

**Redmond - Bear Creek Valley
Ground Water Management Plan:
Management Strategies**

**February 1999
Final**

Data and information contained in this document are current as of the period of project performance: 1989 - 1995.

Submitted by:

Redmond - Bear Creek Valley Ground Water Management Committee

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Ground Water Management Plan**

February 1999

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Executive Summary

**Redmond-Bear Creek Valley
Ground Water Management Plan**

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Executive Summary

Overview

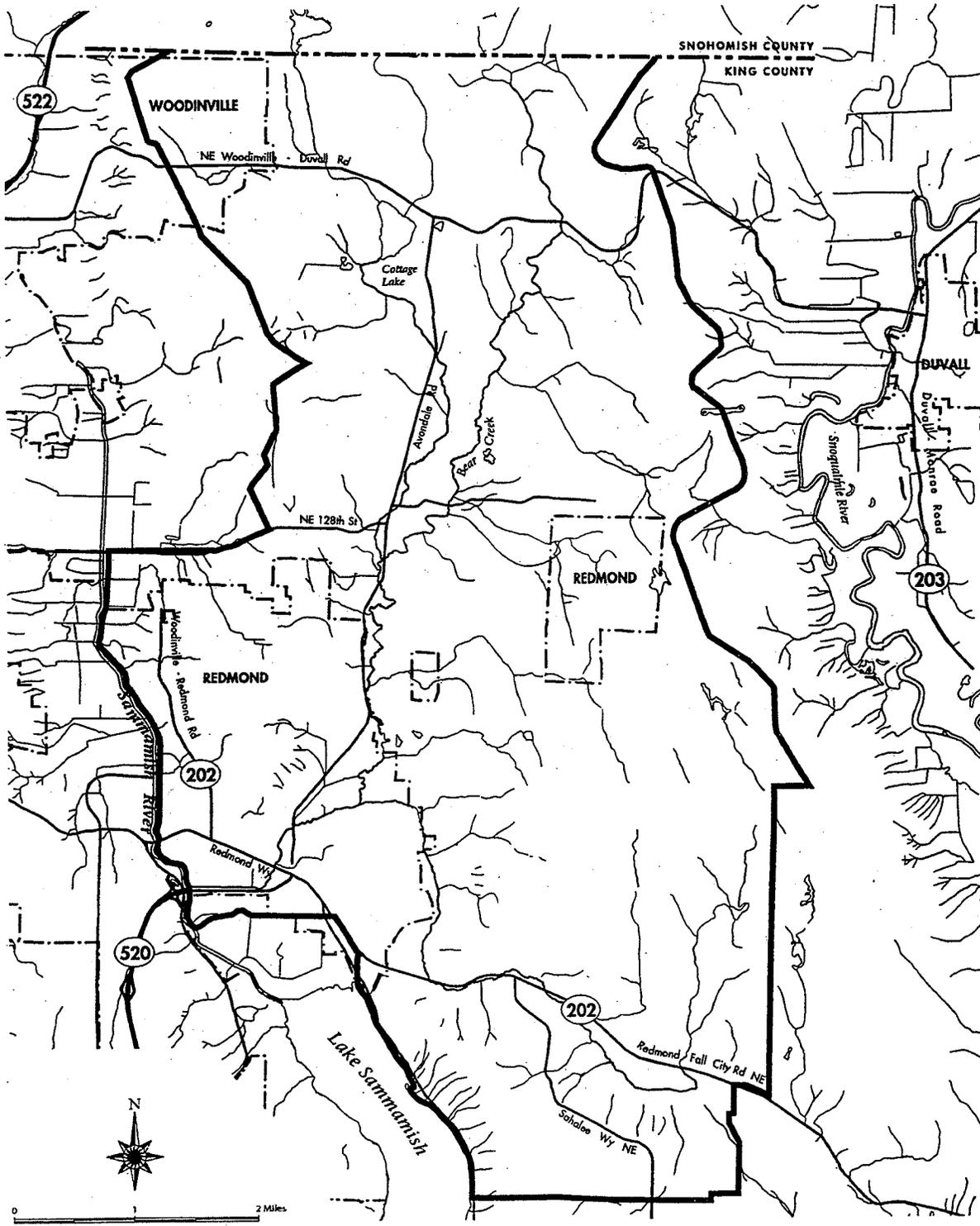
The Redmond-Bear Creek Valley Ground Water Management Area is a forty-four square mile area located north of Lake Sammamish. It is bounded on the west by the Sammamish River and Lake Sammamish, and on the north by the Snohomish-King County line. The eastern boundary follows the topographic divide between the Bear Creek and Snohomish River valleys. The southern boundary runs along the northern boundary of the Sammamish Plateau Water and Sewer District service area. Boundaries of the Ground Water Management Area are indicated on the map on the following page. The primary residential, commercial and industrial land uses are located within the City of Redmond. Predominant land uses in the remainder of the management area are low density residential, neighborhood oriented commercial, rural, or vacant parcels.

Almost one hundred percent of the water used for private, municipal, industrial and irrigation purposes in the Redmond-Bear Creek Valley Groundwater Management Area is provided by ground water sources. The primary beneficial uses of ground water are for domestic and public water supply, fire suppression, and recharge to streams and lakes. Currently, major production wells for the City of Redmond and Union Hill Water Association are located in alluvial aquifers, at relatively shallow depths, in deposits along Bear Creek and Evans Creek. Due to the shallow depth of these wells, lack of confining soil layers, and the high infiltration potential of the soils in these areas, these ground waters are highly susceptible to contamination. The production wells for NE Sammamish Sewer and Water District are located in the alluvial aquifer and in the deeper sea level and regional aquifers in areas of moderate infiltration potential.

The Redmond-Bear Creek Valley Ground Water Advisory Committee developed this plan. They were appointed by the Department of Ecology and will be submitting the plan to the State for certification. The Ground Water Advisory Committee consists of many different groups that manage, develop, or rely on ground water in the area. Committee members from water purveyors, environmental organizations, businesses, and local and state government met over a nine year period to develop the Redmond-Bear Creek Valley Ground Water Management Plan.

This document contains an introduction, recommended ground water management strategies and a recommended implementation process. The supplement to the plan contains the area characterization, references, and appendices.

Redmond-Bear Creek Ground Water Management Area



Ground Water Management Plan Goals

The overall goal of this plan is to protect ground water quality and assure ground water quantity for current and future uses. To achieve this goal, a broad range of strategies are proposed in the plan that should be considered when making land use decisions; the design of surface water facilities; regulation of hazardous materials, on-site sewage disposal, and well construction; and retrofitting of existing infrastructure.

The Redmond-Bear Creek Valley Ground Water Management Plan contains sixteen specific goals intended to provide direction for programs that protect ground water quality and quantity. The goals are divided into three categories and are summarized as follows:

Goals Related to Both Ground Water Quantity and Quality Four goals are proposed that would direct future program development to use special area designations that would help protect ground water resources, develop and implement a data collection and management program, infiltrate storm water, and increase educational efforts for the citizens and local officials of the management area.

Goals Related to Ground Water Quality Water quality in the Redmond-Bear Creek Valley Ground Water Management Area is excellent. The emphasis of this proposed plan is to develop strategies and recommended programs to protect the integrity of the existing water quality. Eleven goals are proposed that address hazardous materials management, infrastructure (e.g., sewage treatment, and underground storage tanks), pesticides, and sand and gravel mining. The goals for each of these subject areas simply state that ground water contamination should be prevented.

Goal Related to Ground Water Quantity The proposed management plan contains one goal related to ground water quantity, which is to manage the ground water resources of King County to optimize the current and long term benefits. The Redmond-Bear Creek Valley Ground Water Advisory Committee found that the best way to address this goal was to develop and implement a long term conservation, education, and monitoring and data collection program that would provide decision makers with information on the relationship between land use, ground water use, and ground water levels.

Recommendations

The Redmond-Bear Creek Valley Ground Water Management Plan provides a description of the ground water resources, identifies potential threats to long term water quality and quantity, recommends management strategies for protection, and suggests funding methods for plan implementation. The recommendations in this plan are important because they foster cooperation among local governments in solving problems that affect a regional resource and that implementation will require a unique and cooperative approach.

After careful study and deliberation about the possible and effective ground water protection measures, the Ground Water Advisory Committee adopted approximately fifty-seven management strategies. Only those that were given highest priority are noted in this Executive Summary.

Water Quality Management strategies that have been prioritized as “high” address the vulnerability of the Redmond-Bear Creek aquifer system, and its importance in supplying potable water in the Ground Water Management Area. These strategies include:

- Incorporating an assessment of water quality impacts from specific land uses in a “Guidance for Environmental Reviewers,” especially in areas that are determined to be highly susceptible to ground water contamination, or in high recharge areas;
- Assessing impacts of right-of-way maintenance by chemicals, and suggesting or requiring other methods if right-of-way maintenance methods could impact ground water;
- Developing basic strategies that King County could implement to assist purveyors in their well head protection efforts;
- The King Conservation District helping small farmers prepare and implement Farm Plans for ground water and other resource protection; and
- Assessing stormwater management facilities’ impact upon ground water, and making a recommendation for upgrade if necessary.

Water Quantity Continued growth in the Redmond-Bear Creek Valley Ground Water Management Area will require additional water supply and appropriate land use controls in aquifer recharge areas to maintain the quantity of aquifer recharge. Where an aquifer system provides the primary source of water to an area, management strategies to assist in preserving ground water quantity are recommended. These include:

- Assessing development’s potential impact to recharge areas or infiltration potential during environmental review. Also, an analysis of aquifer capacity and associated surface water and ground water interaction should be performed, if water rights application is part of the development proposal;
- Adopting general aquifer protection policies to provide a basis for implementing specific requirements;
- Providing information to decision makers related to land and water use;
- Providing education for citizens and local governments by adding to existing educational efforts, and developing needed new education; and,
- Mapping physically susceptible and recharge areas to provide a visual tool for decision makers and the public when discussing groundwater concerns.

Implementation

The Redmond-Bear Creek Valley Ground Water Management Plan is intended to provide a framework to assist cooperation between regulatory agencies through implementation of the adopted management strategies. The management plan recommends forming an oversight committee for ground water protection activities in the planning area. The Redmond-Bear Creek Valley Management Committee would consist of one representative from the City of Redmond, Northeast Sammamish Sewer and Water District, King County Department of Natural Resources, King County Board of Health, and the Ground Water Advisory Committee.

The key task for implementing agencies is to develop programs, projects, budgets, and regulations consistent with this plan. Implementing agencies include:

Local Government

- City of Redmond
- King County
 - Department of Natural Resources
 - Department of Development and Environmental Services
 - Department of Transportation
 - Seattle-King County Department of Public Health
 - Office of Strategic Planning
 - Office of Emergency Management

Special Purpose Districts

- NE Sammamish Sewer District and Water District
- Union Hill Water Association
- Woodinville Water District

State Agencies

- Department of Ecology
- Puget Sound Water Quality Authority
- King County Cooperative Extension
- King Conservation District

Funding

A major source of long term funding must be developed to implement the ground water management plan. The Redmond-Bear Creek Valley Ground Water Advisory Committee recommended approach is based on the principle that users of ground water resources that benefit from programs in the plan should support their implementation. Users of the ground water resource are water utilities, water districts, water associations, small water systems, individual water systems, industries, and irrigators. Funding for the programs would come from water utilities, districts, some associations that have fee collection

systems in place and could collect an allocated amount from their customers. Collection of fees and participation by NE Sammamish Sewer and Water District, the Woodinville Water District and the Union Hill Water Association would be on a voluntary basis, as would the funding and participation by the City of Redmond and King County. Where two or more purveyors or agencies want to implement a project together, the share of funding would be mutually agreed upon by those agencies.

The programs identified in this plan will have substantial public costs. The Ground Water Advisory Committee prioritized the programs into high, medium and low categories in part because of anticipated funding limitations. Based on preliminary estimates, implementing the high priority projects would cost approximately 1.45 million dollars. Medium and low priority projects would cost approximately \$898,000 and \$373,000, respectively.

Acknowledgments

**Redmond-Bear Creek Valley
Ground Water Management Plan**

February 1999

Acknowledgments

The Redmond-Bear Creek Valley Ground Water Advisory Committee, the Seattle-King County Health Department and the King County Department of Natural Resources would like to thank the numerous organizations and citizens who contributed to the development of this plan. The GWAC was formed in 1988 and met regularly throughout the planning process. The GWAC's role was to develop the plan according to the state regulations, to respond to concerns expressed by the affected agencies, and to submit the plan to the Washington State Department of Ecology for certification. The tremendous amount of time and effort of the GWAC is the foundation for their plan.

This Ground Water Management Plan has been produced by the Redmond-Bear Creek Valley Ground Water Advisory Committee, in conjunction with: the Seattle-King County Health Department; the King County Department of Natural Resources, Surface Water Management Division; the Department of Ecology; the City of Redmond; the Northeast Sammamish Sewer and Water District; and the Union Hill Water Association. The Woodinville Water District assisted in test well drilling. In addition, the King County Department of Development and Environmental Services, Metropolitan King County Council staff, and the King Conservation District contributed information or staff.

The Seattle-King County Health Department's Environmental Health Division initiated the ground water planning process. Under direction and support from Charles Kleeburg, then Chief of the Division, William J. Lasby committed to undertaking this complex and lengthy task. Mr. Lasby directed the development of the Plan from 1987 through 1995, and is recognized for his dedication and leadership. Also, the professional and volunteer staff of the Seattle-King County Health Department ground water program are recognized for their perseverance through the many unanticipated setbacks and demands of ground water program development.

The plan was prepared with the assistance of the consulting team of EMCON Northwest, Inc., with Adolfson Associates Inc., CWR-HDR Inc., Russell Resources, and Geo-Recon.

**Redmond-Bear Creek Valley
Ground Water Advisory Committee**

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Woodinville Water District

Board of Commissioners

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Gail Harrell

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District Manager

Bob Bandarra

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The following individuals contributed to the GWMP development as former members, alternates, or as staff in the ground water program.

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Nancy Darling	Washington State Department of Ecology
Mark Denton	Redmond City Council
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Bruce McLean	Environmental Health Specialist
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Klaus Richter	King County Resource Planning
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Kay Shoudy	City of Redmond
John Shuba	Rockcor (Chamber of Commerce)
Nancy Stafford*	Water Tenders
Ginny Stern	Washington State Department of Ecology
Erik Stockdale	King County Resource Planning
Barbara Sullivan	City of Redmond
Dan Sullivan	Sundstrand
Paul Taylor	Cadman Gravel
Stephanie Warden	King County Council Staff
Tiffany Yelton	Washington State Department of Ecology
Margaret Zimmerman	Citizen

***Denotes Alternate**

Chapter One

Introduction

Redmond-Bear Creek Valley Ground Water Management Plan

February 1999

Introduction

Aquifers provide water for many uses in the Redmond-Bear Creek Valley Ground Water Management Area, including drinking water, irrigation for farms and landscaping. Ground water provides nearly 100 percent of the water used in the Redmond-Bear Creek Valley Ground Water Management Area for private, municipal, industrial and agricultural needs. Also, ground water provides base flow to surface water bodies during low rainfall, and sustains fish, wildlife and recreation.

The ground water resource must be protected because once it is contaminated, the use of the resource may be lost forever. Moreover, the cost of protecting ground water from contamination is considerably less than the cost of remedial action. Ensuring ground water availability is also crucial since the natural hydrologic system may be interrupted by urbanization and over use of the aquifer. In summary, a Ground Water Management Plan for the Redmond-Bear Creek Valley area has been developed because:

- The ground water of King County is a limited resource, vital to the future of the County, the well being of its residents, and the vitality of our living natural resources;
- Ground water is not a separate body of water nor is it a separate environmental resource;
- Ground water needs to be protected and managed as a part of the entire hydrologic system, ecosystem, and economic system; and,
- The citizens and officials of King County are the stewards of the ground water resource, both for present and future generations.

1.1 Ground Water Management Program Purpose and Scope

The purpose of the Washington State Department of Ecology's (Ecology) ground water management program is develop and implement local ground water management plans. These plans are intended to represent consensus of the Issaquah Creek Valley Ground Water Advisory Committee regarding the most practical ground water protection measures to safeguard quality and to ensure continued availability of this vital resource. Ecology's ground water management program provides direction to local and state agencies to develop regulations and programs for protecting ground water.

The purpose of the Issaquah Creek Valley Ground Water Management Plan is to provide a framework for cooperation between various agencies through implementation of the adopted ground water protection measures. It is also intended to serve as a guide to further focused research on the aquifers in addressing data and regulatory protection gaps.

1.2 Ground Water Management Program History

In response to growing concern in Washington State about ground water resources, the state legislature passed Substitute House Bill 232 in 1985 (Chapter 90.44.400 RCW *Regulation of Public Ground Waters*). This legislation directed Ecology to:

- Identify specific locations in need of ground water management programs;
- Establish a program to provide financial assistance to these locations; and,
- Develop guidelines for the implementation of local ground water management strategies.

Ecology responded by adopting regulations defining a ground water management area as an area that encloses one or more aquifers, and which exhibits a justifiable concern for the quality and/or quantity of the ground water (Chapter 173-100 WAC *Ground Water Management Areas and Programs*). Ecology's ground water program establishes protocols and guidelines for developing a local ground water management plan. A ground water management plan is designed to protect ground water quality and assure ground water quantity for current and future uses. The guidelines establish a process that allows for ground water issues, concerns and opportunities from all interested groups and agencies to be incorporated into the planning process. The process is designed so that a ground water management plan can be initiated and developed on the local level while being supported by state legislation and regulations. The ground water management program process also provides local government with a method to achieve comprehensive ground water protection goals.

On April 17, 1986, King County petitioned Ecology to officially designate the area as the Redmond-Bear Creek Valley Ground Water Management Area. The petition document outlined a number of ground water protection problems facing the area:

- potential contamination sources threaten groundwater quality, or ground water is susceptible to contamination.
- major aquifers have the potential for over use based on projected future demands.
- aquifers where an approved coordinated water system plan has identified a need for a Ground Water Management Plan.

Ecology designated the Redmond-Bear Creek Valley Ground Water Management Area on October 7, 1986, and approved the membership of the Redmond-Bear Creek Valley Ground Water Management Area Ground Water Advisory Committee, consisting of a broad cross section of interests with representatives from many groups. Ecology selected the Seattle-King County Health Department to be the lead agency because it has jurisdiction throughout the Ground Water Management Area and has a regulatory role in water systems, on-site sewage systems, and other environmental health concerns. On January 1, 1996, the King County Department of Natural Resources, Surface Water Management Division assumed the role of lead agency from the Seattle King County

Health Department. In March 1996, the Department of Ecology approved a boundary change among the East King County GWMA, the Redmond-Bear Creek Valley GWMA, and the Issaquah Creek Valley GWMA.

1.3 Management Plan Process Goals and Objectives

The first step in developing a ground water management plan is to establish goals and objectives. The Ground Water Advisory Committee and the Seattle-King County Department of Public Health developed the following goal and objectives to help guide the process for development of the plans.

Goal: To preserve the purity and assure the quantity and quality of existing and future ground water supplies within the management area.

Objectives

- Designate the Redmond-Bear Creek Valley area as a ground water management area, thereby making it eligible for state grants designated for development of ground water management programs and plans.
- Develop a ground water management plan. This plan must:
 1. Be consistent with federal regulations, state ground water management laws and local ordinances.
 2. Include the public and local agencies' participation in drafting, reviewing, and modifying the plan.
 3. Include the following elements required by Chapter 173-100 WAC *Ground Water Management Areas and Programs*:
 - A public involvement plan to educate and inform the public about ground water and the Ground Water Management Plan process. The public will be informed of the need to protect the ground water resource from contamination and overuse.
 - An area characterization section that includes mapping jurisdictional boundaries showing land and water use management authorities' boundaries and goals; a description of the locale; the hydrogeology; the ground water quality; and the current ground water use and future needs.
 - Identification and description of threats to ground water; stating goals and objectives related to these threats; and recommending strategies that solve or reduce these threats. Technical understanding of the ground water resource will be developed to assist decision makers in formulating public policy.

- An implementation process for the plan, which includes: (1) a work plan for each affected agency and jurisdiction, (2) an effectiveness monitoring system, and (3) a process for periodic review and revision.
- Obtain local approval and state certification of the plan, which will ensure implementation of the recommended ground water protection measures. Public agencies will work cooperatively to fulfill their responsibilities to protect the ground water resource. Local, state, and regional land use and water use plans, policies and regulations will be effective in protecting the ground water resource.

1.4 Plan Contents

The proposed Issaquah Valley Creek Ground Water Management Plan contains management strategies and a proposed implementation process. The supplement contains the area characterization. Each of these sections are briefly described below.

The "Recommended Ground Water Management Strategies" address potential threats to ground water quality and quantity. The recommended management strategies are prefaced by the adopted goals and a summary statement of the issues explored by the Ground Water Advisory Committee and followed by recommended management strategies. This section also contains a work plan for each management strategy, including identifying the responsible agencies and priority.

The "Recommended Implementation Process for the Ground Water Management Program" describes the preferred methods for funding and implementing the plan. It also contains tables showing the management strategies. The management strategies are listed in order, based on the Ground Water Advisory Committee priorities for funding and implementation. Another table lists the management strategy by responsible agency, in implementation order with priority.

The Supplement to this plan contains the area characterization and other background materials. The area characterization section describes the ground water management area and how its boundaries were chosen. It lists the governments and agencies that manage land and water use and describes their responsibilities. The section characterizes historical land use activities that impact ground water quality and quantity; it also describes the area's hydrogeology and characterizes past and present ground water quality. In addition, the section provides estimates of historical and current rates of ground water use and makes projections of future ground water supply needs.

The background material and discussion for each recommended management strategy, including the complete issue papers the Ground Water Advisory Committee used to make the recommendations, with unabridged background information, are available upon request from the Ground Water Program in the Water and Land Resources Division.

1.5 Plan Team and Responsibilities

Development of this plan was a coordinated effort between local and state government and citizen representatives on the Ground Water Advisory Committee. The following provides a brief explanation of the responsibilities of each group in developing the ground water management plan.

Ground Water Advisory Committee

The Ground Water Advisory Committee plays a critical role in developing a sound ground water management plan. The committee consists of a broad cross section of ground water interest groups, including local, state and federal government agencies, large and small businesses, environmental organizations and citizens. The Ground Water Advisory Committee is responsible for assuring that the Ground Water Management Plan is both technically and functionally sound. The committee's specific duties include:

- Oversee the development of the Ground Water Management Plan;
- Review the work plan, schedule, and budget developed by the lead agency;
- Assure that the plan is functional and will not cause environmental or economic adversity;
- Verify that the plan is consistent with the state's regulations on ground water protection; and,
- Formulate and implement a public involvement plan.

Department of Ecology

Ecology appointed the Ground Water Advisory Committee in cooperation with local governments. Ecology also participated on the advisory committee. Ecology has reviewed and approved the interim plan products (e.g. the Public Involvement Plan, the Data Collection and Analysis Plan, the Quality Assurance/Quality Control Plan, and the Data Management Plan) participated on the Ground Water Advisory Committee, and held a public hearing on the Ground Water Management Plan. Ecology will have to certify the final plan for it to go into effect.

Seattle-King County Health Department

As lead agency, the Seattle King County Health Department was responsible for coordinating the activities necessary for development of the Ground Water Management Plan. This included the preparation of a work plan, coordinating data collection and scheduling advisory committee meetings, developing the issue papers and the environmental checklist, drafting the Ground Water Management Plan based on committee direction, and obtaining concurrence from the affected agencies.

King County Department of Natural Resources

The Metropolitan King County Council transferred the ground water management program from the Seattle-King County Health Department to the Surface Water Management Division as part of the County's reorganization plan. Transfer of the program occurred on January 1, 1996, which coincides with the Surface Water Management Division being placed in the new Department of Natural Resources. Subsequently, the Surface Water Management Division was renamed the Water and Land Resources Division and is now the lead agency for the ground water management program.

City of Redmond

An interlocal agreement between the City and King County was signed to help coordinate the ground water management plan activities. The City has been responsible for:

- Providing appropriate staff support and guidance in the development and implementation of the Ground Water Management Plan;
- Providing three staff members to serve on the Ground Water Advisory Committee;
- Assisting in the consultant selection;
- Developing a detailed scope of work and budget;
- Assisting King County in obtaining approval of grant application; and,
- Financing part of the local matching share for the Ground Water Management Plan by contributing approximately \$87,900 cash and \$32,800 of in-kind services.

Northeast Sammamish Sewer and Water District

The District was represented on the Ground Water Advisory Committee and has been responsible for contributing approximately \$28,700 cash and \$14,800 of in-kind services.

Union Hill Water Association

The Association was represented on the Ground Water Advisory Committee and has been responsible for:

- Drilling a test well, providing water quality testing, precipitation and water balance monitoring; and,
- Contributing approximately \$7,800 cash and \$38,800 of in-kind services.

Woodinville Water and Sewer District

The District was represented on the Ground Water Advisory Committee and has been responsible for contributing approximately \$17,400 for test well drilling and \$4,300 of in-kind services.

1.6 Public Review, Adoption, and Implementation

Public Review

Upon completion of the November 1994 draft plan, Ecology held a public hearing for comment and review of the plan. This public hearing was held at the Redmond City Council Chambers on February 16, 1995. Public comments from that hearing are included as Appendix A. The lead agency collected public and agency comments during the three month period between February and June, 1995. Comments received during this period (Appendix B) were analyzed by the Ground Water Advisory Committee and, where appropriate, included in the text of this document.

The Draft Redmond-Bear Creek Valley Ground Water Management Plan has been reviewed under the requirements of the State Environmental Policy Act. The Seattle-King County Health Department prepared an environmental checklist and published a Determination of Nonsignificance in January of 1995. No comments were received pertaining to the adequacy of the environmental review and the determination was sent to the Department of Ecology after the public comment period had closed.

Adoption

Following Ecology's hearing, each affected agency had until June 30, 1995 to evaluate the plan and either concur or disagree with its provisions. The lead agency discussed resolution of issues with non-concurring agencies and governments. The Ground Water Advisory Committee then adopted changes to the plan, to resolve the issues of non-concurrence. The lead agency at this point, the King County Department of Natural Resources, incorporated the required changes and published a final Draft version of the plans in March 1996. This draft was submitted to the Metropolitan King County Council, and was assigned to the Law, Justice and Human Services and the Committee, and hearings were held in July - October 1996 and in August - September 1997. The plan was not passed, either for concurrence or non-concurrence, in either 1996 or 1997.

In 1998 there was a new effort to move the plan along. The plan was referred to both the Utilities and Natural Resources Committee and the Growth Management Committee. Hearings were held in May and June of 1998 and the plan was approved, with conditions, for passage by the Council. On July 6, 1998, the County Council passed Motion 10495 that basically concurred with the plan, although with conditions. The motion and an attached sample letter are included in Appendix B.

The Department of Natural Resources sent these concurrence materials to the Ground Water Advisory Committee (GWAC) on September 8, 1998, with a cover letter (also in Appendix B). The changes proposed by Council were reviewed via phone with the members of the GWAC, and were incorporated into the present document.

This final version of the plan has been prepared for a February 1999 submittal to the Washington Department of Ecology. Ecology will review the plan for consistency with the governing regulations (Chapter 173-100 WAC, see Appendix L of the Area Characterization volume) and will then certify the plan for implementation.

Implementation

Affected agencies and jurisdictions are responsible for implementing the plan following adoption by Ecology. The plan may be modified under the supervision of the Redmond-Bear Creek Valley Ground Water Management Committee. This committee will advise implementing agencies, oversee ground water management activities, review new issues, and consider new programs that emerged after the plan was adopted. It is the responsibility of the Management Committee to develop a process for how to incorporate new issues and programs.

Chapter Two

Management Strategies

**Redmond-Bear Creek Valley
Ground Water Management Plan**

February 1999

Recommended Management Strategies

2.1 Introduction

Ground water management plans contain strategies to address the potential threats to ground water quality and quantity in the planning area. The Redmond-Bear Creek Valley Ground Water Advisory Committee identified the potential water quality and quantity problems or issues and adopted corresponding management strategies for: special area designations to enhance ground water quality and quantity; data collection and management; stormwater management; hazardous materials management; underground storage tank management; on-site sewage disposal system use; pesticides and fertilizer use; well construction and abandonment; sewer pipes; solid waste landfills; burial of human remains; sand and gravel mining; biosolids and sewage effluent; and ground water quantity.

In developing the management strategies, the Ground Water Advisory Committee attempted to make maximum use of existing governmental programs and regulatory structures. The Ground Water Advisory Committee opted for strategies that could be easily understood and supported by the citizens in the Ground Water Management Area. Please note that as the Ground Water Advisory Committee considered each issue, data collection and management strategies and educational strategies were adopted for many of the issues. These are compiled into the Data Collection and Management Program and the Education Program, described in the first section of this Chapter. The original issue papers may be obtained from King County Water and Land Resources Division.

The Ground Water Advisory Committee realized that the adopted strategies would not totally prevent contamination problems from occurring in the Redmond-Bear Creek area aquifers, but that implementation of the management strategies should greatly limit the frequency and severity of such problems. The Redmond-Bear Creek Valley Ground Water Management Plan is intended to provide a framework to facilitate cooperation between various regulatory agencies through implementation of the adopted ground water protection strategies. It is also intended to guide further, focused research on the aquifers to address data and regulatory protection gaps.

The Ground Water Advisory Committee prioritized management strategies based on relative impact to ground water and the method used to address the problem (such as regulation or education). The Ground Water Advisory Committee prioritized the management strategies because they recognized that not all management strategies could be implemented at the same time (so they could be implemented over several years), and that some agencies might not concur with all recommended management strategies. Prioritization allows the Ground Water Advisory Committee to indicate the relative importance of each recommended management strategy.

As the implementing agencies reviewed the draft Ground Water Management Plan during the concurrence process, they found that some proposed management strategies needed to be modified. Others were recommended to be removed, either because new regulations or programs had achieved the desired intent, or because the original management strategy was too broad, and did not focus on the Ground Water Management Area. The implementing agencies' concurrence comments were consolidated by the lead agency, and revised wording was presented to the Ground Water Advisory Committee. The Ground Water Advisory Committee then adopted the revised wording to resolve the issues of non-concurrence. The revised wording was included in the March 1996 Draft. Subsequent changes were required after the concurrence review by the Metropolitan Kin County Council. These changes were reviewed with the members of the Ground Water Advisory Committee by phone, and this final version was prepared in February 1999.

This chapter covers those issues that affect both ground water quality and quantity (Section 2.2); those that affect ground water quality only (Section 2.3); and those that affect ground water quantity only (Section 2.4). The sections first describe the goals for each issue, then specific issues, and the adopted management strategy(ies). The implementing agency(cies) and the Ground Water Advisory Committee priority (1 - 4) is stated.

Summary of Technical Findings and Recommendations

The following discussion illustrates the relationship between the technical information found in the Area Characterization and the recommended management strategies in the Plan. The recommended management strategies in the Plan can be classified as pertaining to either ground water quantity, ground water quality or both ground water quantity and quality.

Water Quality Issues

With the exception of the area serviced by the Woodinville Water District, most of the water used for private, municipal, industrial and irrigation purposes in the Redmond-Bear Creek Ground Water Management Area is provided by ground water sources. The primary beneficial uses of ground water in the Ground Water Management Area are for domestic and public water supply, fire suppression, and recharge to streams and lakes. The ground water system in this area includes a number of aquifers and confining layers. The major aquifer zones in the Ground Water Management Area include (from shallowest to deepest) the alluvial, local upland, sea level and regional aquifers. Currently, major production wells for the City of Redmond are located in valley alluvial aquifers, at relatively shallow depths, in deposits along Bear Creek. Due to the shallow nature of these wells, lack of confining layers, and the high infiltration potential of the soils in these areas, these ground waters are highly susceptible to contamination by land use activities. The production wells for Northeast Sammamish Sewer and Water District and the Union Hill Water Association are located in alluvial aquifers, in the deeper sea *

level and regional aquifers in areas of moderate infiltration potential, in the Evans Creek basin.

Ground water in the Redmond-Bear Creek area comes from precipitation in the basin. Ground water recharge occurs when precipitation travels through soil and reaches the water table of the uppermost aquifer. Areas where ground water is most susceptible to contamination are areas where precipitation and potential contaminants can most easily travel through the soil and where the water table is close to the ground surface. The areas with the highest infiltration potential in the Ground Water Management Area are located in the Cottage Lake Creek, Bear Creek and Evans Creek valleys. Production wells for the City of Redmond and Union Hill Water Association are also located in these valleys.

Aquifers are considered to be "vulnerable" where the soil is permeable, ground water is shallow, and where a potential contamination source is present. (An example would be where a dry cleaners, using an on-site sewage disposal system, is located over a shallow gravel aquifer.) At present, the Bear Creek and Evans Creek valleys are probably the most vulnerable part of the ground water system. In these areas, municipal wells have been completed at relatively shallow depths in coarse-grained sediments which generally are not separated from the surface by impermeable materials. Further, several of the City of Redmond wells are located in the downtown Redmond area. Potential sources in the downtown area are likely to increase in number as development increases. In addition, commercial and industrial growth is continuing at a rapid pace in this area. According to consultants who provided technical information for this plan, planned changes in land use (such as the Novelty Hill master planned developments), will impact both water quality and quantity. Mitigation measures can lessen these impacts. Different studies of the upper aquifer have been conducted by various consultants who have reached differing conclusions with respect to the impacts of development on the deep aquifer system. Some reports conclude that more data are needed about the deep aquifer system to determine if there will be significant impacts from large scale developments in this area.

