Purveyor	A water purveyor identified to provide water service to a given area. When willing to provide the service in a timely and reasonable manner, the designated purveyor is assigned an exclusive right to provide public water service to the area and is required to include the area within its approved Water System Plan. (See Water System Plan).
Expanding Water System	An existing water system which is undertaking new construction to provide water service to additional service connections. A water system with plans and specifications approved by DOH and the Tacoma/Pierce CountyHealth Department, may install up to its approved number of service connections, utilizing existing mains, without being considered an expanding system.
Fire Flow	The rate of water delivery needed for the sole purpose of fighting fires. The fire flow volume shall be in addition to the requirements of the water system for domestic demand.
Fire Suppression	The ability to fight a fire for a sustained period of time.

Franchise Area	Non-exclusive area in which a purveyor is permitted by the County to extend facilities in public rights-of-way. A franchise area is not equivalent to a service area.
Interlocal Agreement	A standard agreement completed by water purveyors which acknowledges service area boundaries as shown on Master Service Area Maps on file with the County. Purveyors may also have supplemental agreements which establish interim service areas or special exceptions to the standard agreement.
Intertie	A physical connection between individual water systems which allows water supply to be transferred in one or both directions. An intertie can be established as a primary source,secondary source or peaking supply, or emergency supply. Ordinarily, the use of an intertie is governed by a written agreement or contract between the purveyors. A modification to water rights issued by the DOE may also be required.
Land Use Designation	Designation of a geographical area of existing and potential use or uses of land for the purposes of water supply system planningin accordance with the adoptedPierce County Comprehensive Plan, and implementation ordinances,as amended.
Land Use Plan	The Pierce County Comprehensive Plan as amended. In addition, this includes any adopted neighborhood or regional plans or specific topic plans,adopted as part ofthe Pierce County Comprehensive Plan
Level of Service	Operational features,such as pressure,flow, reliability, etc., provided to the customer connection by the water system.
New Construction	Any addition of supply,transmission, distribution or storage facilities, either in a new water system or an expanding water system, which provides a capability to serve additional dwelling units or other buildings.
Public Water System	As defined in WAC 246-290: "Any system of water supply intended or used for human consumption or other domestic uses, including source, treatment, storage, transmission, and distribution facilities where water is being furnished to any community, collection, or number of individuals,but excluding a water system serving one single family residence."

Purveyor	As defined in WAC 246-293: "Any agency or subdivision of the state or any municipality, firm, company, mutual or cooperative association, institution, partnership, person, or any other entity that owns or operates a public water system for wholesale or retail service (or their authorized agent).
Reasonable Service	Means the provision of potable water service and/or associated water utility services which are consistent with the conditions of service policies detailed in the utility's DOH-approved WSP.
Rural	Land which is not located within the Pierce County Urban Growth Area, including land classified as "rural fringe" and "rural transitional".
Satellite System	A water system whose service area is generally remote from other existing systems, or for which connection to adjacent water systems is not feasible.
Service Area	A geographical area which is assigned to a water purveyor for the purpose of providing both current and future public water service. Boundaries are defined by agreements among adjacent purveyors and are recorded on a set of maps on file with the Tacoma/Pierce County Health Department.
Service Connection	A physical connection through which water may be delivered to customer for discretionary use. Unless otherwise indicated, all such connections, whether currently in use or not, shall be considered as a service connection. The service connection defines the limit of the water purveyor's responsibility for system design and operation unless otherwise provided for in the water purveyor's condition of service policies. Water customers such as mobile home parks, planned unit developments, condominiums, apartment buildings, industrial/commercial sites, or other similar complexes are generally considered exterior to the water system. In such cases, the purveyor shall be required to meet design standards for water systems up to the point of service to the customer; and beyond that point, the applicable plumbing and building codes, fire codes, County health regulations, and local ordinances are deemed to be sufficient to protect the public health and to ensure adequate water service. These customers are not themselves considered herein as water purveyors unless specifically designated as such by DOH.

Service Area Dispute	A dispute between two or more purveyors planning to or proposing to provide water service to the same area.
Timely and Reasonable Dispute	A dispute between a potential water customer and the designated water purveyor which occurs when a formal request for service is made to the water purveyor and the purveyor makes a proposal to the potential customer that is considered by the potential customer to be untimely or unreasonable. If a determination is made that the purveyor's proposal is not timely or reasonable, a change in service area boundaries may occur.
Timely Service	Means receiving a commitment to provide service,or the reaching of an agreement with the potential customer,within 120 days of request for water service. The 120-day time period is defined as calendar days.
Water System Plan	A written plan prepared for a particular water system and service area that identifies a schedule of needed improvements, a financial program, and an operations program. A water system which is expanding within a designated service area may be required to include other elements in its plan. Details of Water System Plan requirements can be found in WAC 246-290. An "approved Water System Plan" is a water system plan that has been reviewed and approved by both Pierce County and DOH.

PIERCE COUNTY
COORDINATED WATER SYSTEM PLAN
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INTRODUCTION

In 1997, the Water Utilities Coordinating Committee, supported by the Pierce County Regional Water Association, the City of Tacoma and the Tacoma-Pierce County Health Department, requested the Pierce County Public Works and Utilities, Water Programs division to pursue a Washington State Department of Health grant in order to revise the "1995 Pierce County Coordinated Water System Plan", water demand forecast.

In 1998, Water Programs successfully obtained grant funds, a consulting firm was hired and the water demand forecast was prepared. The Pierce County Planning and Land Services Department, the Pierce County Public Works and Utilities, Transportation division and the 23 largest water purveyors operating within the Pierce County Urban Growth Area assisted Water Programs and the consultant in the development of the water demand forecast.

As the WUCC reviewed the finalized water demand forecast in December, 2000, for incorporation into the CWSP, the WUCC recommended several other revisions to the CWSP, including two policy revisions (SA-Policy 17 and AD-Policy 12) and incorporating a previously missing table summarizing interties between systems, into the CWSP. During this time period, a subcommittee of the WUCC was also formed to review the Washington State Department of Health's Local Government Guidance Manual on Timely and Reasonable Criteria for potential incorporation into the CWSP. In 2001, the recommendations made by the "timely and reasonable water service" subcommittee of the WUCC were reviewed by the WUCC for incorporation in the CWSP.

Excluding the WUCC recommended changes discussed above, the Policies and text contained in the 2001 CWSP reflect the Policies and text as contained in the 1995 CWSP and Regional Supplement as adopted by the Pierce County Council on November 26, 1996.

Section I

Plan Summary

SECTION I

SUMMARY

I. INTRODUCTION AND BACKGROUND

This document is the "Regional Supplement of the Pierce County Coordinated Water System Plan" (CWSP). The CWSP consists of two parts; the "Regional Supplement", which presents an assessment of water supply needs in Pierce County and a program to meet those needs; and individual "Water System Plans" prepared by the utilities for their designated service area. The Plan affects only public water supply systems. Private wells for an individual's own use are not subject to the requirements of the "Coordinated Water System Plan". Private wells may still be installed subject to the existing regulations administered by the Tacoma-Pierce County Health Department (TPCHD) and the Washington State Department of Ecology (DOE).

The individual water system plans are prepared within established guidelines and must be consistent with the policies and procedures of this "Regional Supplement". Those individual water system plans that have been reviewed by the County and approved by the Washington State Department of Health (DOH) are incorporated by reference as part of this Plan and are on file with the County.

The first CWSP was developed by a consultant under the direction of the Water Utility Coordinating Committee (WUCC). It was adopted in 1988 as "Ordinance 86-116S4", and codified as Chapter 19.68 of the "Pierce County Code". The WUCC was appointed in 1983 by Pierce County and included representatives of water purveyors, local governments, and agencies responsible for water supply and public health in Pierce County.

The CWSP meets the requirements of several State laws relating to water resource management and utility planning. The "Water Resources Act" of 1971, RCW 90.54, sets forth the State's fundamentals for water resource management intended to ensure that the waters of the State will be protected and fully utilized for the greatest benefit to the people of the State. Continuing with the intent of the Act, the legislature enacted the "Public Water System Coordination Act of 1977", RCW 70.116. This statute, referred to in this Plan as the "Coordination Act", establishes procedures (WAC 246-293) for water purveyors in the State to coordinate their planning and construction programs with other water purveyors and local governments in the same geographic area.

Subsequent to the "Water Resources Act of 1971," the DOE issued "Procedures Relating to the Reservation of Water for Future Public Water Supply" (WAC 173-590). These regulations provide for specific resources to be set aside for use by public water systems in a geographical area to meet projected domestic needs for a period of 50 years.

The "Public Water Systems Coordination Act" or the water rights reservation process may be used separately or in combination by public water systems in the same geographic area. Both of these laws, however, require that a CWSP be prepared for the study area. The CWSP may also be adopted as the "Pierce County Water General Plan", in accordance with Chapter 36.94 RCW, the "County Services Act", if it meets the requirements of that Act. Pierce County is not required to have a "Water General Plan" since it is not providing water as a utility or purveyor.

Once adopted by the County and the State Department of Health (DOH), the CWSP becomes the management and planning framework for water supply development in the County. The CWSP will be reviewed every 5 years and amended, as necessary, to meet changing needs.

II. PRELIMINARY ASSESSMENT AND CRITICAL WATER SUPPLY SERVICE AREA (CWSSA) DECLARATION

As a preface to implementing the "Coordination Act", a Preliminary Assessment of the need for coordination was completed for Pierce County in 1982. It was a cooperative effort of the Tacoma-Pierce County Health Department (TPCHD), Pierce County Planning and Natural Resource Management Department (now Planning and Land Services [PALS]), and the Washington Department of Health.

The Preliminary Assessment identified several issues of concern in Pierce County that may preclude the delivery of a safe, efficient, and reliable water service to the citizens of the County. Those issues include:

- Proliferation of small water systems;
- Water quality problems, especially in the Chambers-Clover Creek Basin;
- Possible limitation of water quantity available to Pierce County;
- Lack of coordination between adjacent water purveyors, resulting in an unorganized regional approach;
- Overlaps and conflicts in service areas;
- Lack of County policies linking water system planning to land use planning; and
- Lack of adequate fire flows in some areas.

Because of the variety and depth of these problems and concerns, the Preliminary Assessment recommended implementation of the "Coordination Act" in Pierce County.

Following the recommendation, the Pierce County Council, on November 8, 1983, adopted a declaration that Pierce County is a "Critical Water Supply Service Area" (CWSSA). This action initiated the procedures of the Coordination Act in Pierce County. The Water Utility Coordination Committee (WUCC), a representative committee of water purveyors, was then appointed to oversee CWSP preparation. The WUCC recommended that the Pierce County Council identifies the CWSSA external boundaries as those of the County, and that a CWSP with uniform and consistent policies be developed to recognize both the urban and rural water supply needs.

III. PROJECT AUTHORIZATION

Preparation of the original CWSP for Pierce County was undertaken in accordance with a contract between the County and a consultant, dated January 19, 1984. The policies, procedures, and recommendations presented in this Plan were developed with the cooperation of the Pierce County Planning Agency (now PALS), the TPCHD, the Pierce County Fire Chiefs Association, water purveyors and other parties represented on the WUCC, the County Council, DOE and DOH.

The review process involved several meetings with the WUCC, all of which were subject to the "Open Public Meetings Act", and public hearings before the Pierce County Planning Commission and the Pierce County Council prior to adoption of the Plan. Policies within the Plan and provisions of the implementing ordinances require periodic updates of the CWSP every five years. Future amendments to this Plan will follow the same procedure for adoption, including open public meetings of the WUCC and public hearings before the Planning Commission and the County Council.

IV. FINDINGS AND CONCLUSIONS

Implementation of the "Public Water System Coordination Act" has provided an opportunity to address a variety of technical, financial, and administrative problems associated with water utility service in Pierce County. The following is a summary of the major findings and conclusions that were identified and developed during the preparation of the CWSP and subsequent updates. These findings and conclusions led to the development of the objectives and policies that are presented in summary form later in this section.

A. Administration

1. The County's objectives in preparing the CWSP are to assist the area water purveyors in providing effective planning by establishing service areas, design standards, service review procedures, and a process to pursue resolution of water resource issues. These processes are designed to seek the most cost-effective water supply service consistent with development needs, resource management policies, and equitable utility service programs.

2. Within the "Critical Water Supply Service Area" (CWSSA), there are over 1500 water purveyors, plus an unknown and undocu-mented number of small water systems that were installed without review or approval prior to initiation of the Plan.

3. Water purveyors previously provided service on a "first come, first served" basis. A more rational approach to utility service and capital

planning is needed. In developing the first CWSP, each purveyor provided an existing service area map along with requested boundaries for a future service area. The existing and proposed service areas of water purveyors were transferred to a master set of maps for review and inspection by the purveyors, agencies and the public. For the update, purveyors were sent a map depicting the location of their service area boundaries as understood by Pierce County. They were asked to verify boundaries. Any conflicts resulting from the updated information were sent back to the purveyors involved, for resolution.

4. A model interlocal service area agreement was prepared and sent to expanding water systems to assist adjacent purveyors in formalizing boundaries and identifying areas of responsibility for water service.

5. A "Satellite System Management Program" (SSMP) was developed to ensure that long-term operation and management are available for existing small systems and for new systems in areas not designated for service by an existing purveyor. The program was intended to provide a range of support services available for new and existing purveyors. The SSMP was adopted by the Pierce County Council on September 8, 1988 as "Ordinance 86-115S3" and codified as Chapter 19.72 of Pierce County Code. To date, two water purveyors have requested SSMA status, of which one has received DOH SSMA approval status. Recent legislation has changed the laws of the State to require new systems to be managed by an SSMA. The new law should result in the approval of additional SSMA's in Pierce County.

6. Because of the large number of existing water systems and possible conflicting interpretation of "reasonable water service and equitable service policies", a nonjudicial and timely review of the conflicting issues was thought to be necessary during the initial implementation phase of the CWSP. Consequently, an Appeals Panel was provided for. The Pierce County Council adopted the idea of an Appeals Panel on September 8, 1988 as "Ordinance 86-115S3" and codified as Chapter 19.72 of Pierce County Code. For the update, the difficulty of implementing the Appeals Panel, the fact that no dispute was ever requested to be resolved by the Panel and, therefore, the Panel was never formed, was examined by the WUCC. The appeals process, therefore, has been revised from an appointed panel authorized to hear disputes to a process that builds a record and attempts to mediate disputes.

7. Minimum water system standards are necessary to help establish a minimum level of water service from all public water systems in Pierce County and to ensure that interties and connections between systems may be accomplished in a cost-effective manner.

8. A "Utility Service Review Procedure" (USRP), which establishes a uniform procedure to identify water service requirements by designated water purveyors was developed for use by all participating agencies and purveyors. This procedure will help ensure accountability for decisions and clarify the authority of the various agencies.

9. Pierce County Planning and Land Services is responsible for the implementation and administration of the "Comprehensive Land Use Plan"(s) and implementation ordinances for Pierce County, as amended (see definitions). Policies contained in this document provide that water system planning should be consistent with the applicable "Land Use Plan" (as defined in this document), and implementation ordinances in effect at the time of water system plan approval. Coordination between PALS and the water purveyors will be necessary throughout the water system planning and approval process.

B. Surface Water Supply

1. The major surface water supply in Pierce County is the City of Tacoma's Green River Pipeline System, which imports water from southeastern King County to several service areas, both inside municipal boundaries and in the unincorporated portion of the County. A second diversion of the Green River, with associated pipeline construction, has been approved and preliminary design of the pipeline is currently under way. Although committed to exercising the second supply diversion on the Green River, the timing of Tacoma's new supply line remains uncertain. If the second diversion of the Green River is not constructed in the near term, the County will be required to pursue additional sources of supply in the immediate future. In addition, the need to revisit the County's Comprehensive Plan developed in accordance with the Growth Management Act may be necessary due to lack of sufficient water to meet growth demands.

2. Major surface supply alternatives to Pierce County are limited due to competing uses, distance from the service area, source development problems, and treatment costs. Constraints of instream flow regulations may also limit alternatives.

3. Projected long-term needs for water supply in Pierce County will probably require additional surface water development. The Puyallup and Nisqually Rivers may be effectively eliminated from resource planning as future public water supply due to existing constraints and, therefore, the Green River or a joint project with Kitsap County or King County purveyors appear to be the only feasible surface supplies for use in conjunction with the area ground waters.

4. Several intermediate size and small water purveyors in eastern Pierce County rely on surface water for some or all source needs. Most of these supplies are from well-managed systems, but there are cases of deterioration due to surface activities that may require additional treatment or development of an alternative source of potable water.

C. Ground Water Supply

1. Local ground water is the primary source of supply for most Pierce County water purveyors, except the City of Tacoma. Approximately 60 percent of the population of Pierce County is served by water obtained from ground water sources.

2. At this time, the Department of Ecology is not issuing new water rights for the Puyallup or Chambers/Clover Creek basins, without additional information being provided. However, the study of groundwater quantity completed for the purpose of this update, indicates that there is more water in the Chambers/Clover Creek and Puyallup aquifers that could be withdrawn without exceeding the estimated sustainable yield of each of the aquifers. This finding should not be construed as an indication that adequate water resources may be readily utilized to meet regional growth. Additional studies must be performed to determine the actual state of the aquifers in Pierce County, including their link to in-stream (surface water) flows. Without those studies, additional water rights will not be issued by DOE and groundwater cannot be considered an adequate resource for purveyors to include in their plans to accommodate additional growth and meet the requirements of the Growth Management Act. Currently, a number of Pierce County water purveyors cannot accommodate new developments within their service areas without additional water rights. In some cases, purveyors hold water rights that exceed their physical capability to withdraw water, but it is unclear under what circumstances the Department of Ecology will allow full utilization of an existing right through additional points of withdrawal. Without additional water rights being issued by DOE, over time more water purveyors will be unable to accommodate new growth.

3. Ground water resources with the highest potential are located in areas with considerable existing population and future development potential. For that reason, they could be subject to water quality deterioration from inappropriate waste management practices. The findings and conclusions of the "Ground Water Study for the Chambers-Clover Creek Basin" and the "Gig Harbor Peninsula Ground Water Study" have applications throughout Pierce County.

4. Ground water can and does play an important role in managing the use of surface water supplies. Conjunctive use relieves surface water demands during summer low flow periods, and allows ground water to recharge by maximizing surface water use in high-flow periods.

5. Only a few water systems have adequate ground water monitoring programs. The current database is inadequate to manage the ground water resources without the cooperation of all water purveyors and local governments.

D. Water Utility Planning and Operations

1. The "CWSP Regional Supplement" provides the framework for water supply and system planning. All water purveyors should incorporate these findings and conclusions in their individual water system plans.

2. Future population and water demand projections for 10 and 20 year planning periods have been prepared for Pierce County. The 1980 population was 485,634. The 1990 population was 586,203, an increase of 20.7 percent. The population in 1993 is estimated by the Washington State Office of Financial Management (OFM) to be approximately 640,000. Projected population for the year 2000 is 707,746 and for the year 2010, 785,347, and for the year 2020, 850,483 (OFM). The twenty-year population increase, from 1993 to 2013 is projected to be 182,000 persons. That represents an increase of 28.4 percent over the estimated population of 1993. The projected average water demand for 2010 would be 137.9 million gallons per day and for the year 2020, 147.8 million gallons per day. The twenty-year projections should be used by the purveyors to plan for improvements or expansion of the water systems. Fifty-year demand projections should be utilized in this CWSP to evaluate long-range water supply alternatives and to fulfill the requirements of the water right reservation process. That information is not currently available.

3. To efficiently use the area's water resources to meet the demands, a regional supply and transmission system will be required. Several water purveyors have either active or emergency interties with adjacent purveyors. With additional interties and some additional transmission facilities with adjacent purveyors, the backbone of the regional supply facilities could be developed. This program would improve reliability for all participating systems and provide cost advantages in joint development of major facilities. It would also be consistent with the State's fundamentals for water resource management.

4. Many of the more than 1500 (1994 estimate) water systems have been installed without the capability to expand to meet area needs or to provide fire flow service to the existing customers.

5. There are a large number of small water purveyors in the County which are operating with limited financial, staff, and water resources. These systems have difficulty in meeting current needs, and are unable to meet additional requirements imposed by growth and new water quality standards. The small size and inadequate revenue base of many of these purveyors will make it difficult for them to finance needed improvements. Staffing of such water systems is usually on a volunteer basis and needed maintenance and monitoring is likely to be overlooked. Support is needed from a County-sponsored program that will facilitate the development of a system of shared resources, adequate qualified staff, and economies of scale. Without such a program, many of the smaller purveyors will have difficulty in meeting more stringent State and Federal drinking water standards and providing even a minimum level of water service.

6. The provision of water for drinking and commerce is an essential public service. Facilities for the transportation, storage and treatment of water for drinking and commerce are essential public facilities. These facilities should enjoy the status of essential public facilities allowing for reasonable and timely processes for the approval of construction permits.

V. ROLES AND RESPONSIBILITIES OF PIERCE COUNTY DEPARTMENTS IN WATER RESOURCE PROTECTION AND MANAGEMENT

To provide high-quality water resource management services to residents and businesses in Pierce County, the County shall seek partnerships with water purveyors and appropriate agencies to implement the following strategy and priorities shown below:

Promote the reduction in demand. Use demand-side management techniques and available community building and conservation tools to empower residents to voluntarily reduce water resource use through behavior changes. These techniques have demonstrated achievable results and reduced water use in participating households.

Promote the development of local supplies. Support and encourage development and long-term sustainable use of local supplies, such as the Puyallup Basin and the Clover/Chambers Creek Basin.

Promote the efficient use of local supplies. Work to overcome the administrative and technical barriers to interties and water wheeling to cost-effectively use water resources available locally.

Promote the management of ground water resources. Develop a schedule for and implement the Groundwater Quality and Quantity Monitoring Program.

Over the past 15 years, numerous programs have emerged within Pierce County government to address the protection and management of water resources, particularly ground waters used for public water supplies. These programs have been implemented, or are being implemented, by a variety of county departments.

During the process of updating the "Pierce County Coordinated Water System Plan", the need for definition or clarification of the roles of County departments became apparent. The purpose of role definition is to:

- Promote effective coordination and minimize the potential for overlap and conflict among the various departments;
- Identify areas of potential overlapping responsibility between county departments and state agencies; and
- Promote a general understanding among the Water Utility Coordinating Committee, the Regional Water Association, individual purveyors, and local decision makers concerning the respective departmental responsibilities for protection and management of the County's water resources.

The following table (Table I-1) demonstrates departmental responsibilities for water resource protection and management as they are currently apportioned, noting that discussions between the various departments concerning those responsibilities are ongoing, and that it is the prerogative of the Pierce County Executive, the Pierce County Council, and the Tacoma-Pierce County Board of Health to modify, reassign, rescind, or increase departmental functions.

Following each identified responsibility, the institutional basis for the responsibility, whether legally mandated or undertaken by option, is indicated parenthetically. For legally mandated responsibilities, the statutory authority is also indicated.

TABLE I-1

WATER RESOURCE PROTECTION AND MANAGEMENT RESPONSIBILITIES

1) Pierce County Public Works and Utilities

A. Water Quality Programs/Activities:

Manage stormwater disposal (mandated, Chapter 36.89 RCW),

Operate public sewer system (mandated, Chapter 36.94 RCW),

Conduct sewer planning (mandated, Chapter 36.94 RCW), and

Conduct solid waste planning (mandated, Chapter 70.95 RCW).

B. Water Quantity Programs/Activities:

Provide for coordination of public water system plans with the "Pierce County Comprehensive Plan and Growth Management Policies" (mandated, Chapter 70.116 RCW).

Coordinate policy development and planning efforts for Pierce County related to ensuring that water resources are adequate to support development identified in the County's "Comprehensive Land Use Plan," and that such resources will be available at the time development occurs without decreasing current service levels below locally established minimum standards (mandated, Chapter 36.70A RCW),

Actively support efforts by water utilities to obtain water rights from the Department of Ecology necessary to meet demands associated with future development forecasted in the County's "Comprehensive Land Use Plan" (optional, proposed under CWSP update),

Actively promote the full development of local and nearby water supplies for sustainable use concurrent with overcoming the administrative and technical barriers to interties and water wheeling.

Prepare and periodically update the "Coordinated Water System Plan" (mandated, Chapter 70.116 RCW),

Maintain Water Service Area maps, document service area boundary changes and ensure that service area conflicts are resolved (mandated, Chapter 70.116 RCW),

TABLE I-1 - continued

Operate public water system assistance program (optional, proposed under CWSP update),

Maintain pre-qualified "Satellite System Management Agencies" roster (optional, proposed under CWSP update),

Act as problem water system receiver of last resort (mandated, Chapter 43.70 RCW),

Serve as a wholesaler of public water supplies (optional, under consideration), and

Act as Lead Agency for the implementation of the CWSP (optional, proposed by CWSP update).

2) Pierce County Planning and Land Services Department

A. Water Quality Programs/Activities:

Maintain maps of critical areas (including "Aquifer Recharge Areas") and administer permitting processes which trigger review by appropriate departments and individuals of proposals that potentially affect critical areas (mandated, Chapter 36.70A RCW),

Enforce zoning codes, including administration of unclassified use and special use permits (mandated, multiple authorities including Chapter 36.70 RCW),

Administer the State Environmental Policy Act as it pertains to land and water use actions which may affect water quality (mandated, Chapter 43.21C RCW), and

Implement the Shorelines Management Act (mandated, Chapter 90.58 RCW).

3) Tacoma-Pierce County Health Department

A. Water Quality Programs/Activities:

Determine adequacy of water quality under requirements of "Growth Management Act", Section 63 for building permits to authorize construction of buildings requiring potable water (mandated, Chapter 36.70A RCW),

TABLE I-1 - continued

Review Hydrogeologic Assessments prepared under Pierce County's Aquifer Recharge Area Ordinance (mandated, Pierce County "Ordinance 91-119S2"),

Prepare, periodically update, and implement the Clover/Chambers Creek Basin and Gig Harbor Peninsula Ground Water Management Programs (mandated, Chapter 90.44 RCW and Chapter 173-100 WAC),

Develop an implementation schedule for the "Ground Water Quality and Quantity Monitoring Program" (Section XIII).

Implement County "Ground Water Monitoring Program" (mandated, specific element of "Ground Water Management Program" certified by the Washington Department of Ecology under Chapter 90.44 RCW and Chapter 173-100 WAC),

Administer local aspects of the state mandated public water system Wellhead Protection Program (optional, proposed under Regional Water Association grant and CWSP),

Regulate solid waste disposal facilities (mandated, Chapter 70.95 RCW and Chapter 173-304 WAC),

Administer the Tacoma-Pierce County Local Hazardous Waste Management Plan (mandated, Chapter 70.105 RCW),

Regulate on-site sewage disposal system use (mandated, Chapter 246-272 WAC),

Regulate biosolids application sites (mandated, Chapter 173-304 WAC),

Administer the South Tacoma Ground Water Protection District (mandated, Chapter 13.09 Tacoma Municipal Code),

Regulate "Group B" public water systems (optional, determined by Joint Plan of Operation with Washington Department of Health under authority of Chapters 246-290 and 246-291 WAC),

Assist the Washington Department of Health in regulating "Group A" public water systems (optional, determined by the "Joint Plan of Operation" with Washington Department of Health under authority of Chapter 246-290 WAC),

Conduct well site inspections (mandated, Chapter 246-290 WAC and Chapter 246-291 WAC), and

TABLE I-1 - continued

Regulate well sealing and decommissioning (optional, by agreement with Department of Ecology under Chapter 18.104 RCW).

B. Water Quantity Programs/Activities:

Determine adequacy of water quantity under "Growth Management Act", Section 63 for building permits to authorize construction of buildings requiring potable water (mandated, Chapter 36.70A RCW),

Determine adequacy of water supplies to serve proposed subdivisions under "Growth Management Act", Section 52 (mandated, Chapter 36.70A RCW), and

Regulate "Group B" public water systems (optional, determined by the "Joint Plan of Operation" with Washington Department of Health under authority of Chapters 246-290 and 246-291 WAC).

4) Pierce County Fire Marshal

A. Water Quality Programs/Activities:

Conduct inspections of facilities with hazardous materials use, handling, or storage (mandated, Chapter 36.43 RCW).

B. Water Quantity Programs/Activities:

Enforce the Pierce County "Fire Flow Ordinance" including minimum fire flow requirements (mandated, Pierce County "Ordinance 92-99").

5) Pierce County Department of Emergency Management

A. Water Quality Programs/Activities:

Coordinate hazardous materials spill response actions (mandated Chapter 38.52 RCW), and

Coordinate regional contingency planning for water supplies (mandated, Chapter 38.52 RCW).

Section II

Coordinated Water System Plan and Local Legislative Policy

SECTION II

COORDINATED WATER SYSTEM PLAN AND LOCAL LEGISLATIVE POLICY

I. INTRODUCTION

The Public Water Systems Coordination Act provides for the integration of water resources, water supply, and land use planning. The law builds on existing programs of State and Pierce County government and the normal capital improvement and operational planning of water utilities.

The Pierce County Coordinated Water System Plan (CWSP) will fulfill the requirements of two laws, and will serve as the framework for several additional laws. These laws and the relationship to County policies include:

A. Public Water System Coordination Act, RCW 70.116

This Act requires that the water system plans be compatible with the County's land use plans. It provides a management program for coordination between utility and land use planning activities at the County level.

B. Water Resources Act, RCW 90.54

This Act identifies state water resource policies. It provides guidelines for State and local government policies to establish the maximum net benefit in the use and development of water supply for the citizens of the state of Washington.

The CWSP process integrates water utility, County, and State policies and regulatory authorities into a single management document.

The above statutes were utilized to develop the legal basis for the recommendations outlined in this plan. In adopting this CWSP, the County Council is adopting implementing policies essential to the proper management of water resources and utilities within Pierce County.

The procedure also provides for the Washington Department of Health (DOH) to adopt this Plan which then completes the partnership between utilities, the County, and the State in implementing the recommended management program.

II. MUNICIPALLY OWNED WATER UTILITIES

The "Public Water Systems Coordination Act" and the procedures outlined in the CWSP apply uniformly to all public water supply systems in Pierce County as it relates to service area designation, design standards in the unincorporated area, and the administrative procedures. However, municipally owned water utilities and local government authorities are not preempted by the CWSP within their municipal boundaries. The following briefly summarizes the municipally owned water utilities in Pierce County, and the policies and authorities that are unique to this form of utility.

A. Municipal Utilities

Municipal utilities are defined as those water systems owned by a city or town, or created under the special district laws of the State. The municipal utilities within Pierce County include:

Ashford Water District
Bonney Lake, City of
Buckley, City of
Burnett Water District
Carbonado, Town of
Clear Lake Water District
Crystal Mountain Water District
Dupont, City of
Eatonville, Town of
Elbe Water and Sewer District
Elkhorn Water District
Fife, City of
Fircrest, Town of
Gig Harbor, Town of
Kopachuck Ridge Water District
Lakewood Water District
McKenna Water District
Milton, City of
Orting, Town of
Puyallup, City of
Roy, City of
South Prairie, Town of
Steilacoom, Town of
Sumner, Town of
Tacoma, Water Division, City of
Valley Water District
Webstone Water District
Wilkeson, Town of

B. Service Area Designation

The corporate boundaries of the municipalities and water districts are established by legal definition, and are by law, the minimum service area of the utility. Some of the municipal utilities, in accordance with the procedures of the CWSP, have identified service areas outside their corporate boundaries, and must confirm these boundaries by signing the Interlocal Agreement and completing a Water System Plan for the identified area. Following completion of an agreement and approval of the Water System Plan by DOH, the new service area boundary is established by legal procedures under Chapter 70.116 RCW, the "Public Water Systems Coordination Act."

The Water System Plan developed for a service area must be consistent with the adopted land use plan of the County for the unincorporated area of the service area. The municipalities' land use plan shall prevail for the area within the corporate boundaries.

(1) Utility Service Policies

The municipal authority, i.e., city council, or water district commissioners, retains the responsibility and authority to set utility service policies within the designated service area. The policies, however, must be consistent with their adopted Water System Plan. If a municipality chooses to reduce or seeks to expand its service area in the unincorporated area, the procedures outlined in the CWSP must be followed.

(2) Municipal Assumption of Water District Service Area

Chapter 70.116 RCW, the Public Water Systems Coordination Act, provides one exception in regard to the merger of existing water utilities. The laws of the State provide an option whereby a municipality may annex a service area of a special district. Upon annexation of a specified percentage of the service area, the municipality can automatically assume ownership of the water district utility. The procedures for this assumption of ownership are outlined in the municipal laws of the State.

Following completion of the service area boundary agreements and approval of the associated Water System Plans by DOH and the County, the service areas established under the procedures of the CWSP are considered to be legally binding and exclusive for all public water systems in Pierce County with the exception noted above.

III. PIERCE COUNTY CWSP POLICIES

The CWSP and its recommendations have been based upon the following policies and programs of Pierce County and local governments.

The following objectives and policies provide guidance to the County and water purveyors in implementing the water system development programs that will meet the water needs of the County.

A. General Objectives

OBJECTIVE 1 **Pierce County will assist the area's water purveyors in providing effective planning by establishing service areas, design standards, service review procedures, and a process to pursue resolution of water resource issues.**

OBJECTIVE 2 **Processes adopted by the County will be designed to seek the most cost-effective water supply service consistent with development needs, fire and life safety, resource management policies, and equitable utility service programs.**

B. Administrative Policies

AD-Policy 1 **The Pierce County Department of Public Works and Utilities should be designated the lead agency in guiding the implementation of the CWSP. The Department of Planning and Land Services should assist the Pierce County Department of Public Works and Utilities in reviewing water system plans for consistency with County land use policies and should be responsible for implementing the Utility Service Review Procedure. The Tacoma-Pierce County Health Department (TPCHD) should be responsible for the implementation of regulations for Group B systems, regulations for well head protection and well sealing, regulations for individual wells and regulations relating to water quality monitoring. The Fire Prevention Bureau should be responsible for the review of water system plans for compliance with fire flow requirements.**

AD-Policy 2 **All Group A water purveyors and any expanding purveyors, should complete the standard Interlocal Service Area Agreement and a supplemental agreement, if necessary, establishing their service areas and their responsibilities for providing service. The Boundary Review**

Board should be formally notified of the service area agreements and provided with copies of the map(s) with boundaries shown.

AD-Policy 3 **Any proposed changes in service area boundaries must be accompanied by an amendment to the water system plan(s) of the purveyor(s) involved.**

AD-Policy 4 **The service area boundaries established by the CWSP process should be recognized in the County Franchise Program for the provision of the utility service. When service area boundaries are not consistent with existing franchise area boundaries, a new County franchise should be obtained to reconcile the differences. Additional franchises should be granted for transmission facilities identified in the Regional Water Supply Plan identified in Section IX of this plan.**

AD-Policy 5 **Procedures for the review and approval of water service to new developments located in the unincorporated portions of the County should follow the Utility Service Review Procedure (USRP), identified in Section VI of this plan. PALS should evaluate and recommend changes to County short platting and subdivision ordinances to incorporate these procedures, if necessary.**

AD-Policy 6 **Pierce County should adopt, by separate ordinance, the provisions of the Satellite System Management Program (SSMP), outlined in Section VII of this Regional Supplement. The goal of this program is to guarantee that long-term operations and management responsibility will be assumed by qualified agencies for new and existing satellite water systems.**

AD-Policy 7 **Pierce County should adopt, by separate ordinance, the Dispute Resolution process described in Section II. This process should be used to resolve disputes that may arise in implementing the Coordinated Water System Plan.**

AD-Policy 8 **The Pierce County Department of Public Works and Utilities should be established as a prequalified Satellite System Management Agency (SSMA) to provide assistance to water purveyors and to the regional supply development program, as appropriate. A particularly valuable role for the County in this regard would be the sponsorship of needed improvements for small purveyors otherwise unable to obtain adequate financing.**

AD-Policy 9 **Pierce County should encourage other water purveyors to become prequalified as Satellite System Management Agencies in order to**

support the policy that failing systems should be taken over by adjacent water systems. The County should attempt to provide support to water systems that agree to act as receivers for failed systems by assisting the receiver to obtain additional sources of funding.

AD-Policy 10 Following adoption of the CWSP, water purveyors should not be granted an exclusive future service area until they have water system plans approved by DOH and a current service area agreement is on file with the County.

AD-Policy 11 The Pierce County Department of Public Works and Utilities will review each Water System Plan for consistency and compatibility with the applicable land use plan (as defined in this plan) and implementation ordinances. The Pierce County Department of Public Works and Utilities will, upon request by a water purveyor and payment of appropriate fees, review and evaluate the System Plan's land use designation map for its service area, for consistency and compatibility with the current status of development and applicable plans. The land use designations should become the basis of the purveyor's plan and the purveyor should not be required to modify that plan due to subsequent land use designation changes until the purveyor's plan is updated. Updates are scheduled after 5 years, but may occur more frequently. Modifications to the approved plans, or provision of services beyond areas or levels of service must be approved in accordance with this plan and Washington State law. The cost of the utility design will be the negotiated responsibility of the developer (initiator of the land use changes) and the purveyor.

AD-Policy 12 The WUCC shall review the CWSP and any issues or information as forwarded by the County Executive, County Council or members of the WUCC, including information resulting from the implementation of the Washington State Watershed Management Act (RCW 90.82) for Water Resource Inventory Areas (WRIAs) located within Pierce County, twice a year. Recommended revisions to the CWSP should be submitted to the County Executive and County Council for review and adoption.

C. Water Rights

WR-Policy 1 Each water purveyor should verify that DOE has properly recorded water rights for the sources and service area of its water system. To protect the legal rights of the system, a water right application should be filed immediately if documents have not been recorded.

WR-Policy 2 The Regional Water Association (RWA) of Pierce County should be requested to pursue, on behalf of County water purveyors, the reservation of public water supplies, as outlined in Section IX. The RWA should petition for both ground water and surface water supplies for future needs. Funding should be made available through the County and the purveyors, if necessary, to assist RWA in completing required supporting documents for water rights reservation.

WR-Policy 3 Pierce County should develop a review and notification program with the Southwest Regional Office of DOE to provide notification of new water rights applications for public water use. This is to ensure that the provisions of this CWSP regarding expansion and new water systems are being met and that the use of water rights reserved are properly recorded and managed in accordance with the objectives of the CWSP.

D. Water Resource Management

WM-Policy 1 Pierce County should continue, with the help of water purveyors, the development of a comprehensive "Ground Water Management Plan" to protect and enhance remaining supplies. The "Ground Water Management Act of 1985" (RCW 90.44.400 - 450) should be implemented to establish a solid legal basis for the ground water plan.

WM-Policy 2 A program for monitoring trends in ground water quality and quantity should be designed and implemented for Pierce County. (See Section XIII)

WM-Policy 3 A well sealing and decommissioning permit program as adopted by Resolution No. 93-1613 should be continued and maintained in Pierce County.

WM-Policy 4 As a part of the regional supply development program, the County and participating purveyors should establish a program for recording well construction yield data and conduct confirmation studies to verify overall safe yield from key ground water aquifer and management areas.

WM-Policy 5 Pierce County should seek to amend state laws to allow water to be moved between water systems to accommodate growth and development.

E. Water Purveyor - Planning and Operations

WP-Policy 1 All expanding water purveyors should update their water system plans based on expected land use and development in their service area(s). Purveyors should utilize the land use designations, as defined in the applicable Comprehensive Land Use Plan (as defined in this plan), and implementation ordinances. They should coordinate with PALS to establish locations of appropriate land use designations within their service areas. For the purposes of this document, the Pierce County Comprehensive Land Use Plan, as amended, will establish land use locations and designations for utility planning.

WP-Policy 2 Purveyors should include in capital facilities planning the capability to provide fire flow, as required by Chapter 15.40 of the Pierce County Code, entitled "Minimum Standards for Fire Flows, Water Mains and Fire Hydrants".

WP-Policy 3 Purveyors interested in regional supply network development should participate in the planning and construction of transmission, source, storage, and other facilities within their service area which could be jointly used by adjacent purveyors. Where such facilities are feasible, purveyors should develop joint financing and development programs based on mutual benefits.

WP-Policy 4 All water purveyors should develop interties with adjacent purveyors. The interties should be sized to accomplish the appropriate regional objectives of reliability, regional transmission, and emergency interties.

WP-Policy 5 Each water purveyor should install individual customer meters. Customer metering provides the ability to develop equitable rates, to manage water loss, and to affect meaningful conservation.

WP-Policy 6 All production wells should have recording meters to measure water production and the ability to monitor water level trends.

WP-Policy 7 All water purveyors should begin regular monitoring and recording of production well total output and water levels in order to develop a baseline set of data for groundwater resource evaluation. The data should be filed with the lead agency in the form and on the schedule specified. The lead agency should provide periodic summary reports to all water purveyors and provide access to the records for public benefit and education.

F. Implementation Policies

IM-Policy 1 Each water purveyor should cooperate and assist in the development of programs and studies identified in this Plan.

IM-Policy 2 The Pierce County Regional Water Association should submit this "Coordinated Water System Plan" to the Washington Department of Ecology in support of a "Petition for Reservation of Public Waters."

IM-Policy 3 Unresolved service area conflicts should be identified and referred to the Washington Department of Health for formal hearings and resolution. The WUCC and County agencies should assist DOH, as requested, in the resolution process to ensure that final service areas are consistent with County utility service objectives.

IM-Policy 4 Pierce County and the WUCC should review, at the time of CWSP review, at least every five years, ordinances which establish minimum design standards, the Satellite System Management Program, the Dispute Resolution process, and the well inspection and decommissioning permit process. The review should ensure that the regulations and processes are effective and reflect timely requirements.

IM-Policy 5 Final petitions for reservation of ground and surface water to meet County needs for 50 years should be submitted to the Washington Department of Ecology. Separate petitions should be submitted for ground water and for surface water. The Pierce County Regional Water Association should serve as the lead or applicant agency for the petition process, with support from County agencies and the Water Utilities Coordinating Committee. Additional supporting studies, and an "Environmental Impact Statement" may be required. Once developed by DOE, the water supply reservation regulation for Pierce County should be reviewed and modified if necessary at least every 10 years, as provided under WAC 173-590-140.

IM-Policy 6 The source storage and transmission facilities necessary to construct the regional supply system within the "Urban Growth Area" should be planned, designed, and constructed by participating purveyors on a shared-benefit/shared-cost basis. The Pierce County Regional Water Association should coordinate the program.

IM-Policy 7 The "Washington Ground Water Management Act of 1985" should be implemented to protect and preserve available water supplies. The County and the Pierce County Regional Water Association should jointly sponsor this effort.

IM-Policy 8 The WUCC should meet twice annually to review the implementation of the "Coordinated Water System Plan."

IM-Policy 9 The WUCC should establish a subcommittee to review, on an annual basis, Chapter 19.70 of the Pierce County Code entitled, "Pierce County Coordinated Water System Plan Minimum Standards and Specifications for Public Water System Planning, Design, and Construction". The review should ensure that the most current practices and regulations are reflected in the Code. Recommended revisions should be submitted to the County Executive and County Council for review and adoption.

The citizens of Pierce County have the right to expect good quality water service based on cost of service. The minimum design and operation requirements contained in Chapters 19.70 and 15.40 of the Pierce County Code are considered to be reasonable and achievable by all properly operated water systems.

IM-Policy 10 Repeated failure to provide safe, reliable, and minimum levels of water service, as measured by the minimum standards and specifications contained in Chapters 19.70 and 15.40 of Pierce County Code, should serve as a basis to evaluate adequacy of water service.

IM-Policy 11 Pierce County should develop a process whereby a system which repeatedly violates health, fire and life safety, or operational standards, can be upgraded or placed in receivership. Such a program must follow due process.

IM-Policy 12 The programs described in the "Coordinated Water System Plan" should be implemented as soon as possible after the adoption of the Plan, or subsequent updates, but in no case longer than five years of the adoption date.

IM-Policy 13 The "Coordinated Water System Plan" and its implementing ordinances should be reviewed and updated as necessary, at least once every five years, as prescribed by RCW 70.116, the "Public Water System Coordination Act of 1977."

G. Comprehensive Land Use Plan

The CWSP addresses requirements for water utilities to respond to expected growth of service demand. Development is guided by the "Pierce County Comprehensive Land Use Plan" (as defined herein) Recommendations concerning capital facilities planning, minimum design

standards for water systems, and fire flow are different for urban and rural areas. Urban areas are distinguished from rural areas by the Urban Growth Area Map on file with the Department of Planning and Land Services and adopted as part of the "Comprehensive Land Use Plan" under the "Growth Management Act." As growth occurs within the County, the Urban Growth Area Map should be updated accordingly. The CWSP recommendations concerning the Urban and Rural Areas should be reviewed and revised, if necessary, with each update of the CWSP.

LU-Policy 1 **Water systems operating inside incorporated areas must adhere to the land use plans of the jurisdictions in which they are operating. When their service areas extend into the unincorporated portions of the County, planning for the water system infrastructure must follow the "Pierce County Comprehensive Land Use Plan."**

LU-Policy 2 **The designation of land use under the "County's Comprehensive Land Use Plan" should take into consideration the availability of adequate potable water.**

LU-Policy 3 **It is incumbent upon the public water utility to develop its individual water system plan in accordance with State law and the guidelines set forth in this CWSP. The County will integrate the individual water system plans into the programs of the County and will implement the CWSP in accordance with the most recent individual water system plans submitted to the Pierce County Department of Public Works and Utilities by the public water utility.**

H. Lead Agency

In order to unify and coordinate implementation of specific CWSP programs such as service area designation, satellite system management, regional supply, etc., it is necessary to provide dedicated resources of a Lead Agency.

LA-Policy 1 **The CWSP establishes the Lead Agency role within the Pierce County Department of Public Works and Utilities for CWSP implementation. The Department of Public Works and Utilities will be assigned responsibility for coordinating water system plan reviews, maintaining current service area designation maps, serving as staff support for the Water Utilities Coordinating Committee (WUCC) and "Dispute Resolution Process," and preparing and presenting annual status reports to the County Executive, the County Council, and the WUCC on implementation of the CWSP. In addition, the Department of Public Works and Utilities will assist the water utilities and DOH to carry out technical programs such as regional supply, groundwater management, and water rights reservation.**

Implementation of the CWSP recommendations will require adaptations within certain current administrative structures.

LA-Policy 2 **While the Department of Public Works and Utilities assumes the lead agency responsibilities, the Pierce County Department of Planning and Land Services (PALS) will be a primary point of contact for implementing CWSP programs such as the Utility Service Review Procedure (USRP). It will be the responsibility of PALS to assist the Department of Public Works and Utilities in the review of water system plans for consistency with land use planning policies.**

LA-Policy 3 **Tacoma-Pierce County Health Department (TPCHD) will provide the technical expertise to assist water purveyors in water quality issues, wellhead protection and aquifer protection. They will also be responsible for the enforcement of State regulations governing public water systems, as agreed upon in the "Joint Plan of Operation" with DOH, individual wells and for the review of land use applications (i.e. plats, septic systems, etc.) for the determination of water system adequacy.**

I. County Franchises

The County franchise program provides for a nonexclusive authorization of use of County public rights-of-way by utilities. The CWSP provides for exclusive service areas designated in accordance with the "Public Water Systems Coordination Act."

CF-Policy 1 **Where necessary, water systems must obtain new franchises that accurately reflect designated service area boundaries as outlined in the CWSP.**

Other franchises may be issued to water utilities for transmission or other facilities with the condition that no extension of service area shall accompany such a franchise unless applicable provisions of the CWSP have been followed.

CF-Policy 2 **The permit required for construction in County rights-of-way shall continue to be a requirement of water utilities holding franchises for geographical service areas.**

J. Authority of Cities, Towns and the County

Nothing in the CWSP or these policies is intended to alter the existing authority of city or town government except as specifically authorized by RCW 70.116. The objective of the County in this

CWSP is to coordinate between County and city or town government and develop utility policies that are consistent with good government practices and resource management needs of Pierce County.

AC-Policy 1 When the service areas of water systems include more that one governmental jurisdiction (cities, towns, or county) planning for system infrastructure must be compatible with the "Comprehensive Land Use Plans" of each jurisdiction in which their service area is located.

The "Growth Management Act," Pierce County Countywide planning policies, and the "Pierce County Comprehensive Plan" call for the signing of interlocal agreements between cities, towns and the County when there is an intention of providing services in other jurisdictions.

K. Individual Water System Plan

The County will adopt the CWSP under the authority of the "Public Water System Coordination Act." The law provides for the integration, by County ordinance, of individual water system plans prepared by cities, water districts, mutuals, investor owned utilities, and all other public water utilities.

SA-Policy 1 In order to identify policies and commitments for specific improvements, an expanding water system or SSMA is required to prepare and submit to the County and the Department of Health (DOH), a "Water System Plan," pursuant to WAC 246-290 and 293. Assignment of the service area to the purveyor is conditioned upon approval of the "Water System Plan." The Plan must identify the service area boundaries based on agreements with adjacent water purveyors. (See Page IV-2)

SA-Policy 2 Prior to approval by DOH of the "Water System Plan," the purveyor shall have exclusive service rights only to its existing service area, as defined in Subsection 3.B below. In this case, service outside of the purveyor's existing service area will be assigned, according to the USRP (Section VI), as though located in an undesignated area. (See Page IV-2)

SA-Policy 3 Once a "Water System Plan" is approved by DOH and service area agreements are in effect, the service area will be assigned to that purveyor. If, at any time, DOH determines that the purveyor has failed to comply with the standards or provisions of its "Water System Plan," the designated service area may be revised or revoked based on the test of timeliness and reasonableness. (See Page IV-2)

SA-Policy 4 The purveyor will identify for the applicant all of the conditions of service which must be agreed to prior to the provision of water service. These conditions would include engineering, financial, managerial, or other requirements deemed appropriate by the purveyor. The "Coordination Act" requires that the purveyor be willing to extend service in a timely and reasonable manner. Once the applicant agrees to these conditions, a building permit or preliminary plat approval can be issued. (See Page IV-3)

SA-Policy 5 Water services, of an interim nature, may be accomplished either through physical connection to an adjacent purveyor's system or installation of a detached satellite system. These services must be stipulated in a written agreement, which is signed by the designated purveyor and the provider of interim service, and agreed to by the applicant. (See Page IV-3)

SA-Policy 6 Adjustments to service areas may occur if the following sequence is followed:

- If, for any reason, water service will not be provided by the designated purveyor and interim service cannot be arranged, the applicant will be referred to adjacent purveyors.
- If timely and reasonable service is not available, either from an adjacent purveyor or an SSMA, service may be provided through the formation of a new independent water system.
- Under any of these scenarios, an adjustment to the designated purveyor's service area boundary would be required. (See P. IV-3)

SA-Policy 7 If a purveyor determines that its service area is either too large or too small, or if a boundary change is required due to circumstances such as those discussed above, the service area boundaries can be revised. This will require the signing of Interlocal Agreements among the affected adjacent purveyors, and such agreements shall be filed with the County Lead Agency for incorporation in the official CWSP file. (See Page IV-4)

SA-Policy 8 This CWSP must be reviewed by the Water Utility Coordinating Committee (WUCC) twice a year and updated as necessary. Future service areas adopted in this Plan may be revised at that time, if such revisions are considered appropriate by the purveyors concerned. (See Page IV-4)

SA-Policy 9 **Where understandings concerning joint service, transfer of service, or common boundaries require more specific terms than are provided in the Standard Interlocal Agreement, the affected purveyors address the specific conditions in a Supplemental Agreement. In order for these agreements to be recognized in implementing the CWSP, the purveyors must place them on file with the County Lead Agency as an addendum to the Standard Agreement. (See Page IV-6)**

SA-Policy 10 **To confirm designated service areas and for establishing their legal service boundary, all expanding water purveyors must complete the necessary "Service Area Interlocal Agreement" and submit it to the Department of Public Works and Utilities. (See Page IV-6)**

SA-Policy 11 **Unless a documented health-related problem is involved, failure to submit a "Service Area Interlocal Agreement" shall result in denial of approval for proposed expansions and building permits within the service area. For purveyors with unresolved service area conflicts, this denial shall be limited to proposed activities within the contested service area. (See Page IV-6)**

SA-Policy 12 **Each Interlocal Agreement will be reviewed in conjunction with individual "Water System Plans." After the Interlocal Agreements have been adopted as a part of the individual "Water System Plans," changes in boundary alignment and in the Interlocal Agreement require a mutual action by the involved water purveyors. The amended Interlocal Agreements must be filed at the Department of Public Works and Utilities. (See Page IV-7)**

SA-Policy 13 **Recognition of water service areas and Interlocal Agreements by the County will be incorporated into the County utility franchise process by revising the franchise boundaries, if necessary, to coincide with the designated water service area boundaries. (See Page IV-7)**

SA-Policy 14 **The Boundary Review Board shall be formally notified of designated service areas and any future amendments to service area boundaries. (See Page IV-7)**

L. Changes in Service Area Boundaries

A mechanism for reviewing changes in service area boundaries will be established which recognizes mutual agreements between adjacent public water systems. The process should be simplified when both water purveyors agree to the boundary change.

SA-Policy 15 **Changes in water service area boundaries will occur when a purveyor(s) wishes to expand or reduce their service area(s) and will be approved only if a new conflict in service areas is not created by the modification. (See Page IV-7)**

SA-Policy 16 **A revised Interlocal Agreement will be required of utilities requesting boundary changes. (See Page IV-7)**

SA-Policy 17 **The lead agency all requested adjustments in service area boundaries to ensure that utility service is consistent with the CWSP objectives. The lead agency may approve, without WUCC review, adjustments in service area boundaries when two, or more, water systems agree to an exchange of service area. All other service area boundary requests will be reviewed by the WUCC. The lead agency will maintain and incorporate all approved boundary changes on the County's official service area maps, and forward these changes to DOH, the Pierce County Development Center, Planning and Land Services and the Building Division. These boundary changes will be integrated into the USRP described in Section VI. (See Page IV-8)**

SA-Policy 18 **The realignment of service area boundaries will require an amendment to the purveyor's water system plans. (See Page IV-8)**

M. Satellite System Management

The CWSP provides for the establishment of Satellite System Management Agencies (SSMA) to provide public water service in areas not within a DOH approved service area of an existing water system. Section VII provides a description of the SSMA program in Pierce County. The objective of this program is to identify those existing water purveyors that have the organizational experience and qualifications to make a long-term commitment for operation of public water systems in accordance with State and federal laws. The prequalification requirements identified in the CWSP, and maintained on file with the Lead Agency, is a quality control program for Pierce County future water supply. Water supply service in areas not designated as future service areas for an existing public water system shall be referred to the SSMA's for development of water service contracts. Contracts may include system ownership and operation.

SS-Policy 1 **No new public water system may be approved or created unless: (a) It is owned or operated by a satellite system management agency established under RCW 70.116.134 and the satellite system management system complies with financial viability requirements of the Washington State Department of Health; or (b) a satellite management system is not available and it is determined by DOH that the new system has sufficient management and financial resources to provide safe and reliable service. (See Page VII-2)**

SS-Policy 2 **Satellite water systems inside a DOH approved future service area will be operated according to the water system plan for that future service area. (See Page VII-2)**

SS-Policy 3 **In areas which are not claimed by an existing water purveyor, or in areas not covered by an approved water system plan, applicants proposing developments requiring new water systems may negotiate with any approved satellite system management agency for the operation of the water system. (See Page VII-2)**

SS-Policy 4 **The applicant and the SSMA are required to enter into a contract agreement which establishes the responsibilities of the SSMA and the applicant. The contract shall also contain a provision dealing with termination of the contract and the requirement that a new SSMA must be in place to operate the system before the existing contract can be terminated. Before there is a change in management or contract management, the SSMA shall notify the Pierce County Lead Agency and the Washington Department of Health. (See Page VII-3)**

N. Contract Management Agency /Satellite System Management Agency

The CWSP recognizes the necessity and importance of service organizations to provide contract operation and maintenance for existing water systems within Pierce County. Section VII discusses operational assistance to water systems that may need it. The assisting agency must be approved as an SSMA. There are more than 1500 public water systems, many of which serve less than ten customers. The Contract Management Agency program will provide a quality assistance program for operating the small systems, through service contracts with the system owners. The responsibility and liability for meeting State and Federal drinking water standards and minimum service requirements will remain with the system owner.

CM-Policy 1 **Pierce County recognizes the necessity and importance of service organizations to provide contract operation and maintenance for existing water systems within the County.**

O. Limitation on New Water Systems

The Public Water System Coordination Act prohibits establishment of new public water systems under new management ownership except under specified conditions. (See SS-Policy 1 above and in Section VII , Page VII-4.) The CWSP provides, through the USRP (Section VI) and the Satellite System Management Program (Section VII), county policies and procedures to be followed in establishing new systems when necessary. In identified Urban areas, water service requirements have been assigned to existing water utilities. With exceptions identified

in this report, no new systems or management agencies will be allowed within those Urban areas unless an existing utility fails to meet its obligations. The Rural Areas include large areas where new water systems will be designed, constructed, and operated either by an SSMA or a local membership organization. The minimum conditions for new systems are specified in the CWSP.

P. Level of Water Service

The CWSP established the design standards and performance criteria that the Water Utility Coordinating Committee (WUCC) believes to be minimum levels of water service necessary within Pierce County. These levels of service criteria have been defined to coincide with appropriate land use designations. The criteria developed are based upon existing practices among Pierce County water utilities and the trends within the Pacific Northwest for good utility practices. The WUCC will be asked to routinely review these criteria to ensure appropriateness of application and to provide guidance to the Appeals Panel in establishing equitable cost allocation consistent with the levels of service required by land use and the customers.

Levels of service for water are based upon land use designations. When determining the appropriate level of service requirement, the determination of which land use designation should be used is sometimes difficult. In order to make the determination of adequate levels of service, land use designations should be matched with appropriate levels of service so that the combination actually recognizes the differences in water needs and uses.

MS-Policy 1 **Within the designated service area of a purveyor, new facilities shall be designed and installed according to the minimum design standards adopted by the purveyor. The purveyor may adopt the minimum standards as adopted in Chapters 19.70, 15.12 and 15.40 of the Pierce County Code, or may adopt more stringent standards. (See Page V-1)**

MS-Policy 2 **Land use designations shall be those identified in the adopted Pierce County Comprehensive Land Use Plan and implementation ordinances. (See Page V-2)**

MS-Policy 3 **Purveyors shall meet water system planning requirements using applicable land use designations for their service area when installing capital improvements. Identification of land use designations shall be coordinated by the purveyor with Pierce County Planning and Land Services (PALS) or municipal planning agency if within the limits of a city or town. Such designations shall be identified in the purveyor's plan, and shall be used to establish design requirements. (See P. V-3)**

MS-Policy 4 **The purveyor shall prepare a plan and a program of capital improvements needed to provide the anticipated level of service in**

each land use area. When the purveyor is requested to provide additional water service, it will identify the planned capital facilities, as well as other installations, which are necessary to provide the service requested. As growth occurs, the full level of water service will eventually be provided throughout the service area of the purveyor in a planned, phased program which meets County requirements and minimizes overall cost to the customers. (See Page V-2)

MS-Policy 5 If municipalities extend new water service to customers outside of the city limits, the design standards adopted by the municipality for service in the unincorporated area must, at least, meet the minimum standards of Chapters 19.70, 15.12 and 15.40 PCC. (See Page V-2)

MS-Policy 6 Water service in rural activity centers and rural gateway communities will be provided by a "Group A" water system or systems, if at all possible. The provision of water by new individual wells or new "Group B" water systems within these rural communities will be discouraged. (See Page V-3)

MS-Policy 7 Urban areas are subject to design requirements based on the expected land use and development in accordance with the applicable Land Use Plan and approved "Water Utility System Plan." Expected land uses shall be used to describe areas within the service area of a purveyor, which shall be subject to levels of service requirements of these minimum standards. (See Page V-3)

MS-Policy 8 The Public Works and Utilities Department shall review all water system planning documents for conformance and consistency with the "Pierce County Comprehensive Land Use Plan," as amended. (See Page V-3)

MS-Policy 9 New sources of water must be designed to meet the Washington Department of Ecology (DOE) and the Washington Department of Health (DOH) regulations and design guidelines including WAC 173-160, "Minimum Standards for Construction and Maintenance of Water Wells," administered by DOE and TPCHD, and WAC 246-290 and 246-293, "Rules and Regulations of the State Board of Health Regarding Public Water System", as administered by DOH. (See Page V-3)

MS-Policy 10 All test and production wells must be drilled in accordance with detailed drilling and testing specifications in WAC 173-160. (See Page V-4)

MS-Policy 11 Water rights must be obtained in accordance with DOE regulations and procedures, and copies of water rights documents, correspondence, and other records are to be maintained on file with the purveyor. (See Page V-4)

MS-Policy 12 Water quality must be proven to conform with DOH criteria specified in WAC 246-290 and 246-293 and/or any additional requirements more stringently applied by the TPCHD. (See Page V-4)

MS-Policy 13 Except as otherwise superseded in these standards, water system design, installation, modification, and operation, is subject to the "Rules and Regulations of the State Board of Health Regarding Public Water Systems," WAC 246-290. (See Page V-4)

MS-Policy 14 Selection of materials and construction of water system facilities in Pierce County shall conform to the following, at a minimum:

FOR DISTRIBUTION FACILITIES EQUAL TO OR GREATER THAN FOUR INCHES IN DIAMETER;

1. Applicable County or municipal ordinance(s), and
2. "Standard Specifications for Road, Bridge, and Municipal Construction", Washington State Department of Transportation APWA, Most Current Edition (DOT/APWA), or
3. Standards of the American Water Works Association (AWWA), or
4. Polyvinyl-Chloride pipe meeting the requirements of ASTM 2241, with a maximum standard dimension ratio of 21.

FOR DISTRIBUTION FACILITIES LESS THAN FOUR INCHES IN DIAMETER;

1. Applicable County or municipal ordinance(s), and, if applicable,
2. "Standard Specifications for Road, Bridge, and Municipal Construction", Washington State Department of Transportation APWA, Most Current Edition (DOT/APWA), or
3. Standards of the American Water Works Association (AWWA). (See Page V-4)

MS-Policy 15 Along County road rights-of-way in unincorporated areas, a purveyor must obtain a franchise to place or repair infrastructure within the right-of-way. The purveyor must also obtain a County right-of-way permit for each individual project within the right-of-way prior to construction. (See Page V-5)

MS-Policy 16 A hydrostatic pressure leakage test will be conducted on all newly constructed water mains, fire lines, fire hydrant leads and stubouts in accordance with DOT/APWA Section 7-11.3(11) or AWWA C-600 specifications. (See Page V-5)

MS-Policy 17 All pipe, reservoirs, and appurtenances shall be flushed and disinfected in accordance with the standards of the DOH, WAC 246-290 and 293. (See Page V-5)

MS-Policy 18 All source and booster pumping facilities required for maintaining an average day supply of water in an emergency shall be equipped with auxiliary power or with power pigtail and manual transfer switching devices. Contingency plans for working toward providing water during emergency situations shall be included in individual water system plans. Purveyor's should include in their water system plans provisions for education their customers about the proper steps to take, concerning water use, in emergency situations. The education should include ways to operate a household on a minimal amount of water. (See Page V-5)

MS-Policy 19 When planning for installation of capital facilities, specific locations, size, and alignment of major water lines, utilities should incorporate the consideration and coordination of emergency interties with adjacent water utilities. (See Page V-5)

MS-Policy 20 All service lines shall be installed so that each residential, commercial, and industrial structure will have a separate metered service for domestic water received from the purveyor. If approved by the water purveyor, domestic water consumption may be measured by a master meter for service to a complex, under single ownership, and where water utility line subdivision is impractical. Service lines providing fire flow may be required by the purveyor to be equipped with a detector meter. (See Page V-6)

MS-Policy 21 All new groundwater sources shall be provided with devices for measurement of depth to water and total production. Installation of these devices is also recommended for existing groundwater sources. All new sources for which water treatment is included shall be provided with flow measurement. (See Page V-6)

MS-Policy 22 Where the possibility of contamination of the supply exists, water services shall be equipped with appropriate cross connection control devices in accordance with WAC 246-290 and 246-293. The designated purveyor and appropriate building official should determine the need, size, kind and location of cross-connection control devices following the specifications in the Uniform Plumbing Code and the most current edition of the Cross-Connection Control Manual by the Pacific Northwest Section of the AWWA. (See P. V-6)

MS-Policy 23 The minimum standards adopted in Chapter 19.70 of the Pierce County Code shall include provisions for the following, at a minimum:

A. Pressure Requirement
B. Pipe Sizing
C. Isolation Valving
D. Air and Air-Vacuum Relief Valves
E. Blow-off Valves
F. Storage requirements based upon three components:
   1. Equalizing Storage, required to supplement production from water sources during high demand periods,
   2. Standby Storage, required as backup supply in case the largest source is out of service; and
   3. Fire Storage, required in order to deliver the level of fire flow service identified in the purveyor's approved plan.
G. General Facility Placement
H. Pipe Cover
I. Separation Distances (See Page V-6)

MS-Policy 24 The minimum standards adopted in Chapter 15.40 of the Pierce County Code shall include provisions for the following, at a minimum:

A. Fire Hydrants
B. Fire Hydrant Location
C. Fire Flow Requirements including Minimum Duration
D. Maintenance of Fire Protection Facilities
E. Water Main Sizing to Provide Fire Flows
F. Fire Flow Requirements including Minimum Duration, based on land use designations as identified in the Pierce County Comprehensive Land Use Plan. (See Page V-7)

MS-Policy 25 The Standards Review Subcommittee shall be established by the WUCC and shall convene at least annually to review these standards and their implementation. The Subcommittee shall seek input from the Pierce County Fire Prevention Bureau and the fire districts in matters related to fire protection standards. Recommendations of

the Standards Review Committee shall be submitted to the WUCC and, if recommended revisions are approved, they shall be forwarded to the County Executive and County Council for review and adoption as part of the annual Comprehensive Plan review. (See Page V-7)

Q. County Fire Marshal Approval

The CWSP integrates the requirements of the Fire Prevention Bureau (FPB) with the water system planning programs of the water utilities. The FPB reviews water system plans for individual projects and divisions of land for compliance with fire flow requirements in effect at the time of application. Compliance with DOH requirements is verified prior to final approval by FPB.

FP-Policy 1 The established County review procedures shall include the Fire Prevention Bureau.

R. Receivership of Failing Utilities

The CWSP establishes the minimum design and operating standards for water utilities within Pierce County. Certain existing small water utilities do not have the financial or management resources, or may not have been initially designed, to meet the needs of the current customers of the system.

The update of the CWSP contains a new section to deal with the issue of receivership. Section X discusses the issues involved in providing assistance to water systems that are experiencing problems meeting the quality or quantity requirements. The last resort for failing water systems is receivership. Policies concerning receivership, from Section X are listed below.

RC-Policy 1 Pierce County will act as receiver for a failed water system only if no other qualified entity is willing to act as receiver. (See Page X-10)

RC-Policy 2 Pierce County will implement a program to avert receivership actions, especially those actions which would require the County to assume direct responsibility for correction, maintenance, and operation of a failed public water system. The Program should ensure that when receivership is unavoidable, adequate pre-planning has been conducted to facilitate the orderly implementation of the receivership action. (See Page X-10)

RC-Policy 3 Pierce County will work with the Washington Department of Health to prepare a draft receivership order to present to the court prior to court action to appoint the County as receiver for a failed water system. (See Page X-10)

RC-Policy 4 **Pierce County should ensure that a receivership order appointing the County as receiver for a failed water system authorizes actions and expenditures that are necessary for the safe and economical operation of a failed system. A receivership order should authorize the following acts:**

- **Hiring another entity to operate the system;**
- **Committing current and future resources of the system to operations and improvements;**
- **Spending money for specific health fire and life safety measures; and**
- **Mandating reimbursement upon sale of the company at the end of receivership. (See Page X-10)**

RC-Policy 5 **Pierce County should make every effort, in the case of being appointed receiver, to ensure that the receivership be terminated at the earliest possible date. (See Page X-10)**

RC-Policy 6 **The Pierce County Code should be amended by request of the Pierce County Executive to allow the Department of Public Works and Utilities to act as receiver for failed water systems and as an SSMA. (See Page X-11)**

RC-Policy 7 **The Department of Public Works and Utilities will ensure that sufficient qualified water system operators are maintained on staff, to provide for adequate operation and management of a water system in the case that the County is appointed as receiver of a failed water system. (See Page X-11)**

RC-Policy 8 **The duties of the appropriate Pierce County official should be amended by the Pierce County Executive to include water system management. (See Page X-11)**

RC-Policy 9 **Pierce County will actively encourage other water systems and purveyors to become qualified to act as satellite system management agencies. (See Page X-11)**

S. Pierce County Regional Supply System

The CWSP provides a proposed "Pierce County Regional Water Supply Plan." This proposal is based upon maximizing the use of additional piping and supply systems. The major water purveyors within Pierce County are encouraged to coordinate further evaluation of the supply system and to revise and incorporate their capital improvement plans into the "Regional Water Supply Plan."

