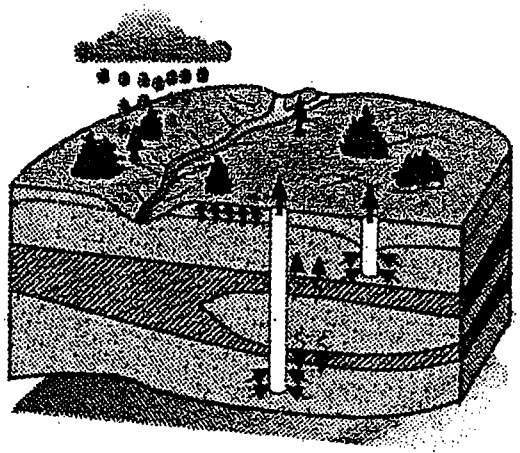
Exhibit A
Ord. PA 1206

Springfield Drinking Water Protection Plan



Adopted
May 17, 1999

City of Springfield

Springfield Utility Board

Rainbow Water District

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Springfield Drinking Water Protection Plan

Prepared for
City of Springfield
Planning and Development Department

Springfield Utility Board

Rainbow Water District

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and

Springfield Utility Board

Adopted
May 17, 1999

Abstract

Groundwater is a critical natural resource for drinking as well as for industrial and agricultural uses. It is in every community's interest to develop a program that protects this vital resource against contamination.

The Springfield *Drinking Water Protection Plan (Plan)* contains the strategy for protecting groundwater in Springfield, Oregon, a metropolitan area with a population of approximately 60,000. The *Plan's* primary protection measures are preventative: a public education program and adoption of a Drinking Water Protection Zoning Overlay District. These were the top two recommendations of a Citizen Task Force, appointed to develop a drinking water protection strategy for Springfield. The Citizen Task Force studied potential groundwater contamination risks within identified drinking water protection (delineated) areas and developed targeted management strategies to minimize the risk of groundwater contamination. The management strategies, together with a contingency plan and plan for future water system needs, form the *Springfield Drinking Water Protection Plan.*

Springfield relies exclusively on groundwater for its water supply; community members and staff were aware of threats to the city's groundwater before the initiation of this *Plan.* In 1991, trace amounts of 1,1,1-Trichloroethane were discovered in a well located near the middle of town. Releases from leaky underground storage tanks were the suspected cause of the contamination. Although the most recent sampling indicates the levels have declined to below detectable amounts, this event heightened awareness in the community of the need for clear, reliable protection measures.

In 1991 and 1992, the Springfield Utility Board (SUB) actively participated in a committee established to help the Oregon Department of Environmental Quality (DEQ) and other state agencies initiate a drinking water protection program for Oregon. In 1992, SUB/Rainbow Water District's Weyerhaeuser wellfield was used as a demonstration project to establish the wellhead protection area delineation methods that would be applied in Oregon. SUB's contaminant source inventories, well log inventories, and GIS mapping helped with the development of the *Oregon Wellhead Protection Program Guidance Manual,* prepared by DEQ and the Oregon Health Division (OHD) to assist communities in preparing a local drinking water protection program.

An initial work program to develop this *Plan* was prepared in May 1995, when Lane County and the cities of Springfield and Eugene jointly adopted a work program to conduct periodic review of the *Eugene-Springfield Metropolitan Area General Plan (Metro Plan).*[1] Preparation of a drinking water protection plan was one of the tasks in this work program to comply with Statewide Planning Goal 5, "to conserve open space and protect natural and scenic resources." In addition, this *Plan* must be certified by DEQ, which launched a new state voluntary drinking water protection program in response to the federal Safe Drinking Water Act of 1986. This state program is built on the premise that local communities are best able to identify and address groundwater contamination concerns within their areas, with technical assistance from state and federal agencies.

[1] The Metro Plan is this metropolitan area's comprehensive plan. Periodic Review is a process required by state law to keep comprehensive plans current, consistent with state laws and administrative rules, and responsive to changing local conditions.

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Acknowledgements

This *Springfield Drinking Water Protection Plan* (*Plan*) was produced through the combined efforts of conscientious citizens, local officials, and public agency staff. The project was staffed by an inter-agency project team from the City of Springfield, Springfield Utility Board, and Rainbow Water District. Lane Council of Governments' staff conducted the Citizen Task Force meetings, advised the project team on process, and produced the *Citizen Task Force Report* and this *Plan*. A Technical Advisory Group, comprised of staff from the project team, the City of Eugene, Eugene Water & Electric Board, and state agencies, provided guidance and technical assistance.

The City of Springfield, Springfield Utility Board, and Rainbow Water District recognize and appreciate the following Springfield Drinking Water Protection Citizen Task Force members for their dedication and effort in protecting Springfield's drinking water. Also acknowledged is the role of the Springfield City Council and Planning Commission in providing policy direction during the course of plan development and the contributions of the Technical Advisory Group for providing guidance and technical assistance.

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Chapter 1: Introduction

The *Springfield Drinking Water Protection Plan (Plan)* contains strategies to protect the City of Springfield's groundwater, the sole source of drinking water for this community. Protection of the City's groundwater is recognized as crucial to the economic viability of Springfield.

This *Plan* is organized into seven chapters. Chapter 1, Introduction, outlines the Plan's organization and provides the background and purpose of the *Springfield Drinking Water Protection Plan (Plan)*. In addition, this chapter provides an overview of the Springfield community and natural environment. Chapter 2, Public Participation, provides the background on how the Springfield Drinking Water Protection Citizen Task Force was selected and which interest groups were represented on the task force. This chapter also contains an overview of how the community was involved and informed of the Plan's development. Chapter 3, Delineation, provides a summary of the delineation process and results. Chapter 4, Inventory, identifies potential contamination sources within the drinking water protection areas for existing and future wells and describes the methodology used to gather potential contaminant information.

Chapters 5 through 7 focus on solutions. Chapter 5, Management of Potential Sources of Contamination, includes the goals and specific management strategies for reducing contamination risks within the drinking water protection areas. Chapter 6, Contingency Plan, identifies primary threats leading to the disruption and/or contamination of Springfield's water system and details protocols to be used in the event of an emergency. Finally, Chapter 7, New Well Site Analysis, provides an analysis of new well sites based on criteria related to groundwater protection.

Chapters 5, 6, and 7 are not meant to be exclusive "solutions." It is recognized that other solutions may be identified and reviewed for potential implementation through the ordinance process. Further, it is understood that not all of the solutions presented may be ultimately adopted through the ordinance process. The solutions to be implemented by ordinance will be selected after further examination, dialogue, and review between the City, SUB, and Rainbow Water District. During that process, factors such as apportionment of costs and enforcement responsibilities will be discussed.

Background

The metropolitan Springfield area relies entirely on groundwater for its public water supply.

The federal Safe Drinking Water Act of 1986 requires that every state have a drinking water protection program in place to guard against contamination of groundwater. In 1995, the Environmental Protection Agency (EPA) certified Oregon's Wellhead Protection Program. The program is usually referred to as drinking water protection because the 1996 amendments to the Safe Drinking Water Act broadened the scope of drinking water protection to include both surface water and groundwater (wellhead) systems.

In 1991, trace amounts of 1,1,1-Trichloroethane were discovered in the SP #1 Well located near the middle of town. Subsequent analysis established a declining trend from approximately two parts per billion (PPB) down to the most recent sampling, which indicates the levels have declined to below detectable amounts. In 1991 and 1992, Springfield Utility Board (SUB) actively participated in the committee established to help the Department of Environmental Quality (DEQ) and other state agencies initiate a drinking water protection program for Oregon. In 1992, SUB/Rainbow Water District's Weyerhaeuser Wellfield was used as a demonstration project to establish the delineation methods that would be applied in Oregon. Additionally, SUB's contaminant source inventories, well log inventories, and GIS mapping helped with the development of the *Oregon Wellhead Protection Program Guidance Manual* and have been used as examples in many other communities.

A state certification process for local jurisdictions that develop plans is included in the new state voluntary drinking water protection program. The DEQ and Oregon Health Division (OHD) Administrative Rules provide the framework for developing a drinking water protection program leading to this certification. The voluntary drinking water protection program is built on the belief that local communities are best suited to developing their own drinking water protection program based on the needs and land uses within the community. The DEQ and OHD developed a guidance manual to assist local communities in following these rules and preparing a drinking water protection plan.

The *Plan* is a work task in the Metro Plan Periodic Review Work Program,[1] approved by local jurisdictions and the Oregon Land Conservation and Development Commission (LCDC) in May 1995. Springfield's service population exceeds 10,000 people that rely on groundwater as the primary source of drinking water. As such, the delineated drinking water protection areas identified in this plan qualify as significant groundwater resources and must be protected to comply with Statewide Planning Goal 5 (OAR 660-23-140). To comply with Goal 5, Springfield must adopt comprehensive plan provisions and land use regulations, consistent with all applicable state-wide goals, that reduce the risk of contamination of groundwater, following the standards and requirements of OAR Chapter 340-40-180. Springfield must also implement a drinking water protection plan that is certified by the DEQ.