Transportation related spills can pose a great threat to ground water in the Ground Water Management Area. Highly permeable soils in the Evans and Bear Creek Valleys underlie the majority of major transportation corridors in the Ground Water Management Area (e.g., Avondale Road and State Route 202). The alluvial aquifers in which the City of Redmond wells are located also underlie segments of these transportation corridors.

The vulnerability of the City of Redmond wells has been demonstrated in the past. City of Redmond, Well Number 5 was contaminated after a construction related sewer main break occurred in the mid-1980s. Contaminants associated with the system waste were detected in Well Number 5. The well was pumped out until water was determined to be safe to drink. This event affected water quality in an existing high-capacity production well, shedding light on the severity of the issue of ground water protection.

Management strategies that have been prioritized as “high” address the vulnerability of the Redmond-Bear Creek aquifer system, and its importance in supplying potable water in the Ground Water Management Area. These strategies include:

- Incorporating an assessment of water quality impacts from specific land uses in a “Guidance for Environmental Reviewers,” especially in areas that are determined to be highly susceptible to ground water contamination, or in high recharge areas.
- Assessing impacts of right-of-way maintenance by chemicals, and suggesting or requiring other methods if right-of-way maintenance methods could impact ground water.
- Development of basic strategies that King County could implement to assist purveyors in their wellhead protection efforts.
- The Conservation District would help small farmers prepare and implement Farm Plans for ground water and other resource protection.
- Assessing stormwater management facilities’ impact upon ground water, and making a recommendation for upgrade if necessary.

Water Quantity Issues

The ground water quantity issue has two components: recharge and water use. Land use affects both recharge and demand for water. Decrease in ground water recharge can be caused by development (by paving and building over recharge areas or areas of high infiltration potential, and in some cases, by eliminating native vegetation on a large scale). The demand for water is expected to increase as more development occurs. According to the King County Comprehensive Plan, demand for water will exceed supply for the Union Hill Water Association and the Northeast Sammamish Sewer and Water District by the year 2000 (supply and demand figures are currently being updated for the Comprehensive Plan).

Union Hill Water Association was denied a water right application in January of 1996. Their application to transfer water rights is pending. Water right denials by the Department of Ecology were based on hydraulic continuity between surface water and ground water. If there is potential for surface water level declines as a result of ground water pumping, the water right application in a particular basin can be denied.

The City of Redmond is currently under contract with the City of Seattle to purchase water to augment its existing ground water supply. The contract is dependent on Redmond’s ground water supply and the quantity of water Redmond pumps on a daily and annual basis. Redmond is currently negotiating the Seattle contract with regards to the quantity of water they are required to withdraw from the aquifer(s) and potential water supply to the master planned developments on Novelty Hill.

Several potential water supply options located in the Ground Water Management Area were identified in a review of potential new sources of drinking water to service

burgeoning population growth within this area of King County. These include the Redmond, Evans Creek, and Sammamish Plateau aquifers.

The Redmond and Evans Creek aquifers are located in relatively shallow deposits and are located in areas that are classified as moderately to highly susceptible to ground water contamination. The Sammamish Plateau Aquifer is located in deeper deposits and is subsequently less susceptible to contamination. However, the preliminary water budget presented in this plan concludes that, until further data are available, the only safe alternative for acquiring additional water is trading water rights or conservation, and that new water sources should not be developed because they may prohibit the maintenance of existing ground water levels.

To date, there has been no direct comparison of development trends (zoning and future land use) to areas of high aquifer susceptibility or high infiltration potential. This Ground Water Management Plan recommends that both land use and precipitation criteria be integrated with the criteria used to determine physically susceptible areas, in order to indicate areas of critical recharge. These areas should then be compared to future development plans to assure appropriate land use in most critical areas. Wellhead Protection Plans prepared by individual water purveyors should provide land use and zoning recommendations regarding appropriate land use in the vicinity of major wellheads.

In summary, continued growth in the Redmond-Bear Creek Ground Water Management Area will require additional water supply and appropriate land use control in recharge areas to maintain the quantity of aquifer recharge. New developments should recognize and mitigate their potential impact to the ground water supply. In this case, where an aquifer system provides the primary source of water to an area, management strategies to assist in preserving ground water quantity are recommended. These include:

- Assessing development's potential environmental impact to recharge areas or infiltration. Also, an analysis of aquifer capacity and associated surface water/ground water interaction should be performed, if water rights application is part of the development proposal. This would add to the current environmental threshold determination review (which currently only addresses withdrawal or direct contamination).
- Adoption of general aquifer protection policies to provide the policy framework for implementation of specific requirements.
- Providing information to decision makers to aid them in land and water use decisions.
- Providing education for citizens and local governments by adding to existing educational efforts, and developing needed new education.
- Mapping physically susceptible and recharge areas to provide a visual tool for decision makers and the public when discussing groundwater concerns, and to

provide an estimate of the land area and governments involved in groundwater protection.

2.2 Programs Related To Ground Water Quality and Quantity

The Ground Water Advisory Committee identified four topics that affect ground water quantity and quality: special area designation; data collection and management; storm water management; and education. The goals that guided development of the recommended management strategies for each are:

Special Area Designations to Enhance Ground Water Protection. To use available special area designations in conjunction with local regulations and policies to enhance ground water protection efforts in the Redmond-Bear Creek Valley Ground Water Management Area.

Data Collection and Management Program. To protect ground water quantity and quality by developing and implementing a long-term data collection and management program.

Storm Water Management. To promote ground water recharge using stormwater management practices which prevent the degradation and/or depletion of ground water.

Education Program. To increase individual participation in protecting the ground water resource by educating citizens concerning the Ground Water Management Plan, the threats to ground water quantity and quality, and means by which those threats can be reduced.

2.2.1 Special Area Designations to Enhance Ground Water Protection

A number of special federal, state, and local area designations may potentially enhance a Ground Water Management Plan. These designations may offer such benefits as a source of funds to implement ground water protection measures, enhanced eligibility for grant funds, or expanded review of development proposals. Additionally, increased public recognition of the value of an aquifer may be an important consequence of a special area designation. The special area designations considered by the Ground Water Advisory Committee are:

- Areas with a critical recharging effect on aquifers used for potable water according to the Growth Management Act (Chapter 36.70A RCW);
- Wellhead Protection Areas according to the 1986 amendments to the federal Safe Drinking Water Act;

- Environmentally Sensitive Areas according to the State Environmental Policy Act Rules (Chapter 197-11 WAC);
- Special Protection Areas according to the Water Quality Standards for Ground Waters of the State of Washington (Chapter 173-200 WAC);
- Sole Source Aquifers according to the federal Safe Drinking Water Act of 1974; and
- Aquifer Protection Areas (Chapter 36.36 RCW).

Areas with a Critical Recharging Effect on Aquifers Used for Potable Water per Chapter 36.70A RCW, Growth Management Act

The Growth Management Act of 1990 requires all counties and cities in Washington to plan in order to manage growth. This act, much of which is codified in Chapter 36.70A RCW, requires that the largest and fastest growing counties (and the cities within them) conduct land use planning to achieve protection of critical areas.

The Growth Management Act also requires that the comprehensive plans contain land use controls to protect quality and quantity of ground water used for public water supplies (Chapter 36.70A.070(1) RCW). King County adopted the King County Comprehensive Plan in November 1994 and development regulations in December, 1995, to meet the Growth Management Act requirements. The City of Redmond has adopted its Comprehensive Plan and development regulations in its support.

The Wellhead Protection Program under the Federal Safe Drinking Water Act

The 1986 amendments to the Safe Drinking Water Act established a Wellhead Protection Program intended to safeguard ground waters that are tapped by public water supply wells. Each state is required to develop and implement a Wellhead Protection Program in accordance with criteria established by the Environmental Protection Agency. A Wellhead Protection Area is defined in the Safe Drinking Water Act as "the surface and subsurface area around a well or wellfield supplying a public water system through which contaminants are reasonably likely to move toward and reach such water well or wellfield (42 U.S.C.A. 300h-7(e)). Due to the nature of wellhead protection, much of the actual implementation efforts will be done by public water systems, local governments, and by those agencies with contaminant source-specific jurisdictional responsibilities. Public water system purveyors are responsible for delineating the Wellhead Protection Area(s) and inventorying sources of contamination within their Wellhead Protection Area(s). Local land use authorities (cities, counties) are responsible for zoning controls and pollution sources outside the authority of the federal or state government. The effectiveness of these programs was largely predicated on the ability of the municipal well owner to directly regulate land use in all or a large portion of the zone of contribution. However, where public water system(s) are entities that do not control surrounding land use, the success of the Wellhead Protection Program will depend on the willingness of local governments to impose necessary land use or other restrictions.

Considering the large numbers of public water systems, responding for requests for individualized land use controls for each would be unmanageable for King County. However, it should be possible to develop a basic Wellhead Protection Program under which water purveyors could apply to the county for protection. In this area, the Union Hill Water Association completed the "Characterization and Protection of the Union Hill Aquifer System" (Carr and Associates, Inc., January 19, 1993). Also, the City of Redmond has completed, and the Northeast Sammamish Sewer and Water District is preparing Wellhead Protection Programs. They may ask King County to enact wellhead protection measures.

Environmentally Sensitive Area Designation Under the State Environmental Policy Act

The State Environmental Policy Act Rules are implemented in unincorporated King County through the King County Code, the County Environmental Procedures (Title 20A.44). The Department of Development and Environmental Services is responsible for ensuring adequate environmental review of proposed actions. Municipalities have either adopted the State Environmental Policy Act Rules by reference or have developed their own regulations that incorporating them. Municipalities are responsible for ensuring proper environmental review of proposed actions occurring within their jurisdictional boundaries.

In developing the State Environmental Policy Act Rules, the Department of Ecology determined that, because of their size or nature, some classes or types of activities are not likely to represent a significant environmental impact and should, under ordinary circumstances, be exempt from the State Environmental Policy Act requirements. These are known as categorical exemptions. The categorical exemptions include some activities that could potentially create significant adverse environmental impacts in areas of unusual ground water sensitivity.

Local governments have the authority to lower the thresholds for requiring environmental review by designating certain portions of their land use jurisdictions as Environmentally Sensitive Areas. These areas are generally more vulnerable to the adverse affects of land and water use activities. Designation would permit the King County Council and the Redmond City Council to eliminate many of the categorical exemptions from environmental review that are currently allowed.

Special Protection Areas Established Under Washington Water Quality Standards for Ground Waters

The Department of Ecology designates Special Protection Areas within the State of Washington (Chapter 173-200-090 WAC). The purpose of designating Special Protection Areas is to identify portions of the state with ground waters that require

extraordinary consideration or increased protection because of one or more unique characteristics.

Sole Source Aquifer Designation Under the Federal Safe Drinking Water Act

The primary intent of the program is to prevent projects that receive federal financial assistance from contaminating aquifers representing the sole or principal source of drinking water for an area. Projects that receive a portion, but not 100 percent, of their funding from the federal government are affected. An example would be a highway construction project funded jointly by the federal and state government. The two Sole Source Aquifers in King County are the lower part of the Cedar River Valley and Vashon Island. Of the many number of positive aspects of a Sole Source Aquifer designation, the most important is its public awareness value. Sole Source Aquifer designation helps people recognize that an aquifer is unique or valuable and is worthy of protection.

Aquifer Protection Areas per Chapter 36.36 RCW

The purpose of an Aquifer Protection Area is to establish a funding base for ground water protection, preservation, and rehabilitation programs. An Aquifer Protection Area is established through an election ballot issue requiring approval from a simple majority of voters within the proposed Aquifer Protection Area boundaries. If voters approve the Aquifer Protection Area, the county can collect modest water and on-site sewage system user fees. Fees may only be collected from users of water withdrawn from an aquifer as opposed to a surface water source. Aquifer Protection Area funding can support virtually all activities associated with the implementation of a Ground Water Management Plan.

Issue 1 - General protection of aquifers. Effective aquifer protection requires cooperation between land use jurisdictions because aquifers do not coincide with jurisdictional boundaries. General policies that provide guidance for land use decisions could be adopted by King County and the City of Redmond to provide a basic level of protection for aquifers.

SA-1A Elimination of categorical exemptions to State Environmental Policy Act: King County and the City of Redmond will jointly determine whether any of the following categorical exemptions to the State Environmental Policy Act (installation of underground chemical storage tanks with a capacity of less than 10,000 gallons; construction of commercial buildings of less than 4,000 square feet and associated parking for up to 20 automobiles; construction of parking lots for up to 20 vehicles; construction of agricultural structures of under 10,000 square feet; and periodic use of Washington Department of Agriculture approved chemicals to maintain a utility or transportation right of way in its design condition (Chapter 197-11-800 WAC) should be eliminated in the physically susceptible areas as identified (mapped) in the Ground Water Management Plan.

SA-1B Designation of Environmentally Sensitive Areas: If any categorical exemptions are determined to be eliminated, King County and the City of Redmond will designate the mapped physically susceptible and recharge areas to be an Environmentally Sensitive Area as authorized by the State Environmental Policy Act so that categorical exemptions, as determined under SA-1A, may be eliminated.

Who: King County and City of Redmond via the Management Committee.
Priority: 1.5
Cost: King County Department of Natural Resources: 0.25 FTE. City of Redmond: no additional
Source of funds: Aquifer protection funds.

SA-1C Adoption of general aquifer protection policies: King County and the City of Redmond adopt the following policies for the Redmond-Bear Creek Valley Ground Water Management Area:

- Ground water based public water supplies should be protected by minimizing land use impacts on ground water quality or quantity to preserve the supply of high quality drinking water for present and future populations.



- King County will protect the quality and quantity of ground water by:
 1. Developing, with the affected jurisdictions, best management practices for new development recommended in the Ground Water Management Plans and Wellhead Protection Programs as appropriate. The goals of these practices should be to promote aquifer recharge quantity and quality.
 2. Refining regulations as appropriate to protect the most physically susceptible areas when new information is supplied by Ground Water Management Plans and Wellhead Protection Programs.
 3. Evaluating and monitoring ground water policies, their implementation costs, impacts upon the quality and quantity of ground water and the need for new water supplies when making future zoning decisions.
 4. Considering ground water impacts and requiring mitigation to ensure that there is no net reduction in ground water quality or quantity during rezoning or development review.
- The City of Redmond will protect the quality and quantity of ground water by enacting the policies in their Comprehensive Plan and by adopting the proposed Clearing and Grading ordinance.
- In the physically susceptible areas that are mapped for the Ground Water Management Plan per SA-1E and recharge areas, identified in purveyor's well head protection plans:

1. In rural areas: preferring land uses that retain a high ratio of permeable to impermeable surface area and that maintain or augment the infiltration capacity of the natural soil; and requiring standards for seasonal and maximum vegetation clearing limits, impervious surface limit, and, where appropriate, infiltration of surface water.
 2. In urban areas: promoting methods that infiltrate runoff where site conditions permit, except where potential ground water contamination cannot be prevented by pollution source controls and stormwater pretreatment, to protect ground water recharge quantity; and developing best management practices for new development, forestry, agriculture and mining operations to promote aquifer recharge quality and quantity.
- Wellhead Protection Programs will provide direction for focusing intense aquifer protection efforts in those areas where the existing built environment presents very significant risks to public drinking water systems.

Who: King County and the City of Redmond.
 Priority: 1.5
 Cost: King County Department of Natural Resources: 0.25 FTE. King County Office of Strategic Planning: 0.04 FTE. Redmond: no additional because the City expects to have the changes made.
 Source of funds: Aquifer protection funds.

SA-1D Enhanced environmental review to protect aquifers: King County and the City of Redmond will jointly develop guidance to assist environmental reviewers to:

- Identify proposed development that may significantly impact ground water in physically susceptible areas mapped in the Ground Water Management Plan and in recharge areas, identified in purveyor's well head protection plans,
- Recognize and require adequate information to assess impacts upon ground water, and
- Recognize and propose effective mitigation.

Who: King County Department of Natural Resources for the approval of the Management Committee.
 Priority: 1.5
 Cost: King County Department of Natural Resources: 0.5 FTE. City of Redmond: 0.57 FTE.
 Source of funds: Aquifer protection funds.

SA-1E Define and Map Ground Water Susceptibility Areas: King County and the City of Redmond will place a priority on implementation of the Ground Water Management Plan in ground water concern areas. These areas include areas physically

susceptible to ground water contamination and aquifer recharge areas. The areas of unusual susceptibility are defined and mapped as follows:

- Soil permeability - Soil units are defined by the Natural Resources Conservation Service in the *Soil Survey of the King County Area* (Soil Conservation Service, 1973). Soils were given a 25 percent rating. A full rating was not used, since that would duplicate surficial geology in the mapping equation. Soils that are excessively drained or are somewhat excessively drained are rated high; soils that are well drained or moderately well drained are rated moderate; and soils that are somewhat to very poorly drained are rated low.
- Geologic materials - United States Geological Survey maps provide information on surficial geology. A clean sand and/or gravel is rated high, tight silt or clay is rated low, and materials (mixtures of sand, silt or clay) that fall between the two categories are rated as moderate.
- Depth to water - Driller's logs and previous investigations are used to determine depth to water. Existing water table elevation maps are used, if available. High (0-25 feet from surface), moderate (25-75 feet from surface), and low (greater than 75 feet from surface) contamination potentials are assigned. Depth to water greater than 100 feet would assume that a relatively permeable layer would likely exist above the water table.

Areas receive overall ratings through use of an overlay map that integrates ratings from the three physical parameters. All parameters are assigned equal weight. A combined rating score is assigned to each portion of the mapped area. Determination of whether an area has a high, moderate, or low susceptibility is then made by conservative interpretation of the combined rating. For example, a combined rating score of high-high-moderate-moderate is given an overall rating of high while a rating of high-moderate-low-low is given an overall rating of moderate. A composite map shows the overall ratings.

To define and map aquifer recharge areas (important to identify to protect ground water quantity): recharge only occurs where water reaches an aquifer by surface infiltration, and where there is a downward component of hydraulic head (pressure head). However, the presence of a downward component of hydraulic head cannot be determined without extensive research on water levels, well completion and well location data. Therefore, to provide a conservative estimate, a downward component of hydraulic head is assumed to be present in all areas. The maps produced for this Plan and for the King County Comprehensive Plan were based on available information. Both the Ground Water Management Plan and the Comprehensive Plan specify that the maps will be refined as new information becomes available. Identification and protection of areas important for ground water quantity and quality is required by the Growth Management Act. King County expects to meet this requirement by starting with the maps currently produced, and adding information such as new information from well head studies and environmental evaluations, so that they are useful for planning and ground water

protection. A recharge map to address ground water quantity concerns needs to be developed. The Union Hill Water Association has completed their maps showing their primary recharge and wellhead protection areas (Figures 7.57 and 7.58). The City of Redmond completed their Wellhead Protection Report in 1997 and the NE Sammamish Sewer and Water District is developing a wellhead protection program.

Who: King County, the City of Redmond. The lead agency will be responsible for dissemination of reliable data about the location of the physically susceptible and recharge areas.

Priority: 1.5

Cost: No initial cost; accomplished by concurring with Ground Water Management Plan. King County Department of Natural Resources expects costs associated with further refinement of the maps of 0.25 FTE. King County Department of Development and Environmental Services Code Development: 0.06 FTE.

Source of funds: General agency funds would be used to disseminate mapped information. The aquifer protection funds would support further revision of the maps.

Issue 2 - Wellhead Protection: Public water system purveyors are required to develop state mandated Wellhead Protection Programs. Purveyors must delineate and adopt measures to protect Wellhead Protection Areas for each well or wellfield. The Ground Water Management Plan will fulfill some wellhead protection needs, by identifying issues and proposing management strategies. In order to accommodate the needs of hundreds of large public water systems, King County needs to develop strategies to aid wellhead protection programs in the unincorporated areas.

SA-2 Wellhead Protection: King County, the City of Redmond, public water system purveyors, and others jointly facilitate Wellhead Protection in King County by assigning to the Ground Water Management Committee (Management Committee) the following tasks:

- Develop and recommend for adoption by the Metropolitan King County Council minimum Wellhead Protection strategies for public water systems.
- Incorporate minimum wellhead protection strategies into the Ground Water Management Plan in order for their implementation to be eligible for funding by the aquifer protection funds.

Task 1: Develop minimum Wellhead Protection Strategies and recommend for adoption by the Metropolitan King County Council.

Task 2: Incorporate minimum Wellhead Protection Strategies into the first Ground Water Management Plan update or sooner by special action taken by elected official.

DATA
COLLECTION
&
MGMT

Updated
version
incl. →

nty Department of Natural Resources and the City of
via the Management Committee.

nty Department of Natural Resources 0.5 FTE King
partment of Development and Environmental Services
lopment 0.56 FTE.
tection funds.

2.2.2 Data Collection and Management Program

Long-term data collection of ground water quality and quantity, precipitation, and stream flow is necessary for the continued development of a conceptual characterization of ground water hydrology within the Ground Water Management Area. Further data collection and analysis is needed along with an expanded network of existing and new wells for the development of a conceptual model of ground water hydrology. The collected data needs to be entered into a database and analyzed to provide useful information for making resource management decisions. Data is collected and analyzed so that state and local agencies can:

- Determine water resource trends in ground water quality and quantity;
- Make informed decisions on such issues as land use and water rights;
- Plan for peak water use and population growth impacts;
- Develop and refine a water resource model;
- Respond to data requests from water agencies and other interested parties; and
- Respond to incidents such as water level declines.

★ **Issue 1: Data collection, analysis, and management.** An initial characterization of the aquifer hydrology in the Ground Water Management Area has been performed. Data collection and management was a vital part of this process. However, additional data collection and analysis is needed to refine the aquifer characterization and to facilitate long-term management of the resource.

DCM-1A Data collection, management, and analysis program: Develop and implement a data collection, management, and analysis program that:

- Collects data needed according to the Data Collection list.
- Continues data entry into the database, manages data for quality control and applicability to analytical techniques, standardizes formats, shares data with other agencies, and ensures data compatibility with other data collection efforts.
- Analyzes the data to:
 1. Refine a conceptual understanding of the ground water hydrology for determination of the available resource.
 2. Assesses impacts of land use on the resource, and

3. Determine if a single effective regional numerical model is needed or would be useful for ground water management.

Task 1: Tag existing and new wells where found.

Who: Seattle-King County Health Department; Ecology; the City of Redmond; utilities; well drillers; and volunteers.
Priority: 1
Cost: Seattle-King County Health Department: 0.5 FTE. The City of Redmond and utilities: To be determined by their voluntary participation.
Source of funds: Aquifer protection funds.

Task 2: Monitoring of water quality, water level, precipitation, and stream discharge parameters. Other activities listed in the Data Collection List would be conducted.

Who: King County Department of Natural Resources
Priority: 1
Cost: Non-FTE Costs: Year 1: \$298,000. Year 2 and ongoing: \$128,360.
Source of funds: Aquifer protection funds.

Task 3: Enter data collected into King County Department of Natural Resources database. Maintain database and provide data regularly to Ecology, the City of Redmond, and water districts.

Task 4: Development of a numerical or computerized ground water hydrology model

Who: King County Department of Natural Resources
Priority: 1
Cost: King County Department of Natural Resources: 1 FTE.
Source of funds: Aquifer protection funds, General Agency Funds.

DCM-1B Data transfers with Ecology: Ecology will input local ground water management area data into Ecology's ground water data base.

Who: Ecology
Priority: 1
Cost: 0.06 FTE.
Source of funds: General Agency Funds.

2.2.3 Ground Water Quality and Quantity Issues Associated with Stormwater Management

Past and present stormwater management practices account for some ground water quantity and quality problems. Ground water quality may be impacted if stormwater

containing contaminants is recharged intentionally or inadvertently. Also, an amount of precipitation that, under natural conditions, would be recharged to ground water is often diverted to surface water. As a result, there is a decrease in the quantity of recharge to ground water.

Issue 1 - Runoff Versus Recharge. The King County Surface Water Design Manual encourages infiltration as a method of stormwater management. The Manual requires that there be no increase in peak runoff rates. Potential ground water recharge could be lost to surface runoff resulting in depletion of aquifers. Many cities in Ground Water Management Areas have adopted or use the King County Surface Water Design Manual for reference in their stormwater management programs and, therefore, are likely following the same policy towards infiltration.

ST-1A Runoff Versus Recharge: King County and the City of Redmond will amend/adopt surface water design manuals to promote that runoff be infiltrated in high and moderate physically susceptible areas where site conditions permit, except where potential ground water contamination cannot be prevented by pollution source controls and stormwater pretreatment. The Department of Ecology's Stormwater Management Manual for the Puget Sound Basin provides the preferred guidance.

Who: King County and the City of Redmond.
Priority: 2
Cost: To be determined.
Source of funds: City of Redmond and King County general funds.

Issue 2 - Ground Water Quality Concerns. Numerous studies have demonstrated that non-point source pollution is a major contributor to ground water degradation. Water quality controls and infiltration of stormwater will increasingly be used to reduce non-point source pollution affects upon both surface and ground water resources. Technology associated with these practices is in early stages and long term affects on ground water quality are unknown. While water quality controls will improve the quality of the water discharged to the ground, the increasing emphasis on infiltration poses risks. Infiltration will be employed most often in areas with glacial and alluvial soils associated with aquifer recharge areas. Regardless of how comprehensive new requirements may be, treatment systems will sometimes fail for a variety of reasons and they cannot be expected to function optimally at all times. Additionally, non-point source pollution that is not borne by stormwater will infiltrate and reach ground water regardless of stormwater management techniques.

ST-2A Ground Water Quality Concerns - Facility Requirements: King County and the City of Redmond within the Ground Water Management Area will require that all types of stormwater facilities be designed to protect ground water quality. The Ground Water Advisory Committee supports the changes to the *Surface Water Management*

Design Manual, to meet the State's requirements to protect ground water quantity and quality.

ST-2B Ground Water Quality Concerns - Study: King County will sponsor study of the effectiveness of the current best available treatment facilities. As part of this study, King County should monitor discharges from these facilities in actual use and prepare a report of findings. The report will recommend whether this type of facility is effective in preventing ground water quality degradation and if it should be used to retrofit existing stormwater quality facilities with documented water quality impacts. Based upon this report, King County will give physically susceptible and recharge areas and Wellhead Protection Areas high priority for water quality facility retrofit as warranted.

Who: King County, the City of Redmond.
Priority: 2
Cost: City of Redmond does not expect additional costs for this action. The program needs to be developed to determine costs; King County Water and Land Resources to provide information, but is expected to be done under existing budget. King County Department of Natural Resources, 0.06 FTE.
Source of funds: Aquifer protection fund.

★ **Issue 3 - Education.** Considerable effort is underway to educate the public regarding the prevention of non-point pollution and improper disposal of hazardous materials. Agencies or jurisdictions involved include King County, the City of Redmond, the Puget Sound Water Quality Authority, Ecology, the King Conservation District, the Natural Resources Conservation Service, public and private schools, and others. Existing educational materials should be evaluated to determine if they stress the interrelationship between surface and ground water pollution.

ST-3 Education. The Ground Water Advisory Committee recommends that King County and the City of Redmond will jointly carry out a ground water education program. In regards to stormwater management, this effort will ensure that educational activities are adequate to communicate to the public: how ground water may become contaminated via surface water pollution, and ways in which ground water recharge may be encouraged. Educational efforts related to stormwater management are included in the Education Section.

Issue 4 - Coordination Between Surface and Ground Water Planning Efforts. Surface and ground water planning efforts should be effectively coordinated in order to make the best use of limited resources.

ST-4A Coordination Between Surface and Ground Water Planning Efforts - Ecology Programs: Ecology will assess its surface and ground water quality planning programs to determine how they could be combined or coordinated in a way which is both scientifically justified and which provides for greater efficiency.

Who: Ecology.
Priority: 2
Cost: 0.32 FTE
Source of Funds: General agency funds.

ST-4B Coordination Between Surface and Ground Water Planning Efforts - Puget Sound Water Quality Authority: The Puget Sound Water Quality Authority recognizes that surface and ground water form a continuous and dynamic system which must be comprehensively protected. The Puget Sound Water Quality Management Plan should be revised to address all water quality issues in the Puget Sound drainage basin, including ground water.

Who: Puget Sound Water Quality Authority.
Priority: 2
Cost: No additional costs.

ST-4C Coordination Between Surface and Ground Water Planning Efforts - King County: King County will assess its water resource planning efforts to determine how to effectively coordinate them to provide the best possible protection of water resources. The Metropolitan King County Council recognized this need when they transferred the ground water program into the Surface Water Management Division of the Department of Natural Resources. Surface Water Management (now called the Water and Land Resources) Division staff is currently assessing how to best provide comprehensive water resource management (i.e., surface water, ground water, and sewage treatment).

Who: King County Department of Natural Resources.
Priority: 2
Cost: King County Department of Natural Resources
Source of Funds: General agency funds.

✱ **Issue 5 - Roadway Runoff.** The State Highway Runoff Program provides for improved water quality and quantity controls for stormwater runoff from new and existing state highways. The *King County Surface Water Design Manual* requires water quality and quantity controls for new roadways in King County. Many cities have similar requirements. However, state and local programs may not address ground water quality and quantity problems associated with existing roadways. Existing contamination problems may be identified via Basin Plans developed by King County Water and Land Resources Division in cooperation with the City of Redmond and via other processes to identify needed capital improvements. King County and the City of Redmond then address the problems identified as funding allows.

ST-5 Roadway Runoff: King County and the City of Redmond will:

- Direct their transportation or public works departments to give high priority to physically susceptible and recharge areas and Wellhead Protection Areas when identifying and correcting water quality problems associated with existing roadways, and
- Develop a program to retro-fit existing structures, as required by the National Pollutant Discharge Elimination System, and require stormwater quality and quantity controls comparable to new regulations when conducting major renovation or widening of roads.

King County Department of Transportation, Road Services Division does not concur with the first bullet under ST-6. This item is placed in the Unfinished Agenda, noting Department of Transportation, Road Services Division concerns.

Who: King County Department of Natural Resources and the City of Redmond.
 Priority: 2
 Cost: City of Redmond; no additional King County: costs associated with regulation development and implementing the regulation need to be determined.
 Source of Funds: Stormwater utility fees or development impact fees allowed under the Growth Management Act may be used to fund improvements made during road renovation or widening.

Issue 6 - Soil Amendment. Glacial till soils impede the infiltration of precipitation and are associated with relatively high runoff volumes subsequent to clearing of natural vegetation. Pesticides and nutrients used in landscaping may be carried off-site with runoff instead of being retained in the soil where they can be used or broken down by natural processes. Contaminated runoff is carried to aquifer recharge areas where it may contribute to ground water contamination.

ST-6 Soil Amendment: King County and the City of Redmond will jointly evaluate the ground water quality and quantity benefits of soil amendment. The Center for Urban Water Resources, University of Washington would be asked to participate in the study. Soil amendment requirements shall be implemented if the proposed research proves to be a practical method of improving water quality, increasing infiltration, and reducing stormwater runoff.

Who: King County; the City of Redmond; and Center for Urban Water Resources, University of Washington.
 Priority: 2
 Cost: To be determined with input from the Center for Urban Water Resources Management. Estimate 0.25 FTE for King County Department of Natural Resources.

Source of Funds: A Centennial Clean Water Fund grant should be sought. Local governments would need to pool resources for matching funds. Other grant sources may also need to be explored. Alternatively, local governments could pool their resources to fund the study.

2.2.4 Ground Water Education Program

Providing citizens with information on ground water resource management and protection may be a particularly effective protection method. Understanding, caring, and commitment are needed to protect a resource that is found almost everywhere and is affected by a wide variety of land and water use activities. Although regulations may help, groups of informed citizens actively caring for their own backyard may be more effective. Providing technical assistance will not address all concerns but will entice some community members to take individual action.

A number of existing education programs focus on individual sources of contamination. However, there is no comprehensive ground water education program. A comprehensive approach is needed to:

- Aid in developing resource protection messages that are consistent regardless of the specific educational program;
- Coordinate with other resource protection programs that focus on a specific issue, such as solid waste, hazardous waste, or stormwater management; and
- Develop specific education activities and materials for point and non-point sources of contamination that do not have their own individual educational programs.

A comprehensive program would coordinate existing environmental education programs to develop compatible messages about ground water resources and ground water protection. This component would be accomplished by briefing environmental educators about King County's ground water system and supporting joint programs. The program would respond to local ground water quality and quantity concerns that are not already covered by other programs. This program would provide assistance for individual drinking water supplies, local planning efforts, and/or other ground water protection projects.

Providing information to citizens involved in community planning projects would be another aspect of this program. Increasingly, citizens are taking an active part in neighborhood planning efforts and are concerned about resource protection. As they develop these plans, whether addressing school siting, transportation routes, or zoning; citizens may need information about the ground water system in their community. This knowledge will assist them in addressing ground water protection measures within the context of their planning processes.

Issue 1 - Existing education. Considerable effort is underway to educate the public regarding the prevention of non-point pollution, conservation, well construction, and improper disposal of hazardous materials. Agencies or jurisdictions involved include King County Department of Natural Resources, Seattle-King County Department of Health, King County Cooperative Extension, King County Department of Development and Environmental Services, the City of Redmond, Puget Sound Water Quality Authority, Department of Ecology, King Conservation District, Natural Resources Conservation Service, and public and private schools. These agencies have developed a variety of educational materials; however, it has not been determined if these existing educational materials contain ground water resource protection information.