T. Water Supply Reservation

The CWSP identifies the importance of reserving necessary surface and groundwater resources to meet the projected 50-year water supply requirements. The Regional Water Association of Pierce County has submitted a request for reservation of the water rights needed to meet the anticipated growth in Pierce County to the Washington State Department of Ecology (DOE). DOE has not acted on the request.

SR-Policy 1 Pierce County should pursue the needed changes in State Legislation to either ensure that water rights, needed to accommodate future growth, can be obtained, or that the "Growth Management Act" be amended to permit a growth limit for the County so that additional water rights are not necessary.

U. Well Sealing and Decommissioning Program

Critical elements of the CWSP are to identify and protect existing and future sources of water supply. With only a few exceptions, the nearly 1500 "Group A" and "Group B" public water supply systems in Pierce County use groundwater as their source of water supply. Protection of this supply from possible contamination requires careful management of the development of the groundwater supply.

The 1991 Washington State Legislature enacted legislation that enables the Washington State Department of Ecology (DOE) to delegate specific sections of WAC 173-160 (Minimum Standards for the Construction and Maintenance of Wells) to local health departments. Through a Memorandum of Agreement with DOE, the TPCHD implemented a well sealing and decommissioning program. As of April 1, 1993 the TPCHD has required all exempt water, dewatering, irrigation and piezometer wells to have the proper sealing components of well construction in place prior to the well being approved for use. The TPCHD also oversees the decommissioning of abandoned wells, and conducts an inspection of all decommissioned wells for compliance with state and local regulations.

The addition of the Well Sealing and Decommissioning Program has complimented the TPCHD's efforts toward the overall protection of the ground water supply from contamination. The program is the first in the state, and is being used as a prototype for other counties in their overall efforts to protect ground water.

SD-Policy 1 Pierce County will continue to support the Well Sealing and Decommissioning Program of the TPCHD as set forth in the "Memorandum of Agreement" with the Washington Department of Ecology.

V. Wellhead Protection Program

The 1986 amendments to the "Federal Safe Drinking Water Act" and WAC 246-290 requires all "Group A" public water systems using ground water sources to prepare "Wellhead Protection Programs." For each well or wellfield, the program requires delineation of a wellhead protection area, an inventory of all potential sources of ground water contamination within each wellhead protection area, a management plan to reduce the possibility of groundwater contamination from identified sources, and a contingency plan for providing alternate sources of drinking water in the event of contamination.

The development and implementation of a "Wellhead Protection Program" is the responsibility of the water purveyors. However, there is the need for institutional changes, beyond the control of the water purveyor, to sufficiently protect wellhead areas. This includes such measures as the legal authority to control land use activities or sources of contamination that represent a potential risk to wells or well fields. To assist water purveyors in the protection of their wellhead protection areas, the "Wellhead Protection Implementation Strategies Project" was undertaken by the Tacoma-Pierce County Health Department, the City of Tacoma, and the Regional Water Association of Pierce County. Under this project, the Pierce County "Wellhead Protection Program" was developed. The Program supplements the County's two ground water management programs, the "Clover/Chambers Creek Basin Ground Water Management Program" and the "Gig Harbor Peninsula Ground Water Management Program", by implementing Aquifer Recharge Area Ordinance requirements in well head protection areas.

WP-Policy 1 **The Tacoma-Pierce County Health Department will serve as lead agency for local implementation and may review Wellhead Protection Programs of individual purveyors to ensure consistency with local implementation protocols.**

This may require a joint plan of operation between the Tacoma-Pierce County Health Department and the Washington Department of Health outlining specific tasks and ensuring that efforts are not duplicated.

WP-Policy 2 **The Tacoma-Pierce County Health Department, Pierce County Public Works and Utilities Department, Pierce County Planning and Land Services Department, Pierce County Fire Prevention Bureau, and the Pierce County Department of Emergency Management will participate in the protection of the designated Wellhead Protection Areas through memoranda of agreement and by virtue of their water quality management functions as referred to elsewhere in this CWSP.**

W. Service Area Assignment

The USRP procedures are intended to identify an existing water pur-veyor willing and able to provide water supply facilities and to include the new development within its service area. In effect, the result of the USRP is to assign the proposed new development or land use to the service area of a specific water purveyor. The service area assign-ment can take place as one of the following types, in order of priority:

(1) The proposed development is within the approved future service area of a purveyor, and that purveyor will contract to install a water system, either by direct connection to existing supply mains or a satellite system;

(2) The proposed development is within the approved future service area of a purveyor. However, interim service will be provided by another adjacent purveyor or a Satellite System Management Agency (SSMA), as provided by an agreement between those purveyors;

(3) The proposed development is outside of approved future service areas and service will be provided by an adjacent purveyor, with the appropriate service area adjustments;

(4) The proposed development is outside of approved future service areas and service will be provided by an SSMA; or

(5) If none of the above options are available, a new water system may be created, along with the necessary service area adjustments, and planning requirements.

US-Policy 1 **Water service requests occurring within the service area of a purveyor that has not completed either its individual water system plan or its Interlocal Agreement will be treated as occurring outside of the purveyor's designated service area. The purveyor will then be among the "adjacent" purveyors to which the applicant will be referred. (See Page VI-1)**

US-Policy 2 **Interlocal Agreements (see Section IV) related to service area boundaries will be required prior to approval of water service to new developments. (See Page VI-1)**

US-Policy 3 **When new water service is requested of a water purveyor within its designated service area, the purveyor shall specify its intent to implement one of the following options:**

(a) The purveyor will provide direct service to the development by physical extension of existing mains and supply; or

(b) A temporary satellite water system will be installed within the purveyor's existing service area, which is expected to be interconnected with the purveyor's existing system within a reasonable period of time. The developer and purveyor shall enter into a legal contract which establishes the purveyor's responsibility for providing or arranging for the appropriate level of managerial and operational functions until the two systems are interconnected. Temporary service may be provided by an adjacent purveyor or an SSMA (see Section VII) if a contract is negotiated with the designated purveyor prior to permit approval. (See Page VI-3)

US-Policy 4 When it is determined that the new water service will not be provided by an existing purveyor within its designated service area, the TPCHD will refer the applicant to existing purveyors in the vicinity of the proposed development. An adjacent purveyor may decide to expand its service area to serve the applicant. Appropriate modifications to the designated service area maps and water system plan will then be completed by the purveyor. See Section III for the process for approval of expansion and modification or amendment of a water system plan. (See Page VI-3)

US-Policy 5 If adjacent purveyors decline to serve the applicant, the TPCHD will refer the applicant to a list of prequalified SSMAs (Section VII). The applicant is responsible for contacting the SSMA's and negotiating conditions of service. (See Page VI-3)

US-Policy 6 If no existing purveyor is able to provide water service in a timely and reasonable manner, the establishment of a new water system may be approved. It shall be the burden of the applicant to provide documentation, if requested by TPCHD, of correspondence with existing purveyors and justification for formation of the new water system. (See Page VI-3)

US-Policy 7 Once a water purveyor providing service has been determined, the proposed project must be reviewed with that purveyor to identify the engineering, financial, managerial, and other requirements of service. Fire flow requirements for the proposed project will be determined by the Pierce County Code Chapters 15.12 and 15.40. The water purveyor will have operational and managerial responsibility for the proposed activity, and that purveyor's approved plan may require more stringent standards than the minimum standards adopted by the County. (See Page VI-4)

If the applicant accepts the conditions of service prescribed by the water purveyor or an SSMA, the purveyor shall provide to the applicant a signed certificate of water availability prior to Pierce County's issuance of the required approval/permit. Exhibit VI-5 provides an example of a certificate of water availability showing the type of information and criteria which should be resolved during coordination by the purveyor and applicant.

If the applicant and purveyor are unable to agree on conditions of service, a request may be submitted for review by the Water Utility Coordinating Committee (WUCC) Dispute Resolution process (see Section II). Such a request may be initiated by either the applicant, the purveyor, or the County and will be coordinated by a lead agency designated by the County Executive. The Dispute Resolution process is limited to determining whether provision of water service by a water purveyor is "timely and reasonable". See the Dispute Resolution process in Section II.

US-Policy 8 Prior to approval of final plat the water facilities are to be installed or bonded for completion to meet all applicable standards, and prior to issuance of a building permit, to be installed and approved. After the preliminary plat or other land use permits are approved, but prior to the application for a building permit, a written contract shall be developed between the purveyor and the applicant to formalize the conditions of service and responsibilities. (See Page VI-4)

X. Land Use Proposals in Conformance with the County Comprehensive Plan

When development applications conform with the "Comprehensive Land Use Plan" and development regulations, the USRP will generally follow the sequential steps outlined in Exhibits VI-1, VI-2 and VI-3. This procedure is described by the following:

(1) The Department of Planning and Land Services (PALS) will coordinate review of all land use applications received. PALS will be responsible for ensuring compliance with the Comprehensive Land Use Plan and appropriate land use regulations. Upon determination of appropriate land use designation, the Building Division will review building requests for conformance with the appropriate building codes. Where a designated water purveyor has not been determined for a development, PALS will notify the Tacoma Pierce County Health Department (TPCHD) to initiate the USRP.

(2) Outside of incorporated areas, development projects that require water service from a public water system will be referred to the TPCHD which will maintain current records of approved water system plans and designated service areas. The TPCHD will review the proposed water service request, and will refer the applicant to a designated purveyor, adjacent purveyors, or SSMAs, as outlined in the steps below. If requested, the outcome of the TPCHD determination may be provided in a Preliminary Service Designation Report. An example format for this report is provided as Exhibit VI-4.

Y. Land Use Proposals Which Require Amendment of the County Comprehensive Plan

If a development proposal requires a zoning change or an amendment to the County Comprehensive Land Use Plan, the effect of such a change must be evaluated in regard to its economic effect upon utility services before implementing the USRP. Since the water purveyor's planning is based upon the existing Land Use Plan, there may be significant additional capital improvements required by proposed land use changes. By identifying new or additional utility costs associated with changes in land use or zoning, these costs of development can be integrated into the decision making process. This will allow the assignment of these costs to customers benefiting from the land use change.

US-Policy 9 **Each affected purveyor should be contacted by Pierce County Planning and Land Services (PALS) and allowed to comment on applications which propose land use changes within their service area prior to approval of that change. (See Page VI-4)**

III. SPECIAL REVIEW CONSIDERATIONS

A. Review of Construction Plans by Pierce County Fire Prevention Bureau

Construction plans for water facilities are required by current ordinance to be submitted to the Pierce County Fire Prevention Bureau for approval.

US-Policy 10 **Before issuing any approval based on fire protection requirements, the Fire Prevention Bureau shall notify the designated water purveyor if TPCHD or DOH review is required. Either TPCHD or DOH must review and approve new sources of supply, pumping stations, transmission lines, storage tanks, and treatment facilities. Distribution system line extensions shall be approved by DOH, if there is no approved water system plan. The Fire Prevention Bureau's approval will then be held in abeyance until notified of approval by TPCHD or DOH.**

US-Policy 11 **Interconnection between the public and private water system must also be monitored to prevent cross-connections and possible contamination.**

B. New Public Water Systems - Limited

US-Policy 12 **The establishment of new public water systems is discouraged if an existing water system is capable and willing to provide the service.**

The procedures which have been developed for reviewing and approving new water systems are incorporated into the USRP previously described in this Section. As identified in the USRP, the creation of a new water system would be the last service alternative utilized.

US-Policy 13 Special consideration is required for the expansion of small systems both inside and outside designated service areas. These issues are addressed below:

(a) Expansion Outside Designated Service Areas
Expanding "Group B" systems located outside of designated service areas of existing purveyors will be referred by the TPCHD to prequalified SSMAs for technical assistance. This would allow the expanding purveyor to discuss and evaluate utility service proposals by an SSMA versus expansion of their system to an independent "Group A" status. If the decision is made to pursue expansion to a "Group A" status, the system must establish its future service area and submit, to the County lead agency and DOH, a completed service area agreement and documentation of its plan for system development.

(b) Expansion Within Designated Service Areas
Expansion of an existing smaller purveyor located within a designated utility service area will not be allowed without approval by the larger purveyor. The CWSP places responsibility on the review agencies to recognize a specific purveyor's service area; and, in turn, the purveyor is responsible for effective management within that service area.

Z. Wastewater Management/Sewer Service Areas

Groundwater protection and wastewater disposal practices are directly related to the protection of future water supplies. Through the adopted Water Quality Management Plans and the County Sewerage General Plan, wastewater management is established for the four designated Water Resource Inventory Area (WRIA) Basins in Pierce County. Pursuant to the County Services Act (RCW 36.94) wastewater management/sewer service areas are defined. The responsibilities of wastewater management are assigned to either the Pierce County Public Works and Utilities Department, existing sewer districts or agencies and cities, or the TPCHD (septic systems). Through the Sewerage General Plan required by the County Services Act, public utility service planning and groundwater protection is coordinated.

WW-Policy 1 The responsibilities of wastewater management are assigned to either the Pierce County Public Works and Utilities Department, existing sewer districts or agencies and cities, or the TPCHD (septic systems).

AA. Groundwater Management Program

The County will continue to implement its groundwater management program utilizing the information developed as a part of the CWSP. The County has developed plans for two groundwater management areas using the "Groundwater Management Act," enacted in 1985. Groundwater Management Plans have been developed for the Chambers-Clover Creek Aquifer and the Gig Harbor Peninsula. These groundwater management areas will be coordinated with the management programs outlined in the CWSP.

BB. Water Conservation Element

The update of the CWSP contains a new section dealing with Water Conservation. Section XI discusses the requirements of existing County policy regarding water conservation and recent State legislation requiring conservation elements in the CWSP and water system plans. Policies identified in Section XI are listed below.

WC-Policy 1 **The Coordinated Water System Plan for Pierce County incorporates the requirements and recommendations of the State of Washington Department of Health and Department of Ecology as adopted in "Conservation Planning Requirements - Guidelines and Requirements for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology, and Conservation Programs" (March 1994). (See Page XI-5)**

WC-Policy 2 **Approval of a water system plan for any purveyor shall be based upon approval of a conservation plan to be included in the water system plan. The conservation plan shall contain provisions for water use data collection, water demand forecasting and a conservation program as described in "Conservation Planning Requirements" (March 1994). (See Page XI-5)**

WC-Policy 3 **Conservation programs of water systems shall contain the following elements as required by the "Conservation Planning Requirements" (March 1994):**

- **Conservation Objectives - Goals and objectives of the conservation program shall be identified. Each water system shall develop conservation objectives which logically meet its needs;**
- **Evaluation of Conservation Measures - Evaluation of measures identified in the "Conservation Planning Requirements" and an explanation of reasons for not implementing those measures it is required to evaluate; and**

- **Identification of Selected Conservation Activities - Include aspects of the implementation program as defined in "Conservation Planning Requirements". (See Page XI-5)**

WC-Policy 4 **The installation of source meters shall be required for all new and expanding public water systems needing additional water rights. (See Page XI-6)**

WC-Policy 5 **All water conservation programs shall contain provisions for the promotion of the conservation program to the public. The promotion program shall include the use of the media (radio, television, newspapers), public water system bill inserts, or other means. (See Page XI-6)**

WC-Policy 6 **Evaluation of conservation measures by a water system shall be based on the cost of a measure in relation to the value of the water conserved. In the absence of clear evidence to the contrary, estimates of the value of conserved water and of costs and benefits will not be challenged. (See Page XI-6)**

WC-Policy 7 **All public water systems, regardless of size, shall consider the benefits and costs of installation of service meters and implementation of conservation rate structures as required by RCW 43.20.235. (See P. XI-6)**

WC-Policy 8 **All public water systems shall incorporate within their water system plans an inventory of potential sources and uses for reclaimed water. The inventory shall include, at least, the following (See Page XI-6):**

Potential Sources:
- **Fish Hatcheries**
- **Stormwater Impoundments**
- **Sewage Treatment Plant Effluent**
- **Industrial and Commercial Process and Cooling Water**

Potential Uses or Users:
- **Industries**
- **Nurseries**
- **Golf Courses and other Landscape Irrigators**
- **Artificial Recharge of Aquifers**
- **Parks and Parkways**
- **Agricultural Irrigation**
- **Flushing of Sanitary Sewers**
- **Fire Protection**
- **Street Cleaning, Dust Control, & other Washing Applications**

WC-Policy 9 **Systems under satellite system management must complete conservation programs according to the number of connections for each individual system. The total number owned, operated, or managed by the SSMA is not considered. However, SSMA's are strongly encouraged to develop conservation plans commensurate to the total number of services managed. A single conservation program may be prepared for all systems under the management of an SSMA. (See Page XI-7)**

WC-Policy 10 **Pierce County shall develop and adopt land development regulations which require water conserving landscape management practices. (See Page XI-7)**

IV. DISPUTE RESOLUTION PROCESS

The CWSP establishes a local management framework for planning and development of water utility services. These services and others are closely linked to public policy for economic growth and development. Where disputes arise concerning CWSP implementation, a mechanism must be provided for swift and fair resolution. A recommendation of this CWSP is the creation of a dispute resolution process to attempt to mediate disputes brought about through CWSP implementation.

This dispute resolution process should not be vested with any judicial authority and should not be subject to civil suit as a result of its recommendations, but rather, it should be a forum to process disputes, attempt to mediate disputes and develop a record related to disputes in implementing CWSP provisions.

A. Definitions

The following definitions shall apply:

"Service area dispute" means a dispute between two or more water purveyors planning to or proposing to provide water service to the same area.

"Timely and reasonable dispute" means a dispute between a potential water customer and the designated water purveyor which occurs when a formal request for service is made to the water purveyor and the purveyor makes a proposal to the potential customer that is considered by the potential customer to be untimely or unreasonable. If a determination is made that the purveyor's proposal is not timely or reasonable, a change in service area boundaries may occur.

Only water service issues relating to new requests for retail water service are subject to appeal under the "Timely and Reasonable Dispute" process. Issues related to conformance with SEPA, the Growth Management Act, any County-wide Regional Planning Policies, County and City land use plans, financing policies, and wholesale agreements are not subject to the appeal process under "Timely and Reasonable Consideration." Issues subject to review are limited to the following:

- Interpretation and application of water utility service area boundaries.
- Proposed schedule for providing service.
- Conditions of service, excluding published rates and fees.
- Annexation provisions imposed as a condition of service, provided existing authorities of City government are not altered by the CWSP, except where a Service area agreement exists between a city and a County, or as are specifically authorized by Chapter 70.116 RCW.
- Design standards more stringent than the minimum design standards specified in the CWSP, DOH-approved WSP and related water industry statutes and standards.

"Timely service" means receiving a commitment to provide service, or the reaching of an agreement with the potential customer, within 120 days of request for water service. The 120-day time period is defined as calendar days.

"Reasonable service" means the provision of potable water service and/or associated water utility services which are consistent with the conditions of service policies detailed in the utility's DOH-approved WSP.

B. Dispute Resolution Process - Lead Agency

The Lead Agency for the dispute resolution process shall be the Pierce County Public Works & Utilities Department, Water Programs division. Support will be provided to Water Programs staff by the Water Utilities Coordinating Committee and, as needed, the Tacoma-Pierce County Health Department and the Pierce County Planning and Land Services Department.

C. Meetings

Meetings shall be scheduled by the Lead Agency on an as needed basis.

D. Process

Requests for resolution shall be submitted in writing to the Lead Agency. Requests shall identify the specific outcome requested of the Dispute Resolution Process and all parties who may be directly affected by the decision. All available facts and documentation shall be provided with the request. The Lead Agency shall ensure that involved parties are notified of meetings scheduled to institute the dispute resolution process.

Upon submittal, the Lead Agency, with the assistance of the WUCC, the Tacoma-Pierce County Health Department and the Pierce County Planning and Land Services Department, shall define the dispute as either a "service area dispute" or a "timely and reasonable dispute." After the dispute has been defined, the affected parties, at the discretion of the Lead Agency, may be given the opportunity to attend a meeting with the Lead Agency and the WUCC in an attempt to resolve the dispute. If the affected parties agree to a meeting, the Lead Agency may prepare a summary of the dispute to be used during the meeting as a means to discuss the dispute and possible options for resolution of the dispute. The summary should discuss the following: the dispute to be resolved; consistency with the Growth Management Act, Pierce County countywide Planning Policies, Pierce County Comprehensive Plan, Pierce County Coordinated Water System Plan and DOH approved water system plans of the affected parties, and; the options available to resolve the dispute.

If the parties agree to a resolution as a result of the meeting, no further action is required except to document the resolution. If however, after 60 days a resolution is not reached, referrals shall be made to an appropriate authority. Service area disputes along with comments as necessary, shall be referred to DOH, as required by WAC 246-293. Timely and reasonable disputes shall be referred to the Pierce County Hearing Examiner. A staff report shall be prepared for the Hearing Examiner. Appendix C "Timely and Reasonable Criteria" contains the non-exclusive list of elements that will be considered by the Lead Agency, Pierce County Planning and Land Services Department, the Tacoma-Pierce County Health Department, the Pierce County Water Utilities Coordinating Committee and the Pierce County Hearings Examiner when making a timely and reasonable determination.

Section III

The Coordinated Water System Plan Process

SECTION III

THE COORDINATED WATER SYSTEM PLAN PROCESS

I. INTRODUCTION

The Public Water System Coordination Act, RCW 70.116, establishes a procedure for the State's water purveyors to coordinate their planning and construction programs with adjacent water purveyors and other local governmental activities. The Act specifies that the Washington State Department of Health (DOH) or the county legislative authority may declare an area within a county as a Critical Water Supply Service Area (CWSSA). The declaration is based upon the findings of a Preliminary Assessment identifying problems related to inadequate water quality, unreliable service, or lack of coordinated water supply planning.

The State Legislature had previously enacted the Water Resources Act, RCW 90.54, which set forth fundamentals of water resource policy to ensure that the waters of the state will be protected and fully utilized for the greatest benefit of the people of the state. Subsequently, "Procedures Relating to the Reservation of Water for Future Public Water Supply", WAC 173-590, were established. These procedures are available to public water systems within a geographical area for use in reserving water rights required to meet their projected domestic needs over the next 50 years. This program is administered by the Washington State Department of Ecology (DOE) in an effort to resolve competing water use activities within a geographical area and to establish a management system that will ensure that an efficient overall water resource program is developed.

The Public Water System Coordination Act and the Water Rights Reservation processes may be used individually or in combination by the local public water purveyors. Implementation of either of these laws requires that a Coordinated Water System Plan (CWSP) be prepared for the Critical Water Supply Service Area (CWSSA). The Pierce County CWSP has been prepared in accordance with the requirements of both. It consists of a compilation of individual water system plans prepared by each expanding water purveyor, and this document, which is known as the Regional Supplement.

The CWSP was submitted to the Pierce County Planning Commission and the Pierce County Council for approval and incorporation into the Pierce County Comprehensive Plan. The CWSP was approved and adopted by the Pierce County Council by Ordinance Number 86-116S4 on August 23, 1988. This document represents the first update of the CWSP.

II. PRELIMINARY ASSESSMENT

The Preliminary Assessment for Pierce County, as required by the Public Water System Coordination Act, was completed in June of 1982. It was a cooperative effort of the Tacoma Pierce County Health Department (TPCHD), the Piece County Department of Planning and Development, (now the Department of Planning and Land Services [PALS]), and the Washington State Department of Health. Several concerns were identified in the Preliminary Assessment, many of which could be resolved on an individual utility or purveyor basis. There were, however, a number of problems the Preliminary Assessment identified as being most appropriately solved through implementation of the Coordination Act. Following the Preliminary Assessment in 1982, the process for developing the CWSP was begun. The Pierce County Council declared the entire county a Critical Water Supply Service Area. With the assistance of the WUCC, a plan was prepared and adopted in August of 1988.

Below is a list of the findings of the original assessment (1982), followed by the status of that particular issue at the present time (1995).

A. Water Quality

(1) 1982 "Most of the larger water systems have adequate water quality monitoring programs, but smaller systems have exhibited poor water quality control."

1995 Requirements for water quality monitoring have increased since the adoption of the CWSP. Almost all public water systems in the County have developed adequate water quality monitoring programs that meet current requirements.

(2) 1982 "Every water system in the Chambers Creek/Clover Creek Drainage Basin is very concerned about future water quality of the aquifer."

1995 There is still concern about the future water quality of the Chambers Creek/ Clover Creek aquifer. However, most of the larger public water systems (greater than 100 connections) are aware of the need for aquifer protection. Wellhead protection requirements have forced larger systems to think about the potential of contamination.

(3) 1982 "Due to land use practices, drinking water quality has been shown to be deteriorating to the point that it is a public health concern - particularly in the Lakewood and shoreline areas."

1995 Water quality in Pierce County is generally very good; although there are areas, such as the Chambers/Clover Creek Basin and some shorelines, experiencing increases in contamination which have exceeded the maximum contaminant levels.

(4) 1982 "A major identified need is for a coordinated effort to evaluate the long-term impact of water use versus waste disposal practices related to Pierce County's limited, fragile groundwater supply."

1995 The Chambers/Clover Creek Drainage Basin has been designated as a sole source aquifer by the Environmental Protection Agency. This action gives some special protection to the aquifer. In addition, there is a compliance order from the Washington Department of Ecology to provide sewers in the area and to implement more stringent septic system design criteria within the drainage basin. There has been a groundwater management plan adopted for the area which recommends land use practices which will further protect the aquifer.

B. Water Quantity

(1) 1982 "The ability of Pierce County water systems to deliver adequate water quantity (and quality) is generally related to system size. While most of the larger systems can provide needed flows on a reliable basis, smaller systems exhibit problems related to facility deterioration, inadequate design for fire flows, poor management, and lack of financial capability to make improvements."

1995 This statement generally reflects the current situation at the time of this update.

(2) 1982 "An adequate quantity of groundwater appears to be available for future use by most Pierce County water systems - but only if the resource is carefully managed to maintain drinking water health standards over the long-term future."

1995 Regional groundwater studies indicate that there may be sufficient water to meet near term requirements (10 to 15 years). However, those studies are based on estimates rather than hard data. Groundwater sources alone will most likely be unable to meet the long term (more than 15 years) requirements of county residents. The need for careful management of the groundwater resource is very important. The lack of adequate information concerning water quantity in Pierce County makes it imperative that additional water quantity data be collected.

(3) 1982 "Future use of water from the Green River by Tacoma will be subject to 'balancing' of various uses of the resource and a stringent management program. Variances in water quantity available will increase management complexity."

1995 The availability of water from the Green River for Tacoma has been fairly well resolved. Tacoma has obtained its second diversion water right for

the proposed Second Supply Project and has completed a negotiated agreement with the Muckleshoot Indian Tribe to enhance stream flows for the Green River.

C. Coordination

(1) 1982 "Pierce County is currently experiencing a proliferation of small water systems and individual wells (and on-site waste disposal), along with its increase in short plats. This has a potential impact on expansion of large water systems as well as groundwater quality."

1995 The proliferation of small public water systems has slowed since the adoption of the current CWSP. Currently, delays in water right processing has increased the interest in individual wells and small public water systems. The exemption from the requirements of water rights for wells not exceeding 5,000 gallons per day, makes the smaller systems easier to get approved than systems needing water rights, or attachment to systems needing additional water rights.

(2) 1982 "Existing County land use plans do not adequately address future provision of water service, thus leaving a large burden on the many Pierce County water systems to respond to development in a 'piecemeal' fashion."

1995 Pierce County adopted a new Comprehensive Land Use Plan in November of 1994. The lack of clear land use planning was an issue until then. Since the adoption of the new Plan is recent, the effect of the planning on the provision of water is not yet clear. The Comprehensive Land Use Plan contains clear land use policy and direction concerning the location of growth and development. It also contains policies concerning the provision of adequate water as a condition for development and a commitment to maintain water quality.

(3) 1982 "Most water systems which require plans are operating with approved plans. However, little coordination has taken place between adjacent water systems during development of these plans, resulting in an unorganized regional approach to provision of water."

1995 Coordination between adjacent utilities has improved substantially, especially in the urban area of the County. As the awareness of water issues grows, coordination becomes even more important. There are still water systems operating without approved water system plans.

(4) 1982 "There are many service area (and franchise area) overlaps, resulting in competition between water systems for provision of water to new developments and leading to inefficient service. No formalized service

area agreements between utilities exist. In addition, no regional mechanism exists to establish service areas and basic, minimum levels of service."

1995 Service area overlaps and conflicts have, for the most part, been rectified between purveyors. There are only a few conflicts needing to be resolved. The CWSP requires service areas to be agreed upon by adjacent purveyors. Almost all expanding water systems have submitted service area agreements. The issue of minimum levels of service has been rectified by the clarification of minimum standards and fire flow requirements.

(5) 1982 "Pierce County has established a variety of policies which have not been coordinated with land use plans or water system plans. Two current major issues relate to fire flow criteria and franchise fees. No annexation policy has been instituted by the County, resulting in overlaps and concern about level of service near some cities."

1995 Policies concerning the provision of services and land use planning have been coordinated through the recent Pierce County Comprehensive Plan. The plan requires consistency between and among policies. Fire flow criteria have been clarified for the past few years. Annexation concerns are to be dealt with through a series of interlocal agreements between Pierce County and incorporated cities and towns. Issues still remain concerning the impact of partial annexation by a city or town of service areas and infrastructure of existing service providers. Minimum standards for water systems meet the requirements of incorporated areas.

III. CWSP UPDATE

The Plan update process began in March of 1994. The WUCC was reconvened and membership was updated. The WUCC invited several groups, believed by the WUCC to have interest in the outcome, to attend their meetings to assist with the update of the plan. These groups included:

- Regional Water Association
- Board of Realtors
- Home Builders Association
- Well Drillers Association
- League of Women Voters
- Muckleshoot Tribe
- Nisqually Tribe
- Puyallup Tribe
- Squaxin Island Tribe

In addition, staff from the following Pierce County agencies were invited to attend:

- Planning and Land Services, Resource Management Section
- Fire Prevention Bureau
- Tacoma-Pierce County Health Department
- Public Works and Utilities, Water Resources

Staff from the Washington Department of Health were also invited and participated in the review of the 1988 CWSP. Staff from the Washington Department of Ecology was invited to participate but did not attend meetings. They did offer comments throughout the process.

All Sections of the CWSP were reviewed by the WUCC to determine if the information in them was still valid. In addition, the Sections were checked against the newly adopted Pierce County Comprehensive Plan to ensure that the CWSP update is consistent with the policies contained in that Plan. Further, the Sections were reformatted to ensure that policies contained in those Sections were clearly identifiable from the text of the Sections.

All Group A water systems were sent letters and maps asking them to draw on the maps their water system boundaries. The purveyors were to identify their proposed future service areas. Some of the systems identified no area beyond their existing service areas. Those systems that did not respond were assumed to be systems that are not interested in expanding. This new service area information was checked against the Official Service Area Maps maintained by the Tacoma-Pierce County Health Department. The service area boundaries were also entered into the Pierce County Geographic Information System.

Areas where there appeared to be overlap between future service areas were identified. The water purveyors were sent maps showing where the overlaps were found and asked to meet with the purveyor claiming the same area in order to resolve the issue. Some of the overlap areas were found to be simple mapping errors on the part of one or both of the purveyors, or on the part of the staff. Those errors were corrected. Other overlaps were misunderstandings between purveyors and agreements were made to resolve those overlaps. However, there were some overlap areas that the purveyors were not able to resolve. Most of the purveyors responding signed new Interlocal Agreements for their service areas. Those not signing new agreements have not changed their service area boundaries from the last time they signed the agreement.

An updated Regional Water Supply Plan was prepared. The update was based on the changes in the population projections since the original CWSP was adopted and on the changes in the information available concerning potential growth since Pierce County has adopted a new comprehensive land use plan (November, 1994, as amended).

Based on a review of RCW 36.94, the Sewerage, Water and Drainage Systems Act, it was determined that the inclusion of a Water General Plan into the CWSP was not necessary, and in actuality, premature. A Water General Plan is intended to include engineering data for the operation of a water supply system by the County. Since the County is not operating a water supply system, a Water General Plan for the County is not necessary. It is not possible to develop a Water General Plan until there is infrastructure to be planned. If Pierce County develops a water supply system, a Water General Plan will be necessary.

New Receivership Section

A section dealing with Receivership has also been added. The Failing Public Water Systems Act specifies the responsibilities of counties in regard to failing public water systems. The program presented in this CWSP includes steps which may be taken by the county to assist water systems that are experiencing difficulty so that the systems will not get to the point of having to resort to receivership. Assisting water systems early in the process will save money for the County in the long run. It will be much more cost effective to provide technical assistance and possibly some financial assistance before receivership is the only option.

New Water Conservation Section

A section was added to the CWSP dealing with Water Conservation since there have been new requirements added to the water system plans for expanding water systems. The section provides guidelines for water purveyors to follow when developing their water system plans. The conservation guidelines are sensitive to the size of water systems, having more sophisticated programs for the larger systems.

New Groundwater Monitoring Section

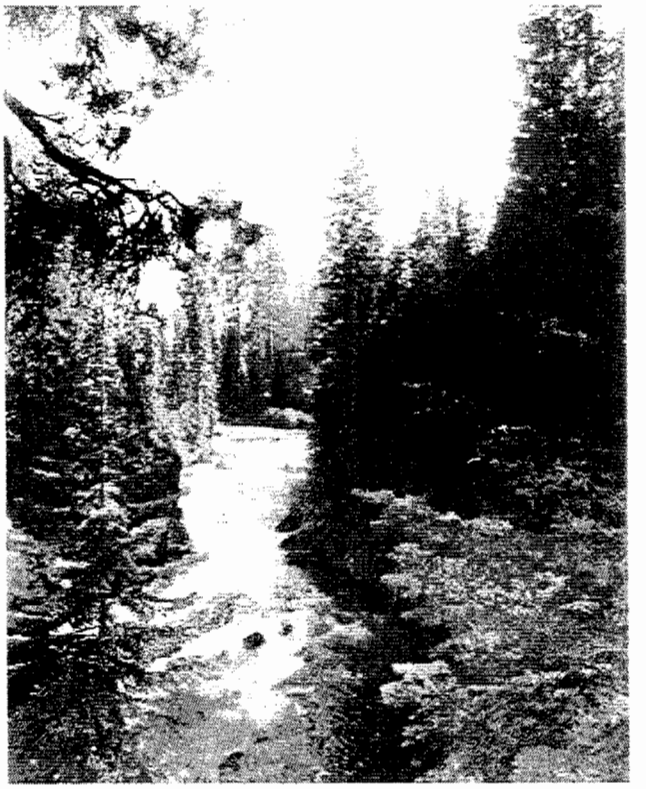
The updated CWSP includes a new section dealing with Groundwater Quality and Quantity Monitoring. The new Pierce County Comprehensive Plan contains policies which direct the County to monitor the effectiveness of that plan over time. The monitoring is to be accomplished by checking several parameters identified as indicators of environmental and economic health. The provision of adequate amounts of potable water for residential, commercial and industrial growth is of paramount importance to the quality of life in Pierce County. The monitoring program proposed in this CWSP includes a description of existing information about water quality and quantity and what needs to be done to use the information. It identifies other information which should be collected and analyzed in order to understand what is occurring in terms of groundwater quality and quantity as growth occurs.

IV. CONCLUSION

The members of the WUCC believe that this update of the Coordinated Water System Plan for Pierce County, including the Regional Supplement will provide for better coordination of water systems and better planning for the wise use of the resource, than provided by the original CWSP. As Pierce County and the Puget Sound Region

continue to grow in terms of population, business and industry, the coordination of water resources between purveyors and throughout the region will become more and more important. Implementation of the policies within this CWSP, including the provision of adequate funding, will ensure that coordination and cooperation will continue to improve and the most efficient use of the water resource will occur.

Section IV



Water Utility Service Areas

SECTION IV

WATER UTILITY SERVICE AREAS

I. INTRODUCTION

The "Public Water System Coordination Act" RCW 70.116 requires that a procedure be established to identify the existing and future service areas of public water purveyors within the "Critical Water Supply Service Area" (CWSSA). The establishment of service area boundaries carries with it two obligations. The first obligation is that the County and State governments recognize an identified purveyor as the responsible agency for providing all public water service within a designated area. The second obligation is that the purveyor shall assume responsibility, within its service area, for planning and implementing water system development and proper utility management. For those areas within the CWSSA which are not within any purveyor's designated service area, the Utility Service Review Procedure (USRP), gives priority to service by an adjacent purveyor, followed by a Satellite System Management Agency (SSMA), or, if neither of these is available, by a newly formed water system (Section VI).

The Coordination Act provides the legal mechanism, for municipalities and private water purveyors alike, to establish an exclusive service area within the unincorporated County areas. This procedure provides the purveyors with the assurance that their planning, capital improvement programs, and financial commitments are consistent with State and County requirements.

From the County's perspective, designated service areas will mean a specific purveyor has accepted responsibility for development of cost effective and efficient service to accommodate the future growth that these areas will experience. Growth management objectives established for these areas by the County's Comprehensive Plan must be accounted for in each purveyor's approved Water System Plan and actual improvements.

The Coordination Act requires that service area boundaries be established by agreement among the purveyors based on a variety of factors including: topography, readiness and ability to serve, local franchise areas, legal water system or municipal boundaries, future population projections, and sewer service areas. It also specifies that these service areas be developed in conformance with the land use policies of the County. Designated service areas include those areas in which the purveyor expects adequate customer growth, within a reasonable period of time, to support an established plan for system development.

A. Service Area Commitments and Procedures

The designated service area defines the area within which all future customers will be provided retail water service by the designated purveyor. An important distinction is that a purveyor's water facilities, such as sources of supply and reservoirs, can be located outside the purveyor's future service area. These facilities can be located within another purveyor's retail service area; provided the facilities are not used for direct retail service without the written concurrence of the designated purveyor.

Once adopted as part of this Coordinated Water System Plan (CWSP), the designated service area will be the exclusive service area of the identified purveyor, giving the purveyor first priority for serving future customers. As a condition of being granted a designated service area, the purveyor shall meet certain obligations and commitments, as described in the following:

1. Water System Plan and Service Area Agreement

SA-Policy 1 **In order to identify policies and commitments for specific improvements, an expanding water system or SSMA is required to prepare and submit to the County and the Department of Health (DOH), a Water System Plan, pursuant to WAC 246-290 and 293. Assignment of the service area to the purveyor is conditioned upon approval of the Water System Plan. The Plan must identify the service area boundaries based on agreements with adjacent water purveyors (See Subsection IV - Interlocal Agreements - below).**

SA-Policy 2 **Prior to approval by DOH of the Water System Plan, the purveyor shall have exclusive service rights only to its existing service area, as defined in Subsection III-B below. In this case, service outside of the purveyor's existing service area will be assigned, according to the USRP (Section VI), as though located in an undesignated area.**

SA-Policy 3 **Once a Water System Plan is approved by DOH and service area agreements are in effect, the service area will be assigned to that purveyor. If, at any time, DOH determines that the purveyor has failed to comply with the standards or provisions of its Water System Plan, the designated service area may be revised or revoked based on the test of timeliness and reasonableness.**

2. Conditions of Service by Designated Purveyor

Water service can be provided by the designated purveyor either through direct connection to the purveyor's existing water system, or as a detached satellite system. In either case, the following policy applies.

SA-Policy 4 The purveyor will identify for the applicant all of the conditions of service which must be agreed to prior to the provision of water service. These conditions would include engineering, financial, managerial, or other requirements deemed appropriate by the purveyor. The Coordination Act requires that the purveyor be willing to extend service in a timely and reasonable manner. Once the applicant agrees to these conditions, a building permit or preliminary permit review may continue.

Certain conditions of service which are not technically related to the provision of service may be imposed under the sole discretion of the purveyor. An example of this would be a municipal utility which requires annexation prior to provision of service. In such a case, the applicant may be required either to annex or agree not to oppose future annexation in order to receive service. Such a requirement is neither supported nor rejected by the objectives of this Plan.

3. Interim Service Agreements

A purveyor may receive a request for service within its designated service area and may not wish to provide immediate service. If this occurs, interim services by another purveyor may be arranged. These services would be provided by either an adjacent purveyor or an SSMA.

SA-Policy 5 Water services, of an interim nature, may be accomplished either through physical connection to an adjacent purveyor's system or installation of a detached satellite system. These services must be stipulated in a written agreement, which is signed by the designated purveyor and the provider of interim service, and agreed to by the applicant.

Service area adjustments are not required for provision of interim services; however, certain adjustments may be agreed to by the participating parties as a condition of service.

4. Service Area Adjustments

SA-Policy 6 Adjustments to service areas may occur if the following sequence is followed:

- **If, for any reason, water service will not be provided by the designated purveyor and interim service cannot be arranged, the applicant will be referred to adjacent purveyors.**

- **If timely and reasonable service is not available, either from an adjacent purveyor or an SSMA, service may be provided through the formation of a new independent water system.**

- **Under any of these scenarios, an adjustment to the designated purveyor's service area boundary would be required.**

SA-Policy 7 **If a purveyor determines that its service area is either too large or too small, or if a boundary change is required due to circumstances such as those discussed above, the service area boundaries can be revised. This will require the signing of interlocal agreements among the affected adjacent purveyors, and such agreements shall be filed with the County Lead Agency for incorporation in the official CWSP file.**

This process is discussed in more detail later in this section.

SA-Policy 8 **This CWSP must be reviewed by the Water Utility Coordinating Committee (WUCC) at a minimum of every 5 years and updated as necessary. Future service areas adopted in this Plan may be revised at that time, if such revisions are considered appropriate by the purveyors concerned.**

While service area boundary revisions may occur at any time following the completion of this CWSP, changes must be specifically addressed during any update to the CWSP.

II. SERVICE AREA SELECTION PROCESS

A. Service Area Identification Procedures

At the beginning of the CWSP preparation (in 1982), all known Group A and Group B public water supply systems were notified of the requirements of the Coordination Act for establishment of service areas. For those purveyors already providing water service, and not wishing to expand, a good faith attempt was made to identify existing service areas.

Purveyors indicating plans for expansion were then provided a map showing the known adjacent existing service areas. These purveyors were requested to delineate a proposed future service area based upon the criteria established in WAC 246-290 and 293.

The master service area maps will be maintained by a County Lead Agency.

The maps are representative of proposed future service areas, as anticipated at the time they were created. Those area boundaries may be subject to change as time passes. The maps are therefore intended to be dynamic, and may be revised as necessary to accurately reflect service area boundaries. The procedure for these changes is contained within Subsection VI of this Section.

The Service Area Boundary Maps have been updated as a part of the Five Year CWSP update effort. Purveyors were provided with computer generated maps for them to draw their water system boundaries. Once the maps were returned with water system boundaries indicated, the information was transcribed into computer files and entered into the GIS system. Areas of non-coverage and areas of conflict were identified. When areas of conflict were identified, both water systems were sent a map showing where conflicts with adjacent purveyors existed. They were asked to resolve the conflict and respond back with the results. These updated maps are available for review at the Pierce County Department of Public Works and Utilities.

B. Existing Service Areas

At the time Pierce County was declared a CWSSA, the Coordination Act required that no new water systems be created unless no existing system was willing and able to provide service. "Existing" water systems were defined as follows:

(1) Municipal corporate boundaries,
(2) Water district boundaries,
(3) Boundary review board designated boundaries between municipalities,
(4) Parcels served by existing distribution systems or DOH approved system map, and
(5) Areas identified in water service contracts existing prior to November 8,1984.

The above understanding was verified in a letter from the WUCC to DSHS, (now DOH), dated December 7, 1983.

C. Future Service Areas

The Coordination Act defines a future service area as "a specific area for which water service is planned by a public water system, as determined by written agreement between purveyors...". It is clear from this definition that the two major requirements to establish a future service area are an approved Water System Plan and agreements with other affected purveyors.

Establishment of individual agreements among all potentially expanding water systems in Pierce County would be cumbersome. In order to accommodate the requirement, an instrument known as the Standard Interlocal Agreement was utilized in Pierce County. A discussion of the Interlocal Agreement is provided later in this Section.

To prevent curtailment of water supply development in these areas pending service area agreements, the Standard Interlocal Agreement provided for extension of new water service through an "Interim Satellite System Management" approach. While service area agreements were being negotiated, priority for service extension of new service was given to adjacent purveyors, followed by satellite system installation. Satellite system management, however, was restricted to those purveyors that had declared an interest in future service extension in the area.

This program allowed for continued growth and development, pending resolution in a reasonable time, of the future service area boundaries. After adoption of this Plan, all remaining future service area disputes will be referred to DOH for resolution according to WAC 246-290 and 293.

III. INTERLOCAL AGREEMENTS

The "Standard Interlocal Agreement" was drafted and approved by the WUCC and forwarded to the purveyors for signature. A copy is included in this Plan as "Appendix A".

The Interlocal Agreement allows for the purveyor to agree with the boundary of its service area as it is shown on the official County map. In so doing, the purveyor acknowledges adjacent water system boundaries also shown on this map, and thus avoids entering into separate agreements with each adjacent water system.

SA-Policy 9 Where understandings concerning joint service, transfer of service, or common boundaries require more specific terms than are provided in the Standard Agreement, the affected purveyors address the specific conditions in a supplemental agreement. In order for these agreements to be recognized in implementing the CWSP, the purveyors must place them on file with the County Lead Agency as an addenda to the Standard Agreement.

SA-Policy 10 To confirm designated service areas and for establishing their legal service boundary, all expanding water purveyors must complete the necessary agreement and submit it to the Department of Public Works and Utilities.

SA-Policy 11 Unless a documented health-related problem is involved, failure to submit a service area agreement shall result in denial of approval for proposed expansions and building permits within the service area. For purveyors with unresolved service area conflicts, this denial shall be limited to proposed activities within the contested service area.

SA-Policy 12 Each Interlocal Agreement will be reviewed in conjunction with individual Water System Plans. After the Interlocal Agreements have been adopted as a part of the individual Water System Plans, changes in boundary alignment and in the Interlocal Agreement require a mutual action by the involved water purveyors. The amended Interlocal Agreements must be filed at Department of Public Works and Utilities.

SA-Policy 13 Recognition of water service areas and Interlocal Agreements by the County will be incorporated into the County utility franchise process by revising the franchise boundaries, if necessary, to coincide with the designated water service area boundaries.

SA-Policy 14 The Boundary Review Board shall be formally notified of designated service areas and any future amendments to service area boundaries.

IV. UNRESOLVED SERVICE AREAS

Designated Service Areas and Interlocal Agreements that have been submitted are shown in Table IV-1. Attempts have been made to resolve conflicts that have been identified.

The Coordination Act provides for a mediation procedure to resolve contested areas at the local level. The procedure specifies that if there are any contested service areas which are not resolved within 1 year of the establishment of the External Boundary, DOH must conduct a public hearing in regard to the unresolved service area. At the termination of that hearing, DOH may either establish a service area line or impose a moratorium on new water service extensions to a "Contested Service Area" pending resolution of that conflict. This moratorium would be limited to the area in question and is not extended to the entire service area of the purveyors involved.

V. SERVICE AREA BOUNDARY CHANGE PROCEDURE

SA-Policy 15 Changes in water service area boundaries will occur when a purveyor(s) wishes to expand or reduce their service area(s) and will be approved only if a new conflict in service areas is not created by the modification.

SA-Policy 16 A revised Interlocal Agreement will be required of utilities requesting boundary changes.

SA-Policy 17 The lead agency will review all requested adjustments in service area boundaries to ensure that utility service is consistent with the CWSP objectives. The lead agency may approve, without WUCC review, adjustments in service area boundaries when two, or more, water systems agree to an exchange of service area. All other service area boundary requests will be reviewed by the WUCC. The lead agency will maintain and incorporate all approved boundary changes on the County's official service area maps, and forward these changes to DOH, the Pierce County Development Center, Planning and Land Services, the Fire Prevention Bureau, and the Building Division. These boundary changes will be integrated into the USRP described in Section VI.

SA-Policy 18 The realignment of service area boundaries will require an amendment to the purveyors' Water System Plans.

VI. WATER SYSTEM PLAN REVIEW PROCEDURE

The "Public Water System Coordination Act" (Chapter 70.116 RCW) requires that each purveyor within the external boundaries of a Critical Water Supply Service Area develop a Water System Plan for its service area. The boundaries of such service areas must be established in accordance with provisions of RCW 70.116.070.

An exemption is provided for non-municipally owned public water systems that were in existence as of September 21, 1977, have no plans for service beyond their existing service area, and meet the minimum water quality and pressure design criteria established by the State Board of Health. However, should the county legislative authority permit a change in development that will increase the demand for water service from an exempt water system beyond the system's ability to provide minimum levels of service, the water system must develop a Water System Plan.

The Washington State Department of Health is responsible for Water System Plan approval. However, there are a number of plan review functions which are within the purview of local government. Prior to Department of Health approval, plans must be reviewed by appropriate agencies of local government to ensure that they:

- Are consistent with local growth management plans and development policies,
- Recognize all applicable water resource plans, water quality plans, and water pollution plans that have been adopted by units of local government,
- Meet the requirements of adopted local fire protection standards, and
- Include a Wellhead Protection Program consistent with local provisions for such programs.

In order to expedite local review of Water System Plans, the following process has been established. Prior to submittal to the Washington Department of Health, a purveyor will submit four copies of its Water System Plan to the Pierce County Department of Public Works and Utilities, Water Programs Division. The Pierce County Department of Public Works and Utilities will distribute one copy each to the Pierce County Planning and Land Services Department, Pierce County Fire Marshal, and Tacoma-Pierce County Health Department. Each of the aforementioned county agencies will be assigned responsibility for review of specific elements of the Plan to determine consistency with local plans, ordinances, and standards.

The Pierce County Public Works and Utilities Department with assistance from the Planning and Land Services Department will review the Water System Plan to determine whether:

- The planning area coincides with the service area boundaries established for the water system under the Pierce County Coordinated Water System Plan;

- The Plan is consistent with the Pierce County Comprehensive Plan, the county's Growth Management Policies, and any other applicable plans or policies; and

- The projections for service area growth, upon which future water demand forecasts are based, are consistent with those generated by Pierce County as part of efforts to develop its Comprehensive Plan;

In addition, in the case of water districts the Water System Plan must meet the approval process as outlined in RCW 57.16.010.

To avoid potential redundancy in review procedures, the Washington State Department of Health will enter into a memorandum of agreement with the Pierce County Public Works and Utilities Department concerning responsibilities for review of Water System Plans for availability of water resources and adequacy of water rights.

The Pierce County Fire Marshal will review the Plan for determination of compliance with the Pierce County Fire Flow Ordinance.

The Tacoma-Pierce County Health Department will review the Wellhead Protection Program component of the Plan to determine consistency with Wellhead Protection Program standards developed by the health department and the Pierce County Regional Water Association. This review will include a determination of whether:

- Wellhead Protection Area delineation maps and methodology documentation have been submitted;

- Wellhead Protection Program contaminant source inventories have been completed and documented in accordance with inventory procedures developed by the Tacoma-Pierce County Health Department;

- Contaminant source owner/operator notification requirements been met; and

- Hazardous material spill response coordination has occurred.

The Washington State Department of Health will amend its Joint Plan of Operation with the Tacoma-Pierce County Health Department to ensure that review of Wellhead Protection Program components of Water System Plans by the Tacoma-Pierce County Health Department will not overlap with state review.

The Pierce County Fire Marshal and the Tacoma-Pierce County Health Department will notify the Public Works and Utilities Department of any deficiencies in the Plan concerning fire flow requirements or Wellhead Protection Program provisions respectively. The Pierce County Public Works and Utilities Department will incorporate responses from the health department, Fire Marshal, and Planning and Land Services Department as part of a preliminary staff report.

The preliminary staff report will indicate that either:

- The Plan is consistent with the Pierce County Coordinated Water System Plan, the Pierce County Comprehensive Plan, applicable community plans, the Fire Flow Ordinance, and Wellhead Protection Program standards;

- The Plan is inconsistent with one or more of the aforementioned plans, ordinances, or standards and the nature of the inconsistency(s) will be specified in the report, or

- The Plan is consistent with the aforementioned plans, ordinances, or standards, PROVIDED, additional resources are obtained through new water rights, interties, and/or other methods to meet demand forecasts. The purveyor will be requested to carefully consider the limits of currently secured water resources and the extent of existing obligations (e.g., outstanding certificates of water availability) before issuing any new certificates of water availability.

The purveyor will be given an opportunity to review the preliminary staff report prior to its finalization. This will afford the purveyor an opportunity to provide the Pierce County Public Works and Utilities Department with supplemental information, or to prepare amendments, as needed to achieve consistency with county plans, ordinances, and standards, and re-submit the Plan. The Pierce County Public Works and Utilities Department will incorporate such supplemental information or Plan amendments into a final staff report. The Public Works and Utilities Department will summarize the staff report in a letter to DOH which the purveyor will attach to the Plan when it is submitted to the Washington Department of Health.

Should the purveyor not concur with the staff report, the purveyor can request that the WUCC review the staff report. Should the WUCC not concur with the staff report, the Pierce County Public Works and Utilities Department will collaborate with the committee in an attempt to resolve issues of non-concurrence. If, after concerted effort,

concurrence is not reached, the staff report together with the statement of non-concurrence from the WUCC will be submitted to the Washington Department of Health.

Should the WUCC concur with the staff report, the Public Works and Utilities Department will provide the purveyor with a letter summarizing the staff report. The purveyor will attach this letter to the Water System Plan when it is submitted to the Washington Department of Health for review.

TABLE IV-1

Service Area Agreements and Conflicts
Pierce County Water Purveyors

(Agreements and their status may be obtained from the Lead Agency)

Section V

Water Utility Minimum Standards and Specifications

SECTION V

WATER UTILITY
MINIMUM STANDARDS AND SPECIFICATIONS

I. INTRODUCTION

This Section of the Coordinated Water System Plan (CWSP) provides a set of design and performance policies which are adopted as minimum standards for new and expanding water purveyors operating in unincorporated Pierce County. Subsection II details the application of the minimum standards for water utility planning and construction. The design standards are included in Pierce County Code Chapter 19B.130 entitled "Pierce County Coordinated Water System Plan Minimum Standards and Specifications for Public Water System Planning, Design, and Construction. In terms of requirements for fire flows and minimum standards for water mains and fire hydrants Chapters 15.12 and 15.40 of the Pierce County Code contain those standards. These standards do not supersede any other legally constituted and applicable standards that are more stringent.

The minimum standards and specifications are for public water system planning, design, and construction for a purveyor's plan to serve a given area with an adequate level of service which will provide for the health and safety of water system customers. They are approved by the Washington State Department of Health (DOH). The specifications are also intended to provide compatibility between water system infrastructure of adjacent water purveyors. Purveyors are to design their systems to provide a level of service adequate for the expected land use of the area over the following 20-year period.

II. APPLICATION OF STANDARDS

A. Utility Plans and County Land Use Plan

The design standards are intended to provide for minimum levels of service, especially fire flow, required for different land use designations.

MS-POLICY 1 Within the designated service area of a purveyor, new facilities shall be designed and installed according to the minimum design standards adopted by the purveyor. The purveyor may adopt the minimum standards as adopted in Chapters 19.70, 15.12 and 15.40 of the Pierce County Code, or may adopt more stringent standards.

MS-POLICY 2 Land use designations shall be those identified in the adopted Pierce County Comprehensive Land Use Plan and implementation ordinances.

MS-POLICY 3 Purveyors shall meet water system planning requirements using applicable land use designations for their service area when installing capital improvements. Identification of land use designations shall be coordinated by the purveyor with Pierce County Planning and Land Services (PALS) or municipal planning agency if within the limits of a city or town. Such designations shall be identified in the purveyor's plan, and shall be used to establish design requirements.

MS-POLICY 4 The purveyor shall prepare a plan and a program of capital improvements needed to provide the anticipated level of service in each land use area. When the purveyor is requested to provide additional water service, it will identify the planned capital facilities, as well as other installations, which are necessary to provide the service requested. As growth occurs, the full level of water service will eventually be provided throughout the service area of the purveyor in a planned, phased program which meets County requirements and minimizes overall cost to the customers.

The minimum standards described in Chapters 19.70, 15.12 and 15.40 of the Pierce County Code do not apply to municipalities insofar as service within corporate boundaries is concerned. However, it is expected that municipalities will adopt (or have adopted) design standards at least equal to those in Pierce County Code.

MS-POLICY 5 If municipalities extend new water service to customers outside of the city limits, the design standards adopted by the municipality for service in the unincorporated area must, at least, meet the minimum standards of Chapters 19.70, 15.12 and 15.40 PCC.

Minimum standards are different for rural and urban areas. Urban and rural areas are delineated in the Urban Growth Area Map described in Section II and adopted as part of the Pierce County Comprehensive Land Use Plan. The Urban Growth Area Map is available for viewing at the Department of Planning and Land Services, the Department of Public Works and Utilities, Water Resources Division, the Fire Prevention Bureau and the Tacoma-Pierce County Health Department. Copies of the map are available for the cost of duplication from the Department of Planning and Land Services.

The rural area of the County includes several land use designations, Rural Neighborhood Centers, Rural Activity Centers and Rural Gateway Communities permit a combination of low density residential and commercial uses, however, to be designated as such, they must have adequate public utility services. These areas will require adequate water system planning in

order to provide water for fire suppression and domestic service to meet the requirements of typical structures and land uses served by those public water systems. Other rural areas generally require public utility planning based on residential domestic service, but will provide water for fire suppression based upon actual land uses pursuant to Chapter 15.40 of Pierce County Code.

MS-POLICY 6 Water service in rural activity centers and rural gateway communities will be provided by a "Group A" water system or systems, if at all possible. The provision of water by new individual wells or new "Group B" water systems within these rural communities will be discouraged.

MS-POLICY 7 Urban areas are subject to design requirements based on the expected land use and development in accordance with the applicable Land Use Plan and approved Water Utility System Plan. Expected land uses shall be used to describe areas within the service area of a purveyor which shall be subject to levels of service requirements of these minimum standards.

MS-POLICY 8 The Department of Public Works and Utilities shall review all water system planning documents for conformance and consistency with the Pierce County Comprehensive Land Use Plan, as amended.

III. GENERAL PROVISIONS

A. Source Development

The following policies are intended to provide guidance in the development of new sources of water.

MS-POLICY 9 New sources of water must be designed to meet the Washington Department of Ecology (DOE) and the Washington Department of Health (DOH) regulations and design guidelines including WAC 173-160, Minimum Standards for Construction and Maintenance of Water Wells, administered by DOE and TPCHD, and WAC 246-290 and 246-293, "Rules and Regulations of the State Board of Health Regarding Public Water System", as administered by DOH.

MS-POLICY 10 All test and production wells must be drilled in accordance with detailed drilling and testing specifications in WAC 173-160.

B. Water Rights

MS-POLICY 11 Water rights must be obtained in accordance with DOE regulations and procedures, and copies of water rights documents, correspondence, and other records are to be maintained on file with the purveyor.

C. Water Quality

MS-POLICY 12 Water quality must be proven to conform with DOH criteria specified in WAC246-290 and 246-293 and/or any additional requirements more stringently applied by the TPCHD.

D. General Design Specifications

MS-POLICY 13 Except as otherwise superseded in these standards, water system design, installation, modification, and operation, is subject to the "Rules and Regulations of the State Board of Health Regarding Public Water Systems," WAC 246-290.

E. General Material Specifications And Construction Standards

Construction within incorporated areas remains subject to municipal permitting requirements. All requirements of the permit shall become part of these specifications.

MS-POLICY 14 Selection of materials and construction of water system facilities in Pierce County shall conform to the following, at a minimum:

FOR DISTRIBUTION FACILITIES EQUAL TO OR GREATER THAN FOUR INCHES IN DIAMETER;

1. **Applicable County or municipal ordinance(s), and**
2. **"Standard Specifications for Road, Bridge, and Municipal Construction", Washington State Department of Transportation APWA, Most Current Edition(DOT/APWA), or**
3. **Standards of the American Water Works Association (AWWA).**
4. **Polyvinyl-Chloride pipe meeting the requirements of ASTM 2241, with a maximum standard dimension ratio of 21.**

FOR DISTRIBUTION FACILITIES LESS THAN FOUR INCHES IN DIAMETER;

1. **Applicable County or municipal ordinance(s), and, if applicable,**
2. **"Standard Specifications for Road, Bridge, and Municipal Construction", Washington State Department of Transportation APWA, Most Current Edition (DOT/APWA), or**
3. **Standards of the American Water Works Association (AWWA).**

MS-POLICY 15 **Along County road rights-of-way in unincorporated areas, a purveyor must obtain a franchise to place or repair infrastructure within the right-of-way. The purveyor must also obtain a County right of way permit for each individual project within the right-of-way prior to construction.**

F. Hydrostatic Pressure Test

MS-POLICY 16 **A hydrostatic pressure leakage test will be conducted on all newly constructed water mains, fire lines, fire hydrant leads and stubouts in accordance with DOT/APWA Section 7-11.3(11) or AWWA C-600 specifications.**

G. Disinfection and Bacteriological Testing

MS-POLICY 17 **All pipe, reservoirs, and appurtenances shall be flushed and disinfected in accordance with the standards of the DOH, WAC 246-290 and 293.**

H. Auxiliary Power/Emergency Planning

MS-POLICY 18 **All source and booster pumping facilities required for maintaining an average day supply of water in an emergency shall be equipped with auxiliary power or with power pigtail and manual transfer switching devices. Contingency plans for working toward providing water during emergency situations shall be included in individual water system plans. Purveyors should include in their water system plans provisions for education their customers about the proper steps to take, concerning water use, in emergency situations. The education should include ways to operate a household on a minimal amount of water.**

I. Utility Interties

MS-POLICY 19 **When planning for installation of capital facilities, specific locations, size, and alignment of major water lines, utilities should incorporate the consideration and coordination of emergency interties with adjacent water utilities.**

J. Flow Measurement

MS-POLICY 20 All service lines shall be installed so that each residential, commercial, and industrial structure will have a separate metered service for domestic water received from the purveyor. If approved by the water purveyor, domestic water consumption may be measured by a master meter for service to a complex, under single ownership, and where water utility line subdivision is impractical. Service lines providing fire flow may be required by the purveyor to be equipped with a detector meter.

MS-POLICY 21 All new groundwater sources shall be provided with devices for measurement of depth to water and total production. Installation of these devices is also recommended for existing groundwater sources. All new sources for which water treatment is included shall be provided with flow measurement.

K. Cross Connection Control

MS-POLICY 22 Where the possibility of contamination of the supply exists, water services shall be equipped with appropriate cross connection control devices in accordance with WAC 246-290 and 246-293. The designated purveyor and appropriate building official should determine the need, size, kind and location of cross-connection control devices following the specifications in the Uniform Plumbing Code and the most current edition of the Cross-Connection Control Manual by the Pacific Northwest Section of the AWWA.

IV. SPECIFIC PROVISIONS

MS-POLICY 23 The minimum standards adopted in Chapter 19.70 of the Pierce County Code shall include provisions for the following, at a minimum:

A. Pressure Requirement
B. Pipe Sizing
C. Isolation Valving
D. Air and Air-Vacuum Relief Valves
E. Blow-off Valves

F. Storage requirements based upon three components:
(1) Equalizing Storage, required to supplement production from water sources during high demand periods,
(2) Standby Storage, required as backup supply in case the largest source is out of service, and
(3) Fire Storage, required in order to deliver the level of fire flow service identified in the purveyor's approved plan.
G. General Facility Placement
H. Pipe Cover
I. Separation Distances

MS-POLICY 24 The minimum standards adopted in Chapter 15.40 of the Pierce County Code shall include provisions for the following, at a minimum:

A. Fire Hydrants
B. Fire Hydrant Location
C. Fire Flow Requirements including Minimum Duration
D. Maintenance of Fire Protection Facilities
E. Water Main Sizing to Provide Fire Flows
F. Fire Flow Requirements including Minimum Duration, based on land use designations as identified in the Pierce County Comprehensive Land Use Plan.

V. STANDARDS REVIEW SUBCOMMITTEE

Minimum standards need to be continuously reviewed and updated to remain current with changing Federal and State requirements. The review of minimum standards should occur more frequently than the established five-year update of the Coordinated Water System Plan.

MS-POLICY 25 The Standards Review Subcommittee shall be established by the WUCC and shall convene at least annually to review these standards and their implementation. The Subcommittee shall seek input from the Pierce County Fire Prevention Bureau and the fire districts in matters related to fire protection standards. Recommendations of the Standards Review Committee shall be submitted to the WUCC and, if recommended revisions are approved, they shall be forwarded to the County Executive and County Council for review and adoption as part of the annual Comprehensive Plan review.

Section VI

Utility Service Review Procedure

SECTION VI

UTILITY SERVICE REVIEW PROCEDURE

I. INTRODUCTION

This Coordinated Water System Plan (CWSP) establishes a set of administrative procedures, water resource policies, and growth objectives of Pierce County water purveyors. The procedures are to guide local officials, citizens, developers, and state and federal regulatory agencies in identifying the necessary facilities for providing an adequate water service.

The "Public Water System Coordination Act" requires that no new public water system be established within Pierce County unless it is determined that existing purveyors are unable to provide the service. This section presents the administrative procedures for reviewing applications for public water supply development in Pierce County, in order to identify existing purveyors who are willing and able to extend this new water service. The procedures are based upon the regulations (WAC 246-290 and 293) of the Washington Department of Health (DOH) and County procedures necessary to comply with the Coordination Act.

II. UTILITY SERVICE REVIEW PROCEDURE

The Utility Service Review Procedure (USRP) applies to all proposed land use activities requiring approval by the County, including formal subdivisions, large lot divisions, short subdivisions, land use permits and approvals, and the issuance of building permits. At the time an application is submitted for permits or approvals, or upon request, and payment of appropriate fees, the Pierce County Department of Planning and Land Services (PALS) will initiate the review procedure. They will coordinate the review before the issuance of any approvals. Flow charts indicating the steps to be followed in the USRP are provided as Figures VI-1, VI-2, and VI-3.

US-POLICY 1 **Water service requests occurring within the service area of a purveyor that has not completed either its individual water system plan or its Interlocal Agreement will be treated as occurring outside of the purveyor's designated service area. The purveyor will then be among the "adjacent" purveyors to which the applicant will be referred.**

US-POLICY 2 **Interlocal Agreements (see Section IV) related to service area boundaries will be required prior to approval of water service to new developments.**

A. Service Area Assignment

The USRP procedures are intended to identify an existing water purveyor willing and able to provide water supply facilities and to include the new development within its service area. In effect, the result of the USRP is to assign the proposed new development or land use to the service area of a specific water purveyor. The service area assignment can take place as one of the following types, in order of priority:

(1) The proposed development is within the approved future service area of a purveyor, and that purveyor will contract to install a water system, either by direct connection to existing supply mains or a satellite system;

(2) The proposed development is within the approved future service area of a purveyor. However, interim service will be provided by another adjacent purveyor or a Satellite System Management Agency (SSMA), as provided by an agreement between those purveyors;

(3) The proposed development is outside of approved future service areas and service will be provided by an adjacent purveyor, with the appropriate service area adjustments;

(4) The proposed development is outside of approved future service areas and service will be provided by an SSMA; or

(5) If none of the above options are available, a new water system may be created, along with the necessary service area adjustments and planning requirements.

B. Land Use Proposals in Conformance with the County Comprehensive Plan

When development applications conform with the Comprehensive Land Use Plan and development regulations, the USRP will generally follow the sequential steps outlined in Figures VI-1, VI-2 and VI-3. This procedure is described by the following:

(1) The Department of Planning and Land Services (PALS) will coordinate review of all land use applications received. PALS will be responsible for ensuring compliance with the Comprehensive Land Use Plan and appropriate land use regulations. Upon determination of appropriate land use designation, the Building Division will review building requests for conformance with the appropriate building codes. Where a designated water purveyor has not been determined for a development, PALS will notify the Tacoma Pierce County Health Department (TPCHD) to initiate the USRP.