In June 1997, the Springfield Committee for Citizen Involvement appointed a Citizen Task Force to work with technical experts to develop recommendations. This Citizen Task Force represented local residents, business owners, agriculture, and industry (see Acknowledgements). Citizen Task Force members were from the city and from the surrounding rural areas affected by the *Plan*. The OHD, DEQ, and Department of Agriculture (ODA) served on a Technical Advisory Group and provided technical assistance (see Acknowledgements).

The Citizen Task Force played a key role in tailoring the plan to fit local conditions and priorities. The Citizen Task Force first studied the local groundwater characteristics and the

[1] The Metro Plan is the metropolitan area's comprehensive plan. Periodic Review is a process required by state law to keep comprehensive plans current, consistent with state laws and administrative rules, and responsive to changing local conditions.

inventory of potential sources of contamination. Then, the group considered the array of possible management strategies and recommended those it felt would be most effective for the Springfield community.

Purpose

Springfield's drinking water quality is excellent. The overriding purpose of this project is to develop a drinking water protection plan to assure the continued excellent quality and quantity of water that benefits the health and economic viability of the community. The primary goals of this project are as follows:

1. Delineate the drinking water protection areas for Springfield's existing and potential future well sites.

2. Review drinking water protection area contaminant source inventories, identifying potential sources of groundwater contamination within the delineated areas and groundwater contamination risks associated with those potential sources.

3. Develop management strategies for the drinking water protection areas of the existing wells. Other solutions and strategies may be identified and reviewed for potential implementation.

4. Develop a contingency plan for possible interruption and/or contamination of the water supply system.

5. Evaluate, analyze, and recommend the selection of new well sites from a groundwater contamination risk perspective.

6. Require further examination and review of the goals and specific management strategies of Chapter 5 to determine which are appropriate for implementation in Springfield through ordinances. Such examination and review to occur by City, SUB, and Rainbow, and to also include an apportionment of costs and enforcement responsibilities.

Community Sketch

Springfield is Oregon's eighth largest and second fastest growing city. Businesses locating here find a strong network of support throughout the community. For Springfield, economic development and diversification are both important and inseparable. For individuals within the community, the benefits of a successful economic development program include increases in the number and variety of jobs available and in per capita income. To insure Springfield's economic viability, protection of the drinking water resource is crucial.

Springfield is the second largest industrial center in Oregon. The city is situated near to rail, highway and air transportation, and boasts well-situated land for industrial and commercial development. Springfield is located on Interstate 5, the major north-south highway in the

western United States. Oregon Highways 126 and 58 provide quick access to the Oregon coast and central Oregon on a year-round basis. Union Pacific Railroad provides freight service and Amtrak provides passenger service.

Springfield, like many cities throughout the United States, relies on groundwater for its water supply. This water is obtained from deep and shallow public water supply wells located inside the city limits and outside the city in the nearby rural areas. SUB supplies water inside the city limits and to the areas adjacent to the south side of the city. These southern areas were previously supplied by the Willamette Water Company (WWC). Rainbow Water District generally serves areas outside the city limits in north and west Springfield. Together, SUB and Rainbow Water District provide drinking water to about 57,048 people.

All of SUB and Rainbow's drinking water supply originates from 30 wells distributed throughout the Springfield area. Map 1 shows the locations of the wells and wellfields and their associated drinking water protection area delineations. The wells are operated in varying combinations to meet seasonal demand changes and daily use fluctuations. Water is pumped from each well or wellfield, chlorinated, passed through a detention main, and it then enters the distribution system. The total developed capacity of the wells is 17,550 gallons per minute (GPM), or 25.27 million gallons per day (MGD).

Natural Environment

Springfield is located in the southern Willamette Valley, between the mountains of the Coast Range and the Cascade Range. The Springfield area is characterized by a relatively level alluvial plain and is traversed by two rivers, several small creeks, and areas of standing water.

Surface Water Drainage

The central features of the regional drainage system are the Willamette and McKenzie Rivers. This area has a long history of seasonal flooding and has only been within the last 20-30 years that flooding has been relatively controlled. Human alteration of the natural drainage pattern of the Upper Willamette Drainage Basin has consisted of a balancing of development and flood control needs. Between the 1940s and the 1950s, the Army Corps of Engineers dammed the headwaters of the Willamette River in five places to provide flood control and storage of irrigation water. Additional damming on the McKenzie River makes for a total of seven flood control reservoirs upstream from Springfield.

Hydrogeology

The principal aquifers in the Springfield-Eugene area occur in the valleys of the Willamette and McKenzie Rivers. The sediments that fill the valleys are unconsolidated, consisting of clay, silt, sand, and gravel mixtures that are generally horizontally layered. Two general geologic formations are present and are referred to as the older alluvium and younger alluvium, respectively. The younger alluvium occurs nearest to the channels of the Willamette and McKenzie Rivers. The older alluvium underlies the younger alluvium and also occurs at ground surface over the majority of the valley, beginning at various distances from the present river channels.

The hillsides that border the valley are formed of bedrock material of volcanic or sedimentary origin. The bedrock materials provide little water to wells and appear to support only individual domestic groundwater supplies. These materials are considered impermeable, forming barrier boundaries to the groundwater flow system.

Maximum alluvial sediment thickness exceeds 400 feet and occurs in the northwest region of the project area near the confluence of the Willamette and McKenzie Rivers. Most of the sediment consists of older alluvium that, in places, is overlain by a thin layer of the younger alluvium. The younger alluvium averages 35 feet thick. In the upstream directions, the sediment thickness declines to near 200 feet along the McKenzie River and to near 100 feet along the Middle and Coast Forks of the Willamette River.

Chapter 2: Public Participation

There have been a variety of opportunities for public participation in the development of the *Springfield Drinking Water Protection Plan (Plan)*, including the Springfield Drinking Water Protection Citizen Task Force (Citizen Task Force), materials and notices sent to the Interested Parties Mailing List, Planning Commission meetings, and City Council meetings.

Representation of Interests

The area that contributes groundwater to Springfield's water supply wells is much larger than the political boundaries of the city. The drinking water protection area includes the entire urban area, as well as areas beyond the city limits and urban growth boundary (UGB).

The following interests were either represented on the Citizen Task Force or were kept informed and involved in the study through other public involvement activities:

- City residents,
- Industries,
- Commercial interests,
- County residents,
- Farmers,
- Local schools,
- State agency staff,
- City of Springfield staff,
- Springfield Utility Board staff,
- Rainbow Water District staff, and
- Local appointed and elected officials.

Community Involvement

The Citizen Task Force was the primary vehicle for community involvement in development of the *Plan*. The Citizen Task Force represented diverse community interests (see Acknowledgements). All meetings of the Citizen Task Force were advertised and open to the public and many citizens attended these meetings. In addition, all Citizen Task Force meeting agendas were mailed to an Interested Parties Mailing List. Some of the persons on this list had initially applied to be on the Citizen Task Force. These persons were mailed complete agenda packets and were encouraged to serve as alternates for Citizen Task Force members who could not attend meetings.

The purpose of the Citizen Task Force was to provide the Springfield Planning Commission with independent and informed views and preferences on drinking water protection options. The objectives were for Citizen Task Force members to:

1. Learn about Springfield's drinking water resource, including technical, environmental and land use aspects, and a range of drinking water protection options;

2. Review existing ordinances and laws that protect Springfield's drinking water, examples from other communities, and the *Oregon Wellhead Protection Guidance Manual*; and

3. Recommend the group's preferences for drinking water protection strategies to protect Springfield's drinking water supply from contamination.

The Citizen Task Force presented its recommendations to the Springfield Planning Commission. The Planning Commission forwarded the Citizen Task Force recommendations to the City Council with one modification. The Planning Commission asked staff to modify the recommendations to reflect the focus on reducing the risk of contamination from "high risk chemicals." The City Council accepted the recommendations and asked staff to prepare the drinking water protection plan for review and public comment. The City Council will review and adopt the *Plan*, portions of which will also be adopted by the Springfield Utility Board and the Rainbow Water District Board.

Separate from the Citizen Task Force process, a group of community volunteers were successful in their petition to have Springfield designated a Groundwater Guardian Community. The Springfield Groundwater Guardians earned this nationally recognized designation by working as volunteers to educate the community on ways to protect the drinking water aquifers from contamination. Activities included co-sponsoring a teleconference titled *Tools for Drinking Water Protection* with the Lane County League of Women Voters and the Retired and Senior Volunteer Program (RSVP). This teleconference was attended by over 100 people including Planning Commissioners; City Councilors; and Commissioners from Springfield, Eugene, and Lane County. RSVP volunteers did a contaminant source inventory for two of Springfield's wellhead areas and conducted a phone and mail survey of over 500 residences in those areas. The Groundwater Guardians continue to be active in educational activities in the community (see Appendix A).

Citizen Task Force Process

The Citizen Task Force met eight times between August 18 and November 18, 1997. Meetings were videotaped to allow absent members and staff to fully view the discussion; a complete set of videos is on file at the Springfield Planning Office. Almost all meetings were fully attended by all Citizen Task Force members.