ED-1 Existing education: King County and the City of Redmond will jointly carry out a ground water education program which will review existing education activities and make use of these programs when applicable. The King County Department of Natural Resources will review applicable educational efforts in progress to determine whether the protection of ground water is emphasized. The King County Department of Natural Resources will seek the cooperation of the parties involved to include ground water information and concerns in the educational programs. Elements of the program are:

- Existing educational program content will be reviewed for agreement with Ground Water Management Plan policies and goals. The King County Department of Natural Resources will review the current educational programs of Natural Resources Conservation Service, Cooperative Extension, and others to ensure that the Ground Water Management Plan goals and policies are reflected;
- The Local Hazardous Waste Management Program in King County will coordinate with the Household Hazardous Waste Education Committee to include information about risks to ground water associated with the disposal of household hazardous wastes to on-site sewage systems as part of their household hazardous waste educational activities;
- King County, the City of Redmond, and water utilities will work with local nurseries, King County Cooperative Extension Service, and King County Conservation Districts to promote the availability of appropriate seed stocks, plants, and materials to facilitate implementation of xeriscaping (use of low-water use plants);
- The Education Program will support conservation education efforts in the schools and for the general public as described under Public Education in the Conservation Planning Requirements (Washington Water Utilities Council, Department of Health, Department of Ecology, March 1994);

- King County will educate residents about landscaping practices that promote aquifer recharge through an informational brochure prepared by Cooperative Extension and the King County Department of Natural Resources;
- The existing public information pamphlet concerning on-site sewage system maintenance and operation will be amended to provide instructions concerning proper household hazardous waste disposal practices prior to any scheduled reprinting;
- The Ground Water Management Plan Education Program will coordinate with and support the Department of Ecology's well identification, well construction, proper well maintenance, contamination sources, and well abandonment.

Issue 2 - New educational elements. Several issues and contaminant sources are not addressed by any existing education program upon which to build. These have been identified through the Redmond Bear Creek Valley Ground Water Advisory Committee consideration of ground water protection issues. These issues and contaminant sources need to be addressed as part of the educational program.

ED-2 New educational elements: King County and the City of Redmond will jointly carry out a ground water educational program which will develop specific educational activities and materials for sources of contamination. The King County Department of Natural Resources will report to the Ground Water Management Committee (Management Committee) on the adequacy of existing educational programs to address ground water concerns. This report will include proposed changes as a result of review and discussions carried out in the implementation of ED-1. King County Department of Natural Resources will then develop a supplemental educational program to address deficiencies identified above, if necessary, and present the program to the Management Committee for review and adoption.

New educational programs will be developed and implemented per the adopted Ground Water Advisory Committee actions below (this is a partial list, more elements are expected to be developed as the program progresses):

- King County will develop and carry out a public education program intended to increase awareness concerning proper on-site sewage system operation and maintenance, including the risks associated with disposal of hazardous wastes in such systems;
- King County and the City of Redmond will jointly educate homeowners and owners of exempt underground storage tanks regarding tank abandonment requirements of the Uniform Fire Code through the Ground Water Management Plan Education Program;

- Information about the relationship between solid waste disposal and ground water will be included in the education program;
- Many homeowners are unaware of their responsibilities with the requirements for home heating oil tank abandonment under the Uniform Fire Code, probably because no programs are in place about proper maintenance and abandonment. By providing educational material to tank owners, community knowledge about the problem will increase. Also, by increasing community awareness, it is expected that home purchasers would require information on tank status be disclosed;
- Other new program elements may be developed under direction from the Management Committee. Some possible tasks are:
 1. Support schools or individual teachers with an interest in ground water protection. Such support could include providing education materials or developing school skits.
 2. Work with neighborhood groups on neighborhood ground water protection efforts. This could include developing and installing interpretive signs, for example, signs explaining Wellhead Protection Areas.
 3. Develop a video on water resources for cable television and distribution to local video outlets.
 4. Sponsor informational booths at local fairs and displays at local libraries or bank lobbies.

Who: The King County Department of Natural Resources, in conjunction with applicable agencies, under direction of the Management Committee.

Priority: 1

Cost: 0.5 FTE per year. City of Redmond: 0.47 FTE. Northeast Sammamish Sewer and Water District: 0.04 FTE. Union Hill Water Association: 0.04 FTE.

Source of Funds: Aquifer protection funds.

2.3 Programs to Protect Ground Water Quality

The Ground Water Advisory Committee researched ten subject areas that potentially could affect ground water quality: hazardous materials management, underground storage tank management, on-site sewage treatment and disposal system use, use of pesticide and fertilizer, well construction and decommissioning, sewer pipes, solid waste landfills, burial of human remains, sand and gravel mining, and biosolids and sewage effluent. The goals, under which the individual management strategies were developed for these subject areas are:

Hazardous Waste Management. To ensure that ground water is not contaminated due to improper management of hazardous wastes.

Hazardous Material Spills. To ensure that spills of hazardous materials are prevented. To be adequately prepared to respond to spills of hazardous materials so ground water contamination is minimized.

Underground Storage Tank Management. To ensure that underground chemical and fuel storage tanks are managed adequately to prevent contamination of ground water in King County.

On-Site Sewage Treatment and Disposal System Use. To promote on-site sewage and treatment disposal planning and practices that are effective in protecting ground water resources from possible adverse impacts.

Use of Pesticide and Fertilizer. To prevent ground water contamination from the use of pesticide and fertilizer.

Well Construction and Decommissioning. To protect the ground water resource in King County by ensuring that proper well construction and decommissioning procedures are followed.

Sewer Pipes. To prevent the degradation of ground water which may be caused by wastewater leaking from gravity sewer pipes and side sewers, and to prevent the loss of water through infiltration to gravity sewer pipes and side sewers.

Solid Waste Landfills. To prevent the occurrence of ground water contamination problems associated with the operation of solid waste disposal facilities in King County.

Burial of Human Remains. To prevent the degradation of ground water from embalming fluids, disintegrating metal caskets, decaying human remains, and other materials associated with processing bodies for funeral burial or cremation.

Sand and Gravel Mining. To ensure that regulatory programs are adequate to prevent adverse affects on ground water quality attributed to sand and gravel mining operations, including reclamation.

Biosolids and Sewage Effluent. To provide assurance that the ground water in King County will not be contaminated by the reuse of wastewater effluent.

2.3.1 Ground Water Protection Issues Associated with Hazardous Materials Management

Industrial and commercial processes produce and use hazardous materials. However, the use of hazardous materials is not limited to industries and businesses. These materials are widely available and used by almost everyone to some degree. The impact of these substances on our environment, particularly ground water, is often determined by the management practices of the businesses and individuals who use them.

Issue 1 - State Hazardous Waste Plan. The Washington State Hazardous Waste Plan has identified many deficiencies in the existing state program to regulate hazardous waste. These deficiencies were identified by an Ecology-sponsored advisory committee made up of business leaders, government agency staff, elected officials, environmentalists, consulting firms, and educators over a period of two years. Ecology has stated in the plan that it is committed to carrying out the recommendations developed by the committee. Implementation of the recommended strategies is necessary in order for the state to manage hazardous wastes in a manner that will protect ground water.

HM-1 State Hazardous Waste Plan - Implementation: The Redmond-Bear Creek Valley Ground Water Advisory Committee adopts the following resolution: "The Ground Water Advisory Committee supports the findings and recommendations of the Washington State Hazardous Waste Plan. The Ground Water Advisory Committee requests that Ecology and the Washington State Legislature fund and carry out the provisions of the Plan with a sense of urgency in recognition of the threat posed to ground water from hazardous wastes." The Ground Water Advisory Committee will communicate this resolution to the Director of Ecology, the Assistant Director for Waste Management, and the Washington State Legislature. The request to effect the solutions recommended by the Washington State Hazardous Waste Plan will be communicated to Ecology during the review and certification process for the Ground Water Management Plan. No further action is necessary.

Issue 2 - Hazardous Waste Facilities Zones. King County has not designated zoning categories in which hazardous waste storage and treatment facilities may be considered for siting. Failure to designate such zones will result in preemption by Ecology of local government jurisdiction over interpretation of zoning codes for facility siting. This preemption would not be permanent since jurisdiction would be returned to local government upon designation of hazardous waste facility zones.

Issue 3 - Implementation of the Uniform Fire Code. Article 80 of the Uniform Fire Code is a valuable tool to prevent hazardous material spills in business, industrial, and institutional settings. Two major obstacles limit comprehensive implementation of Article 80. Many jurisdictions within the Ground Water Management Areas have not fully developed their hazardous materials programs. They lack adequate staff, training, and enforcement tools to implement Article 80. Additionally, the State Building Code Council has adopted a less stringent version of Article 80 that exempts important

hazardous materials from full regulation by fire protection agencies. Some businesses and industries have been exempted from the requirement for Hazardous Materials Management Plans and Hazardous Materials Inventory Statements. Some local jurisdictions within Ground Water Management Areas have not passed ordinances to retain the original scope of Article 80.

HM-3 Implementation of the Uniform Fire Code: King County will:

- Commit staff and funding to comprehensive implementation of Article 80 in both new and existing facilities using both educational and regulatory approaches;
- Propose ordinances for adoption, if they have not already done so, that provide adequate enforcement tools to ensure compliance with Article 80 and that restore the requirements for:
 1. Hazardous Materials Management Plans,
 2. Hazardous Materials Inventory Statements, and
 3. Storage requirements for "Carcinogens, irritants, sensitizers, and other health hazard solids, liquids, and gases" found in Uniform Fire Code 80.315; and
- Emphasize regulatory attention and educational activity in the most physically susceptible and recharge areas.

Tasks 1 and 2. Hazardous materials program development and implementation.

Who: King County Fire Marshal
Priority: 2
Costs: To be determined
Source of Funds: To be determined

Task 3. Evaluation of hazardous materials programs.

Who: King County Department of Natural Resources
Priority: 2
Costs: 0.5 FTE.
Source of Funds: Aquifer protection funds.

Issue 4 - Implementation of the Emergency Planning and Community Right-to-Know Act. Most experts conclude that the King County Local Emergency Management Plan does not adequately address ground water issues associated with large chemical spills. The Local Emergency Management Plan has not, to date, considered the locations of sensitive areas, such as aquifer protection areas, in developing emergency response measures. This is because of the lack of available information.

HM-4 Implementation of the Emergency Planning and Community Right-to-Know Act: King County, as lead agency for the Local Emergency Management Plan, and the

City of Redmond will consider ground water protection in the Local Emergency Management Plan:

- A hazard analysis that takes into consideration the locations of physically susceptible areas, Well Head Protection Areas, Sole Source Aquifers and public water systems using ground water sources; and
- Firefighting techniques and emergency response techniques that favor ground water protection in physically susceptible and recharge areas.

The King County Department of Natural Resources will:

- Provide maps of physically susceptible and recharge areas and well locations to the King County Office of Emergency Management.
- Provide information regarding emergency response techniques necessary to protect aquifers and wells for Local Emergency Plan Committee consideration, and incorporation into the Local Emergency Management Plan;
- Review existing literature and determine the need to contract for a consultant with emergency management expertise; and
- Develop recommendations in conjunction with the Office of Emergency Management, as coordinator of the Local Emergency Plan Committee. It is recommended that the King County Department of Natural Resources, work through the Local Emergency Management Plan process.

The King County Department of Natural Resources will discuss funding with the King County Office of Emergency Management Manager and the City of Redmond's fire department. The goal of these discussions is to determine whether implementation can be funded by an industry supported program. The possibility of supplementing hazardous materials permit fees with aquifer protection fees will also be considered.

Task 1. Include ground water protection measures in the Local Emergency Management Plan.

Who: King County Office of Emergency Management in cooperation with members of the Local Emergency Planning Committee.
Priority: 2
Costs: To be determined by King County Office of Emergency Management Manager.
Source of Funds: To be determined.

Task 2. Communicate the locations of physically susceptible and recharge areas and wells to emergency responders.

Who: King County Department of Natural Resources
Priority: 2

Costs: Negligible. The work involved in preparing/obtaining maps is accounted for in the Data Collection and Management section.

Task 3. Prepare a report for the Office of Emergency Management concerning fire fighting and emergency response techniques that are protective of ground water for consideration by the Local Emergency Plan Committee.

Task 4. Develop recommendations in conjunction with the King County Office of Emergency Management regarding fire fighting and emergency response techniques for inclusion in the Local Emergency Management Plan. Ensure that this information is shared with emergency responders throughout King County.

Task 5. Report on the progress of development and implementation of the Local Emergency Management Plan in relation to Ground Water Advisory Committee concerns.

Who: King County Department of Natural Resources
Priority: 2
Costs: 0.25 FTE. Consultant contract: Amount to be determined.
Source of Funds: Aquifer protection funds.

Issue 5. Prevention of aquifer contamination associated with transportation-related hazardous material spills. An assessment of the risk of aquifer contamination from transportation-related hazardous material spills in King County could provide information regarding the significance and characteristics of this problem. The information obtained could be used to identify risk reduction strategies.

HM-5A Transportation-Related Hazardous Materials Spills - Purveyor Assessment: Purveyors of large public water systems (1,000 connections or more) will:

- Assess the risk of transportation-related hazardous material spills in their Wellhead Protection Programs, and
- Develop and implement risk reduction strategies as needed.

Who: Public water system purveyors (1,000 connections or more).
Priority: 2
Costs: City of Redmond: no additional. Union Hill Water Association: 0.01 FTE. NE Sammamish Sewer and Water District: 0.02 FTE.
Source of Funds: Purveyors operating budgets with some aquifer protection funds support.

HM-5B Transportation-Related Hazardous Material Spills - Management Committee Evaluation: The Ground Water Advisory Committee resolves that it will be the responsibility of the Ground Water Management Committee to evaluate the

recommendations developed and actions taken by the Washington State Department of Health's Transportation Engineering Subcommittee in order to determine whether further actions should be taken on a county-wide basis to protect aquifers from transportation-related hazardous material spills.

Who: Ground Water Management Committee.
Priority: 2
Costs: Costs associated with the functions of the Management Committee are accounted for in Chapter 3, Table 3.8.1. No further costs anticipated.

Who: King County Department of Natural Resources (Prepare a brief evaluation of progress made by purveyors in addressing this issue for the Ground Water Advisory Committee and the Ground Water Management Committee.)
Priority: 2
Costs: 0.08 FTE.
Source of Funds: Aquifer protection funds.

2.3.2 Ground Water Concerns Associated with Underground Storage Tank Management

Commercial underground petroleum and chemical storage tanks represent perhaps the most significant potential threat to ground water quality in King County. Leakage from underground storage tanks and associated piping often occurs without detection and even relatively small amounts of certain compounds can have serious adverse impacts on ground water quality. Once released from an underground storage tank, some volatile organic compounds and petroleum products can rapidly migrate to ground water.

The precise number of underground storage tanks that are located in King County is not known. However, Ecology estimates that at least 6,550 such tanks are currently in operation, not including home heating oil tanks. Underground storage tanks are regulated by federal, state, and local governments. Private sector insurance and lending institutions also bring pressure to bear upon owners and operators of underground storage tanks to install and maintain those systems in a manner which reduces liability risks through avoiding releases.

Leaking underground home heating oil tanks may present a threat to ground water quality. Both federal and state regulations adopt a less aggressive approach to regulation of underground heating oil tanks, however, because of heating oil's chemical constituency and low potential for migration through the soil.

Potential problems associated with home heating oil tanks include leakage from operating tanks and releases from improperly abandoned tanks containing residual product. Many of the existing home heating oil tanks within King County are likely to be bare steel tanks

without cathodic protection and, as such, a large percentage may be leaking or will leak in the future.

Issue 1 - Augment State Underground Storage Tanks Program. The underground storage tank management program administered by Ecology does not possess resources necessary to field check and monitor for compliance with regulations.

UST-1A Augment State Underground Storage Tanks Program: King County Department of Natural Resources and the City of Redmond will prepare a petition to Ecology to designate Ground Water Management Areas as Environmentally Sensitive Areas under Chapter 90.76 RCW, the state Underground Storage Tank Management Act for Metropolitan King County Council and City of Redmond's consideration.

An Environmentally Sensitive Area designation under authority of Chapter 90.76 RCW is not synonymous with an Environmentally Sensitive Area designation under Chapter 197-11-908 WAC of the State Environmental Policy Act; although, a single area could be designated as an Environmentally Sensitive Area under both Chapter 90.76 RCW and SEPA. Designation under RCW 90.76 affects only the construction and operation of underground storage tanks while designation under SEPA is to eliminate certain categorical exemptions.

UST-1B Augment State Underground Storage Tank Program: King County Department of Natural Resources will prepare a program and related ordinances to enhance the current inspection of underground storage tank installation and removal in Environmentally Sensitive Areas to include the relevant requirements of Chapter 173-360 WAC Underground Storage Tank Regulations for Metropolitan King County Council and City of Redmond's consideration.

The City of Redmond cannot concur with UST - 1B, because it needs more time to review the item for impact on personnel and procedures. The Ground Water Advisory Committee recommends that Redmond's participation in this action be placed into the Unfinished Agenda.

Task 1: Prepare and submit petition to designate Ground Water Management Areas as Environmentally Sensitive Areas. After Environmentally Sensitive Area designations, there may be additional work, such as publicity, mapping, and notifying affected agencies.

Task 2: To enhance current inspection program of underground storage tank installation and removal in Environmentally Sensitive Areas to include the relevant requirements of Chapter 173-360 WAC, the state Underground Storage Tank Regulations, the following steps must be undertaken:

- Determine local regulatory authority;

- Develop elements of an enhanced program, including training and evaluation;
- Determine role of local agencies in implementation; for example, the King County Fire Marshal's office and local fire service jurisdictions could assume responsibility for underground storage tank management, provided that they have the capacity; and,
- Amend ordinances as necessary to implement program.

Task 3: Develop and implement a training program for inspectors regarding requirements of the Underground Storage Tank Regulations in order to carry out the inspections referred to in Task 2. The Management Committee must decide who is to provide this training. This program includes determining the additional training needed, identifying inspectors in need of training, and training all inspectors within a given time frame.

Task 4: Determine how to modify local program based upon: Ecology's annual reports evaluating the state underground storage tank program, and an annual review of the effectiveness of local programs and developing evaluation methods.

Who: Tasks 1, 2, 3, 4: King County Department of Natural Resources under Management Committee direction. Task 3: Management Committee to determine.

Priority: 2

Cost: Minimum King County Department of Natural Resources staff: 0.5 FTE

Source of Funds: The enhanced local program would be funded by industry in the form of increases in current inspection fees and supplementary annual tank fees. The latter may be used to pay for training of inspection staff. Other tasks could be funded through the aquifer protection funds.

UST-1C Augment State Underground Storage Tank Program: The King County Department of Natural Resources will prepare an ordinance for Metropolitan King County Council consideration regarding underground tanks requiring disclosure at the time of sale of any real property in King County of the number, location, and legal status of existing underground chemical storage tanks and secondary containment for all new tanks.

Who: King County Department of Natural Resources.

Priority: 2

Cost: 0.08 FTE.

Funding Source: Aquifer protection funds.

Issue 2 - Exempt Tanks. Chapter 173-360 WAC, the state Underground Storage Tank Regulations, are reactive in some respects. The regulations focus on monitoring and post-leak detection rather than prevention of leaks. Construction and monitoring requirements still allow leaks and consequently contamination of the environment.

Additionally, certain classes of underground storage tanks are partially or completely exempt from federal and state regulation.

UST-2A Exempt Tanks: King County Department of Natural Resources will prepare an ordinance for Metropolitan King County Council consideration requiring secondary containment for underground chemical storage tanks as defined by Chapter 173-360-120 WAC and for the following exempt or deferred tanks: heating oil tanks of all sizes and motor fuel tanks of 1,100 gallons or less.

Who: King County Department of Natural Resources under Management Committee advisement.
Priority: 2
Cost: King County Department of Natural Resources: 0.08 FTE.
Funding Source: Aquifer protection funds. Plan review by fire protection agencies would be fee supported.

UST-2B Exempt Tanks: The King County Department of Natural Resources will prepare an ordinance for the Metropolitan King County Council's consideration regarding underground tanks requiring that all underground chemical storage tanks without secondary containment that are in use and exempt from the state Underground Storage Tank Regulations must be tested at regular intervals for integrity by qualified personnel and tagged to either allow or prohibit future product delivery.

Who: King County Department of Natural Resources.
Priority: 2
Cost: 0.08 FTE.
Funding Source: Aquifer protection funds.

Issue 3 - Heating Oil Tanks. Home heating oil tanks may not be maintained or abandoned properly. Homeowners are often unaware of requirements for the proper operation and abandonment of underground heating oil tanks. Currently, no programs are in place to educate citizens or provide incentives for proper operation and abandonment. Also, homeowners are reluctant to abandon tanks properly and under permit due to fears over the possible expense associated with remediating a site with contaminated soil.

Also, the extent of the threat to ground water associated with underground heating oil tanks, including those serving single family residences, is unknown. Locating these tanks would help in determining the potential threat. It is unknown how many of these tanks are in the Ground Water Management Areas or where they are located.

UST-3A Heating Oil Tanks - Abandonment and Maintenance: The King County Department of Natural Resources will prepare an ordinance for the Metropolitan King County Council's consideration regarding underground tanks containing the following provisions for home heating oil tanks:

- Prior to release of any permits associated with energy conversions (gas piping, electrical, etc.), proof must be provided to the permitting department from the Fire Marshal or jurisdictional fire chief that the underground heating oil tank was abandoned in accordance with regulations; and
- Underground heating oil tanks that are abandoned in place must be filled with a material that precludes further storage of any chemical in the tank.

Who: King County Department of Natural Resources.
 Priority: 2
 Cost: 0.08 FTE.
 Funding Source: Aquifer protection funds.

UST-3B Heating Oil Tanks - Location: King County and the City of Redmond will develop a database describing and locating underground heating oil tanks. This includes: developing and maintaining a database on tank location by collecting and entering information (existing and new); analyzing the data periodically; and providing location information to the Education Program and other users, such as Ecology.

Who: The King County Department of Natural Resources under Management Committee direction.
 Priority: 2
 Cost: King County Department of Natural Resources: 0.25 FTE. City of Redmond: No additional cost.
 Funding Source: Aquifer protection funds.

UST-3C Heating Oil Tanks - Education: King County and the City of Redmond will jointly educate homeowners and exempt tank owners regarding tank abandonment requirements of the Uniform Fire Code through the Ground Water Management Plan Education Program. This will be included in the Education Program.

2.3.3 Ground Water Quality Issues Relating to On-Site Sewage Treatment and Disposal System Use

Ground water contamination associated with domestic on-site sewage system effluent can involve a number of contaminants including nitrate, bacteria, viruses, and trace organic chemical compounds. Nitrate is often considered the most significant contaminant associated with domestic wastewater since it is highly resistant to removal from treatment mechanisms present in the soil profile. Bacteria and viruses can be attenuated during migration through a few feet of fine to medium textured soils provided unsaturated flow conditions can be maintained. If on-site sewage systems are improperly designed or constructed, installed in inadequate soils, used at too high of a development density, or used to dispose of non-domestic wastewater, they can adversely affect surface and ground

water quality as well as public health. The King County Comprehensive Plan contains these policies about on-site systems:

F-315 On-site wastewater treatment systems in the Rural Area and Natural Resource Lands should be designed, built and operated as permanent methods of sewage disposal.

F-316 King County should monitor on-site systems that have shown evidence of failure or potential for failure. The data should be used to correct existing problems and prevent future problems. King County should analyze public funding options for correcting on-site wastewater system failures which may include, where feasible and otherwise consistent with this Plan, conversion to community sewage system or installation of public sewers.

Issue 1 - Nitrate Concerns. The designs of most on-site sewage treatment and disposal systems installed in Type 1 soils prior to April 1987, the implementation date of King County Board of Health Title 13, did not incorporate enhanced treatment technology. These systems often support development densities that exceed one residential unit per acre. The poor treatment efficiency of conventional on-site sewage systems installed in coarse textured soils suggests a potential for nitrate contamination of underlying ground water, especially in areas where the density of on-site sewage systems is relatively high. Nitrate concentrations may build up in the zones of contribution to public water system wells to unacceptable levels, potentially resulting in irreversible loss of drinking water supplies.

OS-1 Nitrate Concerns: The Redmond-Bear Creek Valley Ground Water Advisory Committee requests that the following be considered by the Management Committee:

- Require that Wellhead Protection Programs for systems serving over 1,000 connections incorporate nitrate loading analysis in determining the level of risk to public water supplies associated with on-site sewage treatment and disposal systems and other sources of nitrate;
- Collaborate with land use authorities to require alternative methods of development and/or revised land use for tracts of undeveloped land overlying ground water aquifers with unacceptable levels of nitrate (greater than 5 mg/l); and
- Collaborate with the King County Board of Health to require alternative methods of sewage disposal in areas where nitrogen levels in underlying ground water are unacceptable (more than 5 mg/l).

Who: Management Committee.
Priority: 2
Cost: To be determined.
Fund Source: Aquifer protection funds.

Issue 2 - Hazardous Materials. Some types of commercial, industrial, and institutional facilities use or store hazardous materials in their day to day operations or dispose of hazardous wastes. In these cases, there may be an opportunity for hazardous materials to be discharged to on-site sewage treatment and disposal systems.

OS-2A Hazardous Materials: Seattle-King County Department of Public Health should:

- Inventory commercial, industrial, and institutional facilities served by on-site sewage treatment and disposal systems which potentially use, store, or dispose of hazardous materials;
- Educate operators regarding hazardous materials management, and;
- Selectively monitor those facilities that appear to represent a significant risk to ground water quality.

Who: Seattle-King County Health Department. Some education of operators is conducted through the Local Hazardous Waste Management Program.

Priority: 2

Cost: 0.25 FTE

Funding Source: Aquifer protection funds.

OS-2B Hazardous Materials: The Seattle-King County Health Department will prepare amendments to Title 13 of the Code of the King County Board of Health to expressly prohibit the use of on-site sewage systems for disposal of any materials or substances other than domestic sewage as defined in Chapter 246-272-010 WAC for King County Board of Health consideration.

Who: Seattle-King County Health Department.

Priority: 2

Cost: 0.04 FTE.

Funding Source: Aquifer protection funds.

Issue 3 - Household hazardous wastes. Household hazardous wastes can enter the wastewater stream when residues from cleaning and paint products or quantities of unwanted chemical substances are poured into a sink or toilet for disposal. When discharged to an on-site sewage system, household hazardous wastes may pass through the system and migrate to underlying ground water. While wastes from any single residence are not likely to have detectable impacts on underlying ground water, the cumulative affects of many residences may be significant. Many people are unaware that common household products often contain chemical compounds that can represent an environmental or even public health hazard if improperly handled.

OS-3A Household Hazardous Wastes: The Local Hazardous Waste Management Program in King County will coordinate with the Household Hazardous Waste Education Committee to include information about risks to ground water associated with the disposal of household hazardous wastes to on-site sewage systems as part of their household hazardous waste educational activities.

Who: Seattle-King County Health Department
Priority: 2
Cost: 0.125 FTE.
Funding Source: Aquifer protection funds.

OS-3B Household Hazardous Waste: The Seattle-King County Health Department will develop and carry out a public education program intended to increase the awareness of proper on-site sewage system operation and maintenance, including the risks associated with disposal of hazardous wastes in such systems. This is included in the Education Program.

Issue 4 - Operation and Maintenance. Homeowners and businesses may not be aware of the location and proper operation and maintenance of on-site sewage treatment and disposal systems.

OS-4A Operation and Maintenance: The Seattle-King County Health Department will prepare amendments to Title 13 of the Code of the King County Board of Health for consideration by the King County Board of Health to require that the as-built on-site sewage treatment and disposal system plan be recorded with the property deed in order that it be transferred with the title at the time of property purchase. In addition, information concerning the relationship between on-site system maintenance and operation practices and ground water protection should be added to the standard as-built plan form.

Who: Seattle-King County Health Department.
Priority: 2
Cost: 0.04 FTE.
Funding Source: Aquifer protection funds.

OS-4B Operation and Maintenance: The Seattle-King County Health Department will evaluate a county-wide on-site sewage system management program to determine its potential effectiveness in protecting ground water.

Who: Seattle-King County Health Department.
Priority: 2
Cost: 0.5 FTE.
Funding Source: Aquifer protection funds.

2.3.4 Ground Water Quality Issues Related to the Use of Pesticide and Fertilizer

Pesticides and fertilizers are used for the control of plant and animal pests and promotion of plant growth. Pesticides and fertilizers are used at home, right-of-way (ROW) maintenance, agriculture, and forestry. Pesticides and fertilizer have the potential to contaminate ground water when they are used improperly. The King County Comprehensive Plan policy, NE-502 states that King County should actively encourage the use of environmentally safe methods of vegetation control and that herbicide use should be minimized.

Issue 1 - Pesticide and Fertilizer Use. Use of pesticides and fertilizer may pose a threat to ground water quality.

PF-1A Pesticide and Fertilizer Use: King County will encourage and support the development of Farm Plans using Best Management Practices for any agricultural user of pesticide and fertilizer in physically susceptible areas.

Who: King Conservation District.
Priority: 3
Cost: 0.87 FTE
Funding Source: Aquifer protection funds.

PF-1B Pesticide and Fertilizer Use: King County and the City of Redmond will evaluate the Cooperative Extension Pesticide Reduction Program for effectiveness for protecting ground water and applicability to the Ground Water Management Areas.

Who: Evaluate Program by Cooperative Extension and local jurisdictions under direction of the Management Committee
Priority: 3
Cost: No additional cost, the evaluation is included in the program
Funding Source: No funding is necessary.

PF-1C Pesticide and Fertilizer Use: For road and utility rights-of-way in physically susceptible and recharge areas, King County and the City of Redmond will use non-chemical vegetation maintenance practices or will use only chemicals which, when approved application methods are used, do not pose a threat to ground water quality. King County and the City of Redmond will determine if maintenance practices by other parties for roads and utility rights-or-way in physically susceptible and recharge areas need to be restricted to non-chemical methods or chemicals which, when approved application methods are used, do not pose a threat to ground water quality. King County and the City of Redmond will encourage similar practices in non-critical physically susceptible and recharge areas. The Ground Water Advisory Committee encourages the Washington State Department of Transportation, Washington State Parks and Recreation

Commission, Burlington Northern, Weyerhaeuser and other forest owners, and public and private utilities to follow these maintenance practices.

This action is supported by King County Comprehensive Plan policy, NE-502 which states that King County should actively encourage the use of environmentally safe methods of vegetation control and that herbicide use should be minimized. A good example of this type of program is the King County Department of Transportation, Road Services Division, which developed and implemented an integrated pest management program.

Who: King County Department of Natural Resources and the City of Redmond. The City of Redmond intends to follow this recommendation. However, the City would need to determine which regulation to place this in, which sections of the City need to coordinate, and how much it could cost.

Priority: 3

Cost: King County Department of Natural Resources, 0.15 FTE. King County Department of Development and Environmental Services, Code Development: 0.5 FTE. The City of Redmond costs to be determined.

Funding Source: Aquifer protection funds.

Issue 2 - Education and Proposed Programs. Many issues concerning the use of fertilizers and pesticides are best addressed by Ecology's State Strategy and the *Puget Sound Water Quality Management Plan* and various associated educational efforts. Implementation of many of the programs outlined in the State Strategy and the Puget Sound Water Quality Management Plan depend upon funding from the Washington State Legislature and other sources. Existing educational efforts may not stress the need for ground water protection or reflect the goals of the Ground Water Management Plan.

PF-2A Education and Proposed Programs: The Redmond-Bear Creek Valley Ground Water Advisory Committee supports the strategies enumerated in Ecology's *Protecting Ground Water: A Strategy for Managing Agricultural Pesticides and Nutrients* (April 1992) and the 1991 *Puget Sound Water Quality Management Plan* (HHW-2: Information and Education on Less Toxic Alternatives for Household Products and NP-17: Puget Sound Pest Management Information Program) to help insure that operators of small farms and homeowners receive more information about pesticide and fertilizer use. This is accomplished by including it in the Plan, no additional action is necessary.

PF-2B Education and Proposed Programs: The content of existing educational programs will be reviewed for agreement with Ground Water Management Plan policies and goals. The King County Department of Natural Resources will review the current educational programs of the Natural Resources Conservation Service, the Cooperative Extension Service, and others to ensure that the Ground Water Management Plan goals

and policies are reflected. This will be conducted as part of the Ground Water Management Plan Education Section.

2.3.5 Ground Water Quality Issues Related to Well Construction and Decommissioning

Wells provide a link between an aquifer and the earth's surface. Modern wells consist of a well casing that extends downward from the ground surface to the aquifer within a cylindrical bore hole. The Minimum Standards for Construction and Maintenance of Wells (Chapter 173-160 WAC) requires that the space between the casing and the wall of the bore hole be sealed to prevent vertical movement of water along the outside of the casing. If this space is not adequately sealed, it may serve as a conduit by which contaminated surface or subsurface water may travel into an aquifer. Also the regulations require that any well that is unusable, whose use has been permanently discontinued, which is in such disrepair that its continued use is impractical, or is an environmental, safety, or public health hazard, must be decommissioned.

Issue 1 - State Program. Existing regulations for well construction and decommissioning are not adequately enforced. Ecology does not receive enough funding to inspect more than a small percentage of wells during construction or decommissioning.

WC-1A State Program: Ecology, King County, and the City of Redmond will support legislation that provides sufficient funding for a complete well construction and decommissioning program.

Task 1: Develop and submit legislation, with input from affected parties.

Who: Ecology.
Priority: 2
Cost: 0.64 FTE.
Funding Source: Agency General Funds.

Task 2: Support proposed legislation.

Who: King County and the City of Redmond.
Priority: 2
Cost: Probably minimal, to be determined. No additional cost to City of Redmond.
Funding Source: Agency general funds.

WC-1B State Program: King County and Ecology will develop a local health department program for implementation of the delegated portion of the well construction and decommissioning program in King County.