(2) Outside of incorporated areas, development projects that require water service from a public water system will be referred to the TPCHD which will maintain current records of approved water system plans and designated service areas. The TPCHD will review the proposed water service request, and will refer the applicant to a designated purveyor, adjacent purveyors, or SSMAs, as outlined in the steps below. If requested, the outcome of the TPCHD determination may be provided in a Preliminary Service Designation Report.

US-POLICY 3 When new water service is requested of a water purveyor within its designated service area, the purveyor shall specify its intent to implement one of the following options:

(a) The purveyor will provide direct service to the development by physical extension of existing mains and supply; or

(b) A temporary satellite water system will be installed within the purveyor's existing service area, which is expected to be interconnected with the purveyor's existing system within a reasonable period of time. The developer and purveyor shall enter into a legal contract which establishes the purveyor's responsibility for providing or arranging for the appropriate level of managerial and operational functions until the two systems are interconnected. Temporary service may be provided by an adjacent purveyor or an SSMA (see Section VII) if a contract is negotiated with the designated purveyor prior to permit approval.

US-POLICY 4 When it is determined that the new water service will not be provided by an existing purveyor within its designated service area, the TPCHD will refer the applicant to existing purveyors in the vicinity of the proposed development. An adjacent purveyor may decide to expand its service area to serve the applicant. Appropriate modifications to the designated service area maps and water system plan will then be completed by the purveyor. See Section III for the process for approval of expansion and modification or amendment of a water system plan.

US-POLICY 5 If adjacent purveyors decline to serve the applicant, the TPCHD will refer the applicant to a list of prequalified SSMAs (Section VII). The applicant is responsible for contacting the SSMAs and negotiating conditions of service.

US-POLICY 6 If no existing purveyor is able to provide water service in a timely and reasonable manner, the establishment of a new water system may be approved. It shall be the burden of the applicant to provide documentation, if requested by TPCHD, of correspondence with existing purveyors and justification for formation of the new water system.

US-POLICY 7 Once a water purveyor providing service has been determined, the proposed project must be reviewed with that purveyor to identify the engineering, financial, managerial, and other requirements of service. Fire flow requirements for the proposed project will be determined by the Pierce County Code Chapters 15.12 and 15.40. The water purveyor will have operational and managerial responsibility for the proposed activity, and that purveyor's approved plan may require more stringent standards than the minimum standards adopted by the County.

If the applicant accepts the conditions of service prescribed by the water purveyor or an SSMA, the purveyor shall provide to the applicant a signed certificate of water availability prior to Pierce County's issuance of the required approval/permit.

If the applicant and purveyor are unable to agree on conditions of service, a request may be submitted for review by the Water Utility Coordinating Committee (WUCC) Dispute Resolution Process (see Section II). Such a request may be initiated by either the applicant, the purveyor, or the County and will be coordinated by a lead agency designated by the County Executive. The Dispute Resolution Process is limited to determining whether provision of water service by a water purveyor is "timely and reasonable". See the Dispute Resolution Process in Section II.

US-POLICY 8 Prior to approval of final plat the water facilities are to be installed or bonded for completion to meet all applicable standards, and prior to issuance of a building permit, to be installed and approved. After the preliminary plat or other land use permits are approved, but prior to the application for a building permit, a written contract shall be developed between the purveyor and the applicant to formalize the conditions of service and responsibilities.

C. Land Use Proposals Which Require Amendment of the County Comprehensive Plan

If a development proposal requires a zoning change or an amendment to the County Comprehensive Land Use Plan, the effect of such a change must be evaluated in regard to its economic effect upon utility services before implementing the USRP. Since the water purveyor's planning is based upon the existing Land Use Plan, there may be significant additional capital improvements required by proposed land use changes. By identifying new or additional utility costs associated with changes in land use or zoning, these costs of development can be integrated into the decision making process. This will allow the assignment of these costs to customers benefiting from the land use change.

US-POLICY 9 Each affected purveyor should be contacted by Pierce County Planning and Land Services (PALS) and allowed to comment on applications which propose land use changes within their service area prior to approval of that change.

III. SPECIAL REVIEW CONSIDERATIONS

A. Review of Construction Plans by Pierce County Fire Prevention Bureau

Construction plans for water facilities are required by current ordinance to be submitted to the Pierce County Fire Prevention Bureau for approval.

US-POLICY 10 Before issuing any approval based on fire protection requirements, the Fire Prevention Bureau shall notify the designated water purveyor if TPCHD or DOH review is required. Either TPCHD or DOH must review and approve new sources of supply, pumping stations, transmission lines, storage tanks, and treatment facilities. Distribution system line extensions shall be approved by DOH, if there is no approved water system plan. The Fire Prevention Bureau's approval will then be held in abeyance until notified of approval by TPCHD or DOH.

US-POLICY 11 Interconnection between the public and private water system must also be monitored to prevent cross-connections and possible contamination.

B. New Public Water Systems - Limited

US-POLICY 12 The establishment of new public water systems is discouraged if an existing water system is capable and willing to provide the service.

The procedures which have been developed for reviewing and approving new water systems are incorporated into the USRP previously described in this Section. As identified in the USRP, the creation of a new water system would be the last service alternative utilized.

US-POLICY 13 Special consideration is required for the expansion of small systems both inside and outside designated service areas. These issues are addressed below:

(a) Expansion Outside Designated Service Areas
Expanding "Group B" systems located outside of designated service areas of existing purveyors will be referred by the TPCHD to prequalified SSMAs for technical assistance. This would allow the expanding purveyor to discuss and evaluate utility service proposals by an SSMA versus expansion of their system to an independent "Group A" status. If the decision is made to pursue expansion to a "Group A" status, the system must establish its future service area

and submit, to the County lead agency and DOH, a completed service area agreement and documentation of its plan for system development.

(b) Expansion Within Designated Service Areas
Expansion of an existing smaller purveyor located within a designated utility service area will not be allowed without approval by the larger purveyor. The CWSP places responsibility on the review agencies to recognize a specific purveyor's service area; and, in turn, the purveyor is responsible for effective management within that service area.

Figure VI-1

PIERCE COUNTY
Utility Service Review for Subdivisions and Mobile Home Parks

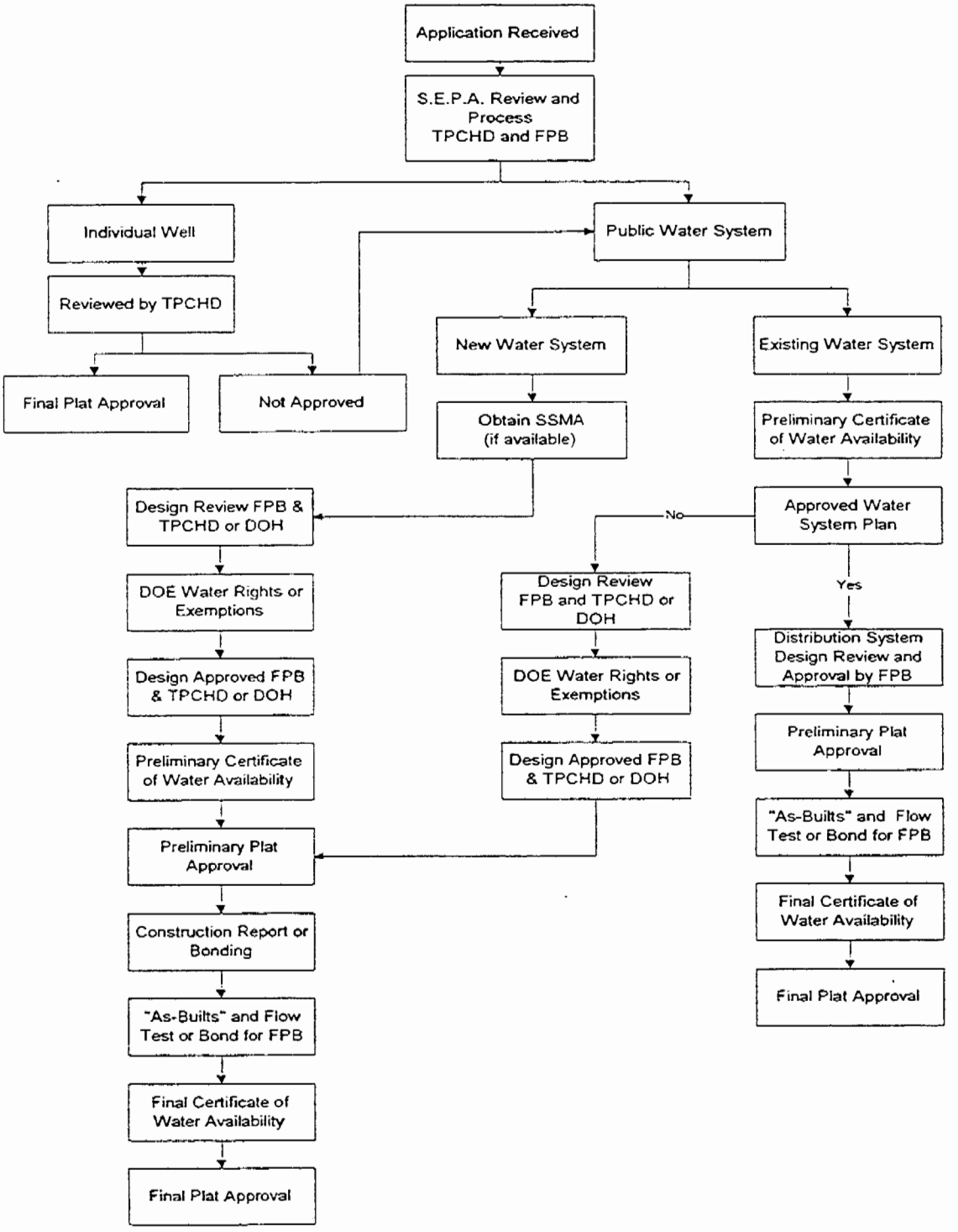


Figure VI–2

PIERCE COUNTY
Utility Service Review for Short Plats and Large Lots up to Four Lots

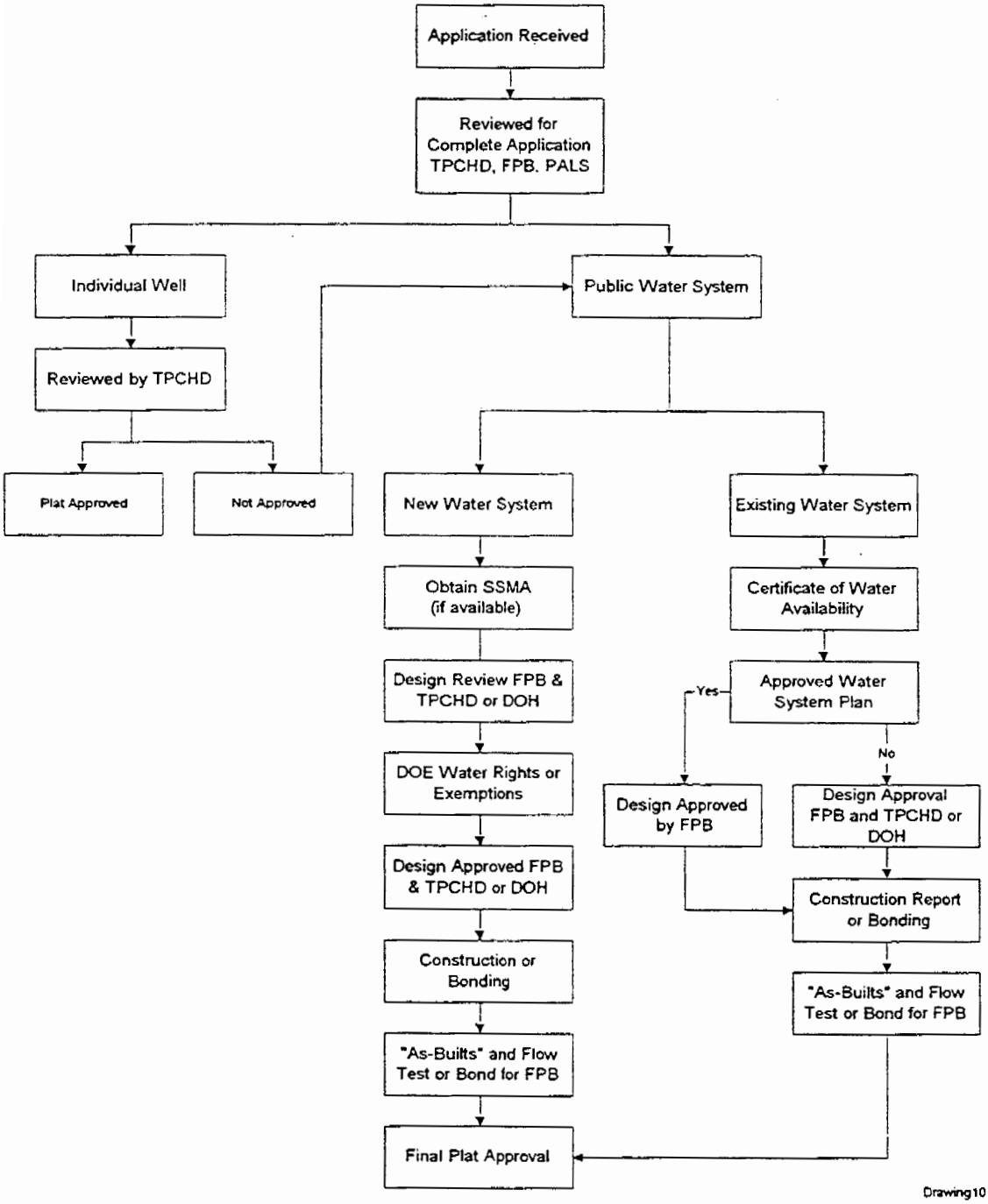
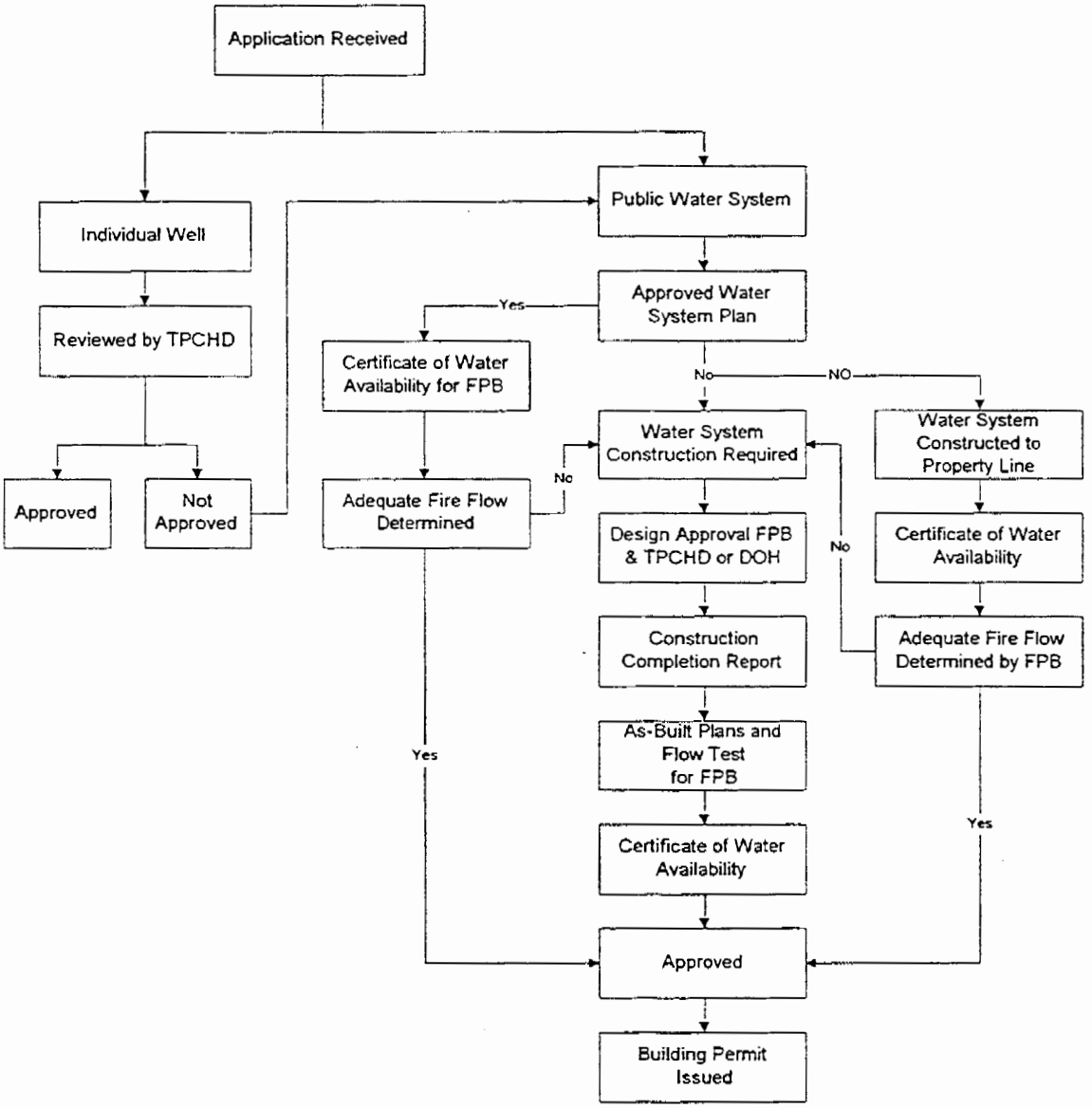


Figure VI–3

PIERCE COUNTY
Utility Service Review Procedure for Application for Building Permit



Drawing8

Section VII

Satellite System Management Program

SECTION VII

SATELLITE SYSTEM MANAGEMENT PROGRAM

I. INTRODUCTION

As part of the update of the "Coordinated Water System Plan" (CWSP) for Pierce County, water purveyors have identified and agreed upon existing and future water service areas. The identification of water service areas is important to ensuring that water purveyors are able to adequately plan for the development of capital facilities and for the provision of sufficient water to serve development expected to occur within their service areas. The development of water system plans, by water purveyors, provides DOH and Pierce County with the assurance that purveyors have the resources necessary to provide water within their identified water service areas. Water service areas, extending beyond areas currently being served by a water purveyor, are not recognized by Pierce County or DOH unless and until the purveyor prepares a water system plan covering those proposed service areas and the plan is approved by DOH.

Within the Urban Growth Area of the County there are areas that are currently not claimed by any water purveyor and areas where no water system plan has been approved. If development is requested within these areas, there should be a mechanism for the provision of adequate and safe potable water. Section VI of this Plan describes the "Utility Service Review Procedure" to be used to determine which water purveyor is responsible for providing water to a new development. When development is proposed outside an area covered by an approved water system plan, a "Satellite System Management Agency" (SSMA) may provide management and operational functions for a system financed and built by the developer of the property. Such an arrangement provides the necessary expertise for proper management and operations of a public water system while meeting the requirement that no new water systems be developed within the "Urban Growth Area" unless operated by a Satellite System Management Agency.

Under the requirements of the "Growth Management Act" (RCW 36.70A) Pierce County has the responsibility to make certain that developments approved by the County have a reliable and properly maintained supply of potable water. If a water system is placed in receivership by DOH because of health concerns or inadequate management, state law (the Failing Public Water System Act of 1990 located in RCW 43.70) dictates that the County take the system over when no water purveyor is willing to assume operation of the system. According to the law, Pierce County has the responsibility because it approved the land use development.

The availability of these services should be coordinated in three categories:

A. Technical Assistance - This category includes technical or management services

provided on an occasional or temporary basis. These services may include repair, trouble shooting, on-call maintenance, construction, training, etc. Under this category, there would not be a contract, with assistance being provided on a less formal basis. The water system owners retain responsibility and liability for system operation.

B. Contract Management or Operation - Under this category, an existing water purveyor would enter into a contract with a qualified Satellite System Management Agency (SSMA) to assume responsibility for essential functions of water system operation. Among these essential functions are system development, day/night and emergency operation and maintenance, regulatory compliance, water quality monitoring, etc. An SSMA must be qualified to assume full responsibility for these functions.

C. Direct Service - This level of service is extended to both new and existing water systems. Ownership of the water system is transferred to a qualified SSMA which assumes full responsibility and liability for the system. For this to occur, capital improvements may be necessary for existing water systems, and new facilities must be built to the minimum standards identified by the satellite agency. In either case, the conditions of extending service to the satellite system shall be described in a contract entered into by the parties in the transfer.

II. POLICIES RELATING TO SATELLITE SYSTEM MANAGEMENT

SS-Policy 1 **No new public water system may be approved or created unless: (a) It is owned or operated by a satellite system management agency established under RCW 70.116.134 and the satellite system management system complies with financial viability requirements of the Washington State Department of Health; or (b) a satellite management system is not available and it is determined by DOH that the new system has sufficient management and financial resources to provide safe and reliable service.**

Owners and operators of new water systems which cannot negotiate an operation agreement with an existing SSMA may provide the necessary documentation to be recognized as a qualified SSMA. (See Subsection 5, below.)

SS-Policy 2 **Satellite water systems inside a DOH approved future service area will be operated according to the water system plan for that future service area.**

SS-Policy 3 **In areas which are not claimed by an existing water purveyor, or in areas not covered by an approved water system plan, applicants proposing developments requiring new water systems may negotiate**

with any approved satellite system management agency the ownership or operation of the water system.

SS-Policy 4 **The applicant and the SSMA are required to enter into a contract agreement which establishes the responsibilities of the SSMA and the applicant. The contract shall also contain a provision dealing with termination of the contract and the requirement that a new SSMA must be in place to operate the system before the existing contract can be terminated. Before there is a change in management or contract management, the SSMA shall notify the Pierce County Lead Agency and the Washington Department of Health.**

III. SERVICES BY SATELLITE SYSTEM MANAGEMENT AGENCIES

A vital part of coordinating effective public water supply in satellite management areas is ensuring that qualified management agencies are available for comprehensive long term service to water systems. These agencies must be committed to full time water system operations and development, with sufficient staff and equipment resources.

Existing water systems may enter into an agreement with an SSMA to provide for comprehensive water system operations and management. The SSMA must offer the capability to assume full management responsibility or ownership of existing water systems in satellite areas. By combining economies among several water systems, and by establishing a formal planning program as an expanding water system, the SSMA becomes a direct participant in meeting CWSP and County planning objectives.

The Utility Service Review Procedure (USRP), described in Section VI will be utilized to identify a purveyor designated for providing services to new developments. When a development is proposed outside of the future service area of existing water systems, and no adjacent system is available to extend service, the USRP will be invoked through the County development permit process to refer the applicant to prequalified SSMAs. Thus, utility service coordination is a part of this program.

The selection of an SSMA for direct service will be the responsibility of the applicant, and will be predicated upon the ability and willingness of the SSMA to provide cost effective service in a timely and reasonable manner. The applicant and SSMA are required to enter into a contract agreement which establishes the SSMA's responsibility and the applicant's responsibility.

IV. APPEALS AND ALTERNATIVES TO SATELLITE SYSTEM MANAGEMENT AGENCY SERVICES

The SSMA's and applicant for water service are expected to negotiate in good faith to develop an agreement to provide effective and viable water supply service. The operations program and financial program of the SSMA shall be maintained on file with the County designated lead agency, and with the Department of Health (DOH), and can be inspected by the applicant. All new facility construction as well as improvements to existing facilities, shall be in accordance with the utility's or SSMA's adopted design standards which, in turn, must meet or exceed the minimum standards adopted by Pierce County.

If the applicant and a prequalified SSMA are unable to agree on conditions of service, the matter may be referred to the Dispute Resolution Process. A discussion of the Dispute Resolution Process and its activities is presented in Section II.

V. PREQUALIFICATION OF SATELLITE SYSTEM MANAGEMENT AGENCIES

In order to assure that SSMA's providing the above services have adequate resources to meet both the current and future needs of Pierce County, a prequalification process is recommended. An agency may request prequalification as an SSMA at any time, by submitting documentation of minimum qualifications to DOH and the designated County Department. A candidate agency should supply documentation of minimum qualifications, as described below: (Note: Contract maintenance agencies are different from SSMA's in that the contract maintenance agency specializes in certain construction or maintenance services. They do not assume responsibility or liability for meeting regulatory agency water quality or operating standards. They should, however, be licensed in Pierce County or by the State to perform certain functions. The licensed maintenance contractors should submit a copy of this current license to verify their eligibility for being listed in the Lead Agency files.)

A. Documentation

Water purveyors shall submit documentation to the Lead Agency of qualifications to provide direct service for satellite system management and that they have submitted the necessary information to DOH. Prequalification requirements are listed below. An SSMA providing management or operation services for another system must have one of the first four requirements and all of the remaining requirements. An SSMA providing management and operations for its own system (a new system for which no existing SSMA will provide services) may rely on the experience of their operating personnel to meet one of the first four requirements listed below. They also must meet all of the other requirements.

1. Demonstrated current or prior ownership and/or operation of approved water system(s) of similar or greater complexity in Pierce County, provided those systems were built and maintained in accordance with applicable laws; or

2. Demonstrated current or prior ownership and/or operation of approved water system(s) of similar or greater complexity within another county, state or municipality, provided sufficient information and technical data on system design, maintenance and operation standards are submitted to allow for valid comparison with similar local systems and all applicable laws; or

3. Demonstrated experience in the design, construction, testing and maintenance of approved water system(s) of similar or greater complexity in Pierce County, provided those systems were built and maintained in accordance with all applicable laws; or

4. Demonstrated experience in the design, construction, testing and maintenance of approved water system(s) of similar or greater complexity within another county, state or municipality, provided sufficient information and technical data on system design, maintenance and operation standards are submitted to allow for valid comparison with similar local systems and all applicable laws.

5. Sufficient qualified operating personnel to assure service to customers on all systems managed. Certification of personnel shall be in accordance with DOH requirements and WAC 246-292. The required certification level shall be based upon the requirements of the largest system served.

6. A written plan delineating twenty-four hour emergency response services available to all customers. The emergency response services plan must include the method(s) proposed for actions in response to emergencies.

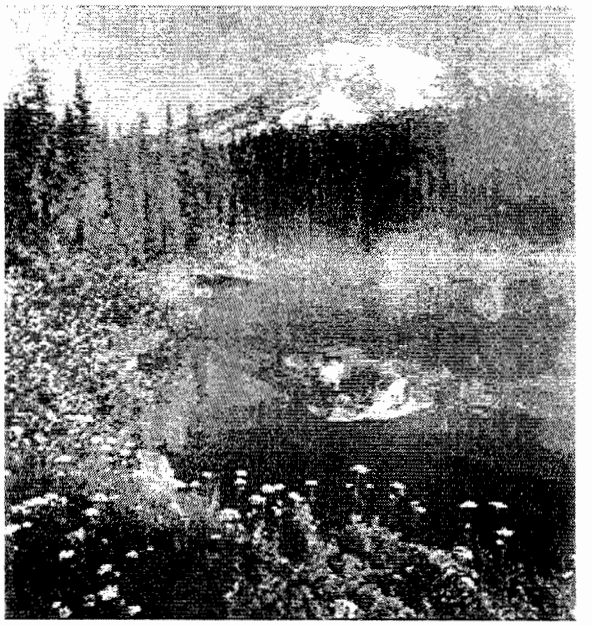
7. A written operations plan submitted for satellite system management.

8. Financial plan and capability to meet capital improvements scheduled for satellite systems.

B. Lead Agency Responsibilities

The County designated Lead Agency shall receive and record all prequalification submittals, and shall provide the applicant for new water service with a complete list of SSMA's who have submitted documentation of qualifications, as specified above. In order to maintain a prequalified status, an SSMA must submit a yearly report of water systems owned or managed, water systems whose contracts with the SSMA have lapsed or were terminated during the previous year, and water systems currently under pending departmental order from DOH or TPCHD.

Section VIII



Regional Water Supply Requirements

SECTION VIII

REGIONAL WATER SUPPLY REQUIREMENTS

I. INTRODUCTION

As the Pierce County Coordinated Water System Plan and Water General Plan, 1988, was updated in 1995, a water demand projection was prepared utilizing March 1995 Puget Sound Regional Council (PSRC) data and projections. For the 1995 water demand projection, the County was divided into eleven water use areas based on PSRC planning boundaries (Forecast Analysis Zones or FAZs). The eleven water use areas, while consistent with FAZ boundaries thereby making the disaggregation of PSRC population, households and employment to the water use areas a simple process, did not take into account individual water service boundaries.

As implementation of the 1996 Pierce County Coordinated Water System Plan has occurred, it has become apparent that a more detailed water demand forecast than was completed in 1995 would serve as a beneficial tool to assist both the County in implementing county water supply and land use management responsibilities and water purveyors in implementing water supply planning and customer service requirements. Therefore, in December of 1997, Pierce County Public Works and Utilities, Water Programs, the Lead Agency in implementing the CWSP, submitted a "Referendum 38" project proposal to the Washington State Department of Health. The project, as submitted to DOH and as supported by the Pierce County Regional Water Association, was to update the regional water demand forecast prepared in 1995 by taking into account individual water service areas of large system providing water service within the Pierce County Urban Growth Area.

Since 1990, the placement of growth within the majority of Washington State's cities, towns and counties has been guided by the Washington State Growth Management Act. The GMA requires the establishment of Urban Growth Areas in which urban level development is to occur, outside of which rural level development is to occur. Further, the GMA requires that urban level facilities be available within UGAs. Under Washington State law water systems with 1,000+ connections, or those that are expanding, are required to develop water system plans consistent with County land use plans (or for incorporated areas, city/town land use plans), coordinated water system plans and Washington State Department of Health guidelines.

It is hoped that through the coordinated effort of preparing a more detailed water demand forecast for Pierce County based on GMA land use plans and DOH guidelines, the County and its UGA water purveyors will be able to cooperatively identify possible trouble spots and work to resolve water supply concurrency issues before they become a crisis.

The methodology used in preparing this forecast is consistent with the water demand forecasting methods for Regional Water System Plans specified by the Washington State Departments of Ecology and Health in their publication entitled Conservation Planning Requirements: Guidelines and Requirements for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology, and Conservation Programs dated March 1994. Also, as discussed later in this section, population and employment data consistent with the County's (and City or Town) Growth Management Plan have been used in preparing this forecast of future water demand.

In order to assist purveyors in planning for growth for which revised water demand projections were not prepared, the 1995 water demand forecast is incorporated into the CWSP as "Appendix E".

II. FORECAST METHODOLOGY

The purpose of developing this water demand forecast for Pierce County is to provide a framework so that system improvements and new supply resources can be anticipated and planned for on a timely basis. The following paragraphs describe the general methodology used in preparing this water demand projection for the County. "Appendix D", Pierce County Coordinated Water System Plan Water Demand Update Project, Methodology and Background Report, should be referred to for additional details.

A. Historical water demand data for various water suppliers in Pierce County were identified and collected. The information included the development of detailed data requests identifying historical consumption and demand levels by customer class, water use characterizations, estimated water savings from conservation programs already implemented, service area population and household data

B. A historical database of water demands, operational data, and planning information were developed for individual water systems in Pierce County to be used in the analysis, including:

   1. Historical water usage data.
   2. Estimates of future water savings through conservation, including the projected impacts from recently enacted plumbing code changes.
   3. Base year population and employment estimates derived by County staff for the individual water service areas and for the County.
   4. Projected population and employment data derived by County staff based on projections from the Puget Sound Regional Council (PSRC) for the individual water service areas and for the County
   5. Projected maximum buildout data derived by County staff based on the County's GMA planning efforts for the individual water service areas.
   6. Projection of future water demand scenarios for base and high growth

alternatives for the years 2005, 2010, 2020 and maximum buildout consistent with the County derived population and employment projections.

7. Summarizing the resulting water demand projection for both the individual water service areas and the County.

C. Utility operating records and data collected from Tacoma Public Utilities and 22 other water purveyors in Pierce County were used in preparing this forecast. Included in the data collection activities was development of usage data by customer class, per capita, per employee, per single family household and per multi family household usage estimates, and assessment of conservation savings from water purveyors.

D. The data from the water purveyors were used to identify historical 1997 water usage in Pierce County and to estimate water use for the individual water service areas.

E. Base year, 1997, estimates of population, households and employment for Pierce County and the individual water service areas were developed by County staff using Pierce County Assessor-Treasurer data, Washington State Employment Security Department point level employment records and data provided by the purveyors. "Appendix D" details the methodology the County used to develop the base year estimates. See Tables VIII-1 (Base Case and High Case), VIII-2, VIII-3 and VIII-4 for Base Year Projections.

F. Year 2010 and 2020 population and household projections for Pierce County and the individual water service areas were developed by County staff using PSRC data and projections dated December, 1998, water system plans, jurisdictions' GMA plans and County land use designations. Because the PSRC prepares projections in 10-year time increments, year 2005 population and household projections were based on a straight-line projection from year 1997 to 2010. For the majority of systems, the PSRC allocation for employment as disaggregated to service areas by County staff, year 2020, was used. Year 2005 and 2010 employment projections were then derived from a straight-line projection from year 1997 to 2020. "Appendix D" details the methodology the County used to develop the population, household and employment projections. See Tables VIII-1 (Base Case and High Case), VIII-2, VIII-3 and VIII-4 for year 2005, 2010 and 2020 Projections.

G. Maximum buildout projections for Pierce County and the individual water service areas were developed by County staff using County land use designations, jurisdictions' GMA plans and average employees per acre figures as contained in Trip Generation, 5th Edition, Institute of Transportation Engineers, 1991. In order to calculate the maximum buildout projections, the amount of vacant, resource and underdeveloped land in unincorporated Pierce County by land use designation for each water service area was determined. Assumptions were then applied to these totals which resulted in the maximum buildout projections for unincorporated Pierce County. For incorporated portions of service areas, buildout projections from GMA plans were used where available. "Appendix D" details the methodology the

County used to develop the maximum buildout projections. See Tables VIII-1 (Base Case and High Case) VIII-2, VIII-3 and VIII-4 for Maximum Buildout Projections.

H. Projections of future water demands were developed for each of the individual water service areas, which were then aggregated to derive a water demand forecast for the entire County. Projections of residential water consumption were based on average water usage assumptions (calculated on a gallons per capita per day basis) in each water use area. The assumptions were developed using 1997 usage data for each service area. Non-residential water consumption estimates (including both commercial class and public water demands) were developed using non-residential water usage assumptions (calculated on a gallons per employee per day basis) in each of the eleven water use areas.
These were developed based on 1997 usage data for each service area. Discrete large demands (including Simpson Paper Company) were estimated in certain water use areas where per employee estimates would not adequately reflect the normal non-residential water consumption patterns. Unaccounted for water, including losses, was also estimated at the individual utility level based on 1997 levels. Where data was not available for a utility, a weighted average of data from the other utilities was used. Assumptions used in the forecast are discussed later in this section with the specific water usage assumptions summarized in Table VIII-2.

III. CURRENT PIERCE COUNTY WATER DEMAND PROFILE

As previously discussed, base year, 1997, estimates population and employment estimates were derived by County staff from Pierce County Assessor-Treasurer data, data provided by water purveyors and Washington State Employment Security Department point level employment data. These estimates were utilized to prepare the base year water demand profile.

Water demand data for 23 water purveyors in the County provided the basis for estimating the 1997 water demand profile in Pierce County. Data were requested from the 23 largest water systems in the operating within the County's UGA in June, 1998. Data was received from 15 systems which altogether provide water service to approximately 70% of the County's population.

Water demands for each water purveyor were disaggregated into single family and multi-family residential consumption, non-residential consumption, large customers' consumption, and unaccounted for water. For residential customer classes, usage estimates were developed on a gallons per household per day basis, and for non-residential customers usage estimates were developed on a gallons per employee per day basis.

A wide diversity of water usage patterns is exhibited in Pierce County for 1997. Single family residential gphd (gallons per household per day) varied from an estimated high of about 313 gphd to 353 gphd to an estimated low of about 209 to 256 gphd. Multi

family residential gphd varied from an estimated high of about 271 gphd to 402 gphd to an estimated low of about 89 to 167 gphd. Countywide, average single family residential consumption in 1997 was estimated at 262 gphd with average multi-family residential consumption, Countywide, estimated at 196 gphd. (See Tables VIII-7 Base Case and VIII-7 High Case)

Non-residential consumption includes the water consumption of private businesses (commercial and industrial uses) and public entities (including city, state and federal facilities, schools, and public parks) and were estimated on a per employee basis for 1994. This usage varied from an estimated high of about 103 gped (gallons per employee per day) to an estimated low of about 32 gped. County wide, average non-residential consumption in 1997 was estimated at 178 gped including Simpson Paper Company and 96 gped excluding Simpson Paper Company.

The total average daily demand for 1997 based on the above single-family, multi-family and non-residential usage assumptions, is estimated at 125.8 MGD, including 51.3 MGD (40.8%) single family residential consumption, 12.7 (10%) multi family residential consumption, 29.0 (23%) discrete large users consumption, 18.1 (14.7%) non-residential consumption, and 14.7 (11.7%) for losses and unaccounted for water usage. Total Tacoma Public Utilities demand, excluding King County service area, in 1997 was 63.28 MGD, representing 50% of the estimated Pierce County total water demand. These 1997 estimates were used as a basis for making projections of the future water demands discussed in this report. (See Tables VIII-11 Base Case and VIII-11 High Case)

IV. FORECAST ASSUMPTIONS

To develop projections of future water demands in the County, a number of other assumptions were required. Key assumptions used in this analysis include the following:

A. No specific adjustments to account for water user price response or price elasticity adjustments are included in the projections. This is consistent with an assumed increase of future water rates in the County that approximately equal the rate of inflation in the County. Rate increases that are lower than the rate of inflation would imply somewhat higher water demand levels while rate increases higher than the rate of inflation would result in lower water demand levels than those projected.

B. The future demands for Tacoma Public Utilities are consistent with its water demand forecast prepared in September, 1999. In-city and outside city water demands in the Tacoma service area were separated and used in this analysis. The discrete large demands for Simpson Paper Company and other non-residential demands included in the City's forecast are also included in this water demand forecast.

C. Savings from the gradual replacement of existing plumbing fixtures with more efficient fixtures that meet new code requirements are included in the forecast. It is assumed that new single family and multi family homes located outside of the City of Tacoma's water service area constructed after 1994, when building code

changes consistent with the 1992 Energy Policy Act lowered fixture water use rates were implemented, use 10.2% less water than existing homes, and that older homes are gradually retrofit with new fixtures with lower water use rates at a replacement rate of 2.5% annually. Similarly it is assumed that non-residential buildings located outside the City of Tacoma's water service area constructed after building code changes were implemented use 10.2% less water than existing buildings, and older buildings are retrofit with new fixtures at a replacement rate of 2.5% annually. For the City of Tacoma service area, inside city limits, it is assumed that new single family homes use 12.4% less water than existing single family homes, new multi family homes use 13.3% less water than existing multi family homes and new non-residential buildings use 11.1% less water than existing non-residential buildings with a fixture replacement retrofit rate of 2.5% per year for all building types. Similarly, for the City of Tacoma service area outside city limits, it is assumed that new single family homes use 10.8% less water than existing single family homes, new multi family homes use 8.7% less water than existing multi family homes and new non-residential buildings use 8.3% less water than existing non-residential buildings, with a fixture replacement retrofit rate of 2.5% per year for all building types. All conservation estimates are based on savings due to the replacement of toilets, showerheads, and water faucets and do not include potential savings from washing machine and dishwasher appliance code changes that have not yet been implemented.

D. Consistent with current demand-side planning methods, conservation is generally treated as a possible future resource available to water purveyors in the County. No reductions for conservation savings other than the changes in plumbing fixtures are included in the projected future demand levels.

E. Losses and unaccounted for water are estimated for each water use area based on 1997 unaccounted for water levels for each utility, with a minimum of 5%. Where data was not available for a utility, 1997-weighted average losses of 15% for the County was assumed. Like potential conservation savings, no specific reductions in losses or unaccounted for water are included in the water demand forecast that could result from specific leak detection programs or other activities to reduce unusually high losses or unaccounted for water. Again these efficiency improvements are treated as a demand-side resource available for certain specific water providers in the County.

V. POPULATION AND EMPLOYMENT PROJECTIONS

Future population and employment growth in the County is likely to be the single largest determinant of the County's changing future water demands. As discussed previously, projected population, household and employment data for Pierce County dated December, 1998, were obtained from the PSRC and were disaggregated into the individual service areas and total County projections for the years 2005, 2010 and 2020 by County staff.

The year 2005, 2010 and 2020 disaggregated projections were compared against water system plans, jurisdictions' growth management plans and County land use designations (zoning) by County staff before finalizing. County staff also developed maximum buildout projections based on the ability of current Pierce County land use designations to accommodate additional growth. For incorporated portions of service areas, maximum buildout projections from jurisdictions' growth management act plans were utilized.

Based on the PSRC projections, population in Pierce County is estimated to increase at an average 1.9% annual rate from 1997 to 2005, an average 2.0% annual rate from 2005 to 2010 and at an average 1.3% annual rate from 2010 to 2020. The lowest rate of growth is projected to occur in the SE Tacoma Mutual service area, with projected population growth averaging 1.3% per year from 1997 to 2005, 1.9% per year from 2005 to 2010 and then declining to –0.1% per year from 2010 to 2020 for an average annual growth rate from 1997 to 2020 of 0.8%. The highest rate of growth is projected to occur in the Gig Harbor service area, with projected population growth averaging 8.6% per year from 1997 to 2005, 6.1% per year from 2005 to 2010 and 2.0% per year from 2010 to 2020 for an average annual growth rate from 1997 to 2020 of 5.1%. See Tables VIII-1 (Base Case and High Case), VIII-2, VIII-3 and VIII-4 for Base Year Projections.

Employment growth is also based on the PSRC projections and is projected to increase in Pierce County at an average 1.8% annual rate from 1997 to 2005, an average 1.6% annual rate from 2005 to 2010 and at an average 1.4% annual rate from 2010 to 2020. The disaggregation process resulted in a negative employment growth rate for 5 systems. Rather than project out a negative growth rate, the 1997 estimates were projected out to 2020 for the 5 systems. The highest rate of employment growth is projected to occur in the Harbor Springs service area. This high rate of employment growth, 15.4% annually from 1997 to 2020, could be due to the difficulty in disaggregating the employment data down to such a small water service area.

In order to provide water purveyors with information regarding how much population and employment could be expected to occur based on existing County land use designations' ability to accommodate additional growth, County staff developed maximum buildout projections. In several cases, the maximum buildout population projections are lower than the PSRC year 2020 projections. This is due, in part, to the use of different assumptions in the preparation of the two sets of projections. ("Appendix D" details the assumptions used by the County to develop the maximum buildout projections.) The area served by the Peacock Hill water system has the largest percentage increase from year 2020 to maximum buildout based on current land use designations.

To examine the impact that higher population and employment growth in Pierce County would have on future water demands, a high case scenario has also been developed. For the high case scenario, population for the County as a whole was assumed to be approximately 1.5 times the population in the base case. This higher

growth rate was then allocated to the individual service areas based on their rates of growth occurring in the base case. In the high case scenario, Pierce County population is projected to increase at an average 3.1% annual rate from 1997 to 2005, at an average 3.1% annual rate from 2005 to 2010 and at an average 1.9% annual rate from 2010 to 2020. Pierce County employment growth, in the high case, is projected to increase at an average 2.8% annual rate from 1997 to 2005, at an average 2.6% annual rate from 2005 to 2010 and at an average 2.0% annual rate from 2010 to 2020.

VI. PROJECTED PIERCE COUNTY WATER DEMANDS

Based on the PSRC population and employment growth projections as disaggregated by County staff and the water use assumptions discussed previously, water demand projections for Pierce County and the individual service areas were prepared. The projected water demands for the individual service areas in Pierce County are detailed in Tables VIII-8 Base Case and VIII-8 High Case, including projected residential and non-residential consumption levels as well as future losses and new code savings in each individual service area. Historical and projected average daily demands for the individual service areas are summarized in Tables VIII-10 Base Case and VIII-10 High Case, including summarized average annual growth rates for each water use area. Historical and projected average daily demands by demand type in the County are summarized in Table VIII-11 Base Case and VIII-11 High Case, including per capita and per employee estimates of these demand levels, both with and without Simpson Paper Company water usage. The base case water demand forecast indicates moderate water demand growth in the County at rates slightly less than the PSRC projected population and employment growth over the next 23 years. Total demand is projected to increase at a rate slower than population growth, in part due to the accumulated water conservation savings that result from new plumbing code savings. During the next 23 years overall water demand in the County is projected to increase in the base case approximately 32% over the estimated 1997 water demand level of 125.2 MGD to approximately 165.7 MGD by 2020. The estimated water demand at maximum buildout based on current zoning is 185.61 MGD, an increase of 12% over the 2020 projection. For comparison purposes, the 1995 CWSP water demand projected a 30% increase from the 1994 water demand level of 114 MGD to approximately 148 MGD by 2020.

Under the high growth case assumptions, water demand is projected to occur at an average 2% annual rate from 1997 to 2020. As presented in Table VIII-6 and Table VIII-7, this average annual growth rate is slightly less than the PSRC projected population and employment growth over this same 23 year time period. This is again due, in part, to the accumulated water conservation savings that result from new plumbing code savings. Overall, water demand in the County is projected to increase more than 60% over the estimated 1997 water demand levels in the County during the next 23 years in the high case scenario to 201.2 MGD by 2020. The estimated water demand at maximum buildout based on current zoning is 246.28 MGD, an increase of 23% over the 2020 projection. For comparison purposes, the 1995 CWSP water demand projected a 70% increase from the 1994 water demand level of 114 MGD to 197.1 MGD by 2020 in the high case scenario.

Note: The Washington Department of Ecology (DOE) recently (May 15, 1995) released studies, in draft form, which quantify the authorized water rights for the Chambers/Clover Creek and Puyallup watersheds. The reports do not attempt to quantify the amount of water in the two aquifers. This Update of the Pierce County Coordinated Water System Plan involved the hiring of a professional firm to provide estimates of the quantity and quality of groundwater in Pierce County. The information in this update is somewhat different than the information in the draft reports from DOE. However, it is as reliable as the report from DOE.

The reports from DOE do recommend that an active water-monitoring program be established and that water quality data being gathered be consolidated into a single database. These recommendations support the conclusion of this CWSP Update that additional information on water quality and quantity be actively sought. (See Sec. XIII)

Table VIII–1

Historical and Projected Population and Maximum Buildout[1]

Base Case

Code	Utility Service Area	1997	2005	2010	2020	Base Maximum Buildout[2]	Compounded Average Annual Growth Rates 1997 - 2005	2005 - 2010	2010 - 2020	1997 - 2020
BA6	City of Bonney Lake	20,222	27,772	33,165	39,297	37,970	4.0%	3.6%	1.7%	2.9%
BA9	City of Buckley	4,022	5,732	6,953	7,250	6,844	4.5%	3.9%	0.4%	2.6%
FA3	City of Fife	4,187	6,517	8,182	9,150	9,631	5.7%	4.7%	1.1%	3.5%
FA4	Fircrest	6,099	6,670	7,078	8,200	8,453	1.1%	1.2%	1.5%	1.3%
FA5	Firgrove Mutual, Inc.	14,400	18,692	21,758	25,547	29,835	3.3%	3.1%	1.6%	2.5%
FA15	Fruitland Mutual Water Company	6,250	8,687	10,427	11,851	11,339	4.2%	3.7%	1.3%	2.8%
GA3	Gig Harbor Water Department	4,439	8,558	11,500	14,000	8,996	8.6%	6.1%	2.0%	5.1%
HA2	Harbor Springs	255	315	358	449	577	2.7%	2.6%	2.3%	2.5%
LA7	Lakewood Water District	62,300	66,949	70,270	93,200	93,200	0.9%	1.0%	2.9%	1.8%
MA12	City of Milton	5,376	6,300	6,960	7,900	8,543	2.0%	2.0%	1.3%	1.7%
MA22	Mt. View Edgewood	7,409	8,783	9,765	11,038	11,038	2.1%	2.1%	1.2%	1.7%
OA5	City of Orting	2,749	4,977	6,568	8,000	8,846	7.7%	5.7%	2.0%	4.8%
PA2	Parkland Light & Water	20,616	21,958	23,300	25,800	26,750	0.8%	1.2%	1.0%	1.0%
PA4	Peacock Hill	2,796	3,004	3,152	4,000	6,745	0.9%	1.0%	2.4%	1.6%
PA16	City of Puyallup	29,910	36,510	41,224	51,500	45,410	2.5%	2.5%	2.3%	2.4%
SA18	South East Tacoma Mutual Water Co	11,044	12,250	13,447	13,357	14,599	1.3%	1.9%	-0.1%	0.8%
SA19	Southwood - Rainier View	19,670	23,286	25,876	31,952	31,952	2.1%	2.1%	2.1%	2.1%
SA22	Spanaway Water Company	17,000	24,213	28,000	32,800	30,758	4.5%	2.9%	1.6%	2.9%
SA24	Steilacoom	4,828	5,786	6,470	7,058	8,090	2.3%	2.3%	0.9%	1.7%
SA25	Stroh Water System	1,870	2,270	2,555	2,632	3,342	2.5%	2.4%	0.3%	1.5%
SA26	Summit	13,000	13,760	14,303	16,000	16,864	0.7%	0.8%	1.1%	0.9%
SA27	City of Sumner	7,781	10,058	11,685	12,015	16,480	3.3%	3.0%	0.3%	1.9%
TA1	Tacoma Water - UP	29,490	31,969	33,740	38,600	36,197	1.0%	1.1%	1.4%	1.2%
TA2	Tacoma Water - Tacoma	185,600	213,881	234,082	254,000	270,000	1.8%	1.8%	0.8%	1.4%
TA3	Tacoma Water - Other Pierce Co.	35,069	48,959	58,881	70,680	88,600	4.3%	3.8%	1.8%	3.1%
TA4	Tacoma Water - King Co.	9,192	10,498	11,314	12,947	16,200	1.7%	1.5%	1.4%	1.5%
	Other Pierce County	157,918	169,224	177,945	188,398	242,000	0.9%	1.0%	0.6%	0.8%
	Total	683,492	797,578	878,958	997,621	1,089,259	1.9%	2.0%	1.3%	1.7%

[1] 1997 population data derived from Pierce County Assessor/Treasurer data; projections based on Puget Sound Regional Council data adjusted for local conditions.

[2] Maximum buildout for unincorporated lands is based on the Pierce County Comprehensive Plan, 1997. Maximum buildout for incorporated lands was taken from local plans when available.

Table VIII-2

Historical and Projected Single Family Households and Maximum Buildout[1]
Base Case

Code	Utility Service Area	1997	2005	2010	2020	Base Maximum Buildout[2]	Compounded Average Annual Growth Rates 1997 - 2005	2005 - 2010	2010 - 2020	1997 - 2020
BA6	City of Bonney Lake	6,281	8,682	10,407	12,197	11,785	4.1%	3.7%	1.6%	2.9%
BA9	City of Buckley	1,048	1,670	2,117	2,253	2,127	6.0%	4.9%	0.6%	3.4%
FA3	City of Fife	666	968	1,638	1,896	1,996	4.8%	11.1%	1.5%	4.7%
FA4	Fircrest	1,999	2,244	2,423	2,709	2,793	1.5%	1.5%	1.1%	1.3%
FA5	Firgrove Mutual, Inc.	3,712	5,191	6,248	7,291	8,515	4.3%	3.8%	1.6%	3.0%
FA15	Fruitland Mutual Water Company	1,325	1,892	2,302	2,601	2,489	4.6%	4.0%	1.2%	3.0%
GA3	Gig Harbor Water Department	1,165	2,288	2,995	3,462	2,225	8.8%	5.5%	1.5%	4.8%
HA2	Harbor Springs	104	143	170	211	271	4.1%	3.5%	2.2%	3.1%
LA7	Lakewood Water District	15,617	15,997	16,298	21,235	21,235	0.3%	0.4%	2.7%	1.3%
MA12	City of Milton	1,611	1,988	2,179	2,344	2,535	2.7%	1.9%	0.7%	1.6%
MA22	Mt. View Edgewood	2,469	2,913	3,127	3,412	3,412	2.1%	1.4%	0.9%	1.4%
OA5	City of Orting	1,056	1,735	2,177	2,662	2,944	6.4%	4.6%	2.0%	4.1%
PA2	Parkland Light & Water	5,897	6,750	7,169	7,187	7,452	1.7%	1.2%	0.0%	0.9%
PA4	Peacock Hill	1,005	1,039	1,068	1,327	2,238	0.4%	0.6%	2.2%	1.2%
PA16	City of Puyallup	7,890	10,878	12,569	15,088	13,304	4.1%	2.9%	1.8%	2.9%
SA18	South East Tacoma Mutual Water Co	2,285	2,290	2,460	2,494	2,726	0.0%	1.4%	0.1%	0.4%
SA19	Southwood - Rainier View	6,663	7,888	8,765	10,823	10,823	2.1%	2.1%	2.1%	2.1%
SA22	Spanaway Water Company	4,900	7,265	8,500	9,650	9,748	5.0%	3.2%	1.3%	3.0%
SA24	Steilacoom	1,589	1,917	2,105	2,212	2,535	2.4%	1.9%	0.5%	1.4%
SA25	Stroh Water System	575	669	742	755	959	1.9%	2.1%	0.2%	1.2%
SA26	Summit	5,155	5,317	5,443	6,028	6,354	0.4%	0.5%	1.0%	0.7%
SA27	City of Sumner	2,043	2,653	2,911	2,944	4,038	3.3%	1.9%	0.1%	1.6%
TA1	Tacoma Water - UP	6,450	7,708	8,325	9,088	8,522	2.3%	1.6%	0.9%	1.5%
TA2	Tacoma Water - Tacoma	51,175	61,048	63,215	64,801	68,883	2.2%	0.7%	0.2%	1.0%
TA3	Tacoma Water - Other Pierce Co.	11,539	16,406	19,570	23,330	29,245	4.5%	3.6%	1.8%	3.1%
TA4	Tacoma Water - King Co.	3,033	3,587	3,933	4,625	5,787	2.1%	1.9%	1.6%	1.9%
	Other Pierce County	48,871	52,330	54,969	58,265	73,964	0.9%	1.0%	0.6%	0.8%
	Total	196,123	233,456	253,825	280,890	308,905	2.2%	1.7%	1.0%	1.6%

[1] 1997 household data derived from Pierce County Assessor/Treasurer data; projections based on Puget Sound Regional Council data adjusted for local conditions.

[2] Maximum buildout based on population maximum buildout esimates.

Table VIII-3

Historical and Projected Multi-family Households and Maximum Buildout[1]

Base Case

Code	Utility Service Area	1997	2005	2010	2020	Base Maximum Buildout[2]	Compounded Average Annual Growth Rates 1997 - 2005	2005 - 2010	2010 - 2020	1997 - 2020
BA6	City of Bonney Lake	684	965	1,156	1,355	1,309	4.4%	3.7%	1.6%	3.0%
BA9	City of Buckley	137	228	289	307	290	6.6%	4.9%	0.6%	3.6%
FA3	City of Fife	1,380	2,056	2,085	2,414	2,541	5.1%	0.3%	1.5%	2.5%
FA4	Fircrest	524	596	644	809	834	1.6%	1.6%	2.3%	1.9%
FA5	Firgrove Mutual, Inc.	815	1,140	1,371	1,601	1,870	4.3%	3.8%	1.6%	3.0%
FA15	Fruitland Mutual Water Company	989	1,428	1,737	1,962	1,877	4.7%	4.0%	1.2%	3.0%
GA3	Gig Harbor Water Department	653	1,287	1,835	2,308	1,483	8.9%	7.4%	2.3%	5.6%
HA2	Harbor Springs	0	0	0	0	0	n/a	n/a	n/a	n/a
LA7	Lakewood Water District	12,195	12,569	12,806	16,684	16,684	0.4%	0.4%	2.7%	1.4%
MA12	City of Milton	463	594	766	957	1,035	3.2%	5.2%	2.3%	3.2%
MA22	Mt. View Edgewood	386	474	641	800	800	2.6%	6.2%	2.2%	3.2%
OA5	City of Orting	61	111	189	296	327	7.8%	11.2%	4.6%	7.1%
PA2	Parkland Light & Water	1,181	1,382	1,792	2,027	2,102	2.0%	5.3%	1.2%	2.4%
PA4	Peacock Hill	115	128	132	164	277	1.3%	0.6%	2.2%	1.6%
PA16	City of Puyallup	2,118	3,068	4,190	5,580	4,920	4.7%	6.4%	2.9%	4.3%
SA18	South East Tacoma Mutual Water Co	2,964	3,036	3,262	3,306	3,613	0.3%	1.4%	0.1%	0.5%
SA19	Southwood - Rainier View	263	311	346	427	427	2.1%	2.2%	2.1%	2.1%
SA22	Spanaway Water Company	1,200	1,703	2,325	3,160	1,456	4.5%	6.4%	3.1%	4.3%
SA24	Steilacoom	362	450	559	661	758	2.8%	4.4%	1.7%	2.7%
SA25	Stroh Water System	213	260	288	293	372	2.5%	2.1%	0.2%	1.4%
SA26	Summit	145	164	168	186	196	1.6%	0.5%	1.0%	1.1%
SA27	City of Sumner	1,114	1,492	1,941	1,963	2,692	3.7%	5.4%	0.1%	2.5%
TA1	Tacoma Water - UP	4,195	5,139	6,029	7,140	6,696	2.6%	3.2%	1.7%	2.3%
TA2	Tacoma Water - Tacoma	22,763	27,427	35,559	41,430	44,040	2.4%	5.3%	1.5%	2.6%
TA3	Tacoma Water - Other Pierce Co.	1,426	1,823	2,419	2,883	3,614	3.1%	5.8%	1.8%	3.1%
TA4	Tacoma Water - King Co.	318	377	413	486	608	2.2%	1.8%	1.6%	1.9%
	Other Pierce County	7,895	8,364	8,463	8,588	13,053	0.7%	0.2%	0.1%	0.4%
	Total	64,559	76,572	91,405	107,787	113,874	2.2%	3.6%	1.7%	2.3%

[1] 1997 household data derived from Pierce County Assessor/Treasurer data; projections based on Puget Sound Regional Council data adjusted for local conditions.

[2] Maximum buildout based on population maximum buildout esimates.

Table VIII–4

Historical and Projected Employment and Maximum Buildout[1]

Base Case

Code	Utility Service Area	1997	2005	2010	2020	Base Maximum Buildout[2]	Compounded Average Annual Growth Rates 1997 - 2005	2005 - 2010	2010 - 2020	1997 - 2020
BA6	City of Bonney Lake	2,206	3,008	3,509	4,511	7,025	4.0%	3.1%	2.5%	3.2%
BA9	City of Buckley	2,567	2,567	2,567	2,567	2,567	0.0%	0.0%	0.0%	0.0%
FA3	City of Fife	9,694	9,694	9,694	9,694	9,883	0.0%	0.0%	0.0%	0.0%
FA4	Fircrest	538	804	970	1,303	1,303	5.1%	3.8%	3.0%	3.9%
FA5	Firgrove Mutual, Inc.	2,064	3,362	4,174	5,797	10,600	6.3%	4.4%	3.3%	4.6%
FA15	Fruitland Mutual Water Company	4,535	4,535	4,535	4,535	5,537	0.0%	0.0%	0.0%	0.0%
GA3	Gig Harbor Water Department	3,447	3,447	3,447	3,447	5,371	0.0%	0.0%	0.0%	0.0%
HA2	Harbor Springs	5	50	78	135	7	33.4%	9.3%	5.6%	15.4%
LA7	Lakewood Water District	19,036	23,452	26,211	31,731	31,731	2.6%	2.2%	1.9%	2.2%
MA12	City of Milton	1,358	1,636	1,810	2,157	2,157	2.4%	2.0%	1.8%	2.0%
MA22	Mt. View Edgewood	684	1,165	1,465	2,066	2,066	6.9%	4.7%	3.5%	4.9%
OA5	City of Orting	496	496	496	496	496	0.0%	0.0%	0.0%	0.0%
PA2	Parkland Light & Water	5,912	6,858	7,449	8,632	13,079	1.9%	1.7%	1.5%	1.7%
PA4	Peacock Hill	105	270	373	580	255	12.5%	6.7%	4.5%	7.7%
PA16	City of Puyallup	13,543	16,754	18,761	22,774	30,505	2.7%	2.3%	2.0%	2.3%
SA18	South East Tacoma Mutual Water Co	2,185	2,780	3,152	3,895	6,213	3.1%	2.5%	2.1%	2.5%
SA19	Southwood - Rainier View	1,400	2,400	3,025	4,275	11,784	7.0%	4.7%	3.5%	5.0%
SA22	Spanaway Water Company	2,662	3,528	4,069	5,152	6,674	3.6%	2.9%	2.4%	2.9%
SA24	Steilacoom	1,193	1,276	1,328	1,432	1,549	0.8%	0.8%	0.8%	0.8%
SA25	Stroh Water System	416	567	662	851	757	3.9%	3.1%	2.5%	3.2%
SA26	Summit	2,093	2,534	2,810	3,361	5,707	2.4%	2.1%	1.8%	2.1%
SA27	City of Sumner	4,315	6,536	7,924	10,701	14,137	5.3%	3.9%	3.0%	4.0%
TA1	Tacoma Water - UP	5,448	6,126	6,549	7,396	7,396	1.5%	1.3%	1.2%	1.3%
TA2	Tacoma Water - Tacoma	106,898	125,708	137,465	160,978	171,100	2.0%	1.8%	1.6%	1.8%
TA3	Tacoma Water - Other Pierce Co.	5,543	7,297	8,393	10,586	41,123	3.5%	2.8%	2.3%	2.9%
TA4	Tacoma Water - King Co.	1,317	1,438	1,514	1,666	2,100	1.1%	1.0%	1.0%	1.0%
	Other Pierce County	67,927	69,960	71,230	73,771	92,268	0.4%	0.4%	0.4%	0.4%
	Total	267,587	308,248	333,660	384,489	483,390	1.8%	1.6%	1.4%	1.6%

[1] 1997 employment data derived from Pierce County Assessor/Treasurer data; projections based on Puget Sound Regional Council data adjusted for local conditions.

[2] Maximum buildout for unincorporated lands is based on the Pierce County Comprehensive Plan, 1997. Maximum buildout figures do not take into consideration maximum buildout for incorporated portions of service areas.