Throughout this four-month process, the Citizen Task Force became immersed in drinking water quantity and quality issues through presentations by state and local agency staff and guest speakers from other communities, an extensive review of written materials, interactive exercises,

and in-depth discussions. At the November 18 meeting, the Citizen Task Force ranked a set of recommendations according to preference using rating sheets. These ratings formed the basis for the management strategies in this *Plan.*

Chapter 3: Delineation of Springfield's Drinking Water Protection Areas

The Springfield Utility Board (SUB) and Rainbow Water District operate more than 30 wells to produce water from extensive aquifers located beneath the Springfield area. Those portions of the aquifers that actually yield water to the community's wells were identified or delineated. The purpose of the delineation process was to determine the drinking water protection area for each well/wellfield. This is the area on the surface that directly overlies that part of the aquifer(s) that supplies groundwater to the wells. The delineated area is divided into time of travel (TOT) zones to indicate the calculated amount of time it takes groundwater to move from that zone to the pumping well. Each of the SUB/Rainbow wells, wellfields, and their respective delineated TOT zones are represented on Map #1, which shows the complete Wellhead Protection Area. Maps #2 through #7 depict the individual well field areas with the TOT zones, contaminant inventories, tax lot zoning, other water features, and topographic features at a larger scale and in more detail.

It is within the drinking water protection areas that a contaminant, if released, could migrate down to the aquifer and travel to the well. The delineated drinking water protection areas and the TOT zones allow Springfield and local officials to focus management strategies and resources on the area(s) where the most benefit to the drinking water resource will occur.

Local Groundwater Characteristics

Groundwater throughout the valley is encountered at shallow depths, typically within 10 to 20 feet of ground surface. The near surface aquifer conditions are generally unconfined. Semi-confined conditions appear to occur at depth due to heterogeneous layering in the sediments or local cementation of the sediments. However, traceable low-permeability layer, such as a clay or silt confining layer of significant areal extent has not been identified in the Springfield area.

Groundwater flow generally occurs in a direction parallel to the valley axis (north, northwest, or west depending on one's location in the valley). A large quantity of groundwater recharge occurs by infiltration of precipitation onto the valley plain in the Springfield-Eugene area. Groundwater also enters the project area from the east along the McKenzie river drainage and from the south along the Coast Fork and Middle Fork drainages of the Willamette River. Groundwater leaves the project area by regional outflow as groundwater and also as discharge to the McKenzie and Willamette Rivers. Groundwater is also withdrawn by water wells.

Groundwater Use

SUB and Rainbow Water District are the primary providers of groundwater in the project area serving over 57,000 people. The Eugene Water & Electric Board (EWEB) is the other major water supplier in the area and currently withdraws all of its supply as surface water from the McKenzie River. EWEB is investigating the development of a backup groundwater supply in the

confluence area of the McKenzie and Willamette Rivers that may be available for use within five years.

Water demand is seasonal and many of the wells are used intermittently. The average day demand for the combined SUB-Rainbow water system is about 10 to 11 million gallons per day (MGD). This demand peaks in the summer months at about 27 MGD.[2]

Delineation Projects

- In 1992, the Environmental Protection Agency (EPA), State of Oregon, and SUB funded a pilot delineation project to help the state develop delineation methodology for the state-wide Drinking Water Protection Program. This project delineated the SUB/Rainbow Weyerhaeuser Wellfield using the two-dimensional computer model FLOWPATH as a demonstration project.

- In April 1995, Golder Associates performed delineations for the SP/MAIA, Thurston/Platt, Willamette, I-5, and Q Street wellfields. This project refined the groundwater flow conceptual model for the area. The study applied the U.S. Geological Survey (USGS) MODFLOW and MODPATH groundwater modeling and particle tracking programs to develop maps showing the 1-, 5-, 10-, and 20-year TOT. A vulnerability assessment and source inventory for the Rainbow wellfields was also performed. (See Appendix B).

- In July 1996, EGR & Associates, Inc. applied the MODFLOW and MODPATH programs to the Rainbow Chase Wellfield to develop 1-, 5-, 10-, and 20-year TOT and Zone of Contribution (ZOC) data for mapping.

- In October 1996, Golder Associates added the new SUB Sports Way well to the model and revised the delineations for the I-5/Sports Way wells.

- In June 1997, the University of Oregon InfoGraphics Department combined all delineations, land uses, and an updated contaminant source inventory into one shaded relief map.

- In December 1998, delineations for future wells and existing wells were completed using the MODFLOW and MODPATH models by Western Groundwater Services.

- Current geographic information system mapping for delineations and contaminant inventories is being completed by the City of Springfield.

[2] *Water System Master Plan* (DRAFT), for Rainbow Water District and Springfield Utility Board, by CH2M Hill, October 1998.

Under the Administrative Rules that apply to Oregon's Drinking Water Protection Program, the Oregon Health Division has responsibility for certifying groundwater-derived drinking water protection areas in the State. The delineations of all of Springfield's wells met state requirements and were certified by OHD in April 1997. Future and new well delineations were certified by OHD in March 1999. (See Appendix K)

Delineation Process

The following activities were performed to complete the delineations:

- Development of a hydrogeological conceptual model for the aquifer area relevant to the wellfields;
- Construction of a three-dimensional numerical groundwater flow model using the USGS, MODFLOW software;
- Evaluations of groundwater travel times and pathlines for each wellfield based on the USGS MODFLOW program output and the USGS particle tracking program MODPATH;
- Preparation of maps showing the 1-, 5-, 10-, and 20-year TOT drinking water protection areas and the total zone of contribution (ZOC) for each wellfield; and
- Preparation of the project reports.

The MODFLOW model has the capabilities required for the aquifer conditions and wellfield configurations in the project area. The model is able to account for aerial recharge from precipitation, hydraulic continuity with surface water, partially penetrating wells, and spatially variable aquifer hydraulic properties. The input data to the model are entered with the aid of digital base maps. These maps contain information on geology, aquifer thickness, groundwater recharge, river channel elevation, and well locations. The maps enable the input data to be accurately located.

Pumping wells were represented in the groundwater computer model. The wells were located in the model based on a digital base map. The model layer from which each well withdraws groundwater was determined based on well construction logs, and generally coincides with the screened or perforated interval of the well. Many of the wells withdraw groundwater from more than one model layer. The maximum capacity for the well was used for the modeling.

Drinking water protection areas were determined for the 1-, 5-, 10-, and 20-year TOTs. The 1-year TOT encompasses an area within which the groundwater travel time to the well is calculated to be less than one year. The 5-year drinking water protection area encompasses an area within which the groundwater travel time to the well is less than five years, and so on. The zone of contribution (ZOC) for a well encompasses the entire recharge area to the well. The resulting drinking water protection areas provided Springfield's Citizen Task Force with defined areas in

which to focus management strategies to protect groundwater. To further the analysis of potential risks to groundwater contamination, the next step was to map land use and develop a contaminant source inventory within the drinking water protection areas. This process and the results are presented in the following chapter.

Chapter 4: Drinking Water Protection Areas Inventory

The primary intent of an inventory is to identify and locate significant potential sources of any contaminants of concern within the drinking water protection areas. Significant sources of contamination can be defined as:

> *any facility or activity that stores, uses, or produces the contaminants of concern and has sufficient likelihood of releasing such contaminants to the environment at levels that could contribute significantly to the concentration of these contaminants in the source waters of the public water supply.*[3]

Contaminants can reach a water body (groundwater, rivers, lakes, etc.) from activities occurring on the land surface or below it. Table 3-2: Potential Sources of Groundwater Contaminants from *Oregon's Wellhead Protection Program Guidance Manual (Guidance Manual)* provides a useful overview of potential sources of contamination and the contaminants that can be associated with each source. The Guidance Manual and Table 3-2 were used as a guideline for understanding the types of chemicals and risks associated with different types of facilities in evaluating the risk of contamination to the community's drinking water supply.

The completed inventories served several important purposes:

- Provided an effective means of educating the Citizen Task force, staff, and the public about potential problems;
- Provided information on the locations of many of the potential sources, especially those that present the greatest risks to the water supply;
- Provided information on the extent and volume of hazardous chemical use in the community; and
- Provided a reliable basis for developing management strategies to reduce the risks to the drinking water supply.

The Springfield inventory of potential contaminant sources was completed in an area substantially larger than the delineated drinking water protection zones. This assured all future drinking water protection areas would be inventoried prior to evaluating a new source location. The boundary for the inventory was essentially the top of the mountain ridges to the north and south, Hendricks Bridge near Cedar Flats to the east, and Coburg Road in Eugene to the west. Maps #1 and #8 show the complete mapping and inventory areas. The SUB Wellhead Map Series Symbology Key is printed separately at a larger scale for clarity. Maps #2 to #7 are for the separate wellfield areas at a larger scale in order to provide a clearer identification of the time-of-travel (TOT) zones and the contaminant inventories.

[3] Oregon DEQ, Source Water Assessment Plan, Draft, November 17, 1998.

The Springfield Drinking Water Protection Citizen Task Force (Citizen Task Force), Springfield Planning Commission, and Springfield City Council used the inventory to direct the focus of management strategies. Management strategies were developed to address the risks posed by hazardous chemicals across all land-use zones in the drinking water protection area.

Methodology

Past, current, and future hazardous chemical uses were identified through a variety of methods. The inventory process did not include an inspection of sites for individual contamination sources or chemical inventories. However, in Chapter 5: Management of Potential Sources of Contamination, inspections of all sites inside the 10-year TOT for chemical inventory and storage is recommended. It was determined that the inventory goal could be accomplished by other means such as using the State Fire Marshal's inventory of hazardous materials submitted by businesses and the Department of Environmental Quality and Environmental Protection Agency source lists. Using the Guidance Manual's Table 3-2 as a guideline, assumptions were made about typical chemicals used at different types of businesses and the risks associated with types of chemicals and volumes stored or in use.

