

# V. NATURAL ENVIRONMENT



CHARTING A FUTURE COURSE

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## ◆ RELATIONSHIP TO THE FRAMEWORK GOALS ◆

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The **Natural Environment Element** highlights the following Framework Goals:

- FG-1 Maintain and enhance Kirkland's unique character.
- FG-2 Support a strong sense of community.
- FG-3 Maintain vibrant and stable residential neighborhoods and mixed-use development, with housing for diverse incomes, ages, and lifestyles.
- FG-4 Promote a strong and diverse economy.
- ✓ **FG-5 Protect and preserve environmentally sensitive areas and reduce greenhouse gas emissions to ensure a healthy environment.**
- FG-6 Identify, protect and preserve the City's historic resources, and enhance the identity of those areas and neighborhoods in which they exist.
- ✓ **FG-7 Encourage a sustainable community.**
- ✓ **FG-8 Maintain and enhance Kirkland's strong physical, visual, and perceptual linkages to Lake Washington.**
- FG-9 Provide safety and accessibility for those who use alternative modes of transportation within and between neighborhoods, public spaces, and business districts and to regional facilities.
- FG-10 Create a transportation system which allows the mobility of people and goods by providing a variety of transportation options.
- ✓ **FG-11 Maintain existing park facilities, while seeking opportunities to expand and enhance the current range and quality of facilities.**
- FG-12 Ensure public safety.
- FG-13 Maintain existing adopted levels of service for important public facilities.
- FG-14 Plan for a fair share of regional growth, consistent with State and regional goals to minimize low-density sprawl and direct growth to urban areas.
- ✓ **FG-15 Solve regional problems that affect Kirkland through regional coordination and partnerships.**
- ✓ **FG-16 Promote active citizen involvement and outreach education in development decisions and planning for Kirkland's future.**
- ✓ **FG-17 Establish development regulations that are fair and predictable.**

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## A. INTRODUCTION

Natural systems serve many essential biological, hydrological, and geological functions that significantly affect life and property in Kirkland. Features such as wetlands and streams provide habitat for fish and wildlife, flood control, and groundwater recharge, as well as surface and groundwater transport, storage, and filtering. Vegetation, too, is essential to fish and wildlife habitat, and also helps to support soil stability, prevents erosion, moderates temperature, produces oxygen, and absorbs significant amounts of water, thereby reducing runoff and flooding. Soils with healthy structure and organic content, such as those found in natural wooded areas, absorb, store, and transport water, effectively supporting vegetation, slope integrity, and reducing flooding and erosion. Clean air is essential to life. In addition to these functions, the natural environment provides many valuable amenities such as scenic landscape, community identity, open space, and opportunities for recreation, culture, and education. Kirkland's citizens recognize and often comment upon the important role the natural environment plays in the quality of life.

Maintaining these valuable natural systems within Kirkland is a crucial but complex undertaking. Effective management of the natural environment must begin with the understanding that natural features are components of systems which are, in turn, interdependent upon other natural systems that range beyond the City's borders. The Washington State Growth Management Act and Federal Endangered Species Act underscore this approach and prescribe additional requirements. Accordingly, Kirkland manages the interrelated natural systems:

- ◆ Jointly with other agencies and the affected Federally recognized tribes to ensure coordinated and consistent actions among the jurisdictions sharing an ecosystem (e.g., a watershed);
- ◆ Comprehensively, by coordinating natural systems information and practices across City departments;

- ◆ Scientifically, by applying the best available science to system-wide inventories and analyses to formulate policies and development standards to protect the functions and values of critical areas; and
- ◆ Conscientiously, to give special consideration to conservation or protection measures necessary to preserve or enhance anadromous fisheries through salmonid habitat conservation.

Additionally, Kirkland's desire and duty to protect natural resources must be balanced with the City's obligations to:

- ◆ Accommodate future growth; and
- ◆ Provide a development process that is timely, predictable, and equitable to developers and residents alike.

Success in balancing these complex and often conflicting concerns depends in large part upon the provision of extensive opportunities for public participation during the formulation of policies, programs, and regulations relating to the natural environment.

As an urban community with a considerable legacy of environmental resources, Kirkland continues its long-standing effort to balance multiple concerns. The City's natural resources include nine drainage basins – some with salmonid-bearing streams, several large wetlands, two minor lakes, and extensive shoreline on Lake Washington (see Figure NE-1). Large portions of the City contain steep slopes and mature vegetation (see Figures NE-2, NE-3, and NE-4). Future growth will generally be infill within Kirkland's well-established, compact land use pattern. Because many of the remaining sites are small and constrained by environmentally sensitive or hazardous areas, Kirkland's challenge for the future will be to accommodate infill growth while protecting and enhancing natural systems on public and private lands.