Table VIII-5

Historical and Projected Population per Household
Base Case

Code	Utility Service Area	1997	2005	2010	2020	Base Maximum Buildout
BA6	City of Bonney Lake	2.9	2.9	2.9	2.9	2.9
BA9	City of Buckley	3.4	3.0	2.9	2.8	2.8
FA3	City of Fife	2.0	2.2	2.2	2.1	2.1
FA4	Fircrest	2.4	2.3	2.3	2.3	2.3
FA5	Firgrove Mutual, Inc.	3.2	3.0	2.9	2.9	2.9
FA15	Fruitland Mutual Water Company	2.7	2.6	2.6	2.6	2.6
GA3	Gig Harbor Water Department	2.4	2.4	2.4	2.4	2.4
HA2	Harbor Springs	2.5	2.2	2.1	2.1	2.1
LA7	Lakewood Water District	2.2	2.3	2.4	2.5	2.5
MA12	City of Milton	2.6	2.4	2.4	2.4	2.4
MA22	Mt. View Edgewood	2.6	2.6	2.6	2.6	2.6
OA5	City of Orting	2.5	2.7	2.8	2.7	2.7
PA2	Parkland Light & Water	2.9	2.7	2.6	2.8	2.8
PA4	Peacock Hill	2.5	2.6	2.6	2.7	2.7
PA16	City of Puyallup	3.0	2.6	2.5	2.5	2.5
SA18	South East Tacoma Mutual Water Co	2.1	2.3	2.4	2.3	2.3
SA19	Southwood - Rainier View	2.8	2.8	2.8	2.8	2.8
SA22	Spanaway Water Company	2.8	2.7	2.6	2.6	2.7
SA24	Steilacoom	2.5	2.4	2.4	2.5	2.5
SA25	Stroh Water System	2.4	2.4	2.5	2.5	2.5
SA26	Summit	2.5	2.5	2.5	2.6	2.6
SA27	City of Sumner	2.5	2.4	2.4	2.4	2.4
TA1	Tacoma Water - UP	2.8	2.5	2.4	2.4	2.4
TA2	Tacoma Water - Tacoma	2.5	2.4	2.4	2.4	2.4
TA3	Tacoma Water - Other Pierce Co.	2.7	2.7	2.7	2.7	2.7
TA4	Tacoma Water - King Co.	2.7	2.6	2.6	2.5	2.5
	Other Pierce County	2.8	2.8	2.8	2.8	2.8
	Total	2.6	2.6	2.5	2.6	2.6

Table VIII-6

Historical and Projected Population per Employee Working in Service Area

Base Case

Code	Utility Service Area	1997	2005	2010	2020	Base Maximum Buildout
BA6	City of Bonney Lake	9.2	9.2	9.5	8.7	5.4
BA9	City of Buckley	1.6	2.2	2.7	2.8	2.7
FA3	City of Fife	0.4	0.7	0.8	0.9	1.0
FA4	Fircrest	11.3	8.3	7.3	6.3	6.5
FA5	Firgrove Mutual, Inc.	7.0	5.6	5.2	4.4	2.8
FA15	Fruitland Mutual Water Company	1.4	1.9	2.3	2.6	2.0
GA3	Gig Harbor Water Department	1.3	2.5	3.3	4.1	1.7
HA2	Harbor Springs	51.0	6.3	4.6	3.3	82.4
LA7	Lakewood Water District	3.3	2.9	2.7	2.9	2.9
MA12	City of Milton	4.0	3.9	3.8	3.7	4.0
MA22	Mt. View Edgewood	10.8	7.5	6.7	5.3	5.3
OA5	City of Orting	5.5	10.0	13.2	16.1	17.8
PA2	Parkland Light & Water	3.5	3.2	3.1	3.0	2.0
PA4	Peacock Hill	26.6	11.1	8.5	6.9	26.5
PA16	City of Puyallup	2.2	2.2	2.2	2.3	1.5
SA18	South East Tacoma Mutual Water Co	5.1	4.4	4.3	3.4	2.3
SA19	Southwood - Rainier View	14.1	9.7	8.6	7.5	2.7
SA22	Spanaway Water Company	6.4	6.9	6.9	6.4	4.6
SA24	Steilacoom	4.0	4.5	4.9	4.9	5.2
SA25	Stroh Water System	4.5	4.0	3.9	3.1	4.4
SA26	Summit	6.2	5.4	5.1	4.8	3.0
SA27	City of Sumner	1.8	1.5	1.5	1.1	1.2
TA1	Tacoma Water - UP	5.4	5.2	5.2	5.2	4.9
TA2	Tacoma Water - Tacoma	1.7	1.7	1.7	1.6	1.6
TA3	Tacoma Water - Other Pierce Co.	6.3	6.7	7.0	6.7	2.2
TA4	Tacoma Water - King Co.	7.0	7.3	7.5	7.8	7.7
	Other Pierce County	2.3	2.4	2.5	2.6	2.6
	Total	2.6	2.6	2.6	2.6	2.3

Table VIII–7

Water Usage Assumptions
Base Case

Code	Utility Service Area	Residential gphd[1] Single Family	Residential gphd[1] Multi-Family	Non-Res gped[2]	Losses
BA6	City of Bonney Lake	286	116	79	5.0%
BA9	City of Buckley	209	167	32	26.0%
FA3	City of Fife	223	199	81	5.0%
FA4	Fircrest	280	200	65	15.0%
FA5	Firgrove Mutual, Inc.	353	271	55	8.0%
FA15	Fruitland Mutual Water Company	350	227	66	23.0%
GA3	Gig Harbor Water Department	262	238	57	6.0%
HA2	Harbor Springs	280	200	65	15.0%
LA7	Lakewood Water District	285	182	75	5.7%
MA12	City of Milton	280	200	65	15.0%
MA22	Mt. View Edgewood	256	89	30	11.9%
OA5	City of Orting	280	200	65	15.0%
PA2	Parkland Light & Water	313	200	83	14.0%
PA4	Peacock Hill	280	200	65	15.0%
PA16	City of Puyallup	227	325	69	3.5%
SA18	South East Tacoma Mutual Water Co	273	211	83	9.6%
SA19	Southwood - Rainier View	280	200	65	15.0%
SA22	Spanaway Water Company	272	182	64	26.8%
SA24	Steilacoom	276	209	77	5.1%
SA25	Stroh Water System	280	200	65	15.0%
SA26	Summit	238	200	80	22.8%
SA27	City of Sumner	280	200	65	15.0%
TA1	Tacoma Water - UP	283	278	80	10.0%
TA2	Tacoma Water - Tacoma	226	174	57	10.0%
TA3	Tacoma Water - Other Pierce Co.	283	278	80	10.0%
TA4	Tacoma Water - King Co.	283	278	80	10.0%
	Other Pierce County	280	200	65	15.0%

[1] gallons per household per day
[2] gallons per employee per day

Table VIII-8

Historical and Projected Water Use Demand Components

Base Case

(Million Gallons per Day)

Code	Utility Service Area	1997	2005	2010	2020	Maximum Buildout	Compounded Average Annual Growth Rates 1997 - 2005	2005 - 2010	2010 - 2020	1997 - 2020
BA6	City of Bonney Lake									
	Single Family Residential	1.79	2.48	2.97	3.48	3.37	4.1%	3.7%	1.6%	2.9%
	Multi-family Residential	0.08	0.11	0.13	0.16	0.15	4.4%	3.7%	1.6%	3.0%
	Non-Residential	0.18	0.24	0.28	0.36	0.56	4.0%	3.1%	2.5%	3.2%
	New Code Savings		(0.12)	(0.21)	(0.33)	(0.33)				
	Losses	0.11	0.14	0.17	0.19	0.20	3.5%	3.3%	1.5%	2.6%
	Total	2.16	2.85	3.34	3.87	3.95	3.5%	3.3%	1.5%	2.6%
BA9	City of Buckley									
	Single Family Residential	0.22	0.35	0.44	0.47	0.45	6.0%	4.9%	0.6%	3.4%
	Multi-family Residential	0.02	0.04	0.05	0.05	0.05	6.6%	4.9%	0.6%	3.6%
	Non-Residential	0.08	0.08	0.08	0.08	0.08	0.0%	0.0%	0.0%	0.0%
	Discrete Large Demands	0.32	0.32	0.32	0.32	0.32	0.0%	0.0%	0.0%	0.0%
	New Code Savings		(0.02)	(0.04)	(0.05)	(0.05)				
	Losses	0.23	0.27	0.30	0.31	0.30	2.2%	2.2%	0.2%	1.4%
	Total	0.87	1.03	1.15	1.18	1.14	2.2%	2.2%	0.2%	1.4%
FA3	City of Fife									
	Single Family Residential	0.15	0.22	0.37	0.42	0.45	4.8%	11.1%	1.5%	4.7%
	Multi-family Residential	0.27	0.41	0.41	0.48	0.51	5.1%	0.3%	1.5%	2.5%
	Non-Residential	0.79	0.79	0.79	0.79	0.80	0.0%	0.0%	0.0%	0.0%
	New Code Savings		(0.05)	(0.08)	(0.13)	(0.13)				
	Losses	0.06	0.07	0.08	0.08	0.09	1.5%	1.7%	0.5%	1.1%
	Total	1.28	1.44	1.57	1.65	1.72	1.5%	1.7%	0.5%	1.1%
FA4	Fircrest									
	Single Family Residential	0.56	0.63	0.68	0.76	0.78	1.5%	1.5%	1.1%	1.3%
	Multi-family Residential	0.10	0.12	0.13	0.16	0.17	1.6%	1.6%	2.3%	1.9%
	Non-Residential	0.03	0.05	0.06	0.08	0.08	5.1%	3.8%	3.0%	3.9%
	New Code Savings		(0.03)	(0.04)	(0.08)	(0.08)				
	Losses	0.12	0.14	0.15	0.16	0.17	1.3%	1.4%	1.2%	1.2%
	Total	0.82	0.91	0.97	1.09	1.13	1.3%	1.4%	1.2%	1.2%
FA5	Firgrove Mutual, Inc.									
	Single Family Residential	1.31	1.83	2.21	2.58	3.01	4.3%	3.8%	1.6%	3.0%
	Multi-family Residential	0.22	0.31	0.37	0.43	0.51	4.3%	3.8%	1.6%	3.0%
	Non-Residential	0.11	0.19	0.23	0.32	0.59	6.3%	4.4%	3.3%	4.6%
	New Code Savings		(0.11)	(0.18)	(0.28)	(0.28)				
	Losses	0.14	0.19	0.23	0.27	0.33	3.8%	3.4%	1.5%	2.7%
	Total	1.79	2.42	2.86	3.32	4.16	3.8%	3.4%	1.5%	2.7%
FA15	Fruitland Mutual Water Company									
	Single Family Residential	0.54	0.66	0.81	0.91	0.87	2.6%	4.0%	1.2%	2.3%
	Multi-family Residential	0.22	0.32	0.39	0.45	0.43	4.7%	4.0%	1.2%	3.0%
	Non-Residential	0.30	0.30	0.30	0.30	0.36	0.0%	0.0%	0.0%	0.0%
	New Code Savings		(0.05)	(0.08)	(0.13)	(0.13)				
	Losses	0.32	0.37	0.42	0.46	0.46	1.9%	2.7%	0.8%	1.6%
	Total	1.38	1.61	1.84	1.98	1.99	1.9%	2.7%	0.8%	1.6%
GA3	Gig Harbor Water Department									
	Single Family Residential	0.30	0.60	0.78	0.91	0.58	8.8%	5.5%	1.5%	4.8%
	Multi-family Residential	0.16	0.31	0.44	0.55	0.35	8.9%	7.4%	2.3%	5.6%
	Non-Residential	0.20	0.20	0.20	0.20	0.31	0.0%	0.0%	0.0%	0.0%
	New Code Savings		(0.06)	(0.10)	(0.14)	(0.14)				
	Losses	0.11	0.07	0.08	0.10	0.07	-5.7%	4.8%	1.4%	-0.4%
	Total	0.76	1.11	1.40	1.60	1.17	4.8%	4.8%	1.4%	3.3%
HA2	Harbor Springs									
	Single Family Residential	0.03	0.04	0.05	0.06	0.08	4.1%	3.5%	2.2%	3.1%
	Multi-family Residential	0.00	0.00	0.00	0.00	0.00	n/a	n/a	n/a	n/a
	Non-Residential	0.00	0.00	0.01	0.01	0.00	33.4%	9.3%	5.6%	15.4%
	New Code Savings		(0.00)	(0.00)	(0.01)	(0.01)				
	Losses	0.01	0.01	0.01	0.01	0.01	4.3%	3.6%	2.3%	3.3%
	Total	0.03	0.05	0.06	0.07	0.08	4.3%	3.6%	2.3%	3.3%

Table VIII-8, continued

Historical and Projected Water Use Demand Components

Base Case

(Million Gallons per Day)

Code	Utility Service Area	1997	2005	2010	2020	Maximum Buildout	Compounded Average Annual Growth Rates 1997 - 2005	2005 - 2010	2010 - 2020	1997 - 2020
LA7	Lakewood Water District									
	Single Family Residential	4.45	4.56	4.64	6.05	6.05	0.3%	0.4%	2.7%	1.3%
	Multi-family Residential	2.22	2.29	2.33	3.04	3.04	0.4%	0.4%	2.7%	1.4%
	Non-Residential	1.42	1.75	1.96	2.37	2.37	2.6%	2.2%	1.9%	2.2%
	New Code Savings		(0.23)	(0.38)	(0.86)	(0.86)				
	Losses	0.49	0.50	0.51	0.64	0.64	0.4%	0.4%	2.2%	1.2%
	Total	8.58	8.87	9.07	11.24	11.24	0.4%	0.4%	2.2%	1.2%
MA12	City of Milton									
	Single Family Residential	0.45	0.56	0.61	0.66	0.71	2.7%	1.9%	0.7%	1.6%
	Multi-family Residential	0.09	0.12	0.15	0.19	0.21	3.2%	5.2%	2.3%	3.2%
	Non-Residential	0.09	0.11	0.12	0.14	0.14	2.4%	2.0%	1.8%	2.0%
	New Code Savings		(0.03)	(0.05)	(0.08)	(0.08)				
	Losses	0.11	0.13	0.15	0.16	0.17	2.2%	2.1%	0.9%	1.6%
	Total	0.74	0.89	0.98	1.07	1.15	2.2%	2.1%	0.9%	1.6%
MA22	Mt. View Edgewood									
	Single Family Residential	0.63	0.75	0.80	0.87	0.87	2.1%	1.4%	0.9%	1.4%
	Multi-family Residential	0.03	0.04	0.06	0.07	0.07	2.6%	6.2%	2.2%	3.2%
	Non-Residential	0.02	0.04	0.04	0.06	0.06	6.9%	4.7%	3.5%	4.9%
	New Code Savings		(0.03)	(0.05)	(0.08)	(0.08)				
	Losses	0.09	0.11	0.12	0.13	0.13	1.8%	1.5%	0.9%	1.3%
	Total	0.78	0.90	0.97	1.06	1.06	1.8%	1.5%	0.9%	1.3%
OA5	City of Orting									
	Single Family Residential	0.30	0.49	0.61	0.75	0.82	6.4%	4.6%	2.0%	4.1%
	Multi-family Residential	0.01	0.02	0.04	0.06	0.07	7.8%	11.2%	4.6%	7.1%
	Non-Residential	0.03	0.03	0.03	0.03	0.03	0.0%	0.0%	0.0%	0.0%
	New Code Savings		(0.03)	(0.05)	(0.07)	(0.07)				
	Losses	0.06	0.09	0.11	0.13	0.15	5.3%	4.3%	1.9%	3.6%
	Total	0.40	0.60	0.74	0.90	1.00	5.3%	4.3%	1.9%	3.6%
PA2	Parkland Light & Water									
	Single Family Residential	1.84	2.11	2.24	2.25	2.33	1.7%	1.2%	0.0%	0.9%
	Multi-family Residential	0.24	0.28	0.36	0.41	0.42	2.0%	5.3%	1.2%	2.4%
	Non-Residential	0.49	0.57	0.62	0.72	1.09	1.9%	1.7%	1.5%	1.7%
	New Code Savings		(0.10)	(0.16)	(0.24)	(0.24)				
	Losses	0.95	0.47	0.50	0.51	0.59	-8.5%	1.4%	0.2%	-2.7%
	Total	3.52	3.33	3.56	3.64	4.18	-0.7%	1.4%	0.2%	0.1%
PA4	Peacock Hill									
	Single Family Residential	0.28	0.29	0.30	0.37	0.63	0.4%	0.6%	2.2%	1.2%
	Multi-family Residential	0.02	0.03	0.03	0.03	0.06	1.3%	0.6%	2.2%	1.6%
	Non-Residential	0.01	0.02	0.02	0.04	0.02	12.5%	6.7%	4.5%	7.7%
	New Code Savings		(0.01)	(0.02)	(0.03)	(0.03)				
	Losses	0.05	0.06	0.06	0.07	0.12	0.5%	0.6%	2.0%	1.2%
	Total	0.37	0.38	0.39	0.48	0.78	0.5%	0.6%	2.0%	1.2%
PA16	City of Puyallup									
	Single Family Residential	1.79	2.47	2.85	3.42	3.02	4.1%	2.9%	1.8%	2.9%
	Multi-family Residential	0.69	1.00	1.36	1.81	1.60	4.7%	6.4%	2.9%	4.3%
	Non-Residential	0.93	1.16	1.29	1.57	2.10	2.7%	2.3%	2.0%	2.3%
	Discrete Large Demands	1.07	0.05	0.05	0.05	0.05	-31.0%	0.0%	0.0%	-12.1%
	New Code Savings		(0.20)	(0.34)	(0.56)	(0.56)				
	Losses	0.16	0.16	0.19	0.23	0.22	0.0%	3.1%	1.9%	1.5%
	Total	4.64	4.63	5.41	6.52	6.43	0.0%	3.1%	1.9%	1.5%

Table VIII-8, continued

Historical and Projected Water Use Demand Components

Base Case

(Million Gallons per Day)

Code	Utility Service Area	1997	2005	2010	2020	Maximum Buildout	Compounded Average Annual Growth Rates 1997 - 2005	2005 - 2010	2010 - 2020	1997 - 2020
SA18	South East Tacoma Mutual Water Co.									
	Single Family Residential	0.62	0.63	0.67	0.68	0.74	0.0%	1.4%	0.1%	0.4%
	Multi-family Residential	0.62	0.64	0.69	0.70	0.76	0.3%	1.4%	0.1%	0.5%
	Non-Residential	0.18	0.23	0.26	0.32	0.51	3.1%	2.5%	2.1%	2.5%
	New Code Savings		(0.04)	(0.07)	(0.12)	(0.12)				
	Losses	0.15	0.16	0.17	0.17	0.20	0.2%	1.2%	0.2%	0.4%
	Total	1.58	1.61	1.71	1.75	2.10	0.2%	1.2%	0.2%	0.4%
SA19	Southwood - Rainier View									
	Single Family Residential	1.87	2.21	2.45	3.03	3.03	2.1%	2.1%	2.1%	2.1%
	Multi-family Residential	0.05	0.06	0.07	0.09	0.09	2.1%	2.2%	2.1%	2.1%
	Non-Residential	0.09	0.16	0.20	0.28	0.77	7.0%	4.7%	3.5%	5.0%
	New Code Savings		(0.09)	(0.14)	(0.27)	(0.27)				
	Losses	0.35	0.41	0.45	0.55	0.64	1.9%	1.9%	2.0%	1.9%
	Total	2.36	2.75	3.03	3.68	4.25	1.9%	1.9%	2.0%	1.9%
SA22	Spanaway Water Company									
	Single Family Residential	1.33	1.98	2.31	2.62	2.65	5.0%	3.2%	1.3%	3.0%
	Multi-family Residential	0.22	0.31	0.42	0.58	0.26	4.5%	6.4%	3.1%	4.3%
	Non-Residential	0.17	0.22	0.26	0.33	0.42	3.6%	2.9%	2.4%	2.9%
	New Code Savings		(0.13)	(0.20)	(0.30)	(0.30)				
	Losses	0.46	0.67	0.80	0.94	0.89	4.8%	3.6%	1.7%	3.2%
	Total	2.18	3.05	3.60	4.17	3.94	4.3%	3.3%	1.5%	2.9%
SA24	Steilacoom									
	Single Family Residential	0.44	0.53	0.58	0.61	0.70	2.4%	1.9%	0.5%	1.4%
	Multi-family Residential	0.08	0.09	0.12	0.14	0.16	2.8%	4.4%	1.7%	2.7%
	Non-Residential	0.09	0.10	0.10	0.11	0.12	0.8%	0.8%	0.8%	0.8%
	New Code Savings		(0.03)	(0.04)	(0.06)	(0.06)				
	Losses	0.03	0.04	0.04	0.04	0.05	1.8%	1.7%	0.5%	1.2%
	Total	0.64	0.73	0.80	0.84	0.96	1.8%	1.7%	0.5%	1.2%
SA25	Stroh Water System									
	Single Family Residential	0.16	0.19	0.21	0.21	0.27	1.9%	2.1%	0.2%	1.2%
	Multi-family Residential	0.04	0.05	0.06	0.06	0.07	2.5%	2.1%	0.2%	1.4%
	Non-Residential	0.03	0.04	0.04	0.06	0.05	3.9%	3.1%	2.5%	3.2%
	New Code Savings		(0.01)	(0.02)	(0.02)	(0.02)				
	Losses	0.04	0.05	0.05	0.05	0.06	1.8%	1.9%	0.3%	1.2%
	Total	0.27	0.31	0.34	0.35	0.43	1.8%	1.9%	0.3%	1.2%
SA26	Summit									
	Single Family Residential	1.23	1.26	1.29	1.43	1.51	0.4%	0.5%	1.0%	0.7%
	Multi-family Residential	0.03	0.03	0.03	0.04	0.04	1.6%	0.5%	1.0%	1.1%
	Non-Residential	0.17	0.20	0.23	0.27	0.46	2.4%	2.1%	1.8%	2.1%
	New Code Savings		(0.04)	(0.06)	(0.12)	(0.12)				
	Losses	0.42	0.43	0.44	0.48	0.56	0.3%	0.4%	0.8%	0.6%
	Total	1.84	1.89	1.93	2.10	2.44	0.3%	0.4%	0.8%	0.6%
SA27	City of Sumner									
	Single Family Residential	0.57	0.74	0.82	0.82	1.13	3.3%	1.9%	0.1%	1.6%
	Multi-family Residential	0.22	0.30	0.39	0.39	0.54	3.7%	5.4%	0.1%	2.5%
	Non-Residential	0.28	0.42	0.52	0.70	0.92	5.3%	3.9%	3.0%	4.0%
	New Code Savings		(0.06)	(0.10)	(0.15)	(0.15)				
	Losses	0.19	0.25	0.28	0.31	0.43	3.4%	2.9%	0.9%	2.2%
	Total	1.27	1.65	1.90	2.07	2.86	3.4%	2.9%	0.9%	2.2%
TA1	Tacoma Water - UP									
	Single Family Residential	1.99	2.49	2.71	2.97	2.75	2.8%	1.7%	0.9%	1.7%
	Multi-family Residential	0.88	1.14	1.32	1.57	1.41	3.3%	2.9%	1.7%	2.5%
	Non-Residential	0.42	0.45	0.49	0.53	0.57	0.9%	1.4%	0.9%	1.0%
	New Code Savings		(0.10)	(0.16)	(0.31)	(0.31)				
	Losses	0.37	0.44	0.48	0.53	0.49	2.4%	1.8%	0.9%	1.6%
	Total	3.66	4.43	4.84	5.28	4.92	2.4%	1.8%	0.9%	1.6%

Table VIII-8, continued

Historical and Projected Water Use Demand Components

Base Case

(Million Gallons per Day)

Code	Utility Service Area	1997	2005	2010	2020	Maximum Buildout	Compounded Average Annual Growth Rates 1997 - 2005	2005 - 2010	2010 - 2020	1997 - 2020
TA2	Tacoma Water - Tacoma									
	Single Family Residential	11.15	13.80	14.29	14.65	15.77	2.7%	0.7%	0.2%	1.2%
	Multi-family Residential	3.93	4.77	6.19	7.21	7.59	2.5%	5.3%	1.5%	2.7%
	Non-Residential	6.91	7.63	8.36	9.74	11.18	1.2%	1.8%	1.5%	1.5%
	Discrete Large Demands	27.38	25.42	26.28	28.04	28.04	-0.9%	0.7%	0.6%	0.1%
	New Code Savings		(0.71)	(1.23)	(2.33)	(2.33)				
	Losses	5.49	5.66	5.99	6.37	6.70	0.4%	1.1%	0.6%	0.6%
	Total	54.85	56.56	59.86	63.66	66.95	0.4%	1.1%	0.6%	0.6%
TA3	Tacoma Water - Other Pierce Co.									
	Single Family Residential	2.95	4.41	5.27	6.29	7.84	5.1%	3.7%	1.8%	3.3%
	Multi-family Residential	0.57	0.77	1.01	1.20	1.45	3.8%	5.5%	1.7%	3.3%
	Non-Residential	0.57	0.72	0.82	1.04	4.22	3.0%	2.7%	2.4%	2.6%
	Discrete Large Demands	0.20	4.00	5.25	6.50	6.50	45.2%	5.6%	2.2%	16.3%
	New Code Savings		(0.18)	(0.32)	(0.59)	(0.59)				
	Losses	0.48	1.08	1.34	1.60	2.16	10.7%	4.4%	1.8%	5.4%
	Total	4.77	10.79	13.37	16.04	21.58	10.7%	4.4%	1.8%	5.4%
TA4	Tacoma Water - King Co.									
	Single Family Residential	0.76	0.94	1.03	1.22	1.52	2.7%	1.9%	1.7%	2.1%
	Multi-family Residential	0.10	0.12	0.12	0.16	0.18	3.2%	0.1%	2.3%	2.2%
	Non-Residential	0.07	0.07	0.08	0.07	0.11	1.1%	1.0%	-0.3%	0.5%
	New Code Savings		(0.01)	(0.03)	(0.09)	(0.09)				
	Losses	0.10	0.12	0.13	0.15	0.19	2.5%	1.3%	1.3%	1.7%
	Total	1.02	1.25	1.33	1.51	1.90	2.5%	1.3%	1.3%	1.7%
	Other Pierce County									
	Single Family Residential	13.68	14.65	15.39	16.31	20.71	0.9%	1.0%	0.6%	0.8%
	Multi-family Residential	1.58	1.67	1.69	1.72	2.61	0.7%	0.2%	0.1%	0.4%
	Non-Residential	4.42	4.55	4.63	4.80	6.00	0.4%	0.4%	0.4%	0.4%
	New Code Savings		(0.67)	(1.01)	(1.63)	(1.63)				
	Losses	2.95	3.13	3.26	3.42	4.40	0.7%	0.8%	0.5%	0.6%
	Total	22.63	23.33	23.96	24.63	32.09	0.4%	0.5%	0.3%	0.4%
	Total County Demand	125.20	139.39	151.00	165.75	185.61	1.4%	1.6%	0.9%	1.2%
	Total County Population	683,492	797,578	878,958	997,621	1,089,259	1.9%	2.0%	1.3%	1.7%
	Gallons per Capita per Day	183.2	174.8	171.8	166.1	170.4	-0.6%	-0.3%	-0.3%	-0.4%

Table VIII–9

Historical and Projected Discrete Large Demands

Base Case

(Million Gallons per Day)

Code	Utility Service Area	1997	2005	2010	2020	Maximum Buildout	Compounded Average Annual Growth Rates 1997 - 2005	2005-2010	2010-2020	1997-2020
BA9	City of Buckley									
	Rainier School	0.28	0.28	0.28	0.28	0.28	0.0%	0.0%	0.0%	0.0%
	Washington State University	0.04	0.04	0.04	0.04	0.04	0.0%	0.0%	0.0%	0.0%
	Total	0.32	0.32	0.32	0.32	0.32	0.0%	0.0%	0.0%	0.0%
PA16	City of Puyallup									
	Matsushita Semiconductors	1.01	0.00	0.00	0.00	0.00	-100.0%	n/a	n/a	-100.0%
	Air Products	0.05	0.05	0.05	0.05	0.05	0.0%	0.0%	0.0%	0.0%
	Total	1.07	0.05	0.05	0.05	0.05	-31.0%	0.0%	0.0%	-12.1%
TA2	Tacoma Water - Tacoma									
	Simpson	21.97	18.00	18.00	18.00	18.00	-2.5%	0.0%	0.0%	-0.9%
	Ten other large customers	5.41	7.42	8.28	10.04	10.04	4.0%	2.2%	1.9%	2.7%
	Total	27.38	25.42	26.28	28.04	28.04	-0.9%	0.7%	0.6%	0.1%
TA3	Tacoma Water - Other Pierce Co.									
	Three large customers	0.20	4.00	5.25	6.50	6.50	45.2%	5.6%	2.2%	16.3%
	Total	0.20	4.00	5.25	6.50	6.50	45.2%	5.6%	2.2%	16.3%
Total Discrete Large Demands		28.96	29.79	31.90	34.91	34.91	0.4%	1.4%	0.9%	0.8%

Table VIII-10

Historical and Projected Average Daily Demands by Water Use Area

Base Case

(Million Gallons per Day)

Code	Utility Service Area	1997	2005	2010	2020	Maximum Buildout	Compounded Average Annual Growth Rates 1997 - 2005	2005-2010	2010-2020	1997-2020
BA6	City of Bonney Lake	2.16	2.85	3.34	3.87	3.95	3.5%	3.3%	1.5%	2.6%
BA9	City of Buckley	0.87	1.03	1.15	1.18	1.14	2.2%	2.2%	0.2%	1.4%
FA3	City of Fife	1.28	1.44	1.57	1.65	1.72	1.5%	1.7%	0.5%	1.1%
FA4	Fircrest	0.82	0.91	0.97	1.09	1.13	1.3%	1.4%	1.2%	1.2%
FA5	Firgrove Mutual, Inc.	1.79	2.42	2.86	3.32	4.16	3.8%	3.4%	1.5%	2.7%
FA15	Fruitland Mutual Water Company	1.38	1.61	1.84	1.98	1.99	1.9%	2.7%	0.8%	1.6%
GA3	Gig Harbor Water Department	0.76	1.11	1.40	1.60	1.17	4.8%	4.8%	1.4%	3.3%
HA2	Harbor Springs	0.03	0.05	0.06	0.07	0.08	4.3%	3.6%	2.3%	3.3%
LA7	Lakewood Water District	8.58	8.87	9.07	11.24	11.24	0.4%	0.4%	2.2%	1.2%
MA12	City of Milton	0.74	0.89	0.98	1.07	1.15	2.2%	2.1%	0.9%	1.6%
MA22	Mt. View Edgewood	0.78	0.90	0.97	1.06	1.06	1.8%	1.5%	0.9%	1.3%
OA5	City of Orting	0.40	0.60	0.74	0.90	1.00	5.3%	4.3%	1.9%	3.6%
PA2	Parkland Light & Water	3.52	3.33	3.56	3.64	4.18	-0.7%	1.4%	0.2%	0.1%
PA4	Peacock Hill	0.37	0.38	0.39	0.48	0.78	0.5%	0.6%	2.0%	1.2%
PA16	City of Puyallup	4.64	4.63	5.41	6.52	6.43	0.0%	3.1%	1.9%	1.5%
SA18	South East Tacoma Mutual Water Co	1.58	1.61	1.71	1.75	2.10	0.2%	1.2%	0.2%	0.4%
SA19	Southwood - Rainier View	2.36	2.75	3.03	3.68	4.25	1.9%	1.9%	2.0%	1.9%
SA22	Spanaway Water Company	2.18	3.05	3.60	4.17	3.94	4.3%	3.3%	1.5%	2.9%
SA24	Steilacoom	0.64	0.73	0.80	0.84	0.96	1.8%	1.7%	0.5%	1.2%
SA25	Stroh Water System	0.27	0.31	0.34	0.35	0.43	1.8%	1.9%	0.3%	1.2%
SA26	Summit	1.84	1.89	1.93	2.10	2.44	0.3%	0.4%	0.8%	0.6%
SA27	City of Sumner	1.27	1.65	1.90	2.07	2.86	3.4%	2.9%	0.9%	2.2%
TA1	Tacoma Water - UP	3.66	4.43	4.84	5.28	4.92	2.4%	1.8%	0.9%	1.6%
TA2	Tacoma Water - Tacoma	54.85	56.56	59.86	63.66	66.95	0.4%	1.1%	0.6%	0.6%
TA3	Tacoma Water - Other Pierce Co.	4.77	10.79	13.37	16.04	21.58	10.7%	4.4%	1.8%	5.4%
TA4	Tacoma Water - King Co.	1.02	1.25	1.33	1.51	1.90	2.5%	1.3%	1.3%	1.7%
	Other Pierce County	22.63	23.33	23.96	24.63	32.09	0.4%	0.5%	0.3%	0.4%
	Total	125.20	139.39	151.00	165.75	185.61	1.4%	1.6%	0.9%	1.2%

Table VIII-11

Historical and Projected Average Daily Demands by Demand Type
Base Case
(Million Gallons per Day)

Customer Class	1997	2005	2010	2020	Maximum Buildout	Compounded Average Annual Growth Rates 1997 - 2005	2005-2010	2010-2020	1997-2020
Single Family Residential	51.4	61.8	67.4	74.8	82.6	2.3%	1.7%	1.1%	1.6%
Multi-family Residential	12.7	15.4	18.4	21.7	22.8	2.4%	3.6%	1.7%	2.4%
Non-Residential	18.1	20.3	22.0	25.3	33.9	1.5%	1.6%	1.4%	1.5%
Discrete Large Demands	29.0	29.8	31.9	34.9	34.9	0.4%	1.4%	0.9%	0.8%
Total Consumption	111.2	127.3	139.7	156.7	174.3	1.7%	1.9%	1.2%	1.5%
New Code Savings		(3.1)	(5.2)	(9.0)	(9.0)		10.5%	5.8%	n/a
Losses	14.0	15.2	16.5	18.1	20.4	1.0%	1.6%	0.9%	1.1%
Total County Demands	125.20	139.39	151.00	165.75	185.61	1.4%	1.6%	0.9%	1.2%
County Population	683,492	797,578	878,958	997,621	1,089,259	1.9%	2.0%	1.3%	1.7%
Single Family Households	196,123	233,456	253,825	280,890	308,905	2.2%	1.7%	1.0%	1.6%
Multi-family Households	64,559	76,572	91,405	107,787	113,874	2.2%	3.6%	1.7%	2.3%
County Employment	267,587	308,248	333,660	384,489	483,390	1.8%	1.6%	1.4%	1.6%
Single Family Res. Consumption (gphd)[1]	262.1	264.9	265.5	266.3	267.5	0.1%	0.0%	0.0%	0.1%
Multi-family Res. Consumption (gphd)	196.9	200.6	200.9	201.5	200.1	0.2%	0.0%	0.0%	0.1%
Non-Residential Consumption (gped)[2]	175.8	162.6	161.6	156.6	142.4	-1.0%	-0.1%	-0.3%	-0.5%
Non-residential without Simpson (gped)	93.7	104.2	107.6	109.8	105.2	1.3%	0.7%	0.2%	0.7%
Total Average Daily Demands (gpcd)[3]	183.2	174.8	171.8	166.1	170.4	-0.6%	-0.3%	-0.3%	-0.4%
Total without Simpson (gpcd)	151.0	152.2	151.3	148.1	153.9	0.1%	-0.1%	-0.2%	-0.1%

[1] gallons per household per day
[2] gallons per employee per day
[3] gallons per capita per day

Table VIII-1

Historical and Projected Population and Maximum Buildout[1]
High Case

Code	Utility Service Area	1997	2005	2010	2020	Maximum Buildout[2]	Compounded Average Annual Growth Rates 1997 - 2005	2005 - 2010	2010 - 2020	1997 - 2020
BA6	City of Bonney Lake	20,222	31,800	40,900	52,200	60,258	5.8%	5.2%	2.5%	4.2%
BA9	City of Buckley	4,022	6,700	8,800	9,300	10,200	6.6%	5.6%	0.6%	3.7%
FA3	City of Fife	4,187	7,800	10,600	12,400	13,600	8.1%	6.3%	1.6%	4.8%
FA4	Fircrest	6,099	7,000	7,700	9,800	10,800	1.7%	1.9%	2.4%	2.1%
FA5	Firgrove Mutual, Inc.	14,400	21,000	26,200	33,200	59,644	4.8%	4.5%	2.4%	3.7%
FA15	Fruitland Mutual Water Company	6,250	10,000	12,900	15,500	19,990	6.1%	5.2%	1.9%	4.0%
GA3	Gig Harbor Water Department	4,439	10,800	15,800	20,400	22,400	11.8%	7.9%	2.6%	6.9%
HA2	Harbor Springs	255	300	400	600	1,119	2.1%	5.9%	4.1%	3.8%
LA7	Lakewood Water District	62,300	69,500	75,100	117,200	128,900	1.4%	1.6%	4.6%	2.8%
MA12	City of Milton	5,376	6,800	7,900	9,600	10,804	3.0%	3.0%	2.0%	2.6%
MA22	Mt. View Edgewood	7,409	9,500	11,200	13,500	14,900	3.2%	3.3%	1.9%	2.6%
OA5	City of Orting	2,749	6,200	8,900	11,500	15,000	10.7%	7.5%	2.6%	6.4%
PA2	Parkland Light & Water	20,616	22,700	25,000	29,600	37,700	1.2%	1.9%	1.7%	1.6%
PA4	Peacock Hill	2,796	3,100	3,300	4,900	12,941	1.3%	1.3%	4.0%	2.5%
PA16	City of Puyallup	29,910	40,100	48,000	66,900	73,600	3.7%	3.7%	3.4%	3.6%
SA18	South East Tacoma Mutual Water Co	11,044	12,900	14,900	14,700	20,961	2.0%	2.9%	-0.1%	1.3%
SA19	Southwood - Rainier View	19,670	35,568	45,508	48,154	52,210	7.7%	5.1%	0.6%	4.0%
SA22	Spanaway Water Company	17,000	26,500	34,900	40,850	55,923	5.7%	5.7%	1.6%	3.9%
SA24	Steilacoom	4,828	6,300	7,500	8,600	9,500	3.4%	3.5%	1.4%	2.5%
SA25	Stroh Water System	1,870	2,500	3,000	3,100	5,747	3.7%	3.7%	0.3%	2.2%
SA26	Summit	13,000	14,200	15,100	18,200	21,019	1.1%	1.2%	1.9%	1.5%
SA27	City of Sumner	7,781	11,300	14,000	14,600	18,205	4.8%	4.4%	0.4%	2.8%
TA1	Tacoma Water - UP	29,490	33,300	36,300	45,200	48,000	1.5%	1.7%	2.2%	1.9%
TA2	Tacoma Water - Tacoma	185,600	229,100	263,100	299,700	320,000	2.7%	2.8%	1.3%	2.1%
TA3	Tacoma Water - Other Pierce Co.	35,069	56,400	73,100	94,800	120,000	6.1%	5.3%	2.6%	4.4%
TA4	Tacoma Water - King Co.	9,192	11,200	12,600	15,600	20,000	2.5%	2.4%	2.2%	2.3%
	Other Pierce County	157,918	176,900	189,600	211,650	300,000	1.4%	1.4%	1.1%	1.3%
	Total	683,492	869,468	1,012,308	1,221,754	1,483,421	3.1%	3.1%	1.9%	2.6%

[1] 1997 population data derived from Pierce County Assessor/Treasurer data; projections based on Puget Sound Regional Council data adjusted for local conditions.
[2] Maximum buildout for unincorporated lands is based on the Pierce County Comprehensive Plan, 1997. Maximum buildout for incorporated lands was taken from local plans when available.

Table VIII-2

Historical and Projected Single Family Households and Maximum Buildout[1]
High Case

Code	Utility Service Area	1997	2005	2010	2020	Maximum Buildout[2]	Compounded Average Annual Growth Rates 1997 - 2005	2005 - 2010	2010 - 2020	1997 - 2020
BA6	City of Bonney Lake	6,281	9,942	12,834	16,202	18,703	5.9%	5.2%	2.4%	4.2%
BA9	City of Buckley	1,048	1,952	2,680	2,890	3,170	8.1%	6.5%	0.8%	4.5%
FA3	City of Fife	666	1,158	2,122	2,570	2,819	7.2%	12.9%	1.9%	6.0%
FA4	Fircrest	1,999	2,355	2,636	3,237	3,567	2.1%	2.3%	2.1%	2.1%
FA5	Firgrove Mutual, Inc.	3,712	5,832	7,523	9,476	17,024	5.8%	5.2%	2.3%	4.2%
FA15	Fruitland Mutual Water Company	1,325	2,178	2,848	3,402	4,387	6.4%	5.5%	1.8%	4.2%
GA3	Gig Harbor Water Department	1,165	2,887	4,114	5,045	5,540	12.0%	7.3%	2.1%	6.6%
HA2	Harbor Springs	104	136	190	282	526	3.4%	6.9%	4.0%	4.4%
LA7	Lakewood Water District	15,617	16,606	17,418	26,703	26,703	0.8%	1.0%	4.4%	2.4%
MA12	City of Milton	1,611	2,146	2,474	2,848	3,205	3.6%	2.9%	1.4%	2.5%
MA22	Mt. View Edgewood	2,469	3,151	3,587	4,173	4,173	3.1%	2.6%	1.5%	2.3%
OA5	City of Orting	1,056	2,161	2,950	3,827	4,992	9.4%	6.4%	2.6%	5.8%
PA2	Parkland Light & Water	5,897	6,978	7,692	8,245	10,501	2.1%	2.0%	0.7%	1.5%
PA4	Peacock Hill	1,005	1,072	1,118	1,626	4,294	0.8%	0.8%	3.8%	2.1%
PA16	City of Puyallup	7,890	11,947	14,634	19,599	21,562	5.3%	4.1%	3.0%	4.0%
SA18	South East Tacoma Mutual Water Co	2,285	2,412	2,726	2,745	3,914	0.7%	2.5%	0.1%	0.8%
SA19	Southwood - Rainier View	6,663	12,048	15,416	16,312	17,686	7.7%	5.1%	0.6%	4.0%
SA22	Spanaway Water Company	4,900	7,950	10,142	11,528	17,723	6.2%	5.0%	1.3%	3.8%
SA24	Steilacoom	1,589	2,088	2,440	2,696	2,978	3.5%	3.2%	1.0%	2.3%
SA25	Stroh Water System	575	737	871	889	1,648	3.2%	3.4%	0.2%	1.9%
SA26	Summit	5,155	5,487	5,746	6,856	7,918	0.8%	0.9%	1.8%	1.2%
SA27	City of Sumner	2,043	2,981	3,488	3,578	4,461	4.8%	3.2%	0.3%	2.5%
TA1	Tacoma Water - UP	6,450	8,029	8,957	10,642	11,301	2.8%	2.2%	1.7%	2.2%
TA2	Tacoma Water - Tacoma	51,175	65,392	71,052	76,460	81,639	3.1%	1.7%	0.7%	1.8%
TA3	Tacoma Water - Other Pierce Co.	11,539	18,900	24,296	31,291	39,609	6.4%	5.2%	2.6%	4.4%
TA4	Tacoma Water - King Co.	3,033	3,826	4,380	5,573	7,145	2.9%	2.7%	2.4%	2.7%
	Other Pierce County	48,871	54,737	59,088	66,041	91,690	1.4%	1.5%	1.1%	1.3%
	Total	196,123	255,088	293,422	344,736	418,878	3.3%	2.8%	1.6%	2.5%

[1] 1997 household data derived from Pierce County Assessor/Treasurer data; projections based on Puget Sound Regional Council data adjusted for local conditions.
[2] Maximum buildout based on population maximum buildout esimates.

Table VIII–3

Historical and Projected Multi-family Households and Maximum Buildout[1]
High Case

Code	Utility Service Area	1997	2005	2010	2020	Maximum Buildout[2]	Compounded Average Annual Growth Rates 1997 - 2005	2005 - 2010	2010 - 2020	1997 - 2020
BA6	City of Bonney Lake	684	1,105	1,426	1,800	2,078	6.2%	5.2%	2.4%	4.3%
BA9	City of Buckley	137	266	365	394	432	8.6%	6.5%	0.8%	4.7%
FA3	City of Fife	1,380	2,461	2,701	3,271	3,588	7.5%	1.9%	1.9%	3.8%
FA4	Fircrest	524	626	701	967	1,066	2.2%	2.3%	3.3%	2.7%
FA5	Firgrove Mutual, Inc.	815	1,280	1,651	2,080	3,737	5.8%	5.2%	2.3%	4.2%
FA15	Fruitland Mutual Water Company	989	1,643	2,149	2,566	3,309	6.6%	5.5%	1.8%	4.2%
GA3	Gig Harbor Water Department	653	1,624	2,522	3,363	3,693	12.1%	9.2%	2.9%	7.4%
HA2	Harbor Springs	0	0	0	0	0	n/a	n/a	n/a	n/a
LA7	Lakewood Water District	12,195	13,048	13,686	20,981	20,981	0.8%	1.0%	4.4%	2.4%
MA12	City of Milton	463	641	869	1,163	1,309	4.2%	6.3%	3.0%	4.1%
MA22	Mt. View Edgewood	386	513	735	979	979	3.6%	7.5%	2.9%	4.1%
OA5	City of Orting	61	138	256	425	554	10.7%	13.2%	5.2%	8.8%
PA2	Parkland Light & Water	1,181	1,429	1,923	2,326	2,963	2.4%	6.1%	1.9%	3.0%
PA4	Peacock Hill	115	132	138	201	531	1.7%	0.9%	3.8%	2.5%
PA16	City of Puyallup	2,118	3,370	4,878	7,249	7,975	6.0%	7.7%	4.0%	5.5%
SA18	South East Tacoma Mutual Water Co	2,964	3,197	3,614	3,638	5,187	1.0%	2.5%	0.1%	0.9%
SA19	Southwood - Rainier View	263	476	608	644	698	7.7%	5.0%	0.6%	4.0%
SA22	Spanaway Water Company	1,200	1,865	2,865	3,920	2,648	5.7%	9.0%	3.2%	5.3%
SA24	Steilacoom	362	490	649	805	889	3.9%	5.8%	2.2%	3.5%
SA25	Stroh Water System	213	287	339	346	641	3.8%	3.4%	0.2%	2.1%
SA26	Summit	145	170	178	212	245	2.0%	0.9%	1.8%	1.7%
SA27	City of Sumner	1,114	1,677	2,325	2,385	2,974	5.2%	6.8%	0.3%	3.4%
TA1	Tacoma Water - UP	4,195	5,353	6,486	8,361	8,879	3.1%	3.9%	2.6%	3.0%
TA2	Tacoma Water - Tacoma	22,763	29,379	39,967	48,884	52,195	3.2%	6.3%	2.0%	3.4%
TA3	Tacoma Water - Other Pierce Co.	1,426	2,100	3,003	3,867	4,895	5.0%	7.4%	2.6%	4.4%
TA4	Tacoma Water - King Co.	318	402	460	585	750	3.0%	2.7%	2.4%	2.7%
	Other Pierce County	7,895	8,702	8,869	9,468	16,181	1.2%	0.4%	0.7%	0.8%
	Total	64,559	82,374	103,363	130,880	149,377	3.1%	4.6%	2.4%	3.1%

[1] 1997 household data derived from Pierce County Assessor/Treasurer data; projections based on Puget Sound Regional Council data adjusted for local conditions.
[2] Maximum buildout based on population maximum buildout esimates.

Table VIII–4

Historical and Projected Employment and Maximum Buildout[1]
High Case

Code	Utility Service Area	1997	2005	2010	2020	Maximum Buildout[2]	Compounded Average Annual Growth Rates 1997 - 2005	2005 - 2010	2010 - 2020	1997 - 2020
BA6	City of Bonney Lake	2,206	3,444	4,327	5,992	11,149	5.7%	4.7%	3.3%	4.4%
BA9	City of Buckley	2,567	3,001	3,249	3,293	3,800	2.0%	1.6%	0.1%	1.1%
FA3	City of Fife	9,694	11,602	12,559	13,137	15,100	2.3%	1.6%	0.5%	1.3%
FA4	Fircrest	538	844	1,055	1,557	1,800	5.8%	4.6%	4.0%	4.7%
FA5	Firgrove Mutual, Inc.	2,064	3,777	5,026	7,534	21,191	7.8%	5.9%	4.1%	5.8%
FA15	Fruitland Mutual Water Company	4,535	5,220	5,611	5,931	9,761	1.8%	1.5%	0.6%	1.2%
GA3	Gig Harbor Water Department	3,447	4,350	4,736	5,023	13,374	3.0%	1.7%	0.6%	1.7%
HA2	Harbor Springs	5	48	88	180	200	32.7%	12.9%	7.4%	16.9%
LA7	Lakewood Water District	19,036	24,345	28,013	39,902	45,900	3.1%	2.8%	3.6%	3.3%
MA12	City of Milton	1,358	1,766	2,054	2,621	2,728	3.3%	3.1%	2.5%	2.9%
MA22	Mt. View Edgewood	684	1,260	1,680	2,527	2,900	7.9%	5.9%	4.2%	5.8%
OA5	City of Orting	496	618	672	713	841	2.8%	1.7%	0.6%	1.6%
PA2	Parkland Light & Water	5,912	7,090	7,992	9,903	18,433	2.3%	2.4%	2.2%	2.3%
PA4	Peacock Hill	105	279	391	711	900	13.0%	7.0%	6.2%	8.7%
PA16	City of Puyallup	13,543	18,401	21,845	29,584	49,442	3.9%	3.5%	3.1%	3.5%
SA18	South East Tacoma Mutual Water Co	2,185	2,927	3,492	4,287	8,921	3.7%	3.6%	2.1%	3.0%
SA19	Southwood - Rainier View	1,400	3,666	5,320	6,443	19,255	12.8%	7.7%	1.9%	6.9%
SA22	Spanaway Water Company	2,662	3,888	4,772	6,526	12,134	4.8%	4.2%	3.2%	4.0%
SA24	Steilacoom	1,193	1,389	1,540	1,745	2,000	1.9%	2.1%	1.3%	1.7%
SA25	Stroh Water System	416	625	777	1,002	1,302	5.2%	4.4%	2.6%	3.9%
SA26	Summit	2,093	2,615	2,966	3,823	7,113	2.8%	2.6%	2.6%	2.7%
SA27	City of Sumner	4,315	7,343	9,494	13,003	15,617	6.9%	5.3%	3.2%	4.9%
TA1	Tacoma Water - UP	5,448	6,381	7,046	8,661	9,808	2.0%	2.0%	2.1%	2.0%
TA2	Tacoma Water - Tacoma	106,898	134,653	154,506	189,941	202,785	2.9%	2.8%	2.1%	2.5%
TA3	Tacoma Water - Other Pierce Co.	5,543	8,406	10,420	14,199	55,697	5.3%	4.4%	3.1%	4.2%
TA4	Tacoma Water - King Co.	1,317	1,535	1,686	2,007	2,593	1.9%	1.9%	1.8%	1.8%
	Other Pierce County	67,927	73,134	76,879	82,889	114,382	0.9%	1.0%	0.8%	0.9%
	Total	267,587	332,607	378,196	463,134	649,126	2.8%	2.6%	2.0%	2.4%

[1] 1997 employment data derived from Pierce County Assessor/Treasurer data; projections based on Puget Sound Regional Council data adjusted for local conditions.

[2] Maximum buildout for unincorporated lands is based on the Pierce County Comprehensive Plan, 1997. Maximum buildout figures do not take into consideration maximum buildout for incorporated portions of service areas.

Table VIII-5

Historical and Projected Population per Household
High Case

Code	Utility Service Area	1997	2005	2010	2020	Maximum Buildout
BA6	City of Bonney Lake	2.9	2.9	2.9	2.9	2.9
BA9	City of Buckley	3.4	3.0	2.9	2.8	2.8
FA3	City of Fife	2.0	2.2	2.2	2.1	2.1
FA4	Fircrest	2.4	2.3	2.3	2.3	2.3
FA5	Firgrove Mutual, Inc.	3.2	3.0	2.9	2.9	2.9
FA15	Fruitland Mutual Water Company	2.7	2.6	2.6	2.6	2.6
GA3	Gig Harbor Water Department	2.4	2.4	2.4	2.4	2.4
HA2	Harbor Springs	2.5	2.2	2.1	2.1	2.1
LA7	Lakewood Water District	2.2	2.3	2.4	2.5	2.7
MA12	City of Milton	2.6	2.4	2.4	2.4	2.4
MA22	Mt. View Edgewood	2.6	2.6	2.6	2.6	2.9
OA5	City of Orting	2.5	2.7	2.8	2.7	2.7
PA2	Parkland Light & Water	2.9	2.7	2.6	2.8	2.8
PA4	Peacock Hill	2.5	2.6	2.6	2.7	2.7
PA16	City of Puyallup	3.0	2.6	2.5	2.5	2.5
SA18	South East Tacoma Mutual Water Co	2.1	2.3	2.4	2.3	2.3
SA19	Southwood - Rainier View	2.8	2.8	2.8	2.8	2.8
SA22	Spanaway Water Company	2.8	2.7	2.7	2.6	2.7
SA24	Steilacoom	2.5	2.4	2.4	2.5	2.5
SA25	Stroh Water System	2.4	2.4	2.5	2.5	2.5
SA26	Summit	2.5	2.5	2.5	2.6	2.6
SA27	City of Sumner	2.5	2.4	2.4	2.4	2.4
TA1	Tacoma Water - UP	2.8	2.5	2.4	2.4	2.4
TA2	Tacoma Water - Tacoma	2.5	2.4	2.4	2.4	2.4
TA3	Tacoma Water - Other Pierce Co.	2.7	2.7	2.7	2.7	2.7
TA4	Tacoma Water - King Co.	2.7	2.6	2.6	2.5	2.5
	Other Pierce County	2.8	2.8	2.8	2.8	2.8
	Total	2.6	2.6	2.6	2.6	2.6

Table VIII-6

Historical and Projected Population per Employee Working in Service Area High Case

Code	Utility Service Area	1997	2005	2010	2020	Maximum Buildout
BA6	City of Bonney Lake	9.2	9.2	9.5	8.7	5.4
BA9	City of Buckley	1.6	2.2	2.7	2.8	2.7
FA3	City of Fife	0.4	0.7	0.8	0.9	0.9
FA4	Fircrest	11.3	8.3	7.3	6.3	6.0
FA5	Firgrove Mutual, Inc.	7.0	5.6	5.2	4.4	2.8
FA15	Fruitland Mutual Water Company	1.4	1.9	2.3	2.6	2.0
GA3	Gig Harbor Water Department	1.3	2.5	3.3	4.1	1.7
HA2	Harbor Springs	51.0	6.3	4.5	3.3	5.6
LA7	Lakewood Water District	3.3	2.9	2.7	2.9	2.8
MA12	City of Milton	4.0	3.9	3.8	3.7	4.0
MA22	Mt. View Edgewood	10.8	7.5	6.7	5.3	5.1
OA5	City of Orting	5.5	10.0	13.2	16.1	17.8
PA2	Parkland Light & Water	3.5	3.2	3.1	3.0	2.0
PA4	Peacock Hill	26.6	11.1	8.4	6.9	14.4
PA16	City of Puyallup	2.2	2.2	2.2	2.3	1.5
SA18	South East Tacoma Mutual Water Co	5.1	4.4	4.3	3.4	2.3
SA19	Southwood - Rainier View	14.1	9.7	8.6	7.5	2.7
SA22	Spanaway Water Company	6.4	6.8	7.3	6.3	4.6
SA24	Steilacoom	4.0	4.5	4.9	4.9	4.8
SA25	Stroh Water System	4.5	4.0	3.9	3.1	4.4
SA26	Summit	6.2	5.4	5.1	4.8	3.0
SA27	City of Sumner	1.8	1.5	1.5	1.1	1.2
TA1	Tacoma Water - UP	5.4	5.2	5.2	5.2	4.9
TA2	Tacoma Water - Tacoma	1.7	1.7	1.7	1.6	1.6
TA3	Tacoma Water - Other Pierce Co.	6.3	6.7	7.0	6.7	2.2
TA4	Tacoma Water - King Co.	7.0	7.3	7.5	7.8	7.7
	Other Pierce County	2.3	2.4	2.5	2.6	2.6
	Total	2.6	2.6	2.7	2.6	2.3

Table VIII-7

Water Usage Assumptions
High Case

Code	Utility Service Area	Residential gphd[1] Single Family	Multi-Family	Non-Res gped[2]	Losses
BA6	City of Bonney Lake	286	116	79	5.0%
BA9	City of Buckley	209	167	32	26.0%
FA3	City of Fife	223	199	81	5.0%
FA4	Fircrest	280	200	65	15.0%
FA5	Firgrove Mutual, Inc.	353	271	55	8.0%
FA15	Fruitland Mutual Water Company	350	227	66	23.0%
GA3	Gig Harbor Water Department	262	238	57	6.0%
HA2	Harbor Springs	280	200	65	15.0%
LA7	Lakewood Water District	285	182	75	5.7%
MA12	City of Milton	280	200	65	15.0%
MA22	Mt. View Edgewood	256	89	30	11.9%
OA5	City of Orting	280	200	65	15.0%
PA2	Parkland Light & Water	313	200	83	14.0%
PA4	Peacock Hill	280	200	65	15.0%
PA16	City of Puyallup	227	325	69	3.5%
SA18	South East Tacoma Mutual Water Co	273	211	83	9.6%
SA19	Southwood - Rainier View	280	200	65	15.0%
SA22	Spanaway Water Company	272	182	64	26.8%
SA24	Steilacoom	276	209	77	5.1%
SA25	Stroh Water System	280	200	65	15.0%
SA26	Summit	238	200	80	22.8%
SA27	City of Sumner	280	200	65	15.0%
TA1	Tacoma Water - UP	283	278	80	10.0%
TA2	Tacoma Water - Tacoma	226	174	57	10.0%
TA3	Tacoma Water - Other Pierce Co.	283	278	80	10.0%
TA4	Tacoma Water - King Co.	283	278	80	10.0%
	Other Pierce County	280	200	65	15.0%

[1] gallons per household per day
[2] gallons per employee per day

Table VIII-8

Historical and Projected Water Use Demand Components
High Case
(Million Gallons per Day)

Code	Utility Service Area	1997	2005	2010	2020	Maximum Buildout	Compounded Average Annual Growth Rates 1997 - 2005	2005 - 2010	2010 - 2020	1997 - 2020
BA6	City of Bonney Lake									
	Single Family Residential	1.79	2.84	3.67	4.63	5.34	5.9%	5.2%	2.4%	4.2%
	Multi-family Residential	0.08	0.13	0.17	0.21	0.24	6.2%	5.2%	2.4%	4.3%
	Non-Residential	0.18	0.27	0.34	0.48	0.89	5.7%	4.7%	3.3%	4.4%
	New Code Savings		(0.17)	(0.29)	(0.46)	(0.46)				
	Losses	0.11	0.16	0.20	0.26	0.32	5.2%	4.8%	2.2%	3.8%
	Total	2.16	3.24	4.09	5.11	6.32	5.2%	4.8%	2.2%	3.8%
BA9	City of Buckley									
	Single Family Residential	0.22	0.41	0.56	0.60	0.66	8.1%	6.5%	0.8%	4.5%
	Multi-family Residential	0.02	0.04	0.06	0.07	0.07	8.6%	6.5%	0.8%	4.7%
	Non-Residential	0.08	0.10	0.10	0.11	0.12	2.0%	1.6%	0.1%	1.1%
	Discrete Large Demands	0.32	0.32	0.32	0.32	0.32	0.0%	0.0%	0.0%	0.0%
	New Code Savings		(0.03)	(0.05)	(0.07)	(0.07)				
	Losses	0.23	0.29	0.35	0.36	0.39	3.4%	3.5%	0.4%	2.1%
	Total	0.87	1.13	1.34	1.39	1.50	3.4%	3.5%	0.4%	2.1%
FA3	City of Fife									
	Single Family Residential	0.15	0.26	0.47	0.57	0.63	7.2%	12.9%	1.9%	6.0%
	Multi-family Residential	0.27	0.49	0.54	0.65	0.71	7.5%	1.9%	1.9%	3.8%
	Non-Residential	0.79	0.94	1.02	1.07	1.23	2.3%	1.6%	0.5%	1.3%
	New Code Savings		(0.08)	(0.13)	(0.19)	(0.19)				
	Losses	0.06	0.09	0.10	0.11	0.13	3.7%	3.3%	1.0%	2.4%
	Total	1.28	1.70	2.01	2.22	2.51	3.7%	3.3%	1.0%	2.4%
FA4	Fircrest									
	Single Family Residential	0.56	0.66	0.74	0.91	1.00	2.1%	2.3%	2.1%	2.1%
	Multi-family Residential	0.10	0.13	0.14	0.19	0.21	2.2%	2.3%	3.3%	2.7%
	Non-Residential	0.03	0.05	0.07	0.10	0.12	5.8%	4.6%	4.0%	4.7%
	New Code Savings		(0.03)	(0.05)	(0.10)	(0.10)				
	Losses	0.12	0.14	0.16	0.20	0.22	1.8%	2.1%	2.1%	2.0%
	Total	0.82	0.95	1.05	1.30	1.45	1.8%	2.1%	2.1%	2.0%
FA5	Firgrove Mutual, Inc.									
	Single Family Residential	1.31	2.06	2.66	3.35	6.01	5.8%	5.2%	2.3%	4.2%
	Multi-family Residential	0.22	0.35	0.45	0.56	1.01	5.8%	5.2%	2.3%	4.2%
	Non-Residential	0.11	0.21	0.28	0.42	1.18	7.8%	5.9%	4.1%	5.8%
	New Code Savings		(0.14)	(0.24)	(0.38)	(0.38)				
	Losses	0.14	0.22	0.27	0.34	0.68	5.3%	4.9%	2.3%	3.9%
	Total	1.79	2.70	3.42	4.30	8.51	5.3%	4.9%	2.3%	3.9%
FA15	Fruitland Mutual Water Company									
	Single Family Residential	0.54	0.76	1.00	1.19	1.54	4.3%	5.5%	1.8%	3.5%
	Multi-family Residential	0.22	0.37	0.49	0.58	0.75	6.6%	5.5%	1.8%	4.2%
	Non-Residential	0.30	0.34	0.37	0.39	0.64	1.8%	1.5%	0.6%	1.2%
	New Code Savings		(0.07)	(0.12)	(0.18)	(0.18)				
	Losses	0.32	0.42	0.52	0.59	0.82	3.6%	4.2%	1.3%	2.7%
	Total	1.38	1.84	2.25	2.58	3.57	3.6%	4.2%	1.3%	2.7%
GA3	Gig Harbor Water Department									
	Single Family Residential	0.30	0.76	1.08	1.32	1.45	12.0%	7.3%	2.1%	6.6%
	Multi-family Residential	0.16	0.39	0.60	0.80	0.88	12.1%	9.2%	2.9%	7.4%
	Non-Residential	0.20	0.25	0.27	0.29	0.76	3.0%	1.7%	0.6%	1.7%
	New Code Savings		(0.09)	(0.15)	(0.22)	(0.22)				
	Losses	0.11	0.08	0.11	0.14	0.18	-3.0%	6.6%	2.0%	1.2%
	Total	0.76	1.38	1.90	2.32	3.05	7.7%	6.6%	2.0%	5.0%
HA2	Harbor Springs									
	Single Family Residential	0.03	0.04	0.05	0.08	0.15	3.4%	6.9%	4.0%	4.4%
	Multi-family Residential	0.00	0.00	0.00	0.00	0.00	n/a	n/a	n/a	n/a
	Non-Residential	0.00	0.00	0.01	0.01	0.01	32.7%	12.9%	7.4%	16.9%
	New Code Savings		(0.00)	(0.00)	(0.01)	(0.01)				
	Losses	0.01	0.01	0.01	0.01	0.03	3.7%	6.9%	4.2%	4.6%
	Total	0.03	0.05	0.06	0.10	0.18	3.7%	6.9%	4.2%	4.6%

Table VIII-8, continued

Historical and Projected Water Use Demand Components

High Case

(Million Gallons per Day)

Code	Utility Service Area	1997	2005	2010	2020	Maximum Buildout	Compounded Average Annual Growth Rates 1997 - 2005	2005 - 2010	2010 - 2020	1997 - 2020
LA7	Lakewood Water District									
	Single Family Residential	4.45	4.73	4.96	7.61	7.61	0.8%	1.0%	4.4%	2.4%
	Multi-family Residential	2.22	2.38	2.49	3.82	3.82	0.8%	1.0%	4.4%	2.4%
	Non-Residential	1.42	1.82	2.09	2.98	3.43	3.1%	2.8%	3.6%	3.3%
	New Code Savings		(0.26)	(0.44)	(1.16)	(1.16)				
	Losses	0.49	0.52	0.55	0.79	0.82	0.9%	1.0%	3.8%	2.2%
	Total	8.58	9.18	9.66	14.05	14.52	0.9%	1.0%	3.8%	2.2%
MA12	City of Milton									
	Single Family Residential	0.45	0.60	0.69	0.80	0.90	3.6%	2.9%	1.4%	2.5%
	Multi-family Residential	0.09	0.13	0.17	0.23	0.26	4.2%	6.3%	3.0%	4.1%
	Non-Residential	0.09	0.11	0.13	0.17	0.18	3.3%	3.1%	2.5%	2.9%
	New Code Savings		(0.04)	(0.06)	(0.10)	(0.10)				
	Losses	0.11	0.14	0.17	0.19	0.22	3.1%	3.1%	1.6%	2.4%
	Total	0.74	0.95	1.11	1.30	1.46	3.1%	3.1%	1.6%	2.4%
MA22	Mt. View Edgewood									
	Single Family Residential	0.63	0.81	0.92	1.07	1.07	3.1%	2.6%	1.5%	2.3%
	Multi-family Residential	0.03	0.05	0.07	0.09	0.09	3.6%	7.5%	2.9%	4.1%
	Non-Residential	0.02	0.04	0.05	0.08	0.09	7.9%	5.9%	4.2%	5.8%
	New Code Savings		(0.04)	(0.06)	(0.10)	(0.10)				
	Losses	0.09	0.12	0.13	0.15	0.15	2.8%	2.7%	1.5%	2.2%
	Total	0.78	0.97	1.11	1.29	1.30	2.8%	2.7%	1.5%	2.2%
OA5	City of Orting									
	Single Family Residential	0.30	0.61	0.83	1.07	1.40	9.4%	6.4%	2.6%	5.8%
	Multi-family Residential	0.01	0.03	0.05	0.09	0.11	10.7%	13.2%	5.2%	8.8%
	Non-Residential	0.03	0.04	0.04	0.05	0.05	2.8%	1.7%	0.6%	1.6%
	New Code Savings		(0.04)	(0.07)	(0.11)	(0.11)				
	Losses	0.06	0.11	0.15	0.19	0.26	8.0%	6.1%	2.6%	5.2%
	Total	0.40	0.74	1.00	1.29	1.71	8.0%	6.1%	2.6%	5.2%
PA2	Parkland Light & Water									
	Single Family Residential	1.84	2.18	2.40	2.58	3.28	2.1%	2.0%	0.7%	1.5%
	Multi-family Residential	0.24	0.29	0.38	0.47	0.59	2.4%	6.1%	1.9%	3.0%
	Non-Residential	0.49	0.59	0.67	0.83	1.54	2.3%	2.4%	2.2%	2.3%
	New Code Savings		(0.11)	(0.18)	(0.30)	(0.30)				
	Losses	0.95	0.48	0.53	0.58	0.83	-8.2%	2.1%	0.9%	-2.1%
	Total	3.52	3.43	3.81	4.15	5.95	-0.3%	2.1%	0.9%	0.7%
PA4	Peacock Hill									
	Single Family Residential	0.28	0.30	0.31	0.46	1.20	0.8%	0.8%	3.8%	2.1%
	Multi-family Residential	0.02	0.03	0.03	0.04	0.11	1.7%	0.9%	3.8%	2.5%
	Non-Residential	0.01	0.02	0.03	0.05	0.06	13.0%	7.0%	6.2%	8.7%
	New Code Savings		(0.01)	(0.02)	(0.04)	(0.04)				
	Losses	0.05	0.06	0.06	0.09	0.23	0.9%	0.9%	3.6%	2.1%
	Total	0.37	0.39	0.41	0.59	1.56	0.9%	0.9%	3.6%	2.1%
PA16	City of Puyallup									
	Single Family Residential	1.79	2.71	3.32	4.44	4.89	5.3%	4.1%	3.0%	4.0%
	Multi-family Residential	0.69	1.09	1.58	2.35	2.59	6.0%	7.7%	4.0%	5.5%
	Non-Residential	0.93	1.27	1.51	2.04	3.41	3.9%	3.5%	3.1%	3.5%
	Discrete Large Demands	1.07	1.07	1.08	1.10	1.01	0.1%	0.1%	0.1%	0.1%
	New Code Savings		(0.24)	(0.43)	(0.77)	(0.77)				
	Losses	0.16	0.21	0.25	0.33	0.40	3.5%	3.7%	2.6%	3.2%
	Total	4.64	6.11	7.31	9.49	11.53	3.5%	3.7%	2.6%	3.2%

Table VIII-8, continued

Historical and Projected Water Use Demand Components

High Case

(Million Gallons per Day)

Code	Utility Service Area	1997	2005	2010	2020	Maximum Buildout	Compounded Average Annual Growth Rates 1997 - 2005	2005 - 2010	2010 - 2020	1997 - 2020
SA18	South East Tacoma Mutual Water Co.									
	Single Family Residential	0.62	0.66	0.74	0.75	1.07	0.7%	2.5%	0.1%	0.8%
	Multi-family Residential	0.62	0.67	0.76	0.77	1.09	1.0%	2.5%	0.1%	0.9%
	Non-Residential	0.18	0.24	0.29	0.35	0.74	3.7%	3.6%	2.1%	3.0%
	New Code Savings		(0.05)	(0.09)	(0.14)	(0.14)				
	Losses	0.15	0.16	0.18	0.18	0.29	0.8%	2.2%	0.2%	0.8%
	Total	1.58	1.69	1.89	1.92	3.06	0.8%	2.2%	0.2%	0.8%
SA19	Southwood - Rainier View									
	Single Family Residential	1.87	3.37	4.32	4.57	4.95	7.7%	5.1%	0.6%	4.0%
	Multi-family Residential	0.05	0.10	0.12	0.13	0.14	7.7%	5.0%	0.6%	4.0%
	Non-Residential	0.09	0.24	0.35	0.42	1.25	12.8%	7.7%	1.9%	6.9%
	New Code Savings		(0.22)	(0.35)	(0.44)	(0.44)				
	Losses	0.35	0.62	0.78	0.82	1.04	7.1%	4.9%	0.5%	3.7%
	Total	2.36	4.11	5.21	5.50	6.94	7.1%	4.9%	0.5%	3.7%
SA22	Spanaway Water Company									
	Single Family Residential	1.33	2.16	2.76	3.14	4.82	6.2%	5.0%	1.3%	3.8%
	Multi-family Residential	0.22	0.34	0.52	0.71	0.48	5.7%	9.0%	3.2%	5.3%
	Non-Residential	0.17	0.25	0.30	0.41	0.77	4.8%	4.2%	3.2%	4.0%
	New Code Savings		(0.15)	(0.26)	(0.37)	(0.37)				
	Losses	0.46	0.74	0.96	1.14	1.63	6.0%	5.4%	1.8%	4.0%
	Total	2.18	3.33	4.28	5.03	7.33	5.4%	5.1%	1.6%	3.7%
SA24	Steilacoom									
	Single Family Residential	0.44	0.58	0.67	0.74	0.82	3.5%	3.2%	1.0%	2.3%
	Multi-family Residential	0.08	0.10	0.14	0.17	0.19	3.9%	5.8%	2.2%	3.5%
	Non-Residential	0.09	0.11	0.12	0.13	0.15	1.9%	2.1%	1.3%	1.7%
	New Code Savings		(0.03)	(0.05)	(0.08)	(0.08)				
	Losses	0.03	0.04	0.05	0.05	0.06	2.8%	3.0%	1.0%	2.0%
	Total	0.64	0.79	0.92	1.01	1.14	2.8%	3.0%	1.0%	2.0%
SA25	Stroh Water System									
	Single Family Residential	0.16	0.21	0.24	0.25	0.46	3.2%	3.4%	0.2%	1.9%
	Multi-family Residential	0.04	0.06	0.07	0.07	0.13	3.8%	3.4%	0.2%	2.1%
	Non-Residential	0.03	0.04	0.05	0.07	0.08	5.2%	4.4%	2.6%	3.9%
	New Code Savings		(0.01)	(0.02)	(0.03)	(0.03)				
	Losses	0.04	0.05	0.06	0.06	0.11	3.0%	3.1%	0.4%	1.9%
	Total	0.27	0.34	0.40	0.42	0.76	3.0%	3.1%	0.4%	1.9%
SA26	Summit									
	Single Family Residential	1.23	1.30	1.37	1.63	1.88	0.8%	0.9%	1.8%	1.2%
	Multi-family Residential	0.03	0.03	0.04	0.04	0.05	2.0%	0.9%	1.8%	1.7%
	Non-Residential	0.17	0.21	0.24	0.31	0.57	2.8%	2.6%	2.6%	2.7%
	New Code Savings		(0.04)	(0.07)	(0.15)	(0.15)				
	Losses	0.42	0.44	0.46	0.54	0.70	0.7%	0.8%	1.6%	1.1%
	Total	1.84	1.95	2.03	2.37	3.05	0.7%	0.8%	1.6%	1.1%
SA27	City of Sumner									
	Single Family Residential	0.57	0.83	0.98	1.00	1.25	4.8%	3.2%	0.3%	2.5%
	Multi-family Residential	0.22	0.34	0.47	0.48	0.59	5.2%	6.8%	0.3%	3.4%
	Non-Residential	0.28	0.48	0.62	0.85	1.02	6.9%	5.3%	3.2%	4.9%
	New Code Savings		(0.08)	(0.14)	(0.20)	(0.20)				
	Losses	0.19	0.28	0.34	0.38	0.47	4.8%	4.2%	1.0%	3.0%
	Total	1.27	1.84	2.26	2.50	3.13	4.8%	4.2%	1.0%	3.0%
TA1	Tacoma Water - UP									
	Single Family Residential	1.99	2.60	2.91	3.49	3.65	3.4%	2.3%	1.8%	2.5%
	Multi-family Residential	0.88	1.18	1.41	1.81	1.87	3.7%	3.6%	2.6%	3.2%
	Non-Residential	0.42	0.46	0.50	0.61	0.76	1.2%	1.7%	1.9%	1.6%
	New Code Savings		(0.09)	(0.15)	(0.34)	(0.34)				
	Losses	0.37	0.46	0.52	0.62	0.66	2.9%	2.4%	1.8%	2.3%
	Total	3.66	4.62	5.19	6.19	6.60	2.9%	2.4%	1.8%	2.3%