The inventory was completed in several phases. The first phase was a limited inventory of the potential contaminant sources in the Weyerhaeuser Wellfield as part of the 1992 Golder study. A vulnerability assessment and a partial inventory was completed for the I-5 and "Q" Street Wellfield in 1995 in addition to the well log inventory completed by Springfield Utility Board's (SUB) staff (Appendix D). In 1996, SUB updated all previous inventories, expanded the inventory range to the current study area (Appendix C), and developed the geographic information system (GIS) mapping currently in use. In 1998, the inventories were updated again and a Windshield Survey was completed on all commercial and industrial zoned properties in the drinking water protection areas (Appendix F and Appendix G). The process for completing the inventory is summarized as follows:

- Developed a GIS base map that showed delineations for the existing wells and future wells including all TOT zones, tax lots, roads, addresses, and zoning

- Plotted information from federal and state agency databases that represented potentially significant sources of contamination to the drinking water supply. Plotted data include:

  DEQ
  1. Underground storage tanks
  2. Leaking underground storage tanks
  3. Petroleum releases
  4. Underground storage tank clean-up list (addressed sites)
  5. Underground storage tank clean-up list (non-addressed sites)
  6. Registered hazardous waste generators
  7. Spills
  8. Environmental clean-up sites
  9. Solid waste facilities

State Fire Marshall
10. Hazardous materials handlers (single entries of companies)
11. Hazardous materials handlers (all chemical entries)
12. Hazardous materials incidents (with addressed sites)
13. Hazardous materials incidents (with non-addressed sites)

EPA
14. Superfund sites
15. Toxic release locations
16. Discharging facilities

- Developed an inventory of 1,212 water well logs and 285 monitoring well logs within the study area.

- Retired and Senior Volunteers (RSVP) conducted a postcard and door-to-door questionnaire survey of the "Q" Street and SP/MAIA wellhead areas. Survey results were mapped separately for evaluation.

- Reviewed the results of the Lane County Oregon State University Extension Service Nitrate Volunteer Monitoring Study for wells in the Springfield study area. No mapping was required because no wells exceed one-half the nitrate MCL.

- Completed a windshield survey of all commercial and industrial property in the protection areas based on the Guidance Manual recommendations, as modified to meet Springfield's needs. Potential high volume hazardous chemical users are identified as recommended by the Citizen Task Force.

Results

Results of the inventory and mapping are shown on the map series attached at the end of this document. This GIS map base can be displayed at any scale and will be updated bi-annually to reflect any changes in the status of the contaminant sources inventoried. The mapped drinking water delineations are being shared through the Lane Council of Governments' (LCOG) common mapping system, the City of Springfield, and the University of Oregon InfoGraphics library. In addition to being used by the City of Springfield for this *Plan*, the map is being used for public education projects, by the City of Eugene and Lane County for information purposes, as well as consultants working for private industry in developing their business plans.

The total inventory covered an area significantly larger than the 19.67 square miles inside the total zone of contribution (ZOC) to the existing wells (see Table 4-1). This is a substantial area that has numerous and complex issues to evaluate as the Task Force developed its understanding of the risk of groundwater contamination. By expanding the inventory area, it was possible to assure any new well location under consideration could be evaluated for potential risk of

contamination. The newly mapped future well delineations increase the number of square miles inside the total ZOC.

Table 4-1
Wellhead Protection Area Coverage

Zone of Contribution	Total Square Miles
1 year	1.08
5 year	2.13
10 year	2.33
20 year	3.80
99 year	10.33
Total Square Miles	19.67

Table 4-2 displays an inventory of all tax lots inside the ZOC of the existing wells (map, tax lot inventory within zones of contribution, LCOG). There are 12,962 tax lots inside this area with over 1,259 (approximately 10 percent) of the lots zoned commercial/industrial. A critical point established during the review of zoning regulations in Springfield is that any use allowed in the regulations can be developed on any parcel with appropriate zoning designation. Additionally, many uses are allowed in adjacent non-commercial/industrial zoned properties by the conditional use permit process. In Springfield, there is a significant occurrence of demolition and reconstruction to a completely different type of enterprise. This means that a chemical warehouse or a hazardous waste generator can locate on any of the 1,259 commercial/ industrial zoned lots, regardless of what occupies that lot today and regardless of proximity to the community's water supply.

Table 4-2
Inventory of Tax Lot Zoning[4]

Time of Travel	Total Commercial Zoning	Total Industrial Zoning	Total Residential Zoning	Total Agricultural Use	Total Vacant Lots	Total Number of Tax Lots
Within 1 year	25	9	27	21	2	124
Between 1and 5 Years	57	47	579	48	12	761
Between 5 and 10 Years	63	48	700	19	18	920
Between 10 and 20 Years	31	87	1725	21	30	1944
Between 20 and 99-Years ZOC	608	284	7960	59	84	9213

[4] *Citizen Task Force Recommendations for Springfield Drinking Water Protection Plan*, LCOG, December 1997.

Table 4-3 lists the number of identified potential sources of contamination within the zones of contribution to the seven existing wellfields. Of the 13 categories of inventoried sites there are only four that do not occur inside the 5-year TOT. There were no toxic releases, solid waste facilities, superfund sites, or discharging facilities. However, there are many leaking underground storage tanks, underground storage tank cleanups, petroleum releases, underground storage tanks (potential future sources of contamination), spills, environmental cleanup sites, hazardous waste generators, hazardous materials handlers, and EPA discharging facilities.

The *Guidance Manual's* Table 3-2: Potential Sources of Groundwater Contaminants, lists 61 general types of businesses that have been shown to be sources of contaminants and lists the common contaminants associated with those sources. Springfield has all but eight of those sources. The only sources not found in Springfield that are listed in Table 3-2 are waste water treatment works, military installations, plastics/synthetics producers, confined animal feeding operations, livestock sewage lagoons, airports, landfills/dumps and golf courses.

Table 4-3
Potential Contaminant Source Inventory

Incident	1 Year	5 Year	10 Year	20 Year	99 year	Totals
DEQ						
Underground storage tank	2	17	12	11	75	117
Leaking underground storage tanks	2	11	13	9	52	87
Petroleum releases	2	10	14	10	46	82
Underground storage tank cleanup	2	10	13	8	50	83
Registered haz waste generators	2	2	10	3	28	45
Spills	0	2	1	1	5	9
Environmental cleanups	0	0	1	1	8	10
Solid waste	0	0	0	0	1	1
State Fire Marshall						
Hazardous incidents	1	10	6	9	12	38
Haz mat handlers	3	10	7	15	69	104
EPA						
Superfund	0	0	0	0	2	2
Toxic releases	0	0	0	0	3	3
Discharge facilities	0	0	1	0	0	1
Totals	**14**	**72**	**78**	**67**	**351**	**582**

The State Fire Marshall's inventories of hazardous chemicals were used in establishing the recommendation in the management section to ban the use of dense non-aqueous phase liquids (DNAPL's). DNAPLs are heavier than water, sink in the aquifer, and are very difficult to clean up. Local experience with attempting to expedite cleanups demonstrated that it will take at least two years to get a cleanup plan approved and the process started. Because of this experience, the

Citizen Task Force recommended banning any new use of DNAPL's in the 0 to10-year TOT and eliminating all existing uses of these chemicals in the 0 to 5-year TOT. The management strategy section also has identified actions to limit the amount of chemicals stored, handled, treated, used, or produced in quantities greater than 500 gallons within the 0 to 1-year TOT.

Each management strategy identified in Chapter 5 had its origin based on the risks identified above and depicted in the inventory maps.

Chapter 5: Management of Potential Sources of Contamination

In this chapter, potential sources of contamination are addressed by goals and related management strategies. Goals are broad vision statements that describe desired conditions or activities in the future. They provide direction for the development of management strategies. The management strategies for each goal more specifically describe a course of action.

Goals developed by the Springfield Drinking Water Protection Citizen Task Force (Citizen Task Force) are listed below in order of priority. The Citizen Task Force prioritized these goals without information on their relative costs and benefits. It is important to emphasize that the first two goals (Public Education and Overlay Zone) received a score in the prioritization significantly higher than the remaining recommendations. Public education and the adoption of an overlay zone were intended as the key recommendations of the Citizen Task Force.[5]

1. Implement a Public Education Program
2. Adopt a Drinking Water Protection Overlay Zone
3. Develop and Implement a Groundwater Monitoring Program
4. Enhance the Existing a Hazardous Waste Collection Program
5. Develop and Implement a Septic System upgrade/maintenance program
6. Use and Enhance Existing Spill Response Plan
7. Form Public-Private Partnerships
8. Implement a Water Conservation Program
9. Use Property Purchase and Donation to Provide Protection Areas

During the prioritization process, the Citizen Task Force offered the following additional recommendations for which there was general consensus of support, although they were not ranked with the others as separate alternatives. These additional recommendations are discussed at the end of this chapter.

- Intergovernmental coordination
- Stormwater management
- Abandoned wells
- New well site location

[5] Please refer to the *Citizen Task Force Recommendations for Springfield Drinking Water Protection Plan* for results of Citizen Task Force prioritization process, December 1997.