Who: Ecology and Seattle-King County Health Department.

Priority: 2
Cost: Seattle-King County Health Department: 0.5 FTE. Ecology: 0.64 FTE.
Funding Source: Aquifer protection funds.

Issue 2 - Well Identification. Wells need to be identified so that Ecology may implement their programs to protect the ground water resource. There is no method to systematically identify wells. Wells that were drilled before 1973 were not required to submit well logs to Ecology, and there is no program to identify wells that should be decommissioned.

WC-2A Well Identification: King County Department of Natural Resources will develop an ordinance for Metropolitan King County Council consideration that requires sellers to disclose to buyers the existence of used or unused wells on their property. The Ground Water Advisory Committee encourages Ecology to prepare draft legislation to require sellers to disclose to buyers the existence of used or unused wells on their property.

Who: King County Department of Natural Resources.
Priority: 2
Cost: 0.08 FTE.
Funding Source: Aquifer protection funds.

WC-2B Well Identification: King County Department of Natural Resources will develop an ordinance for Metropolitan King County Council and the City of Redmond's consideration that require applicants to establish the location and status of wells present on their property when that property is the subject of State Environmental Policy Act review, rezone applications, and/or land use permit applications. King County and the City of Redmond will provide this information to Ecology.

Who: King County Department of Natural Resources and Ecology
Priority: 2
Cost: 0.08 FTE for King County; 0.48 FTE for Ecology.
Funding Source: Aquifer protection funds.

Issue 3 - Decommissioning cost. Improperly decommissioned wells may become a conduit for contamination to an underlying aquifer. Decommissioning costs may discourage property owners from disclosing improperly decommissioned wells.

WC-3A Decommissioning cost: King County will explore the possibility of creating a funding mechanism for decommissioning of wells identified through the property owner disclosure program.

Task 1: Report to Management Committee on feasibility of providing money for well decommissioning.

Task 2: Revise Ground Water Management Plan if necessary.

Who: Task 1, King County Department of Natural Resources
Priority: 2
Cost: King County Department of Natural Resources, 0.125 FTE.
Funding Source: Aquifer protection funds.

Who: Task 2, Management Committee.
Priority: 2
Cost: This will be part of Management Committee tasks.
Funding Source: Aquifer protection funds.

WC-3B Decommissioning cost: During revision of Chapter 173-160 WAC, Ecology will consider alternatives to present requirements for well decommissioning procedures that are cost effective, appropriate to the well's hydrogeology, and would protect public health.

Who: Ecology.
Priority: 2
Cost: 0.14 FTE.
Funding Source: Agency general funds.

Issue 4 - Education. There is a lack of general public knowledge about the public health significance of the requirements for well construction, operation, maintenance, and decommissioning.

WC-4 Education: The Ground Water Management Plan Education Program will coordinate with and support Ecology's efforts in well identification, well construction, well maintenance, contamination sources, and proper well decommissioning.

2.3.6 Ground Water Concerns Associated with Sewer Pipes

The more recently installed sewer pipes in King County are fabricated from polyvinyl chloride (PVC), a strong, durable material that is virtually leak-free. However, prior to the use of polyvinyl chloride, sewer pipes were made from materials such as concrete, brick, clay, and ductile iron, materials which are much more susceptible to leakage. Many of these older pipes are still in use.

Infiltration is defined as ground water entering sewer pipes, both as runoff during storm events or as base flow from other sources. To date, data on the extent and magnitude of this potential problem is unavailable. There have been no studies conducted on

exfiltration of wastes from sewer lines in King County and their impacts on ground water quality.

Issue 1 - Infiltration and Exfiltration. Infiltration of ground water into gravity sewer pipes may be causing significant export losses of ground water from the Ground Water Management Areas. Exfiltration of sewage from leaking sewer pipes may be causing contamination of ground water.

SP-1A Infiltration and Exfiltration - Studies: King County will review and analyze existing studies and on going pilot programs by the Waterwater Division and local sewer districts to determine if infiltration and exfiltration are problems in the Ground Water Management Area; and analyze conclusions and determine appropriate follow up action, if any.

Who: King County Department of Natural Resources and sewer agencies.
Priority: 3
Cost: King County Department of Natural Resources: 0.25 FTE. City of Redmond: doesn't expect any additional costs.
Funding Source: Aquifer protection fund.

SP-1B Infiltration and Exfiltration - Programs: Encourage the King County Waterwater Division, the City of Redmond and sewer utilities to continue existing or implement new regularly scheduled leak detection and repair programs to protect aquifers in the Ground Water Management Area. This is included in the Ground Water Management Plan, no additional action is required.

SP-1C Infiltration and Exfiltration - Leakproof Piping: Encourage King County to amend the Comprehensive Land Use Plans and King County Code Chapter 13.24 to require that: new sewer piping installed in physically susceptible and recharge areas be leakproof, and existing leaking sewer pipes, including side sewers, will be replaced as soon as possible with leakproof piping in physically susceptible and recharge areas according to schedules provided in comprehensive plans developed by sewer utilities. This request will be communicated during Ground Water Management Plan review. No further action is necessary.

Issue 2 - Ground Water Depletion. Granular backfill around sewer pipes could provide a conduit for the migration of ground water, depleting valuable ground water reserves from a specific area.

SP-2 Ground water depletion - Backfill: Ecology should consider amendments to sewer construction specifications to prevent the transmission of ground water along pipe alignments in high ground water transmissivity areas. Such transmissions take place in the granular backfill required for proper pipe support. These amendments shall include best management practices for backfill materials and/or the use of impermeable seals at

appropriate intervals. This request will be communicated during the Ground Water Management Plan concurrence process. No further action is necessary.

2.3.7 Ground Water Quality Issues Related to Solid Waste Landfills

The ground water impact from landfills is from leachate production. Leachate is water or other liquid that has been contaminated by dissolved or suspended materials due to contact with solid waste or gases from the solid waste. Ground water that has been contaminated by leachate may affect public health. Ground water that is not currently being used for drinking water also needs to be protected from leachate contamination, as it may become a drinking water source in the future.

Issue 1 - Standards. King County Board of Health solid waste management standards can be improved to provide better ground water protection. Ecology has revised the state solid waste regulation to include ground water protection provisions (adopted as Chapter 173-351 WAC). Seattle-King County Health Department has not yet adopted this WAC by reference.

SW-1 Standards: The Seattle-King County Health Department will prepare amendments to Title 10 to adopt Chapter 173-351 WAC by reference for consideration by the King County Board of Health.

Who: Seattle-King County Health Department.
Priority: 4
Cost: Seattle-King County Health Department: 0.04 FTE.
Funding Source: General agency funds.

Issue 2- Abandoned Sites. Abandoned solid waste disposal sites may pose a threat to ground water.

SW-2 Abandoned Sites: The Seattle-King County Health Department will evaluate the remediation efforts of King County on abandoned sites and make a report to the Management Committee.

Who: Seattle-King County Health Department.
Priority: 4
Cost: 0.08 FTE.
Funding Source: Aquifer protection fund.

Issue 3 - Education. The public may not be aware of the relationship between landfilling solid waste and the threat to ground water quality. The Education Program will include information about the relationship between solid waste disposal and ground water.

2.3.8 Ground Water Concerns Associated with Burial of Human Remains

Cemeteries are found throughout King County, and it is possible that, under certain hydrogeologic conditions, burial practices have affected or are affecting local ground water quality. The threat to ground water from decomposing corpses and caskets includes chemicals, bacteria, viruses and metals. Currently, there are 70 cemeteries in King County ranging in size from 20 burial sites to 140,000 burial sites. Nothing is known about the existing or potential effect of decomposing corpses and caskets on ground water within King County.

Issue 1 - Lack of information. Information is insufficient to determine ground water impairments from embalming fluids, decaying human remains, and other materials associated with the burial of human remains in King County.

B-1 Information - Studies: The King County Department of Natural Resources will evaluate existing information on cemeteries, including the results of the Woodlawn (New York) Cemetery investigation when made available. The King County Department of Natural Resources will also conduct a study within the county to determine if cemeteries are contaminating ground water. Findings of this study can be critically reviewed and compared with findings from other studies nationwide. Information gathered can be used to establish siting criteria for new and existing cemeteries undergoing expansion or to take other appropriate follow-up actions, if required.

Who: King County Department of Natural Resources.
Priority: 4
Cost: 0.04 FTE.
Funding Source: Aquifer protection funds.

2.3.9 Ground Water Quality Issues Related to Sand and Gravel Mining

Productive sand and gravel mines are often located over vulnerable aquifers. Mining activities in these areas can increase ground water vulnerability to contamination both from the extraction process and from site reclamation.

Issue 1 - Regulatory modifications. Sand and gravel mining operations can cause changes in a site or include activities which increase the potential for contamination of important aquifers. Significant changes in sand and gravel mining permit process are occurring at the state level.

SG - 1 Regulatory Modifications. King County Department of Natural Resources will develop a comprehensive list of best management practices in grading permits issued for gravel pits for Metropolitan King County Council and City of Redmond's consideration. King County and the City of Redmond should comply with the National Pollutant Discharge Elimination System and Ecology's "General Permit" requirements.

For the general permit drafted by Ecology, sand and gravel facilities are required to manage, treat and discharge their wastewater in a manner consistent with the Ground Water Quality Standards and National Pollutant Discharge Elimination System. This general permit includes the implementation of best management practices and monitoring of discharges to ground water with annual reporting of the monitoring data to Ecology. The General Permit provides positive controls to protect both surface water and ground water from contamination. The King County Road Services Division, Department of Transportation, has prepared an approved National Pollutant Discharge Elimination System General Permit for each of their active and inactive sand and gravel mining operations in King County.

Who: King County, City of Redmond
Priority: not ranked
Cost: King County Department of Natural Resources: 0.125 FTE.
Redmond has no additional costs for this action.
Funding Source: Aquifer protection funds.

Issue 2 - Land use of inactive or reclaimed mines. Permissible subsequent use of reclaimed sand and gravel mining sites should reflect the increased susceptibility of aquifers to contamination. Currently, there is no formal requirement that permitted uses be given special consideration.

SG-2A Reclaimed sand and gravel mines: King County Department of Natural Resources will propose an amendment to the King County Comprehensive Plan for Metropolitan King County Council's consideration to include a policy which stipulates that land use of reclaimed sand and gravel mines be carefully evaluated in light of the increased susceptibility of underlying aquifers to contamination due removal of overlying protective geologic materials during past mining operations.

Who: King County Department of Natural Resources: 0.15 FTE.
Priority: 2.
Funding Source: Aquifer protection fund.

SG-2C Zoning Code - Reclamation Plans: King County will provide comments to the State Department of Natural Resources on mine reclamation plans proposed within the Redmond-Bear Creek Valley Ground Water Management Area. Additionally, consistent with KCCP Policy NE-333, King County will develop, with affected jurisdictions, Best Management Practices for mining operations.

Who: King County Department of Natural Resources and Department of Development and Environmental Services, Code Development. The City of Redmond intends to address this in the proposed Clearing and Grading Regulations, which are expected to be adopted in 1996 and be included in the Development Guide update.

Priority: 2
Costs: King County Department of Natural Resources: 0.125 FTE. King County Department of Development and Environmental Services, Code Development: 0.5 FTE. Redmond has no additional cost for this action.
Funding Source: Aquifer protection fund.

2.3.10 Ground Water Concerns Associated with Biosolids and Sewage Effluent

Biosolids are the treated and primarily organic sewage solids generated from wastewater treatment plants, and may be utilized for various beneficial uses including: compost and fertilizer production, agricultural and silvicultural land application, and land reclamation. The Ground Water Advisory Committee determined that no additional action was needed for this issue.

Sewage effluent is the liquid waste left after sewage has settled. This liquid may be untreated, or it may be further settled, filtered, and disinfected, depending on final use. Reuse of effluent is regulated by the State Water Pollution Control Act (Chapter 90.48 RCW) administered by Ecology and by the Wastewater Reclamation and Reuse Interim Standards.

Issue 1 - Guideline Revision. Recently, an increased need for conservation of water resources has focused interest on reuse of treated effluent. The effluent guidelines are being revised and will need to comply with the state Ground Water Quality Standards. However, it is not known if special protection for physically susceptible and recharge areas will be considered.

BSE-1 Guideline Revision: The Redmond-Bear Creek Valley Ground Water Advisory Committee encourages Ecology to include ground water protection in the revised guidelines for reuse of effluent. The guidelines may need to include constraints on reuse of effluent in physically susceptible and recharge areas.

Who: Washington State Department of Health and Ecology.
Priority: 4
Cost: No additional cost is anticipated.

⇒ 2.4 Ground Water Quantity Issues

The Ground Water Advisory Committee adopted the following goal to guide the development of the recommended management strategies: to manage the ground water resources of King County to optimize current and long-term benefits. Ground water quantity is important because ground water is used for drinking water, irrigation,

industrial processes, and provides flow to streams, which support fish and other wildlife. Aquifers, and related surface water levels, are maintained by preserving recharge.

The two main threats to preserving recharge and ground water levels are by reducing recharge by increasing permeable surfaces, and by overuse. Recharge occurs only through relatively undisturbed, permeable soils. Population growth, with its related construction of buildings and roads, causes an increase in impermeable surfaces. Population growth also increases the demand for ground water.

The state of Washington has attempted to balance the needs of its citizens with maintaining the water resource. Ecology administers laws dealing with water appropriations and allocations. Allocations to new users must not conflict with existing use; however, the information needed to make allocation decisions is lacking. Some areas of the state have experienced the affects of unwise use of aquifers, such as water level decline and sea water intrusion. Parties involved in water use are developing and using innovative techniques, such as conservation and artificial recharge, to decrease water use and increase water availability. Recent interest in maintaining surface water resources has spotlighted the interaction of ground water and surface water. Future ground water resource management must consider this interaction.

The *Ground Water Areas Management and Programs* (Chapter 173-100 WAC) contains guidelines on program content which were to be adapted to the particular needs of a ground water management plan. Included in the program content is a section on alternatives, which outlines various land and water use management strategies that address each of the ground water problems discussed in a problem definition section. It states that the alternative management strategies would address water conservation, conflicts with existing water rights and minimum instream flow requirements, programs to resolve such conflicts, and long-term policies and construction practices necessary to protect existing water rights and subsequent facilities installed in accordance with the Ground Water Management Plan program and/or other water right procedures. This Plan does not address these topics, except for conservation. Several new state programs, initiated since the WAC was written, provide programs to resolve conflicts with existing water rights and minimum instream flow requirements, and long-term policies and construction practices necessary to protect existing water rights and subsequent facilities (generally, under the Water Resources Forum from the Chelan Agreement). The Ground Water Advisory Committee found that the best way to address ground water quantity issues is to develop and implement a long-term monitoring and data collection program to provide the decision makers with the necessary ground water information.

★ **Issue 1 - Policies and Ordinances.** The proposed King County clearing ordinance may provide broad protection for physically susceptible and recharge areas. The proposed clearing ordinance may not be adopted by King County. Also, environmental review needs to include information on development impacts to ground water quantity and quality.

WQ-1A Policies and Ordinances: King County Department of Natural Resources will propose a clearing and grading ordinance with guidelines for clearing in physically susceptible and recharge areas and specific performance standards including phasing and seasonality of clearing activities, retention requirements, and coverage for Metropolitan King County Council consideration.

Who: King County Department of Natural Resources and Department of Development and Environmental Services.

Priority: 1

Costs: King County Department of Natural Resources 0.125 FTE, Department of Development and Environmental Services, Code Development: 0.18 FTE.

Who: The City of Redmond.

Priority: 1

Costs: No additional costs are anticipated.

WQ-1B Policies and Ordinances: Petition the Department of Ecology to amend the State Environmental Policy Act checklist to include analysis of impacts on the quantity of aquifer recharge. Until the change by Ecology can be formally made, the City of Redmond, King County, and other reviewing agencies will consider impacts on the quantity of aquifer recharge during State Environmental Policy Act checklist review, as described in the SEPA guidance document, to be developed by King County Department of Natural Resources. *SEPA*

Task 1: Revise State Environmental Policy Act checklist.

Who: Ecology, through rule revision.

Priority: 1

Cost: 0.03 FTE.

Funding Source: General agency funds.

Task 2: Include impacts on the quantity of aquifer recharge during State Environmental Policy Act checklist guidance document.

Who: King County Department of Natural Resources.

Priority: 1

Cost: 0.125 FTE.

Funding Source: General agency funds.

* **Issue 2 - Data Needs.** There are many needs for a complete characterization of aquifer resources. This information is needed by Ecology for water rights application analysis, surface water/ground water interaction determinations, possible ground water reservation, and other resource management decision making processes and concerns. To date, this has not been completed.

WQ-2A Data Needs: Design and implement a ground water data collection management program which would enable Ecology and others who make land and water use decisions (such as purveyors, land use planners, and public officials) to make water resource decision based on more complete information.

Who: King County and the City of Redmond through the Management Committee.
Priority: 1
Cost: In the Data Collection and Management section.
Funding Source: Aquifer protection funds.

WQ-2B Policies and Ordinances: The Redmond-Bear Creek Ground Water Advisory Committee supports the Department of Ecology's Sea Water Intrusion Policy. This is included as a statement of support in the Ground Water Management Plan. No additional action is needed.

* → **Issue 3 - Water Rights.** Water rights records do not necessarily accurately reflect actual pumpage rates and current use of ground water resource.

WQ-3A Water rights: Utilities will update their water right records and submit them to the Department of Ecology as per the recommended program in the "Five Year Water Resource Data Management Plan."

Who: Water users required to report.
Priority: 1
Cost: City of Redmond: 0.09 FTE. NE Sammamish Sewer and Water District: \$500, Union Hill Water Association: \$500.
Funding Source: General agency funds.

* **Issue 4A - Conservation.** Conservation has been shown to have a positive impact on ground water resources. Ground water may be conserved through implementation of effective demand reduction techniques. Conservation of water supplies is essential to the proper management of ground water resources. Some conservation methods could be implemented to enhance current programs. Draft King County landscaping ordinances have been proposed, but they may not be adopted. King County Board of Health regulations for small water systems do not include conservation elements.

WQ-4A1 Conservation: King County Department of Natural Resources will develop a proposed landscaping ordinance to encourage conservation for new commercial and residential development for Metropolitan King County Council's consideration. Landscaping plans should incorporate native growth areas, use of plant species which are drought tolerant, water efficient irrigation technologies, soil amendments, and limitations on the amount of allowable turf. The City of Redmond would consider adopting similar ordinances.

Who: King County and the City of Redmond.
Priority: 1
Cost: King County Department of Natural Resources: 0.08 FTE. King County Department of Development and Environmental Services, Code Development: 0.22 FTE. City of Redmond: no additional costs, part of the Development Guide update in 1995.
Funding Source: Aquifer protection fund.

WQ-4A2 Conservation: Seattle-King County Department of Public Health will propose a revision to regulations for existing, new, or expanded Group B Public Water Systems to address water conservation goals and measures for King County Board of Health consideration.

WQ-4A3 Conservation: Seattle-King County Department of Public Health will propose regulations for new and existing individual wells incorporating conservation measures, including source meters, for King County Board of Health consideration.

Who: Seattle-King County Health Department and King County Board of Health.
Priority: 1
Cost: 0.08 FTE.
Funding Source: Aquifer protection funds.

* **Issue 4B Education.** Education has also been shown to have a positive impact on ground water resources. Educational activities are included in the Education Section.

* **Issue 4C Artificial recharge.** Artificial recharge is a new technique that is being tried in this area. However, not enough is known about the possible benefits of long-term artificial recharge.

WQ-4C1 Artificial recharge: Purveyors should investigate artificial recharge programs.

Who: Public water systems.
Priority: 1
Cost: To be determined by purveyors.
Funding Source: General Agency/utility funds.

* **Issue 4D - Decline Limits.** Water level decline limits are set by Ecology and can be an effective tool for managing the resource. Ecology needs long-term information in order to set decline limits.

WQ-4D1 Decline Limits: The Department of Ecology shall review the information collected through the Data Collection and Management Program and make recommendations for the purpose of preventing further declines, or restoring pre-decline

levels, and maintaining safe sustainable yields. All jurisdictions shall then follow the appropriate mitigation actions as recommended by Ecology.

Who: Ecology.
Priority: 1
Cost: 2.58 FTE.
Funding Source: General agency funds.

Ecology needs to discuss the amount of time they would need to carry out WQ - 4D1. They cannot concur with this action prior to knowing the workload, costs and probable outcomes. The Ground Water Advisory Committee recommends that this Issue and Action be placed in the Unfinished Agenda.

2.5 Unfinished Agenda

The Guidelines for Ground Water Management Area and Programs calls for concurrence on the recommended management strategies, and resolution of any non-concurrence issues by the Ground Water Advisory Committee. During review of the Draft Redmond-Bear Creek Ground Water Management Plan, some management strategies were identified that, while the implementing agency felt that the goal and issue and recommended action were valid, it could not commit resources to implementing the management strategy at this time. The Department of Ecology's guidance for concurrence allows that unresolved issues may be placed onto an Unfinished Agenda section. These issues may not be critical to the Plan, generally, that means they cannot relate to overall plan implementation and funding. However, Ecology retains the final determination on whether they are critical to the Plan. The following issues were identified by the Ground Water Advisory Committee during non-concurrence issue resolution as appropriate to be placed in the unfinished agenda.

Stormwater

ST-2B Ground Water Quality Concerns - Study: King County and the City of Redmond will sponsor study of the effectiveness of the current best available treatment facility. As part of this study, King County will monitor discharges from these facilities in actual use and prepare a report of findings. The report will recommend whether this type of facility is effective in preventing ground water quality degradation and if it should be used to retrofit existing stormwater quality facilities with documented water quality impacts. Based upon this report, King County will give physically susceptible and recharge areas and Wellhead Protection Areas high priority for water quality facility retrofit as warranted.

The City of Redmond does not concur with ST-2B at this time, as they need more time to consider the costs for this recommendation.

ST-5 Roadway Runoff: King County and the City of Redmond will:

- Direct their transportation or public works departments to give high priority to physically susceptible and recharge areas and Wellhead Protection Areas when identifying and correcting water quality problems associated with existing roadways, and
- Develop a program to retro-fit existing structures, as required by the National Pollutant Discharge Elimination System, and require stormwater quality and quantity controls comparable to new regulations when conducting major renovation or widening of roads.

King County Department of Transportation, Road Services Division does not concur with the first bullet under ST-5. Road Services produces a six year budget for road maintenance, and has already identified and prioritized the transportation needs in the County for the current budget. However, staff, during concurrence discussion, stated that consideration of location of a road, whether in a sensitive area, could be included as a factor in the prioritization in the future.

Hazardous Materials

HM-3 Implementation of the Uniform Fire Code: King County and the City of Redmond will:

- Commit staff and funding to comprehensive implementation of Article 80 in both new and existing facilities using both educational and regulatory approaches;
- Propose ordinances for adoption, if they have not already done so, that provide adequate enforcement tools to ensure compliance with Article 80 and that restore the requirements for:
 1. Hazardous Materials Management Plans,
 2. Hazardous Materials Inventory Statements, and
 3. Storage requirements for "Carcinogens, irritants, sensitizers, and other health hazard solids, liquids, and gases" found in Uniform Fire Code 80.315; and
 4. Emphasize regulatory attention and educational activity in the most physically susceptible and recharge areas.

The City of Redmond would like to concur with this item, but cannot commit staff and funding given current budget constraints.

Underground Storage Tanks

UST-1B Augment State Underground Storage Tank Program: King County and the City of Redmond will enhance current inspection of underground storage tank installation

and removal in Environmentally Sensitive Areas to include the relevant requirements of Chapter 173-360 WAC, the state Underground Storage Tank Regulations.

The City of Redmond does not concur with this item, because it needs more time to review the item for personnel and procedure impacts.

Water Quantity

WQ-4D1 Decline Limits: The Department of Ecology shall review the information collected through the Data Collection and Management Program and make recommendations for the purpose of preventing further declines, or restoring pre-decline levels, and maintaining safe sustainable yields. All jurisdictions shall then follow the appropriate mitigation actions as recommended by Ecology.

Ecology does not concur with this action prior to knowing the workload, costs and probable outcomes.

Chapter Three

Recommended Implementation Process

**Redmond-Bear Creek Valley
Ground Water Management Plan**

February 1999

Recommended Implementation Process for the Ground Water Management Program

3.1 Introduction

The ground water management planning process has been funded by Centennial Clean Water Fund grants administered by the Washington State Department of Ecology (Ecology) and contributions from King County, cities, and water utilities. However, implementation of the Ground Water Management Plan depends upon long term funding and appropriate assignment of responsibility. Executive and legislative branches of government and other public and private interests have important roles in the implementation of the Ground Water Management Plan to protect ground water quality and quantity. The recommended implementation process described in this chapter assigns roles and tasks and proposes a source of funding. Topics addressed include:

- Legislative authority
- Funding
- Washington Department of Ecology
- Ground Water Management Committee
- Ground Water Advisory Committee
- Lead agency
- Implementation Plan
- Process for evaluation and revision of the Ground Water Management Plan

Summary tables (Section 3.8) list actions to be taken during plan implementation. These tables also list priorities, whom is responsible for implementation, an estimate of personnel time (in FTE, full-time equivalent), and a source of funds.

3.2 Legislative Authority

The land areas affected by this plan lie within the jurisdictions of the City of Redmond, King County, Woodinville Water District, Northeast Sammamish Sewer and Water District and Union Hill Water Association. These entities are responsible for land use and/or maintaining municipal water supplies to provide sufficient and adequate potable water in their respective jurisdictions. The coordinated water supply plan outlines the area of these jurisdictions.

Metropolitan King County Council

The Metropolitan King County Council is legislative authority of the county. The Metropolitan King County Council exercises its legislative power by adoption and enactment of ordinances; by levying taxes, appropriating revenue and adopting budgets; and other powers as described in the King County Charter (King County Charter,

Sections 220 - 270). The Council ensures that the policies in the King County Comprehensive Plan are carried out through ordinances implementing the Plan.

Seattle-King County Board of Health

The Seattle-King County Board of Health was created by Metropolitan King County Council Ordinance 12098 in response to a state law, RCW 70.05.035, which required that the County have a single board of health by January 1, 1996. Previously the Metropolitan King County Council served as the Board of Health for King County and the Seattle City Council served as the Board of Health for Seattle.

The Board of Health is constituted as a federated body: 11 of its 13 voting members are elected officials - 6 from the Metropolitan King County Council, 3 from the Seattle City Council and 2 from the Suburban Cities of King County. The two remaining voting members are health professionals, selected by the other members of the Board, who serve as citizen public health experts, assisting the Board to deal with complex, often technical, public health issues. A third health professional serves as a nonvoting member.

The Board has powers concerning health and sanitary measures for the protection of the public health within the county, including:

- Enacting such county rules and regulations as are necessary in order to preserve, promote, and improve public health, and provide for the enforcement thereof; and
- Establishing fee schedules for issuing or renewing permits or for such other services as are authorized, provided that such fees or services shall not exceed that actual cost of providing any such services. Fee schedules shall be established by board rules and regulations.

Affected City Councils, Special Purpose Districts, and Others

City councils, elected by the citizens within the city boundaries, are the legislative body for the incorporated cities. They have similar powers and authority as the county council; most importantly, they are the land use and policy bodies for the incorporated cities. Other administrative bodies include the board of commissioners for water districts, sewer districts, and water associations. These boards set policies and rates for the provision of water and sewer service within their service areas.

Recommendation: The Redmond-Bear Creek Valley Ground Water Advisory Committee recommends that legislative authority for adoption and implementation of the Ground Water Management Plan be shared between the Metropolitan King County Council, the King County Board of Health, the Redmond City Council, the Northeast Sammamish Sewer and Water District, and Union Hill Water Association. Each legislative body is needed to implement their portion of the plan because they encompass actions that are specific to their jurisdiction. King County Board of Health authority is

particularly important because it allows for the adoption of ordinances that are effective in both the unincorporated areas and in the cities of King County. Roles of each legislative authority are recommended as outlined below:

Redmond City Council

- Adopt the Ground Water Management Plan after it has been certified by Ecology;
- Adopt ordinances as needed to implement the Ground Water Management Plan within city limits; and
- Adopt future revisions to the Ground Water Management Plan approved by King County, Woodinville Water District, Northeast Sammamish Sewer and Water District, and Union Hill Water Association.

NE Sammamish Sewer and Water District, the Woodinville Water District and the Union Hill Water Association

- Adopt the Ground Water Management Plan after it has been certified by Ecology;
- Adopt measures as needed to implement the policies and recommendation of the Ground Water Management Plan within their respective jurisdictions; and
- Adopt future revisions to the Ground Water Management Plan approved by King County and the City of Redmond.

Metropolitan King County Council

- Adopt the Ground Water Management Plan after it has been certified by Ecology and approved by the City of Redmond, Woodinville Water District, Northeast Sammamish Sewer and Water District, and Union Hill Water Association;
- Adopt revisions to the Ground Water Management Plan approved by the City of Redmond, Woodinville Water District, Northeast Sammamish Sewer and Water District, and Union Hill Water Association; and
- Adopt ordinances necessary for the implementation of the recommendations and policies of the Ground Water Management Plan.

King County Board of Health

- Adopt rules and regulations necessary for the implementation of the recommendations and policies of the Ground Water Management Plan.

3.3 Funding

A major source of long-term funding must be developed in order to implement the Ground Water Management Plan. This source of funding would be augmented by grants and any specific use or service fees. Tables 3.8.1. and 3.8.2. in Section 3.8. indicate actions for which grants and specific use/service fees are appropriate.

A variety of methods could be available to fund ground water protection. One method is to establish an Aquifer Protection Area under Chapter 36.36 RCW. The King County Board of Health could adopt a Rule and Regulation to establish added fees on permits for a variety of water users or potential contaminators. Water purveyors could establish funding through increasing their rates or other methods. An unexplored method for emergency or long-term funding could be through the "Sewerage, Water, and Drainage Systems" (County Services Act, Chapter 36.94 RCW).

Aquifer Protection Area (APA). The purpose of an APA is to establish a funding base for ground water protection, preservation, and rehabilitation programs. If voters approve the APA, the county can collect ground water and septic system user fees.

Chapter 36.94 RCW. The County Council may act under the emergency provisions granted to it under Chapter 36.94 RCW to float a short-term bond providing operating funds for the implementation of the groundwater management program.

Special Purpose Districts, Cities and Others could fund regional and individual components of the adopted ground water plan through special assessments in their water rates or by other methods. Each utility would agree to a share of the regional costs annually when the Management Committee (described below) meets to determine funding for the recommended implementation activities. Through interlocal agreements, the regional aspects of the plan and King County participation could be funded along with individual utility responsibilities.

Part of deciding what method will provide the funding source includes determining from whom the funds will be collected. This could include ground water users, contamination source owners, or all parcels in the Ground Water Management Area. Another decision is how to physically collect the funds.

Ground Water Users: Collecting funds from ground water users would ensure that those that are currently using ground water pay for the ground water protection program.

Contamination Source Owners: The APA method includes collecting funds from on-site sewage system owners. However, this ignores other sources of ground water contamination. Sources of ground water contamination are complex and are not necessarily owned by one individual. Also, many contamination sources are already licensed.

All Parcels in the Ground Water Management Area: This would include non-users of the groundwater resource.

Recommendations: The Ground Water Advisory Committee recommends that users that benefit should support the Ground Water Management Plan. Users of the ground water resource are water utilities, water districts, water associations, small water systems, individual water systems, industries, and irrigators.

Plan implementers that have fee collection systems in place (water utilities, districts, some associations) should collect an allocated amount from their customers. All collection of fees and participation by NE Sammamish Sewer and Water District, the Woodinville Water District and the Union Hill Water Association shall be on a voluntary basis.

The funding for tasks and projects implemented by a purveyor shall be the responsibility of that purveyor. Where two or more purveyors agree to implement a project together, the funding shall be as they may agree. Nothing shall prevent the purveyors, individually or together from entering into agreements with the county for mutually agreeable projects. King County shall be responsible for funding projects it undertakes.

Initial personnel time estimates for Ground Water Management Plan elements are shown in Tables 3.8.1. and 3.8.2. In the future, any Redmond-Bear Creek Valley Ground Water Plan tasks yet to be completed will be evaluated annually, updated and modified by the Management Committee. Any party to the Management Committee can direct their funds to go toward the tasks that they have agreed to complete or contract with another party to complete. They can also decline to fund certain portions of the work at their discretion. All implementation will be at the discretion of the funding agency, that is, implementation will be accomplished as funds are allocated.

The Ground Water Advisory Committee also recommends that the Metropolitan King County Council adopt an ordinance providing for implementation of the Ground Water Management Plan incorporating the following features:

- Establishes the membership and role of the Management Committee;
- Establishes the lead agency and responsibility for staffing implementation of the Plan; and
- Provides for voluntary interlocal agreements with plan implementers.

3.4 Washington Department of Ecology Role

The certified Ground Water Management Plan will be codified in the Washington Administrative Code. As such, it is a regulation that Ecology is responsible for administering. Ecology will rely on local government cooperation to implement the Plan but may assist the lead agency, if needed, to gain compliance with provisions of the adopted Plan.