Table VIII-8, continued

Historical and Projected Water Use Demand Components

High Case

(Million Gallons per Day)

Code	Utility Service Area	1997	2005	2010	2020	Maximum Buildout	Compounded Average Annual Growth Rates 1997 - 2005	2005 - 2010	2010 - 2020	1997 - 2020
TA2	Tacoma Water - Tacoma									
	Single Family Residential	11.15	14.78	16.06	17.28	18.70	3.6%	1.7%	0.7%	1.9%
	Multi-family Residential	3.93	5.11	6.95	8.51	9.00	3.4%	6.3%	2.0%	3.4%
	Non-Residential	6.91	8.17	9.39	11.49	13.25	2.1%	2.8%	2.0%	2.2%
	Discrete Large Demands	27.38	28.92	30.28	33.04	33.04	0.7%	0.9%	0.9%	0.8%
	New Code Savings		(0.76)	(1.38)	(2.75)	(2.75)				
	Losses	5.49	6.25	6.81	7.51	7.91	1.6%	1.7%	1.0%	1.4%
	Total	54.85	62.47	68.11	75.07	79.15	1.6%	1.7%	1.0%	1.4%
TA3	Tacoma Water - Other Pierce Co.									
	Single Family Residential	2.95	5.10	6.57	8.47	10.62	7.1%	5.2%	2.6%	4.7%
	Multi-family Residential	0.57	0.87	1.23	1.58	1.97	5.4%	7.0%	2.5%	4.5%
	Non-Residential	0.57	0.82	1.01	1.39	5.72	4.7%	4.2%	3.2%	4.0%
	Discrete Large Demands	0.20	4.00	5.25	7.50	7.50	45.2%	5.6%	3.6%	17.0%
	New Code Savings		(0.20)	(0.38)	(0.82)	(0.82)				
	Losses	0.48	1.18	1.52	2.01	2.78	11.9%	5.2%	2.8%	6.5%
	Total	4.77	11.77	15.20	20.12	27.76	11.9%	5.2%	2.8%	6.5%
TA4	Tacoma Water - King Co.									
	Single Family Residential	0.76	1.00	1.17	1.49	1.87	3.6%	3.1%	2.5%	3.0%
	Multi-family Residential	0.10	0.13	0.14	0.18	0.23	4.0%	1.1%	2.4%	2.7%
	Non-Residential	0.07	0.08	0.08	0.08	0.13	1.9%	1.9%	-0.5%	0.9%
	New Code Savings		(0.03)	(0.05)	(0.09)	(0.09)				
	Losses	0.10	0.13	0.15	0.18	0.24	3.2%	2.6%	2.1%	2.6%
	Total	1.02	1.31	1.49	1.84	2.37	3.2%	2.6%	2.1%	2.6%
	Other Pierce County									
	Single Family Residential	13.68	15.33	16.54	18.49	25.67	1.4%	1.5%	1.1%	1.3%
	Multi-family Residential	1.58	1.74	1.77	1.89	3.24	1.2%	0.4%	0.7%	0.8%
	Non-Residential	4.42	4.75	5.00	5.39	7.43	0.9%	1.0%	0.8%	0.9%
	New Code Savings		(0.77)	(1.17)	(1.93)	(1.93)				
	Losses	2.95	3.27	3.50	3.87	5.45	1.3%	1.3%	1.0%	1.2%
	Total	22.63	24.32	25.64	27.71	39.87	0.9%	1.1%	0.8%	0.9%
	Total County Demand	125.21	153.32	173.15	201.15	246.28	2.6%	2.5%	1.5%	2.1%
	Total County Population	683,492	869,468	1,012,308	1,221,754	1,483,421	3.1%	3.1%	1.9%	2.6%
	Gallons per Capita per Day	183.2	176.3	171.0	164.6	166.0	-0.5%	-0.6%	-0.4%	-0.5%

Table VIII–9

Historical and Projected Discrete Large Demands
High Case
(Million Gallons per Day)

Code	Utility Service Area	1997	2005	2010	2020	Maximum Buildout	Compounded Average Annual Growth Rates 1997 - 2005	2005-2010	2010-2020	1997-2020
BA9	City of Buckley									
	Rainier School	0.28	0.28	0.28	0.28	0.28	0.0%	0.0%	0.0%	0.0%
	Washington State University	0.04	0.04	0.04	0.04	0.04	0.0%	0.0%	0.0%	0.0%
	Total	0.32	0.32	0.32	0.32	0.32	0.0%	0.0%	0.0%	0.0%
PA16	City of Puyallup									
	Matsushita Semiconductors	1.01	1.01	1.01	1.01	1.01	0.0%	0.0%	0.0%	0.0%
	Air Products	0.05	0.06	0.07	0.09	0.00	2.0%	2.0%	2.0%	2.0%
	Total	1.07	1.07	1.08	1.10	1.01	0.1%	0.1%	0.1%	0.1%
TA2	Tacoma Water - Tacoma									
	Simpson	21.97	21.00	21.00	21.00	21.00	-0.6%	0.0%	0.0%	-0.2%
	Ten other large customers	5.41	7.92	9.28	12.04	12.04	4.9%	3.2%	2.6%	3.5%
	Total	27.38	28.92	30.28	33.04	33.04	0.7%	0.9%	0.9%	0.8%
TA3	Tacoma Water - Other Pierce Co.									
	Three large customers	0.20	4.00	5.25	7.50	7.50	45.2%	5.6%	3.6%	17.0%
	Total	0.20	4.00	5.25	7.50	7.50	45.2%	5.6%	3.6%	17.0%
Total Discrete Large Demands		28.96	34.31	36.93	41.95	41.86	2.1%	1.5%	1.3%	1.6%

Table VIII-10

Historical and Projected Average Daily Demands by Water Use Area
High Case
(Million Gallons per Day)

Code	Utility Service Area	1997	2005	2010	2020	Maximum Buildout	Compounded Average Annual Growth Rates 1997 - 2005	2005-2010	2010-2020	1997-2020
BA6	City of Bonney Lake	2.16	3.24	4.09	5.11	6.32	5.2%	4.8%	2.2%	3.8%
BA9	City of Buckley	0.87	1.13	1.34	1.39	1.50	3.4%	3.5%	0.4%	2.1%
FA3	City of Fife	1.28	1.70	2.01	2.22	2.51	3.7%	3.3%	1.0%	2.4%
FA4	Fircrest	0.82	0.95	1.05	1.30	1.45	1.8%	2.1%	2.1%	2.0%
FA5	Firgrove Mutual, Inc.	1.79	2.70	3.42	4.30	8.51	5.3%	4.9%	2.3%	3.9%
FA15	Fruitland Mutual Water Company	1.38	1.84	2.25	2.58	3.57	3.6%	4.2%	1.3%	2.7%
GA3	Gig Harbor Water Department	0.76	1.38	1.90	2.32	3.05	7.7%	6.6%	2.0%	5.0%
HA2	Harbor Springs	0.03	0.05	0.06	0.10	0.18	3.7%	6.9%	4.2%	4.6%
LA7	Lakewood Water District	8.58	9.18	9.66	14.05	14.52	0.9%	1.0%	3.8%	2.2%
MA12	City of Milton	0.74	0.95	1.11	1.30	1.46	3.1%	3.1%	1.6%	2.4%
MA22	Mt. View Edgewood	0.78	0.97	1.11	1.29	1.30	2.8%	2.7%	1.5%	2.2%
OA5	City of Orting	0.40	0.74	1.00	1.29	1.71	8.0%	6.1%	2.6%	5.2%
PA2	Parkland Light & Water	3.52	3.43	3.81	4.15	5.95	-0.3%	2.1%	0.9%	0.7%
PA4	Peacock Hill	0.37	0.39	0.41	0.59	1.56	0.9%	0.9%	3.6%	2.1%
PA16	City of Puyallup	4.64	6.11	7.31	9.49	11.53	3.5%	3.7%	2.6%	3.2%
SA18	South East Tacoma Mutual Water Co	1.58	1.69	1.89	1.92	3.06	0.8%	2.2%	0.2%	0.8%
SA19	Southwood - Rainier View	2.36	4.11	5.21	5.50	6.94	7.1%	4.9%	0.5%	3.7%
SA22	Spanaway Water Company	2.18	3.33	4.28	5.03	7.33	5.4%	5.1%	1.6%	3.7%
SA24	Steilacoom	0.64	0.79	0.92	1.01	1.14	2.8%	3.0%	1.0%	2.0%
SA25	Stroh Water System	0.27	0.34	0.40	0.42	0.76	3.0%	3.1%	0.4%	1.9%
SA26	Summit	1.84	1.95	2.03	2.37	3.05	0.7%	0.8%	1.6%	1.1%
SA27	City of Sumner	1.27	1.84	2.26	2.50	3.13	4.8%	4.2%	1.0%	3.0%
TA1	Tacoma Water - UP	3.66	4.62	5.19	6.19	6.60	2.9%	2.4%	1.8%	2.3%
TA2	Tacoma Water - Tacoma	54.85	62.47	68.11	75.07	79.15	1.6%	1.7%	1.0%	1.4%
TA3	Tacoma Water - Other Pierce Co.	4.77	11.77	15.20	20.12	27.76	11.9%	5.2%	2.8%	6.5%
TA4	Tacoma Water - King Co.	1.02	1.31	1.49	1.84	2.37	3.2%	2.6%	2.1%	2.6%
	Other Pierce County	22.63	24.32	25.64	27.71	39.87	0.9%	1.1%	0.8%	0.9%
	Total	125.21	153.32	173.15	201.15	246.28	2.6%	2.5%	1.5%	2.1%

Table VIII-11

Historical and Projected Average Daily Demands by Demand Type
High Case
(Million Gallons per Day)

Customer Class	1997	2005	2010	2020	Maximum Buildout	Compounded Average Annual Growth Rates 1997 - 2005	2005-2010	2010-2020	1997-2020
Single Family Residential	51.4	67.6	78.0	92.0	112.9	3.5%	2.9%	1.7%	2.6%
Multi-family Residential	12.7	16.6	20.8	26.5	30.4	3.4%	4.7%	2.4%	3.2%
Non-Residential	18.1	21.9	24.9	30.5	45.6	2.4%	2.6%	2.0%	2.3%
Discrete Large Demands	29.0	34.3	36.9	41.9	41.9	2.1%	1.5%	1.3%	1.6%
Total Consumption	111.2	140.4	160.7	190.9	230.8	3.0%	2.7%	1.7%	2.4%
New Code Savings		(3.8)	(6.4)	(11.5)	(11.5)		11.3%	6.0%	n/a
Losses	14.0	16.7	18.9	21.7	27.0	2.2%	2.5%	1.4%	1.9%
Total County Demands	125.21	153.32	173.15	201.15	246.28	2.6%	2.5%	1.5%	2.1%
County Population	683,492	869,468	1,012,308	1,221,754	1,483,421	3.1%	3.1%	1.9%	2.6%
Single Family Households	196,123	255,088	293,422	344,736	418,878	3.3%	2.8%	1.6%	2.5%
Multi-family Households	64,559	82,374	103,363	130,880	149,377	3.1%	4.6%	2.4%	3.1%
County Employment	267,587	332,607	378,196	463,134	649,126	2.8%	2.6%	2.0%	2.4%
Single Family Res. Consumption (gphd)[1]	262.1	265.2	265.8	266.8	269.5	0.1%	0.0%	0.0%	0.1%
Multi-family Res. Consumption (gphd)	196.9	200.9	201.5	202.3	203.7	0.3%	0.1%	0.0%	0.1%
Non-Residential Consumption (gped)[2]	175.8	169.1	163.6	156.5	134.7	-0.5%	-0.7%	-0.4%	-0.5%
Non-residential without Simpson (gped)	93.7	105.9	108.0	111.2	102.4	1.5%	0.4%	0.3%	0.7%
Total Average Daily Demands (gpcd)[3]	183.2	176.3	171.0	164.6	166.0	-0.5%	-0.6%	-0.4%	-0.5%
Total without Simpson (gpcd)	151.0	152.2	150.3	147.5	151.9	0.1%	-0.2%	-0.2%	-0.1%

[1] gallons per household per day
[2] gallons per employee per day
[3] gallons per capita per day

Section IX

Regional Water Supply Plan

SECTION IX

REGIONAL WATER SUPPLY PLAN

I. INTRODUCTION

Water supply in Pierce County is provided by the City of Tacoma, other incorporated cities, and by a variety of water districts, mutual (non-profit) water companies, and several investor owned systems. In addition, there are a large number of small water associations and individual wells. The water service areas for the larger systems are shown on Figure IX-3.

The Tacoma water system is a regional supply with the Green River being its primary water supply source. In addition, the City has a number of wells within its service area that supplement the Green River source. Pipeline No. 1 carries water from the City's Green River intake to McMillin Reservoir. Pipelines Nos. 2 and 4, then transport the water from the reservoir to the City's distribution system. The City's water supply pipelines cross much of the Pierce County Urban Growth Area and the City provides water to areas along the pipeline route and supplies water as a primary or supplemental supply to several other water systems. The City's service area is shown in Figure IX-3.

At the time of the CWSP Update significant water supply questions remain unanswered. The outcome of these issues will fundamentally affect the ability of purveyors in Pierce County to meet the projections of growth in county and municipal Urban Growth Areas. Although committed to exercising the second supply diversion on the Green River, the timing and alignment of Tacoma's new supply line remain uncertain. The ability to utilize the second supply to supplement summer peaking demand also depends on modifications to Howard Hansen Dam that are still being evaluated. Several major utilities that are groundwater-supplied, and located in the designated Pierce County Urban Growth Area, have initiated restrictions on growth due to an inability to acquire additional legal rights in the Chambers/Clover Creek and Puyallup basins, and initial assessments for these basins, although highly controversial, suggest that no additional withdrawals affecting streamflow should be allowed. Water rights for withdrawal from deeper aquifers have been granted, but there is no clear indication whether and when additional rights will be available.

The analysis and discussion presented in this chapter are based on resource availability on an average annual basis. In addition to meeting the water supply needs during the course of the year, water purveyors must have adequate physical facilities and legal withdrawal right to meet peak summer demands. These demands are typically one and one half to three times the average demand. There are currently major utilities in the Urban Growth Area of Pierce County facing building moratoria if additional peaking supply can not be acquired, either through the construction of new wells or through the timely processing of intertie applications by the Departments of

Health and Ecology. This may have a substantial impact on the ability of Pierce County to implement the County Comprehensive Plan.

II. BACKGROUND

Several significant events have occurred that affect water supply since the original Pierce County Coordinated Water System Plan (CWSP) was prepared in 1986:

1. The Central Puget Sound Area experienced droughts in 1987 and 1992. The 1987 drought was more serious for Tacoma because the Corps of Engineer's Howard Hansen reservoir did not fill that spring and river flows to the reservoir were much less than normal. The City was left short of water and implemented water use restrictions. During this period, Tacoma purchased water from several adjoining utilities through emergency interties, which provided some relief to the Tacoma system.

2. The City of Tacoma is currently proceeding with permitting and final design of Pipeline No. 5 (see Figure IX-3) which will allow the City to use its second diversion water right on the Green River. As shown, Pipeline No. 5 passes through southern King County. Tacoma is contracting with the South King County Regional Water Association, Lakehaven Utility District, and Seattle to participate in the project in exchange for a share of the water supply. If sufficient participation among utilities in King County does not occur, the second diversion may be utilized to increase supply into Pierce County along Tacoma's current pipeline alignment.

3. The Washington State Department of Ecology has denied several applications fore new water rights in the Chambers/Clover Creek and Puyallup basins in Pierce County. Applications for water rights in the Gig Harbor and Key Peninsula areas have not been evaluated in a timely manner, and it is not currently known when work in this area will be initiated by the Department of Ecology. Some systems in Pierce County have adequate supply for the present, while others do not have sufficient water rights and well capacity to meet their current peak demand. Several systems report some shortage of supply. Some systems have moratoriums on further water connections except for "fill in" of lots in previously approved subdivisions.

4. The original CWSP developed a long-range water supply plan of joint facilities and connections between the existing systems. The intervening water shortage events, however, have focused attention on short-term solutions to meet current shortages and less on long-term facilities development. Since the CWSP will probably be updated every six years to coincide with the cycle for updating the County Comprehensive Plan, this is the planning horizon of immediate concern.

5. While general use has increased, overall water use in Pierce County has decreased since 1988 primarily because the Simpson Timber Company, Tacoma's largest customer improved its process efficiency.

The scope of the Regional Water Supply Plan in this update of the CWSP is on the Comprehensive Urban Growth Area as defined in the Pierce County Comprehensive Plan (Nov. 1994). In addition, this Regional Water Supply Plan addresses the provision of water on the Gig Harbor Peninsula, since this is a developing area, although only the City of Gig Harbor and its urban growth area is designated "urban" in the County's Comprehensive Plan. The water issues and proposed solutions on the Gig Harbor peninsula are different from the Central Pierce County Urban Growth Area, so they are addressed separately in this section.

Water Quality

With a few exceptions, the groundwater quality in Pierce County is good. It could be impacted in the future, however, by land use activities and seawater intrusion. The Chambers/Clover Creek Basin and parts of the Puyallup Basin are most vulnerable to degradation from land use activities. All three of the basins are vulnerable to seawater intrusion.

The quality and exposure of the groundwater in the Chambers/Clover Creek Basin varies, with the shallow aquifer (less than 400 feet) being susceptible to contamination from surface activities. Several areas, including the Tacoma industrial area, Fort Lewis, McChord Air Force Base and Lakewood have experienced significant groundwater degradation due to industrial activities. Monitoring and cleanup activities are underway for some of the most seriously impacted areas. While much of the populated area has been sewered in recent years, there is still evidence of high nitrate concentrations possibly from on-site septic systems. It is anticipated that increasing chloride levels from seawater intrusion may occur in the shallow aquifers in the future at locations near Puget Sound where groundwater pumping is heavy.

Generally, the deeper aquifers in the Chambers/Clover Creek basin are relatively well protected from land use activities by impervious strata between the shallow and deep aquifers. Water quality in the deeper aquifers is quite good, although iron and manganese concentrations are typically higher than in the shallower aquifers. The likelihood of seawater intrusion is also less than for the shallower aquifers due to the presence of deep geological barriers along much of the western margin of the basin.

There is little available information on the groundwater quality of the Lower Puyallup River groundwater basin. The limited data indicates that the groundwater quality meets drinking water standards. However, several deep wells have high iron and manganese concentrations. With the exception of the river valley floor, much of the basin is protected by relatively impervious glacial till which reduces the susceptibility of the groundwater to degradation from land use activities. Near the mouth of the Puyallup River in the Port of Tacoma industrial area, shallow groundwater has been contaminated by surface activities. The deeper aquifers exhibit artesian pressures, which protects them from the downward movement of contaminants. Increased pumping could lower the water table, eliminate the artesian pressure, and increase the potential for contamination. Seawater intrusion is a possibility in both shallow and deeper aquifers in the Commencement Bay area.

III. CENTRAL PIERCE COUNTY

This section addresses water planning for all of the Urban Growth Area except for the Gig Harbor Peninsula.

A. Existing Water Systems

The Pierce County Urban Growth Area includes the City of Tacoma and its water service area, which extends outside the City limits southeast along its pipelines to McMillin Reservoir and then east along the City's Supply Pipeline No. 1. The balance of the "Urban Growth Area" is served by municipal systems, mutuals and small private water systems. These systems have designated water service areas which are recognized as part of the CWSP planning process. Although interties exist between many of the systems, each system generally operates independently, using its own sources, storage, and distribution system. Most of the systems rely on groundwater, either from wells or springs, but several also purchase water from the City of Tacoma.

The topography of the Urban Growth Area is shown on Figure IX-3. It consists of hilly or plateau areas with elevations between 400 and 800 feet except for the Puyallup and White River Valleys. The White River is a major tributary of the Puyallup River and enters it from the east near Puyallup. The two rivers are bordered by low, flat valleys, with elevations close to sea level. As shown on Figure IX-3, the elevations of the hills and plateaus gradually increase to the south and east. Clover Chambers Creek creates a less pronounced trough through the central part of the County.

The City of Tacoma, Puyallup, Sumner, Fife, and Milton serve the population in the river valleys. Tacoma and Puyallup also serve higher elevations. The other systems serve the settled hills and plateau areas. Since the systems have developed relatively independently, the reservoir levels and pressure zones are designed to serve the range in elevations found within the respective service areas. This means that each system has its own pressure zones which are usually different from those of its neighbors. This is shown graphically in Figure IX-2 and presents some practical limitations to interties between systems.

As part of this CWSP update, information was requested from the larger systems serving the Urban Growth Area concerning their systems, customers, water use, interties, and operating information including copies of their most recent comprehensive water plans.

In addition to collecting information on the water systems within the Urban Growth Area, there were meetings with representatives of the systems to discuss their water supply concerns and to gain insight into both short- and long-term regional

water supply plans. The Urban Growth Area is logically divided into three subregions because of geography, topography, and common water supply issues.

Meetings were held with representatives of 1) the Water Cooperative of Pierce County consisting of seven systems that serve the area generally southeast of Tacoma; 2) the cities of Puyallup, Bonney Lake, and Sumner which serve portions of the Puyallup River valley and higher areas east of the valley, and 3) water systems serving the Gig Harbor Peninsula. The needs and interests of each of these areas is decidedly different. The first two are discussed below, and the Gig Harbor Peninsula later in this section.

Currently, the water supply situation throughout Pierce County is heavily influenced by the inability of water systems to obtain water rights and to develop new water sources with any certainty. This is due to the current uncertainties regarding the appropriation of water in Washington State and challenges to the authority of the Department of Ecology to administer the water rights process.

B. Water Resources

The central portion of the Pierce County Urban Growth Area east of the Tacoma Narrows lies in either the Chambers\Clover Creek or the Lower Puyallup River Basins. These areas are shown on Figure IX-1. As part of this CWSP update, Hong West prepared an assessment of the groundwater resources available in each of these basins. The findings are discussed below.

The Chambers\Clover Creek Basin covers approximately 160 square miles. The following summarizes the estimated safe groundwater yield in the basin. This is the quantity that can be withdrawn continually without diminishing groundwater resource.

Safe Ground Water Yield in
Chambers\Clover Creek Basin

Source	(gal/min/mi2)	(ac-ft/yr.)	(mgd)
Brown and Caldwell (1985)	110 to 190	30,000 to 45,000	26 to 41
Hong West (1995)	110 to 180	28,000 to 47,000	25 to 42

The Brown and Caldwell estimate was developed as part of the original Chambers\Clover Creek Basin Groundwater Management Study and the findings were adjusted in the figures shown above to account for inconsistencies in the earlier results. The Hong West safe yield was estimated using a modified water balance approach. The average annual precipitation falling on the study area is approximately 40 inches per year (WSU, 1968), the average evapotranspiration approximately 20 inches (WSU, 1968), and the average annual runoff is approxi-

mately 0.67 cubic feet per second per square mile of drainage basin or approximately 9 inches per year (Brown and Caldwell, 1985). Therefore, the net groundwater recharge is 11 inches per year. Assuming 30-to-50 percent of the recharge is potentially developable as groundwater gives the safe yields shown above.

The Lower Puyallup River Basin is approximately 215 square miles in area. Hart Crowser estimated groundwater recharge rates for two sub-basins, the Lower Puyallup and Lake Tapps, in 1984. Together, these comprise approximately 168 square miles of the basin. The groundwater recharge was estimated to be 7 to 16 inches per year for the Lower Puyallup area and 11 to 18 inches per year in the Lake Tapps area. Taking an average of these estimates, extrapolating it to the 215 square mile total area of the Basin, and applying the assumption that 30 to 50 percent of the recharge is available as sustainable yield gives the following estimate:

Lower Puyallup River Basin

Source	(gal/min/mi2)	(ac-ft/yr)	(mgd)
Hart Crowser (1984)	130 to 220	45,000 to 75,000	39 to 65

There is very little available data to estimate the runoff component for the Lower Puyallup Basin. Also, an analysis of the surface water system and its relationship to the groundwater system is complicated by the upper watersheds of the Puyallup and White Rivers where precipitation increases with elevation, there is a large component of glacial melt water, and the basins are underlain by bedrock. The hydrogeology is further complicated by the influence of Lake Tapps and by the Lower Puyallup alluvial valley which is the principal groundwater discharge point for the entire region. The above estimates based on the earlier Hart Crowser study are the best available.

The City of Tacoma also has surface water rights on the Green River as follows:

First Diversion Rights	72 mgd
Second Diversion Rights	65 mgd
Total	137 mgd

At the present time, the City is only capable of delivering its first diversion rights through Pipeline No. 1. It is currently in the process of implementing its Pipeline No. 5 project that would give it transmission capability to also deliver its second diversion right. The City plans to contract for delivery of up to 40 mgd from Pipeline No. 5 to the City of Seattle and South King County, and will also use some of the water for aquifer recharge.

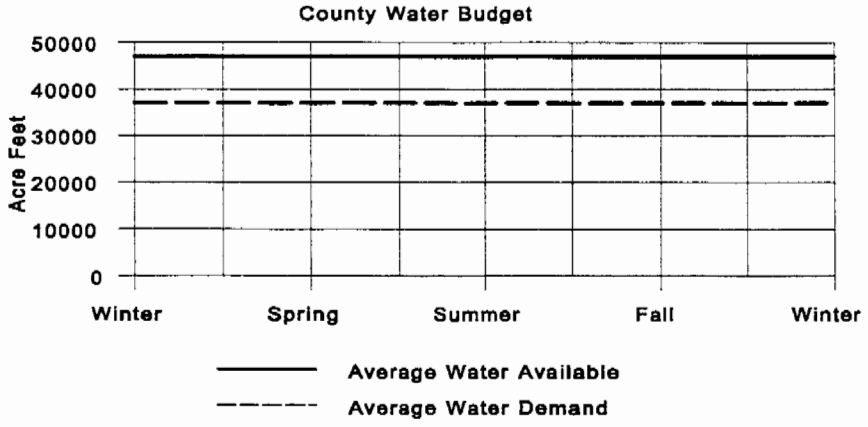
The City's second diversion right can only be used when flows in the Green River exceed 150 cfs at its headworks. Therefore, there are periods during the summer when the full amount of the City's water rights will not be available.

C. Water Use

There are problems which surface when trying to determine the amount of water available, and comparing that to the demand for water. The supply of water available in the aquifer is measured using an average rainfall for the year. Rainfall does not occur uniformly over the seasons. As a matter of fact, the demand for water increases relative to the lack of rainfall. When there is less rainfall, there is a larger demand for water. The demand for water is determined by calculating the water rights that have been issued, and the average amount of pumping that utilities do over the span of a year. To actually understand the situation with water availability or scarcity over the course of an average year, there needs to be information gathered concerning the peak day demand for water and the status of the amount of water in the aquifers as a function of the seasonal variation of water in the aquifers.

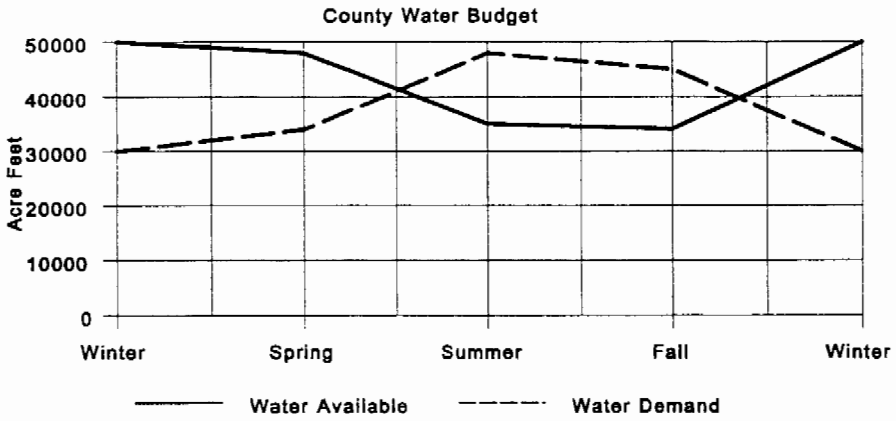
If the average amount of water in the aquifer could be compared to the average daily demand for water, the results would be graphed as shown in Graph Number 1 below (using hypothetical volumes):

Graph Number 1



If the data were available to graph the actual availability and the actual demand for water over the course of the year, the graph might look something like Graph Number 2 below (using hypothetical volumes):

Graph Number 2



Graphs are hypothetical - for illustration purposes only.

The average daily water demands for the central Pierce County Urban Growth Area were projected as part of the 1995 CWSP update and are presented in Appendix E. (Please see Section VIII – Introduction for an explanation of the differences between the 1995 CWSP water demand projections and the water demand projection contained in Section VIII.) The Urban Growth Area includes water use areas 3 through 9 and the projections are summarized below. These are average usage rates and peak demands will be substantially higher.

Projected Water Use
(Million Gallons Per Day)

	1990	1994	2000	2010	2020
Base Case	102.5	98.5	107.8	120.0	130.6
High Case	102.5	98.5	113.3	139.3	174.9

The base case represents the population forecasts used in developing the Pierce County Comprehensive Plan. The high case is more representative of recent growth trends and is probably more indicative of the high range of possible future water use for planning purposes.

The following summarizes available water resources, considering both the surface and groundwater sources.

Potential Supply	MGD
Green River (first diversion)	72
Puyallup Basin Groundwater	39 to 65
Chambers/Clover Creek Groundwater	25 to 42
Subtotal	136 to 179
Green River (second diversion)	65
Total	201 to 244

Tacoma is negotiating with Seattle, Federal Way, and the South King County Water Association and plans to commit up to 40 MGD of supply from its second diversion (Pipeline No. 5) to these systems. This would reduce the range of water available in Pierce County to 161 to 204 MGD. It should also be noted again that the 65 MGD from the second diversion is not available year-round but only when the river flows at the headworks exceed 150 cfs.

If Pipeline No. 5 and additional storage behind Howard Hansen Dam are constructed and water purveyors are able to develop the groundwater resources estimated for the Chambers/Clover Creek and Puyallup River Basins, the above information suggests that the available water resources should meet future water requirements, on an annual average basis, through the year 2020. These assumptions require close scrutiny, however, and must be tempered with the fact that considerable investigation may be required by regulatory agencies to confirm the long term availability of groundwater supplies.

It is again noted that the above analysis assumes that the water purveyors will develop well capacity and system storage to meet peak demands and that water will be delivered to localized areas of shortage through interties and/or water wheeling arrangements.

D. Water Supply Plan

The 1988 Coordinated Water System Plan prepared for Pierce County identified source, storage, and transmission pipeline improvements to supplement the existing water supply in meeting future demands. The recommendations in the previous study were carefully considered and discussed with members of the WUCC. The conclusions are that the improvements as shown are not appropriate for a number of reasons:

1. There has been substantial water system development during the intervening seven years since the CWSP was prepared.

2. The water demand projections in this updated CWSP are significantly less than the projections in the earlier plan.

3. The Growth Management Act, which aims to concentrate future growth within the defined Urban Growth Area, also influences the need for future water system facilities.

4 The facilities proposed in the previous plan are very conceptual in nature, it is difficult to understand the rationale for some of them, and this level of proposed improvements will not be needed in the foreseeable future.

5 Facilities proposed in the previous plan were not coordinated with the water system plans of the various purveyors.

6. The proposed improvements also did not give clear guidance to Pierce County or the water purveyors for future development.

This update, therefore, proposes a different approach, which is described in this section. It is organized into a discussion of future sources, interties, regional facilities, and wheeling.

The scope of the update included setting up a computer model developed by the Tacoma Water Division for its water supply and transmission system. This model was used to confirm the feasibility of using the new supply sources, the interties, transmission pipelines, and water wheeling discussed in this plan. Detailed analysis of the interties between existing systems, other than Tacoma, was not possible without analyzing the distribution systems, which was beyond the scope of the study.

E. Future Sources

The City of Tacoma, as part of its investigations to update its Comprehensive Water Plan and to expand it into an integrated resources plan, has prepared a study of possible water sources. The study identifies several possible future sources that could be used to help supply Pierce County and which are shown on Figure IX-5.

1. Groundwater in the Tide Flats Area of Tacoma - It is anticipated that 10 to 20 mgd of water supply could be developed from deep aquifer wells in the tide flats area which could be readily connected to the Tacoma system.

2. Groundwater at the Chambers Creek properties. Pierce County acquired this site which was formerly owned by the Lone Star Sand and Gravel Company for the Chambers Creek Regional Wastewater Plant, including 12.9 mgd of groundwater rights and 8.9 mgd of surface water rights. Approximately 3.6 mgd of the groundwater rights are from an artificial lake on the site, leaving 9.2

mgd that could probably be developed. The report concluded that it would be too expensive to filter and deliver the surface water.

3. Artificial Groundwater Recharge - The City of Tacoma is proceeding with plans to recharge the South Tacoma Wellfield with surface water from its Green River source. Previous studies indicated that this wellfield could supply 48 mgd for a period of 60 days with a continuous safe yield of 12-13 mgd. The City's goal is either to extend the allowable duration of pumping or to increase the aquifer yield.

4. Water conservation and reuse also offer opportunities for increasing the available water supply in the future. Simpson has already substantially reduced its water use, but has the potential for more conservation including reusing treated wastewater. Other industries in the area have also shown an interest in conservation.

It should be kept in mind that these sources are a way to withdraw the groundwater resources estimated earlier in this section and do not necessarily increase the available groundwater resources. However, the deeper aquifers such as the tide flats area may be recharged over a broader geographical area which could augment the area's water resources.

As previously stated, the City of Tacoma and the U. S. Army Corps of Engineers are jointly studying the feasibility of operational changes at Howard Hansen Dam that would increase the firm yield of the Green River. If feasible, this could increase the City's withdrawals in the future.

F. Interties

Interties are connections between systems that allow water to be exchanged between the systems.

In 1991, the Washington State Legislature passed legislation (second substitute Senate Bill 5358) relating to interties. This bill recognizes the value of interties and provides that effective January 1, 1991 any water system proposing to create an internee with another system must file a written notice with both the Washington State Department of Health and the Department of Ecology. The notice must identify the location of the proposed intertie, the purpose and capacity. The Department of Health is supportive of intertie arrangements because it promotes reliability and quality of service. The Department of Ecology (DOE) generally appears to be supportive of interties so long as no increase in water rights is required, but the approval process is lengthy and DOE has been reluctant to approve these transfers.

Some of the water systems in the Urban Growth Area have been experiencing water shortages. This is related to growth and the inability of the water systems to obtain additional water rights, rather than a lack of water available in the

underlying aquifer. Some of the systems that have been experiencing shortages include Fruitland, Summit, Sound, among others. In part because of these issues, the purveyors in the area southeast of Tacoma have formed a cooperative for the purposes of jointly addressing their water supply needs. This Water Cooperative of Pierce County has sponsored a study of their water requirements as compared with the available water rights and is exploring interties to allow the systems to support each other, at least on an emergency basis. In addition, a number of systems have connections to the Tacoma water supply pipelines.

Table IX-2 summarizes the existing and proposed interties taken from information provided by the systems. These interties are proving very helpful by improving system reliability and providing emergency back-up to water-short systems and should be encouraged.

Existing (and proposed) interties should be shown in the CWSP and the individual water system plans. According to the legislation, the notice for interties existing prior to January 1, 1991 can be incorporated into the 5-year update of the water system plans, but must be filed no later than June 30, 1996. It should be noted, that emergency interties are exempt from the legislation, although there is value in filing for the intertie, should it be required on more than an emergency basis in the future. As part of this CWSP update, the interties between the systems in the Cooperative were reviewed using the water system plans and other information supplied by the systems. It is difficult to evaluate the capabilities of the interties without performing a hydraulic analysis of the several water systems. It is recommended that each system identify its water supply needs through its interties and evaluate its ability to deliver water to its customers from the interties. Concurrently, the Coop members need to have discussions with adjacent systems to determine the practical limitations of the interties. Many of the systems have computer models, which should facilitate this analysis.

It is recommended that the individual systems continue to develop groundwater resources in their service areas to the extent that the groundwater aquifer will sustain the use and it is feasible to secure a water right. There may be opportunities for joint development of wells and/or storage by adjacent systems. It may be more efficient for the Cooperative systems to jointly prepare the notice for all of the interties and this approach should help to gain DOH and DOE approval. As a further step in regional cooperation, it is recommended that the area to be served by the water right include the entire service area of the Cooperative (or possibly be extended to include the south and east boundary of the Urban Growth Area). Further, it is suggested that filings for any new water rights also identify the entire area. This may eliminate the need to give notice on interties or, at least would make the notice a formality.

The Water Cooperative of Pierce County continues to work on issues of mutual interest to the member systems. Recently, they sponsored a study of their groundwater rights and well capacities as part of an effort to determine the

available resource, opportunities for cooperating in well development, interties, and to help gain Pierce County's support for funding and other assistance. The study concluded that the annual groundwater recharge in the area served by the Cooperative is about 179,000 acre feet and that the annual usage is about 35,000 acre feet. The study estimates that 30 to 50 percent is potentially available as water supply so the safe yield would be 54,000 to 90,000 acre feet/year. In preparing the study, Robinson and Noble, Inc. noted that they had not assessed aquifer levels or trends in levels over time, which would provide better information on aquifer yield.

G. Regional Facilities

The interties discussed above were established as a means to provide water supply support between systems usually on an emergency or standby basis. Historically, water systems in Pierce County have been constructed to serve their respective service areas with little coordination with adjacent systems. As a result, the systems are constructed to deliver water from their wells to the customers, the distribution pipeline grid is relatively weak at the system extremities, and there are differences in system pressures (Figure IX-4). This means that the quantity of water available at an intertie is often limited and that water can probably flow in only one direction through an intertie unless it is pumped.

The City of Tacoma water supply pipelines cross much of the Urban Growth Area in central Pierce County. The City is already serving a substantial area outside of its City limits. Currently, new large-scale area developments at Fredrickson, Sunrise, Cascadia, and Sunrise View are resulting in the construction of large water supply facilities by the City south of its Transmission Pipeline No. 2. The City is expecting to complete a combination of 30 to 24-inch pipeline to Sunrise this year including the construction of a reservoir. The City of Tacoma's surface supply and pipelines are a tremendous resource to the Pierce County Urban Growth Area. The price of City water is currently higher than the individual water systems pay for drilling wells and extracting the water, but the water supply is available and the pipelines are installed with some capability to deliver water to the various systems.

H. Recommended Actions For Central Pierce County

Conceptually, there are two pipeline improvements in Pierce County that will be important to meeting future water demands: (1) a pipeline along S. 176th Street E. connecting to the Tacoma system; and (2) pipelines connecting Pierce County's groundwater rights at the Chambers Creek site to the Tacoma system. Based upon the present water supply situation and projected demands, probably the only improvement that might be constructed during the next six years is the pipeline along S. 176th Street E. The other improvements would be needed further into the future and the routes shown should only be considered schematic at this time.

1. Extending the pipeline along 176th Street E. west into Spanaway and then north along Waller Road to connect with Tacoma's Pipeline No. 2 creates a looped

system with the ability to serve the Spanaway, and possibly Parkland, area. Parkland and the South East Tacoma systems could be served directly from Pipeline No. 2. These systems have pressure zones with hydraulic grade lines at 527 ft., 512 ft, and 568 ft. respectively. All should be able to receive water by gravity.

2. Chambers Creek Properties - The groundwater resources at Pierce County's site could be connected to the Tacoma system at the intersection of 40th and Bridgeport Way where Tacoma has a 30-inch pipeline. In addition, if there was a need, a pipeline could be constructed from the site through the Lakewood and South East Tacoma systems to Pipeline No. 2 (see Figure IX-5) to allow the use of this source by these systems.

The pipeline along 176th Street E. is probably the only improvement that might be constructed during the next six-year period (i.e., by the year 2000). The pipeline could be phased, serving initially as an intertie between the purveyors and later connect to the Tacoma system. An engineering study will be required to determine the size, route, cost, and connections between the systems. It is recommended that the interested purveyor systems meet with the City of Tacoma to explore its construction. The water purveyors could: 1) contract with the City of Tacoma to build the pipeline and sell water; or 2) the systems could jointly construct and own the pipeline and contract to purchase water from the City. Since this pipeline also benefits the City of Tacoma service area, it appears reasonable that regardless of the ownership and financing arrangement that the City of Tacoma should be willing to pay a share of the cost.

I. Water Wheeling

The Regional Water Supply Plan discussed above also presents opportunities for wheeling water through the system or exchanging water from different sources. When Tacoma completes Pipeline No. 5, it will be used to supply a portion of the City's requirements, "freeing up" capacity in Pipelines 2 and 4 that could be used to supply other systems. Wheeling is used extensively by electric utilities, but has not been highly developed for water systems. In Pierce County, the Tacoma water supply pipelines could be used for wheeling water. As discussed above, there are opportunities in the future for water supply from the County's Chambers Creek property, among others. At this time, neither of these entities are water purveyors in Pierce County. To take the County's groundwater supply as a possible example of wheeling, there are water supply shortages, as discussed above, in some of the systems southeast of Tacoma. Using the wheeling concept, the County might contract with the City of Tacoma to deliver a quantity of water to the Tacoma system and, in return, Tacoma could deliver a similar quantity of water from its pipeline through connections to the systems needing water. The City of Tacoma would charge the water systems the price for the water that it is purchasing from Pierce County, plus a wheeling charge for use of the City of Tacoma facilities. This

arrangement would need to be worked out through a rate analysis and an agreement between the parties involved.

Similar to interties, wheeling of water would require an application to and approval by the Washington State Departments of Health and Ecology. There are at least five issues that could limit the wheeling of water. These are water quality, water rights, financial, political, and operations issues. Water quality can be a concern when water from different sources is mixed especially as it relates to corrosion control and the lead and copper rule. However, since mixing of various sources is occurring throughout Pierce County, this is most likely an issue that can be resolved on a case by case basis.

Proposed interties (and water wheeling) may affect water quality and system operation in several ways. Groundwater systems using Tacoma surface water as a supplemental supply are required to maintain a disinfectant residual in areas served by surface or mixed ground and surface waters. Systems that do not disinfect continuously must therefore either begin to do so, or isolate zones served by surface water. Systems mixing differing source waters may experience a variation in water quality that impacts corrosivity to household plumbing. Corrosion control strategies for lead and copper are being developed or implemented by several utilities in Pierce County. These impacts may be beneficial or detrimental, or have little impact, depending on source water quality, and should be evaluated on a case by case basis.

The place of use assigned to the existing water rights must be addressed. Historically, water rights have listed a purpose and place of use. For most systems, the purpose of the right is municipal supply and the place of use is the service area of the system. With the recent legislation on interties, it will be necessary for systems to request a change in the place of use. One possibility is to request a change to encompass the Urban Growth Area of Pierce County. Another would be to set up groups of neighboring water systems such as the Water Cooperative of Pierce County and to change the place of use to the combined service areas of the Cooperative members. In either case, approval from the Department of Health and the Department of Ecology will be necessary.

The financial, political, and operations issues regarding water wheeling should be addressed by the WUCC as a regional matter.

Recommendations For Central Pierce County

The following are recommendations for improving water supply in Pierce County by increasing reliability and improving supply to water-short areas.

1. The water purveyors should continue to cooperatively develop interties with adjacent systems.

2. The Water Cooperative of Pierce County systems should consider preparing a joint notice to DOH and DOE for their interties and identify the service area as the entire service area of the members

3. Water purveyors should coordinate their water system planning with adjacent systems and the approval process for water plan updates should require written confirmation that this coordination has occurred.

4. In applying for new water rights, systems should broadly define the area of intended use. For example, in the area served by Water Cooperative of Pierce County, this area should include the combined service area of the systems.

5. Tacoma should continue the design and construction of Pipeline No. 5.

6. The water purveyors and/or the City of Tacoma should initiate discussions, and conduct an engineering study, in order to address the issues of a pipeline on 176th Street E. that can serve the requirements of the interested systems.

7. Pierce County with the help of the water purveyors should implement the groundwater monitoring program outlined in Section XII of this CWSP update for the Lower Puyallup and Chambers/Clover Creek Basins.

8. The County should take steps toward the development of the groundwater resources at its Chambers Creek site and enter into discussions with Tacoma and systems having an interest in the water supply.

9. The City of Tacoma, Pierce County, and/or the water purveyors should explore the concept of wheeling water through the Tacoma system and develop a contract for this purpose. This relates to possible future use of Pierce County's Chambers Creek properties, and other potential sources, etc.

10. Pierce County officials should work with the Washington Departments of Ecology and Health to facilitate the availability of water.

IV. GIG HARBOR PENINSULA

A. General

The Gig Harbor Peninsula presents unique water supply issues in Pierce County and will require different approaches to resolving these issues than the rest of the County. It is separated from the main Urban Growth Area by the Tacoma Narrows and it appears that the population will need to rely on local groundwater resources for meeting water supply requirements for the foreseeable future.

The City of Gig Harbor and its urban growth area are the only portions of the Gig Harbor Peninsula designated urban in the Pierce County Comprehensive Plan (see Figure IX-1). This means that future development outside the designated Gig Harbor Urban Growth Area will be on 2.5 acre or larger lots. However, there is already substantial development with an urban density on the Gig Harbor Peninsula including a large number of platted subdivisions that have been "approved" under previous land use regulations, and many have vacant lots that can continue to be built upon. It will probably be several years, therefore, before the new land use policies in the 1994 Comprehensive Plan begin to affect the growth rate.

The groundwater resources of the Gig Harbor Peninsula generally meet the primary drinking water standards. The glacial till which caps most of the peninsula provides a relatively good measure of protection from contamination due to land use activities. However, shallow wells are susceptible to nitrate and bacterial contamination associated with on-site septic waste disposal practices. Some wells on the Peninsula also have high iron and manganese concentrations, which is a typical problem with water produced from deep glacial aquifers throughout Western Washington. This may cause poor tasting water and can stain plumbing fixtures or laundry washed in the water.

The Gig Harbor Peninsula is particularly susceptible to seawater intrusion. To date, only a few wells have experienced significant seawater contamination. Many wells, however, have shown evidence of increasing chloride concentrations over time, indicating a degradation of the groundwater. Continued well development, both along the coastline and inland could cause increased seawater intrusion. Special care must be taken in approving new wells to make certain that groundwater withdrawal rates will not exceed recharge rates in order to preserve the high quality of the peninsula's groundwater resources.

B. Water Resources

Streams on the Gig Harbor peninsula are small and do not offer a reliable source of water supply. Water is supplied either from individual wells or wells serving public systems. The groundwater resources were studied in the Gig Harbor Peninsula Groundwater Management Program that was completed in 1992. These resources were also reviewed as part of this update to the CWSP by Hong West Associates, Inc. The Tacoma Pierce County Health Department (TPCHD) is planning to implement a sampling and data collection program on the Gig Harbor Peninsula to begin to collect information that can be used to better manage the groundwater resources, in the future.

The Gig Harbor Peninsula in Pierce County covers approximately 50 square miles. It is bordered by the Kitsap/Pierce County line to the north, Colvos Passage and the Tacoma Narrows to the east, Carr Inlet to the south, and Henderson Bay and Burley Lagoon to the west. It includes Fox Island and other small islands within the area.

The discussion and statistics for the Gig Harbor Peninsula do not include the Key or Long Branch Peninsula unless specifically stated.

Several researchers have estimated the groundwater resources of the Gig Harbor Peninsula and adjacent areas in recent years based upon various assumptions of annual precipitation, less evapotranspiration and surface runoff. The difference, is recharge to the groundwater, and a portion of this recharge can be withdrawn from the groundwater system without significant adverse impacts to the groundwater reservoir. The following summarizes the estimated safe yields predicted by the various studies:

Gig Harbor Peninsula

Source	(gal/min./mi.^{2})	(ac-ft.yr.)	(mgd)
Drost (1982)	80 to 130	6,300 to 11,000	5.7 to 9.5
EES (1989)			
High Estimate	220 to 370	18,000 to 29,000	16 to 26
Low Estimate	50 to 75	3,600 to 6,000	3.2 to 5.4
Sweet-Edwards (1992)			
High Estimate	120 to 200	9,600 to 16,000	8.7 to 15
Low Estimate	50 to 85	4,000 to 6,500	3.6 to 6.0
Hong West (1995)	75 to 130	6,100 to 10,000	5.4 to 9.0

The Hong West estimate, which was prepared for this update of the CWSP considered the previous studies in arriving at the results shown above. It is based upon an annual precipitation of approximately 51 inches per year (NOAA 1992), an average surface runoff of 27 inches, and an average evapotranspiration rate of approximately 19 inches per year (Drost, 1982). Therefore, the net groundwater recharge is 8 inches per year. Assuming that 30 to 50 percent of this amount is potentially available as water supply gives the estimated safe yield for the Gig Harbor Peninsula shown above.

The groundwater aquifers on the Gig Harbor Peninsula include Upper and Sea Level aquifers that are recharged from local precipitation. There is evidence of deeper (below sea level) aquifers that may receive recharge from mainland areas, or upward recharge from deeper aquifers. There are few wells penetrating to the deeper aquifers and the groundwater mechanisms are less clearly understood but they offer the possibility of water supply in addition to local groundwater recharge.

Recognizing the importance of managing the groundwater resources of the Gig Harbor Peninsula, the Tacoma-Pierce County Board of Health sponsored the preparation of a Groundwater Management Plan in 1992. The study concluded by recommending the following steps be taken to protect the aquifer:

- Request the Washington Department of Health to modify its public water system policies by delineating water system service areas and requiring public water systems to have an approved water system plan as a prerequisite for establishing its future service area.

- Revise Pierce County ordinances to require that system water plans be coordinated with adjacent "Group A" purveyors.

- Request DOE to require metering and, where possible, water level monitoring for all permitted wells on the Gig Harbor Peninsula.

- Request the Pierce County Council to incorporate state water conservation guidelines in the CWSP and require systems to reflect these in their water system plans.

- Request that DOE and DOH determine more precise standards for determining the adequacy of water supply as required by Section 63 of the Growth Management Act.

- Design and implement a groundwater monitoring and aquifer evaluation program for the Gig Harbor Peninsula, or alternatively, for critical subregions to better estimate the aquifer resource.

- Request the Tacoma-Pierce County Health Department to implement a seawater intrusion program.

The Gig Harbor Peninsula Groundwater Management Program reached tentative conclusions that current usage is not causing a decline in the water table except in some localized areas of heaviest use. However, with current water demand projections, the potential exists for significant declines in areas of heavy use. The report states that modest to severe local drawdown can occur when the pumping exceeds 1,500 gpm for any area of less than 10 square miles and that sea water intrusion may be a problem if withdrawals greater than 500 gpm occur within 500 to 1,000 feet of the shoreline. It could be even more severe in areas with restricted local aquifers.

C. Water Use

The average daily water demands for the Gig Harbor Peninsula developed as part of the 1995 CWSP update, and as contained in Appendix E, are summarized below. (Please see Section VIII – Introduction for an explanation of the differences between the 1995 CWSP water demand projections and the water demand projection contained in Section VIII.)

Projected Water Use
(Million Gallons Per Day)

	1990	1994	2000	2010	2020
Base Case	4.5	5.1	5.4	6.4	6.9
High Case	4.5	5.1	5.9	7.7	10.3

If Pierce County strictly follows the rural development criteria in its Comprehensive Plan, growth and projected water use could be even less than the base case. The high case as shown above is more indicative of recent growth rates and shows that the demand will begin to encroach into the estimated long-term safe yield range of 5.4 to 9.0 mgd before the year 2000. Also, existing water rights are approximately 9.0 mgd and fully appropriate the capacity of the aquifer. This is an indication that there may be increasing problems with the quantity and quality of water supply within the Gig Harbor Peninsula.

D. Existing Water Systems

The City of Gig Harbor is the only municipal water system on the Gig Harbor peninsula. Several private investor owned systems including Harbor, Richardson, and Stroh water companies provide service to large areas of the peninsula.

Gig Harbor serves its incorporated area and will serve a large new platted development north of the City limits. The developer is installing the water system and a new well adequate for the subdivision, which will be integrated with the Gig Harbor system and will be deeded to the City.

The Harbor Water Company is the largest investor owned utility and is operating a number of systems on the Gig Harbor Peninsula and in neighboring Kitsap County. The Company serves approximately 4,800 customers on the Gig Harbor and Key Peninsulas in Pierce County.

Many of the water systems operated by Harbor Water were originally constructed to serve new subdivisions or were small private systems that Harbor has acquired or was requested to take over by the customers because the owners tired of maintaining them or because there were problems with the systems. Harbor has made system improvements and has interconnected many of the smaller systems in order to improve performance and reliability. The Company's operations are now being consolidated into four regions on the Gig Harbor Peninsula and three regions on the Key Peninsula. Harbor Water Company is currently completing its first water system plan to meet the requirements of the Washington State Department of Health and to obtain recognition of its water service areas.

The Stroh Water Company is a privately owned utility serving an area of about 1160 acres southwest of Gig Harbor. The utility has about 600 connections and supplies a population estimated to be 1720 people. The water system consists of six wells, three reservoirs, three booster pump stations, and three pressure zones.

It is estimated that approximately 460 water systems are located on the Gig Harbor and Key Peninsulas. Of these, 124 are "Group A" systems (systems with 15 or more connections) and 334 are "Group B" systems (systems with fewer than 15 connections). Originally, these systems probably were started to serve small unincorporated communities or beachfront development. More recently, they have been constructed as a prerequisite for new residential subdivisions. Indeed, subdivision practices may have encouraged the proliferation of small water systems. There is evidence that several "Group B" systems have at times been allowed in the same development.

There is a real need for improved water service on the Gig Harbor Peninsula. Groundwater is scarce in some locations and locally, seawater intrusion is a concern. The large number of water systems is evidence of the lack of planning and a "piecemeal" approach to water supply. Many of the systems have inadequate or undersized facilities by current DOH standards. The area is solely dependent on local groundwater for supply and water use appears to be approaching the sustainable capacity of this water resource. Since groundwater quality is generally good, and most systems have adequate supply, and the small systems are not under strong pressure to meet new drinking water regulations ("Group B" systems are exempt), there is little incentive to manage the water resource or to take a regional approach to water supply. It is difficult for small systems to afford the cost of adequate water facilities, hire a licensed operator, and meet the water quality monitoring requirements of today's water system regulations. The Harbor Water Company demonstrated its interest and ability over the past 25 years to acquire, expand and intertie small satellite water systems on the Gig Harbor Peninsula. The Peninsula Light Company has also expressed an interest in assuming a regional role for the Gig Harbor Peninsula. The Peninsula Light Company (PLC) serves approximately 23,000 electric customers on the Gig Harbor and Key Peninsulas. It is organized as a non-profit rural electric cooperative and has been providing electric service for approximately 70 years Recognizing the

need for improved water service, the Company's Management conducted an advisory survey of its customers in 1993 which indicated that a majority of the customers were supportive of PLC entering the water field. Since then, the Company has been developing a strategy for providing water service and is proposing the following policies and approach:

- Begin by offering management services to water systems (e.g. water quality monitoring, meter reading, billing, accounting, repair and maintenance).
- Defer owning or financing systems for three years, allowing time to gain experience and confidence.
- Require water systems receiving financial assistance to secure loans with water assets.
- Require systems to agree to improve their systems to specified operating standards (at their cost) before PLC will accept ownership.
- Do not pay cash to acquire water systems.
- Assign personnel hired for water operations dual electrical/water roles until the water rate base grows to support them.

PLC is envisioning assuming a satellite management agency role. A detailed discussion of water issues and PLC's proposed action was included in the 1995 Notice of Annual Election with a ballot for members to vote on the Company's proposal for water service. PLC has received these ballots; the majority of which favored PLC providing water service. Subsequently, PLC's Board of Directors has voted to begin offering water service.

E. Water Supply Plan

As already stated, the Gig Harbor Peninsula will need to rely on its local groundwater resources for the foreseeable future. Important issues that need to be addressed to improve water supply include:

- Approval of new systems
- Viability of existing systems
- Receivership for failing systems
- Regional planning
- Groundwater monitoring

This update to the CWSP addresses policies and procedures for addressing these issues at the County level. Further discussion is necessary to implement them on the Gig Harbor Peninsula because the key for improving water supply for the next 5 to 10 years will be more policy and management oriented.

F. Regional Supply

This alternative has already been addressed with the comment that supply from outside the Peninsula does not appear feasible in the short term. On the Gig Harbor Peninsula, the existing development is spread throughout the area so that constructing a regional supply system would be very expensive and probably not feasible within the six-year period addressed by this update to the Pierce County Coordinated Water System Plan.

Sateliite management will be necessary to improving water supply on the Gig Harbor Peninsula that cannot be feasibly intertied with existing systems. As already mentioned, the Harbor Water Company is active in satellite management.

As a non-profit cooperative, the Peninsula Light Company has demonstrated a genuine interest in improving water supply to the population of the Gig Harbor Peninsula, most of whom are its electrical customers. It has access to financial resources, including grants and low interest loans. In addition, it has the organization and experience from operating an electric utility for many years. The challenge faced by PLC will be to build a water system customer base and to attract "good" systems as well as systems "in trouble". One way to launch its water business would be to acquire or provide services to one of the larger systems.

The rural designation of much of the Gig Harbor Peninsula in the County's Comprehensive Plan raises questions about future development of water service. There appears to be sufficient platted lots so that development will continue at recent rates for the next several years, but the designation of the Peninsula as a rural area in the County's Comprehensive Plan will slow future subdivision development unless it is modified. Rural development allowed by the Plan will be on large tracts (2.5 to 5 acres +) which will make community water systems infeasible. Satellite system management would be the only feasible approach to improve service to the existing systems since there probably will not be enough density to support regional systems. Some interties between systems will certainly be possible.

G. Satellite System Management

Satellite system management concepts have been evolving in Pierce County and in Washington State in recent years. Recent State law and Section VII of this CWSP update require Satellite System Management Agencies (SSMA) to be approved by DOH and by the County. The provisions further clarify that any new system not within the approved water service area of a water purveyor must be managed by a SSMA. Implementation of this policy in the Gig Harbor Peninsula by approving Harbor Water Company, Peninsula Light Company, and others as SSMA's would help to ensure adequate management and service levels for new water systems.

Harbor Water Company has been expanding its satellite management role in the Gig Harbor Peninsula. It has been contracting with developers of new subdivisions to assume the ownership and management of the water systems and is providing management services to a number of existing systems. Tax laws make it difficult for a private water system to accept ownership of an existing system without paying taxes on the value of the system. Private systems can be owned by an individual, a partnership, or be an investor owned corporation. Private systems are also regulated by the Washington Utility and Transportation Commission (WUTC) which encourages companies to charge the same water rate to all of the systems it operates. This makes it more difficult to set rates that recognize differences in the costs of operating or upgrading different systems. For example, Harbor Water operates approximately 80 systems in Washington State, each of which pays the same rate. Also, since the WUTC limits the rates and profit levels for private water systems, it is more difficult for these systems to plan and capitalize large improvements such as would be required for a regional or subregional supply system.

H. Long Term Plan

For the short term, the groundwater resources of the Gig Harbor Peninsula will probably be able to supply the growing demands for water supply. It is possible that the deeper aquifer(s) may be in continuity with mainland sources, or there may be the possibility of joint groundwater development with Kitsap County. The previous CWSP suggested that the Skokomish River might be a future source of supply. Development of supply from the Skokomish River would be a major capital project. Also, competing water interests combined with the need to maintain in-stream flows, and the current moratorium on new water rights by DOE would affect the feasibility of this source.

As part of the Regional Planning and Coordination, discussed under the short-term planning horizon, it is recommended that Pierce County Public Works and Utilities take the lead in sponsoring a water supply study of longer range regional solutions for the Gig Harbor and Key Peninsulas.

Recommendations For the Gig Harbor Peninsula

The following are proposed actions for coordinating and improving water supply on the Gig Harbor Peninsula.

1. Pierce County should establish SSMA qualification requirements and the SSMA's should submit their qualifications for approval as SSMA's. Pierce County policy and recently enacted state law is to require new systems to be managed by a SSMA.

2. Pierce County Public Works and Utilities should serve as the convener of discussions between the SSMA's and the City of Gig Harbor to agree on

procedures and/or service areas for providing satellite management services to new and existing water systems on the Gig Harbor Peninsula.

3. Pierce County should contract with the SSMA's to provide technical assistance and operations and maintenance for systems subject to receivership.

4. Pierce County (i.e. TPCHD and Pierce County Public Works and Utilities) should encourage SSMA management assistance and/or ownership of existing systems not within the recognized future service area of a water purveyor.

5. Pierce County, with the help of the water purveyors, should implement a long term Groundwater Monitoring Program as recommended elsewhere in this CWSP update.

6. TPCHD should continue to implement the Gig Harbor Peninsula Groundwater Management Plan to gain data and implement a groundwater management program. Controls should be put on areas with significant development and areas with sources of possible contamination.