Goals and Related Management Strategies

Goal 1: Implement a public education program.

The Citizen Task Force's highest priority was to develop and implement a public education program that would include the following four components, in order of priority.

1. Comprehensive public education program
2. Notification
3. Technical assistance
4. Signs

1. Develop a comprehensive public education program that would include the following activities:

   - Set aside funds for a coordinated program that integrates all water aspects (e.g., drinking water, stormwater, wastewater); develops a different approach for different age groups and land uses, targeting the greatest efforts toward school children and high-risk zones; uses the media; encourages volunteers to monitor; and draws from cost-effective approaches and materials used elsewhere.

   - Identify the areas at greatest risk to the aquifer and focus public education and technical assistance efforts in the 1-year time-of-travel (TOT) zone, including sending a message to new and existing businesses and property owners about which activities are allowed.

   - The program could continue the work that Project WET and the McKenzie Watershed Council have been doing.

   - Increase education about Lane County's hazardous materials collection program.

   - For businesses, there could be *industrial mentoring zones* in which large industries with technical expertise who have *been there* mentor smaller ones on best management practices (BMPs).

   - The program should organize volunteers to monitor drinking water quality.

   - Prepare displays and models to use in special events conducted by the program or at other public events such as city and county public works days and local fairs. Informational hand-outs can be prepared and made available at these events and also at the front desk of the Planning Department at City Hall (to be handed out to permit applicants) and at local utility offices. These materials would explain activities that affect drinking water quality and would be copied from other communities to the extent possible.

- Use the local media, including newspapers, radio and television, to raise awareness about drinking water protection and about where to go for more information.

2. Provide notification to people in the drinking water protection area.

   - Contact everyone in the drinking water area (via utility bills, school take home notices, mailers, etc.). Target well owners and inform them of BMPs and proper abandonment procedures.

3. Provide technical assistance.

   - Use existing technical assistance programs of the Oregon Department of Environmental Quality and Oregon Department of Agriculture to encourage BMPs, especially in the 0 to 5-year TOT zone.

4. Use signs to increase awareness.

   - Use billboards on freeways and major transportation routes, signs at businesses and stores, and messages at card locks or gas pumps to raise awareness about drinking water protection in general and about specific products and alternatives. Change signs occasionally. Use donations or ask sign companies for temporary use. Specific examples suggested were:

     - *Adopt a Well* program.

     - Placing sign at businesses similar to the one at Farmers' Co-op on 30th and Olympic Street.

     - Electronic message at card locks or gas pumps (on the gas card reader).

     - At point of sale: where oil, chemicals, paints, or other hazardous materials are sold. Signs could emphasize, *Try to use an alternative that won't produce a hazardous waste* and suggest alternatives.

     - Install Burma Shave style of signs in the protection areas.

     - *Entering Groundwater Protection Zone* signs on freeway.

     - Large billboard on I-105, Beltline, and Thurston area.

Goal 2: Adopt a drinking water protection overlay zone.

The Citizen Task Force's other highest priority was for the City of Springfield to adopt a *Drinking Water Protection Overlay Zone* for the combined zone of contribution and to refer the overlay zone to the City of Eugene and Lane County for adoption and application to areas that

are in their jurisdictions.[6] Businesses and property owners that provide scientific evidence that demonstrates their property is not in the regulated TOT zones would be exempt.

The Citizen Task Force agreed that the overlay zone should apply to both existing and new businesses, but most members recognized the need to lessen the burden on existing businesses that might need to relocate as a result of the regulations. For this reason, some Citizen Task Force members agreed that large commercial nodes with expensive infrastructure, that pose a potential risk to the aquifer, would have the option of working with local agencies to relocate a well that would affect their operations by sharing in the costs of relocation. For example, businesses in the commercial node might pay the costs to close down the existing well (possibly through a bond paid to the city) and develop an equitable way to replace the well.

The Citizen Task Force generally agreed that the overlay zone would contain the following five components, in order of priority.[7]

1. Prohibitions
2. Standards
3. Inspections
4. Monitoring
5. Transport

1. Prohibit high-risk uses.

   - Prohibit new use of *sinkers,* (i.e., hazardous chemicals such as Dense Non-Aqueous Phase Liquids (DNAPLs) that are heavier than water, which sink in the aquifer and are very difficult to clean up) in the 0 to 5-year TOT. Phase out existing uses of sinkers over time in the 0 to 5-year TOT.[8]

   - Prohibit high-risk uses in the 1-year TOT zone; for existing businesses, allow a longer phase out time for those with a high level of protection in place than for those with a low level of protection.

   - When higher risk uses convert ownership, they must convert to an allowed use.[9]

[6] The overlay zone's score in the ranking of alternatives differed from public education by just two points.
[7] One Citizen Task Force member favored a more incentive-based approach over strict regulation in the district.
[8] The prohibition applies to TOT zones for existing and new businesses, inconsistent with the Citizen Task Force direction to treat these two groups the same, although the initial Citizen Task Force recommendation was 1 to 10-year TOT for new uses.
[9] Citizen Task Force members requested information on the number of properties that would be affected by this recommendation. Map 8 shows the number of tax lots by zoning in each TOT zone. Note that the tax lots are not cumulative, e.g., to determine the number of tax lots in the 0 to 5-year TOT zone, one must add the five year to the one year. This information provides an indication of the potential scope of impact.

2. Develop standards.

   - Apply stricter standards in the 0 to 5-year TOT zone to discourage high-risk businesses from locating there.

   - In the 1-year TOT zone, set storage requirements and a threshold for the amount of hazardous materials stored on site[10].

   - Require tight pipe sanitary and storm sewers for new construction and retrofits of existing construction.

   - Address use of chemicals on lawns.

3. Implement an inspection program to regulate use of hazardous chemicals in the 0 to 10-year TOT zone.

4. In the 0 to 5-year TOT zone, require monitoring by new and existing high-risk uses.

5. Regulate hazardous materials transport.

   - Regulate hazardous materials transport in the overlay zone, with greater restrictions in the 0 to 5-year TOT zone.

   - Limit transport of chemicals in the 0 to 5- year TOT zone, including transport by rail.

   - Consider limiting hazardous travel to certain hours of the day when spill response is available.

   - Develop hazardous materials transportation routes.

Goal 3: Develop and implement a ground water monitoring program.

The Citizen Task Force recommended a monitoring program that includes all drinking water protection area delineations inside the Drinking Water Protection Overlay Zone[11] and possibly individual potential sources of contamination. The frequency of the tests and contaminants to be evaluated needs to be determined. The monitoring program includes the following three components, in order of priority.

1. Comprehensive monitoring program

[10] The Citizen Task Force noted that the threshold should be higher than Renton, Washington's, which was considered to be too low.

[11] Wellhead delineations are areas shown on a map that depict the extent, orientation, and boundaries of a wellhead protection area using such factors as geology, aquifer characteristics, well pumping rates, and TOT.

2. Sampling during investigation
3. Sampling during clean up

1. Establish a comprehensive monitoring program.

   - Establish a monitoring well network. The network should include wells owned by the water suppliers and those required on private property by the Department of Environmental Quality (DEQ) or through overlay zone requirements for new or modified high-risk activities in the drinking water protection areas.

   - Evaluate risk and develop a monitoring plan to detect intentional damage or contamination to the wells and aquifer.

   - If BMPs are required at a facility, they should also be required to properly maintain the BMPs installed, especially oil/water separators in parking lots and in containment areas. This would include inspection to determine and enforce compliance.

2. Sample Chemicals of concern during site investigation

   - Require that samples for chemicals of concern[12] are taken during site investigation. Whenever samples are collected during a site investigation or clean-up and follow-up monitoring, results of this sampling must be provided at no additional cost to the Drinking Water Protection Program.

3. Sample during clean up

   - Require businesses conducting clean-up activities to provide sample results of all analyses to the monitoring program at no additional cost to the program.

Goal 4: Enhance the existing hazardous waste collection program

The Citizen Task Force recommended the following four enhancements to Lane County's hazardous waste collection program, in order of priority.

1. Increased frequency and flexibility
2. Demand management
3. Evaluation
4. Increased program funding

[12]Chemicals of concern are chemical contaminants that are a risk to the public water supply which have been identified in the aquifer and are originating from an unknown source or may be coming from more than one source.

1. Increased frequency and flexibility of hazardous waste collection

   - Conduct the current program more often and make it more flexible by having more drop-off locations. Increasing drop-off locations is intended to encourage people who move to drop off paints and other household hazardous materials so they do not get left behind for the next occupant.

   - Create an amnesty program for chemicals stored in drinking water protection areas now that are not being disposed of due to high costs.

2. Hazardous waste demand management.

   - Change the system, or encourage the system to change, to reduce quantities of hazardous materials purchased. For example, discourage homeowners from purchasing greater quantities than needed.

3. Evaluate the current program and implement improvements.

4. Increase program funding. Additional funding for the program is needed to provide financial assistance to small businesses to reduce the costs of disposal and for an assistance program to remove underground storage tanks (e.g., home heating oil tanks and agricultural fuel tanks) that are not regulated.

Goal 5: Develop and implement a septic system upgrades/maintenance program.