3.5 Ground Water Management Committee

The Redmond-Bear Creek Valley Ground Water Advisory Committee recommends the formation of a Ground Water Management Committee (Management Committee). The Management Committee shall be established by motion by the Metropolitan King County Council with members appointed by the Council, serving staggered terms of three years, and should consist of seven representatives, one each from the City of Redmond, NE Sammamish Sewer and Water District, King County Department of Natural Resources, King County Board of Health, and a representative from the Ground Water Advisory Committee. The Management Committee will be advised by the Ground Water Advisory Committee, at its discretion, for a period of three years after certification of the Ground Water Management Plan by Ecology. The Management Committee will carry out the following tasks:

- Recommend allocation of aquifer protection funds;
- Review, amend as necessary, adopt, and recommend to the Metropolitan King County Council, King County Board of Health, City of Redmond, NE Sammamish Sewer and Water District, the Woodinville Water District and the Union Hill Water Association an annual allocation of aquifer protection funds based upon the adopted implementation plan for the Ground Water Management Plan;
- Monitor the implementation of the Ground Water Management Plan, including;
 1. Review annual reports on implementation prepared by the lead agency;
 2. Determine whether implementation is adequate and whether changes are needed in priorities, monitoring, reporting, etc., during the implementation period;
- Update the Ground Water Management Plan;
 1. Act as a forum to consider new or ongoing ground water protection issues of significance to the Redmond Bear Creek Ground Water Management Area;
 2. Determine whether revisions are needed to the Ground Water Management Plan;
 3. Review, amend as necessary, adopt, and recommend for adoption by the Metropolitan King County Council, King County Board of Health, and the Redmond City Council, NE Sammamish Sewer and Water District, the Woodinville Water District and the Union Hill Water Association an updated Ground Water Management Plan three years after certification of the original plan by Ecology.
- Perform tasks as assigned in the Ground Water Management Plan.

The Redmond-Bear Creek Valley Ground Water Management Committee should consist of representatives from the City of Redmond, NE Sammamish Sewer and Water District, the Union Hill Water Association, Woodinville Water District, King County Department of Natural Resources, and the King County Board of Health. Additionally, existing citizen Ground Water Advisory Committee members may participate on the Management Committee on an advisory (non-voting) basis. The Management Committee should meet at least annually to provide oversight to the implementation, to ensure that the budget process is performed in a fair and equitable manner, and to address the topics as assigned in the Ground Water Management Plan. Decisions of the Management Committee will be by consensus. The Management Committee may make use of subcommittees to accomplish some tasks. Federal and state agencies may be asked to serve in a technical capacity, as appropriate, on the subcommittees.

Public Involvement: Interested public groups and individuals should be kept informed of the Management Committee work and implementation progress by inclusion on a notification list. These groups and individuals should receive Management Committee meeting agenda and minutes and routine updates on the Ground Water Management Plan progress. The Management Committee meetings should be open to the public, if they wish to attend. Also, if the Management Committee is aware of an agency or individual that has an interest in a topic under discussion, they should be invited to attend. Elected officials should also be included on the notification list. Elected officials may also have the opportunity to have presentations on the Ground Water Management Plan progress.

3.6 Ground Water Advisory Committee

The Redmond-Bear Creek Valley Ground Water Advisory Committee was established to develop the Plan. After it is certified by Ecology, the Ground Water Advisory Committee's duties are complete. However, successful implementation of a Ground Water Management Plan depends upon support by the affected agencies and the community.

The Ground Water Advisory Committee recommends that they continue to meet at its discretion for up to three years from the date that the Ground Water Management Plan is certified by Ecology. The role of the Ground Water Advisory Committee is to monitor implementation of the Ground Water Management Plan and to make recommendations to the Management Committee via its representative. The Ground Water Advisory Committee will also review and comment upon the first Ground Water Management Plan update.

3.7 Lead Agency

Implementation of the Ground Water Management Plan will require staff to perform day-to-day tasks. The staff should be familiar with the plan, database management, local issues, budget process, and be technically capable. The staff should provide

administrative functions to the satisfaction of the Management Committee and the legislative authorities.

For these reasons, the Ground Water Advisory Committee recommends that the King County Department of Natural Resources serve as lead agency for the implementation of the Ground Water Management Plan. The Ground Water Advisory Committee recognizes that the reorganization of King County placed the responsibility of the ground water program in the Department of Natural Resources. In fulfilling its role as lead agency, it is recommended that the Department of Natural Resources:

- Annually refine cost estimates of the Ground Water Management Plan in consultation with implementing governments and agencies;
- Assist the Management Committee in determining the recommended funding ratio of voluntarily participating agencies;
- Prepare an annual proposed allocation of the aquifer protection funds, based upon the adopted Ground Water Management Plan (and its revisions), for review and adoption by the Management Committee, affected governments and agencies, and the Metropolitan King County Council. The allocation will be based on the voluntary consensus of the participating agencies;
- Provide staff support to the Management Committee;
- Monitor the implementation of the Ground Water Management Plan using established goals and benchmarks;
- Prepare annual implementation reports for the review of the Management Committee and Ground Water Advisory Committee;
- Implementation of elements of the Ground Water Management Plan as assigned to the lead agency by the adopted plan or by future revisions to the adopted plan;
- Coordination of implementation of multi-jurisdictional program efforts such as data collection, education and mapping;
- Bring issues to the attention of the Management Committee;
- Coordinate with King County planning processes;
- Coordinate with federal, state, and local agencies regarding ground water protection;
- Coordinate the process for revision of the Ground Water Management Plan, which includes:
 1. Prepare draft update of the plan for review, amendment as necessary, and approval of the Management Committee;
 2. Hold public hearings;
 3. Submit draft updates of the Ground Water Management Plan to the Metropolitan King County Council and carry out the process of obtaining concurrence from affected governments and agencies; and
- Carry out other tasks that are determined to be appropriate.

King County implementation efforts will be phased in over time and is dependent upon the availability of funding.

3.8 Implementation Plan

Ground Water Advisory Committee implementation priorities are listed in the Implementation Plan, included as Tables 3.8.1. and 3.8.2. Prioritization enables the Ground Water Advisory Committee to ensure that ground water protection is maximized in the near term. The tables are designed to communicate the priorities of the implementation process. Each table lists, in relation to a specific action, its priority, whom will be responsible for carrying it out, an estimate of personnel time or other costs, and a potential source of funding. The first table is organized by Ground Water Advisory Committee - determined priority. The second is organized by the agency or government that will be responsible for implementing the action.

3.9 Process for Evaluation and Revision of the Plan

A process for periodic evaluation and revision of the Ground Water Management Plan is established in order to ensure that the adopted goals are achieved efficiently under changing conditions. The Management Committee, the Ground Water Advisory Committee, the Department of Natural Resources, and governments and agencies affected by the Ground Water Management Plan will be involved in its evaluation and revision. The first revision will be considered three years from the date of Plan certification by Ecology. Subsequent revisions will be considered on five year intervals unless the Management Committee determines that more frequent updates are needed.

The concurrence process will be initiated by the Department of Natural Resources following adoption of revisions by the Management Committee. Public hearings will be held as required by law. The draft update will be submitted to the Metropolitan King County Council for review, amendment, and adoption when all affected governments and agencies have concurred.

Redmond-Bear Creek Valley Ground Water Management Plan updates at time intervals smaller than three years should be avoided due to the lengthy process of review, public hearings, concurrence, and adoption. Other mechanisms may be used to implement short-term changes either in substance or priority. For example, a grant could be sought to carry out a specific new task that the Management Committee feels is urgent but which is not included in the current Ground Water Management Plan. Alternatively, Ground Water Management Plan priorities could be changed in order to step up activity related to an issue that the Management Committee determines is more urgent than others.

The Department of Natural Resources will assist the Management Committee in its evaluation of the Ground Water Management Plan by preparing annual implementation reports. The Management Committee will use the reports, as well as its own deliberations and the recommendations of the Ground Water Advisory Committee, to determine whether and how plan should be modified when it is updated. These reports will cover such topics as:

- Progress in implementing plan elements in comparison with established priorities, benchmarks and schedule;
- Problems encountered in implementation of specific program elements;
- Proposed revisions or priority adjustments to address problems encountered in implementation; and
- Changes in federal, state, or local laws impacting the Ground Water Management Plan.

Table 3.8.1

Implementation Priorities

**Redmond-Bear Creek Valley
Ground Water Management Plan**

February 1999

Table 3.8.1 Implementation Priorities

Management Strategy	Agency	Priority 1, 1.5 FTE Estimate	Priority 2 FTE Estimate	Priority 3, 4 FTE Estimate	AP Fund	Other Fund Source	Priority
DCM - 1A Data Collection Analysis and Management	King County Dept. of Natural Resources: Collection and Analysis costs: \$298,701 in year 1, \$128,360 for year 2 - end.	2.75	0.00	0.00	Aquifer Protection Fund		1
DCM - 1A Data Collection Analysis and Management	King County Dept. of Natural Resources: Data Entry	1.00	0.00	0.50	Aquifer Protection Fund		1
DCM - 1A Data Collection Analysis and Management	SKCHD	0.50	0.00	0.00	Aquifer Protection Fund		1
DCM - 2 Data Collection Analysis and Management	Ecology	0.06	0.06	0.06		General Agency Funds	1
Education	City of Redmond	0.47	0.00	0.00		General Funds	1
Education	King County Dept. of Natural Resources	0.50	0.00	0.00	Aquifer Protection Fund		1
Education	NE Sammamish	0.04	0.00	0.00		General funds	1
HM - 3 Implementation of the Uniform Fire Code	King County Fire Marshal (Task 1,2)	TBD				General funds	1
HM - 5A Transportation-Related Hazardous Materials Spills-Purveyor Assessment	NE Sammamish	0.02	0.00	0.00		General Agency Fund	1
Management Committee Tasks:	King County Dept. of Natural Resources	1.00	0.00	0.00	Aquifer Protection Fund		1

Table 3.8.1 Implementation Priorities

Management Strategy	Agency	Priority 1, 1.5 FTE Estimate	Priority 2 FTE Estimate	Priority 3, 4 FTE Estimate	AP Fund	Other Fund Source	Priority
ST - 4A Coordination Between Surface and Ground Water Planning Efforts: Ecology Programs	Ecology	0.00	0.64	0.32		General Funds	1
ST - 5 Roadway Runoff	King County Dept. of Natural Resources	0.00	TBD	0.00	Aquifer Protection Fund		1
WQ - 1A Policies and Ordinances	DDES Code Development	0.18				General Funds	1
WQ - 1A Policies and Ordinances	King County Dept. of Natural Resources	0.13			Aquifer Protection Fund		1
WQ - 1B Policies and Ordinances	King County Dept. of Natural Resources	0.13	0.00		Aquifer Protection Fund		1
WQ - 2A Data Needs	King County Dept. of Natural Resources in DCMP	See DCM-1	0.00	0.00	Aquifer Protection Fund		1
WQ - 3A Water rights	Union Hill	0.0046	0.00	0.00		General Agency Funds	1
WQ - 3A Water rights records	City of Redmond	0.09	0.00	0.00		General Funds	1
WQ - 3A Water rights records	NE Sammamish1	0.0046	0.00	0.00		General funds	1
WQ - 4A1 Conservation	City of Redmond	no additional	0.00	0.00		General Funds	1
WQ - 4A1 Conservation	DDES Code Development	0.22	0.00	0.00		General Agency Fund	1
WQ - 4A1 Conservation	King County Dept. of Natural Resources	0.08			Aquifer Protection Fund		1

Table 3.8.1 Implementation Priorities

Management Strategy	Agency	Priority 1, 1.5 FTE Estimate	Priority 2 FTE Estimate	Priority 3, 4 FTE Estimate	AP Fund	Other Fund Source	Priority
WQ - 4A2, 4A3 Conservation	SKCHD	0.08	0.00	0.00	Aquifer Protection Fund		1
SA - 1A, 1B Elimination of categorical exemptions to SEPA	City of Redmond	no additional	0.00	0.00		General Funds	1.5
SA - 1A, 1B Elimination of categorical exemptions to SEPA	King County Dept. of Natural Resources	0.25	0.00	0.00	Aquifer Protection Fund		1.5
SA - 1C Adoption of General Policies	City of Redmond	no additional				General Funds	1.5
SA - 1C Adoption of General Policies	DDES Code Development	0.04				General Agency Fund	1.5
SA - 1C Adoption of General Policies	King County Dept. of Natural Resources	0.25			Aquifer Protection Fund		1.5
SA - 1D Enhanced environmental review to protect aquifers	City of Redmond	0.57	0.00	0.00		General Funds	1.5
SA - 1D Enhanced environmental review to protect aquifers	King County Dept. of Natural Resources	0.50	0.00	0.00	Aquifer Protection Fund		1.5
SA - 1E Mapping physically susceptible areas	DDES Code Development	0.06	0.00	0.00		General Agency Fund	1.5
SA - 1E Mapping physically susceptible areas	King County Dept. of Natural Resources	0.25	0.00	0.00	Aquifer Protection Fund		1.5
SA - 2 Wellhead Protection	DDES Code Development	0.56				General Funds	1.5
SA - 2 Wellhead Protection	King County Dept. of Natural Resources	0.50			Aquifer Protection Fund		1.5

Table 3.8.1 Implementation Priorities

Management Strategy	Agency	Priority 1, 1.5 FTE Estimate	Priority 2 FTE Estimate	Priority 3, 4 FTE Estimate	AP Fund	Other Fund Source	Priority
HM - 1 State Hazardous Waste Plan-Implementation	King County Dept. of Natural Resources	no additional	0.00	0.00	Aquifer Protection Fund		2
HM - 3 Implementation of the Uniform Fire Code	King County Dept. of Natural Resources	0.00	0.50	0.00	Aquifer Protection Fund		2
HM - 4 Implementation of the Emergency Planning and Community Right-to-Know Act	King County Dept. of Natural Resources (Task 2-5)	0.00	0.25	0.00	Aquifer Protection Fund		2
HM - 4 Implementation of the Emergency Planning and Community Right-to-Know Act	King County: Emergency Management (Task 1)	0.00	TBD	0.00		General Funds	2
HM - 5A Transportation-Related Hazardous Materials Spills-Purveyor Assessment	Union Hill	0.01	0.00	0.00		General Agency funds	2
HM - 5B Transportation-Related Hazardous Material Spills-Management Committee Evaluation	King County Dept. of Natural Resources	0.00	0.08	0.08	Aquifer Protection Fund		2
OS - 1 Nitrate Concerns	Management Committee		TBD		Aquifer Protection Fund		2
OS - 2A Hazardous Materials	SKCHD	0.00	0.25	0.00	Aquifer Protection Fund		2
OS - 2B Hazardous Materials	SKCHD	0.00	0.04	0.00	Aquifer Protection Fund		2
OS - 3A Household Hazardous Wastes	SKCHD (LHWMP)	0.00	0.13	0.00	Aquifer Protection Fund		2

Table 3.8.1 Implementation Priorities

Management Strategy	Agency	Priority 1, 1.5 FTE Estimate	Priority 2 FTE Estimate	Priority 3, 4 FTE Estimate	AP Fund	Other Fund Source	Priority
OS - 4A Operation and Maintenance	SKCHD	0.00	0.04	0.00	Aquifer Protection Fund		2
OS - 4B Operation and Maintenance	SKCHD	0.00	0.50	0.00	Aquifer Protection Fund		2
SG - 1 Regulatory Modifications	King County Dept. of Natural Resources	0.00	0.13	0.00	Aquifer Protection Fund		2
SG - 2A Reclaimed Sand and Gravel Mines	King County Dept. of Natural Resources		0.15		Aquifer Protection Fund		2
SG - 2C Zoning Code-Reclamation Plans	DDES Code Development	0.00	0.50	0.00		General Funds	2
SG - 2C Zoning Code-Reclamation Plans	King County Dept. of Natural Resources		0.13		Aquifer Protection Fund		2
ST - 1A Runoff Versus Recharge	City of Redmond		TBD			General Funds	2
ST - 1A Runoff Versus Recharge	King County	0.00	TBD	0.00		General Agency Funds	2
ST - 2A Ground Water Quality Concerns - Facility Requirements	King County Dept. of Natural Resources	0.00	0.06	0.00	Aquifer Protection Fund		2
ST - 2B Ground Water Quality Concerns - Study	King County SWM	0.00	TBD	0.00		General funds	2
ST - 4B Coordination Between Surface and Ground Water Planning - PSWQA	PSWQA	0.00	No additional	0.00		General funds	2

Table 3.8.1 Implementation Priorities

Management Strategy	Agency	Priority 1, 1.5 FTE Estimate	Priority 2 FTE Estimate	Priority 3, 4 FTE Estimate	AP Fund	Other Fund Source	Priority
ST - 4C Coordination Between Surface and Ground Water Planning Efforts: King County	King County Dept. of Natural Resources	0.00	0.25	0.00	Aquifer Protection Fund		2
ST - 6 Soil Amendment	King County Dept. of Natural Resources	0.00	0.25	0.00	Aquifer Protection Fund	General Agency Funds	2
UST - 1A,1B Augment State UST Program	King County Dept. of Natural Resources	0.00	0.50	0.00	Aquifer Protection Fund	Fees	2
UST - 1C Augment State UST Program	King County Dept. of Natural Resources	0.00	0.08	0.00	Aquifer Protection Fund		2
UST - 2A Exempt Tanks	King County Dept. of Natural Resources	0.00	0.08	0.00	Aquifer Protection Fund		2
UST - 2B Exempt Tanks	King County Dept. of Natural Resources	0.00	0.08	0.00	Aquifer Protection Fund		2
UST - 3A Heating Oil Tanks: State Code Amendment	King County Dept. of Natural Resources	0.00	0.08	0.00	Aquifer Protection Fund		2
UST - 3B Heating Oil Tanks: Location	King County Dept. of Natural Resources	0.00	0.25	0.00	Aquifer Protection Fund		2
WC - 1A State Program	Ecology	0.00	0.64	0.00		Permit fees general agency fund	2
WC - 1B State Program	Ecology	0.00	0.64	0.00		TBD	2
WC - 1B State Program	SKCHD	0.00	0.50	0.00	Aquifer Protection Fund		2

Table 3.8.1 Implementation Priorities

Management Strategy	Agency	Priority 1, 1.5 FTE Estimate	Priority 2 FTE Estimate	Priority 3, 4 FTE Estimate	AP Fund	Other Fund Source	Priority
WC - 2A Well Identification	King County Dept. of Natural Resources	0.00	0.08	0.00	Aquifer Protection Fund		2
WC - 2B Well Identification	Ecology	0.00	0.48	0.32		General Agency Funds	2
WC - 2B Well Identification	King County Dept. of Natural Resources	0.00	0.08	0.00	Aquifer Protection Fund		2
WC - 3A Decommissioning cost	King County Dept. of Natural Resources	0.00	0.13	0.13	Aquifer Protection Fund		2
WC - 3B Decommissioning cost	Ecology	0.00	0.14	0.00		Unfinished Agenda	2
WQ - 1B Policies and Ordinances	City of Redmond	no additional	0.00	0.00		General Funds	2
WQ - 1B Policies and Ordinances	Ecology	0.03	0.00	0.00		Centennial Clean Water Fund grant	2
Education	Union Hill	0.04	0.00	0.00		General Agency funds	3
PF - 1A Pesticide and Fertilizer Use	Conservation District	0.00	0.00	0.87		General Funds	3
PF - 1B Pesticide and Fertilizer Use	Cooperative Extension	0.00	0.00	no additional		General Agency Funds	3
PF - 1B Pesticide and Fertilizer Use	King County Dept. of Natural Resources	0.00	0.00	0.08	Aquifer Protection Fund		3
PF - 1C Pesticide and Fertilizer Use	City of Redmond	0.00	0.00	TBD		General Agency Funds	3

Table 3.8.1 Implementation Priorities

Management Strategy	Agency	Priority 1, 1.5 FTE Estimate	Priority 2 FTE Estimate	Priority 3, 4 FTE Estimate	AP Fund	Other Fund Source	Priority
PF - 1C Pesticide and Fertilizer Use	DDES Code Development	0.00	0.00	0.50		General Agency Fund	3
PF - 1C Pesticide and Fertilizer Use	King County Dept. of Natural Resources	0.00	0.00	0.15	Aquifer Protection Fund		3
SP - 1A Infiltration and Exfiltration: Studies	King County Dept. of Natural Resources	0.00	0.00	0.25	Aquifer Protection Fund	Centennial Clean Water Fund Grant	3
SP - 1B, 1C Infiltration and Exfiltration	GWAC	0.00	0.00	no additional	Aquifer Protection Fund		3
SP - 2 Groundwater depletion - Backfill	GWAC	0.00	0.00	no additional	Aquifer Protection Fund		3
B - 1 Information - Studies	King County Dept. of Natural Resources	0.00	0.00	0.04	Aquifer Protection Fund		4
BSE - 1 Guideline Revision	GWAC	0.00	0.00	no additional	Aquifer Protection Fund		4
SW - 1 Standards	SKCHD	0.00	0.00	0.04		General Agency Funds	4
SW - 2 Abandoned sites	SKCHD	0.00	0.00	0.08	Aquifer Protection Fund		4
WQ - 4D1 Decline Limits	Ecology	2.58	0.00	0.00		General Agency Funds	Unfinished Agenda
TOTAL		12.90	7.70	3.41			

Table 3.8.2

Implementing Agencies

**Redmond-Bear Creek Valley
Ground Water Management Plan**

February 1999

Table 3.8.2 Implementing Agencies

Management Strategy	Agent	FTE Priority 1, 1,5	FTE Priority 2	FTE Priority 3, 4	AP Fund	Other Fund Source	Priority
SP - 1B, 1C Infiltration and Exfiltration	GWAC	0.00	0.00	no additional	Aquifer Protection Fund		3
SP - 2 Groundwater depletion - Backfill	GWAC	0.00	0.00	no additional	Aquifer Protection Fund		3
BSE - 1 Guideline Revision	GWAC			no additional	Aquifer Protection Fund		4
Subtotal GWAC		0.00	0.00	0.00			
Management Committee Tasks:	King County Department of Natural Resources	1.00	0.00	0.00	Aquifer Protection Fund		1
WQ - 4A1 Conservation	King County Department of Natural Resources	0.08			Aquifer Protection Fund		1
WQ - 1B Policies and Ordinances	King County Department of Natural Resources	0.13	0.00		Aquifer Protection Fund		1
SA - 1C Adoption of General Policies	King County Department of Natural Resources	0.25			Aquifer Protection Fund		1.5
SA - 2 Wellhead Protection	King County Department of Natural Resources	0.50			Aquifer Protection Fund		1.5

Table 3.8.2 Implementing Agencies

Management Strategy	Agent	FTE Priority 1, 1,5	FTE Priority 2	FTE Priority 3, 4	AP Fund	Other Fund Source	Priority
HM - 5B Transportation-Related Hazardous Material Spills-Management Committee Evaluation	King County Department of Natural Resources	0.00	0.08	0.08	Aquifer Protection Fund		2
SG - 1 Regulatory Modifications	King County Department of Natural Resources	0.00	0.13	0.00	Aquifer Protection Fund		2
SG - 2A Reclaimed Sand and Gravel Mines	King County Department of Natural Resources		0.15		Aquifer Protection Fund		2
SG - 2C Zoning Code-Reclamation Plans	King County Department of Natural Resources		0.13		Aquifer Protection Fund		2
ST - 2A Ground Water Quality Concerns - Facility Requirements	King County Department of Natural Resources	0.00	0.06	0.00	Aquifer Protection Fund		2
Education	King County Department of Natural Resources	0.50	0.00	0.00	Aquifer Protection Fund		1
SA - 1A, 1B Elimination of categorical exemptions to SEPA	King County Department of Natural Resources	0.25	0.00	0.00	Aquifer Protection Fund		1.5

Table 3.8.2 Implementing Agencies

Management Strategy	Agent	FTE Priority 1, 1,5	FTE Priority 2	FTE Priority 3, 4	AP Fund	Other Fund Source	Priority
SA - 1E Mapping physically susceptible areas	King County Department of Natural Resources	0.25	0.00	0.00	Aquifer Protection Fund		1.5
HM - 1 State Hazardous Waste Plan-Implementation	King County Department of Natural Resources	no additional	0.00	0.00	Aquifer Protection Fund		2
HM - 3 Implementation of the Uniform Fire Code	King County Department of Natural Resources	0.00	0.50	0.00	Aquifer Protection Fund		2
UST - 1A,1B Augment State UST Program	King County Department of Natural Resources	0.00	0.50	0.00	Aquifer Protection Fund	Fees	2
UST - 1C Augment State UST Program	King County Department of Natural Resources	0.00	0.08	0.00	Aquifer Protection Fund		2
UST - 2A Exempt Tanks	King County Department of Natural Resources	0.00	0.08	0.00	Aquifer Protection Fund		2
UST - 2B Exempt Tanks	King County Department of Natural Resources	0.00	0.08	0.00	Aquifer Protection Fund		2

Table 3.8.2 Implementing Agencies

Management Strategy	Agent	FTE Priority 1, 1,5	FTE Priority 2	FTE Priority 3, 4	AP Fund	Other Fund Source	Priority
UST - 3B Heating Oil Tanks: Location	King County Department of Natural Resources	0.00	0.25	0.00	Aquifer Protection Fund		2
WC - 2A Well Identification	King County Department of Natural Resources	0.00	0.08	0.00	Aquifer Protection Fund		2
WC - 2B Well Identification	King County Department of Natural Resources	0.00	0.08	0.00	Aquifer Protection Fund		2
SP - 1A Infiltration and Exfiltration: Studies	King County Department of Natural Resources	0.00	0.00	0.25	Aquifer Protection Fund	Centennial Clean Water Fund Grant	3
B - 1 Information - Studies	King County Department of Natural Resources	0.00	0.00	0.04	Aquifer Protection Fund		4
WQ - 1A Policies and Ordinances	King County Department of Natural Resources	0.13			Aquifer Protection Fund		1
ST - 5 Roadway Runoff	King County Department of Natural Resources	0.00	TBD	0.00	Aquifer Protection Fund		1

Table 3.8.2 Implementing Agencies

Management Strategy	Agent	FTE Priority 1, 1,5	FTE Priority 2	FTE Priority 3, 4	AP Fund	Other Fund Source	Priority
ST - 4C Coordination Between Surface and Ground Water Planning Efforts: King County	King County Department of Natural Resources	0.00	0.25	0.00	Aquifer Protection Fund		2
ST - 6 Soil Amendment	King County Department of Natural Resources	0.00	0.25	0.00	Aquifer Protection Fund	General Agency Funds	2
UST - 3A Heating Oil Tanks: State Code Amendment	King County Department of Natural Resources	0.00	0.08	0.00	Aquifer Protection Fund		2
WC - 3A Decommissioning cost	King County Department of Natural Resources	0.00	0.13	0.13	Aquifer Protection Fund		2
PF - 1B Pesticide and Fertilizer Use	King County Department of Natural Resources	0.00	0.00	0.08	Aquifer Protection Fund		3
PF - 1C Pesticide and Fertilizer Use	King County Department of Natural Resources	0.00	0.00	0.15	Aquifer Protection Fund		3
SA - 1D Enhanced environmental review to protect aquifers	King County Department of Natural Resources	0.50	0.00	0.00	Aquifer Protection Fund		1.5

Table 3.8.2 Implementing Agencies

Management Strategy	Agent	FTE Priority 1, 1,5	FTE Priority 2	FTE Priority 3, 4	AP Fund	Other Fund Source	Priority
HM - 4 Implementation of the Emergency Planning and Community Right-to-Know Act	King County Department of Natural Resources (Task 2-5)	0.00	0.25	0.00	Aquifer Protection Fund		2
WQ - 2A Data Needs	King County Department of Natural Resources in DCMP	See DCM 1	0.00	0.00	Aquifer Protection Fund		1
DCM - 1A Data Collection Analysis and Management	King County Department of Natural Resources: Collection and Analysis costs: \$298,701 - year 1, \$128,360 year 2 - end	2.75	0.00	0.00	Aquifer Protection Fund		1
DCM - 1A Data Collection Analysis and Management	King County Department of Natural Resources: Data Entry	1.00	0.00	0.50	Aquifer Protection Fund		1
Subtotal King County Department of Natural Resources		7.33	3.12	1.21			
OS - 1 Nitrate Concerns	Management Committee		TBD		Aquifer Protection Fund		2

Table 3.8.2 Implementing Agencies

Management Strategy	Agent	FTE Priority 1, 1,5	FTE Priority 2	FTE Priority 3, 4	AP Fund	Other Fund Source	Priority
Subtotal Management Committee		0.00	0.00	0.00			
DCM - 1A Data Collection Analysis and Management	SKCHD	0.50	0.00	0.00	Aquifer Protection Fund		1
WQ - 4A2, 4A3 Conservation	SKCHD	0.08	0.00	0.00	Aquifer Protection Fund		1
OS - 2A Hazardous Materials	SKCHD	0.00	0.25	0.00	Aquifer Protection Fund		2
OS - 2B Hazardous Materials	SKCHD	0.00	0.04	0.00	Aquifer Protection Fund		2
OS - 4A Operation and Maintenance	SKCHD	0.00	0.04	0.00	Aquifer Protection Fund		2
OS - 4B Operation and Maintenance	SKCHD	0.00	0.50	0.00	Aquifer Protection Fund		2
SW - 2 Abandoned sites	SKCHD	0.00	0.00	0.08	Aquifer Protection Fund		4
WC - 1B State Program	SKCHD	0.00	0.50	0.00	Aquifer Protection Fund		2
OS - 3A Household Hazardous Wastes	SKCHD (LHWMP)	0.00	0.13	0.00	Aquifer Protection Fund		2
SW - 1 Standards	SKCHD	0.00	0.00	0.04		General Agency Funds	4

Table 3.8.2 Implementing Agencies

Management Strategy	Agent	FTE Priority 1, 1,5	FTE Priority 2	FTE Priority 3, 4	AP Fund	Other Fund Source	Priority
Subtotal SKCHD		0.58	1.45	0.11			
WQ - 3A Water rights records	City of Redmond	0.09	0.00	0.00		General Funds	1
WQ - 4A1 Conservation	City of Redmond	no additional	0.00	0.00		General Funds	1
SA - 1A, 1B Elimination of categorical exemptions to SEPA	City of Redmond	no additional	0.00	0.00		General Funds	1.5
SA - 1C Adoption of General Policies	City of Redmond	no additional				General Funds	1.5
ST - 1A Runoff Versus Recharge	City of Redmond		TBD			General Funds	2
WQ - 1B Policies and Ordinances	City of Redmond	no additional	0.00	0.00		General Funds	2
PF - 1C Pesticide and Fertilizer Use	City of Redmond	0.00	0.00	TBD		General Agency Funds	3
Education	City of Redmond	0.47	0.00	0.00		General Funds	1
SA - 1D Enhanced environmental review to protect aquifers	City of Redmond	0.57	0.00	0.00		General Funds	1.5
Subtotal City of Redmond		1.13	0.00	0.00			
PF - 1A Pesticide and Fertilizer Use	Conservation District	0.00	0.00	0.87		General Funds	3
Subtotal Conservation District		0.00	0.00	0.87			
PF - 1B Pesticide and Fertilizer Use	Cooperative Extension			no additional		General Agency Funds	3
Subtotal Cooperative Extension		0.00	0.00	0.00			

Table 3.8.2 Implementing Agencies

Management Strategy	Agent	FTE Priority 1, 1,5	FTE Priority 2	FTE Priority 3, 4	AP Fund	Other Fund Source	Priority
WQ - 1A Policies and Ordinances	DDES Code Development	0.18				General Funds	1
WQ - 4A1 Conservation	DDES Code Development	0.22	0.00	0.00		General Agency Fund	1
SA - 1C Adoption of General Policies	DDES Code Development	0.04				General Agency Fund	1.5
SA - 1E Mapping physically susceptible areas	DDES Code Development	0.06	0.00	0.00		General Agency Fund	1.5
SA - 2 Wellhead Protection	DDES Code Development	0.56				General Funds	1.5
PF - 1C Pesticide and Fertilizer Use	DDES Code Development	0.00	0.00	0.50		General Agency Fund	3
SG - 2C Zoning Code-Reclamation Plans	DDES Code Development	0.00	0.50	0.00		General Funds	2
Subtotal DDES		1.06	0.50	0.50			
DCM - 2 Data Collection Analysis and Management	Ecology	0.06	0.06	0.06		General Agency Funds	1
WC - 2B Well Identification	Ecology	0.00	0.48	0.32		General Agency Funds	2
WC - 3B Decommissioning cost	Ecology	0.00	0.14	0.00		Unfinished Agenda	2
ST - 4A Coordination Between Surface and Ground Water Planning Efforts: Ecology Programs	Ecology	0.00	0.64	0.32		General Funds	1

Table 3.8.2 Implementing Agencies

Management Strategy	Agent	FTE Priority 1, 1,5	FTE Priority 2	FTE Priority 3, 4	AP Fund	Other Fund Source	Priority
WC - 1A State Program	Ecology	0.00	0.64	0.00		Permit fees general agency fund	2
WC - 1B State Program	Ecology	0.00	0.64	0.00		TBD	2
WQ - 1B Policies and Ordinances	Ecology	0.03	0.00	0.00		Centennial Clean Water Fund grant	2
WQ - 4D1 Decline Limits	Ecology	2.58	0.00	0.00		General Agency Funds	Unfinished Agenda
Subtotal Ecology		2.68	2.62	0.71			
ST - 1A Runoff Versus Recharge	King County	0.00	TBD	0.00		General Agency Funds	2
HM - 3 Implementation of the Uniform Fire Code	King County Fire Marshal (Task 1,2)	TBD				General funds	1
ST - 2B Ground Water Quality Concerns - Study	King County SWM	0.00	TBD	0.00		General funds	2
HM - 4 Implementation of the Emergency Planning and Community Right-to-Know Act	King County: Emergency Management (Task 1)	0.00	TBD	0.00		General Funds	2
Subtotal King County		0.00	0.00	0.00			
Education	NE Sammamish	0.04	0.00	0.00		General funds	1

Table 3.8.2 Implementing Agencies

Management Strategy	Agent	FTE Priority 1, 1,5	FTE Priority 2	FTE Priority 3, 4	AP Fund	Other Fund Source	Priority
HM - 5A Transportation-Related Hazardous Materials Spills-Purveyor Assessment	NE Sammamish	0.02	0.00	0.00		General Agency Fund	1
WQ - 3A Water rights records	NE Sammamish ¹	0.00	0.00	0.00		General funds	1
Subtotal NE Sammamish		0.06	0.00	0.0000			
ST - 4B Coordination Between Surface and Ground Water Planning - PSWQA	PSWQA		No additional			General funds	2
Subtotal PSWQA		0.00	0.00	0.00			
WQ - 3A Water rights	Union Hill	0.00	0.00	0.00		General Agency Funds	1
HM - 5A Transportation-Related Hazardous Materials Spills-Purveyor Assessment	Union Hill	0.01	0.00	0.00		General Agency funds	2
Education	Union Hill	0.04	0.00	0.00		General Agency funds	3
Subtotal Union Hill		0.06	0.00	0.00			
TOTAL		12.90	7.70	3.41			

Appendices

Appendix A: Public Comment

Appendix B: Letters of Comment or Concurrence

**Redmond-Bear Creek Valley
Ground Water Management Plan**

February 1999

Appendix A

Public Comment

**Redmond-Bear Creek Valley
Ground Water Management Plan**

February 1999

HEARING TRANSCRIPTION
REDMOND-BEAR CREEK GROUND WATER MANAGEMENT AREA
FEB. 16, 1995

Opening remarks by hearing officer, Doug Rushton:

This hearing is for Ecology to receive comments on the draft Redmond/Bear Creek Ground Water Management Area Program Plan. Let the record show that it's 9:22 on February 16, and this hearing is being held in Redmond at the Redmond City Council Chambers in the Public Safety Building located in Redmond. The primary purpose of tonight's hearing is to receive your comments regarding this plan. The legal notice of this hearing was published in the *Washington State Register* on February 1 of this year, and notices were also published on about the same day in the *Seattle PI* and the *Bellevue Journal American*. In addition, notices were sent to about 100 interested people or entities or firms. And I'd like to remind you again, if you want to speak, please sign up on one of the cards over on the table and we'll get you in the line-up here. Okay, when I call your name, I'll hand you the tape recorder and you can speak into the little holes that are here so we can record you loud and clear. So, the first person was Mr. Elfelt, so here you go.