A variety of tools are needed to effectively manage the natural environment, because natural systems traverse private and public property lines as well as jurisdictional boundaries. These tools include:

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- ◆ Programs and practices used by the City to maintain land for which it is responsible, such as parks, open space, and rights-of-way;
  - ◆ Public education and involvement to cultivate a culture of stewardship;
  - ◆ Incentives to foster sound practices by Kirkland residents, businesses, and institutions;
  - ◆ Acquisition of the most ecologically valuable sites by the City when feasible; and
  - ◆ Regulations accompanied by effective enforcement.
- Of these, public involvement and education should be emphasized, due to the considerable cumulative impact of the actions and choices of individuals, institutions, and businesses in Kirkland.
- The reader may wish to refer to Kirkland’s Natural Resource Management Plan for additional discussion of issues related to the natural environment. The Natural Resource Management Plan is a reference document intended to facilitate coordinated, comprehensive management of Kirkland’s urban forest, water, earth, and air resources. The guiding principles and implementing strategies set forth in the Natural Resource Management Plan do not have the legal status of the Comprehensive Plan or development regulations. Rather, it serves as an informational resource when considering new City practices, programs, and regulations that will implement the goals and policies in the Kirkland Comprehensive Plan.
- ◆ Recognizes the importance of environmental quality and supports standards to maintain or improve it;
  - ◆ Supports comprehensive management of activities in sensitive and hazard areas through a variety of methods in order to ensure high environmental quality and to avoid risks or actual damage to life and property;
  - ◆ Promotes system-wide management of environmental resources. Supports interagency coordination among jurisdictions sharing an ecosystem;
  - ◆ Supports the acquisition of comprehensive technical data and the application of best available science for natural systems management; and
  - ◆ Acknowledges the importance of informing the public of the locations, functions, and needs of Kirkland’s natural resources.

## B. THE NATURAL ENVIRONMENT CONCEPT

The fundamental goal of the Natural Environment Element is to protect natural systems and features from the potentially negative impacts of nearby development and to protect life and property from certain environmental hazards. To accomplish this, the Element:

## C. NATURAL ENVIRONMENT GOALS AND POLICIES

**Goal NE-1: Protect natural systems and features from the potentially negative impacts of human activities, including, but not limited to, land development.**

**Goal NE-2: Manage the natural and built environments to achieve no net loss of the functions and values of each drainage basin; and, where possible, to enhance and restore functions, values, and features. Retain lakes, ponds, wetlands, and streams and their corridors substantially in their natural condition.**

**Goal NE-3: Manage the natural and built environments to protect and, where possible, to enhance and restore vegetation.**

**Goal NE-4: Manage the natural and built environment to maintain or improve soils/geologic resources and to minimize risk to life and property.**

**Goal NE-5: Improve air quality and reduce Kirkland’s contribution to climate change.**

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## MANAGING THE NATURAL ENVIRONMENT

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***Goal NE-1: Protect natural systems and features from the potentially negative impacts of human activities, including, but not limited to, land development.***

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***Policy NE-1.1: Use a system-wide approach to effectively manage environmental resources. Coordinate land use planning and management of natural systems with affected State, regional, and local agencies as well as affected federally recognized tribes.***

Environmental resources – such as streams, soils, and trees – are not isolated features, but rather components of ecosystems that go beyond a development site and, indeed, beyond our City boundaries. Therefore, a system-wide approach is necessary for effective management of environmental resources. Also, recognition of the interdependence of one type of natural system upon another is essential. An example of this is the relationship between the shoreline and Lake Washington. For this reason, a comprehensive approach to the management of natural resources is most effective.

Responsibility for management of these ecosystems falls to many agencies at many levels of government, including King County, State resource agencies, and watershed planning bodies. Kirkland and its planning area lie within the Usual and Accustomed Treaty Area of the Muckleshoot Indian Tribe. Joint coordination and planning with all affected agencies is appropriate to ensure consistent actions among the jurisdictions sharing an ecosystem.

***Policy NE-1.2: Concentrate efforts in areas that will yield the greatest benefits.***

City projects, programs, practices, and regulations related to the natural environment should be focused to yield maximum ecological benefit for the time and money involved. Application of this policy will involve selecting the most effective management tool for a desired outcome (see Policy NE-1.3), allocating

staff and financial resources for greatest results, and determining which natural features are most important to protect or restore.

***Policy NE-1.3: Use a variety of techniques to manage activities affecting air, vegetation, water, and the land to maintain or improve environmental quality, to preserve fish and wildlife habitat, to prevent degradation or loss of natural features and functions, and to minimize risks to life and property.***

The systems and features of the natural environment are considered to be community assets that significantly affect the quality of life in Kirkland. In public rights-of-way, City parks, and on other City-owned land, current technology, knowledge, and industry standards should be proactively used to practice and model sound stewardship practices. For resources on private property, the City should use a combination of public education and involvement, acquisition of prime natural resource areas, and incentives to promote stewardship, as well as regulations combined with effective enforcement.

Because of the many problems caused by adverse impacts to natural vegetation, water, or soils/geologic systems, developers should provide site-specific environmental information to identify possible on- and off-site methods for mitigating impacts. The City should be indemnified from damages resulting from development in sensitive or hazard areas, and land surface modification of undeveloped property should be prohibited unless a development application has been approved. Protective measures should also include techniques to ensure perpetual preservation of sensitive areas and their buffers, as well as certain hazard areas.