The Citizen Task Force forwarded the following two recommendations in this category, in order of priority:

1. Inspections and maintenance requirements.
2. Septic tank regulations.

1. Work with Lane County to adopt an ordinance of inspections and maintenance requirements on existing septic systems.

2. Allow no more than one septic tank per acre in the county on property within the zone of contribution.

Goal 6: Use and enhance existing spill response plan.

The Citizen Task Force supported the following aspects of spill response, in order of priority.

1. Existing plan
2. Spill diversion and containment
3. Mapping
4. Hot line

1. Recognize and support continuation of the existing Spill Response Plan and support a continuous review process.

2. Construct spill diversion and containment structures at wellheads and along freeways.

3. Continuously update storm sewer system maps and integrate into the geographic information system (GIS). Continue to provide the fire department with good maps of the storm and sanitary sewer systems.

4. Set up a regional hotline spill number, similar to the City of Eugene's.

Goal 7: Form public-private partnerships.

The Citizen Task Force forwarded the following three recommendations, in order of priority.

1. Public education by private sector
2. Public-coordinated partnerships
3. Business recognition program

1. Encourage public education by the private sector, for example:

   - Hardware stores could place signs or education brochures to identify replacement chemicals that are as effective but less hazardous.

   - Displays and seminars presented by home improvement stores could address contamination routes, drinking water protection and related topics; or could allow local government staff to give seminars.

   - Fuel oil suppliers could distribute information concerning overfills and spill containment.

2. Establish public-coordinated partnerships, for example:

   - Local governments could coordinate meetings of businesses to discuss ways to protect drinking water, for example:

     - Successful storage and handling practices.

     - A local materials exchange program.

     - Establishing ways businesses can assist with public education programs.

     - Setting up a resource center and/or forums for small businesses.

- Partnerships with agricultural chemical suppliers to collect chemical containers and excess agricultural chemicals.

- Requiring the manufacturer to take back empty hazardous materials containers (e.g., by using a deposit system or not purchasing from makers that do not participate).

3. Establish a business recognition program in which the public sector recognizes private sector efforts to protect groundwater through an awards program or with signs that acknowledge their efforts.

Goal 8: Implement a Water Conservation Program.

The Citizen Task Force forwarded the following four recommendations, in order of priority.

1. Water demand management
2. Rate structure changes
3. Piping loss reductions
4. Rebate program

1. Implement the recommendations of a previous Springfield Utility Board (SUB) Citizen Task Force on water demand management.

2. Direct water suppliers to eliminate the rate structure that encourages water use.

3. SUB should decrease water loss from piping.

4. Recommend water suppliers to develop a rebate program for water-efficient appliances.

Goal 9: Use property purchase/donation to provide protection areas.

The Citizen Task Force forwarded the following four recommendations, in order of priority.

1. New wells
2. Land set-asides
3. Conservation easements
4. Voluntary deed restrictions

1. Purchase sites now for future wells.

2. Encourage set-asides in large tract developments that provide open space, wetlands, and riparian areas for aquifer protection.

3. The public sector would coordinate and facilitate conservation easements for integrated water management in drinking water protection areas for reimbursement or donation as a tax write-

off. The Citizen Task Force, overall, favored using easements instead of property purchase for protection in wellhead areas.

4. Encourage voluntary deed restrictions that are protective of the aquifer.

Goal 10: Consider Additional Recommendations

The Citizen Task Force forwarded the following recommendations regarding:

1. Intergovernmental coordination,
2. Stormwater management,
3. Abandoned wells, and
4. Evaluation of new well sites.

The Citizen Task Force considered these recommendations to be very important, although they were not included as separate options in the initial list of alternatives to be prioritized.

1. Encourage intergovernmental coordination. The City and local utilities should coordinate to protect drinking water, as follows:

   - With the Environmental Protection Agency for *sole source aquifer* designation;
   - With the Oregon Department of Transportation to ensure road hazards are minimized;
   - With the Union Pacific Railroad to institute precautions;
   - With the Oregon Department of Agriculture to address agricultural land and county issues through a locally appointed agricultural or resource lands Citizen Task Force;
   - With the Department of Environmental Quality (DEQ) to decommission or clean up sites contaminated by businesses in the past; and
   - With Junction City and Coburg to partner with agricultural chemical suppliers, DEQ and Lane County to collect chemical containers and excess agricultural chemicals.

2. Support the City's efforts to be proactive and develop a stormwater management program.

3. There are over 1,500 wells identified in the drinking water protection study area, wells that are no longer in use pose a significant risk to aquifer contamination. It is recommended to identify and decommission these abandoned wells.

4. SUB should consider proximity to major transportation routes and other areas prone to risk as one factor in the evaluation of new well sites.

Chapter 6: Contingency Plan

Goals and management strategies presented in the previous chapter focus on proactive efforts that are intended to protect the drinking water supply from contamination. In the event a drinking water contamination problem should occur, Springfield also needs to be prepared to react to the contamination emergency with a contingency plan. A contingency plan is a designed response to the contamination or disruption of Springfield's current water supply. The contingency plan focuses on:

- Identification of the primary potential threats to the water supply; and
- Developing procedures that will be followed should the threats materialize.

Springfield's contingency plan addresses ten elements required by the Oregon Wellhead Protection Program, including:

1. Potential threats to the drinking water supply;
2. Protocols for incident response;
3. Prioritization of water usage;
4. Key personnel and development of a notification roster;
5. Short-term and long-term replacement of water supplies;
6. Short-term and long-term conservation measures;
7. Plan testing, review, and update;
8. Personnel training;
9. Provisions for public education; and
10. Logistical and financial resources.

Additional details for emergency response situations can be found in the *Springfield Utility Board's (SUB) 1998 Integrated Contingency Plan*, which describes SUB's emergency organization and provides for clear authority, direction, and communication during emergencies.

1. Potential threats to the drinking water supply

Due to the complexity of the SUB and Rainbow Water District's water supply system, potential threats are dependent on the location of the problem. The community water system is currently supplied by 30 wells in seven wellfields located throughout the area as shown in Map #1. The supply system is divided into three separate pressure and operational areas. They are:

SUB/Rainbow North System is primarily located north of I-105 and east of I-5 and served by the Rainbow I-5, SUB Sports Way, Rainbow "Q" Street, Rainbow Chase wellfields, and SUB/Rainbow jointly owned WEYCO wellfield. Water pressure ranges between 80 and 105 pounds per square inch (PSI).

SUB West System is bounded by I-105 on the north, the city limits on the west and south, and 28th Street on the east. It is served by water from the Willamette Wellfield

plus water through interties from SUB/Rainbow North System and SUB East System. Water pressure in this system is maintained at 50 to 55 PSI, which is substantially lower than the other systems and only allows for bringing water into the system.

SUB East System is essentially east of 28th Street and bounded by the city limits on the north, south, and east. Water for the East System comes from the Thurston and SP/MAIA Wellfields in addition to the SUB/Rainbow jointly owned WEYCO Wellfield. Water pressure ranges between 70 and 90 PSI.

The Thurston, WEYCO, Chase, and Willamette Wellfields are located near the McKenzie or Willamette Rivers and have the potential to be impacted by flooding and spills in the rivers.

The I-5, Sports Way, "Q" Street, and SP/MAIA Wellfields are less subject to flooding. They are closer to commercial/industrial areas and are next to the I-5 and I-105 highways, which are major transportation corridors.

Primary threats to Springfield's drinking water system are related to an interruption of water delivery or contamination of the aquifer used for the drinking water supply. Nine types of events have been identified that could cause an interruption in delivery and /or contamination of the water supply:

A. Electrical/Mechanical problems: power outage, broken pipeline, pump failure
B. Flooding
C. Detection of contamination at a wellhead
D. Contamination from a leaking underground fuel storage tank or chemical spill at a nearby business
E. Railroad or highway spills
F. Spill in the McKenzie River, Willamette River, Springfield Millrace or the storm water systems that discharge to the rivers or millrace
G. Stormwater contamination resulting in well water contamination
H. Sabotage
I. Earthquakes and volcanic activities

The most likely threats to the drinking water supply are electrical/mechanical failure; detection of contamination at or near a wellhead; a chemical release within the drinking water protection area; railroad or highway spills; a spill in the McKenzie River, Willamette River, or the Springfield Millrace; and the stormwater systems that discharge to the rivers and millrace. Procedures to deal with these threats are outlined in Element 2 below.

2. Protocols for incident response

This element details the appropriate response for the most likely potential threats above.

A. B. Electrical/Mechanical and Flooding Related Interruptions:

Springfield primarily relies on a redundancy of groundwater source rather than reservoir capacity to meet water demands. Most wellfield power supplies have the capability to be fed from more than one power substation, which reduces the potential for long-term outages. Experience has shown that no wellfield has been out of service for more than one hour due to an electrical supply failure. From an electrical reliability standpoint, the risk of more than one wellfield being down because of an electrical outage is remote. Four wellfields are located in flood plains and subject to potential flooding effects. Flooding may not impact all wells within these wellfields.

Responses to these events include:

- Rely on water source capacity and power system redundancy to the extent possible. During the summer peak demand times there is no excess source capacity. During the remainder of the year sources can be activated that are not effected by the interruption.

- In the short-term (less than one-half day in summer and about one day in winter) rely on water tank storage.