My name is Joseph Elfelt. I live in the Redmond area. I think it's kind of silly in a way that we're having a public hearing on the night that the plan apparently is first really out for the public to get a look at. The plan sits about 2 inches thick. I've flipped through a few pages sitting here during the workshop part, but I imagine there's quite a bit of comment I'd make if the plan was presented in a workshop setting like tonight, but that the public hearing reconvened a week or 10 days or a couple weeks from now and perhaps in the future on other ground water management plans, they could work that way. One thing I'd like to find out more - I have another procedural remark. I'd like to see several copies of the draft ground water management plan in both the Redmond and Woodinville library, and coordination with the chief librarian in each facility, so that one of those copies can be the reference not to be removed and the other copies can be checked out by citizens that might not want to pop the \$29 for their own. I didn't see real strong language in there to the effect that the policies in the ground water management plan and regulations that result, have to comply under GMA with both the county-wide planning policies and the new King County Comprehensive Plan. So I'd like to see some stronger language about that. One of the first things I looked for was to see if the recharge area for the Union Hill aquifer was called out on the maps, and it's not. I am familiar with the car report that was done for the Union Hill Water Association and under the Growth Management Act were protected - were required to protect both water quality and quantity. Surely the recharge for Union Hill Association exists some place, and I just don't see it identified yet, and I think it's really important to identify and protect that sooner rather than later because of the MPDs are developed on top of what really does turn out to be the Union Hill Aquifer, when all the experts finally reach consensus, it might be a little late. There's quite a bit of reference in there to the Bear Creek community plan adopted in 1989 prior to the Growth Management Act. I don't know how valid those references are anymore in light of the policy in the new King County Comprehensive Plan which says that: "if there's any conflict between a policy in an old community plan, like the Bear Creek plan, and a policy in the new King County Comprehensive Plan, then the old policy in the community plan doesn't have any effect. It's the new policy in the county comprehensive plan, that's the only thing that has any effect anymore. On page 4-6 where we're talking about how much this is going to cost, there's no figure in there for cost per household during the workshop part of the meeting tonight, but not yet on the record as staff mentioned that the target is to keep the cost per household at \$30 per perhaps less. Certainly, I think since there was a cost estimate that was kind of in-hand, that the range of cost figures should be in there. Certainly, nobody should be asked to comment or endorse on something where there's absolutely no reference to cost in the plan at all. Figure 2.5.6 is a map showing septic system repair permits from 1987, as I recall, and I think that was about the year the county health regulations changed to allow mound systems, more high-tech septic systems of that sort, and I'd really like to see some info in the plan looking at these higher tech systems and to see if there's any kind of track record success or failure rate on those. I think the King County has some kind of sewage citizen advisory

committee. I don't know quite the right name, but a neighbor of mine, Judy _____, sits on that, so that's one group that the ground water people could contact to get some data from, I think. Figure 2.6.8 and 2.6.44 show the location of various monitoring wells that are around. I've ridden horseback through all the little roads and trails on the MPD sites, and they've got a whole bunch of wells; some big, some small. There's a lot of two or three-inch wells up there that are capped. As I recall, some of them, right on the cap, say that they're monitoring wells for this, that or the other. None of those wells are depicted in the ground water management plan. Now surely somebody has data or information or maybe they could easily be monitored to get data or information since the holes are already in the ground, we sure ought to be looking at that. Table 2.5.4 and 2.5.3 both refer to population forecast and allocations from 1992 figures from the Puget Sound Regional Council, under growth management, we're not using population figures from PSRC, we're required to only use population figures from the state Office of Financial Management. I know from my review of the county comprehensive plan that the PSRC figures are higher than the OFM figures are, so I really would like to see the ground water people get with the county planning staff who know these population figures inside out and get updated figures from the planners based on what the county comprehensive plan has done. Also, those 1992 figures from the PSRC were basically cut twice by the planners in the process of putting a King County comprehensive plan together, so I think the growth projection for Bear Creek is a little high there in the proposed ground water plan. A general comment is that the ground water plan should contain a section that would talk about the scope of regulations that might result. By scope of regulations, I mean the breath or the extent or the limits of regulations that might come from this, and that will enable people at this early date to know what we potentially are buying in on if we choose to support and endorse the ground water management plan. It's virtually impossible for a citizen, a nontechnical sort, to look at the policies and say, yea, I like the direction, because we don't know what the total outcome is going to be in terms of regulations that might affect us as individual property owners. I like greatly the notion - the response I got to my question during the workshop was whether the philosophy of the ground water plan treated area on the rural side of the line the same as area on the urban side of the line. The response was yes, the ground water plan does not distinguish between the two. I like that a lot. I don't think the rural side of the line should have to pay a heavy burden because we trash ground water on the urban side. I know that the county currently has policies and regulations whereby the county exempts county projects, schools, projects of other public entities from the effect of policies and regulations the rest of us have to comply with. I certainly hope that the regulations that result from the ground water plan are regulations that the county has to play by just like all the other citizens, and I should include the city of Redmond in on that too, I'm sure. The notion that government passes laws and exempts itself is a notion that is fading in popularity, witness the recent action of Congress on that point. Oh, and the last point is, I hope that there might be some funds become available at some point to do some research on the effect that livestock on these five-acre lots have on ground water. There's been a lot said, fingers pointed; the livestock people are to blame, or they're not to blame. No one really knows. It shouldn't be too difficult to do some research. My property would be an ideal one to do it on because the way we're situated at the top of a little drainage where water comes in on the high end and leaves at the low end and you can just test the effect that horses have right there, and what I could envision is that pick several small livestock operations around, some that appear to be well run and some that appear not to be well run, so you have both ends of the spectrum, and just monitor this stuff, and actually collect some data and see, and that would help to settle the debate of how much we need to cut down on the small livestock folks. So, appreciate the time.

Thank you.

This is Bill Lasby, Seattle King County Health Department, and I received a letter from the Woodinville Water District, and to summarize, or actually I'll just read - it's like three or four paragraphs. The purpose of this letter is twofold. First, to acknowledge Woodinville Water District's support of the intent of the Redmond/Bear Creek Ground Water Management Plan, and second, to advise you that while we support the intent, there's some specifics that will need to be worked through before implementation can proceed. The Board of Commissioners, of course, has a fiduciary responsibility to Woodinville Water District customers to

ensure that the ground water management plan meets the long range goals and objectives of the district as it pertains to development of future water resources. It goes on to say, one of the areas of concern is of course the public involvement strategy and the cost involved. We look forward to further discussing the implementation strategy and understand that our support of the plan at this time does not commit us to future financial obligations. Sincerely yours, Bob Bandera, General Manager of Woodinville Water District. And this letter would be entered into the record.

Thank you. The next person to speak is Mary O'Farrell. You can either come forward or I can just hand it to you, whichever way you want to do it.

I'll come forward so I don't have to... I too missed the notices in the paper about this meeting tonight, and did not find out about it until last night when I received a call which gave me a few minutes this afternoon to look at the copy in the library, and I wish I had had more time to go into depth before the workshop, but I hope to submit comments in writing. My major complaint is, while the study limited itself only to the infiltration potential of the upper most aquifer system, and I realize that your resources were limited, but the Union Hill Water Association spent \$50,000 or \$60,000 three or four years ago to do quite extensive study of their aquifer recharge area, and I think that the resources that our association's members spent to do that should have - the results should have been incorporated into this study before it is finalized. I would disagree with the statement that it was too late and because of the other information that is in the references for Chapter 2, many of the documents were published only in February of '94, which is about three years after the car report was published. I think there was enough time to incorporate that information. Approximately 2,000 households are dependent on that aquifer supply and we do not want to go on to Seattle City water if it's at all possible, and we are counting on this effort to protect our water supply. Another question I had was the Table 2.5.10, Toxic Cleanup Program. Two of the sites on Union Hill Road, Northwest Pipeline and Olympia Precast are businesses, or places that I drive past everyday and I notice that the contaminant status is suspected and confirmed and they're waiting for assessment or remedial action, but I'm just wondering how much time these companies on this toxic list have to get their act cleaned up so that they aren't potentially contaminating the surface water and the ground water resources there at Evans Creek and Rutherford Creek which is right next to the pipeline. On page 2-50 it said areas of high and medium infiltration potential were determined from the infiltration potential map prepared for the ground water management area, and I think this map is incomplete because it didn't look at the Novelty Hill area or the Evans Creek tributaries. It says Evans Creek Valley and Bear Creek, but not the tributaries higher up. On the recommendations number 8 and 9, I would disagree that the priorities should be given to the shallow aquifer zones in the valley because as we've seen from some of Redmond's land use decisions they have permitted the construction of Mervyns and Target to proceed full speed ahead right next to their largest volume well, well no. 5. Originally the loading dock of Costco was to be right next to that well, and with Costco's plans on hold, it's not as bad as it might have been, but I think trying to protect the areas that are zoned for industrial development is futile. So, at least in the Redmond area. I think we need to concentrate on the deeper wells, and I would say that as a motivation for concentrating on that only to look at the Highline aquifer which has been developed all over it and can only be pumped for four days at a time before they have to stop for their second air, from what I understand it, it recharges so slowly that they are not able to use it continuously at all. And that's all my comments right now. Thank you. Oh, I forgot to say my name and address. My name is Mary O'Farrell. My address is 23708 N.E. 70th St., Redmond 98053.

Thank you. (Doug Rushton) Is there anyone else who would like to speak? Okay, my intention is to take the comments we at Ecology receive and prepare a responsiveness summary and everyone who's name and address is on that list will get a copy of it. Again, if you'd like to send in written comments, both Bill's address and my address are over there on the wall, or here on this board, or you can talk with us. We can give you a business card, either one. And after this comment period is over, Seattle/King County is the lead agency, will consolidate the comments and presents them to the GWAC. The GWAC resolves areas of nonconcurrency, gives it to Ecology and we certify it. If there are areas of nonconcurrency, we try to resolve those and

negotiate it out. And, last chance, does anyone else care to speak? Okay. Let the record show this hearing is adjourned at 9:42, and thank you for your comments and participation.

gwm\ling\trude\conf\trudeleg.rtf

ATTENDANCE LIST

February 16, 1995

Redmond-Bear Creek GWMA Hearing

	Name	Address	Phone/Fax	Affiliation
1	Margaret Bay	700-5th Ave 2200 Seattle 98104	296-1968	KC-SWA
2	Bernie Beedoy	Smith Town	296-4739	SKCHD
3	Maggie Windus	19624 NE 129th way, Woodinville	891-9413	Wildlife/waterenders
4	Terry Lavender	17304 208th Ave NE Woodinville	788-2304	Citizen <i>Speaks</i>
5	Don Tubbs	8412-154th Ave NE, Redmond	861-6000	Geo Engineer
6	Karen Jatta	3516 Sahalee Dr W Redmond	868-8007	GWAC
7	Geoff Clayton	15116 169th Ave NE Woodinville	869-1488	NE. Scum
8	Joseph Efelz	11866 204th Ave NE Redmond 98053	981-8017	
9	Lyle Fitch	9419-1676th Ave NE, Redmond	882-7690	King County District
10	MAXINE KEESLING	15241 NE 153rd ST WOOD. 98072	483-8523	HONEY FARMER
11	STAVEN PALMER	7234 237th Ave NE Redmond	868-1303	UAWA
12	MARY O'FARRELL	23708 NE 70th St. Redmond	836-2743	Bear Creek Cit. for Growth Mgmt.
13	VICKI SHARLEY	KING COUNTY DEPT. OF PUBLIC WORKS 400 Yester Way, Rm 400 Seattle 98104	296-6560 W 296-0567 F	KING COUNTY ROADS-GWRO
14	BRAD PETROUCH	13190 160th Ave SE ^{Bivue} 98008	649-7038	Ecology
15	Gwen Maxfield	19220 NE 127th, R. 98053	881-7832	WWD
16	DON BERKOWITZ	19611 NE REDMOND RD 98053	868-7330	BEAR CR. CITIZEN

7-74

FOR GR. MGMT.

To the best of my knowledge, the non-state facility provided by the vendor did did not meet the Americans with Disabilities Act access criteria.

Signature

Date

Redmond-Bear Creek GWMA Hearing

	Name	Address	Phone/Fax	Affiliation
17	JOHN PHILLIPS	P.O. Box 712, REDMOND	868-1303	UTWA
18	Rick Hardesty	21429 NE 60 th PL Redmond	8688440	UTWA
19	Bruce McLean	2601 27th Ave W	296 4574	SACHO
20	THOMAS THOMAS	15534 ABERDALE RD WILSON	288-6008	LETTERBOXERS
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cc: All members METRO King County Council
Redmond Mayor and City Council

Maxine Keesling
15241 NE 153rd Street
Woodinville, WA 98072
(206) 483-8523

February 1, 1995

TO: Editors of Concerned Newspapers

Don't believe regulatory reform. King County and the City of Redmond are dropping another layer of costly (to the pockets of local landowners) regulations based on intensive studies that showed no problems needing correction. The affected area lies between the Sammamish River and the west ridge of the Snoqualmie Valley, and between the Snohomish County line and the Lake Sammamish/Sahalee Plateau topographic divide. The public hearing on this new creation, called the Redmond-Bear Creek Valley Ground Water Management Plan (RBC-GWMP) is Thursday, Feb. 16, 7:00 pm, at Redmond City Council Chambers.

The theme, "Once a groundwater source is contaminated, it may be lost forever," is belied by the fact that current groundwater quality "... generally meets all the primary and secondary state and federal drinking water standards." (And the county's comprehensive plan environmental analysis disclosed that "All river and streams in the County are classified either A (excellent) or AA (extraordinary), with the exception of the Duwamish River ... which is classified B (good).")

So, when past numerous horse-acre developments, and past years of droppings by thousands of dairy cattle, and two active landfill dumps have left us in great condition water quality-wise, why do we need another funded bureaucracy to protect from FUTURE contamination? What is mostly now a Rural Area has already been downzoned from horse-acres to 1 home/5 acres; the cattle are mostly gone; the dumps closed; and current environmental regulations leave us with essentially nothing to do but watch the native brush grow - a non-contaminating, non-activity.

Huge amounts of our money (to be collected with water bills or real estate taxes depending on the funding mechanism) will pay for endless research/studies to determine exactly where these future threats are. They'll be "monitoring for pesticide and fertilizer contamination in agricultural areas" despite the previous determination that "fertilizer use is largely restricted to turf applications at public golf courses, residential lawns ... (because) commercial agriculture is virtually absent in the RBC-GWMA." It's also stated that "There has not been a reported incident of groundwater contamination related to pesticides or fertilizer practices in King County."

Other of our so-called Aquifer Protection Fund (APF) dollars will be spent to acquire more local regulatory authority from the state, including \$400 to "Write letters to the Director of Ecology ... and the Washington State Legislature." We're to fund our own "education" in groundwater protection to the tune of \$312,000/year, plus many thousands of APF dollars to prepare and implement regulations for home heating oil tanks, followed by \$300-\$350 tank inspection/review fees. And the City of Redmond is to spend \$204,800 the first year to help decide where to toughen our already-tough environmental regulations in this groundwater management area.

To avoid this regulatory overlap and further transfers of your money to the government, come to the meeting on the 16th and/or communicate your displeasure to Redmond's Mayor (556-2100) and the King County Council (Hot Line 296-1688).

Maxine Keesling
15241 NE 153rd Street
Woodinville, WA 98072
(206) 483-8523

PLUS ATTACHED
LETTER TO-ED

NOTE:
NO ATTACHMENT
CDL 2/10/95

February 16, 1995: TESTIMONY ON REDMOND-BEAR CREEK VALLEY GROUNDWATER MGMNT PLAN

TO: The Department of Ecology, Redmond City Council and METRO King County Council

The 2"-thick Plan book discloses no significant environmental impacts from hundreds of years of indiscriminate, unsupervised land uses in the Bear Creek Valley, including droppings from thousands of dairy cows, two landfill dumps without cavity linings, numerous horse-acre urban-style housing developments along with urban densities and apartments. In fact the book says the area's water quality meets all the primary and secondary state and federal drinking water standards. And the environmental analysis for King County's complan disclosed that with the exception of a stretch of the Duwamish River, "All river and streams in the County are classified either A (excellent) or AA (extraordinary)."

In addition to all the tough new environmental controls found in the recently-adopted Complan and the Bear Creek Basin Plan and the Bear Creek Community Plan, including massive downzoning and maximum retention of native vegetation of from 65% to 90%, we have controls from the federal EPA, the Army Corps of Engineers, the DOE, the Puget Sound Water Quality Authority, the METRO water quality division, and King County's Surface Water Management.

So will you please show the necessity for yet ANOTHER layer of bureaucracy and new taxes ("user fees") to control what's already being controlled in EXISTING programs? To control what hasn't been a problem in the past, according to your own testing?

How do you justify spending a projected \$352,000 a year to EDUCATE us about what COULD happen if we don't do thus-and-such, and to take more school classroom time to teach our children what's already being taught in Surface Water Management programs that even take our kids out of the classroom to transplant wetlands vegetation. We already are paying for interpretive signs to protect streams and wetlands. Justify paying for even more interpretive signs for groundwater protection - we've too much sign clutter now and what will the new signs protect that isn't already protected by the SWM signs. And what about the \$400 budgeted for writing letters to the state legislators to get more local/authority and more local taxing authority. With businesses to pay more, of course. And what about the \$300-\$350 fees for inspecting and reviewing heating oil tanks.

State law for setting up groundwater management areas focuses on those areas with existing or imminent problems of contamination or over-appropriation. We have none of those problems, and existing land use controls and existing bureaucracy will prevent future problems. Your own testing programs disclose absolutely no justification for imposing a groundwater management bureaucracy and new taxes in this 50-square-mile area. Prove me wrong.

Maxine Keesling

P.S. Please remove my own Hollywood Hill neighborhood from your study area, and correct your text description of the western boundary going to the Sammamish River. The study area is MAPPED, as it should be, at the top eastern edge of Hollywood Hill where the land drops east into the Bear Creek Valley. The mass of the Hill drops west into a different river basin, and no testing was done in this Hollywood Hill area.

M. K.

Appendix B

Letters of Comment or Concurrence

**Redmond-Bear Creek Valley
Ground Water Management Plan**

February 1999



THE CITY OF REDMOND
OFFICE OF THE MAYOR
ROSEMARIE M. IVES, Mayor

RECEIVED

JAN 12 1996

SURFACE WATER MANAGEMENT DIVISION
OFFICE SUPPORT SERVICES

January 9, 1996

Mark Isaacson, Ground Water Program Manager
Stormwater Management Division
700 Fifth Ave., 22nd Floor
Seattle, WA 98104-9830

Subject: Draft Redmond Bear Creek Ground Water Management Plan

Dear Mr. Isaacson,

Thank you for incorporating the revisions we requested in our April 20, 1995 letter regarding the draft Redmond Bear Creek Ground Water Management Plan. City of Redmond staff and I support the 12/8/95 draft plan which reflects these revisions. I have attached a copy with some minor changes to be incorporated into the final plan. After the Metropolitan King County Council has reviewed and concurred with the plan, and the funding has been secured, we look forward to implementation of tasks identified by the city.

Sincerely,

A handwritten signature in cursive script, appearing to read "Rosemarie M. Ives".

Rosemarie M. Ives
Mayor

attachment

February 17, 1995

Doug Rushton
DOE
PO Box 47600
Olympia, WA 98504-7600

Re: Draft Redmond-Bear Creek Ground Water Plan

Dear Mr. Rushton,

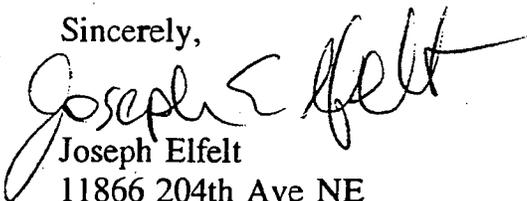
This letter and the attachment are part of my testimony that a priority should be placed on designating and protecting the recharge area for the Union Hill Water Association aquifer.

First, the Growth Management Act requires both quality and quantity of ground water to be protected. "The land use element shall provide for protection of the quality and quantity of ground water used for public water supplies." RCW 36.70A.070(1).

Second, the Seattle water department lacks sufficient water supply to serve the Union Hill Water Association if either the quality or quantity of water in Union Hill's aquifer becomes imperiled by development planned for their recharge area. The attached report shows that existing water providers in King County are currently short 101 Million Gallons per Day of having enough fresh water supply to serve growth forecast for the area over the next 20 years. Because there is no alternative supply readily available, it is of the utmost importance to designate and protect the recharge area for the Union Hill Water Association.

I may file additional written comments after having an opportunity to actually review the draft plan.

Sincerely,



Joseph Elfelt
11866 204th Ave NE
Redmond, Washington 98053
206-881-8017

c: GWAC c/o Bill Lasby
Union Hill Water Assc.



RH2 ENGINEERING, P.S.
 8383 158th Avenue NE, Suite 200
 Redmond, WA 98052
 (206) 869-1488 • (800) 720-8052
 Fax: (206) 869-7769

Letter of Transmittal

164

TO: King County Council
 Growth Management Committee
 Room 402 King County Courthouse
 516 3rd Avenue
 Seattle, WA 98104

DATE: October 5, 1994	JOB NO.: 192.103
ATTENTION: Tom Koney	
RE: Projected Increases in Water Demand for King County	

WE ARE SENDING YOU THE FOLLOWING:

<input checked="" type="checkbox"/> Attached	Under Separate Cover Via:		
Shop Drawings	Prints	Plans	Samples
Copy of Letter	Change Order		

COPIES	DATE	NO.	DESCRIPTION
1	8/9/94		Tables and Graphs illustrating projected increases in water demand for King County based on adopted GMPC Growth Targets

THESE ARE TRANSMITTED AS CHECKED BELOW:

<input type="checkbox"/>	For approval	<input type="checkbox"/>	Approved as submitted	<input type="checkbox"/>	Resubmit	copies for approval
<input checked="" type="checkbox"/>	For your use	<input type="checkbox"/>	Approved as noted	<input type="checkbox"/>	Submit	copies for distribution
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<input checked="" type="checkbox"/>	For your information	<input type="checkbox"/>		<input type="checkbox"/>		
<input type="checkbox"/>	For review and comment	<input type="checkbox"/>	For bids due:	<input type="checkbox"/>	Prints returned after loan to us	

REMARKS:

Tom:
 These are a series of tables and graphs were prepared based on GMPC Growth Targets. The total projected increase is about 136 million gallons per day (MGD). Current Seattle Water capacity is about 220 MGD. Some of that new demand could be met from existing sources and from construction of Pipeline 5 (now referred to as the "Second Diversion"). Even if we assume those and related supplies, King County will still need about 101 MGD more water to meet the growth targets. One somewhat surprising result of this analysis is that Seattle will need about 42% of the net new water. If you have any questions or would like these results illustrated in a different manner.

COPY TO:		SIGNED:	Gene Peterson
-----------------	--	----------------	---------------

Proposed Growth Target Ranges for Households and Employment*

Cities	Net New	Net New Hhld Ranges		Net New	Net New Emp. Ranges	
	Households	Low	High	Employment	Low	High
Algona	404	346	462	350	300	400
Auburn	8,082	6,553	9,610	11,100	9,000	13,200
Beaux Arts	-	-	-	-	-	-
Bellevue	8,575	7,680	9,550	28,250	25,300	31,200
Black Diamond	1,033	947	1,119	1,200	1,100	1,300
Bothell (K.C. part)	1,931	1,448	2,413	2,900	2,150	3,600
Burien	1,796	1,596	1,995	450	400	500
Carnation	404	404	404	-	-	-
Clyde Hill	12	12	12	-	-	-
Des Moines	1,796	1,437	2,155	2,500	2,000	3,000
Duvall	1,886	1,563	1,759	1,700	1,600	1,800
Enumclaw	2,626	2,182	2,667	1,000	900	1,100
Federal Way	14,996	13,425	16,566	14,800	13,300	16,400
Hunts Point	4	4	4	-	-	-
Issaquah	2,694	1,879	3,508	4,300	3,000	5,600
Kent	6,735	6,120	7,500	11,500	10,450	12,550
Kirkland	5,837	5,328	6,346	8,600	7,800	9,300
Lake Forest Park	135	101	168	200	150	250
Medina	17	17	17	-	-	-
Mercer Island	1,122	1,056	1,188	1,700	1,600	1,800
Milton	18	18	18	-	-	-
Normandy Park	135	135	135	-	-	-
North Bend	1,527	1,266	1,787	2,050	1,700	2,400
Pacific	1,212	606	1,818	100	50	150
Redmond	11,458	9,637	12,760	29,509	29,500	34,750
Renton	8,890	7,730	10,049	23,000	20,000	26,000
Sea Tac	3,592	3,546	7,500	15,800	15,600	26,900
Seattle	53,877	48,233	59,520	132,700	118,800	146,600
Skykomish	27	27	27	-	-	-
Snoqualmie	2,784	1,942	3,625	4,500	3,100	5,820
Tukwila	5,388	4,761	6,014	22,250	19,000	24,000
Woodinville	1,796	1,750	1,842	1,950	1,900	2,000
Yarrow Point	18	18	18	-	-	-
City Totals	150,807	131,767	172,556	322,409	288,700	370,620
Unincorp K.C.	44,897	40,048	50,000	25,000	23,300	28,700
GRAND TOTAL	195,704	171,815	222,556	347,409	312,000	399,320

Percent MF Units = 37%

SF gpd = 635

MF gpd = 381

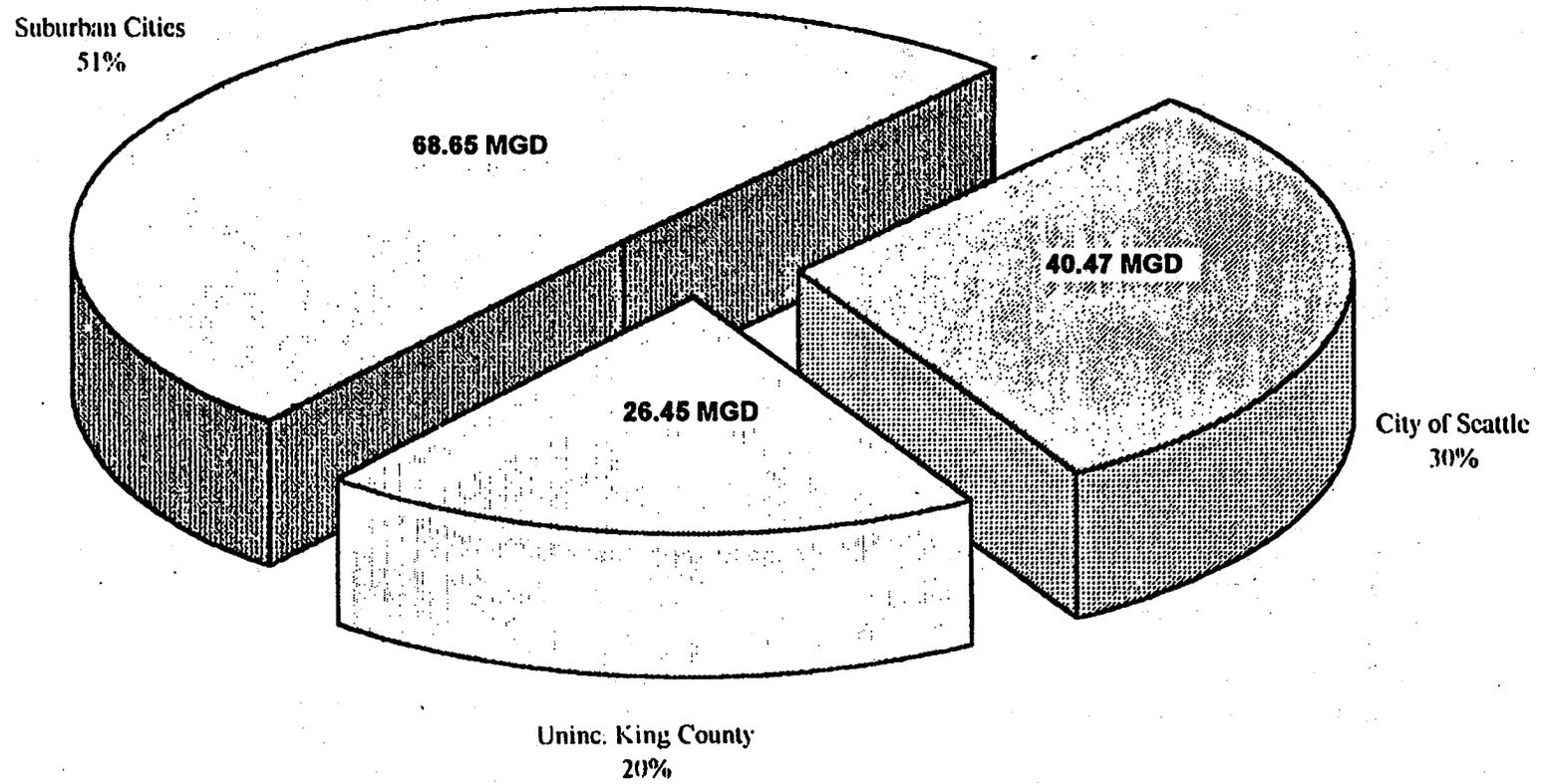
Employee gpd = 85

NOTE: PEAK SEASON DEMAND IS BASED ON THE RATIO OF PEAK SEASON TO PEAK DAY DEMAND

NOTE: ALL DEMAND ROUNDED TO NEAREST 1000 GPD

Cities	Net New Households	New SF HH	New MF HH	New SF Demand (GPD)	New MF Demand (GPD)	Total Res Demand (GPD)	Net New Emp	Emp Demand (GPD)	TOTAL DEMAND (GPD)
Algona	404	256	148	162,000	57,000	219,000	350	30,000	249,000
Auburn	8,082	5,115	2,967	3,248,000	1,131,000	4,379,000	11,100	944,000	5,323,000
Beaux Arts	-	-	-	-	-	-	-	-	-
Bellevue	8,575	5,427	3,148	3,446,000	1,200,000	4,646,000	28,250	2,401,000	7,047,000
Black Diamond	1,033	654	379	415,000	145,000	560,000	1,200	102,000	662,000
Bothell (K.C., part)	1,931	1,222	709	776,000	270,000	1,046,000	2,900	247,000	1,293,000
Burien	1,796	1,137	659	722,000	251,000	973,000	450	38,000	1,011,000
Carnation	404	256	148	162,000	57,000	219,000	-	-	219,000
Clyde Hill	12	8	4	5,000	2,000	7,000	-	-	7,000
Des Moines	1,796	1,137	659	722,000	251,000	973,000	2,500	213,000	1,186,000
Duvall	1,886	1,194	692	758,000	264,000	1,022,000	1,700	145,000	1,167,000
Enumclaw	2,626	1,662	964	1,055,000	367,000	1,422,000	1,000	85,000	1,507,000
Federal Way	14,996	9,490	5,506	6,026,000	2,098,000	8,124,000	14,800	1,258,000	9,382,000
Hunts Point	4	3	1	2,000	1,000	3,000	-	-	3,000
Issaquah	2,694	1,705	989	1,083,000	377,000	1,460,000	4,300	366,000	1,826,000
Kent	6,735	4,262	2,473	2,707,000	942,000	3,649,000	11,500	978,000	4,627,000
Kirkland	5,837	3,694	2,143	2,346,000	817,000	3,163,000	8,600	731,000	3,894,000
Lake Forest Park	135	85	50	54,000	19,000	73,000	200	17,000	90,000
Medina	17	11	6	7,000	2,000	9,000	-	-	9,000
Mercer Island	1,122	710	412	451,000	157,000	608,000	1,700	145,000	753,000
Milton	18	11	7	7,000	3,000	10,000	-	-	10,000
Normandy Park	135	85	50	54,000	19,000	73,000	-	-	73,000
North Bend	1,527	966	561	614,000	214,000	828,000	2,050	174,000	1,002,000
Pacific	1,212	767	445	487,000	170,000	657,000	100	9,000	666,000
Redmond	11,458	7,251	4,207	4,604,000	1,603,000	6,207,000	29,509	2,508,000	8,715,000
Renton	8,890	5,626	3,264	3,573,000	1,244,000	4,817,000	23,000	1,955,000	6,772,000
Sea Tac	3,592	2,273	1,319	1,443,000	502,000	1,945,000	15,800	1,343,000	3,288,000
Seattle	53,877	34,096	19,781	21,651,000	7,537,000	29,188,000	132,700	11,280,000	40,468,000
Skykomish	27	17	10	11,000	4,000	15,000	-	-	15,000
Snoqualmie	2,784	1,762	1,022	1,119,000	389,000	1,508,000	4,500	383,000	1,891,000
Tukwila	5,388	3,410	1,978	2,165,000	754,000	2,919,000	22,250	1,891,000	4,810,000
Woodinville	1,796	1,137	659	722,000	251,000	973,000	1,950	166,000	1,139,000
Yarrow Point	18	11	7	7,000	3,000	10,000	-	-	10,000
Incorp. Cities	150,807	95,438	55,369	60,603,000	21,096,000	81,705,000	322,409	27,405,000	109,114,000
Unincorp K.C.	44,897	28,413	16,484	18,042,000	6,280,000	24,322,000	25,000	2,125,000	26,447,000
GRAND TOTAL	195,704	123,851	71,853	78,645,000	27,376,000	106,027,000	347,409	29,530,000	135,561,000