Table IX-2
INTERTIES

ntertie No.	Utility To	To Pressure (ft)	Utility From	From Pressure (ft)	Intertie Pressure (inches)	Intertie Capacity (gpm)
1	City of Bonney Lake Water District	735	Tacoma		12	3522
2	City of Puyallup	590	Tacoma		10	2446
3	City of Sumner	234	City of Puyallup			0
4	Pacific		City of Sumner	234		0
5	Fife Department of Public Works		Tacoma			0
6	Fife Department of Public Works		Tacoma			0
7	Firgrove Mutual, Inc.	720	Tacoma		12	3522
8	Firgrove Mutual, Inc.	643	Tacoma		12	3522
9	Fowler		City of Sumner	234	2	98
10	Fruitland Mutual Water Company	556	Firgrove Mutual Inc	643		0
11	Fruitland Mutual Water Company	556	Summit Water & Supply Co.	595	8	1565
12	Spanaway Water Co.		H20 Water	527.3	8	3000
13	Tacoma		Lakewood Water District	404	6	880
14A	Steilacoom		Lakewood Water District	490	12	3522
14B	Steilacoom		Lakewood Water District			
15	Tacoma		Lakewood Water District	404	12	3522
16	Parkland Light & Water Co.	512	SE Tacoma Mutual Water	568	4	391
17	Parkland Light & Water Co.	512	SE Tacoma Mutual Water	520	8	1565
18	Parkland Light & Water Co.	512	SE Tacoma Mutual Water	568	6	880
19	Parkland Light & Water Co.	512	Spanaway Water Co.	527.3	8	1000
20	Spanaway Water Co.	513	Parkland Light & Water Co.	527.3	8	1000
21	SE Tacoma Mutual Water	568	Summit Water & Supply Co.	595	8	
22	SE Tacoma Mutual Water	568	Lakewood Water District		4	391
23	SE Tacoma Mutual Water	520	Tacoma		4	391
24	Summit Water & Supply Co.	595	Tacoma			0
25	Summit Water & Supply Co.	595	Tacoma		6	880
26	Summit Water & Supply Co.	595	Tacoma		12	391
27	SE Tacoma Mutual Water	595	Tacoma		8	391
28	Town of Milton	277	City of Federal Way		10	2446
29	Twin Firs		Spanaway Water Co.	527.3	4	1100
30	Webstone		City of Sumner	234	8	1565
31	Winchester		Spanaway Water Co.	527.3	12	3800
32	City of Bonney Lake Water District	735	City of Auburn		12	
33	Parkland Light & Water Co.	512	Lakewood Water District	404	12	2500
34	Shore Acres		City of Gig Harbor		4	1000
35	Shore Acres		City of Gig Harbor		4	1000
36	City of Gig Harbor		Washington Water		4	500
37	Tapps Island		City of Bonney Lake	735	6	
38	Winchester Heights		City of Bonney Lake	735	2	
39	SE Tacoma Mutual Water		Summit Water & Supply Co.	595	8	
40	Firgrove Mutual, Inc.		Tacoma			
41	Curran Road		Tacoma			
42	Crescent Park		Spanaway Water Co.	527.3	8	3100
	PROPOSED INTERTIES					
101	Fruitland Mutual Water Co.	556	City of Puyallup	590		
102	Tacoma		City of Orting			
103	City of Sumner	234	City of Bonney Lake Water District	735		
104	Firgrove Mutual, Inc.		Tacoma			
105	Firgrove Mutual, Inc.		Tacoma			
106	Firgrove Mutual, Inc.		Tacoma			
107	Rainier View Water		Firgrove Mutual Inc			
108	Summit Water & Supply Co.		Parkland Light & Wtr. Co.			1500

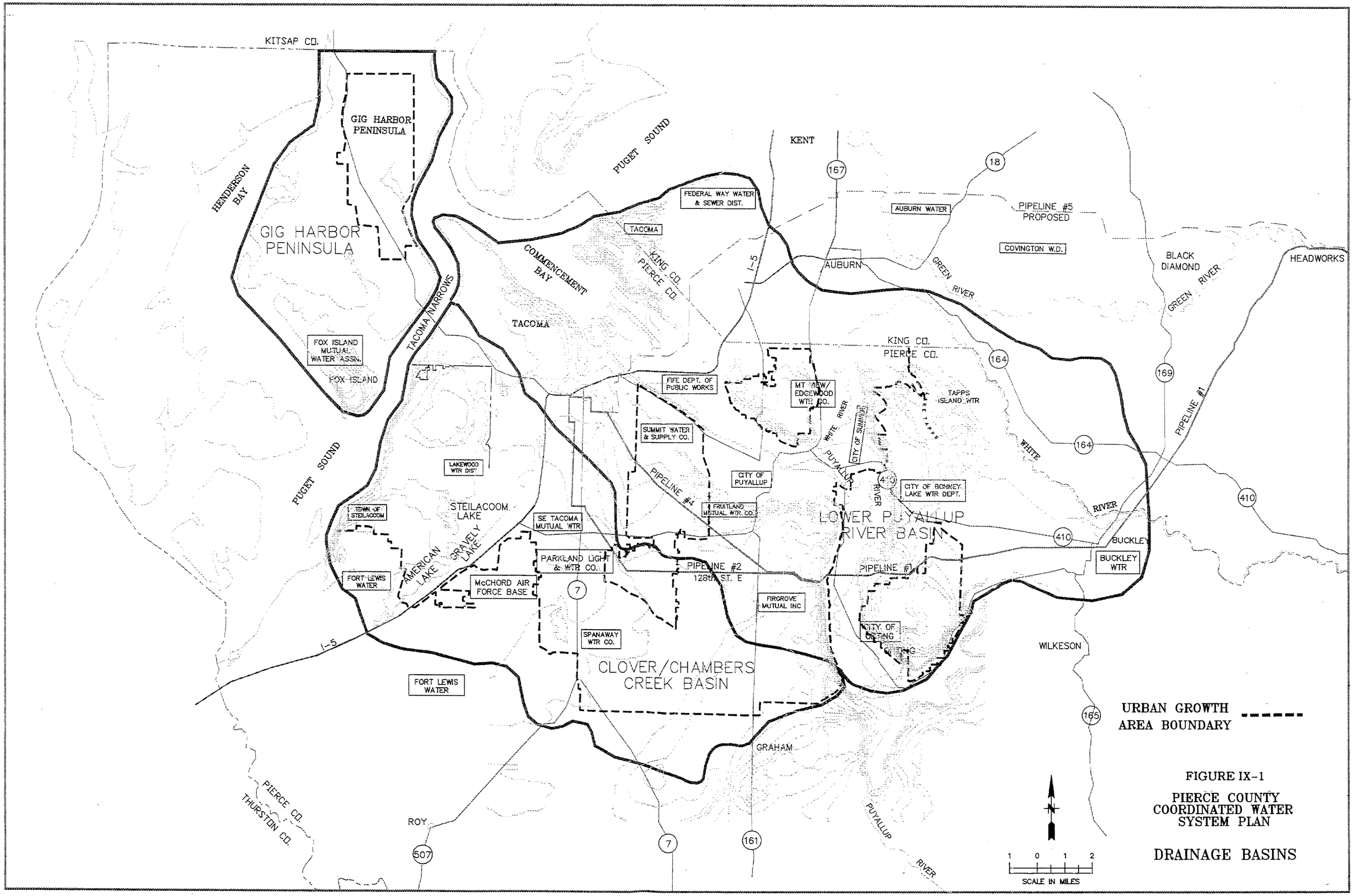


FIGURE IX-1

PIERCE COUNTY COORDINATED WATER SYSTEM PLAN

DRAINAGE BASINS

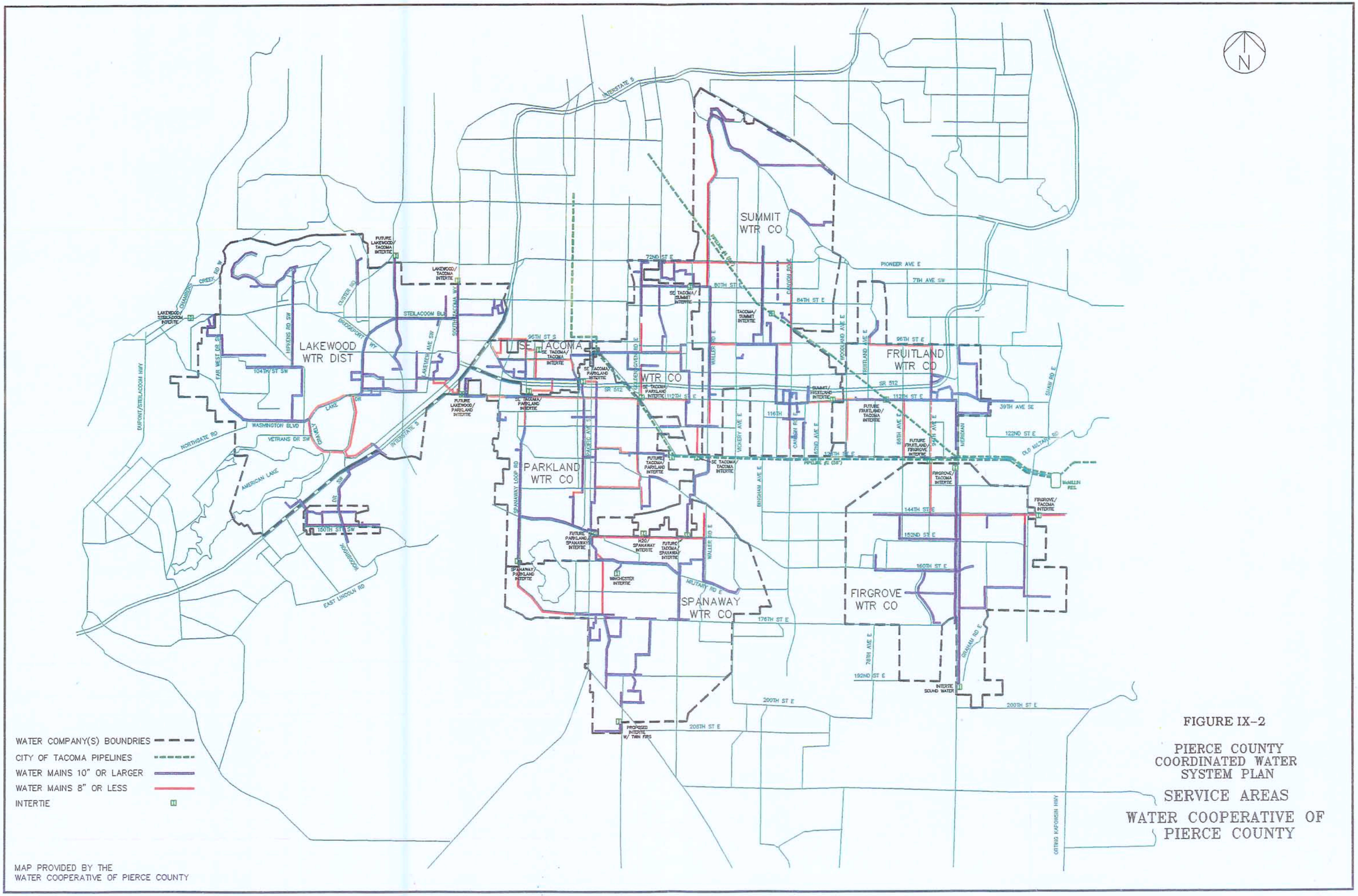


FIGURE IX-2

PIERCE COUNTY
COORDINATED WATER
SYSTEM PLAN

SERVICE AREAS

WATER COOPERATIVE OF
PIERCE COUNTY

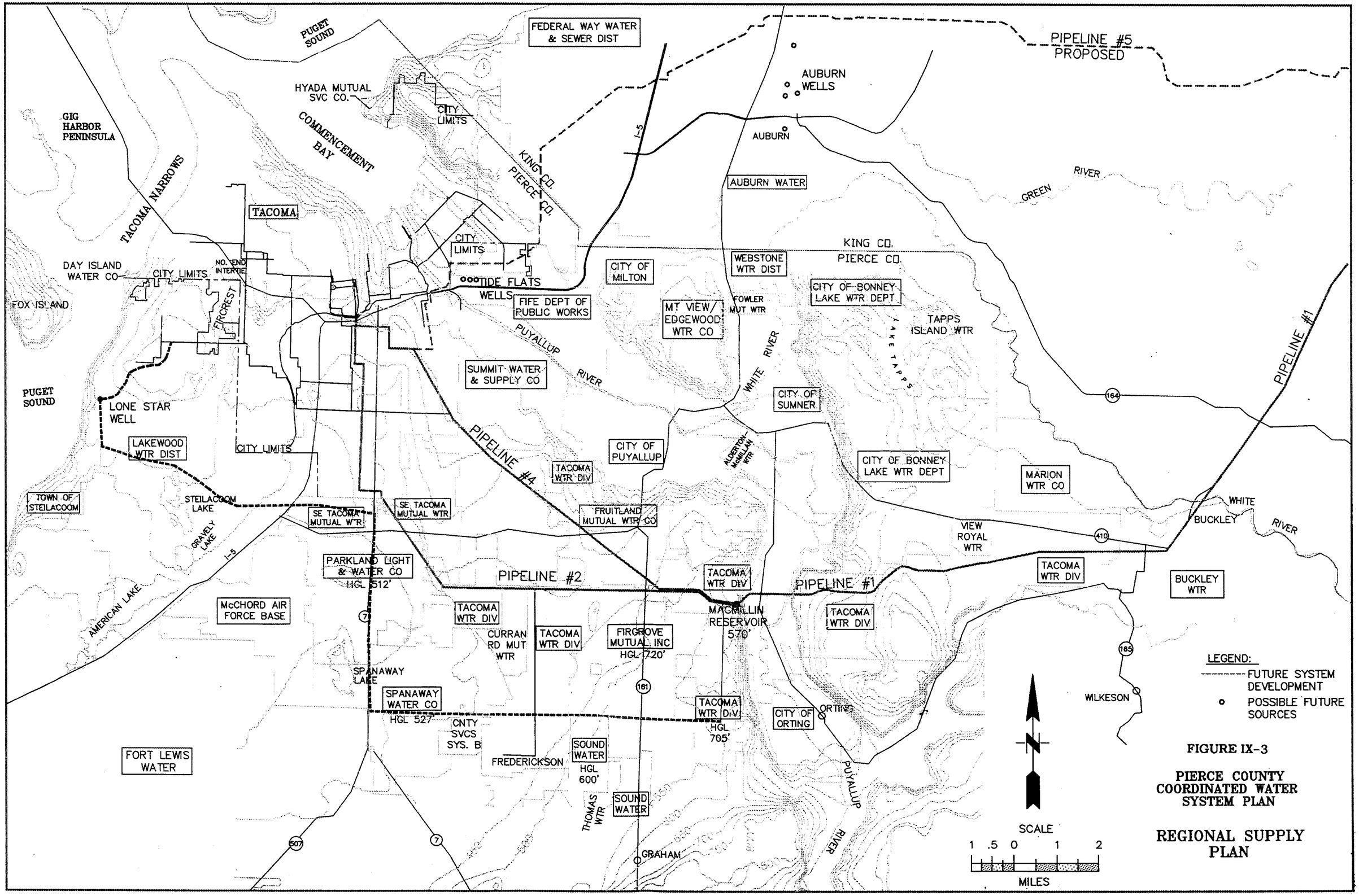


FIGURE IX-3

PIERCE COUNTY COORDINATED WATER SYSTEM PLAN

REGIONAL SUPPLY PLAN

Section X

Receivership

SECTION X

RECEIVERSHIP

I. SUMMARY

A. Summary of Receivership Issues

The combination of recent changes in laws in the State of Washington (The "Failing Public Water Systems Act") and federal law (The "Safe Drinking Water Act") has changed the climate in terms of the receivership of failing water systems in Pierce County. The Safe Drinking Water Act has added responsibilities to public water systems to ensure that drinking water is healthy and safe. The requirements will be difficult and expensive for small water systems to meet. The adoption of the Failing Public Water Systems Act by the Washington State Legislature provides that in the case of a failed water system, Pierce County may be required to serve as a receiver if no other entity is willing to take the responsibility.

If Pierce County or any other water purveyor is required or chooses to serve as a receiver, there are certain responsibilities that must be carried out. To meet those requirements, Pierce County must prepare for the eventuality of receivership and water purveyors interested in serving in the capacity of receiver must become prequalified as satellite system management agencies. The results could be additional financial responsibilities to ensure that any water system under the control of a receiver can provide adequate safe and healthy water. In addition, there would be requirements for staff expertise to operate a water system or the means to contract with an entity that can provide the expertise. This Section of the Coordinated Water System Act is intended to provide information concerning the responsibilities of receivership and possible options for action if the County or other purveyor is appointed by the court to function as a receiver.

B. Summary of Receivership Policies

Subsection V of this section contains policies adopted by Pierce County to deal with the eventuality of failure of a public water system and subsequent appointment by the court of Pierce County to function as a receiver. Pierce County's policy will be to act as a receiver only if no other entity is willing to take the responsibility. It is the position of the County that the most cost-effective way to deal with failed water systems is for the failed system to be taken over by an adjacent system.

There are policies contained within Subsection V which deal with ensuring that the County is prepared to act as a receiver and ensuring that in the case of the County being appointed as a receiver by the court that the receivership order issued by the courts allows for appropriate actions on the part of the County.

II. LEGISLATIVE BACKGROUND

A. Failing Public Water Systems Act of 1990

The Failing Public Water Systems Act of 1990 amends several sections of the Revised Codes of Washington and adds a new section to RCW 43.70. The purpose of the Act is to anticipate potential problems with some water systems to meet the requirements of the Federal Safe Drinking Water Act (Public Law No. 93-523, 88 Stat. 1660 [1974] [codified as amended in scattered sections of 42 U.S.C {1993}]). The purpose of the Failing Public Water Systems Act (FPWSA) is to ensure:

1) Customers served by public water systems are assured of an adequate quantity and quality of water supply at reasonable rates;
2) There is improved coordination between state agencies engaged in water system planning and public health regulation and local governments responsible for land use regulation and public health and safety;
3) Public water systems in violation of health and safety standards adopted under RCW 43.20.050 remain in operation and continue providing water service providing that public health is not compromised, assuming a suitable replacement purveyor is found and deficiencies are corrected in an expeditious manner consistent with public health and safety; and
4) The state address, in a systematic and comprehensive fashion, new operating requirements which will be imposed on public water systems under the federal Safe Drinking Water Act.

In short, the Failing Public Water Systems Act provides that the State Department of Health (DOH) may request, through the courts, that a failing water system be taken over by a receiver. And if no other satisfactory receiver volunteers, the county in which the failing system is located must serve as receiver. The term "taken over" refers to becoming the "receiver" of the water system. The responsibilities and limitations of becoming a receiver are discussed in Subsection III below.

B. Federal Safe Drinking Water Act

The Safe Drinking Water Act (SDWA), enacted in 1974, is a wide reaching federal law, which provides for among other things, uniform national standards for the quality of drinking water. Amendments to the SDWA were made in 1977, 1979,

1980 and extensively in 1986. The Act has several cross-references to other federal laws dealing with water and hazardous material disposal. The standards in the Act include uniform testing procedures and purification methods. Public water providers are required to comply with the requirements of the SDWA. Small water systems may not be able to afford the cost of testing and capital improvements necessary to meet the requirements of the SDWA.

A "public water system" as defined in SDWA is a system for the provision to the public of piped water for human consumption, if the system serves at least 15 connections or regularly serves at least twenty-five individuals. The term includes any collection, treatment, storage and distribution facilities under the control of the operator and any collection or pretreatment storage facilities not under control of the operator which are used primarily in connection with the system. (The State of Washington has adopted similar regulations which apply to systems with 2 to 15 connections.)

The SDWA applies to public water systems, as defined above, and specifies contaminants which, in the judgement of the Administrator (Environmental Protection Agency), may have an adverse effect on the health of persons. It specifies for each contaminant a maximum contaminant level if, in the judgement of the Administrator, it is economically and technologically feasible to ascertain the level of such contaminant in water in public water systems. Or, if in the judgement of the Administrator, it is not economically or technologically feasible to determine the level of such a contaminant, each treatment technique known to the Administrator, which leads to a reduction in the level of the contaminant sufficient to satisfy the drinking water regulations. The Act contains criteria and procedures to assure a supply of drinking water which dependably complies with the maximum contaminant levels, including quality control and testing procedures to insure compliance with those levels and to insure proper operation and maintenance of the system, and requirements as to 1) the minimum quality of water which may be taken into the system and 2) siting for new facilities for public water systems.

The Act gives primary enforcement responsibility to States which have met several criteria and it set up civil penalties in the form of fines for systems not in compliance once they have been given notice to make corrections. The SDWA also sets up a phased time frame for the Environmental Protection Agency to determine goals for maximum contaminant levels.

In September of 1993 the Environmental Protection Agency (EPA) sent a report to Congress suggesting changes in the Act to accommodate several issues which were particularly difficult for small systems nationwide. The report indicated that the problems for small systems (3300 population or less) are most significantly caused by:

- Deteriorated physical infrastructure
- Lack of excess capital
- Limited customer and rate bases
- Inadequate rates and poor financial management
- Diseconomies of scale
- Limited technical and managerial capabilities

Again, the EPA report dealt with small water systems nationwide. While some of Pierce County's 1500 water systems do not experience any of these problems, many of them experience some or all of them. As more contaminants are added to the EPA list setting maximum contaminant levels, it will be more difficult for small water systems to comply. The result will be an increase in the number of failing water systems and a higher potential for systems to go into receivership.

III. RECEIVER RESPONSIBILITIES AND POWERS UNDER RECEIVERSHIP

A. Receivership Statutes

While the exact scope of a receiver's role will be defined by the particular receivership order issued by the court, there are statutes and case law in Washington which describe the general powers and duties of a receiver. A "receiver" is defined in RCW 7.60.010 to be "a person appointed by a court or judicial officer to take charge of property during the pending of a civil action or proceeding, or upon judgement, decree or order therein, and to manage and dispose of it as the court or officer may direct". The powers of a receiver are listed in RCW 7.60.040. A "receiver shall have power, under control of the court, to bring and defend actions, to take and keep possession of the property, to receive rents, collect debts, and generally do such acts respecting the property, as the court may authorize".

The following roles of receivers have been determined by Washington case law.

- **Legal Actions.** A receiver can bring and defend legal actions. A receiver does not act for either the purveyor or creditor, but rather preserves the property as an officer of the court. No party can sue the receiver without prior consent of the receivership court.

- **Contracts.** Previous contracts of the failed purveyor do not bind the receiver unless the receiver ratifies them.

- **Property.** The receiver can take and keep possession of the property, receive rents (income) and collect debts. Technically, title in the property

rests in the court, not in the receiver, but the receiver can generally act like an owner, subject to approval by the court. With approval of the court, the receiver may sell the property of the failed system.

- **Bond.** The receiver must post bonds to the persons that the court identifies, such as creditors, conditioned on faithful discharge of the duties of receiver.

- **Reimbursement.** The receiver is entitled to be reimbursed for its efforts in administrating the system in receivership. Reimbursement generally has priority over other claims to the systems assets, but the reimbursement is limited to acts of the receiver authorized by the court.

- **Notice of Appointment.** A receiver must give notice of its appointment to the Washington Department of labor and Industry, the Department of Revenue, and the federal Internal Revenue Service.

- **Receiver's Certificates.** The court may authorize the receiver to borrow money by issuing receiver's certificates, which evidence an obligation of the court. This action by the court seems to occur very rarely.

B. Receivership Order

Following the granting of a petition to appoint a receiver, the court will issue an order defining the scope of the receiver's authority. The Department of Health (DOH) will generally write a draft of the order for the court. The order may be very specific concerning actions that must be taken by the receiver. DOH will generally recommend that the court grant the receiver full authority "to act in the best interest of the customers" served by the water system.

Generally, the receivership order should authorize actions and expenditures that the receiver thinks necessary for the safe and economical operation of the failed system. The receiver may, in particular, want to have the receivership order authorize the following acts:

- Hiring another entity to operate the system
- Committing current and future resources of the system to operations and improvements
- Spending money for specific health measures
- Mandating reimbursement upon sale of the company at the end of receivership

A receiver may return to the court and ask for authorization or ratification of particular acts as they arise.

C. County Powers to Operate a Water System

Chapter 36.94 of the Revised Codes of Washington provides for the County to operate its own water system. It is assumed that in the event of receivership by the County of a failed water system, that the provisions in RCW 36.94 would guide the powers of the County in addition to the receivership order.

The Chapter provides that "The construction, operation, and maintenance of a water system is a county purpose" (RCW 36.94.020). The same section describes the general powers of the County as being to "adopt, provide for, accept, establish, condemn, purchase, construct, add to, and maintain" water systems within the County, though it may not condemn a water system owned by a municipal corporation or private utility. In terms of financing, the County may levy charges on the water customers and tax the gross revenues of a system it operates to pay for the costs of planning, financing, construction and operation (RCW 36.94.140 and 160). The County may form a utility local improvement district (ULID) or local improvement district (LID) and charge assessments for improvements to property within the district (RCW 36.94.220).

The County may contract with other governments or private entities for maintenance and operation of its water system (RCW 36.94.190). DOH maintains a list of certified "satellite system management agencies" which are qualified to operate more than one public water system on a regional or countywide basis (RCW 70.116.134).

D. Financing During or After Receivership

In January of 1993, DOH released a report entitled Public Water Systems Needs Assessment Final Report, in Washington State Report on Local Public Works and Options. In the report, DOH detailed the results of a survey of estimates of water system costs between the period of 1993 and 1999. The costs included rehabilitation and replacement of existing facilities, system growth, capital expenditures to meet the Safe Drinking Water Act, additional operation and maintenance under SDWA, SDWA monitoring requirements, and planning costs. In the report, rehabilitation and maintenance costs between 1993 and 1999 for systems serving fewer than 100 connections average $40,000, while systems serving 100-500 connections average $180,000. The costs of water quality monitoring under the SDWA start at $4,500 per year for systems with less than 500 connections, plus laboratory fees. A system that goes into receivership may need much more improvement than figured in the report and customer charges may not be sufficient to pay for operational costs.

If a system goes into receivership, the receiver and the court must decide whether it should make immediate improvements for safety reasons, or whether it can operate the system at current standards until a responsible buyer

purchases the system. The County has four means available to finance improvements during receivership:

- **Raise Rates.** RCW 36.94.140 empowers the County to adjust rates for water service. Also the County may charge some customers more if the costs to operate or improve their part of the system are higher.

- **Levy Special Assessments.** If the court so orders, the County may levy special assessments on customers to finance improvements necessary for health (RCW 43.70.195.1).

- **Public Works Trust Fund.** The Failing Public Water Systems Act directs the Public Works Board to give water safety improvements priority in granting loans from the Trust Fund (Section 6-7, RCW 43.155.065-070). The Board, however, still has discretion in choosing loan recipients, and is limited by how much money is available in the Fund.

- **Pay With County Funds.** Obviously, this option may strain the county budget and produce political opposition. Still, if the court authorizes County expenditures and reimbursement in the receivership order, the County can expect to recover the money upon sale of the system. Given that state statute proclaims the operation of a water system as a county purpose, such expenditures are probably permitted.

When the receivership period ends, if the County takes over the system itself, it can employ these same four financing tools, or it may issue debt in the form of revenue or general obligation bonds (RCW 36.67).

E. Limitations on the Power of Receivers

Limitations on the power of a receiver may come from two sources, the Washington Utilities and Transportation Commission and the federal bankruptcy law. If the receiver is subject to regulation by the WUTC, the receiver may not be able to increase the rates it charges customers until the WUTC approves the increase. Even if a rate increase is authorized by the receivership order, the power of the court does not overshadow the power of the WUTC. When Washington courts have reviewed rate-setting decisions of the WUTC, they have always deferred to the Commission's power and expertise. If the receiver is not subject to regulations by the WUTC, the WUTC will not be involved in the receivership action unless the failed system either reverts back to the original owner (if the owner was WUTC regulated), or is purchased by a second WUTC regulated company.

If the owner of a failed water system files for bankruptcy, the receiver may lose control of the water system, but will receive at least some reimbursement for

expenses. The operations of a receiver may terminate with the filing of a bankruptcy action, the role of the receiver terminated. However, the bankruptcy court may, at its discretion, leave the receiver in possession and operating the system if that would better serve the interests of creditors and equity holders. Even if the receiver must surrender control of the water system, it should be reimbursed reasonable compensation for services rendered and costs and expenses incurred. Reimbursement to the receiver for actual, necessary expenses takes priority over creditors' claims, by federal statute. Therefore to ensure reimbursement, the receiver should only make "necessary" expenditures in the operation of the water system. If the owner petitions for bankruptcy, the receiver may lose control of the water system, but will receiver at least some reimbursement for expenses.

IV. OPTIONS FOR COUNTY ACTION

A. <u>During Receivership</u>

During the time that the County operates as a receiver, it may need to make two choices, whether to operate the system itself or contract for operation and whether to make improvements to the system or simply operate the system in the present state.

The decision to operate the system or contract for operation should be based on whether the County, at the time, has expertise in the operation of a water system. Currently, there are employees within the Pierce County Department of Public Works and Utilities with certification and experience in the operation of a public water system. It may be that at a later date, those employees may not be available. If employees are not available, the County should contract with an individual or other public water system for the operation of the system.

Another consideration in the decision to operate a failed system should be the financial aspects of the choices. The County should determine if it is more cost effective to the citizens of the County and to the customers of the water system for the County to operate the system or to contract for the operation from an outside entity.

The decision to make improvements should be based on the health, fire and life safety of the system at the time it enters receivership status. Health and Fire Safety officials will need to monitor water quality and quantity and seek to ensure regulatory compliance. If health, fire and life safety conditions indicate improvements are immediately necessary, the receiver will probably have to make them, if the funds are available from the sources discussed above. If no funds are available for needed improvements, it is not clear whether the DOH or the court can require the County to divert general fund dollars to the water

system. If improvements are not immediately necessary, the County can probably decide whether it has the resources, then convince the court to write a corresponding order.

B. When Receivership Ends

RCW 43.70.195(6) states, in part: "No later than twelve months after appointment of a receiver, the petitioning agency, in conjunction with the county in which the system is located, and the appropriate state and local health agencies, shall develop and present to the court a plan for disposition of the system."

The final disposition of a water system that has been placed in receivership will likely take one of four forms. First, with the approval of the department of health, the water system could return to the original owner. Second, the County could purchase the water system itself. Third, customers of the water system could set up a water district and issue bonds to purchase the system. And fourth, an existing water provider could purchase the system.

If the system were to return to the control of the original owner, it would have to be after the owner had proven that the capability to manage the system had improved. Also the original owner would most likely have to demonstrate the ability to pay the past debts and costs incurred by the receiver during the receivership period. The receiver should definitely investigate the financial resources and management skill of the original owner or any other prospective purchaser.

In the second instance, the County could take the water system by eminent domain. The FPWSA encourages the acquisition of failing systems by public entities in Section 9, RCW 8.25.280, discounting the valuation of the property by the cost of necessary health and safety improvements. The court could further discount the price by the amount of money owed to the County for its expenses as receiver. Following acquisition of the system, the County could employ all of the powers set forth in RCW 36.94, including contracting with another entity for management of the system. Qualified satellite system management agencies are listed with the Washington DOH.

In the third instance, the customers of the water system could establish a water district and issue bonds to finance the purchase of the system. Given that the costs of improvements are generally pretty large (or the system would not have failed originally), an independent water district might not be able to afford to make the improvements and pay for operation of the system as well as reimburse the receiver for expenses and pay the outstanding indebtedness.

The fourth instance is estimated by DOH to be the most cost effective. The interconnection of small water systems with larger neighbors appears to be the least expensive means to meet the requirements of SDWA. Again, the list of qualified satellite system management agencies of the Washington DOH is the best source to identify prospective purchasers. The receiver should be careful to ensure the court order authorizing the sale includes allocation of funds to reimburse the receiver's expenses.

V. PIERCE COUNTY RECEIVERSHIP POLICIES

RC-POLICY 1 **Pierce County will act as receiver for a failed water system only if no other qualified entity is willing to act as receiver.**

RC-POLICY 2 **Pierce County will implement a program to avert receivership actions, especially those actions which would require the County to assume direct responsibility for correction, maintenance, and operation of a failed public water system. The program should ensure that when receivership is unavoidable, adequate pre-planning has been conducted to facilitate the orderly implementation of the receivership action.**

RC-POLICY 3 **Pierce County will work with the Washington Department of Health to prepare a draft receivership order to present to the court prior to court action to appoint the County as receiver for a failed water system.**

RC-POLICY 4 **Pierce County should ensure that a receivership order appointing the County as receiver for a failed water system authorizes actions and expenditures that are necessary for the safe and economical operation of a failed system. A receivership order should authorize the following acts:**

- **Hiring another entity to operate the system**
- **Committing current and future resources of the system to operations and improvements**
- **Spending money for specific health fire and life safety measures**
- **Mandating reimbursement upon sale of the company at the end of receivership**

RC-POLICY 5 **Pierce County should make every effort, in the case of being appointed receiver, to ensure that the receivership be terminated at the earliest possible date.**

RC-POLICY 6 **The Pierce County Code should be amended by request of the Pierce County Executive to allow the Department of Public Works and Utilities to act as receiver for failed water systems and as an SSMA.**

RC-POLICY 7 **The Department of Public Works and Utilities will ensure that sufficient qualified water system operators are maintained on staff, to provide for adequate operation and management of a water system in the case that the County is appointed as receiver of a failed water system.**

RC-POLICY 8 **The duties of the appropriate Pierce County official should be amended by the Pierce County Executive to include water system management.**

RC-POLICY 9 **Pierce County will actively encourage other water systems and purveyors to become qualified to act as satellite system management agencies.**

VI. PROBLEM SYSTEM RESOLUTION AND PUBLIC WATER SYSTEM ASSISTANCE PROGRAM

The following section of the CWSP has been prepared to establish a process for addressing problem water systems in Pierce County. Problem water systems in this context are those that are in violation of Department of Health regulations and are in a condition that renders them unable to reliably provide drinking water of sufficient quantity and/or quality.

Pierce County will institute a program intended to avert receivership actions when possible, particularly those actions which would require the county to assume direct responsibility for correction, maintenance, and operation of failed public water systems, and to ensure that when receivership is unavoidable, adequate pre-planning has been conducted to facilitate orderly implementation of such an action. This will be accomplished through establishing a Public Water System Assistance Program within the Pierce County Public Works and Utilities Department. The goals of the Public Water System Assistance Program are to help ensure the health and safety of water system customers, and to assist purveyors and their customers in pursuing long-term solutions to water system problems. The assistance program will involve providing technical and, possibly, financial support to purveyors in addressing water system difficulties prior to their necessitating court mandated receivership. In providing assistance to non-publicly owned utilities, Pierce County Public Works and Utilities will be bound by provisions of the state constitution concerning use of public funds for private purposes. The assistance program will offer two levels of service based upon the legal status or operational condition of a public water system: a basic and an expanded level of service.

Basic Support. The first, or basic, level of service is primarily oriented towards systems which may be experiencing problems at an incipient stage, but are not yet in violation of Washington Department of Health regulations, and are generally providing reliable service; or systems that are not currently experiencing problems, but are contemplating system improvements or altering their organizational structures (e.g., conversion from an investor owned utility to a water district).

Under the basic level of service, the county will respond to requests for assistance or information from purveyors. Services which may be provided include:

- Minor operational trouble shooting/problem solving
- Identification of nearby purveyors potentially capable of providing technical advice or developing interties
- Lists of qualified Satellite System Management Agencies
- Assistance with questions concerning water system plan preparation
- Information concerning water district formation
- Options for funding water system improvements

The Pierce County Public Works and Utilities Department will be the basic service provider, but will also direct purveyors to other agencies for further information. For example, questions regarding specific requirements for Community Development Block Grants would be referred to the Pierce County Community and Economic Development Board. Questions regarding activities that may require conditional use permit, such as construction of a storage tank, would be referred to the Pierce County Department of Planning and Land Services.

Expanded Support The second level of service is an expanded level oriented towards the following systems: 1) Those identified by the Pierce County Public Works and Utilities Department, through consultations with purveyors conducted under the previously described basic level of service, with problems that appear likely to ultimately necessitate a receivership action; and 2) those systems against which the Washington Department of Health is considering initiating a receivership action and has so notified Pierce County.

Once the county discovers a water system problem sufficiently severe to potentially result in a receivership action, or after being notified by the Department of Health that a receivership action is being contemplated due to an apparent violation, the Pierce County Public Works and Utilities Department will contact the system owner/operator to determine whether county assistance would help resolve the violation, thus averting a receivership action. The Department will offer to aid the owner/operator in evaluating problems, seeking solutions, conducting system capability assessments, preparing cost estimates, conducting rate studies, and exploring funding options. The Pierce County Public Works and Utilities Department will also assist the owner/operator of the problem water system in complying with the requirements of other boards and agencies, for example, coordinating with the Boundary Review Board regarding service area adjustments.

If the purveyor sought and received assistance from the county in the past under the Public Water System Assistance Program's basic level of service, the Pierce County Public Works and Utilities Department will determine whether solutions that were previously recommended have been properly implemented. If not, the department will assist in their implementation. If previous solutions failed, the department will explore other options that may be available to the water system for correcting the problem.

The Pierce County Public Works and Utilities Department will contact nearby purveyors or Satellite System Management Agencies to determine their willingness to assist the problem water system, assume responsibility for system operation, acquire the system, or act as a receiver. The Department will facilitate communications between such purveyors and agencies and the owner/operator of the problem system.

The Pierce County Public Works and Utilities Department will encourage the owner/operator of the problem system to make corrections, contract with another purveyor for system operation, initiate formation of a water district, or sell the system to a qualified purveyor. Alternatively, customers of the system may be encouraged to initiate formation of a water district if the owner is unresponsive.

The Pierce County Public Works and Utilities Department will consult with representatives of other county departments and the Water Utilities Coordinating Committee to discuss options for intervening with problem systems and, if necessary, to develop a contingency plan for possible receivership. The contingency plan will identify immediate system needs, establish a preliminary approach to long-term operation of the system, and set forth a preliminary work plan, to be finalized and implemented should a receivership action occur. The Pierce County Public Works and Utilities Department will attempt to identify a nearby purveyor or Satellite System Management Agency to act as the receiver. If such a purveyor or agency accepts the receivership role, the Department may request that it assume responsibility for managing preparation of the contingency plan. Otherwise, the Pierce County Public Works and Utilities Department will be responsible for preparing the contingency plan.

Other Pierce County departments which are likely to participate in the preparation of a contingency plan include: the Pierce County Community and Economic Development Board, the Pierce County Budget and Finance Department, the Pierce County Prosecuting Attorney, the Tacoma-Pierce County Health Department, and the Pierce County Fire Marshal.

The Pierce County Community and Economic Development Board will be consulted concerning the availability of funding under the federal Community Development Block Grant Program and the eligibility requirements of that program. Under certain circumstances, Community Development Block Grants can provide purveyors and homeowners with financial assistance for water system infrastructure improvements to correct public health and safety problems.

The Pierce County Budget and Finance Department will be requested to assist in the identification of financing options and development of assessments or reimbursement schedules. This will be particularly critical if the Public Works Trust Fund or county general revenue funds are to be utilized for system rehabilitation. Should direct financial assistance be provided by the county to rehabilitate a system, costs incurred by the county will be recovered as appropriate to maintain consistency with Article VIII Section 7 of the state constitution.

The Prosecuting Attorney will be consulted regarding legal issues relative to receivership actions, particularly those related to the 5th Amendment to the U.S. Constitution (relating to takings), structuring legal agreements, development of a strategy for court appearances, and identification of constraints on use of public funds for water system rehabilitation.

The Tacoma-Pierce County Health Department will review the contingency plan to ensure that proposed remedies will provide a satisfactory level of public health protection, and the Pierce County Fire Marshal will provide input to the contingency plan regarding fire flow ordinance requirements.

Receivership. Should the Department of Health initiate a receivership action, the problem water system will be considered a failed system, and the county will no longer be providing "assistance" to the purveyor. There should be implicit understanding that at the point a system is considered failed, Pierce County will pursue a course of action that results in the most expedient resolution of the receivership action.

Generally, two general classes of water system failures are likely to be encountered:

- Acute failure - principally where water supply is interrupted or suddenly contaminated, usually involving a public health or safety emergency
- Chronic failure - resulting from inadequate pressure, low levels of contamination, or seawater intrusion

The first class may necessitate emergency remedial action to ameliorate any immediate threat to public health and safety. Emergency measures may include providing bottled water, a tanker truck, emergency intertie, temporary installation of pumps, and/or establishment of an emergency power supply. Should there be doubt concerning Pierce County's or another nominated receiver's authority to intervene in an emergency situation, Chapter 43.70 WAC allows the court to appoint a temporary receiver to address the emergency situation. After the emergency action, steps necessary to restore the system to full compliance would be undertaken, and issues related to operation, maintenance, and long-term ownership would then be resolved in the manner described below for systems experiencing chronic failure.

A chronic failure would be addressed in accordance with a work plan submitted by the designated receiver, either Pierce County or a purveyor, to the court that ordered the

receivership action. The receiver will be responsible for finalizing and implementing the preliminary work plan developed as part of the contingency plan, or if a preliminary work plan has not been previously developed, for formulating and implementing such a plan. The plan must address the following:

- Assessment of the capability of the failed system to operate in compliance with health or safety standards
- Determination of the level of service to which the system will be upgraded or restored
- Preparation of capital and operating cost estimates, both short and long term
- Identification of a viable source of funding
- Provisions for obtaining Pierce County Council approval for funding, if the county acts as receiver
- Arrangements for correction, operation, and maintenance of the system during the receivership period
- Provisions for conducting any required water quality monitoring during the receivership period
- Preparation of a water system plan in accordance with Department of Health requirements
- Assessment of fees necessary to recover costs associated with the correction, operation, and maintenance of the system

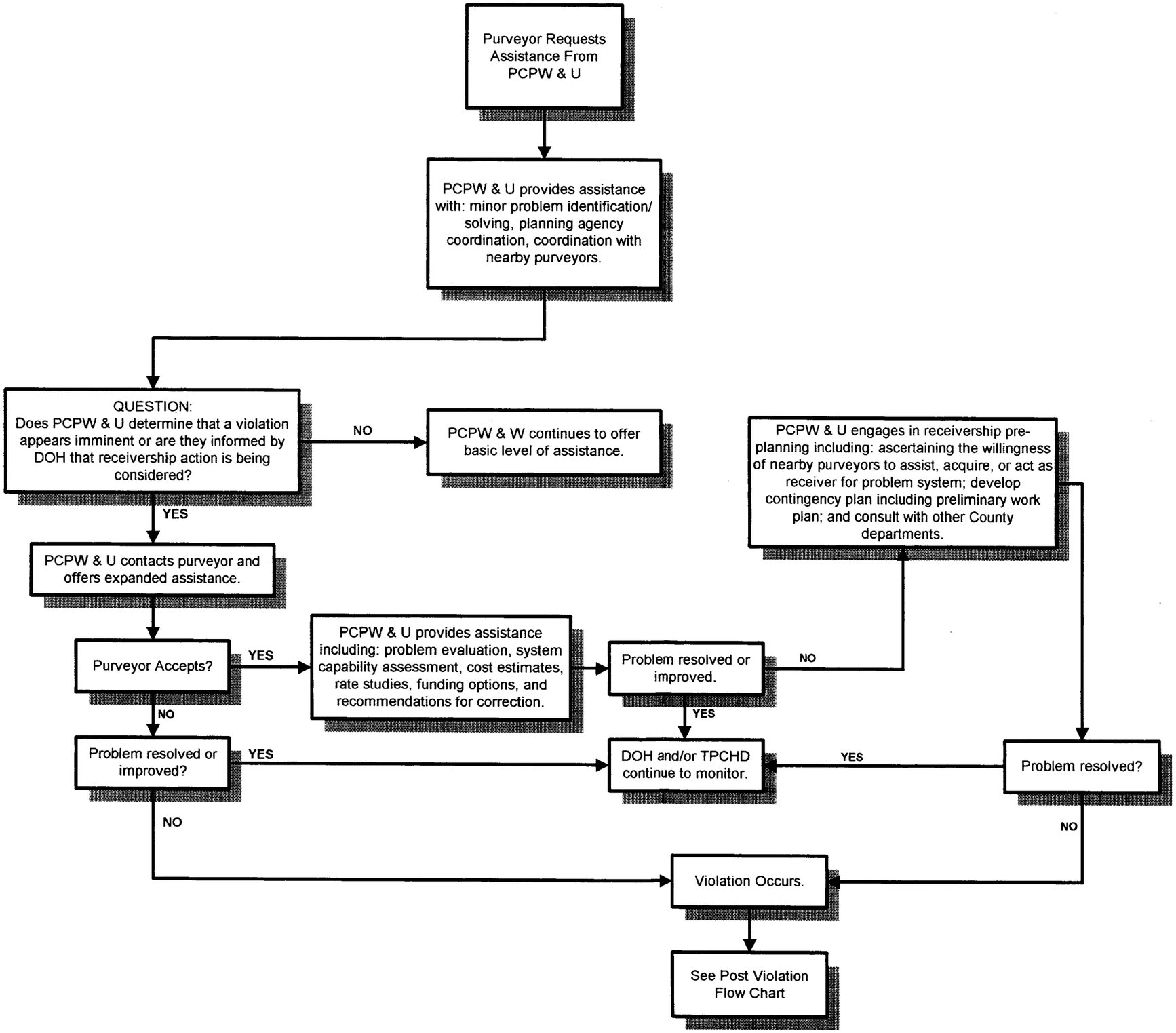
In the absence of a public health and safety emergency, Pierce County may choose not to initiate any capital improvements until funding is secured in the form of grants or customer rates, unless so ordered by the court.

Within one year of being appointed, the receiver must submit a plan to the court outlining alternatives for disposition of the system. Should sale or transfer of the system to an investor owned utility be the preferred alternative for system disposition, the water system plan developed by the receiver will need to be structured in a manner compatible with Washington Utilities and Transportation Commission requirements.

Public Water System Assistance Program and Problem Water Systems:

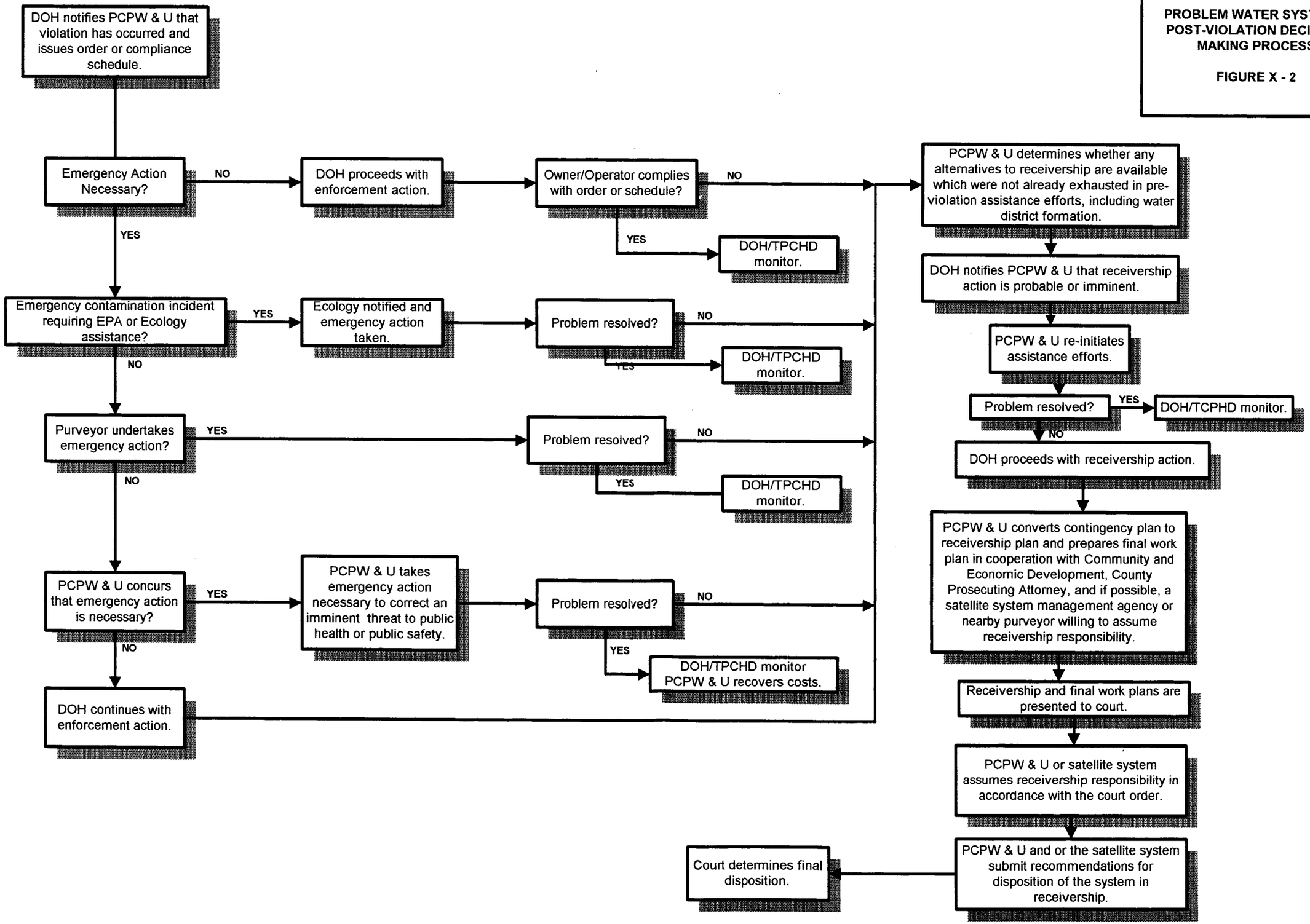
Pre-Violation Decision Making Process

FIGURE X - 1



PROBLEM WATER SYSTEMS: POST-VIOLATION DECISION-MAKING PROCESS

FIGURE X - 2



Section XI

Water Conservation Program

SECTION XI

WATER CONSERVATION PROGRAM

I. INTRODUCTION

A. Existing Pierce County Policies

The Comprehensive Plan for Pierce County Washington , adopted in November of 1994 contains the following policies dealing with water conservation:

UT-Gen Objective 4 Conserve resources to save money and to promote reliability of existing supply, consistent with the serving utility's public service obligations. (Comp. Plan Page VIII-70)

4.3 Consider cost-effective water and energy conservation technologies, including but not limited to, site plans, construction methods and materials, landscaping in land use policies, and development regulations. Such technologies for methods and materials shall also promote practices that do no compromise human health conditions when occupied or used. (Comp. Plan Page VIII-70)

UT-Gen Objective 6 Protect the environment while providing for utility facilities. (Comp. Plan Page VIII-71)

6.3 Determine the capability of land and natural systems when providing such facilities and services as storm water drainage and flood prevention, water, sewage, and solid waste disposal. (Comp. Plan Page VIII-71)

UT-Wa Objective 23 Support water conservation measures and educate Pierce County residents on methods to conserve water. (Comp. Plan Page VIII-79)

23.1 Pierce County's building codes and plumbing codes should be updated to require water-conserving devices. (Comp. Plan Page VIII-79)

23.2 Water conservation measures should be mandated for all land uses. (Comp. Plan Page VIII-79)

23.3 Mandate the application and implementation of water conserving landscaping plans. (Comp. Plan Page VIII-80)

23.4 Incorporate State water conservation guidelines for public water systems into the Pierce County CWSP and the Pierce County Water General Plan. (Comp. Plan Page VIII-80)

B. Existing State Policies and Requirements

The Washington State Department of Ecology (DOE), the Washington State Department of Health (DOH) and the Washington Water Utility Council (WWUC), in 1994 jointly published "Conservation Planning Requirements - Guidelines and Requirements for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology, and Conservation Programs". The intent of the document is to "help water system managers understand what will be required by State agencies for review and approval of water system plans, petitions for the reservation of future water supplies and water right applications".

General state mandates for implementation of water use efficiency are found in:
- RCW 43.27A.090(6) - Powers and duties of the department
- RCW 90.03.005 - Reduction of wasteful practices
- RCW 90.03.400 - Crimes against the water code
- RCW 90.44.110 - Waste of water prohibited
- RCW 90.54.020 (2) and (6) - General declaration of fundamentals for utilization and management of waters of the state
- RCW 90.54.180 - Water use efficiency and conservation programs and practices

Specific directives to DOH for incorporation of procedures and guidelines relating to water use efficiency in development and approval of water system plans are provided in:
- RCW 43.20.230 - Water resource planning
- RCW 246-290-100 - Water system plans

The "Conservation Planning Requirements" emphasize flexibility. The selection of water conservation methods and the criteria for the level of implementation to be achieved recognize regional differences in water supply and demand conditions. However, approval of a water conservation plan is a necessary condition for the issuance of a water right by DOE. "A water conservation plan in compliance with the 'Conservation Planning Requirements' will be required for approval of water system plans and for issuance of water right permits for public water systems by Ecology."

A "water conservation plan", according to the "Conservation Planning Requirements", consists of three components: 1) requirements for water use data collection, 2) demand forecasting, and 3) the conservation program. The "conservation program", as used in that document, refers to recommended conservation measures and a description of the level and schedule for implementation of the required and recommended conservation measures. This section of the Pierce County Coordinated Water System Plan will deal only

with the conservation program since the other components of the conservation plan are located in other sections of this document.

DOH is the lead state agency regarding conservation program development and planning for public water systems. DOE has the overall state responsibility for development and implementation of a comprehensive water conservation program that includes all water uses. In the case where no water system plan is required by DOH, DOE is designated to operate as the lead agency in reviewing and approving the conservation plan when water rights are pursued.

C. State Requirements for Conservation Plans

To assure consistency of review by the DOH and DOE, conservation plans will be required to conform to the following format. (Additional detail is provided in the publication "Conservation Planning Requirements" - March 1994.) The three elements of the conservation plan may be in different sections of a water system plan, but must include the items listed below.

Water Use Data Collection Requirements. Systems must report the best available data on water use for the following categories of land use:

- Single-Family Residential
- Multi-Family Residential
- Commercial
- Industrial
- Governmental
- Agricultural

Water Demand Forecast. A complete forecast, including an estimate of reduction of water use from implementation of water conservation measures, must be developed.

Conservation Program. Implementation of approved water conservation plans by public water systems will be a condition on all water right reports of exam and all subsequent water right permits and certificates issued by DOE for public water systems. If the public water system has not been collecting data as required, the data which has been collected must be submitted, and collection of data will be a condition of new water rights and certificates, and will be required for future water system plan approvals. Implementation of the required conservation measures, conservation measures chosen for implementation, and data collection identified in "Conservation Planning Requirements" (March 1994) will be made a condition of all new water right permits, and will be reviewed in future water system plan approvals.

Program Elements:

Conservation Objectives - Goals and objectives of the conservation program shall be identified. These objectives should be designed to meet the needs of the specific water system (e.g., attain maximum utilization of current supplies, reduce peak daily consumption, reduce peak monthly consumption, reduce total annual consumption, promote long term efficiency with accelerated conservation on a short term basis, reduce usage from a specific customer class, and develop public education and awareness). Each water system will need to develop conservation objectives which logically meet its needs.

Evaluation of Conservation Measures - Public water systems must evaluate all recommended conservation measures identified in the "Conservation Planning Requirements" (March 1994) and implement those that are required, and those that meet the public water system's needs. The specific measures to be evaluated depend upon the size of the system. However, system are encouraged to evaluate measures above the minimum requirements. The system must explain decisions not to implement measures which it is required to evaluate.

Identification of Selected Conservation Activities:

- Description - A description of the conservation measures being implemented, including which measures are required.

- Schedule - A schedule indicating when the conservation measures will be implemented, with emphasis on the six-year implementation schedule.

- Budget - The projected budget for each selected conservation measure. The schedule and budget information should be shown together.

- Monitoring Requirements - A description of how the system will monitor the success of its conservation measures (e.g., documented reduction in water usage, distribution of conservation materials, implementation of specific measures).

- Target Water Savings Projections - Each system will identify a percentage savings goal, based on the measures chosen for implementation, which the entire water conservation program will attempt to save. Because different system may have already implemented different levels of conservation, and the conservation needs of each system are different, no percentage savings goal has been established in this document. This percentage savings goal will be factored into the demand forecast as identified in the demand forecasting methodology in "Conservation Planning".

II. WATER CONSERVATION PROGRAM

Water conservation, if it is to be effective, will require responsible action on the part of citizens, the public water systems, local governments and State agencies. The Departments of Health and Ecology, along with the WWUC has set the direction for water conservation in the State of Washington with their "Conservation Planning Requirements". The citizens of the county may be asked to change their water use habits and possibly to upgrade their water use devices. Public water systems are being asked to establish new ways of operating, collecting data, and reporting that data and to modify system design strategies in order to conserve water. Local governments and state agencies are being asked to provide technical assistance and to review submitted plans, projects and proposals in a reasonable amount of time.

Water conservation program requirements will vary based on the size of the water system as determined by the total number of connections served by the water system, including direct service connections and service connections served by wholesale customers. For each size category of public water system a set of recommended measures is identified. There is a separate set for small systems (systems with fewer than 1,000 connections), a set for medium systems (systems with 1,000 to 25,000 connections) and a set for large systems (systems of 25,001 or more connections).

Regional water associations or other regional water planning organizations are encouraged to consider conservation measures as shown on the chart on Page 8. However, no requirement exists in the "Conservation Planning Requirements" for development of a conservation plan in regional water plans.

WC-Policy 1 **The Coordinated Water System Plan for Pierce County incorporates the requirements and recommendations of the State of Washington Department of Health and Department of Ecology as adopted in "Conservation Planning Requirements - Guidelines and Requirements for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology, and Conservation Programs" (March 1994).**

WC-Policy 2 **Approval of a water system plan for any purveyor shall be based upon approval of a conservation plan to be included in the water system plan. The conservation plan shall contain provisions for water use data collection, water demand forecasting and a conservation program as described in "Conservation Planning Requirements" (March 1994).**

WC-Policy 3 **Conservation programs of water systems shall contain the following elements as required by the "Conservation Planning Requirements" (March 1994):**

- Conservation Objectives - Goals and objectives of the conservation program shall be identified. Each water system shall develop conservation objectives which logically meet its needs.
- Evaluation of Conservation Measures - Evaluation of measures identified in the "Conservation Planning Requirements" and an explanation of reasons for not implementing those measures it is required to evaluate.
- Identification of Selected Conservation Activities - Include aspects of the implementation program as defined in "Conservation Planning Requirements".

WC-Policy 4 The installation of source meters shall be required for all new and expanding public water systems.

WC-Policy 5 All water conservation programs shall contain provisions for the promotion of the conservation program to the public. The promotion program shall include the use of the media (radio, television, newspapers), public water system bill inserts, or other means.

WC-Policy 6 Evaluation of conservation measures by a water system shall be based on the cost of a measure in relation to the value of the water conserved. In the absence of clear evidence to the contrary, estimates of the value of conserved water and of costs and benefits will not be challenged.

WC-Policy 7 All public water systems, regardless of size, shall consider the benefits and costs of installation of service meters and implementation of conservation rate structures as required by RCW 43.20.235.

WC-Policy 8 All public water systems shall incorporate within their water system plans an inventory of potential sources and uses for reclaimed water. The inventory shall include, at least, the following:

Potential Sources
- Fish hatcheries
- Stormwater impoundments
- Sewage treatment plant effluent
- Industrial and commercial process and cooling water

Potential Uses or Users:

- **Industries**
- **Nurseries**
- **Golf courses and other landscape irrigators**
- **Artificial recharge of aquifers**
- **Parks and parkways**
- **Agricultural irrigation**
- **Flushing of sanitary sewers**
- **Fire protection**
- **Street cleaning, dust control, and other washing applications**

WC-Policy 9 **Systems under satellite system management must complete conservation programs according to the number of connections for each individual system. The total number owned, operated, or managed by the SSMA is not considered. However, SSMA's are strongly encouraged to develop conservation plans commensurate to the total number of services managed. A single conservation program may be prepared for all systems under the management of an SSMA.**

WC-Policy 10 **Pierce County shall develop and adopt land development regulations which require water conserving landscape management practices.**

Required and recommended water conservation measures, based on system size, and pertinent definitions are shown on the following pages.

RECOMMENDED WATER CONSERVATION PROGRAM FOR PUBLIC WATER SYSTEMS

MEASURES	PUBLIC WATER SYSTEMS			
	LARGE	MEDIUM	SMALL	REGION
A. Public Education				
1. School Outreach	X			X
2. Speakers Bureau	X			X
3. Program Promotion (implementation required)	X	X	X	X
4. Theme Shows and Fairs	X			X
B. Technical Assistance				
1. Purveyor Assistance	X	X		X
2. Customer Assistance	X	X		X
3. Technical Studies	X			X
4. Bill Showing Consumption History	X	X		
C. System Measures				
1. Source Meters (required if requesting water rights)	X	X	X	X
2. Service Meters	X	X	X	X
3. Unaccounted Water/Leak Detection	X	X		X
D. Incentives/Other Measures				
1. Single-Family/Multi-Family Kits	X	X		X
2. Nurseries/Agriculture	X	X		X
3. Landscape Management/Playfields-	X	X		X
Xeriscaping	X	X	X	X
4. Conservation Pricing	X			X
5. Utility Financed Retrofit	X			X
6. Seasonal Demand Management	X			X
7. Recycling/Reuse				

Definitions:

Large System Measures — Would apply to utilities having 25,001 or more services. This program requires a considerable staff effort and possible changes in land use or building code controls for implementation of some of the program measures.

Medium System Measures — Would be implemented by a majority of the municipal public water systems and water districts. This program applies to utilities with 1,000 to 25,000 services.

Small System Measures Is a minimum program. This small system program will be required of all public water systems with fewer than 1,000 services, which must prepare a water system plan or obtain a water right.

Regional System Measures Regional conservation plans may be developed in conjunction with these guidelines. However, no requirement exists for the development of a conservation plan in regional water plans. Regional planning organizations can develop conservation plans which meet the needs of individual water systems

DEFINITION OF CONSERVATION ELEMENTS

For purposes of the Coordinated Water System Plan for Pierce County, the Conservation Program elements are defined below:

A. PUBLIC EDUCATION

1. School Outreach - Education program targeted at grades K through 12 to increase awareness of local water resources and encourage water conservation practices. Activities include school presentations, preparation of curriculum material, and tours of water utility facilities.

2. Speakers Bureau - Seeking speaking opportunities and making speakers available to a wide cross-section of service, community, and other groups. Provide speakers with audio and visual aids for presentations. Focus on increasing public awareness of water resource and conservation issues.

3. Program Promotion - publicize the need for water conservation through television and radio public service announcements, new articles, and utility bill inserts.

4. Theme Shows and Fairs - Prepare a portable display of water conservation devices and selected written material. Staff this display at local area theme shows and fairs.

B. TECHNICAL ASSISTANCE

1. Purveyor Assistance and Customer Assistance - Regional assistance to aid purveyors in developing and implementing conservation programs tailored to their needs. Similar response by purveyors to customers who request assistance in implementing water conservation practices.

2. Technical Studies - Studies would be designed and conducted by the utility or regional water organization. Study objectives would be to collect data and research new technology to develop programs which would produce measurable water savings. Study areas might include residential flow metering, lawn watering practices, and commercial/industrial water use patterns.

3. Bill Showing Consumption History - An extension of the electric energy conservation program. Billings would show percentage increase or decrease in water use over the same period in the previous year.

C. SYSTEM MEASURES

1. Source Meters -Install master source meters for all sources. Maintain a periodic meter testing and repair program.

2. Service Meters - Install individual service meters for all water users. Maintain a periodic meter testing and repair program.

3. Unaccounted Water/Leakage Detection - Conduct a regular and systematic program of finding and repairing leaks in system mains and laterals. This includes on-site tests using computer-assisted leak detection equipment on water distribution mains, valves, services, and meters.

4. High Technology Meters - Utilize concepts of telemetry and exception reporting to detect and investigate instances of abnormal water usage.

5. Master Source Meters - Require a master source meter, at a minimum, for Base Program utilities.

D. INCENTIVES AND OTHER MEASURES

1. Single-Family and Multi-Family Kits - Distribute kits containing easily installed water saving devices to single-family residential homes and the owners and managers of apartment buildings and condominiums. Devices in kits could include shower flow restrictors, toilet tank water displacement devices, leak detection dye tablets, informational brochures, and other materials.

2. Seasonal Demand Management - Implement measures aimed at controlling peak seasonal demand. This may include use of seasonal rate structures, distributing lawn watering calendars, promoting public awareness on ways to curb peak day water demand, etc. This measure may be combined with the program promotion if materials are distributed.

3. Recycling or Reuse - Examine opportunities for water reuse and recycling as an approach to deducing water demands. Potential program areas include:
   - Reuse of reclaimed wastewater for the irrigation of public green space, industrial cooling, and power plant cooling.
   - On-site wastewater treatment and recycling of effluent for non-potable uses in commercial buildings.
   - Utilization of gray water (bath, lavatory, and clothes washing water) for non-potable uses.

4. Landscape Management/Playfields - Promote low water demand landscaping in all retail customer classes (private, public, commercial, industrial, etc.). Work with local nurseries to ensure the availability of plant that achieve this objective.

5. Nurseries/Agriculture - Apply current technology to water use practices of large agriculture/irrigation operations. Examples are nurseries and park department facilities. Moisture sensors, flow timers, low volume sprinklers, drip irrigation, and other practices to increase irrigation efficiency would be implemented.

6. Water For Golf Courses/Major Use - In future siting of golf courses and other large water consuming facilities, or where the location of such existing facilities warrants, encourage the use of reclaimed wastewater.

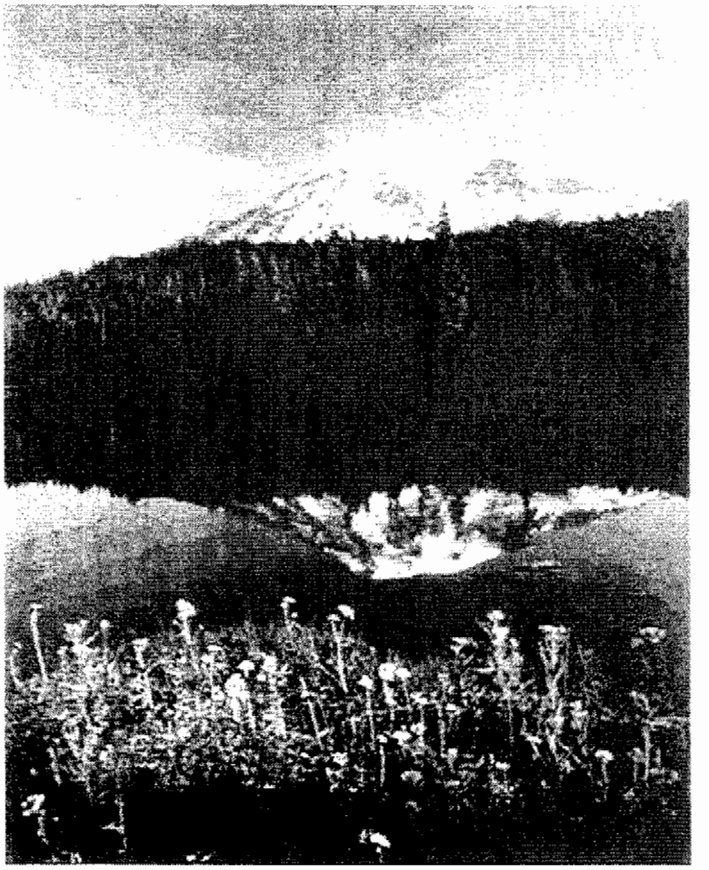
7. Conservation Program Performance Audit - To evaluate the efficiency and effectiveness of a utility conservation program, an entity such as the Regional Water Association or the County shall routinely conduct a program performance audit and report its findings to the utility.

8. Seasonal Pricing/Inverted Rates - Implement rate design techniques to provide economic incentives to conserve water. Under seasonal pricing, the unit price of water would be increased during a high seasonal use period. Under an inverted rate, the customer pays a specific charge for an initial quantity of water and a greater charge for succeeding quantities.

9. Irrigation/Private Wells - Identification of location, aquifer source, average annual, and peak month usage to analyze impact on supply and evaluate availability for municipal use where land use changes occur. General purpose government would be encouraged to monitor use and consider land use and building code conditions that would promote efficient use of water from these sources. All well above a specified capacity should be required to be metered with use records available for resource management.

10. Utility Financed Retrofit - Under a program similar to that used in the electrical energy program, installation of water efficient fixture in existing residences and commercial/industrial facilities would be promoted by the utility by: a) providing fixtures at no cost, b) giving a rebate for consumer purchased fixtures, and c) arranging for suppliers to provide fixtures at the utility's cost.

Section XII



Groundwater Quality and Quantity Monitoring Program

SECTION XII

GROUNDWATER QUALITY AND QUANTITY MONITORING PROGRAM

I. INTRODUCTION

In November of 1994, Pierce County adopted the Comprehensive Plan for Pierce County, Washington. The Plan was the County's response to the requirements of the Growth Management Act (RCW 36.70A). The Plan identifies policies that are "integral to Pierce County's entire planning effort". (Page I-15 of the Comprehensive Plan for Pierce County, Washington) One of these policies states:

> "Pierce County shall establish a process which .. Addresses key issues of county-wide concern, including, but not limited to population growth and distribution, land capacity, density, land conversion, permit processing, housing costs, economic strength and diversity, job training and education, **natural resource consumption, public health and safety, water use**, solid waste, transportation, open space, cultural resources, energy use, air, **water and groundwater quality**." (emphasis added)
>
> Policy 6.3 on Page VIII-71 of the plan reads:
> "Determine the capability of land and natural systems when providing such facilities and services as storm water drainage and flood prevention, **water**, sewage, and solid waste disposal." (emphasis added)
>
> Policy 26.5 located on Page VIII-81 of the plan reads:
> "Implement a long term groundwater quantity and quality monitoring program for basins that provide domestic water supplies."

This section discusses the development of a long term water quality and quantity monitoring program. The program is intended to:

- Characterize existing groundwater levels in specific aquifers across each basin.
- Monitor water levels and identify significant trends.
- Determine groundwater resource availability in relation to expected growth.
- Characterize existing groundwater quality.
- Monitor water quality parameters and identify significant trends.
- Identify areas experiencing water quality degradation and recommend mitigation efforts.

This section also recommends how such a monitoring program can be implemented and provides an estimate of the annual cost.

A. Collecting Baseline Data

The difficulty with assessing baseline conditions and identifying trends is not so much a lack of data, but the lack of an effective database management system that provides efficient analysis. Except for regular water level and pumping volume measurements, "Group A" wells are regularly and adequately monitored for the most significant water quality contamination parameters. Nitrate, chloride, and organic chemicals are generally monitored every three years and are indicative of water quality degradation due to septic systems, seawater intrusion, and other land use practices. There is probably enough historical data to characterize most baseline water quality conditions for specific wells and general hydrogeologic regions.

Sufficient data is lacking, however, to accurately assess ground water quantity issues. Regular and wide-spread collection of monthly static water level measurements and total monthly pumping volume measurements from water supply wells are needed to assess the impact of increased withdrawal from aquifers and to evaluate the potential for additional ground water development.

B. Principal Objectives

The principal objective of this long-term ground water monitoring plan is to initiate a county-wide program to collect and organize pertinent water quality and quantity information so that baseline ground water conditions may be characterized, significant changes or trends may be identified over time, and responsible actions may be taken when and where needed. This is a formidable task, especially when considering:

1. There are approximately 700 "Group A" wells located in Pierce County;

2. The hydrogeologic systems encountered across the county are complex, highly variable in nature, and only generally understood;

3. There is a vast amount of historical water quality and water level data already existing in various forms at various federal, state, county, local, and other agencies;

4. Ground water quality is threatened by sea water intrusion, septic system discharges, industrial activities, agricultural practices, and other land use activities; and

5. Local and regional ground water declines and surface water baseflows are being affected by increased pumping and reduced recharge.

C. Specific Objectives

Based on this principal objective and these understandings, an effective and cost efficient monitoring program should meet several specific objectives:

- Collect only reliable and useful data.
- Provide a centralized, organized, and readily available data management system.
- Incorporate previous monitoring efforts.
- Coordinate with other agencies and other proposed monitoring programs to reduce redundancy, poor data utilization, and overall costs.
- Minimize costs and effort from purveyors.
- Provide an efficient means to identify specific wells or regions experiencing declining water tables.
- In time, provide a more accurate estimate of potentially developable ground water resources in the county.
- Establish baseline chemical identification, water quality, and water levels in each monitoring well/aquifer zone.
- Provide an efficient means to identify specific wells or regions experiencing degraded or degrading water quality.
- Offer flexibility to change, expand, or focus monitoring efforts as data gaps or critical areas are identified.
- Provide recommendations or respond to significant changes as they are identified.

II. PROGRAM IMPLEMENTATION

Based on the above objectives, the following specific tasks should be implemented to achieve an effective and efficient long-term ground water monitoring program:

A. Select an Oversight Committee

An oversight committee shall be selected to oversee the long-term management of the monitoring program and may include representatives from the Pierce County Public Works and Utilities - Water Resources Section, the Tacoma-Pierce County Health Department, the Washington State Department of Health, the Water Utility Coordinating Committee (WUCC), the Gig Harbor Peninsula and Clover/Chambers Creek Ground Water Advisory Committees, the U. S. Geological Survey, and possibly a ground water consulting firm.

B. Specify a Monitoring Agency with Adequate Staff

A specific monitoring agency should be selected to conduct the actual monitoring program.

C. Adequately Fund the Program

Determine an adequate, reliable funding source for the maintenance of the monitoring program. Pierce County should look beyond county resources when investigating the source(s) of funding.

D. Distribute a Survey to all Group A Systems

Distribute a survey requesting the following specific information (a great deal of this information may already be available on the Ground Water Contamination Susceptibility Assessment Survey Forms required for the County's wellhead protection program):

1) Provide a map which accurately locates each ground water supply well.
2) Provide a unique name or Ecology well tag number for each well.
3) Provide a drillers log and/or well completion diagram for each well showing the depths to the top and bottom of all screened or perforated intervals if available.
4) Provide an accurate wellhead elevation if known or an estimated elevation based on a USGS topographic map for each well (the TPCHD's GPS may be used).
5) Specify if a reliable water quality sample can be collected at or very near the wellhead for each well.
6) Describe if and how static water level measurements may be collected from each well.
7) Specify if and how pumping volumes are metered at each well.
8) Provide all available historic water quality sampling data, water level measurements, and total monthly pumping volumes for each well.
9) Provide the name and phone number of a contact person responsible for sampling.

This information will provide the essential foundation for the monitoring program. Currently, important well information is scattered across several different agencies, is generally incomplete, and is not readily available. This survey will provide the information needed to select the most appropriate wells for long-term monitoring. Accurate well completion information is needed to determine which aquifer or aquifers a specific well taps. Wells screened across multiple aquifers do not provide representative aquifer chemistry or water level data. In addition, the historic water quality, water level, and pumping volume data will provide the basis for characterizing baseline conditions and identifying trends.