- Apply conservation measures (Element 6).

- Institute adopted four-stage water curtailment plans in both the SUB and Rainbow Water District service areas based on the system's ability to maintain reservoir levels for fire protection (Appendix E).

C. Detection of Contamination at a Wellhead

The required response to the detection of contamination at a wellhead depends on whether the contamination is less than or exceeds the maximum contaminant level (MCL). The MCL is considered to be the maximum allowed concentration of contaminant in drinking water without posing a significant health risk. The community has applied a much higher standard in responding to man-made chemicals, like Dense Non-Aqueous Phase Liquids (DNAPL), and other volatile, semi-volatile, and synthetic organic chemicals. Every effort will be made to eliminate any detectable amounts of these man-made substances from the drinking water supply.

- Notify the Oregon Health Division (OHD)(1-503-731-4381) and Department of Environmental Quality (DEQ)(see Appendix H) of any confirmed detection.

If the contamination exceeds the MCL:

- Send news release to local media.

- Notify local elected officials
  - SUB staff will notify Board members
  - Rainbow staff will notify Board members
  - Springfield City Manager's Office will notify City Councilors

- Follow OHD Public Notice requirements identified in Oregon Administrative Rules 333-061-0042

- Shut down the affected well(s). If an emergency exists and permission to use the well(s) is granted by OHD and DEQ, water will be mixed with water from other wells to reduce the contaminant in the distribution system to below the MCL, minimizing the concentration of the contaminant to the greatest extent possible.

- Flush affected system and reservoirs.

- Implement curtailment or conservation plan as needed.

- Work with Water Resources Division to notify other nearby well owners and minimize contaminant movement. Water Master, Michael Mattick, 746-1856.

- Expand cooperation with agencies investigating the contamination.

If the contaminant level is below the MCL:

- A minimum of quarterly monitoring will occur to track changes in contaminant levels over time and verify that contaminant levels remains below the MCL.

- If contamination is detected at WEYCO Wellfield, initiate SUB, Rainbow Water District, and Weyerhaeuser Memorandum of Understanding that details the responses required and which may include turning on the carbon treatment system.

- Turn off well if not absolutely needed (non-critical demand periods). If an emergency exists, water will be mixed with water from other wells to reduce the contaminant in the distribution system to below the MCL, minimizing the concentration of the contaminant to the greatest extent possible.

- Modify well operation to *last on, first off* during critical demand periods.

- Run only in conjunction with other wells.

- Notify local elected officials
  - SUB staff will notify Board members
  - Rainbow staff will notify Board members

- Springfield City Managers Office will notify City Councilors

- Send news release to local media.

- Implement first stage conservation measures (Section 6 in this chapter and Appendix E Water Curtailment Plan).

- Work with WRD to notify other nearby well owners and minimize contaminant movement. Water Master, Michael Mattick, 746-1856.

- Cooperate with agencies investigating the contamination.

D.E. Contamination From a Leaking Underground Fuel Storage Tank or Chemical Spill at a Nearby Business and Railroad or Highway Spills:

The release of a contaminant from spills and leaking underground fuel storage tanks is primarily addressed through the proactive management strategies intended to reduce the likelihood of this risk. Standard operating procedure between the Springfield Fire Department and SUB, Rainbow, and the Eugene Water & Electric Board treatment plant is for notification of *all* releases in Springfield and upstream on the McKenzie and Willamette Rivers from the Fire Department to water suppliers. The water suppliers coordinate their responses based on the risk of drinking water contamination.

In the event of a contaminant release from underground fuel storage tanks or spills in the drinking water protection area and adjoining surface waters, the following protocol applies:

Within the Zero to 5-Year TOT

- Inventory and rank chemicals used in the drinking water protection area (Chapter 4) and prepare related responses. This work is under way and will be completed in the near future. It is intended that the inventory and responses will be complete prior to being needed. DNAPL chemicals are an extreme risk in this aquifer setting and immediate clean up and removal is necessary.

- Contact Springfield Fire & Life Safety (9-1-1) when immediate response is needed.

- Contact Springfield Fire Marshal (726-3737), Oregon State Fire Marshal (1-503-378-3473), and CHEMTREC (1-800-424-9300) to determine spilled chemical characteristics and cleanup recommendations.

- Notify all responders that the release is within the drinking water protection area.

- Shut off nearby public water supply wells as an immediate precaution.
- Determine short-, medium-, and long-term well operation
- Follow communication and notification procedures contained in Element 4 in this Chapter.
- Work to facilitate an expedited cleanup, but leave cleanup to the responsible party.
- Coordinate with responsible party's contingency plan.
- Implement conservation or curtailment plan as appropriate.
- Notify OHD and local elected officials
  - SUB staff will notify Board members
  - Rainbow staff will notify Board members
  - Springfield City Managers Office will notify City Councilors
- Send news release to local media.
- Work with WRD to notify other nearby well owners and minimize contaminant movement. Water Master, Michael Mattick, 746-1856.
- Cooperate with DEQ and other responsible agencies to facilitate cleanup and any remedial action.

Within the 5- to 20-Year TOT

- Inventory and rank chemicals used in the drinking water protection area (Chapter 4) and prepare related responses.
- Contact Springfield Fire & Life Safety (9-1-1) when immediate HAZMAT response is needed.
- Contact Springfield Fire Marshal (726-3737), Oregon State Fire Marshal (1-503-378-3473), and CHEMTREC (1-800-424-9300) to determine spilled chemical characteristics and cleanup recommendations.
- Notify all responders that the release is within the drinking water protection area.
- Follow communication and notification procedures contained in Element 4 of this plan.

- Notify OHD and local elected officials
  - SUB staff will notify Board members
  - Rainbow staff will notify Board members
  - Springfield City Managers Office will notify City Councilors
- Send news release to local media.
- Leave cleanup to the responsible party.
- Coordinate with responsible party's contingency plan.
- Cooperate with DEQ (see Appendix H) and other responsible agencies to facilitate cleanup and any remedial action.

F. Spill in the McKenzie River, Willamette River, Springfield Millrace, or the Storm Water Systems that Discharge to the Rivers or Millrace;

- Contact Springfield Fire & Life Safety (9-1-1) when immediate HAZMAT response is needed.
- A contaminant release to surface waters may impact the drinking water wells, notify all responders that the release is within the drinking water protection area.
- Contact Springfield Fire Marshal, Oregon State Fire Marshal, and CHEMTREC to determine spilled chemical characteristics and cleanup recommendations.
- Follow communication and notification procedures contained in Element 4 of this plan.
- Shut off nearby public water supply wells as an immediate precaution.
- Determine short-, medium-, and long-term well operation
- Monitor outflows to receiving drainage ways for contaminants. The fire and public works departments should take extra precautions to prevent contaminant runoff.
- Work to facilitate an expedited cleanup, but leave cleanup to the responsible party.
- Implement conservation or curtailment plan as appropriate.
- Send news release to local media.

- Cooperate with DEQ (see Appendix H) and other responsible agencies to facilitate cleanup and any remedial action.

3. Prioritization of water usage

This element prioritizes community needs in case the water supply is interrupted and/or a replacement supply is necessary. Prioritization of water use from highest to lowest is established in the adopted Water Curtailment Plans and as developed in the Springfield Drinking Water Protection Citizen Task Force mock emergency exercise as follows:

1. Fire protection
2. Hospitals
3. Emergency evacuation shelters
4. Nursing homes
5. Schools
6. Residents
7. Industrial/commercial
8. Public parks
9. All other

4. Key personnel and development of a notification roster

In the event of an emergency situation threatening the water supply, key people must be notified and response procedures coordinated among SUB, Rainbow, City of Springfield, City of Eugene, Lane County, and State of Oregon personnel.

If a call is received by the 9-1-1 center, the fire department and police department are to be dispatched to the event of an emergency spill. The nature of the incident determines who is dispatched. If the incident involves a vehicle accident, the police department is often the first to be notified. If the event is non-vehicle related and a spill is reported, the appropriate fire department is normally the first to be notified by the 9-1-1 dispatch center. Both fire and police will be notified if a contaminant is known to be present. The incident commander will notify dispatch of the need for Regional HAZMAT Response Team. With all spill reports in the Springfield area, the Dispatch Center notifies the EWEB Hayden Bridge Treatment Plant. The plant operator on duty notifies SUB and Rainbow Water District and relays all information available.

During an emergency spill event, an incident command center is established to safely control the situation. The incident command system is dynamic, meaning that as events unfold, roles and responsibilities of personnel may change as the situation progresses. The person in charge may also change depending on which agency responds first. For example, police may be first on the scene and in control until the fire department arrives. If a spill occurs within the drinking water protection area, SUB, Rainbow, and Springfield Public Works Department (PWD) should be notified immediately. The police, SUB, Rainbow, and PWD personnel are responsible for aiding the fire chief in adequate, appropriate, and safe actions.

Key personnel and their roles are listed below:

Springfield Police (Emergency 9-1-1, Administrative 726-3714)
Police personnel are often the first to be dispatched and respond to an emergency event. Police are in charge of public safety until fire department personnel arrive, then the incident command control is relinquished to fire department personnel. At the direction of the fire department incident commander, the police are responsible for keeping the area secured and providing support help.