Total Projected Increase in Peak Season Water Demand in King County by Year 2010 based on GMPC Growth Targets is 136 Million Gallons per Day

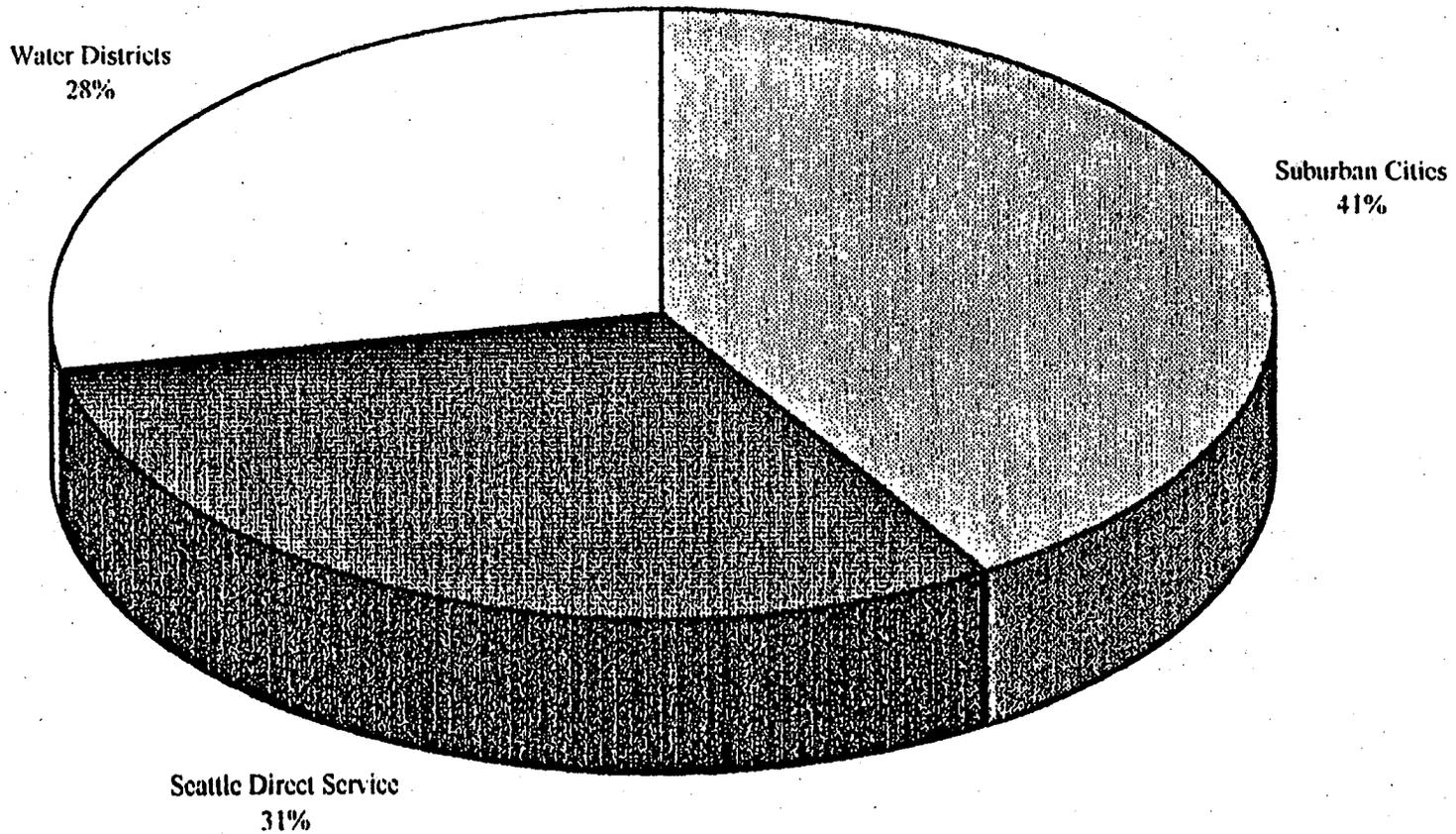


Matrix of Water Purveyors and the Areas They Serve

City Served	Ames Lake	Bryn Mawr	Cascade View*	Cedar River	Covington	Highline	Lacbaiven	Norbeas Sammamish	Northshore	Sallal*	Sammamish Plateau	Shoreline	Stuyway	Scott Creek	Union Hill	Woodinville W.D.	W.D. 20	W.D. 45	W.D. 49	W.D. 54	W.D. 83	W.D. 85	W.D. 90	W.D. 107	W.D. 111	W.D. 119	W.D. 125	W.D. 127 (Fall City)*
Algona*							●																					
Auburn							●																					
Beaux Arts*																												
Bellevue																								●				
Black Diamond									●																			
Bothell (K.C. part)									●																			
Burien						●											●											
Camation																												
Clyde Hill*																												
Des Moines						●															●							
Duvall																												
Enumclaw																												
Federal Way							●																					
Hunts Point*																												
Issaquah																												
Kent						●								●														
Kirkland									●																			
Lake Forest Park												●																
Modina*																												
Mercer Island																												
Milton*																												
Normandy Park						●																						
North Bend																												
Pacific*																												
Redmond																												
Renton		●												●														
Sea Tac						●											●											
Seattle																												
Skykomish*																												
Snoqualmie																												
Tukwila						●																						
Woodinville									●							●												
Yarrow Point*																												
Unincorp K.C.	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

* Purveyors not included in future demand analysis

**Total King County Peak Season Water Demand Increase by 2010 by
Purveyor Type per GMPC Growth Targets is about 136 MGD**



Purveyor	Total Daily Increase in Peak Season Water Demand per GMPC Growth Targets	Estimated Supply Available for Growth	2010 Net New Peak Season Water Needs per GMPC Growth Targets	% of Region's Peak Season Water Growth	Estimated Cost @ \$3 Million/MGD
SUBURBAN CITY PURVEYORS					
NOTE: NUMBERS ROUNDED TO NEAREST 1,000					
Auburn†	7,223,000	7,223,000	0	0.00%	\$0
Bellevue	7,090,000	0	7,090,000	6.99%	\$21,270,000
Black Diamond	689,000	0	689,000	0.68%	\$2,067,000
Bothell (K.C. part)	1,293,000	0	1,293,000	1.27%	\$3,879,000
Carnation†	259,000	259,000	0	0.00%	\$0
Duvall	1,285,000	0	1,285,000	1.27%	\$3,855,000
Enumclaw	1,545,000	0	1,545,000	1.52%	\$4,635,000
Issaquah	2,787,000	0	2,787,000	2.75%	\$8,361,000
Kent²	5,975,000	5,975,000	0	0.00%	\$0
Kirkland	3,894,000	0	3,894,000	3.84%	\$11,682,000
Mercer Island	753,000	0	753,000	0.74%	\$2,259,000
North Bend	1,026,000	0	1,026,000	1.01%	\$3,078,000
Redmond	8,781,000	0	8,781,000	8.65%	\$26,343,000
Renton†	6,772,000	6,772,000	0	0.00%	\$0
Snoqualmie	1,977,000	0	1,977,000	1.95%	\$5,931,000
Tukwila	4,937,000	0	4,937,000	4.86%	\$14,811,000
<i>Subtotal</i>	<i>56,286,000</i>	<i>20,229,000</i>	<i>36,057,000</i>	<i>35.53%</i>	<i>\$108,171,000</i>
Seattle Direct Service	42,384,000	0	42,384,000	41.76%	\$127,152,000
DISTRICT PURVEYORS					
Ames Lake	462,000	0	462,000	0.46%	\$1,386,000
Bryn Mawr	30,000	0	30,000	0.03%	\$90,000
Cedar River	1,694,000	0	1,694,000	1.67%	\$5,082,000
Covington²	2,639,000	2,639,000	0	0.00%	\$0
Highline	3,782,000	0	3,782,000	3.73%	\$11,346,000
Lakehaven†	11,135,000	11,135,000	0	0.00%	\$0
Northeast Sammamish	1,025,000	0	1,025,000	1.01%	\$3,075,000
Northshore	1,597,000	0	1,597,000	1.57%	\$4,791,000
Sammamish Plateau	4,013,000	0	4,013,000	3.95%	\$12,039,000
Shoreline	1,056,000	0	1,056,000	1.04%	\$3,168,000
Skyway	127,000	0	127,000	0.13%	\$381,000
Soos Creek	1,401,000	0	1,401,000	1.38%	\$4,203,000
Union Hill	1,714,000	0	1,714,000	1.69%	\$5,142,000
Woodinville Water District	2,090,000	0	2,090,000	2.06%	\$6,270,000
W.D. 20	692,000	0	692,000	0.68%	\$2,076,000
W.D. 45	70,000	0	70,000	0.07%	\$210,000
W.D. 49	708,000	0	708,000	0.70%	\$2,124,000
W.D. 56	232,000	0	232,000	0.23%	\$696,000
W.D. 83	90,000	0	90,000	0.09%	\$270,000
W.D. 85	101,000	0	101,000	0.10%	\$303,000
W.D. 90	1,151,000	0	1,151,000	1.13%	\$3,453,000
W.D. 107	521,000	0	521,000	0.51%	\$1,563,000
W.D. 111²	1,159,000	1,159,000	0	0.00%	\$0
W.D. 119	136,000	0	136,000	0.13%	\$408,000
W.D. 125	354,000	0	354,000	0.35%	\$1,062,000
<i>Subtotal</i>	<i>37,979,000</i>	<i>14,933,000</i>	<i>23,046,000</i>	<i>22.71%</i>	<i>\$69,138,000</i>
GRAND TOTALS	136,649,000	35,162,000	101,487,000	100%	\$304,461,000

†Estimated Supply From Existing Wells

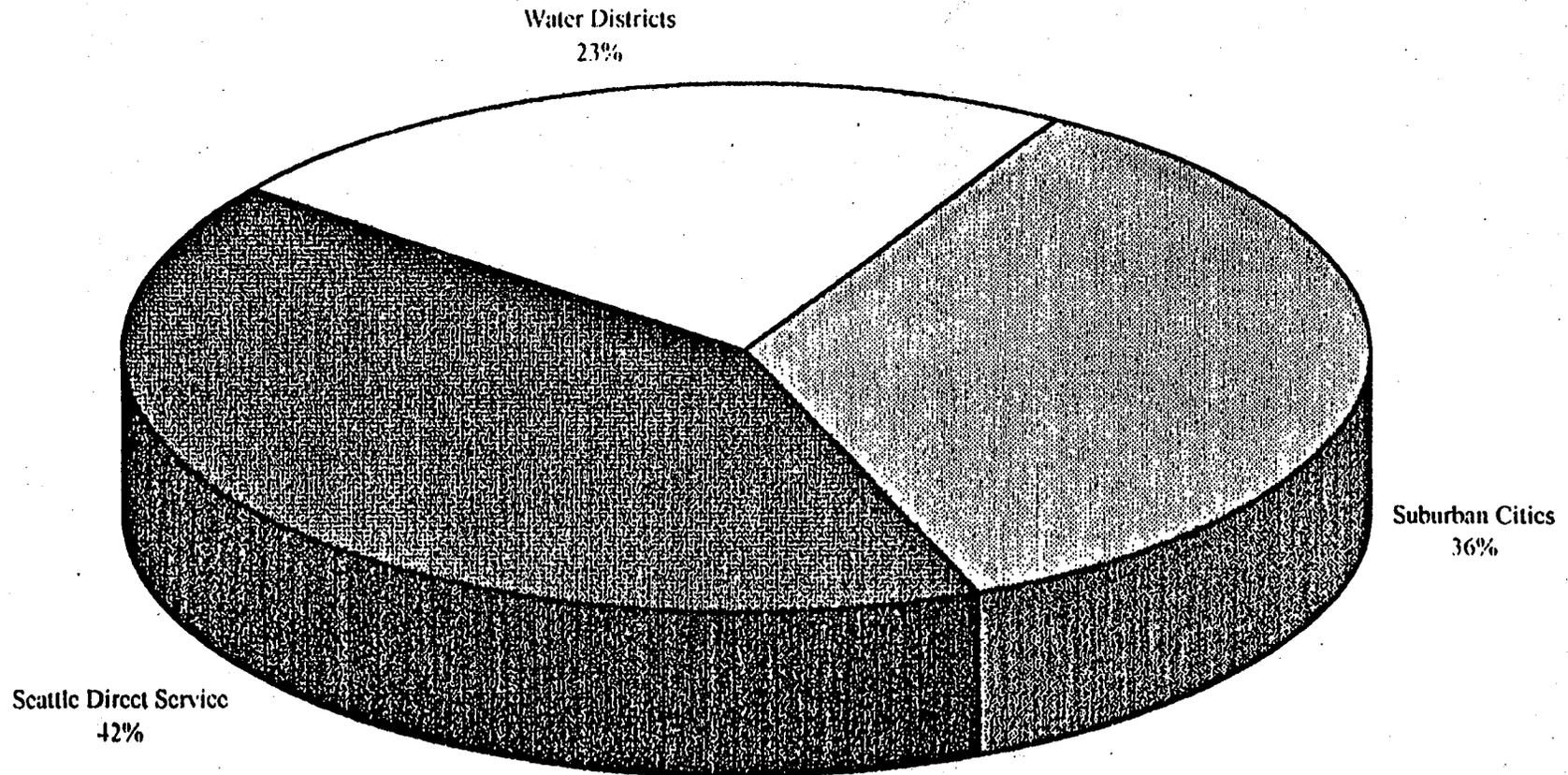
²Assumes Successful Completion of Tacoma Second Diversion Pipeline

³ Does Not Include Any Yield From Tacoma Interlie Project

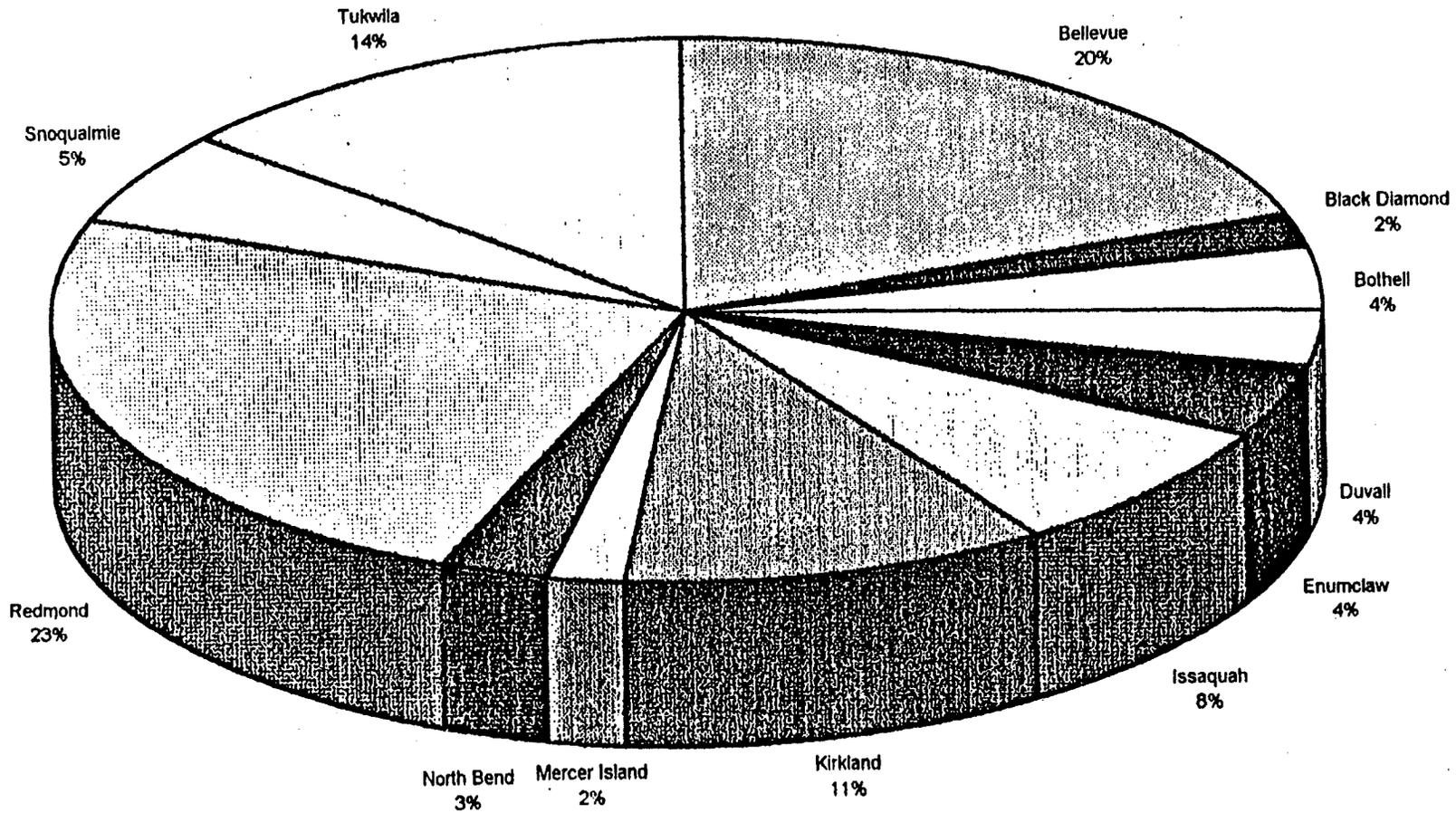
†Assumes Successful Completion of Tacoma Second Diversion Pipeline and OASIS Project

§Total Capital Improvements for "Meeting Projected Demand" through 2010 in Supplement V of Seattle Water Supply is \$178,102,000.

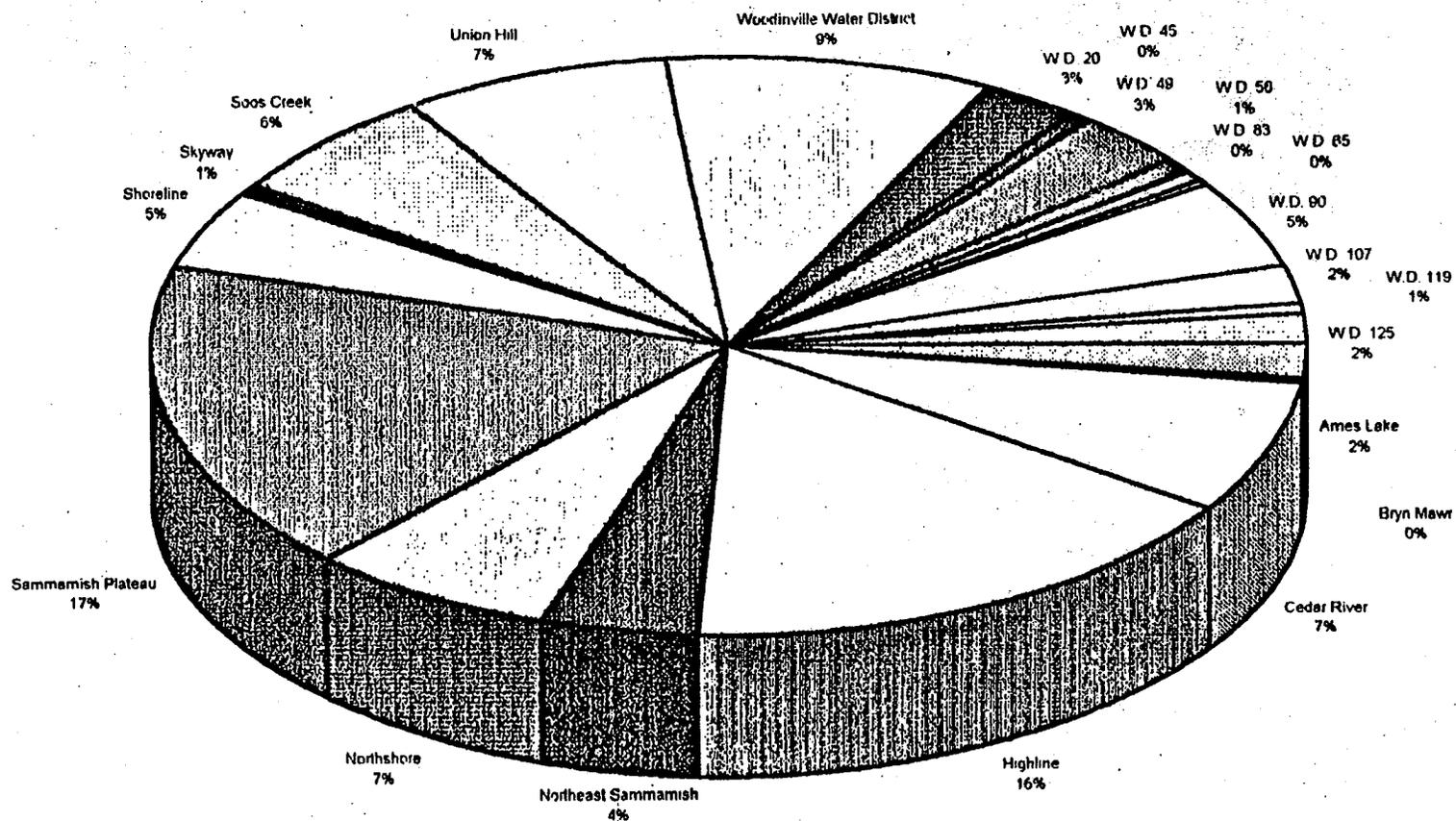
Net Portion of Peak Season Water Demand Increase by 2010 by Purveyor Type per GMPC Growth Targets



Distribution of Suburban Cities' 36% of Net Peak Season Water Demand Increase by 2010



Distribution of Water Districts' 23% of Net Peak Season Water Demand Increase by 2010



UNION HILL WATER ASSOCIATION

P.O. BOX 712

REDMOND, WASHINGTON 98073-0712

PHONE - 868-1303 FAX - 868-5661

December 15, 1995

Mr. Bill Lasby
Seattle King County Health Department
Room 918 Smith Tower
Seattle, WA. 98104

Dear Mr. Lasby.

The Seattle-King County Health Department in conjunction with the Redmond-Bear Creek Valley Ground Water Management Committee (GWAC) has prepared a revised draft Redmond-Bear Creek Valley Ground Water Management Plan (Plan) which includes the Union Hill Water Association Service Area, our supply wells and our recharge area.

The GWAC has requested that the Union Hill Water Association express its concurrence with the plan as provided for in applicable state law and administrative regulations; previously, the Union Hill Water Association Board of Trustees considered the Draft Plan and provided comments and a letter of non-concurrence to the GWAC regarding such Plan.

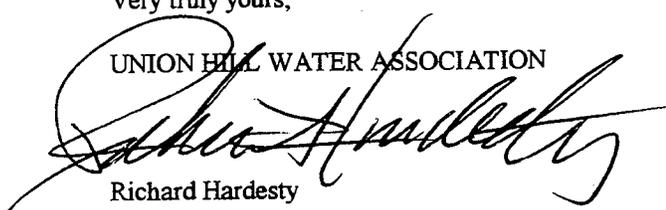
The Plan has now been revised to address and include the Water Association comments and concerns to the Water Association's satisfaction.

By way of Minute Action, the Board of Trustees of Union Hill Water Association, King County, Washington concurs with the goals, provisions, policies and procedures set forth in the Plan as revised as of this date. Staff of Union Hill Water Association has been directed to undertake all actions necessary to assure adoption of this Plan as soon as possible and to provide whatever assistance may be required to the GWAC, Seattle King County Health Department and the King County Department of Public Works - Surface Water Management Division to assure early adoption and implementation. Staff is directed to bring back to our Board for concurrence any major changes or deviations to the Draft Copy now before us.

This Motion was adopted at a regular open public meeting of the Board of Trustees, Union Hill Water Association, King County, Washington held on December 14, 1995.

Very truly yours,

UNION HILL WATER ASSOCIATION



Richard Hardesty
President

**UNION HILL WATER ASSOCIATION
KING COUNTY, WASHINGTON**

MINUTE ACTION OF THE BOARD OF TRUSTEES OF UNION HILL WATER ASSOCIATION, KING COUNTY, WASHINGTON, EXPRESSING CONCURRENCE WITH THE REDMOND-BEAR CREEK VALLEY GROUND WATER MANAGEMENT PLAN.

WHEREAS, the Seattle-King County Health Department in conjunction with the Redmond-Bear Creek Valley Ground Water Management Committee (GWAC) prepared a draft Redmond-Bear Creek Valley Ground Water Management Plan (Plan) for the Water Association review and comment; and

WHEREAS, the GWAC requested that the Water Association express its concurrence with the plan as provided for in applicable state law and administrative regulations; and the Water Association Board of Trustees having previously considered the Plan and having provided comments and a letter of non-concurrence to the GWAC regarding such Plan; and

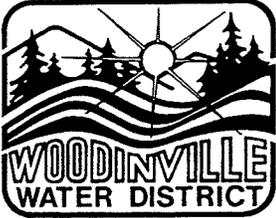
WHEREAS, the Plan having been revised to address and include the Water Association comments and concerns to the Water Association satisfaction; now therefore,

BE IT RESOLVED, by the Board of Trustees of Union Hill Water Association, King County, Washington, as follows:

1. The Water Association concurs with the goals, provisions and procedures set forth in the Plan as revised.
2. Water Association staff are hereby authorized and directed to provide a copy of this resolution of concurrence to the Seattle-King County Department of Health, the GWAC, the King County Department of Public Works - Surface Water Management Division and to keep the Board further advised regarding the status, further adoption and implementation of such Plan.

ADOPTED at a regular open public meeting of the Board of Commissioners, Union Hill Water Association, King County, Washington, Washington, held on the 14th day of December 1995.

Rick Hardesty, President



WOODINVILLE WATER DISTRICT

17238 Woodinville-Duvall Road
P.O. Box 1390
Woodinville, Washington 98072-1390
(206) 483-9104
FAX (206) 486-9244

COMMISSIONERS
Edward Cebron
Gail C. Harrell
Gwenn Maxfield

GENERAL MANAGER
Bob Bandarra

February 16, 1995

Mr. Bill Lasby
Supervisor, Drinking Water and Groundwater Program
Seattle-King County Department of Public Health
Smith Tower
506 Second Avenue Room 918
Seattle, WA 98104

Re: Redmond-Bear Creek Valley Ground Water Management Plan (GWMP)

Dear Mr. Lasby,

The purpose of this letter is two fold; first to acknowledge Woodinville Water District's support of the intent of Redmond -Bear Creek Valley Ground Water Management Plan, and second to advise you that while we support that intent there are specifics that we will need to work through before implementation can proceed.

The Board of Commissioners of course have a fiduciary responsibility to Woodinville Water District customers to be ensure that the GWMP meets the long range goals and objectives of the District as it pertains to the development of future ground water sources.

One of the areas of specific concern is the proposed education program that is noted in the GWMP. The District has an education program that involves working with the schools, public, homeowner associations and service organizations. In addition, we have a water efficiency demonstration garden and King County Composting site on District property open to the public. We annually invest \$150,000 to the coordination of this program. Perhaps the GWMP should consider that program as a form of in kind match by the District rather than asking them to fund an additional \$26,000 to \$49,000 in the GWMP.

We look forward to further discussing the implementation strategy and understand that our support of the plan at this time does not commit us to future financial obligations.

If I can provide you with any additional information please contact me at 483-9104 extension 303.

Sincerely,

WOODINVILLE WATER DISTRICT

Bob Bandarra
General Manager

cc: Board of Commissioners

Maxine Keesling • Country N.W.

**15241 N.E. 153rd Street
Woodinville, WA 98072**

(206) 483-8523

February 19, 1995

Bill Lasby, Supervisor
Sea/King Dept of Public Health
Room 201 Smith Tower
Seattle WA 98104

Re: DOE/HD meeting 2-16-94, Redmond City Hall
Draft Redmond-Bear Creek Valley Ground
Water Management Plan

M.K.

P.S. What is the significance of "complete concurrence", and am I getting this mixed up with another hearing where a tribal representative insisted on "complete concurrence." If this process involves any tribal letters of concurrence, I wish to be sent copies of those letters. Also, Mr. L., you mentioned our not being limited to using only 35% of our properties. I have news: Under SWM's Basin Plan, we can cut only 35% of our vegetation, with the 65% remainder being dedicated to the county as permanent open space tracts.

I appreciated the good humor and patience of the meeting leaders, including yourself, with someone who obviously ^{was} not enthralled with the Plan. I do object mightily to these overlapping Plans that all end up with regulatory consequences that overlap and duplicate OTHER - usually SWM - regulations. Especially when they add not just regulations but additional fees.

As to the three groundwater protection measures you mentioned in your February 3rd letter, SWM sends out educational brochures and nauseam in addition to both adult and child education classes/seminars; you've already collected and analyzed data showing no significant groundwater ^{IMPACTS} from over a hundred years of heavy livestock use and county dumping and intense commercial/residential development; and heaven knows we need no more enhancement/enforcement than we get under SWM with its basin steward and his army of citizen informers. As to the sewage break which did cause contamination, that could happen no matter how much protection/enforcement you have in place, just as there have been Metro bus spills of oil. (Which the Department of Ecology brushed off as inconsequential.)

But let me clarify/understand one thing you said. Despite the fact that Hollywood Hill appears on the same Complan groundwater recharge map as the Redmond/Bear Creek Groundwater Plan area, it is NOT a part of the area and will not be included under Plan charges and regulations - there would have to be a DIFFERENT draft plan and hearings etc. for Hollywood Hill?? And separate testing and findings? (You can see I'm wary of Hollywood Hill's being sneaked in under the back flap of the tent, as it were.)

Sincerely,

Maxine Keesling

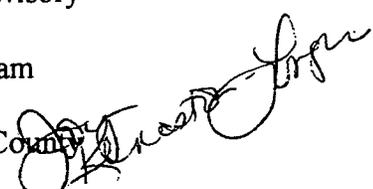
cc: Doug Rushton, DOE
PO Box 47600, Olympia 98504-7600 (Hollywood Hill hobby farmer)
FAX: 407-7162

Memo

December 21, 1995

To: Laura Lowe, Department of Ecology
Catherine Moody, Chair of the Issaquah Ground Water Advisory Committee
Jack Davis, Chair of the Redmond-Bear Creek Ground Water Advisory Committee
Bill Lasby, Supervisor, Drinking Water and Ground Water Program

From: Joy Keniston-Longrie, Environmental Programs Manager, King County
Department of Metropolitan Services



Re: **Draft Issaquah Creek Valley and Redmond-Bear Creek Ground Water Management Plans**

Thank you for including the revisions we requested in the draft Issaquah Creek Valley and Redmond-Bear Creek Valley Ground Water Management Plans. We, as the Department of Metropolitan Services, concur with the plans. We do however, have the following comments about this final draft:

- ◆ The State Dangerous Waste Regulations WAC 173-303 are still listed as the Federal Dangerous Waste Regulations WAC 173-303 throughout the document.
- ◆ The quotations and statements dealing with the SQG's and their generation and accumulation rates will need to change soon to reflect the pending changes to the Dangerous Waste Regulations. Those regulations will change shortly, shortly defined as, whenever the lawsuit against Ecology and the regulatory change process is settled.
- ◆ The statements about the services offered by the LHWMP may become inaccurate during 1996 due to the merger and the LHWMP plan update process.
- ◆ The responsibilities of various King County and Metro units mentioned in these documents will probably change during the first half of 1996 due to the merger process.
- ◆ All references to Metro will be inaccurate as of 1/1/96. After midnight of 12/31/95 Metro no longer exists.

After the Metropolitan King County Council has reviewed and concurred with the plan, and the funding has been secured, we look forward to implementation of the tasks identified for our agency.