E. Select an Appropriate Data Management System

A relatively simple PC based system like Microsoft Access or Paradox may be adequate for Pierce County's monitoring program. Once a data base is selected, program staff should begin inputting all the information collected in Task 2.

The most effective data base system will provide the following types of output:

- Trend plots for water quality parameters and water level data.
- Statistically significant trend analyses.
- Well location maps that may be constrained (i.e. map only those wells with screen intervals less than -400 feet in elevation, or map only those wells where nitrate concentrations exceeded the MCL in the last three years).

There are several existing ground water databases that are currently used in Pierce County. These include the EPA STORET database, the Department of Ecology PCSTORET database, the USGS WATSTORE database, and the TPCHD database. In addition, the TPCHD is currently updating its database to evaluate ground water monitoring data collected in the Chamber/Clover Creek Basin.

F. Finalize Monitoring Well Network and Incorporate other Monitoring Efforts

A complete list of "Group A" wells needed for this long-term ground water monitoring program needs to be developed. However, this plan includes a list of likely candidates, makes specific recommendations for others, and identifies areas where others are needed. A list of these proposed monitoring locations for each ground water basin is provided in Tables XII-1 through XII-3, and their locations are shown on Figures XII-1 through XII-3.

In summary, this program identifies 90 wells or monitoring locations for the initial Group A monitoring well network. Of these, 40 wells were previously monitored in the two studies described below.

Twenty-one sites are included in the Gig Harbor Peninsula, 35 sites are located in the Clover/Chambers Creek Basin, and 34 sites are located in the Lower Puyallup River Basin.

Approximately 40-percent of the sites are located in the shallow aquifer system where septic systems and other land use activities are the greatest contamination threat, 40-percent are located in the sea level aquifer where ground water development is the greatest and potential sea water intrusion is the most likely, and the remaining 20-percent are located in deeper aquifers to monitor future development potential.

In the preparation of this program, a review was conducted of the wells utilized in previous monitoring efforts and the attempt made to specifically identify other candidates. The review focused on confirming the actual location of existing/proposed wells and analyzing well logs to confirm screen completion intervals and to identify which aquifer is actually tapped by each well. Well information was reviewed at the Department of Ecology Southwest Regional Office, the Washington State Department of Health, Tacoma Public Utilities, and the Tacoma-Pierce County Health Department. In general, efforts were largely unsuccessful. Drillers logs and well completion information for Group A wells is not readily available. A comprehensive and centrally located information base of specific Group A well data is essential for the development, implementation, and maintenance of an effective, long-term monitoring program.

Other Monitoring Programs

Other monitoring efforts are described in reports by Tacoma-Piece County Health Department (1992), Sweet-Edwards/EMCON (1992), Brown and Caldwell (1985), Walters and Kimmel (1968), and Drost (1982). The ground water monitoring programs conducted for the two most recent studies are summarized below.

An initial two-year long pilot project for the development and implementation of a long-term ground water quality and quantity-monitoring program for the Clover/Chambers Creek Basin is currently in progress. The program was developed by the Clover/Chambers Creek Ground Water Advisory Committee, the Regional Water Association, the Washington State Department of Health, and the Tacoma-Pierce County Health Department. The current monitoring program includes 34 Group A water supply wells and 4 springs located in strategic areas across the basin and in each of the three principal aquifer units. The pilot project is intended to characterize baseline conditions and is scheduled to end in April 1995.

A ground water quality monitoring study for the Gig Harbor Peninsula Groundwater Management Plan by Sweet-Edward/EMCON ended in 1992. In addition to analyzing groundwater quality data from approximately 80 wells from Drost (1982) and approximately 50 wells from the STORET and PCSTORET data bases, this study collected groundwater quality data from 19 additional Group A wells in 1989 and 1990.

G. Finalize Sampling Parameters and Sampling Schedule

Based on a review of existing regulatory requirements, existing knowledge of Pierce County ground water quality, and insight by the WUCC groundwater monitoring committee, the minimum sampling/monitoring requirements necessary to achieve the goals of the monitoring program were identified.

Existing Water Quantity Monitoring Requirements
None

Additional Water Quantity Monitoring Requirements
Monthly static water level measurements and total monthly pumping volume measurements should be included in the long-term monitoring program. This information is needed to further assess baseline water level conditions and provide the information needed to identify local and regional water table declines and assess future ground water development potential in Pierce County.

Parameter	Frequency
Static Water Level	Every Month
Total Pumping Volume	Every Month

Static water level elevation measurements that are based on accurate wellhead elevations and are not significantly affected by recent pumping are essential. In addition, each well that is utilized in the monitoring program should be evaluated to determine which aquifer system it taps.

Existing Water Quality Monitoring Requirements
Group A water systems currently conduct water quality monitoring for coliform bacteria, complete inorganic chemicals and physical parameters, volatile organic compounds, and others including radionuclides.

Parameter	Frequency
Bacteria	Every Month
Inorganic Chemical and Physical	Every 3 Years
Volatile Organic Compounds	Every 3 Years
Others	Variable

Bacteriological monitoring is typically required once per month. Bacteriological sampling is conducted at some point in the distribution system and may not indicate whether positive tests are the result of contamination at the source or a problem in the distribution system. Therefore, wells selected for this long-term groundwater monitoring program should be sampled at the wellhead only.

The complete inorganic chemical and physical parameter analyses include primary and secondary contaminants. The Primary Chemical Contaminants include arsenic, barium, cadmium, chromium, mercury, nitrate, selenium, sodium, and turbidity. Secondary Chemical Contaminants include chloride, color, hardness, iron, manganese, specific conductivity, silver, zinc, and

occasionally sulfate and total dissolved solids. Group A systems must test for these inorganic chemical and physical parameters every three years.

In addition, Group A systems are subject to new and evolving monitoring requirements for inorganic and organic chemicals, volatile organic chemicals, and synthetic organic chemicals. In general, volatile organic compounds are tested every three years.

Additional Water Quality Monitoring Requirements

The existing Group A water quality monitoring requirements generally provide the data needed for this program. However, expanding the list and increasing the monitoring frequencies for a few select parameters is recommended.

Major Cations & Anions	Every Year*
Nitrate	Every 6 Months**
Chloride	Every 6 Months**

* for 3 years.
** in January and July.

Cation and Anion Data

Major cation and anion data are needed to characterize the basic ground water chemistry, and if regularly monitored may indicate regional recharge/discharge changes in the aquifer systems. The major cation/anion analysis includes eight parameters. Of the eight, chloride and sodium are currently included in the inorganic chemical and physical parameter list. Adding the remaining six anions and cations to the regular long-term monitoring program is recommended. These include calcium, magnesium, potassium, sulfate, fluoride, and alkalinity. After a statistically representative baseline has been established, cation/anion testing can be reduced to every 10 years or on an "as needed" basis.

Nitrate and Chloride Monitoring

Nitrate and chloride are probably the simplest and most reliable indicators of groundwater degradation due to septic tanks and seawater intrusion. Given their importance, nitrate and chloride are recommended to be monitored every six months for wells included in this monitoring program. To minimize any seasonal variations which may occur, these samples should be collected in January and July to correspond with the rainy and wet seasons in this region.

In summary, for all wells selected in this long-term ground water monitoring program: 1) all samples should be collected at the wellhead; 2) nitrate and chloride samples should be collected twice a year in January and July; and 3) major cation/anion samples should be collected until a statistically representative baseline is established. For wells that do not have sufficient

existing data to establish any baseline conditions, collecting two samples (January and July) and analyzing them for the parameters regularly required by the state plus the other six cations and anions is recommended.

H. Coordinate with Other Proposed Monitoring Programs

The proposed monitoring program should coordinate its data collection and analysis efforts with the other agencies that are planning regional water quality and quantity monitoring programs in the County. Three of these programs are summarized below.

A project proposal has been submitted by the U.S. Geological Survey to conduct a ground water resource assessment of the Tacoma-Puyallup area in Pierce County. The proposed study area comprises about 75 square miles, stretching from Tacoma southeastward to Orting. The proposed area covers most of the land south and west of the Puyallup River not covered by the Clover/Chambers Creek Basin. One objective of this proposed project is to characterize the general water chemistry of the significant aquifer units and characterize any regional ground water contamination patterns caused by septic tanks, landfills, and other sources. The proposed project will collect water quality samples from 30 to 35 wells and 3 to 4 springs. It is not known how many of these wells will be from "Group A" systems. The samples will be analyzed for pH, specific conductance, dissolved oxygen, alkalinity, major cations and anions, iron, manganese, nitrate, and fecal coliform bacteria. Volatile organic compounds, dissolved organic compounds, trace metals, and possibly specific organic compounds will be analyzed for wells near commercial or industrial areas. Boron and detergents will be analyzed for in wells in high septic tank density areas. In addition, water levels will be monitored bimonthly for a two year period in an unspecified number of wells. The water quality results will be stored in the USGS database in Tacoma and uploaded to the EPA's STORET water quality database. Well inventory data will be stored in the USGS ground water database in Tacoma.

A long-term ground water monitoring plan has been proposed for the Gig Harbor Ground Water Implementation Project. It is projected that a network of approximately 25 existing public water supply wells will be established, but the plan does not specify if these wells will be limited to Group A systems. Baseline conditions will be characterized by monitoring selected wells on a quarterly or biannual basis for a two year period. Subsequent long-term monitoring will continue on a yearly to every third year basis.

In addition, the USGS has begun a multi-year National Water Quality Assessment (NAWQA) for the Puget Sound Basin. There are approximately 435 wells in Pierce County in the WATSTORE database that will be evaluated in this study. A significant number of these wells are from "Group A" systems.

I. Analyze Data, Recommend Mitigation, and Revise Monitoring as Needed

A preliminary analysis should be conducted for each monitoring well as soon as existing historical water quantity and quality data are entered into the database and should be continually updated as results from scheduled sampling events become available. Basic analyses should include:

Quantity

- Producing water level trend plots for individual wells
- Graphing total monthly pumping volumes for individual wells
- Identifying regions and aquifer zones experiencing declining water levels

With time, the monitoring program should begin collecting and integrating other water budget data to better assess future resource availability (i.e. precipitation, surface water runoff, Evapotranspiration, and total ground water pumping data). This information is needed to produce a more accurate and hopefully calibrated computer model of the ground water systems.

Quality

- Characterizing the baseline chemistry of each aquifer (trilinear diagrams and/or stiff plots using major cation and anion results);
- Producing parameter trend plots for individual wells (with primary emphasis on nitrate and chloride results); and
- Identifying regions or aquifer zones experiencing water quality degradation.

Table 1 -- Summary of Proposed Ground Water Monitoring Network, Gig Harbor Peninsula

Map ID	Owner/Well Name	Location	Surface Elevation	Total Depth	Screen Depth	Screen Elevation	Aquifer Zone	Previously Monitored
	Shallow Aquifer							
1	Fox Island #17	21/1-35Q	260	116	112 to 116	148 to 144	A	Yes
2	Artondale Golf and C. Club	21/1-13N	86	54	54	32	A	Yes
3	Cedar Crest #2	21/2-7L	250	159	154 to 159	96 to 91	A	Yes
4	Dogwood #1	21/2-6A	180	107	97 to 107	83 to 73	A	Yes
5	Forest Park	22/2-18H	380	249	239 to 249	141 to 131	A	Yes
A	Forest Beach/Arletta Area						A	No
B	Purdy Area						A	No
C	Wollochet/Airport Area						A	No
D	Rosedale/Raft Island Area						A	No
	Sea Level Aquifer							
6	Raft Island	21/1-10C	140	295			C	No
7	Rosemont #2	21/1-11R	270	200	181 to 200	89 to 80	C	Yes
8	Strohs #2	21/2-18J	280	319	312 to 319	-32 to -39	C	Yes
9	Forest Beach #3	21/1-21M	86	140	120 to 130	-34 to -44	C	Yes
10	Fox Island #19	21/1-35Q	260	315			C	Yes
E	Purdy Area						C	No
F	Crescent Lake Area						C	No
G	Gig Harbor Area						C	No
	Deeper Aquifers							
11	Gig Harbor #3	21/2-17F	341	909	745 to 900	-404 to -55	G	Yes
12	Pt. Fosdick	20/2-5D	200					Yes
H	Wa. Cor. Ctr. for Women	22/1-36R	310	511	484 to 501	-174 to -19	E	No
I	Kopachuck State Park	21/1-16L		796	700 to 720			No

Table 2 -- Summary of Proposed Ground Water Monitoring Network, Clover/Chambers Creek Basin

Map ID	Owner/Well Name	Location	Surface Elevation	Total Depth	Screen Depth	Screen Elevation	Aquifer Zone	Previously Monitored
	Shallow Aquifer							
13	Lakewood Water #J-1	20/3-31F	280	157	137 to 158	143 to 122	A	Yes
14	Parkland Light/Water #9	19/3-8N	290	31	21 to 31	269 to 259	A	Yes
15	Parkland Light/Water #5	19/3-9G	380	177	160 to 175	220 to 205	A	Yes
16	City of Fircrest #7	20/2-14F	360	204	160 to 197	200 to 163	A	Yes
17	Sound Water	18/4-5K	460	111	80 to 111	380 to 349	A	Yes
18	Bethany Lutheran Church	18/3-25F	450	85	78 to 83	372 to 367	A	Yes
19	City of Tacoma #11A	20/3-18N	280	113	93 to 113	187 to 167	A	Yes
20	McChord AFB, Bldg. 846	19/2-24C					A	Yes
21	Spanaway #3	19/3-28Q					A	Yes
22	Firgrove Mutual #16	17/4-17N		170	143 to 155		A	No
J	Lakewood Area						A	No
K	Sunrise Terrace Area						A	No
	Sea Level Aquifer							
23	Lakewood Water #G-2	19/2-1K	280	173	152 to 173	128 to 107	C	Yes
41	Fort Lewis #19B	19/2-30B	240	285	245 to 275	-5 to -35	C	Yes
24	Firgrove Mutual #12	19/4-17Q	480	1010	308 to 318	172 to 162	C	Yes
25	SE Tacoma Mutual #11	19/3-3F	410	387	315 to 374	95 to 36	C	Yes
26	Lakewood Water #O-2	20/2-28P	240	314	283 to 310	-43 to -70	C	Yes
27	City of Tacoma #UP-10/1OU	20/2-21C	340	342	328 to 342	12 to -2	C	Yes
28	City of Tacoma #1-A	20/3-19P	265	304	110 to 285	155 to -20	C	No
29	Lakewood Water #A-1	19/2-21A	270	257			C	Yes
30	Frontier County Park	18/4-9J	560				C	Yes
31	Fort Lewis #13	19/2-28F	280				C	Yes
32	Spanaway #7	19/3-27M	370				C	Yes
L	Southwood Water Area						C	No
M	Fircrest Area						C	No
	Deeper Aquifers							
33	Shining Mt. Elementary	18/3-12E	430	626	404 to 445	26 to -15	E	Yes
34	Lakewood Water #J-2	20/3-31F	280	605	498 to 605	-218 to -32	E/G	No
35	Lakewood Water #A-3	19/2-16R	270	481	441 to 481	-171 to -21	E	No
36	Lakewood Water #D-2	19/2-10L	260	638	310 to 608	-50 to -348	E	Yes
37	Fort Lewis #19A	19/2-30B	240	712	682 to 705	-442 to -46	G	Yes
38	City of Steilacoom #5	20/2-29Q	220	870	719 to 870	-499 to -65	G	No
39	Lakewood Water #P-2 or -1	20/2-35J	260				E	Yes
40	Parkland Light/Water #12	19/3-16M	310				E	Yes
N	Fircrest Area						E	No
O	Frederickson Area						E	No

Table 3 -- Summary of Proposed Ground Water Monitoring Network, Lower Puyallup River Basin

Map ID	Owner/Well Name	Location	Surface Elevation	Total Depth	Screen Depth	Screen Elevation	Aquifer Zone	Previously Monitored
	Shallow Aquifer							
42	Summit Water #5 or 7	19/3-2A	450				A	Yes
43	Summit Water #12	19/3-1G	450	619	216 to 236	234 to 214	A	Yes
44	Firgrove Mutual #5	19/4-27A	580	225	206 to 221	374 to 359	A	Yes
P	Fife Area							
Q	Milton Area							
R	Dash Point Area							
S	Salishan Area							
T	Maplewood Springs Area							
U	Mt. View/Edgewood Area							
V	Sumner Area							
W	Tapps Island Area							
X	Alderton/McMillin Area							
Y	Buckley Area							
Z	South Prairie Area							
	Sea Level Aquifer							
45	Tacoma, Gravity Line 1	19/4-8A					C	Yes
AA	Fife Area							No
BB	Milton Area							No
CC	Dash Point Area							No
DD	Salishan Area							No
EE	Maplewood Springs Area							No
FF	Puyallup Area							No
GG	Mt. View/Edgewood Area							No
HH	Firgrove Mutual Area							No
II	Buckley Area							No
JJ	South Prairie							No
KK	Orting Area							No
LL	Bonney Lake Area							No
	Deeper Aquifers							
46	Firgrove Mutual #10	19/4-27B					E	Yes
MM	New Tacoma Tideflats Well							No
NN	Puyallup Rec. Center Well							No
OO	Sumner Deep Well							No
PP	Fruitland Deep Well							No
QQ	Puyallup Tribe Well							No
RR	Deep Tacoma Well							No

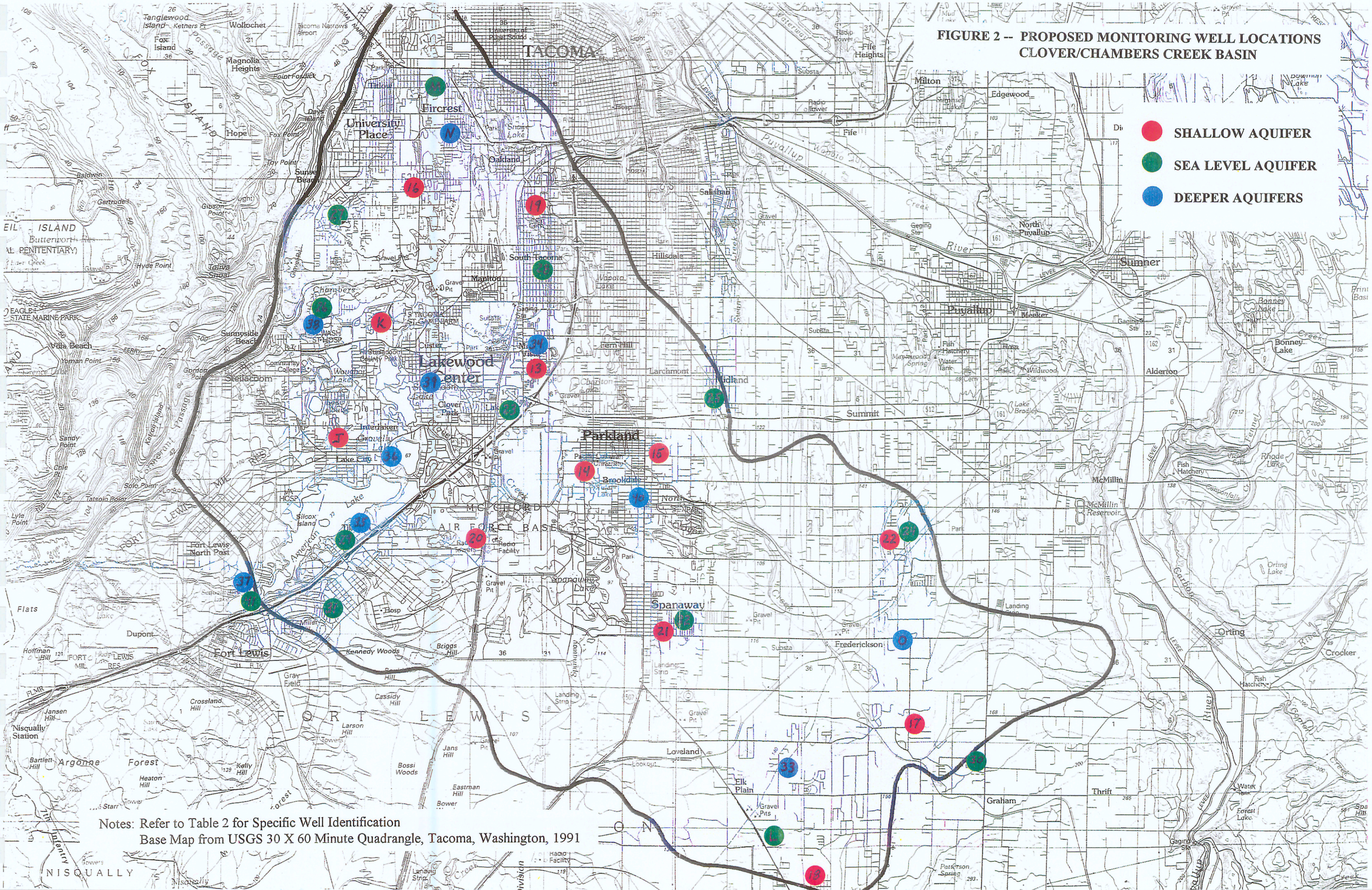
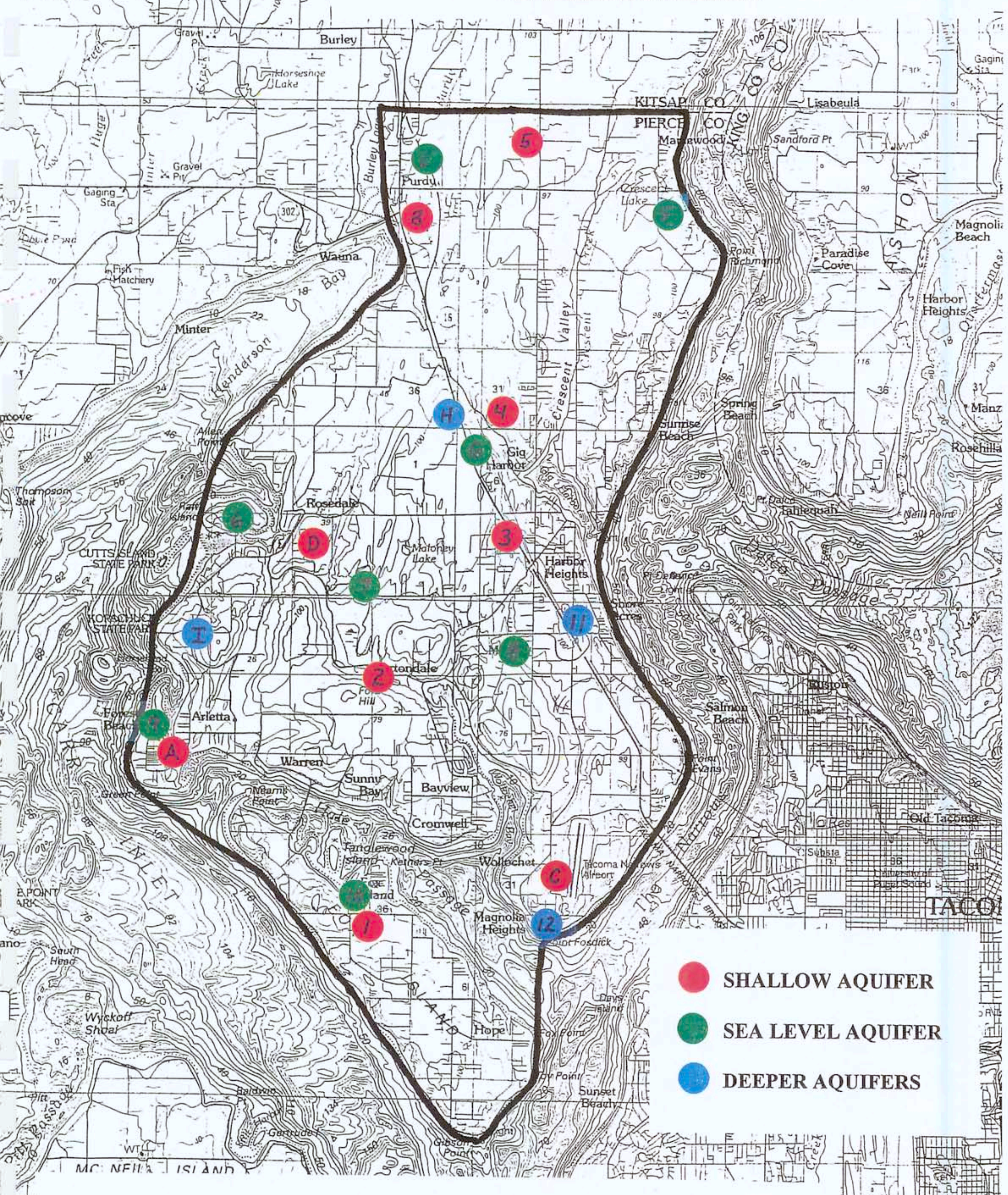


FIGURE 2 -- PROPOSED MONITORING WELL LOCATIONS CLOVER/CHAMBERS CREEK BASIN

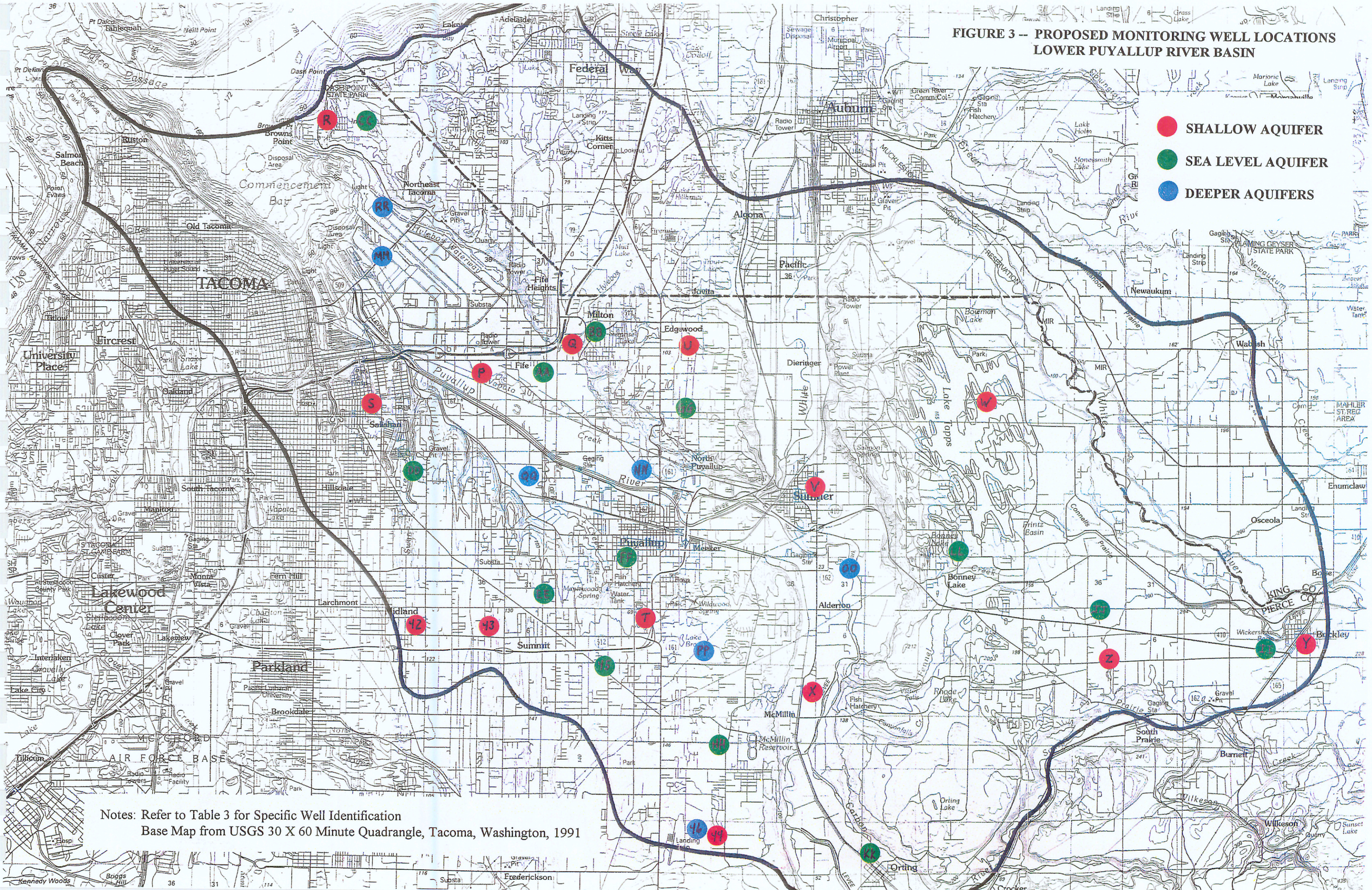
Notes: Refer to Table 2 for Specific Well Identification
Base Map from USGS 30 X 60 Minute Quadrangle, Tacoma, Washington, 1991

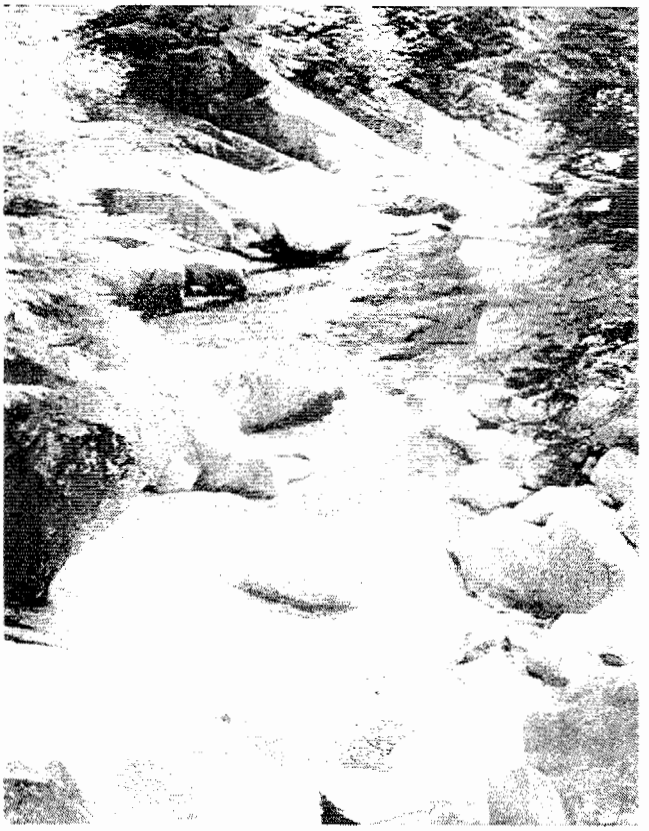
FIGURE 1 -- PROPOSED MONITORING WELL LOCATIONS
GIG HARBOR PENINSULA



Notes: Refer to Table 1 for Specific Well Identification
Base Map from USGS 30 X 60 Minute Quadrangle, Tacoma, Washington, 1991

FIGURE 3 -- PROPOSED MONITORING WELL LOCATIONS LOWER PUYALLUP RIVER BASIN





Appendices

"APPENDIX A"

STANDARD SERVICE AGREEMENT ESTABLISHING WATER UTILITY SERVICE AREA BOUNDARIES

PREAMBLE

THIS AGREEMENT establishing water utility service area boundaries is entered into this day for purposes of identifying the external boundaries of the service area for which this water purveyor has assumed water service responsibility.

WHEREAS, service area agreements are required by WAC 246-293-250 to help assure that water reserved for public water supply purposes within Pierce County will be utilized in the future in an efficient and planned manner; and

WHEREAS, the designation of retail water service area and future service planning areas, together with the cooperation of other utilities, will help assure efficient planning to accommodate growth, avoid duplication of service, and facilitate the best use of resources; and

WHEREAS, The responsibilities applicable to water purveyors are outlined in the Pierce County Coordinated Water System Plan (CWSP) and by the adopted rules and regulations of the Washington State Department of Health (DOH); and

WHEREAS, It is not the intent of this Agreement to give new authority or responsibilities to the water purveyor or to the County or State regulatory agencies, in addition to those requirements imposed by law; and

NOW, THEREFORE, the undersigned party, having entered into this Agreement by its signature, concur with and will abide by the following provisions:

Section 1. The terms used within the contract shall be as defined in the implementing regulations of Chapter 70.116 RCW, except as identified below.

A. Lead Agency shall mean the department or organization within Pierce County that has been designated by the Pierce County Executive as being administratively responsible for the coordination and filing of the Pierce County Water Service Area map, Standard Service Agreement Establishing Water Utility Service Area Boundaries, Agreements for Retail Service Areas, Utility Service Policies, and other administrative documents necessary for the implementation of the Pierce County CWSP.

B. Pierce County Coordinated Water System Plan (CWSP) shall mean the plan adopted by the Pierce County Council for public water systems within critical water supply service areas within Pierce County which identifies the present and future needs of the systems and sets forth means for meeting those needs in the most efficient manner possible.

C. Pierce County Water Service Area Map shall mean the map referenced in this Agreement for the retail service area signed by the water purveyor, except as amended in accordance with the CWSP procedures and with the concurrence of the affected water purveyors.

D. Retail Service Area shall mean the designated geographical area within Pierce County in which the undersigned water purveyor assumes full responsibility for providing water service to individual customers.

E. Utility Service Policies shall mean those policies and conditions of service that are attached to the provision of water service for individual customers. The identified policies and conditions of service are those conditions incorporated within the water purveyor's water system improvement and expansion plans required under the provisions of the Public Water Systems Coordination Act and DOH.

Section 2. Lead Agency. The lead agency for administering the Pierce County Water Utility service area agreements shall be the Pierce County Department of Public Works and Utilities unless otherwise established by the Pierce County Executive. The lead agency shall function only as a coordination center. The lead agency will maintain the original documents and will be responsible for updating the water system map and agreements as provided for in the CWSP.

Section 3. Authority The authority for this Agreement is granted by the Public Water Systems Coordination Act of 1977, Chapter 70.116 RCW.

Section 4. Service Area Boundaries. The undersigned Water Purveyor acknowledges that the Pierce County Water Service Area Maps identifying its retail service area boundaries, dated _____ and included as Attachment A to this Agreement, identify the Water purveyor's present and future service area. The undersigned further acknowledges that there are no service area conflicts with an adjacent water utility or purveyor, or, if such a conflict exists, agrees that no new water service will be extended within disputed areas except as stipulated in an adjudication by DOH.

This agreement shall apply to service areas existing as of August, 1994, and to the service area boundaries identified in the above referenced maps, or as shown on current revisions thereof, provided that no revisions of service areas shown on these maps shall be made without prior written concurrence of the water utilities/purveyors involved and such written concurrence is filed with the Lead Agency. Revisions may also require an amendment to the purveyor's or utility's service plans.

Section 5. Boundary Adjustments. If, at some time in the future it is in the best interest of the undersigned parties to make service area boundary adjustments, such modifications must be by written concurrence of all involved utilities and the proper legislative authority(ies), and must be noted and filed with the designated Pierce County lead agency and DOH. It is understood by the undersigned utility that it may decline to provide service within its designated service area boundary, but in that case, an applicant may be referred to other adjacent purveyors or utilities or a new utility may be created and the original service area boundary will be adjusted accordingly.

Section 6. System Extension Policies. The undersigned utility agrees that in order to expand its existing water service area, (other than by addition of retail customers to existing water mains), or to serve in the capacity of a prequalified satellite system management agency (SSMA), it shall have adopted design standards and Utility Service extension policies. The design standards shall meet or exceed the Pierce County Water System Minimum Standards and Specifications.

A water utility anticipating expansion of retail service in unincorporated areas of Pierce County, or intending to operate as an SSMA, shall identify utility service policies in its updated water system plan. The undersigned utility agrees to identify, for information, its utility service policies or provide a copy of the updated water system plan to the Lead Agency prior to application for extension of its existing water system into new service areas within the unincorporated areas of Pierce County.

Municipalities further agree that if they identify a service area outside of their existing municipal corporate boundaries, the municipality will assume full responsibility for providing water service equivalent to the level of service provided for their customers inside the city limits with similar service requirements, and must also meet or exceed Pierce County's minimum design standards.

Section 7. Special Working Agreements. Special working agreements, if they exist and are relevant, between this water purveyor and an adjacent water purveyor shall be attached to this Agreement as Attachment B and incorporated herein by this reference.

Section 8. Compliance with the CWSP. Nothing in this Agreement shall waive any requirement of the state, federal or local government regarding the provision of water service. This Agreement shall comply with the interlocal agreement requirement of the CWSP.

IN WITNESS WHEREOF, the undersigned party has executed this Agreement as of _____.

_____
Water Purveyor

_____
Representative

_____
Title

Receipt Acknowledged:

_____
Pierce County Public Works and Utilities Department

Date_____

STANDARD SERVICE AGREEMENT
ESTABLISHING WATER UTILITY
SERVICE AREA BOUNDARIES - 3

STANDARD SERVICE AGREEMENT
ATTACHMENT B

Utility shall include copies of separate agreements, relating to common service areas, transfer arrangements, special working agreements, and/or retail service agreements with adjacent utilities. These agreements will be included by reference in this Interlocal Agreement.

INTERLOCAL AGREEMENT
ATTACHMENT C

DESCRIPTION OF NEW WATER SERVICE REFERRAL IN SATELLITE MANAGEMENT AREAS

The following is a description of the process to be utilized by Pierce County in identifying the responsible water purveyor for providing new water service in Satellite Management Areas as identified in the Pierce County Water Service Area Maps. These Satellite Management areas are of two types: "Interim Satellite System Management Areas", in which several purveyors may have proposed expansion of existing systems into commons areas, and a "Satellite System Management Area", in which there is not presently a water system nor the likelihood of extending an existing system in the near future. In these areas the following priorities shall be applied by Pierce County and DOH:

Interim Satellite System Management Areas - Extension of Service

1. When a need for new public water service is identified in an area for which the assignment of a designated future service area is pending; the Lead Agency shall identify the purveyors having a declared interest in future service in that geographical area either through an extension of an existing system or through temporary satellite system operation, and which have a written plan to extend service to an area from an adjacent system.

2. The Applicant for service shall be provided a list of qualified purveyors.

3. The Applicant shall obtain, from the qualified purveyors, proposals which include description of new facilities, fire flow compliance, schedule, and cost.

4. The Applicant shall select from the proposals and notify the Lead Agency and DOH, in writing, attaching a copy of the selected proposal. If the Lead Agency or DOH determines that the proposal does not meet the requirements of State law, County ordinance, the Coordinated Water System Plan, or the Comprehensive Land Use Plan it may be rejected by written notice and the Applicant will be referred to the qualified purveyors for revised proposals.

5. If a purveyor and applicant notify the Lead Agency, in writing, that the purveyor is in a position to begin construction of capital facilities and that a designation of future service area is required, the Lead Agency shall notify adjacent purveyors and determine if a service are agreement can be reached. If not, the matter will be referred to the Water Utility Coordinating Committee (WUCC). The WUCC shall determine whether the need is valid and shall take one of the following actions:

a. Direct the Lead Agency to continue negotiations to reach an agreement with adjacent purveyors.

b. Establish a process within the Committee to resolve the service area among the purveyors.

c. Refer the request to DOH for formal resolution.

6. If the proposal is approved, the Applicant shall enter into a contract for water service with the selected purveyor.

7. A new water system is installed only if this alternative is approved by DOH.

Satellite System Management Areas

1. The County Lead Agency determines adjacent utilities and prequalified Satellite System Management Agencies and provides a list of theses to the applicant for service.

2. The applicant shall obtain proposal for water service from the list of prequalified purveyors, select the preferred alternative and submit a notice of selection to the County's Lead Agency for filing.

3. The applicant shall enter into a contract with the selected purveyor.

4. The County Lead Agency shall modify the service area records in accordance with Step 3.

STANDARD SERVICE AGREEMENT
ESTABLISHING WATER UTILITY
SERVICE AREA BOUNDARIES - 6

"APPENDIX B"

SUMMARY OF THE SAFE DRINKING WATER ACT

The "Safe Drinking Water Act" (SDWA) was enacted in 1974 to protect the public from risks of consuming contaminated drinking water. The SDWA required the Environmental Protection Agency (EPA) to establish standards or treatment techniques for contaminants adversely affecting human health, to set requirements for monitoring the quality of drinking water supplies, and to ensure the proper operation and maintenance of water systems.

Implementation of the SDWA was carried out through States wishing to assume such responsibilities, this responsibility was known as "primacy". The State of Washington, having assumed "primacy" now evaluates each "Group A" (15+ connections) public water system for compliance with SDWA standards.

The SDWA was amended in 1986 and required EPA to set Maximum Contaminant Levels (MCL's) and monitoring requirements for 83 specific contaminants. MCL's have enforceable standards and are set based on levels reached through the use of the "best available technology" (BAT). Regulated water systems are to exhibit compliance with monitoring requirements and with water quality standards. The water system operator must collect the samples and have them analyzed in an approved water laboratory.

Test results are monitored by the state and enforcement action is taken if test results indicate that a violation has occurred. EPA takes action if the state fails to carry out its responsibilities. Treatment may be required, or a new source may be necessary.

EPA has set "rules" governing each set of contaminants, and requires compliance within 18 months of adoption.

Phase 1 VOC's - Volatile Organic Chemicals
Establishes MCL's and monitoring requirements for manufactured carbon-based chemicals that are released into the atmosphere from water at standard pressure and temperature (trichlorethylene, carbon tetrachloride, benzene, gasoline).

SWTR - Surface Water Treatment Rule
All water systems utilizing surface water sources (lakes, rivers, streams) or groundwater under the influence of surface water must be treated for bacterial and virus control.

Coliform - Total Coliform
Requires increased monitoring and public notification for coliform bacteria. Coliform are a group of bacterial microorganisms that are representative (indicators) of contamination.

Lead/Copper
Establishes new monitoring requirements at household tap and requires treatment for lead and copper in water lines.

Phase 2 SOC/IOC - Synthetic Organic Chemicals/Inorganic Chemicals
Sets MCL's and requires monitoring for 38 SOC's/IOC's, some VOC's, and PCB's. SOC's are manufactured carbon-based chemicals (pesticides and industrial solvents), IOC's are non-carbon-based chemicals, elemental metals or minerals.

Phase 5 SOC/IOC - Synthetic Organic Chemical/Inorganic Chemicals
Establishes new monitoring standards for 24 additional SOC's/IOC's.

Radionuclides
Establishes new monitoring and treatment requirements for radioactive chemicals that are both natural and man-made and are carcinogenic.

Disinfection By-Products
Establishes new monitoring and treatment requirements for chemical by-products of disinfection (chlorination or ozonation).

Ground Water Disinfection
Increases monitoring and treatment for all systems using ground water sources.

IMPLEMENTATION SCHEDULE FOR SDWA REQUIREMENTS

Regulation	1991	1992	1993	1994	1995	1996	1997	1998
VOC's	X							
SWTR			X					
Coliform		X						
Lead/copper				X				
#2 SOC/IOC					X			
#5 SOC/IOC						X		
Radionuclides							X	
Disinfect. By-prods								X
GW Disinfection								X

The last few years have seen an increase in concern regarding the 1986 amendments to the SDWA. The number of contaminants for which testing is required has grown from 35 in 1986 to 111 in 1997. Increased monitoring necessitates increased data management, compliance review, enforcement, etc. Information needs alone outstrip resources at every level throughout the public water system environment.

The "Public Water Needs Assessment" completed in January 1993 by the State Department of Health estimated that more than $2.6 billion would be needed to meet the demands of the SDWA. The $2.6 billion figure represents approximately $690 million for SDWA compliance, $830 million for rehabilitation and repair, and $707 million for growth. Additionally $106 million is needed for operation and maintenance, $99 million for monitoring, and $115 million for planning.

In a state where customers are use to paying $12 to $17 per month for water, increases of $50 per month for small systems (15-100 connections) and $30 per month for larger systems (100+ connections) will not be uncommon. These costs only include the costs outlined, not the costs of any treatment necessary if the expanded testing indicates a problem. It is estimated that 50 percent of the groundwater systems in the state will need to be treated, adding another $50 per month to small system's customer's bills.

The impacts of the SDWA will be felt the hardest by 2 groups of systems: 1) the smallest of the regulated systems; and 2) systems with multiple water sources. Small customer bases make it very difficult to absorb debt service regardless of the source. Of the 13,000 water systems in the state, 4,700 are subject to the entire SDWA, of those, 2,200 have fewer than 1,000 customers and over 75 percent of them are privately owned, making financing even more difficult. As the number of sources, i.e. wells, increases, the monitoring costs rise proportionately. A system with ten wells will have ten times the monitoring costs of systems with only one well.

Pierce County, with 13 percent (1,500/13,000) of the state's public water systems, follows the state statistically. The majority of its water systems are small (1,100/1,500) and costs of service will rise accordingly. Pressure to aid and/or support, if not takeover, these small systems will intensify. The "Failing Public Water System Act" of 1992 places Pierce County in the undesirable position of taking over systems that are experiencing severe trouble, where no other utility is willing to do so.

This brief presentation addresses only the known considerations, there are still factors of growth and spiraling costs to be anticipated with new contaminants added to EPA's mandatory schedule. The problems are many and the solutions appear to be few. All levels of governance, federal to local water districts must address a formidable problem in the near future.

"APPENDIX C"

TIMELY AND REASONABLE CRITERIA

INTRODUCTION

The following represents the non-exclusive list of elements that will be considered by the Lead Agency, Pierce County Planning and Land Services Department, the Tacoma-Pierce County Health Department, the Pierce County Water Utilities Coordinating Committee and the Pierce County Hearings Examiner when making a timely and reasonable service determination as requested by the filing of a timely and reasonable service dispute by a potential water customer as detailed in the Pierce County Coordinated Water System Plan, Chapter 19D.140 Pierce County Code and Washington Administrative Code 246.293.

Issues Subject to Appeal Under the Timely and Reasonable Process

Only water service issues relating to new requests for retail water service are subject to appeal under the Timely and Reasonable process. Issues related to conformance with SEPA, the Growth Management Act, any County-wide Regional Planning Policies, County and City land use plans, financing policies, and wholesale agreements are not subject to the appeal process under the Timely and Reasonable consideration. Issues subject to review are limited to the following:

- Interpretation and application of water utility service area boundaries.
- Proposed schedule for providing service.
- Conditions of service, excluding published rates and fees.
- Annexation provisions imposed as a condition of service, provided existing authorities of City government are not altered by the CWSP, except where a Service area agreement exists between a city and a County, or as are specifically authorized by Chapter 70.116 RCW.
- Design standards more stringent than the minimum design standards specified in the CWSP, DOH-approved WSP and related water industry statutes and standards.

Definitions

Timely Service

Timely service is defined as receiving a commitment to provide service, or the reaching of an agreement with the potential customer, within 120 days of request for water service. The 120-day time period shall be defined as calendar days.

It is fairly unlikely that water service will be received within 120 days after initial contact between the applicant for water service and the purveyor, nor after the submittal of an application and/or payment of fees. An applicant (developer) must generally extend or construct additional facilities in order to serve the property being developed. The construction of these water facilities are subject to design review and approval at both the state and local levels, local permitting processes, construction season considerations, and are often done in conjunction with other planned infrastructure projects such as road, sewer, lights, etc. The previous activities are on the applicant's timeframe, outside of the control of the water purveyor.

The 120-day clock shall commence at the filing of a written application or request by the applicant to the purveyor for utility service pursuant to the Utility Service Review Procedure (USRP) contained in the Pierce County CWSP. A completed agreement, to the satisfaction of both parties, must be reached within this time period. A completed agreement contains the schedule and terms of providing service within 120 days (or a time period acceptable to both parties). The purveyor should document the record start date of the first meeting with the applicant.

If an appeal exists, it will likely occur during the 120-day period. An existing purveyor might be considered unable to provide the service in a timely manner if:

- Where no infrastructure installation is required (other than a water service connection), the water service is not provided to the applicant within 120 days of submitting a completed agreement and necessary fees to the purveyor; or

- Where no infrastructure installation is required (other than a water service connection), the water service is not provided to the applicant within 120 days of final payment for the infrastructure and completion of all required administrative work by the applicant; or

- The water cannot be provided to the applicant within 120 days of submitting a written request and application fees to the purveyor unless by an agreement with the potential customer; or

- The purveyor states in writing that it is unable or unwilling to provide the service; or

- The purveyor and applicant are unable to achieve an agreement on the schedule and terms of provision of service within 120 days of commencement of good faith negotiations by both parties.

<u>Reasonable</u>

Reasonable service is defined as the provision of potable water service and/or associated water utility services, which are consistent with the conditions of service policies detailed in the utility's DOH-approved WSP.

An existing purveyor might be considered unable to provide service in a reasonable manner if:

- The purveyor's conditions of water service differ adversely in an arbitrary and capricious manner from the stated conditions of service in the purveyor's approved water system plan or small water system management plan; or

- The purveyor's conditions of water service differ adversely in an arbitrary and capricious manner from the purveyor's acknowledged standard practice with other applicants requesting similar water services.

TIMELY AND REASONABLE SERVICE DETERMINATION CRITERIA

A. Status of Water Rights. *What consideration should be given to water rights status?*

DOH requires all projects to be supported by adequate water rights. It will not be assumed that water rights will eventually be issued. Therefore, waiting for a water right permit to be issued may not be timely nor reasonable.

B. Signed Service Area Agreement.

A utility's service area in its water system plan should be consistent with the service area claimed during the CWSP process. The entity requesting service must be located within this service area.

C. A DOH approved water system plan.

A water system that has committed to providing service for new requests for water must have an approved WSP or have a development schedule to prepare a WSP, agreed upon with the Department.

D. Consistency with local land use plans and policies. *What constitutes consistency with local land use plans and policies?*

Service area boundaries and utility level of service standards should be consistent with minimum design standards contained in the CWSP, DOH-approved WSP and related water industry statutes and standards and be consistent with minimum level of service requirements in the County's Comprehensive Plan and Regulations. Additionally, the following should be considered:

- Consistency with Local land use Authority construction scheduling for capital improvements.

- Consistency with Local land use Authority financing schedules for capital improvements.

- Consistency with Local land use Authority Growth Management Boundaries.
- Available water rights consistent with population projections.

E. **Current operating permit status of water system.** *How does current DOH water system plan approval status affect provision of service?*

A system in a "Red" operating permit category cannot be expanded. A system with a "Blue" operating permit designation indicates it has yet to be evaluated for current adequacy status or its ability to expand. If the system is in the "Yellow" category, service may or may not be considered available, depending on the nature of the problem(s) that caused the system to be placed in the yellow category A system in the "Green" category may be expanded if it meets necessary requirements as determined by DOH.

F. **Conditions of Service.** *What is reasonable?*

Conditions of service shall be found to be reasonable, provided that they are consistent with the conditions of service policies detailed in the utility's DOH-approved water system plan.

G. **Cost of Water Service.**

Cost of service specifically relates to system development charges and terms of developer extension agreements necessary to support requests for new water service in a utility's future service area. System development charges are typically addressed and justified in a utility's WSP. Assuming during utility preparation of water system plans, the DOH required public meeting was held, and adequate agency review of these elements prior to approval of the WSP, the reasonableness of cost of service should not be an issue for a given utility with an approved WSP. However, it is recognized that a utility's cost of service may be different for specific projects, which may require that cost become a topic of concern. Therefore, in some limited and unique circumstances, cost of service can be discussed as a part of an appeal, but should not be the sole issue to initiate an appeal.

H. **Pre-annexation Agreements.**

Pursuant to Pierce County Code 19D.140.100, pre-annexation agreements were not contemplated in the designation of exclusive water service area boundaries by the Water Utility Coordinating Committee at the time of service area boundary designation and furthermore, are not necessary to the provision of timely and reasonable service within a purveyor's exclusive water service area boundary. Therefore, a requirement that a potential customer enter into a pre-annexation agreement as a condition of service may be challenged as unreasonable through the dispute resolution process.

I. **Service Areas**

Pursuant to Pierce County Code 19D.140.090.F(1), unresolved service area disputes shall be referred by the Lead Agency to the Washington State Department of Health for final resolution.

"APPENDIX D"

PIERCE COUNTY COORDINATED WATER SYSTEM PLAN WATER DEMAND UPDATE PROJECT

METHODOLOGY AND BACKGROUND REPORT

BACKGROUND

On a regional level, questions regarding water supply and demand have taken on a greater urgency as a result of robust economic development, the listing of Puget Sound Chinook salmon as a threatened species, the difficulty of obtaining new water rights from the Washington State Department of Ecology and changes in regulations.

In addition to the water supply issues facing the region as a whole, questions regarding water supply and demand have come to the forefront for Pierce County recently as the County continues to pursue a Change of Use Application from industrial to municipal use of ground and surface water rights purchased by the County in 1994 and as the County continues to refine its Washington State Growth Management Act (GMA) Comprehensive Land Use Plan through the development of more detailed "community plans".

As implementation of the 1996 Pierce County CWSP has occurred, it has become apparent that a more detailed water demand forecast than was completed in 1995 would serve as a beneficial tool to assist both the county in implementing county water supply and land use management responsibilities and water purveyors in implementing water supply planning and customer service requirements.

Since 1990, the placement of growth within the majority of Washington State's cities, towns and counties has been guided by the Washington State Growth Management Act. The GMA requires the establishment of Urban Growth Areas (UGA's) in which urban level development is to occur, outside of which rural level development is to occur. Further, the GMA requires that urban level facilities be available within UGA's. Under Washington State law water systems with 1,000+ connections or those that are expanding, are required to develop water system plans consistent with County land use plans (or for areas within incorporated areas, city/town land use plans), Coordinated Water System Plans and Washington State Department of Health guidelines.

It is hoped that through the coordinated effort of preparing a more detailed water demand forecast for Pierce County based on GMA land use plans and WSDOH guidelines, the County and its UGA area water purveyors will be able to cooperatively identify possible trouble spots and work to resolve water supply concurrency issues before they become a crises.

GOALS

The project has been developed based upon the following general goals:

- The long-term projections, to year 2020, developed for the project will be consistent with Growth Management Act planning projections.
- The project will be consistent with Washington State Department of Health water system planning guidelines.
- The end product will be presented in such a matter as to be understandable to the general public.
- The project will contain estimates of "maximum buildout" based on the capability of existing land use designations to accommodate additional growth.
- The project will contain a medium and high growth scenario and will account for water conservation savings.

GENERAL APPROACH

Under Washington State law, Coordinated Water System Plans are prepared under the direction of a committee of water purveyors (the Water Utilities Coordinating Committee or WUCC). Pierce County, with assistance from the largest water purveyor in the County, the City of Tacoma, approached the WUCC with the concept of updating the 1995 water demand forecast contained in the 1996 CWSP and applying for a WSDOH grant to accomplish the project. The following general approach to the project was supported by the WUCC:

- The project would incorporate those water purveyors providing water service within the Pierce County UGA required to prepare water system plans plus 2 additional systems requesting participation;
- Pierce County would collect operating data from each system via a survey;
- 1997 would serve as the "base year";
- Pierce County would allocate Puget Sound Regional Council population, household and employment projections to the water systems;
- Pierce County would develop "base year" population, household and employment estimates;
- Pierce County would develop "maximum buildout" projections;

- The consulting firm of RW Beck would develop detailed water demand projections by linking water usage data with projection data, developing a projection model and assessing likely conservation levels.

Data Development

Pierce County, with input from the WUCC, developed a survey to collect historical consumption and demand data by customer class, water use characterizations, estimated water savings from conservation programs, service area population and water right information from project participants. The survey was developed and mailed mid-year, 1998, therefore, 1997, a normal water year for Western Washington, served as the base year, with information also requested for 1994, 1995 and 1996. For systems not responding to the survey, needed data was pulled from water system plans, when available.

The Puget Sound Regional Council (PSRC) serves as a regional planning agency for Pierce, King, Kitsap and Snohomish Counties. During the initial scoping of the project with the WUCC, it was concluded that the County would not develop new population, household and employment projections, but would disaggregate projections developed by the Puget Sound Regional Council (PSRC) to the service areas for the years 2000, 2010 and 2020. It was agreed, however, that the County would develop straight-line projections for the year 2005 based on the PSRC 2000 and 2010 projections. Using PSRC population and employment projections is a common practice for most of the WUCC members when preparing water system plans and served as the source of projections for the 1995 water demand effort. Additionally, land use is factored into the projections and member agencies are given the opportunity to review draft numbers to ensure consistency with local GMA land use plans.

Through the development of coordinated water system plans, water purveyors are required to establish service areas in coordination with surrounding purveyors. The Pierce County CWSP has designated the Pierce County Public Works and Utilities Department (PCPWU) as the Lead Agency responsible for maintaining the official water service area map for the County. As Pierce County was developing the water demand project with the WUCC, PCPWU was also entering all 350 Group A water service boundaries into the County's GIS system down to a parcel level in order to move away from generalized "paper maps" serving as the official water service map for the County. The parcel specific water service GIS layer served as the base map for the water demand project thus enabling the County to overlay several other GIS data sources when developing data for the project. Details as to how this was accomplished for the base year estimates and projections follows.

METHODOLOGY

Base Year (1997) Housing and Population

Pierce County estimated base year, 1997, housing counts for parcels with 1 to 4 housing units directly from GIS parcel information based on County Assessor Land Use Codes. Mobile home and multi-family housing counts were estimated using an August, 1998 Pierce County Assessor-Treasurer Department database of number of units in mobile home parks and multi-family structures (5+ units) tied to the GIS parcel file. 1997 population by service area was estimated based on person per household and vacancy rates from the PSRC at the Census Tract level and the County generated single family, multi-family and mobile home estimates. The County developed housing and population estimates were compared against data provided by the purveyors, with final estimates created based on a combination of purveyor data and the County generated estimates.

Base Year (1997) Employment

Pierce County obtained the services of the PSRC in the development of the 1997 employment estimates due to the PSRC ability to utilize data not available to the County. The PSRC overlaid the Washington State Employment Security Department (ESD) point level employment records with the County's GIS water service boundary data layer. The PSRC was then able to summarize employment for each service area by six sectors (Construction/Resources; Finance, Insurance, Real Estate, Services; Manufacturing; Retail; Wholesale, Transportation, Communication, Utilities; Government/Education). The ESD records contain information for "covered employment" only, approximately 80 to 85% of employees countywide; therefore, the PSRC expanded the ESD employment to "total employment" based on factors developed by the PSRC for such purposes. Pierce County reviewed the PSRC employment figures for reasonableness and inclusion of major employers. Data was revised due to this review where necessary.

While it was possible for the PSRC to estimate employment in the Construction/resources sector for each of the service areas, employment in this sector was ultimately not included in the base year 1997 employment estimates. The PSRC does not develop forecasts for the Construction/Resources sector due to the transitory nature of the jobs in this sector; therefore the construction/resource job sector was removed from the base year estimates as well.

Population, Housing and Employment Projections (2005, 2010, 2020)

General Methodology- Base Case Scenario

The PSRC develops population, housing and employment projections for several geographical areas the smallest of which is termed "Transportation Analysis Zone" or TAZ. While TAZ's do not cross county lines, the boundaries, in many cases, cross both city limits and water service area boundaries. In order to assign a percentage of each TAZ to a water service area, Pierce County utilized GIS technology to overlay the PSRC TAZ boundaries onto the parcel specific water service GIS data layer. This manipulation resulted in a simple percentage

disaggregation formula which was then applied to the PSRC's December, 1998 population, household and employment projections to derive a first cut at service area projections. Because TAZ's were assigned to water service areas on a percentage of area falling within a water service area, without taking into account zoning designations or jurisdictional boundaries, the first cut at base case scenario projections were examined by Pierce County and compared against Pierce County land use designations per the County's GMA plan and projections contained in water system plans, when available. For service areas incorporating portions of city or town city limits, the projections were also compared against population projections allocated to cities and towns by the Pierce County Council for GMA purposes (R97-59) and city and town comprehensive plans. Based on these reviews, the County finalized the base case scenario population, household and employment projections by service area.

Year 2005 Population, Housing and Employment Projections

The PSRC prepares population, housing and employment projections for the years 2000, 2010 and 2020. Because the year 2000 is nearly upon us, it was decided that developing year 2005 projections would be beneficial. Year 2005 population, housing and employment projections are "straight-line" projections from the year 1997 to 2010.

Single-family, multi-family households

In order to split total household projections into projections of single-family households and multi-family households, the percentage of single-family households and multi-family households by service area derived for the 1997 estimates were compared against current County land use designations and adjusted, if needed, then projected out to 2020.

Employment

For the majority of systems, the PSRC allocation for employment as disaggregated to service areas by the County, year 2020, was used. Year 2005 and 2010 employment projections were then derived from a straight-line projection from year 1997 to 2020.

"Appendix A" details how the 2005, 2010 and 2020 population, housing and employment projections were derived for the individual service area.

General Methodology – High Case Scenario

The base case scenario population, housing and employment projections served as the starting point for calculating the high case scenario projections. The high case population for the County as a whole was assumed to be approximately 1.5 times the population in the base case. This rate of growth was then allocated to the individual service areas based on their rates of growth in the base case. For the base case, the ratio of population per employee and population per household per service area for the years 1997, 2005, 2010 and 2020 were calculated. These ratios were then utilized in the development of the high case projections and, therefore, were assumed to be the same in the high case and the base case scenarios. Specifically, the high case employment projections were developed based on the ratio of population per employee occurring in the base case scenario and the high case population projections. The high case household projections were developed for each utility based on the base case ratio of population per household and the high case population estimates, and

were divided between single family and multi-family classes based on the base case scenario.

"Maximum Buildout" Projections

General Methodology – Population – Base Case Scenario

During the initial scoping process with the WUCC, several members asked that the County prepare "maximum buildout" population and employment projections for their systems based on the capacity of land use designations to accommodate additional growth. In order to complete this task, Pierce County Assessor -Treasurer parcel data was overlaid with the GIS water service boundary file in order to derive the amount of vacant land, resource land and underdeveloped land in unincorporated Pierce County by Pierce County land use designation for each water service area. Assumptions were then applied to these totals in order calculate the maximum buildout projections.

While buildout projections are common for jurisdictions to develop due to the GMA's requirement to establish UGA's and accommodate allocated population growth, the use of common assumptions among jurisdictions to develop such projections does not occur. For this effort, two scenarios were developed for the maximum buildout population projections; a "base case" and a "high case" scenario. Several assumptions used in developing the maximum buildout population projections were identical for the two scenarios, including:

- Two rural land use designations (Reserve 5 and Reserve 10) will eventually be converted to a urban land use designation ("moderate density single family");
- 75% of land in land use designations allowing both commercial and residential uses would be developed with commercial uses;
- Underdeveloped "urban" land was defined as parcels of one acre or greater in size;
- A household size of 2.25 was used to calculate population projections;
- Buildout population projections from city comprehensive land use plans and/or water system plans were used for incorporated portions of service areas.

In addition to the assumptions previously discussed, the following assumptions were used to develop the maximum buildout population projections for the "Base Case" Scenario:

- For land use designations allowing only residential land uses, 30% of the acreage was removed for roads and critical areas and 20% was removed for "other land uses" (i.e. schools, churches, utility facilities).
- For the "moderate density single family" land use designation, the majority of the UGA, buildout at 4 housing units per acre was used.

- For land use designations allowing multi-family land uses, residential buildout at 12 units per acre was used.

General Methodology – Population – High Case Scenario
In addition to the general assumptions applicable to both the Base and High Case scenarios, the following assumptions were used to develop the Maximum Buildout Population Projections for the High Case scenario:

- Gross acreage was used (i.e. no acreage was removed for roads, or other land uses).

- For the "moderate density single family" land use designation, buildout at 6 housing units per acre was used.

- For land use designations allowing multi family land uses, residential buildout at 25 units per acre was used.

"Appendix A" details how the maximum buildout population projections for both the base case and high case were derived for the individual service areas and, therefore, notes variations to the above methodology for several systems.

General Methodology – Housing – Base Case Scenario
For the majority of individual service areas, the base case maximum buildout housing projections were calculated as the product of the 2020 household projections and the ratio of maximum buildout population to 2020 population.

General Methodology – Housing – High Case Scenario
For the majority of individual service areas, the high case maximum buildout housing projections were estimated to be higher than base case maximum buildout projections in proportion to the difference between high case and base case population projections.

General Methodology – Employment – Base Case Scenario
In order to derive base case maximum buildout employment projections, the types of commercial and industrial land uses allowed in the various Pierce County land use designations were examined and compared against employee per acre information contained in *Trip Generation 5th Edition*, Institute of Transportation Engineers, 1991. An average employee per acre for the land use designations allowing commercial and industrial land uses based on allowed land uses and employee per acre figures in *Trip Generation, 5th Edition*, was then applied to the gross acreage (unincorporated County) of vacant land, underdeveloped land and resource land within each commercial and industrial land use designation occurring within each service area. Employment within incorporated portions of service areas was not taken into account, therefore, the base case maximum buildout projections only reflect buildout of unincorporated portions of service areas.

General Methodology – Employment – High Case Scenario
The high case maximum buildout employment projections were calculated in several ways. Appendix A details the methodology utilized for each service area.

WATER DEMANDS

Forecast Methodology

The purpose of developing this water demand forecast for Pierce County is to provide a framework so that system improvements and new supply resources can be anticipated and planned for on a timely basis. The following paragraphs describe the general methodology used in preparing this water demand projection for the County.

- Historical water demand data for the project participants were identified and collected via a survey. The information collected included: historical consumption and demand levels by customer class, water use characterizations, estimated water savings from conservation programs already implemented, service area population and household data
- A historical database of water demands, operational data, and planning information were developed for individual water systems in Pierce County to be used in the project, including:
  - Historical water usage data.
  - Estimates of future water savings through conservation, including the projected impacts from recently enacted plumbing code changes.
  - Base year population and employment estimates derived by County staff for the individual water service areas and for the County.
  - Projected population and employment data derived by County staff based on projections from the Puget Sound Regional Council (PSRC) for the individual water service areas and for the County.
  - Projected maximum buildout data derived by County staff based on the County's GMA planning efforts for the individual water service areas.
  - Projection of future water demand scenarios for base and high growth alternatives for the years 2005, 2010, 2020 and maximum buildout consistent with the County derived population and employment projections.
  - Summarizing the resulting water demand projection for both the individual water service areas and the County.
- Utility operating records and data collected from Tacoma Public Utilities and 22 other water purveyors in Pierce County were used in preparing the water demand forecast. Included in the data collection activities was development of usage data by customer class, per capita, per employee, per single family household and per multi family household usage estimates, and assessment of conservation savings from water purveyors.
- The data collected from the water purveyors were used to identify historical 1997 water usage in Pierce County and to estimate water use for the individual water service areas.

- Projections of future water demands were developed for each of the individual water service areas, which were then aggregated to derive a water demand forecast for the entire County. Projections of residential water consumption were based on average water usage assumptions (calculated on a gallons per capita per day basis) in each water use area. The assumptions were developed using 1997 usage data for each service area. Non-residential water consumption estimates (including both commercial class and public water demands) were developed using non-residential water usage assumptions (calculated on a gallons per employee per day basis) in each of the eleven water use areas. These were developed based on 1997 usage data for each service area. Discrete large demands (including Simpson Paper Company) were estimated in certain water use areas where per employee estimates would not adequately reflect the normal non-residential water consumption patterns. Unaccounted for water, including losses, was also estimated at the individual utility level based on 1997 levels. Where data was not available for a utility, a weighted average of data from the other utilities was used Assumptions used in the forecast are discussed later in this section with the specific water usage assumptions summarized in Table VIII-2.

Water Demand Assumptions

To develop the projections of future water demands for the County and individual water service areas, a number of assumptions were required. Key assumptions include the following:

- No specific adjustments to account for water user price response or price elasticity adjustments are included in the projections. This is consistent with an assumed increase of future water rates in the County that approximately equal the rate of inflation in the County. Rate increases that are lower than the rate of inflation would imply somewhat higher water demand levels while rate increases higher than the rate of inflation would result in lower water demand levels than those projected.

- The future demands for Tacoma Public Utilities are consistent with its water demand forecast prepared in September 1999. In-city and outside city water demands in the Tacoma service area were separated and used in this analysis. The discrete large demands for Simpson Paper Company and other non-residential demands included in the City's forecast are also included in this water demand forecast.