Springfield Fire Chief (Emergency 9-1-1, Administrative, Dennis Murphy, 726-3737)
The fire chief or other designated fire personnel will be responsible for determining if local personnel can adequately and safely respond to a spill event. The incident commander will contact Oregon Emergency Response System and request a Regional HAZMAT Response Team if the situation and/or contaminant is beyond local equipment and personnel capabilities. If it is determined that local response is adequate, the incident commander determines and directs what is needed from police, SUB, Rainbow, and City personnel through a unified incident command system.

Springfield Utility Board Water Department Director (Ken Cerotsky, Work and after hours emergencies 746-8451. After hours notice is routed to Water Production call out list.)
This person coordinates necessary actions, making any decisions regarding the operation of the SUB water system. In the event the department director is not available, the SUB *Integrated Contingency Plan* will be initiated. This plan establishes that the most responsible SUB personnel contacted is the responsible person for the Utility, until such time as they are replaced in accordance with the plan. SUB Water Department director provides technical assistance and backup support as directed by the incident commander. It is this person's responsibility to inform the incident commander of the spill location within the drinking water protection area and suggest any additional precautionary measures that need to be considered. Operational situations that may affect Rainbow will be coordinated directly with the responsible Rainbow representative as soon as possible. The Oregon Health Division will be immediately notified in the event of any drinking water contamination. SUB Water Department director will designate a media relations person who will prepare a press release and handle all media contacts for SUB.

Rainbow Water District Superintendent (J. Timothy Hanley, Work and after hours emergencies 746-1676. After hours notice is routed to the on-call person.)
This person coordinates necessary actions, making any decisions regarding the operation of the Rainbow water system. Rainbow Water District superintendent provides technical assistance and backup support as directed by the incident commander. It is this person's responsibility to inform the incident commander of the spill location within the drinking water protection area and suggest any additional precautionary measures that need to be considered. Operational situations that may effect SUB will be coordinated directly with

the responsible SUB representative as soon as possible. The OHD will be immediately notified in the event of any drinking water contamination. Rainbow Water District superintendent will designate a media relations person who will prepare a press release and handle all media contacts for Rainbow.

Lane County Sheriff's Office, Emergency Response Coordinator (Ike Jenson, 682-4160)
The Lane county emergency coordinator should be notified and will inform the Lane County Public Health Department and the Oregon Emergency Response System, who in turn notifies other appropriate state agencies. Usually, the fire chief notifies the county coordinator if the event requires county resources for response. However, if the county coordinator is notified first, he will notify SUB and Rainbow when a spill emergency occurs within the drinking water protection area.

Other local officials to be notified include:

Springfield City Manager (Mike Kelly, 726-3700)

Springfield Mayor (Maureen Maine, 726-3700)

Other state and federal contact numbers include:

Oregon Health Division, Tom Charbonneau, Regional Engineer, 1-503-731-4381

Oregon DEQ, Western Region Phone List, Appendix H

Oregon Water Resources Division, Michael Mattick, Water Master, 746-1856

Oregon State Fire Marshal, 1-503-378-3473

CHEMTREC, 1-800-424-9300
Call this 24-hour Emergency Notification number to report transportation related spills and to get MSDS sheets and related clean-up information on chemicals that have been spilled. Internet address: www.cmahq.com.

5. Short-term and long-term replacement of water supplies

In the event of an emergency, the minimum water needs of the community must be met with water that meets applicable health standards. Short-term options are those where the alternative supply is needed for a few hours or days. Long-term options are considered for a permanent replacement supply.

Potential short-term drinking water:

- Implement curtailment plan (Appendix E) and conservation practices.
- Purchase water from EWEB (limited capacity available).
- Bottled water.
- Deliver potable water from non-affected wells with private tanker trucks and/or National Guard.
- Make water available for only a short duration each day and issue a *Boil Water* notice to insure public health.

Intermediate-term:

- Same as short-term

Long-term:

- Develop new well(s).
- Construct well treatment facility(s).
- Construct surface water treatment plant (capacity limited to existing water rights on the Willamette River).
- Purchase water from EWEB.

6. Short-term and long-term conservation measures

Conservation of water use will lessen demands on Springfield's public water supply system in the event of an emergency situation. This element identifies short-term and long-term conservation practices that could be implemented as a function of user needs identified in Element 3, Prioritization of Water Usage. The extent of conservation/curtailment measures necessary will depend on the nature and extent of the emergency. Generalized conservation/curtailment practices that can be applied across land uses are identified below, followed by specific measures that can be applied for different user groups:

- Encourage conservation implementation in all uses prior to an emergency.
- Prohibit outdoor water use.
- Provide water for drinking water purposes only.

- Administer fines to violators of water misuse or overuse in the event of a water shortage emergency.

- Make water available for a short duration each day.

- Drop water pressure so that overuse is unlikely.

- Review individual commercial/industrial use on a case-by-case basis to determine critical need.

- Educate people about the emergency and necessary actions.

Willamalane Parks and City of Springfield: Park and City irrigated turf areas will not be irrigated from the SUB or Rainbow public water supply systems during a water emergency. Some parks have auxiliary surface water sources and wells. In most instances these auxiliary supplies will not be affected by these curtailment measures unless they compromise the public system. Street flushing and sweeping with water will be curtailed.

Commercial/Industrial/Agricultural auxiliary water supply wells: SUB and Rainbow should seek cooperation from owners of wells whose operation might affect water availability to the SUB and Rainbow public water supply wells. Auxiliary wells in the vicinity of the public water supply wells may also influence the flow of contamination by drawing water more quickly toward the public wells. Well owners should be notified in the event of an emergency that their cooperation in reduced water use might be requested.

Emergency Evacuation Shelters and Schools: Schools can reduce water use primarily by eliminating grounds irrigation. In a temporary emergency, tankers for drinking water and other essential functions should be stationed at the school or emergency shelter to keep them in operation.

McKenzie Willamette Hospital: The hospital is encouraged to develop a water contingency and conservation plan. In a temporary emergency, tankers for drinking water and other essential functions should be stationed at the hospital to keep them in operation. For auxiliary potable water supply, the hospital's irrigation well can be treated with a portable treatment system from the National Guard or treatment equipment supplier.

Industry/Commercial: Many businesses already have a contingency plan in place that identifies water conservation practices in the event of a water shortage. Businesses should be informed that in the event of a water emergency, their water use may be curtailed and it is in their best interest to develop a conservation plan if they do not already have one.

Resident: Common conservation measures for residential use include limiting practices such as lawn irrigation, car washing, and laundry use, as well as installing conservation devices such as low-flow shower heads. SUB publishes a variety of information on water use reduction and conservation practices. Additionally, Oregon Water Resource Department,

DEQ, and the American Water Works Association publish information on water conservation. SUB and Rainbow should educate customers on water conservation practices prior to a water emergency. These educational efforts are described in Element 9.

Fire Department: In the event of a fire during a water supply emergency, the fire department has top priority for water usage. The Springfield Fire & Life Safety Department must be notified when an emergency water conservation or curtailment plan is going into effect. The notification shall include specific operational details such as low-pressure areas and isolated zones in the water distribution system in order for fire personnel to make informed decisions about fire suppression. Communication between the fire chief and stand-by personnel is critical. Additionally, the fire department should identify alternative sources of water for fire response services to insure fire protection.

7. Plan testing, review, and update

This contingency plan will be evaluated, reviewed, and updated using an annual review and periodic mock exercise. SUB and Rainbow will review any personnel or situational changes and make adjustments to the Plan annually. A copy of this Contingency Plan is included in SUB's Water Production Emergency Procedure Manual. The Emergency Procedure Manual is reviewed and updated quarterly with corrections or modifications to the plan taking place during that process. In addition a simulated emergency (mock exercise) will allow emergency responders to make necessary adjustments to the plan. Mock exercises will also serve as an educational tool for local citizens, reminding the community of the importance of protecting their drinking water supply and of the curtailment measures that might be imposed in the event of an emergency.

8. Personnel training

To be effective, contingency plans must rely on properly trained people operating within a well-organized and effective system with up-to-date information. County and state emergency responders have been professionally trained to deal with HAZMAT responses. Local personnel should also be trained in initial HAZMAT response since they could be the first to arrive on site. Police officers receive HAZMAT awareness level training as part of their officer-training program. Currently, all fire personnel receive HAZMAT operations level of training. With this training, local personnel are able to adequately identify and contain many hazardous materials.

9. Provisions for public education

Public notification and education information builds and maintains support for the plan. It further encourages assistance and understanding when an emergency arises and the plan is put into effect. Management strategies for *Springfield's Drinking Water Protection Plan* have a strong educational imperative that satisfies this component of the contingency plan. However, before an emergency occurs residents and businesses must be informed about the

conservation and curtailment measures they will be expected to apply. This information should be prepared and distributed prior to a contamination or supply interruption.

10. Logistical and financial resources

The City, SUB, and Rainbow should participate in an emergency response situation only to the extent of providing assistance and information regarding the water system and the particular needs of the community. The City, SUB, and Rainbow should not attempt any clean up on their own, although containment may be necessarily appropriate. The responsible party is legally obligated to report and clean up chemical releases. If no responsible party is found, the community may need to finance contamination clean up or treatment. Potential funding sources include:

- State emergency funds.
- Federal emergency funds.
- A bond measure for replacement, treatment, or cleanup needs.