City of Seattle
Norman B. Rice, *Mayor*



King County
Gary Locke, *Executive*

Seattle-King County Department of Public Health

Alonzo L. Plough, Ph.D., **MPH**, *Director*

MEMORANDUM

November 18, 1995

To: Laura Lowe, Department of Ecology
Jack Davis, Chair of the Redmond Ground Water Advisory Committee
Bill Lasby, Supervisor, Drinking Water and Ground Water Program

From:  Carl Osaki, Chief, Environmental Health Services

Re: Draft Redmond-Bear Creek Ground Water Management Plan

Thank you for including the revisions we requested in the draft Redmond-Bear Creek Ground Water Management Plan. We, as the Seattle-King County Health Department, Environmental Health Division, concur with the plan. After Metropolitan King County Council has reviewed and concurred with the plan, and the funding has been secured, we look forward to implementation of the tasks identified to our agency.

N:\gwm\red\concrdrft\corresp\skchd.ok



WASHINGTON STATE DEPARTMENT OF
Natural Resources

February 21, 1995

Doug Rushton
Department of Ecology
P.O.Box 47600
Olympia, WA 98504-7600

Dear Mr. Rushton:

The Department of Natural Resources (DNR) has reviewed the November 4, 1994 Draft Redmond-Bear Creek Valley Ground Water Management Plan and has the following comments:

1. Page 3-126, 1st paragraph - Replace "SB 5502 "Surface Mining" passed by the 1993 Legislature..." with "RCW 78.44 as amended in 1993 and 1994..."
2. Page 3-126, 1st paragraph - The last sentence is inaccurate and needs to be eliminated. DNR has no jurisdiction over a site once reclamation is complete and DNR releases the surface mining permit. What DNR does do is work with the operator to complete a reclamation plan and work so the end product of the reclaimed pit is water quality protection for the future. Jurisdiction over the site then passes to the county and/or other state agencies.
3. Page 3-126, 2nd paragraph - This paragraph is confusing and should be eliminated. We think this paragraph refers to our concern that the whole water pollution picture be looked at when discussing water quality and not just surface mining operations. Many other pollution sources exist in proximity to mining operations that affect water quality more than the mine site. DNR normally has no jurisdiction over these adjacent sites but many other state and county agencies do. This point is probably not all that pertinent to the discussion on page 3-126 and should be eliminated.

Thank you for the opportunity to comment. If you have questions, please call Dave Pierce at (360)825-1631.

Sincerely,

Dave Kiehle
Growth Management Coordinator



STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

P.O. Box 47600 • Olympia, Washington 98504-7600
(206) 407-6000 • TDD Only (Hearing Impaired) (206) 407-6006

April 26, 1995

Mr. Bill Lasby
Drinking and Ground Water Programs
Seattle-King County Health Department
918 Smith Tower
Seattle, WA 98104

Dear Bill:

The Department of Ecology has reviewed the November 4, 1994 draft of the Redmond-Bear Creek Ground Water Management Area (GWMA) Program. We have several comments on the Program (Attached) and find it to be substantially consistent with Ground Water Management Areas and Programs, Chapter 173-100 WAC, except for two areas: SEPA and comparing water availability with use trends (See our comment #14, Specific Comments.) I am aware SEPA work has been done, but where we are in the process is not clear. Please send me a copy of the threshold determination, comments, the timeline for SEPA events, and any other relevant documents and include a section on SEPA in the revised plan.

We have attached comments which we believe will improve the final plan. We reviewed the draft plan using the criteria outlined in Chapter 173-100 WAC, Ground Water Management Areas and Programs: consistency with state laws and regulations, technical soundness, and economic feasibility. Please refer to WAC 173-100-100 and RCW 90.44.410 for plan content framework.

After findings are received from affected governments and the Ground Water Advisory Committee resolves areas of nonconcurrency, if any, we will look at the plan and comments for certification of the Program. Please do not hesitate to contact me if you have questions (360/407-6642). I have also included copies of comments we have received from others on the draft Plan.

I look forward to working with you and other local jurisdictions in refining and implementing the Program. Congratulations.

Sincerely,

Clifford D. (Doug) Rushton
Shorelands and Water Resources Programs

Enclosures (2)

cc: Jack Davis, GWAC Chair



Redmond-Bear Creek Ground Water Management Area
Draft - November 4, 1994
Department of Ecology Comments

General Comments

1. The technical studies commissioned by the Ground Water Advisory Committee (GWAC) are valuable contributions to the hydraulic understanding of the Redmond-Bear Creek area. The document appears to be very adequate for defining ground water quality, and listing hazardous waste sites, landfills, etc. It has done a good job in describing the geology and presenting cross-sections which are useful from a water resources point of view.
2. Some of the proposed actions are "overdone" or unnecessary. Example: Installation and maintenance of nine stream gaging stations in the Redmond-Bear Creek area is unnecessary for characterizations of surface water resources and has little relation to ground water protection (pg. 3-27).
3. The plan contemplates state legislation, in recommending assessment of a state agency (Ecology), and in proposing streamlining county surface and ground water planning efforts (pg. 3-42, 3-43). If county water resource efforts need streamlining, this could certainly be done apart from the Redmond-Bear Creek Ground Water Management Plan.
4. Some of the plan recommendations in the Education Program appear redundant with other existing programs: recycling and waste reduction (3-51); household hazardous waste information pamphlet; water conservation education in schools and for general public. Opportunities for coordination with other efforts need to be used.
5. Time series hydrographs of well water levels should be incorporated into the main document.

Redmond-Bear Creek GWMA
Draft Plan - 11/4/94
Department of Ecology Comments

6. Additional information would make it more useful for water resources evaluation. If available, we suggest additional areas of water resources evaluation, such as those that follow.

There is nothing on long term static water level trends. Nothing on long term precipitation trends. And more importantly, only a couple years of surface water flow data was briefly mentioned at two gages. The volume of stream gage data that the USGS has been collecting for decades were not evaluated. The data exists to perform exceedence probability statistics on stream flows. In light of hydraulic continuity between ground water and surface water, it is also important to evaluate 7-day low flow analyses plots over long periods of time. Then it would be nice to compare precipitation trends (normalized to basin size and converted to CFS) to mean annual flow, and 7-day low flow trends. This could further be compared to ground water static water level trends.

An example of a simple analysis Ecology staff performed in another basin is something that could have been done in this study. Staff contacted the City of Issaquah and asked for a data dump on static water levels for their wells. That afternoon, staff received static water level data on their wells from 1981 through 1994 which were graphed. Data indicated there has been a gradual, three foot average ground water decline over this period. Staff then graphed summer dry season months (June through October) separate from winter rainy season monthly averages (November through May). There was over a 4.5 foot average decline in the summer static water levels, and a slightly less than 2 foot average decline in winter water levels.

Staff compared long term precipitation data, and long term stream gage data from 1964 through 1992. Issaquah Creek had a trend which demonstrated a 7-day low flow decline of 5 cfs.

7. We recommend looking at King County Surface Water Management (SWM) gate data in relation to urbanization in the area. SWM analyzes storm flow data and plots it to predict future urbanization effects on flooding and erosion. We could use this data to compare it to the loss in aquifer recharge and low flow trends in the summer.
8. Because of the length of time it has taken to develop the draft Plan, some of the parts are outdated (*e.g.* Page 3-11 mentions that EPA has been petitioned to designate Vashon Island as a sole source aquifer; which is done.) We recommend

updating as appropriate and put something in the introduction that says something like, "This plan is current as of March 31, 1995."

9. The Plan does a good job accommodating changing jurisdictional scenery, such as the Wellhead Protection Area Program and the Growth Management Act on page 4-11.

Specific Comments

10. Pg. 2-17. Quantities allocated by water rights to 53 Group B public water systems within the ground water management area were not determined and should have been to give an accurate portrayal of use. (See comment #14, below)
11. Page 3-43. Coordination of planning efforts, particularly those under the jurisdiction of Ecology, is moving toward a watershed basis and includes both surface and ground water. We have the *Nooksack Initiative*, where Ecology has assigned staff from various programs (solid and hazardous waste, water quality, water resources, shorelands, etc.) to work on issues within the Nooksack basin. Lessons learned from this experiment will be applied to other areas around the state, including King County.
12. Section 4-6. It is a good idea to retain the Ground Water Advisory Committee (GWAC) to make use of their experience for advising the Management Committee. Page 4-8 states the GWAC will make a report and recommendations to the Management Committee. Ecology would like to be kept apprised (at our Northwest Regional Office) of their recommendations and observations.
13. Consider putting in a list of acronyms. For example, in Table 2.7.1, the acronym "UAA": is used but not defined.
14. Table 2.7.1 is a water budget. We would like to see analysis of annual withdrawal rates compared to projected growth and how long-term water management would be done in order to meet the projected needs. Identifying potential conflicts between the two and ways to resolve them would be beneficial in avoiding future problems. Describe how to use conservation as part of the solution to meet future needs. [Please refer to RCW 90.44.410 (2), which describes requirements in detail.] Some of these items are in the draft Plan, but

Redmond-Bear Creek GWMA
Draft Plan - 11/4/94
Department of Ecology Comments

they are not readily identifiable. If they are in the Plan and we have missed them, please locate them in the plan for us.

15. Page 3-110, WC-3A. The National Conservation and Resource Service (formerly Soil Conservation Service) may have funding available for decommissioning old agricultural water supply wells.

Implementation
(Spreadsheet gwm\red\concrdrf\ecology.tbl)

1. Data transfers to Ecology. We will do the best we can with available resources and staff to input locally-developed data into our systems. After completion of studies, Seattle-King County Health should transfer data to Ecology's Northwest Regional Office in Bellevue, include a data description, a hard copy and an electronic copy.
2. Coordination between Surface and Ground Water programs. We are moving toward, and will continue to move toward, a watershed approach to water planning, including both surface and ground water. We will continue to work with local agencies, Tribes, and others in these efforts.
3. Heating Oil Tanks - Local Legal Authority. The King County Fire Marshall should contact the King County Prosecutor's Office for their advice. Seeking Attorney General opinions is a lengthy, time-consuming, formal process and there may be other ways to achieve the same goal that are easier (*e.g.* developing a Memorandum of Understanding).
4. On-Site Sewage Regulation (p. 3-95). Evaluating the effects of on-site sewage systems on ground water and assessing best available technologies is an ongoing effort. We have developed a broad approach to these issues and feel it is fairly effective. We are looking at siting requirements and trying to be more site-specific, since specific conditions can vary significantly. Our approach is to use best available technology and work with local agencies and the state Department of Health to develop the best approach to the specific case.

Redmond-Bear Creek GWMA
Draft Plan - 11/4/94
Department of Ecology Comments

5. State Program - Well Management (WC-1A, p. 3-106). General comment - the term well "abandonment" is really a misnomer since wells are not "abandoned, but are *decommissioned*. Abandoned implies the owner simply "walked away". Chapter 18.04 RCW was amended and the changes went into effect on July 1, 1993. Those regulation changes affected all areas mentioned except the water right application, which is undergoing revision. Ecology does not, at this time, contemplate additional changes to Chapter 18.04 RCW.
6. State Program - Delegation of Well Drilling (WC-1B, p. 3-107). We will be happy to work with appropriate local governments for delegation of well drilling. Please contact Mr. Richard Szymarek at 360/407-6648 for assistance in this. We do note that revenue generated will not cover the costs that are delineated in the plan for the Ecology portions. King County generates about \$45,000 each year from well drilling fees and 50% of that amount is passed on to the County.
7. State Program - Well Identification (WC-2A, p. 3-108). Ecology will not be preparing draft legislation, but the County is welcome to. Delegated Counties have used this approach to manage local drilling programs to ensure compliance.
8. State Program - Well Identification (WC-2B, p. 3-109). The comments for WC-2B go with those for WC-2A, above. Regarding tagging, it is not required prior to the adoption of a regulation change. Well tagging is optional at this time. Ecology will be adopting regulations to make tagging mandatory. This should take effect in 1996.
9. Abandonment Costs (WC-3B, p. 3-111). Again, we prefer the word "decommissioning" to the word "abandonment" when discussing these types of wells. We are in the process of revising Chapter 173-160 WAC to include expanding our well decommissioning sections. They could possibly deal with these comments.
10. Standards (SW-1A, p. 3-118). Basically, the major issues between the solid waste minimum functional standards and the ground water quality standards have been worked out. Nonetheless, we are attempting to further refine coordination between the two programs.
11. SW-1C. There are no plans at this time to prepare amendments to these regulations.

Redmond-Bear Creek GWMA
Draft Plan - 11/4/94
Department of Ecology Comments

12. SEPA Amendments (WQ-1B, p. 3-140). Section 335 of the SEPA regulations (State Environmental Policy Act, Chapter 197-11 WAC) specifies the lead agency can require additional information. At this time, Ecology is not pursuing changes to SEPA. When we consider amendments, we would then consider the suggested changes. In any event, a lead agency can require information beyond a SEPA checklist in order to assess the probable impacts of proposed actions, such as impacts to aquifer recharge, under Chapter 197-11-335 - Additional Information.

13. Decline Limits (WQ-4D1, p. 3-145). For assessing decline limits, we suggest the Seattle-King County Health pursue a meeting with the Shorelands and Water Resources Program out of Ecology's Northwest Regional Office. Mr. Steve Hirschey is the contact and his number is 206/649-7066. Prior to making a commitment of staff or resources, we want to have a better idea of the workload, its costs, and probable outcomes.



**King County
Solid Waste Division**

Department of Natural Resources
Yesler Building
400 Yesler Way, Room 600
Seattle, WA 98104-2637
(206) 296-6542

February 20, 1996

TO: Mark Isaacson, Project Manager, Surface Water Management Division

FM: Kevin Kiernan, Engineering Services Manager *KK*

RE: Redmond Bear Creek Groundwater Management Plan

Thank you for providing us the opportunity to review the revised draft of Management Strategies for the Redmond Bear Creek Ground Water Management Plan. This revised draft is responsive to our previous comments that original management strategies were too broad, did not recognize protection afforded by existing regulations, and did not focus on the Ground Water Management Area (GWMA).

Again, thank you for the opportunity to comment and for your thoughtful consideration of our prior comments. If you have any questions please call me on extension 6-4419.

KK:SJ:mfn
SJ4/rbcom.doc

cc: Rodney G. Hansen, Manager, Solid Waste Division
Shirley Jurgensen, Supervising Engineer



King County
Department of Development
and Environmental Services
3600 - 136th Place Southeast
Bellevue, Washington 98006-1400

August 9, 1996

TO: Mark Issacson, Project Manager, Surface Water Management Division

FM: Robert S. Derrick, Director, Department of Development and Environmental Services

RE: Redmond Bear Creek Groundwater Management Plan

Thank you for including the majority of the revisions we requested to the November draft of the Redmond Bear Creek Groundwater Management Plan (GWMP). With resolution acceptable to the Department of the following outstanding issues, the Department of Development and Environmental Services (DDES) will be able to concur with the plan:

1. **Funding.** The tasks assigned to DDES are identified to be funded by "General Agency Funds". As discussed in our previous comments, DDES is a fee-supported agency and needs specific funding to conduct any work that does not generate fees. An acceptable funding source will have to be identified for the agency to complete the assigned tasks or they are unlikely to be completed. We again request that the tasks be funded through the Aquifer Protection Fund or some other specific source.
2. **Bear Creek Fully Contained Communities.** The Union Hill Water Association's site specific recommendations for the Novelty Hill Urban Planned Development/Fully Contained Community (UDP/FCC) is out of place in this basin scale document. No other portion of the plan area or other major projects were discussed at this level of scale. In addition, the information presented is incomplete; representing only one opinion of that area. The failure to include significant information from additional well data and evaluation by several highly qualified geotechnical professionals which contradicts the Association's specific recommendations results in an unmistakable bias in this portion of the plan. All of this information was recently presented during the Northridge UDP/FCC hearings. The Hearing Examiner report dated June 28, 1996 provides appropriate recommendations for this area based on input from all parties and available data. The recommendations representing only Union Hill Water Association are inconsistent with the more recent recommendations and should be removed from the plan. Specifically, all text following the bullet #9 on page 94 removed and pages 94A and 94B deleted.
3. **Coordination with other GWMPs.** Most of the tasks that are identified for DDES are consistent across all of the GWMPs. DDES concurs with the level of effort and proposed



Mark Issacson
August 9, 1996
Page 2

schedule identified in this plan. Since the completion of tasks identified under this one plan will complete the majority of the tasks identified for DDES in the other plans, the funding of these tasks should be shared across all plans.

It is our understanding that some of these issues will not be resolved until after the King County Council has reviewed and concurred with the plan. We look forward to working with the Management Committee to resolve any outstanding issues and move forward with a successful implementation of the plan. After the Council has reviewed and concurred with the plan, the outstanding issues have been resolved, and the funding has been secured, we look forward to implementation of the tasks identified for our agency.

RSD:js

cc: Jack Davis, Chair, Ground Water Advisory Committee
Laura Lowe, Washington State Department of Ecology
Greg Kipp, Deputy Director, Department of Development and Environmental Services
ATTN: Jerry Balcom, Supervisor, Code Development Section
Mark Carey, Manager, Land Use Services Division
Tom McDonald, Manager, Building Services Division



**King County
Water and Land Resources Division**

Department of Natural Resources
700 Fifth Avenue, Suite 2200
Seattle, WA 98104-5022
(206) 296-6519
(206) 296-0192 FAX

September 8, 1998

Jack Davis
Chair, Redmond-Bear Creek Valley Ground Water Advisory Committee
29656 - 232nd Southeast
Kent, WA 98042

Dear Mr. Davis:

Enclosed please find a copy of Motion 10495, passed by the Metropolitan King County Council on July 6, 1998, regarding their concurrence with the Redmond-Bear Creek Valley Ground Water Management Plan.

The County Council voted to require several changes in the Management Strategies document. Their recommendations, and the rationale for each, are listed in the attached concurrence letter that Council wrote (dated June 12 with the motion number "10495" stamped on each page). The concurrence letter states agreement with the goals and objectives of the groundwater program and specifies the revisions that are necessary for Council's concurrence with the plans. We will include both the motion and concurrence letter in Appendix B ("Letters of Comment and Concurrence by Affected Jurisdictions") of the Management Plan.

We believe that the best course of action, for the sake of groundwater protection, is to make the changes required by Council, finalize the plans and submit them to Ecology for certification, and proceed to implementation. This cover letter, transmitting to you the motion and concurrence letter from Council, describes in detail the changes we will make to the document to accomplish these requirements. Please let us know at your earliest convenience if you agree with the approach and the proposed changes. I do not know whether it will be necessary (or even possible after such a long time) to call a meeting of the Ground Water Advisory Committee to ratify these changes. If you think that this is necessary, please call me (at 206-296-8323) and I will be glad to assist you in assembling the committee members.

The following sections require changes:

Management Strategy HM-2 (Hazardous Waste Facilities Zones -- Local designation, p. 2-27): text will be deleted. The text for Issue 2 will be kept. Also, we will keep this issue in mind in developing an approach to Well Head Protection.

Management Strategy SG-2B (Fill Testing, p. 2-47): will be deleted.

Management Strategy SG-2C (Reclamation Plans, also p. 2-47): will be changed to the following: "King County will provide comments to the State Department of Natural Resources on mine reclamation plans proposed within the Redmond-Bear Creek Valley Ground Water Management Area. Additionally, consistent with KCCP Policy NE-333, King County will

develop, with affected jurisdictions, Best Management Practices for mining operations.” Again, we will keep this issue in mind in the development of our approach to Well Head Protection.

Management Strategy PF-1A (Pesticide and Fertilizer Use, p. 2-38): which requires King County to fund the King Conservation District will be changed to: “King County will encourage and support the development of Farm Plans using Best Management Practices for any agricultural user of pesticide and fertilizer in physically susceptible areas.”

Section 3.5 (Ground Water Management Committee, p. 3-6), the paragraph at the bottom of page 3-6 will include a new first sentence as follows: “The Management Committee shall be established by motion by the Metropolitan King County Council with members appointed by the Council, serving staggered terms of three years.”

Section 3.7 (Lead Agency, p. 3-7) the following sentence will be added to the end of the section (after the bulleted items on p. 3-8): “King County implementation efforts will be phased in over time and is dependent upon the availability of funding.”

Council also requested that we include a summary of the Hearing Examiner’s findings and conditions of approval for Northridge, specifically the groundwater impacts from the Novelty Hill UPD. In response to this issue, the attached summary will be inserted as a new Appendix C to the Management Plans volume.

As the enclosed concurrence letter by County Council says, King County is pressing ahead to begin implementation of the groundwater program. We, at the King County Department of Natural Resources, are developing approaches for the various management strategies included in the Management Plans, working on a long-term funding option which will allow us to expanding our efforts in new directions, and establishing contacts with agencies and municipalities which may help this effort. We will, of course, be able to accomplish more when long-term funding is secured.

Thank you for the dedication and diligence of the Redmond-Bear Creek Valley Ground Water Advisory Committee on this lengthy project. Please contact me at 206-296-8323 to discuss any questions you have about the above changes to the plans, and about what we can do to start the implementation phase of the groundwater program.

Sincerely,

Ken Johnson

Ken Johnson
Groundwater Program Lead

KJ:pra32

Enclosures

cc: Distribution List

09/23/97

ROB MCKENNA
JANE HAGUE
CYNTHIA SULLIVAN
PETE VON REICHBAUER
LARRY PHILLIPS

Introduced By:

Louise Miller

sub 6/12/98 kn

Proposed No.:

97-600

MOTION NO. **10495**

A MOTION regarding concurrence with the recommendations contained in the Redmond-Bear Creek Valley Ground Water Management Plan.

WHEREAS, the Washington State Growth Management Act requires jurisdictions to designate critical areas, including areas with a critical recharging effect on aquifers used for potable water, RCW 36.70A.050, and

WHEREAS, Policy C-5 of the Countywide Planning Policies states that all jurisdictions that are included in ground water management plans shall support the development, adoption and implementation of the plans, Ordinance 11446, and

WHEREAS, Policy NE-333 of the King County Comprehensive Plan states that King County should protect the quality and quantity of the ground water countywide by placing a priority on implementation of ground water management plans, and

WHEREAS, the Washington State Department of Ecology has designated King County as the lead agency responsible for coordinating and undertaking the activities necessary for development of ground water management programs in the county, WAC 173-100-080, and

1 WHEREAS, a ground water advisory committee has been established for the
2 Redmond-Bear Creek Valley ground water management area, and

3 WHEREAS, the ground water advisory committee contained representatives of
4 local governments, special purpose districts, water associations, agricultural interests, well
5 drilling firms, forestry companies, environmental organizations and industry, and

6 WHEREAS, the Redmond-Bear Creek Valley ground water advisory committee
7 has overseen the development of the Redmond-Bear Creek Valley Ground Water
8 Management Plan, and

9 WHEREAS, the oversight provided by the ground water advisory committee has
10 included reviewing the work plan, schedule and budget for development of plan, assuring
11 that the proposed plan is technically and functionally sound and verifying that the proposed
12 plan is consistent with Washington state laws and authorities of affected agencies, WAC
13 173-100-090, and

14 WHEREAS the city of Redmond and the Union Hill Water Association are
15 required to implement some of the recommendations in the Redmond-Bear Creek Valley
16 Ground Water Management Plan and have issued letters of concurrence, and

17 WHEREAS, following the metropolitan King County council's review and
18 comment on the plan's recommendations, the Redmond-Bear Creek Valley Ground Water
19 Management Plan will be submitted to the Washington State Department of Ecology for
20 certification in accordance with WAC 173-100-120, and

21 WHEREAS, following the Department of Ecology's certification of the Redmond-
22 Bear Creek Valley Ground Water Management Plan, the Metropolitan King County

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Council will be responsible for implementing those portions of the Plan which are within their jurisdictional authority to implement;

NOW, THEREFORE BE IT MOVED by the Council of King County:

The King County executive is hereby requested to transmit to the Redmond-Bear Creek Valley Water Advisory Committee a letter, substantially in the form attached, identifying the county's findings and indicating areas of county concurrence and non-concurrence with recommendations contained in the Redmond-Bear Creek Valley Ground Water Management Plan. This letter should contain the following:

- 1. a clear statement of concurrence or nonconcurrence;
- 2. a statement of agreement with the goals and objectives of the ground water program; and
- 3. specific revisions necessary for county concurrence.

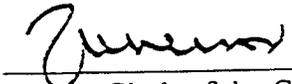
PASSED by a vote of 11 to 0 this 6th day of July

1998.

KING COUNTY COUNCIL
KING COUNTY, WASHINGTON


Chair

ATTEST:


Clerk of the Council

Attachments: Concurrence Letter

June 12, 1998

Jack Davis
Chair, Redmond-Bear Creek Valley Ground Water Advisory Committee
29656 232 SE
Renton, WA 98042

Dear Mr. Davis:

King County generally agrees with the goals and objectives of the Redmond-Bear Creek Valley Ground Water Management Plan, yet makes a statement of nonconcurrency based on its finding of inconsistency between the recommendations contained in the Plan and the intent of chapter 90.44 RCW and other federal, state and local laws. The County recognizes the importance of the Plan's recommendations to preserve and protect ground water, a highly valued natural resource. The County's role in implementing the recommendations of this Plan reflects the County's responsibility as a resource manager, a land development regulator, and the permitting authority for the unincorporated areas of King County.

King County's statement of nonconcurrency is based on its finding of inconsistency between several recommendations included in the Plan and adopted county comprehensive planning policies and county laws. These recommendations must be modified as set forth below to achieve consistency and to allow county concurrence with the Draft Ground Water Management Plan. These recommendations include Management Strategy HM-2, Management Strategy SG-2B, Management Strategy SG-2C, Management Strategy PF-1A, Section 3.5, Ground Water Management Committee and Section 3.7, Lead Agency. A summary of the basis for inconsistency and the changes necessary for King County concurrence follows.

King County does not concur with the recommendation of Management Strategy HM-2 to designate zones for hazardous waste storage and treatment. This finding of inconsistency is based upon the fact that that the strategy:

1. is redundant; these issues are currently regulated by the Model Toxic Control Act;
and
2. does not reflect King County's current use of industrial zoning, which is where King County allows hazardous wastes to be stored and treated.

King County can make a finding of consistency only if the text of Management Strategy HM-2 is deleted.

King County does not concur with the recommendation of Management Strategy SG-2B which requires the King County Department of Natural Resources to propose an ordinance to the Council to require testing of fill used in sand and gravel mining sites undergoing reclamation. This finding of inconsistency is based upon the fact that the strategy:

1. is redundant; mines are required to meet DOE conditions, which include ground water protections; and
2. is inconsistent with King County Comprehensive Plan Policy RL-411; and
3. is inconsistent with King County Comprehensive Plan Policy NE-333.

King County can make a finding of consistency only if the text of Management Strategy SG-2B is deleted.

King County does not concur with Management Strategy SG-2C (Reclamation Plans) as it is currently written. This finding of inconsistency is based upon the fact that the State DNR has regulatory authority over mine reclamation plans. King County's regulatory authority is limited to offering comments on proposed reclamation plans to DNR for consideration.

King County can make a finding of consistency only if the text of Management Strategy SG-2C is amended as follows: "King County will provide comments to the State DNR on mine reclamation plans proposed within the Redmond-Bear Creek Valley Ground Water Management Area. Additionally, consistent with KCCP Policy NE-333, King County will develop with affected jurisdictions, Best Management Practices for mining operations.

King County does not concur with the recommendation of Management Strategy PF-1A which requires King County to fund the King Conservation District. This finding of inconsistency is based upon existing obligations imposed by federal, state and local laws related to county revenues and expenditures. These limitations restrict the county from being able to commit to fund the Conservation District.

King County can make a finding of consistency only if the text of Management Strategy PF-1A is amended as follows: "King County will encourage and support the development of Farm Plans using Best Management Practices for any agricultural user of pesticide and fertilizer in physically susceptible areas."

King County does not concur with the recommendations of Section 3.5 as they are currently written. King County can concur with the Redmond-Bear Creek Valley Ground Water Management Plan if a statement is added to Section 3.5 which states: "The Management Committee shall be established by motion by the Metropolitan King County Council with members appointed by the Council, serving staggered terms of three years."

King County does not concur with the recommendations contained in Section 3.7 regarding King County's role as lead agency to implement the Plan. A finding of inconsistency is based upon existing obligations imposed by federal, state and local laws related to county revenues and expenditures. These limitations restrict the county from being able to fully commit to Plan implementation following certification.

King County can make a finding of consistency only if the text of Section 3.7 is amended to include the following statement: "King County implementation efforts will be phased in over time and is dependent upon the availability of funding."

Although ground water impacts from the Novelty Hill UPD have been mitigated through master drainage plans, King County finds that all potential ground water impacts should be addressed in the Redmond-Bear Creek Valley Ground Water Management Plan. Thus, King County finds that consistent with Comprehensive Plan Policies RL-411, NE-333, NE-334, NE-335 and NE-336, the Plan should be amended to include a summary of the Hearing Examiner's findings and conditions of approval for Northridge.

King County places a high priority on implementing the specific management strategies relating to wellhead protection, development of best management practices, education, and mapping of critical aquifer recharge areas. Once the Council adopts a long-term funding option, the County would start to undertake other implementation activities. Such activities would include coordinating and staffing the anticipated interjurisdictional ground water management committees; developing a data collection and management program to monitor ground water quality and quantity; and enhancing education programs to promote ground water protection.

Thank you for the dedication and diligence of the Redmond-Bear Creek Valley Ground Water Advisory Committee on this lengthy project. Please contact Mark Isaacson, Department of Natural Resources, Water and Land Resources Division, at 206-296-8369 to discuss starting this work.

Sincerely,

Ron Sims
King County Executive

Appendix C

Summary of the Hearing Examiner's Findings and Conditions of Approval

Northridge / Novelty Hill UPD

A condition of Metropolitan King County Council's concurrence with the Redmond - Bear Creek Valley Groundwater Management Plan is that information be included about the resolution of the controversy regarding the Northridge Fully Contained Community and Urban Planned Development (UPD). This project is located in the Novelty Hill area of Bear Creek Community, about 2 miles east of Redmond and west of Duvall. A major component of the controversy was the potential for groundwater impacts.

The Quadrant Corporation is the developer of this property. The King County Department of Development and Environmental Services (DDES) issued a permit for the development in April 1996 (revised May 22, 1996). The Hearing Examiner reviewed DDES's file on the project, received public input, and reviewed other material submitted, then issued its report June 28, 1996, with a supplemental report dated August 14. Finally, Metropolitan King County Council passed Ordinance No. 12617 on January 13, 1997, endorsing the Hearing Examiner's report and the DDES permits, with some minor modifications. The project is under development as of September 1998.

The groundwater issues mainly involve the source of recharge for the aquifer that supplies water to an adjacent water supply system, Union Hill Water Association (UHWA), just to the south and west of the UPD site. UHWA's Well No. 1 is located south of the UPD and is screened in a pre-Vashon coarse-grained stratum variously called the "Olympia Gravels" or "Sea Level Aquifers" (in the terminology of the *Area Characterization Plan* Supplement to this *Groundwater Management Plan*), the "Middle Whidbey Layer", the "Primary Aquifer" (for UHWA), or the "Upper Coarse-Grained unit Q(A)c" (US Geological Survey terminology). This aquifer is often found confined, and thus hydraulically separated from higher (Vashon or Qva) aquifers, by thick overlying fine-grained sediments called the "Transitional Beds", "Olympia sediments", or "Q(A)f layer".

UHWA's hydrogeologic analyses were conducted by J.R. Carr / Associates, and included in a report issued in January 1993. These studies, based on geophysical surveys of the subsurface stratigraphy rather than actual boreholes, indicated that there may be an opening (window) through the Q(A)f unit in the vicinity of the UPD. In this case recharge from the Qva aquifers would flow downward through the window into the Q(A)c and south to the UHWA Well No. 1. This concept of the aquifer systems implies that the UPD is in the aquifer recharge area of UHWA Well No. 1.

On the other hand, other hydrogeologists have concluded that there is no such window. Consultants retained by Quadrant included Geoengineers and Associated Earth Sciences (AESI). AESI developed a computer model of the aquifer system based on well logs, monitoring data, and typical or conservative estimates of aquifer properties that had not been directly measured locally. In addition, four wells were drilled on site in late 1995. These studies, and the borings, indicated that no window through the Q(A)f layer exists.

Even in the absence of a direct connection from the UPD to the UHWA well, it was considered important to conserve recharge in this area. Therefore, the DDES permit required infiltration of significant quantities (some 40%) of the water that would otherwise become surface water runoff after development. This infiltration would be to the shallow Qva (or Vashon advance outwash) aquifer, which serves as both a direct source of water for nearby individual and small water supplier well systems as well as a pathway for recharge to the Q(A)c aquifer, even in the absence of a direct window through the Q(A)f layer. In addition to these infiltration facilities, the developer was required to monitor the water table in the Qva to assure that there is no significant reduction in water levels subsequent to development. There was also discussion of possible monitoring in the deep Q(A)c aquifer, but this was not made a requirement except if the shallow monitoring were to first indicate a significant drawdown had occurred in the shallower Qva aquifer.

The permit also includes mitigation features to preserve the quality of the water. Much of the stormwater will be treated using wetponds and oil/water separators, and best management practices will be followed on the site during construction. There will also be monitoring of groundwater quality in the Qva aquifer. As a final precaution, planning will be required to assure proper disposal of hazardous waste in business and retail areas.

There were also some concerns expressed about the quantity and quality of the shallow groundwater for another nearby development, the Novelty Hill Ranch Estates, and for a more distant well that supplies the City of Redmond. The permit requires that nearby shallow wells be replaced if they show adverse impacts after development. It was decided that the Redmond well would be adequately protected by the requirements for infiltration and treatment.