- Savings from the gradual replacement of existing plumbing fixtures with more efficient fixtures that meet new code requirements are included in the forecast. It is assumed that new single family and multi family homes located outside of the City of Tacoma's water service area constructed after 1994, when building code changes consistent with the 1992 Energy Policy Act lowered fixture water use rates were implemented, use 10.2% less water than existing homes, and that older homes are gradually retrofit with new fixtures with lower water use rates at a replacement rate of 2.5% annually. Similarly it is assumed that non-residential buildings located outside the City of Tacoma's water service area

constructed after building code changes were implemented use 10.2% less water than existing buildings, and older buildings are retrofit with new fixtures at a replacement rate of 2.5% annually. For the City of Tacoma service area, inside city limits, it is assumed that new single family homes use 12.4% less water than existing single family homes, new multi family homes use 13.3% less water than existing multi family homes and new non-residential buildings use 11.1% less water than existing non-residential buildings with a fixture replacement retrofit rate of 2.5% per year for all building types. Similarly, for the City of Tacoma service area outside city limits, it is assumed that new single family homes use 10.8% less water than existing single family homes, new multi family homes use 8.7% less water than existing multi family homes and new non-residential buildings use 8.3% less water than existing non-residential buildings, with a fixture replacement retrofit rate of 2.5% per year for all building types. All conservation estimates are based on savings due to the replacement of toilets, showerheads, and water faucets and do not include potential savings from washing machine and dishwasher appliance code changes that have not yet been implemented.

- Consistent with current demand-side planning methods, conservation is generally treated as a possible future resource available to water purveyors in the County. No reductions for conservation savings other than the changes in plumbing fixtures are included in the projected future demand levels.

- Losses and unaccounted for water are estimated for each water use area based on 1997 unaccounted for water levels for each utility, with a minimum of 5%. Where data was not available for a utility, 1997-weighted average losses of 15% for the County was assumed. Like potential conservation savings, no specific reductions in losses or unaccounted for water are included in the water demand forecast that could result from specific leak detection programs or other activities to reduce unusually high losses or unaccounted for water. Again these efficiency improvements are treated as a demand-side resource available for certain specific water providers in the County.

APPENDIX A

Unless otherwise noted, the following details the methodology used to derive the base case scenario projections for the individual service areas. The high case scenario projections were calculated based on the base case scenario projections as detailed in the *Pierce County Coordinated Water System Plan Water Demand Update Project, Methodology and Background Report* (Report) with very few exceptions. Where the exceptions occurred, the following details the methodology used.

City of Bonney Lake

Projections – 2005, 2010 and 2020

For population and housing projections and year 2020 employment, the PSRC allocation derived figures were used. Year 2005 and 2010 employment projections were derived from a straight-line projection from year 1997 to 2020. Year 2005 population and housing projections are straight-line projections from the year 1997 to year 2010. All projections were compared against water system plan (1997) figures and the County's 2017-population allocation (R97-59).

Projections – Maximum Buildout

Base case and high case scenario population, employment and housing maximum buildout projections for the unincorporated portion of the City's service area were derived as explained in the *Report's* text. Base case and high case scenario maximum buildout population projections for the incorporated portion of the City's service area were pulled from the City's comprehensive plan. Employment figures for the high case scenario were calculated as base case scenario maximum buildout employment times ratio of high case scenario maximum buildout population to base case scenario maximum buildout population.

City of Buckley

Projections – 2005, 2010 and 2020

For population and housing projections, the PSRC allocation derived figures were revised. Because the PSRC allocation derived employment figures projected a negative employment growth rate; base year (1997) employment was projected out to year 2020. Year 2005 population and housing projections are straight-line projections from the year 1997 to year 2010. All projections were compared against water system plan figures (1998) and the County's 2017-population allocation (R97-59).

Projections – Maximum Buildout

Base case and high case scenario population, employment and housing maximum buildout projections for the unincorporated portion of the City's service area were derived as explained in the *Report's* text. Base case and high case scenario maximum buildout population projections for the incorporated portion of the City's service area were pulled from the City's comprehensive plan. Employment figures for the high case scenario were calculated as base

case scenario maximum buildout employment times ratio of high case scenario maximum buildout population to base case scenario maximum buildout population.

City of Fife

Projections – 2005, 2010 and 2020
For population and housing projections, the PSRC allocation derived figures were revised. Because the PSRC allocation derived employment figures projected a negative employment growth rate; base year (1997) employment was projected out to year 2020. Year 2005 population and housing projections are straight-line projections from the year 1997 to year 2010. All projections were compared against water system plan figures (1998) and the County's 2017-population allocation (R97-59).

Projections – Maximum Buildout
Base case and high case scenario population, employment and housing maximum buildout projections for the unincorporated portion of the City's service area were derived as explained in the *Report's* text. Base case and high case scenario maximum buildout population projections for the incorporated portion of the City's service area were pulled from the City's comprehensive plan. Employment figures for the high case scenario were calculated as base case scenario maximum buildout employment times ratio of high case scenario maximum buildout population to base case scenario maximum buildout population.

City of Fircrest

Projections – 2005, 2010 and 2020
For population and housing projections, the PSRC allocation derived figures were revised. For year 2020 employment, the PSRC allocation derived figures were used. Year 2005 and 2010 employment projections were derived from a straight-line projection from year 1997 to 2020. Year 2005 population and housing projections are straight-line projections from the year 1997 to year 2010. All projections were compared against the County's 2017-population allocation (R97-59).

Projections – Maximum Buildout
Base case and high case scenario population, employment and housing maximum buildout projections for the unincorporated portion of the City's service area were derived as explained in the *Report's* text. Base case and high case scenario maximum buildout population projections for the incorporated portion of the City's service area were pulled from the City's comprehensive plan. Employment figures for the high case scenario were calculated as base case scenario maximum buildout employment times ratio of high case scenario maximum buildout population to base case scenario maximum buildout population.

Firgrove Mutual

Projections – 2005, 2010 and 2020
For population and housing projections and year 2020 employment, the PSRC allocation derived figures were used. Year 2005 and 2010 employment projections were derived from a straight-line projection from year 1997 to 2020. Year 2005 population and housing projections are straight-line projections from the year 1997 to year 2010. All projections were compared against water system plan figures (1991, 1999).

Projections – Maximum Buildout
Base case and high case scenario population, employment and housing maximum buildout projections were derived as explained in the *Report's* text. Employment figures for the high case scenario were calculated as base case scenario maximum buildout employment times ratio of high case scenario maximum buildout population to base case scenario maximum buildout population.

Fruitland Mutual

Projections – 2005, 2010 and 2020
For population and housing projections, the PSRC allocation derived figures were used. Because the PSRC allocation derived employment figures projected a negative employment growth rate; base year (1997) employment was projected out to year 2020. Year 2005 population and housing projections are straight-line projections from the year 1997 to year 2010. All projections were compared against water system plan figures (1989. 1999).

Projections – Maximum Buildout
Base case and high case scenario population, employment and housing maximum buildout projections were derived as explained in the *Report's* text. Employment figures for the high case scenario were calculated as base case scenario maximum buildout employment times ratio of high case scenario maximum buildout population to base case scenario maximum buildout population.

City of Gig Harbor

Projections – 2005, 2010 and 2020
For population and housing projections, the PSRC allocation derived figures were revised. Because the PSRC allocation derived employment figures projected a negative employment growth rate; base year (1997) employment was projected out to year 2020. Year 2005 population and housing projections are straight-line projections from the year 1997 to year 2010. All projections were compared against water system plan figures (1995) and the County's 2017-population allocation (R97-59).

Projections – maximum buildout
Base case and high case scenario population, employment and housing maximum buildout projections for the unincorporated portion of the City's service area were derived as explained in the *Report's* text. Base case and high case scenario maximum buildout population projections for the incorporated portion of the City's service area were pulled from the City's comprehensive plan. Employment figures for the high case scenario were calculated as base case scenario maximum buildout employment times ratio of high case scenario maximum buildout population to base case scenario maximum buildout population.

Harbor Springs

Projections – 2005, 2010 and 2020
For population and housing projections and year 2020 employment, the PSRC allocation derived figures were used. Year 2005 and 2010 employment projections were derived from a straight-line projection from year 1997 to 2020. Year 2005 population and housing projections are straight-line projections from the year 1997 to year 2010.

Projections – Maximum Buildout
Base case and high case scenario population, employment and housing maximum buildout projections were derived as explained in the *Report's* text. Employment figures for the high case scenario were calculated as base case scenario maximum buildout employment times ratio of high case scenario maximum buildout population to base case scenario maximum buildout population.

Lakewood

Projections – 2005, 2010 and 2020
For population and housing projections, year 2010, and year 2020 employment, the PSRC allocation derived figures were used. For year 2020 population and housing projections, the PSRC allocation was revised. Year 2005 and 2010 employment projections were derived from a straight-line projection from year 1997 to 2020. Year 2005 population and housing projections are straight-line projections from the year 1997 to year 2010. All projections were compared against water system plan figures (1998) and the County's 2017-population allocation (R97-59).

Projections – Maximum Buildout
Because the Lakewood Water District provides water service within the newly formed City of Lakewood and at the time of the project, the City had not yet completed a buildout projection for the City, base case maximum buildout projections are equal to year 2020 projections. High case scenario maximum buildout population projections are equal to the high case scenario 2020 population projection plus 10%. High case scenario maximum buildout employment projections are equal to the high case scenario 2020 employment projections plus 15%. High case scenario maximum buildout housing projections are equal to the 2020 projections of households for single family and multi-family.

City of Milton

Projections –2005, 2010 and 2020
For population and housing projections, the PSRC allocation derived figures were revised. For year 2020 employment, the PSRC allocation derived figures were used. Year 2005 and 2010 employment projections were derived from a straight-line projection from year 1997 to 2020. Year 2005 population and housing projections are straight-line projections from the year 1997 to year 2010. All projections were compared against water system plan figures (1993) and the County's 2017-population allocation (R97-59).

Projections – Maximum Buildout
Base case and high case scenario population, employment and housing maximum buildout projections for the unincorporated portion of the City's service area were derived as explained in the *Report's* text. Base case and high case scenario maximum buildout population projections for the incorporated portion of the City's service area were pulled from the City's comprehensive plan. Employment figures for the high case scenario were calculated as base case scenario maximum buildout employment times ratio of high case scenario maximum buildout population to base case scenario maximum buildout population.

Mt View Edgewood

Projections – 2005, 2010 and 2020
For population and housing projections and year 2020 employment, the PSRC allocation derived figures were used. Year 2005 and 2010 employment projections were derived from a straight-line projection from year 1997 to 2020. Year 2005 population and housing projections are straight-line projections from the year 1997 to year 2010. All projections were compared against water system plan figures (1989).

Projections – Maximum Buildout
Because Mt View – Edgewood Mutual provides water service within the newly formed City of Edgewood and at the time of the project, the City had not yet completed a buildout projection for the City, base case maximum buildout projections are equal to year 2020 projections. High case scenario maximum buildout population projections are equal to the high case scenario 2020 population projection plus 30%. High case scenario maximum buildout employment projections are equal to the high case scenario 2020 employment projections plus 25%. High case scenario maximum buildout housing projections are equal to the 2020 projections of households for single family and multi-family.

City of Orting

Projections – 2005, 2010 and 2020
For population and housing projections, the PSRC allocation derived figures were revised. For year 2020 employment, the PSRC allocation derived figures were used. Year 2005 and 2010 employment projections were derived from a straight-line projection from year 1997 to 2020.

Year 2005 population and housing projections are straight-line projections from the year 1997 to year 2010. All projections were compared against water system plan figures (1994) and the County's 2017-population allocation (R97-59).

Projections – Maximum Buildout
Base case and high case scenario population, employment and housing maximum buildout projections for the unincorporated portion of the City's service area were derived as explained in the *Report's* text. Base case and high case scenario maximum buildout population projections for the incorporated portion of the City's service area were pulled from the City's comprehensive plan. Employment figures for the high case scenario were calculated as base case scenario maximum buildout employment times ratio of high case scenario maximum buildout population to base case scenario maximum buildout population.

Parkland Light and Water

Projections – 2005, 2010 and 2020
For population and housing projections and year 2020 employment, the PSRC allocation derived figures were used. Year 2005 and 2010 employment projections were derived from a straight-line projection from year 1997 to 2020. Year 2005 population and housing projections are straight-line projections from the year 1997 to year 2010. All projections were compared against water system plan figures (1994).

Projections – Maximum Buildout
Base case and high case scenario population, employment and housing maximum buildout projections were derived as explained in the *Report's* text. Employment figures for the high case scenario were calculated as base case scenario maximum buildout employment times ratio of high case scenario maximum buildout population to base case scenario maximum buildout population.

Peacock Hill

Projections – 2005, 2010 and 2020
For population and housing projections and year 2020 employment, the PSRC allocation derived figures were used. Year 2005 and 2010 employment projections were derived from a straight-line projection from year 1997 to 2020. Year 2005 population and housing projections are straight-line projections from the year 1997 to year 2010.

Projections – Maximum Buildout
Base case and high case scenario population, employment and housing maximum buildout projections were derived as explained in the *Report's* text. Employment figures for the high case scenario were calculated as base case scenario maximum buildout employment times ratio of high case scenario maximum buildout population to base case scenario maximum buildout population.

City of Puyallup

Projections – 2005, 2010 and 2020
For population and housing projections and year 2020 employment, the PSRC allocation derived figures were used. Year 2005 and 2010 employment projections were derived from a straight-line projection from year 1997 to 2020. Year 2005 population and housing projections are straight-line projections from the year 1997 to year 2010. All projections were compared against water system plan figures (1994) and the County's 2017-population allocation (R97-59).

Projections – Maximum Buildout
Base case and high case scenario population, employment and housing maximum buildout projections for the unincorporated portion of the City's service area were derived as explained in the *Report's* text. Base case and high case scenario maximum buildout population projections for the incorporated portion of the City's service area were pulled from the City's comprehensive plan. Employment figures for the high case scenario were calculated as base case scenario maximum buildout employment times ratio of high case scenario maximum buildout population to base case scenario maximum buildout population.

South East Tacoma Mutual

Projections – 2005, 2010 and 2020
For population and housing projections and year 2020 employment, the PSRC allocation derived figures were used. Year 2005 and 2010 employment projections were derived from a straight-line projection from year 1997 to 2020. Year 2005 population and housing projections are straight-line projections from the year 1997 to year 2010. All projections were compared against water system plan figures (1994).

Projections – Maximum Buildout
Base case and high case scenario population, employment and housing maximum buildout projections were derived as explained in the *Report's* text. Employment figures for the high case scenario were calculated as base case scenario maximum buildout employment times ratio of high case scenario maximum buildout population to base case scenario maximum buildout population.

Southwood – Rainier View

Projections – 2005, 2010 and 2020
For population and housing projections, base case, the PSRC allocation derived figures were revised. For year 2020 employment, base case, the PSRC allocation derived figures were used. Year 2005 and 2010 employment projections were derived from a straight-line projection from year 1997 to 2020. Year 2005 population and housing projections are straight-line projections from the year 1997 to year 2010. High case scenario population and housing projections are based on numbers contained in the system's preliminary water system plan as provided by Apex Engineering.

Projections – Maximum Buildout
Base case and high case scenario population, employment and housing maximum buildout projections were derived as explained in the *Report's* text. Employment figures for the high case scenario were calculated as base case scenario maximum buildout employment times ratio of high case scenario maximum buildout population to base case scenario maximum buildout population

Spanaway

Projections – 2005, 2010 and 2020
For year 2020 employment, the PSRC allocation derived figures were used. Year 2005 and 2010 employment projections were derived from a straight-line projection from year 1997 to 2020. Population and housing projections, all years, are based upon PSRC allocation derived figures which were revised to reflect Spanaway Water Company's water availability request data.

Projections – Maximum Buildout
Base case and high case scenario population, employment and housing maximum buildout projections were derived as explained in the *Report's* text. Employment figures for the high case scenario were calculated as base case scenario maximum buildout employment times ratio of high case scenario maximum buildout population to base case scenario maximum buildout population

Town of Steilacoom

Projections – 2005, 2010 and 2020
For population and housing projections and year 2020 employment, the PSRC allocation derived figures were used. Year 2005 and 2010 employment projections were derived from a straight-line projection from year 1997 to 2020. Year 2005 population and housing projections are straight-line projections from the year 1997 to year 2010. All projections were compared against the County's 2017-population allocation (R97-59).

Projections – Maximum Buildout
Base case and high case scenario population, employment and housing maximum buildout projections for the unincorporated portion of the Town's service area were derived as explained in the *Report's* text. Base case and high case scenario maximum buildout population projections for the incorporated portion of the Town's service area were pulled from the Town's comprehensive plan. Employment figures for the high case scenario were calculated as base case scenario maximum buildout employment times ratio of high case scenario maximum buildout population to base case scenario maximum buildout population.

Stroh Water System

Projections – 2005, 2010 and 2020
For population and housing projections and year 2020 employment, the PSRC allocation derived figures were used. Year 2005 and 2010 employment projections were derived from a straight-line projection from year 1997 to 2020. Year 2005 population and housing projections are straight-line projections from the year 1997 to year 2010.

Projections - Maximum Buildout
Base case and high case scenario population, employment and housing maximum buildout projections were derived as explained in the *Report's* text. Employment figures for the high case scenario were calculated as base case scenario maximum buildout employment times ratio of high case scenario maximum buildout population to base case scenario maximum buildout population.

Summit Water and Supply Company

Projections – 2005, 2010 and 2020
For population and housing projections and year 2020 employment, the PSRC allocation derived figures were used. Year 2005 and 2010 employment projections were derived from a straight-line projection from year 1997 to 2020. Year 2005 population and housing projections are straight-line projections from the year 1997 to year 2010. All projections were compared against water system plan figures (1988 & 1999).

Projections – Maximum Buildout
Base case and high case scenario population, employment and housing maximum buildout projections were derived as explained in the *Report's* text. Employment figures for the high case scenario were calculated as base case scenario maximum buildout employment times ratio of high case scenario maximum buildout population to base case scenario maximum buildout population.

City of Sumner

Projections – 2005, 2010 and 2020
For population and housing projections and year 2020 employment, the PSRC allocation derived figures were used. Year 2005 and 2010 employment projections were derived from a straight-line projection from year 1997 to 2020. Year 2005 population and housing projections are straight-line projections from the year 1997 to year 2010. All projections were compared against water system plan figures (1993) and County's 2017-population allocation (R97-59).

Projections - Maximum Buildout
Base case and high case scenario population, employment and housing maximum buildout projections for the unincorporated portion of the City's service area were derived as explained in the *Report's* text. Base case and high case scenario maximum buildout population

projections for the incorporated portion of the City's service area were pulled from the City's comprehensive plan. Employment figures for the high case scenario were calculated as base case scenario maximum buildout employment times ratio of high case scenario maximum buildout population to base case scenario maximum buildout population.

Tacoma-University Place

Projections – 2005, 2010 and 2020
For population and housing projections, the PSRC allocation derived figures were revised. For year 2020 employment, the PSRC allocation derived figures were used. Year 2005 and 2010 employment projections were derived from a straight-line projection from year 1997 to 2020. Year 2005 population and housing projections are straight-line projections from the year 1997 to year 2010. Population projections were compared against the County's 2017 population allocation (R97-59).

Projections – Maximum Buildout
Because Tacoma Water provides water service within the newly formed City of University Place and at the time of the project, the City had not yet completed a buildout projection for the City, base case maximum buildout projections are equal to year 2020 projections. High case scenario maximum buildout population projections are equal to the high case scenario 2020 population projection plus 10%. High case scenario maximum buildout employment projections are equal to the high case scenario 2020 employment projections plus 15%.

Tacoma – Tacoma city limits

Projections – 2005, 2010 and 2020
For population and housing projections and year 2020 employment, the PSRC allocation derived figures were used. Year 2005 and 2010 employment projections were derived from a straight-line projection from year 1997 to 2020. Year 2005 population and housing projections are straight-line projections from the year 1997 to year 2010.

Projections – Maximum Buildout
Base case scenario maximum buildout population projection is equal to 125% of the 2020 base case scenario population projection. Base case scenario maximum buildout employment projection was calculated based on the 2020 base case scenario population to maximum buildout population projection ratio. High case scenario maximum buildout population projection is equal to 125% of the 2020 high case scenario population projection. High case scenario maximum buildout employment projection was estimated to be higher than the base case maximum buildout projection in proportion to the difference between high case and base case population projections.

City of Tacoma – Other

Projections – 2005, 2010 and 2020
For population and housing projections and year 2020 employment, the PSRC allocation derived figures were used. Year 2005 and 2010 employment projections were derived from a straight-line projection from year 1997 to 2020. Year 2005 population and housing projections are straight-line projections from the year 1997 to year 2010.

Projections – Maximum Buildout
Base case scenario maximum buildout population projection is equal to 125% of the 2020 base case scenario population projection. Base case scenario maximum buildout employment projection was calculated based on the 2020 base case scenario population to maximum buildout population projection ratio. High case scenario maximum buildout population projection is equal to 125% of the 2020 high case scenario population projection. High case scenario maximum buildout employment projection was estimated to be higher than the base case maximum buildout projection in proportion to the difference between high case and base case population projections.

City of Tacoma – King County

Projections – 2005, 2010 and 2020
For population and housing projections and year 2020 employment, the PSRC allocation derived figures were used. Year 2005 and 2010 employment projections were derived from a straight-line projection from year 1997 to 2020. Year 2005 population and housing projections are straight-line projections from the year 1997 to year 2010.

Projections – Maximum Buildout
Base case scenario maximum buildout population projection is equal to 125% of the 2020 base case scenario population projection. Base case scenario maximum buildout employment projection was calculated based on the 2020 base case scenario population to maximum buildout population projection ratio. High case scenario maximum buildout population projection is equal to 125% of the 2020 high case scenario population projection. High case scenario maximum buildout employment projection was estimated to be higher than the base case maximum buildout projection in proportion to the difference between high case and base case population projections.

Other Pierce County

Projections – 2005, 2010 and 2020
Originally, it was planned that the County would develop base year estimates and projections on several geographical areas, including for the individual service areas, the rest of the UGA not covered by the project participants, the rural area of the County and for the County as a whole. As the base year estimates and projections were being developed, however, the

County concluded that only developing projections for the individual service areas and a total figure for the "rest of the County" would be possible. This proved to be the case for several reasons, including that 12 of the project participants contained area located outside of the UGA thus complicating the method of deriving "rural" data and, at this point in time neither the PSRC or the County have prepared estimates or projections for "rural Pierce County" and doing so for this project could prove to be "politically sensitive".

Base case population and employment projections are based on the PSRC allocation. 1997 households were calculated as the difference between total County, households, and the sum of households in the other service areas. The number of households were then projected to increase at the rate of increase in population.

Year 2005 population and housing projections are straight-line projections from the year 1997 to year 2010.

Projections – Maximum Buildout

Base case scenario maximum buildout population projection is equal to 125% of the 2020 base case scenario population projection. Base case scenario maximum buildout employment projection was calculated based on the 2020 base case scenario population to maximum buildout population projection ratio. High case scenario maximum buildout population projection is equal to 138% of the 2020 high case scenario population projection. High case scenario maximum buildout employment projection was estimated to be higher than the base case maximum buildout projection in proportion to the difference between high case and base case population projections.

"APPENDIX E"

REGIONAL WATER SUPPLY REQUIREMENTS*

I. INTRODUCTION

Projecting future water demands in Pierce County is necessary to efficiently plan for near-term capital improvements to the current water supply systems as well as long-term water resource additions for the County. This section of the updated Pierce County Coordinated Water System Plan describes the methodology and results of a water demand forecast prepared for Pierce County to be used in the evaluation of water planning options.

The projection of water demands began with a review of existing and historical water usage data to better identify how and where water is being used in Pierce County. Disaggregating water demand to specific water use areas and different water consumption types provides a basis for developing a more detailed and useful projection of future water demands in the County. The disaggregation also allows for the use of current population and employment growth assumptions that are consistent with the County's Growth Management Plan. The final product of this forecasting effort is two alternative water demand projections for Pierce County for the years 2000, 2010, and 2020. These projections represent a base case and a high case for future water demands in the County consistent with current planning assumptions.

Although there are a variety of methodological approaches possible to prepare a regional water demand forecast, the limitations of the existing data severely restrict the possible options. This water demand forecast has been prepared for the entire County based on a disaggregation of the County into eleven separate water use areas. Historical water system demands along with survey data collected specifically for this forecasting effort from representative water systems throughout the County were examined on a per capita usage basis to provide a baseline for the water demand forecast. Also included in the forecast are demand-side reductions in water usage that are projected to result from recently implemented conservation programs at both the state and federal levels.

The methodology used in preparing this forecast is consistent with the water demand forecasting methods for Regional Water System Plans specified by the Washington State Departments of Ecology and Health in their publication entitled Conservation Planning Requirements: Guidelines and Requirements for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology, and Conservation Programs dated March 1994. Also, as discussed later in this section, population and employment data consistent with the County's Growth Management Plan have been used in preparing this forecast of future water demand.

* Section VIII reprinted in its entirety from 1995 CWSP, dated November 26, 1996

II. FORECAST METHODOLOGY

The purpose of developing this water demand forecast for Pierce County is to provide a framework so that system improvements and new supply resources can be anticipated and planned for on a timely basis. The following paragraphs describe the methodology used in preparing this water demand projection for the County:

A. Historical water demand data for various water suppliers in Pierce County were identified and collected. The information included the development of detailed data requests identifying historical consumption and demand levels by customer class, water use characterizations, estimated water savings from conservation programs already implemented, service area population and employment data, and future planning information and assumptions.

B. A historical database of water demands, operational data, and planning information were developed for individual water systems in Pierce County to be used in the analysis including:

1. Analysis of historical water usage data and identification of appropriate water use areas for planning purposes.
2. Development of estimates of future water savings through conservation, including the projected impacts from recently enacted plumbing code changes.
3. Obtaining projected population and employment data from the Puget Sound Regional Council (PSRC) and summarizing both for Pierce County and for the eleven water use areas.
4. Projection of future water demand scenarios for base and high growth alternatives for the years 2000, 2010, and 2020 consistent with the PSRC population and employment projections.
5. Summarizing the resulting water demand projection for both the County and the eleven water use areas.

C. Utility operating records and data collected from Tacoma Public Utilities and 35 other water purveyors in Pierce County were used in preparing this forecast. Included in the data collection activities was development of usage data by customer class, per capita and per employee usage estimates, and assessment of conservation savings from water purveyors.

D. The data from the water purveyors were used to identify historical 1990 and 1994 water usage patterns in Pierce County and to estimate water use for the eleven water use areas defined in cooperation with the staff of the County's Department of Public Works and Utilities. (See Exhibit IX-1.) In developing the boundaries for these water use areas, staff considered the existing

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geographical and water service subdivisions of the County. The effort was tempered by the need to match these water use areas as closely as possible with the planning boundaries (Forecast Analysis Zones) developed by the PSRC for its population and employment projection data. The eleven water use areas are described as follows:

1. Gig Harbor Peninsula
2. Longbranch Peninsula
3. Lakewood
4. Tacoma/University Place
5. North Hill
6. Lake Tapps
7. South Hill
8. Parkland/Spanaway
9. Central Area
10. South County
11. Fort Lewis/McChord/McNeil Island

E. Historical and projected population and employment estimates for Pierce County and the eleven water use areas were developed by County staff using PSRC data and projections dated March 1995. The PSRC data are based on Washington State Office of Financial Management (OFM) projections for the County consistent with its Growth Management Plan. Disaggregation of estimated County population and employment totals into 50 local Forecast Analysis Zones (FAZs) was prepared by the PSRC staff to be consistent with 1995 urban growth boundary planning assumptions in Pierce County. Population and employment estimates both for 1990 and 1994 as well as for the projected future years were developed for the eleven water use areas by aggregating the FAZ data. These data are summarized in Table VIII-1 at the end of this section.

F. Projections of future water demands were developed for each of the eleven water use areas which were then aggregated to derive a water demand forecast for the entire County. Projections of residential water consumption were based on average water usage assumptions (calculated on a gallons per capita per day basis) in each water use area. The assumptions were developed using a weighted average of water provider data for each water use area. Non-residential water consumption estimates (including both commercial class and public water demands) were developed using non-residential water usage assumptions (calculated on a gallons per employee per day basis) in each of the eleven water use areas. These were developed using a weighted average of non-residential water provider data in each water use area. Discrete large demands (including Simpson Paper Company) were estimated in certain water use areas where per employee estimates would not adequately reflect the normal non-residential water consumption patterns. Losses were

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also estimated at the individual water use area level based on a weighted average of the water provider data from each water use area. Assumptions used in the forecast are discussed later in this section with the specific water usage assumptions summarized in Table VIII-2.

III. CURRENT PIERCE COUNTY WATER DEMAND PROFILE

Water demand data for 36 water purveyors in the County provided the basis for estimating the 1994 water demand profile in Pierce County. Data were requested from the 32 largest water systems in the County in November 1994. Data were received from 18 systems which altogether provide water service to approximately 65% of the County's population. Water supply to several large geographic areas of the County is provided by smaller water systems (*i.e.,* less than 1,000 direct service connections). Telephone surveys of 30 of these small systems were conducted in order to develop water usage characterizations for these areas of the County with 18 of these systems providing useful data for the study.

To the degree possible, the water demands for each water purveyor were disaggregated into residential and non-residential consumption estimates as well as losses and unaccounted for water usage. These water demand components were then correlated with available customer, population, and employment data for each water provider to produce comparable water usage profiles on per customer, per capita, and per employee bases for water systems throughout the County.

A wide diversity of water usage patterns is exhibited in Pierce County for 1994. Per capita residential water consumption (including both single family and multifamily services) were estimated for 36 water systems. The estimates varied from a high of about 135 to 165 gpcd (gallons per capita per day) for the systems serving Steilacoom, Puyallup, and Fircrest to a low of about 60 to 85 gpcd for the systems serving Dupont, Southeast Tacoma Mutual, Wilkeson, and Carbonado. Residential customers in the Tacoma Public Utilities service area in 1994 used an estimated 87 gpcd inside the city limits and an estimated 100 gpcd outside the city limits. County-wide, average residential consumption in 1994 was estimated at 101 gpcd.

Estimated Historical Pierce County
Water Consumption and Average Daily Demand

	1990	1994
Residential Consumption (gpcd*)		
Non-residential Consumption (gped**)	207	150
Non-residential w/o Simpson (gped)	73	73
Total Average Daily Demand (gpcd)	199	176
Total Demand w/o Simpson (gpcd)	145	146

*gpcd refers to gallons per capita per day
**gped refers to gallons per employee per day *(Refer to Table VIII-5 for complete data)*

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Non-residential consumption includes the water consumption of private businesses (commercial and industrials uses) and public entities (including city, state and federal facilities, schools, and public parks) and was estimated on both a per customer and a per employee basis for 1994. It was possible to develop per employee non-residential consumption estimates for only about ten water systems in the County from the available data. This usage varied from a high of about 102 gped (gallons per employee per day) for water systems with one or more large water users to a low of about 28 gped for those systems serving areas that are more rural in character. Average non-residential water consumption estimates of between 50 and 75 gped were generally estimated for the various water use areas of the County. Non-residential 1994 water consumption in the Tacoma Public Utilities service area excluding Simpson Paper was estimated at 118 gped inside the city limits and at 53 gped outside the city limits. County-wide, average non-residential consumption in 1994 was estimated at 150 gped including Simpson Paper Company and 73 gped excluding Simpson Paper Company.

System water demand levels for 1994 (including metered consumption, losses, and unaccounted for water) were also estimated on a per capita basis for several water systems in the County. These per capita estimates demonstrate the wide variation in water usage levels in the County. Estimated per capita system demands were developed for 22 water systems and varied from a high of about 240 to 280 gpcd for systems serving Gig Harbor, Parkland, and Dupont to a low of about 90 to 110 gpcd for systems serving the communities of Firgrove, Ashford, and Wilkeson. Average daily demand for Tacoma Public Utilities in 1994 was 251 gpcd including Simpson Paper Company and an estimated 175 gpcd without Simpson. County-wide average daily demand in 1994 was estimated at 176 gpcd including Simpson Paper and an estimated 146 gpcd without Simpson Paper.

The data for these water systems were used to estimate the total water demand in Pierce County for both 1990 and 1994. Average daily demand in the County for 1990 is estimated at 116.5 MGD (Million Gallons per Day), including 59.0 MGD (51%) residential consumption, 17.2 MGD (15%) non-residential consumption, 31.5 MGD (27%) for Simpson Paper Company, and 8.8 MGD (8%) for losses and unaccounted for water usage. The total average daily demand for 1994 is estimated at 114.1 MGD, including 65.4 MGD (57%) residential consumption, 19.0 MGD (17%) non-residential consumption, 19.8 MGD (17%) for Simpson Paper, and 9.9 MGD (9%) for losses and unaccounted for water usage. (The significant drop in water consumption at Simpson Paper between 1990 and 1994 is reported to be the successful result of implementing various conservation efforts.) Total Tacoma Public Utilities demand in 1994 was 66.1 MGD, representing 58% of the estimated Pierce County total water demand. These 1994 estimates were used as a basis for making projections of the future water demands discussed in this report.

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IV. FORECAST ASSUMPTIONS

To develop projections of future water demands in the County, a number of other assumptions were required. Key assumptions used in this analysis include the following:

A. No specific price response or price elasticity adjustments are included in the projections. Consistent with an assumed general inflation rate of 3.0% to 4.0% annually over the forecast period and a small but positive income elasticity for future water demand, this assumption implies that future water rates will increase on average in the County between 4.0% and 5.0% annually throughout the forecast period. Lower rate increases would imply somewhat higher water demand while higher rate increases would result in a moderately lower growth in water demand than in the projections.

B. The future demands for Tacoma Public Utilities are consistent with its water demand forecast prepared in March 1995. In-city and outside city water demands in the Tacoma service area were separated and used in this analysis. The discrete large demands for Simpson Paper Company and other non-residential demands included in the City's forecast are also included in this water demand forecast.

C. Water savings from the gradual replacement of existing plumbing fixtures with more efficient fixtures that meet new code requirements are included in the forecast. Residential new code savings are estimated as a 15% reduction from current average water usage levels along with an assumed 3% retrofit replacement savings. Non-residential new code savings are estimated as a 6% reduction from current average water usage levels along with an assumed 3% retrofit replacement savings. These estimates are based on the savings due to the replacement of toilets, shower heads, and water faucets and do not include potential savings from washing machine and dishwasher appliance code changes that have not yet been implemented.

D. Consistent with current demand-side planning methods, conservation is generally treated as a possible future resource available to water purveyors in the County. No reductions for conservation savings other than the changes in plumbing fixtures are included in the projected future demand levels.

E. Losses and unaccounted for water are estimated for each water use area based on a weighted average for the water purveyors in the area. Like potential conservation savings, no specific reductions in losses or unaccounted for water are included in the water demand forecast that could result from specific leak detection programs or other activities to reduce unusually high losses or unaccounted for water. Again these efficiency improvements are treated as a demand-side resource available for certain specific water providers in the County.

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V. POPULATION AND EMPLOYMENT PROJECTIONS

Future population and employment growth in the County is likely to be the single largest determinant of the County's changing future water demands. As discussed previously, historical and projected population and employment data for Pierce County dated March 1995 were obtained from the PSRC and are consistent with the County's Growth Management Plan. Data were available at the FAZ level and were aggregated into the eleven water use areas and total County estimates for the years 1990, 1994, 2000, 2010, and 2020 by Pierce County staff.

Recently, population in Pierce County has been increasing at a 2.5% annual rate from 1990 to 1994 while employment growth over this period has increased 2.4% annually (See Table VIII-1 and Exhibits VIII-2 and VIII-3). The range of population growth in the water use areas varies from a low of 1.6% per year in the Tacoma/University Place water use area (Area 4) to a high of 4.5% per year in the Lake Tapps water use area (Area 6). Estimated employment growth in the County shows a similar wide range, from a low of -0.7% annually in the South County water use area (Area 10) to a high of 9.4% annually in the Central Area water use area (Area 9).

Based on the PSRC estimates, projected population in Pierce County is estimated to increase at an average 1.2% annual rate from 1994 to 2000 and at an average 1.3% annual rate from 2000 to 2020. The lowest rate of growth is anticipated in the Fort Lewis/McChord/McNeil Island water use area (Area 11) which is projected to grow 0.8% annually through 2000 and then decline at a -0.2% annual rate from 2000 to 2020. The highest rate of growth is projected to occur in the South Hill water use area (Area 7), with projected population growth averaging 1.3% per year to 2000 and 2.2% per year from 2000 to 2020.

Employment growth is also based on the PSRC estimates and is projected to increase in Pierce County at an average 1.1% annual rate from 1994 to 2000 and at an average 1.3% annual rate from 2000 to 2020. The lowest rate of growth is anticipated in the South County water use area (Area 10) which is projected to decline by -0.4% annually through 2000 and then by -0.6% per year from 2000 to 2020. The highest rate of employment growth is projected to occur in the Central Area water use area (Area 9), with projected employment growth averaging 3.5% per year to 2000 and 2.7% per year from 2000 to 2020.

Compared with historical population and employment growth in Pierce County, these projections are low for both the near term and for the long-term. To examine the impact that higher population and employment growth in Pierce County would have on future water demands, a high case scenario has also been developed. This high growth case assumes that both population and employment growth in each water use area will be double the projected levels of the base case, except in those water use areas with projected declines in population and employment where no change is assumed.

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In the high case scenario, Pierce County population is projected to increase at an average 2.3% annual rate from 1994 to 2000 and at an average 2.6% annual rate from 2000 to 2020. Employment growth in the high case is also based on double the rate of growth provided in the base case PSRC estimates and is projected to increase in Pierce County at an average 2.3% annual rate from 1994 to 2000 and at an average 2.7% annual rate from 2000 to 2020. Both the population and employment projections of this high case scenario are higher than the comparable rates witnessed for these two factors historically in the County and provide a useful higher level of future water demand growth for planning purposes.

VI. PROJECTED PIERCE COUNTY WATER DEMANDS

Based on the PSRC population and employment growth projections and the water use assumptions discussed previously, water demand projections for Pierce County and the eleven water use areas were prepared. The projected water demands for the eleven water use areas in Pierce County are detailed in Table VIII-3, including projected residential and non-residential consumption levels as well as future losses and new code savings in each water use area. Historical and projected average daily demands for the eleven water use areas are summarized in Table VIII-4, including summarized average annual growth rates for each water use area (also see Exhibit VIII-4). Historical and projected average daily demands by demand type in the County are summarized in Table VIII-5, including per capita and per employee estimates of these demand levels, both with and without Simpson Paper Company water usage.

The base case water demand forecast indicates moderate water demand growth in the County at rates approximating the PSRC projected population and employment growth over the next 25 years. Both consumption and demand are projected to increase faster than population growth during the next six years due to the impact of several large discrete water demands during this time period. Total demand is projected to increase at a rate slower than population growth after 2000, in part due to the accumulated water conservation savings that result from new plumbing code savings. During the next 25 years overall water demand in the County is projected to increase in the base case approximately 30% over the estimated 1994 water demand level of 114 MGD to approximately 148 MGD by 2020.

Under the high growth case assumptions, significant growth in water demand is projected to occur over the next 25 year period. As presented in Table VIII-6 and Table VIII-7, both consumption and demand are projected to increase at or faster than the rate of population growth in the County during the next six years in the high case scenario. This is again because of the impact of several large discrete water demands during this time period. Consumption and demand is projected to increase at a significant but lower rate of growth than population growth after 2000, again in part due to the accumulated water conservation savings that result from new plumbing

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code savings (see Exhibit VIII-5). Overall, water demand in the County is projected to increase more than 70% over the estimated 1994 water demand levels in the County during the next 25 years in the high case scenario to nearly 200 MGD by 2020.

Note: The Washington Department of Ecology (DOE) recently (May 15, 1995) released studies, in draft form, which quantify the authorized water rights for the Chambers/Clover Creek and Puyallup watersheds. The reports do not attempt to quantify the amount of water in the two aquifers. This Update of the Pierce County Coordinated Water System Plan involved the hiring of a professional firm to provide estimates of the quantity and quality of groundwater in Pierce County. The information in this update is somewhat different than the information in the draft reports from DOE. However, it is as reliable as the report from DOE.

The reports from DOE do recommend that "an active water-monitoring program" be established and that water quality data being gathered "be consolidated into a single data base". These recommendations support the conclusion of this CWSP Update that additional information on water quality and quantity be actively sought. (See Section XII)

* Section VIII reprinted in its entirety from 1995 CWSP, dated November 26, 1996

Table VIII-1

Pierce County Coordinated Water System Plan

Historical and Projected Pierce County Population and Employment*

Pierce County Population	1990	1994	2000	2010	2020	Compounded Average Annual Growth Rates 1990 - 1994	1994 - 2000	2000 - 2020
AREA 1: Gig Harbor Penninsula	31,636	36,461	40,130	50,388	55,879	3.6%	1.6%	1.7%
AREA 2: Longbranch Penninsula	8,954	10,034	10,855	10,823	11,313	2.9%	1.3%	0.2%
AREA 3: Lakewood	64,495	69,939	74,080	84,346	87,308	2.0%	1.0%	0.8%
AREA 4: Tacoma/University Place	210,730	224,655	235,245	275,035	299,866	1.6%	0.8%	1.2%
AREA 5: North Hill	30,135	33,479	36,023	41,421	46,631	2.7%	1.2%	1.3%
AREA 6: Lake Tapps	41,772	49,780	55,870	68,465	80,167	4.5%	1.9%	1.8%
AREA 7: South Hill	49,395	55,500	60,144	78,160	93,559	3.0%	1.3%	2.2%
AREA 8: Parkland/Spanaway	51,038	55,434	58,777	65,139	70,759	2.1%	1.0%	0.9%
AREA 9: Central Area	41,513	48,146	53,191	65,857	74,317	3.8%	1.7%	1.7%
AREA 10: South County	29,773	34,805	38,632	39,915	42,343	4.0%	1.8%	0.5%
AREA 11: Ft. Lewis, McChord,McNeil Is.	26,762	28,658	30,100	29,442	28,904	1.7%	0.8%	-0.2%
Total	586,203	646,891	693,047	808,991	891,046	2.5%	1.2%	1.3%

Pierce County Employment	1990	1994	2000	2010	2020			
AREA 1: Gig Harbor Penninsula	5,311	5,899	6,347	7,049	8,001	2.7%	1.2%	1.2%
AREA 2: Longbranch Penninsula	918	946	967	973	1,067	0.8%	0.4%	0.5%
AREA 3: Lakewood	24,654	27,860	30,298	35,830	38,246	3.1%	1.4%	1.2%
AREA 4: Tacoma/University Place	109,196	118,102	124,875	146,335	169,748	2.0%	0.9%	1.5%
AREA 5: North Hill	13,537	16,487	18,729	24,206	27,766	5.1%	2.1%	2.0%
AREA 6: Lake Tapps	5,072	6,694	7,931	10,121	11,826	7.2%	2.9%	2.0%
AREA 7: South Hill	16,079	17,902	19,289	22,498	24,918	2.7%	1.3%	1.3%
AREA 8: Parkland/Spanaway	11,293	12,572	13,544	15,510	16,584	2.7%	1.2%	1.0%
AREA 9: Central Area	4,928	7,064	8,689	13,206	14,773	9.4%	3.5%	2.7%
AREA 10: South County	1,948	1,891	1,847	1,644	1,634	-0.7%	-0.4%	-0.6%
AREA 11: Ft. Lewis, McChord,McNeil Is.	42,623	43,751	44,608	44,694	44,398	0.7%	0.3%	0.0%
Total	235,559	259,168	277,124	322,066	358,961	2.4%	1.1%	1.3%

* Based on Puget Sound Regional Council Data, March 1995.

Table VIII-3
Pierce County Coordinated Water System Plan
Historical and Projected Water Use Area Demand Components

Million Gallons per Day

	1990	1994	2000	2010	2020
AREA 1: Gig Harbor Penninsula					
Residential	3.9	4.5	4.9	6.2	6.9
Non-Residential	0.3	0.3	0.3	0.4	0.4
Losses	0.3	0.3	0.4	0.5	0.5
New Code Savings			(0.2)	(0.6)	(0.9)
AREA 2: Longbranch Penninsula					
Residential	0.8	0.9	1.0	1.0	1.0
Non-Residential	0.0	0.0	0.0	0.0	0.1
Losses	0.1	0.1	0.1	0.1	0.1
New Code Savings			(0.0)	(0.1)	(0.1)
AREA 3: Lakewood					
Residential	7.0	7.6	8.0	9.1	9.5
Non-Residential	1.8	2.1	2.3	2.7	2.9
Losses	0.8	0.9	1.0	1.1	1.2
New Code Savings			(0.3)	(0.9)	(1.3)
AREA 4: Tacoma/University Place					
Residential	19.0	20.2	21.2	24.8	27.0
Non-Residential	12.9	13.9	14.7	17.3	20.0
Discrete Large Demands	31.5	19.8	24.3	25.0	25.0
Losses	3.2	3.4	3.6	4.2	4.7
New Code Savings			(0.7)	(1.0)	(0.8)
AREA 5: North Hill					
Residential	2.9	3.3	3.5	4.0	4.5
Non-Residential	0.7	0.8	0.9	1.2	1.4
Losses	0.3	0.3	0.3	0.4	0.4
New Code Savings			(0.1)	(0.4)	(0.6)
AREA 6: Lake Tapps					
Residential	4.0	4.8	5.4	6.6	7.8
Non-Residential	0.3	0.3	0.4	0.5	0.6
Losses	0.9	1.1	1.3	1.6	1.8
New Code Savings			(0.2)	(0.6)	(1.0)
AREA 7: South Hill					
Residential	5.6	6.3	6.3	8.8	10.6
Non-Residential	0.8	0.9	1.0	1.1	1.2
Losses	0.8	0.9	0.9	1.2	1.4
New Code Savings			(0.3)	(0.9)	(1.4)
AREA 8: Parkland/Spanaway					
Residential	3.5	4.0	4.5	4.6	4.9
Non-Residential	0.1	0.1	0.1	0.1	0.1
Losses	0.8	0.9	1.0	1.1	1.1
New Code Savings			(0.2)	(0.6)	(0.9)
AREA 9: Central Area					
Residential	4.4	5.1	5.6	6.9	7.8
Non-Residential	0.2	0.4	0.4	0.7	0.7
Discrete Large Demands			1.2	1.2	1.2
Losses	1.1	1.2	1.4	1.7	2.0
New Code Savings			(0.2)	(0.7)	(1.0)
AREA 10: South County					
Residential	3.4	3.9	4.4	4.5	4.8
Non-Residential	0.1	0.1	0.1	0.1	0.1
Losses	0.2	0.2	0.2	0.2	0.2
New Code Savings			(0.2)	(0.4)	(0.6)
AREA 11: Ft. Lewis, McChord, McNeil Is.					
Residential	4.5	4.9	5.1	5.0	4.9
Non-Residential	-	-	-	-	-
Losses	0.5	0.5	0.5	0.5	0.5
New Code Savings			(0.2)	(0.4)	(0.6)
Total County Demand	116.5	114.1	124.2	137.9	147.8

Table VIII-6

Pierce County Coordinated Water System Plan

Historical and Projected Average Daily Demands by Water Use Area - High Case

Million Gallons per Day

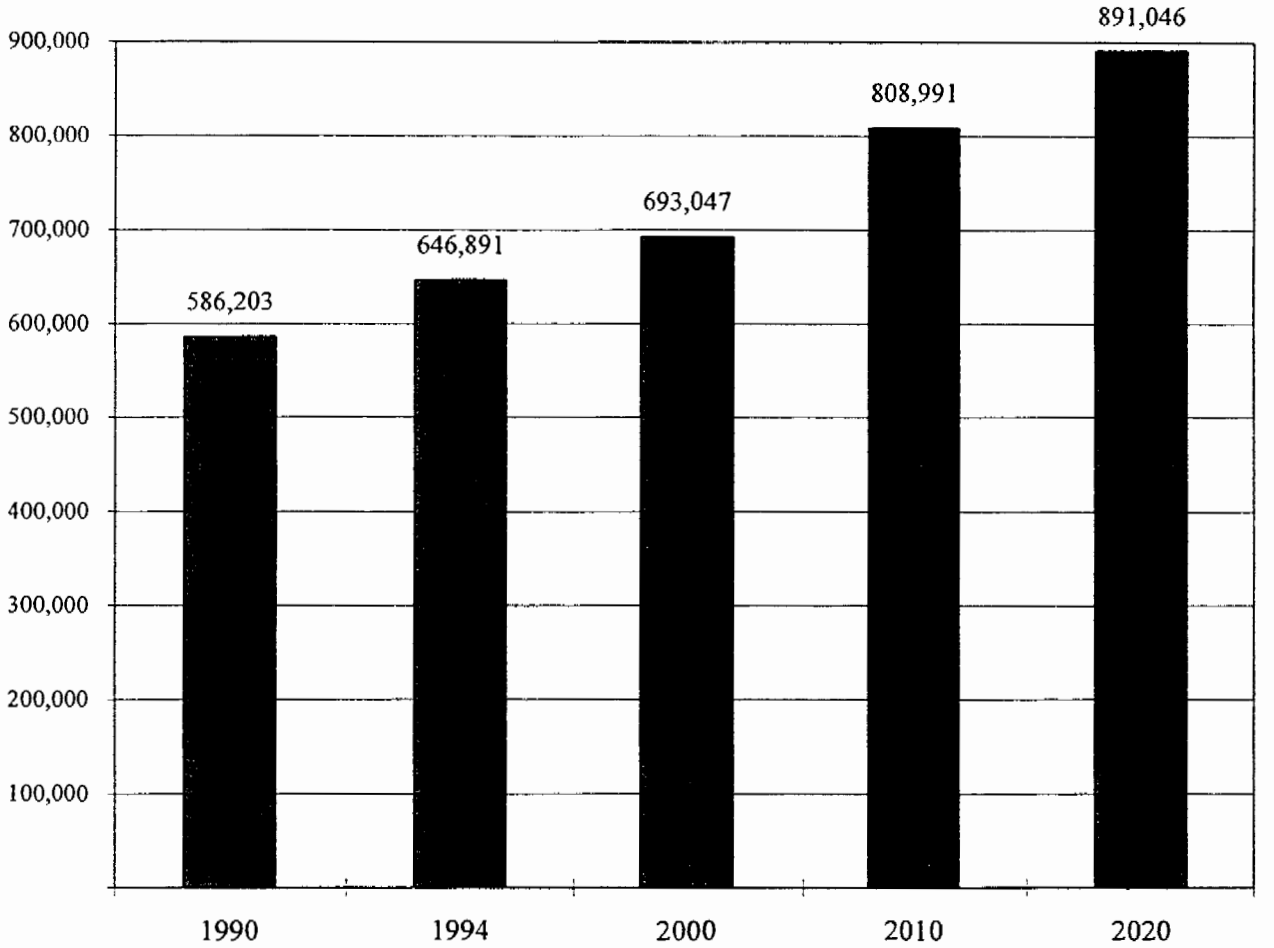
	1990	1994	2000	2010	2020	*Compounded Average Annual Growth Rates* 1990 - 1994	1994 - 2000	2000 - 2020
AREA 1: Gig Harbor Penninsula	4.5	5.1	5.9	7.7	10.3	*3.6%*	*2.4%*	*2.8%*
AREA 2: Longbranch Penninsula	0.9	1.0	1.2	1.2	1.2	*2.8%*	*1.8%*	*0.0%*
AREA 3: Lakewood	9.7	10.6	11.6	13.3	15.5	*2.3%*	*1.6%*	*1.4%*
AREA 4: Tacoma/University Place	66.5	57.4	65.1	78.3	95.2	*-3.6%*	*2.1%*	*1.9%*
AREA 5: North Hill	3.9	4.4	5.0	6.3	8.2	*3.1%*	*2.2%*	*2.6%*
AREA 6: Lake Tapps	5.2	6.3	7.6	10.5	14.6	*4.6%*	*3.3%*	*3.3%*
AREA 7: South Hill	7.1	8.0	9.0	13.0	19.1	*2.9%*	*2.0%*	*3.8%*
AREA 8: Parkland/Spanaway	4.4	5.1	5.9	6.0	6.2	*3.7%*	*2.6%*	*0.2%*
AREA 9: Central Area	5.7	6.7	9.1	11.9	16.1	*4.1%*	*5.4%*	*2.9%*
AREA 10: South County	3.6	4.2	4.9	5.2	5.4	*3.9%*	*2.6%*	*0.5%*
AREA 11: Ft. Lewis, McChord,McNeil Is.	5.0	5.4	5.7	5.5	5.3	*1.7%*	*1.0%*	*-0.4%*
Total County Demands	116.5	114.1	131.1	158.9	197.1	*-0.5%*	*2.3%*	*2.1%*
Total County Population	586,203	646,891	693,047	808,991	891,046	*2.5%*	*1.2%*	*1.3%*
Gallons per Capita per Day	199	176	189	196	221			

Table VIII-7
Pierce County Coordinated Water System Plan
Historical and Projected Average Daily Demands by Demand Type - High Case

Million Gallons per Day

	1990	1994	2000	2010	2020	Compounded Average Annual Growth Rates 1990 - 1994	1994 - 2000	2000 - 2020
Residential	59.0	65.4	75.7	96.5	124.7	2.6%	2.4%	2.5%
Non-Residential	17.2	19.0	21.7	29.4	39.9	2.4%	2.3%	3.1%
Discrete Large Demands	31.5	19.8	25.5	26.2	26.2	-11.0%	4.3%	0.1%
Total Consumption	107.7	104.2	122.9	152.1	190.8	-0.8%	2.8%	2.2%
Losses	8.8	9.9	11.5	15.1	19.9			
New Code Savings	-	-	(3.3)	(8.3)	(13.7)			
Total County Demands	116.5	114.1	131.1	158.9	197.1	-0.5%	2.3%	2.1%
County Population	586,203	646,891	742,267	954,779	1,241,277	2.5%	2.3%	2.6%
County Employment	235,559	259,168	296,590	385,066	507,520	2.4%	2.3%	2.7%
Residential Consumption (gpcd)	101	101	102	101	100			
Non-Residential Consumption (gped)	207	150	159	144	130			
w/o Simpson (gped)	73	73	77	79	81			
Total Average Daily Demands (gpcd)	199	176	177	166	159			
w/o Simpson (gpcd)	145	146	144	140	139			

Exhibit VIII-2
Historical and Projected Pierce County Population



Historical and Projected Pierce County Population by Water Use Area

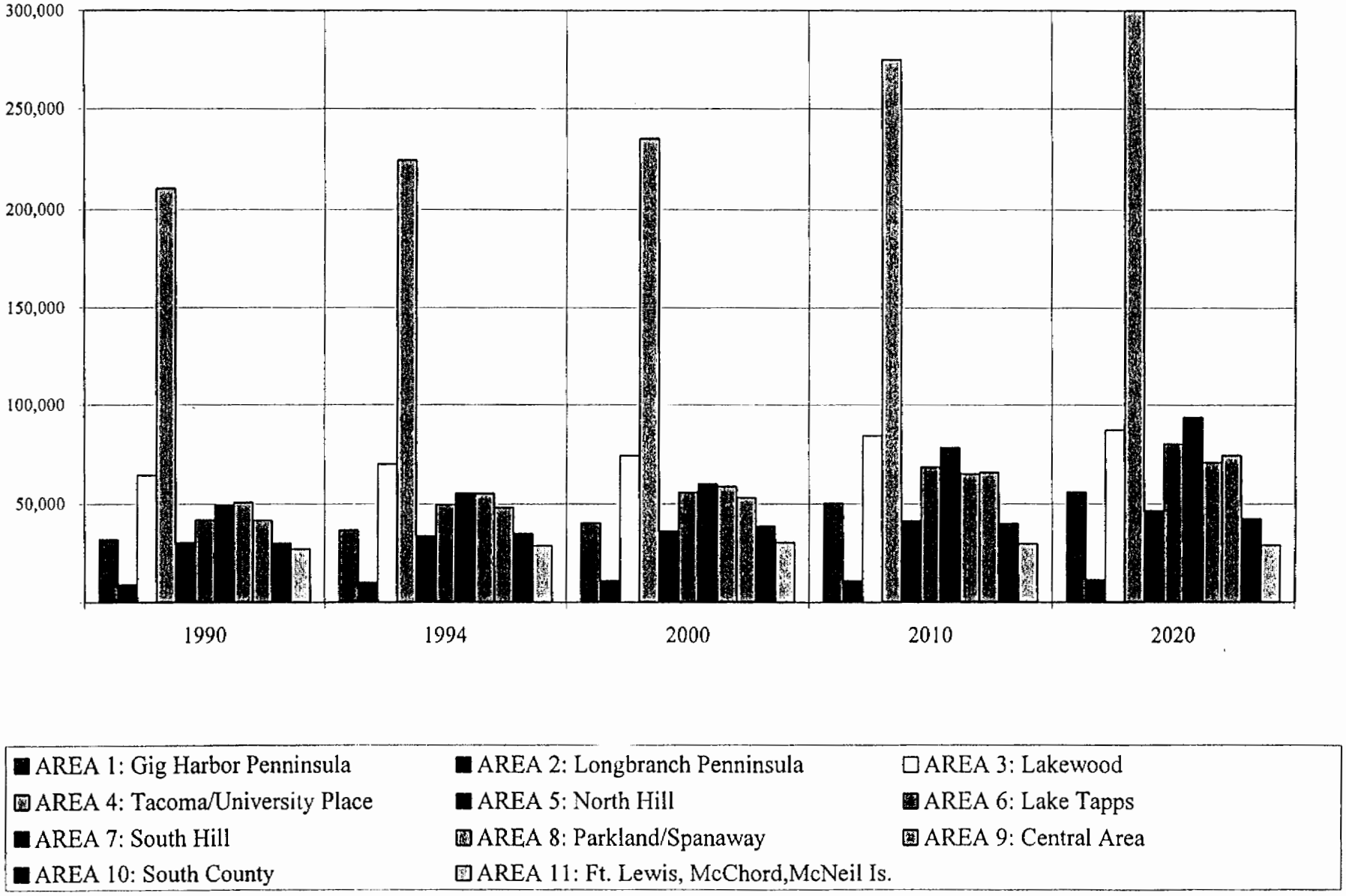


Exhibit VIII-3

Exhibit VIII-4
Historical and Projected Pierce County Average Daily Water Demands - Base Case

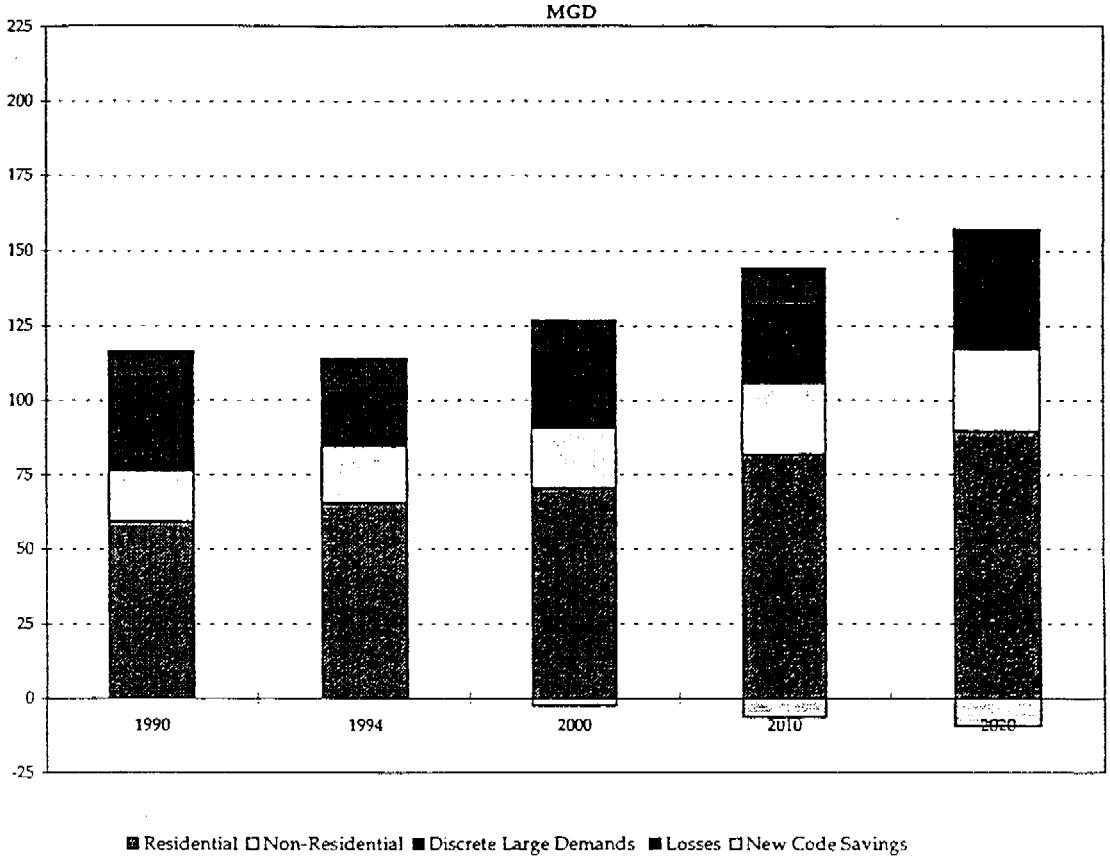
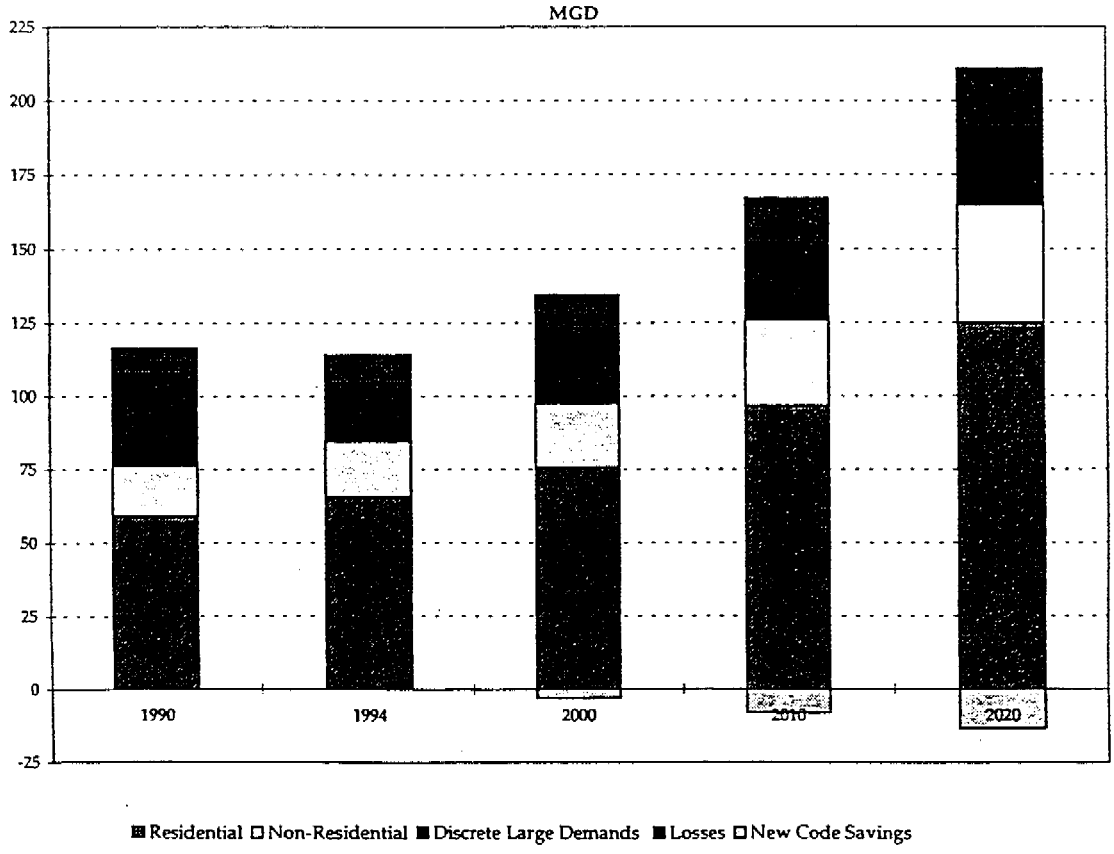


Exhibit VIII-5
Historical and Projected Pierce County Average Daily Water Demands - High Case



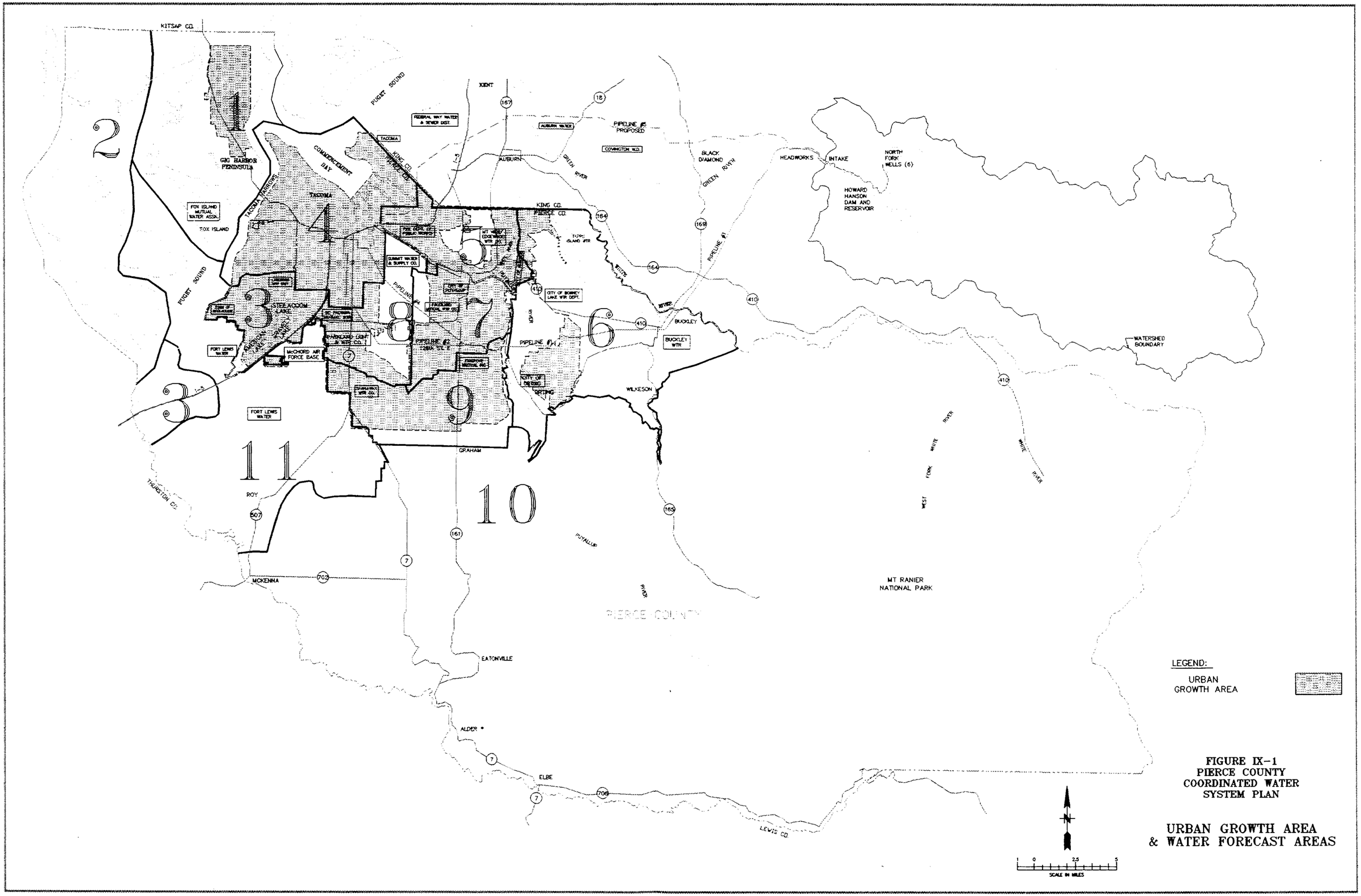


FIGURE IX-1
PIERCE COUNTY
COORDINATED WATER
SYSTEM PLAN

URBAN GROWTH AREA
& WATER FORECAST AREAS