***Policy NE-1.4: Proactively pursue restoration or enhancement of the natural environment. In addition, require site restoration if land surface modification violates adopted policy or development does not ensue within a reasonable period of time.***

The City should look for and act upon opportunities to restore or enhance natural features and systems wherever significant environmental benefits will be realized cost-effectively. Too, land surface modifications

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that violate the intent of the Goals and Policies should be corrected through site restoration. Developers and property owners should be required to restore the affected sites to a state which approximates the conditions that existed prior to the unwarranted modification. At the very least, developers should be required to restore the site to a safe condition and revegetate areas where vegetation has been removed.

***Policy NE-1.5: Provide to all stakeholders information concerning natural systems and associated programs and regulations. Work toward creating a culture of stewardship by fostering programs that support sound practices, such as low impact development and sustainable building techniques. Model good stewardship techniques in managing trees, streams, wetlands, shorelines and other natural features and systems in the public realm.***

By sharing information the City can better serve the interests of both the environment and people. In order to provide a degree of consumer awareness, the City should make available information which is based on current knowledge, technology, and appropriate standards and practices, as well as data regarding known natural resources and potential natural hazards.

Kirkland can promote public environmental awareness and stewardship of sensitive lands in a variety of ways. The City can provide resources and incentives to assist the public in adopting practices that benefit rather than harm natural systems. For example, the City should work with residents, businesses, builders, and the development community to promote low impact development and sustainable building practices. These practices can lower construction and maintenance costs and enhance human health, as well as benefit the environment.

The City should promote and model these practices and others, including purchasing energy efficient and renewable technology products and services whenever feasible, by maintaining model sensitive area buffers, using current arboricultural techniques for public trees, using and eventually certifying new public facilities through programs fostering sustainable building practices, and by linking Kirkland stakehold-

ers to information sources and programs for notable trees, neighborhood planting events, backyard wildlife, and streamside living.

The City can also increase awareness by allowing access where appropriate to sensitive areas for scientific and recreational use while protecting natural systems from disruption. Careful planning of access trails and the installation of environmental markers and interpretive signs can allow public enjoyment of lakes, streams, or wetlands and increase public awareness of the locations, functions and needs of sensitive areas. In the case of large scale projects on sensitive sites, the City can require developers to provide additional materials, such as brochures, to inform owners and occupants of the harmful or helpful consequences of their actions in or near sensitive areas and buffers.

***Policy NE-1.6: Encourage sustainable building and low impact development practices in public and private development.***

Low impact development (LID) techniques minimize surface water runoff by reducing impervious surface and by using landscaping and permeable materials or retaining mature vegetation to absorb water close to the source. LID strives to mimic nature by minimizing impervious surface, infiltrating surface water through bio-filtration and bio-retention facilities, retaining contiguous forested areas and maintaining the character of the natural hydrologic cycle. Sustainable or green building practices cover all aspects of development, including site preparation and layout, material selection and building construction, deconstruction of existing buildings, and operation and maintenance.

Utilizing these practices has many benefits: construction and maintenance costs are lowered; water quality is improved; surface water runoff is reduced and treated; stream and fish habitat impacts are lessened; native trees and other vegetation are preserved; and recycled materials are used. Some examples of the practices include integrated building and site design, vegetated roofs, reduced impervious surface, reused waste water for irrigation, alternative heating and cooling systems, and recycled building materials and

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landscaping used to reduce heat emissions and to treat surface runoff. The practices may evolve over time as the market, science and technology change.

The City recognizes that modeling sustainable building practices in the construction of public facilities will set the tone for private development to reduce waste, preserve resources and increase energy efficiency. The City should strive to create a green building program that initially incorporates green building construction into new or renovated City facilities, with the goal of eventually requiring certification through the LEED, BUILT GREEN, or other programs fostering sustainable building practices. The City should also provide incentives and standards for private development to utilize green building practices. Incentives could include priority permit processing for certified green building projects. Increased public awareness of sustainable building practices can be accomplished with educational materials, outreach to building professionals and citizens, and with public displays designed to explain the various facets of low impact development and green building construction.

***Policy NE-1.7: Encourage reduction, reuse, and recycling in order to reduce the waste stream and save energy.***

Development actions to salvage, reuse and/or recycle building construction materials should be promoted and encouraged. This includes not only new construction but deconstruction of existing buildings.

***Policy NE-1.8: Strive to minimize human impacts on habitat areas.***

The presence and activities of humans can impact habitat in a variety of ways. City policies and regulations strive to ensure that those impacts are avoided, if possible, or at least mitigated. In addition to physical alterations of natural resources, less obvious impacts, such as those from noise and light, should be minimized.

### NATURAL WATER SYSTEMS

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***Goal NE-2: Manage the natural and built environments to achieve no net loss of the functions and values of each drainage basin; and, where possible, to enhance and restore functions, values, and features. Retain lakes, ponds, wetlands, and streams and their corridors substantially in their natural condition.***

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***Policy NE-2.1: Using a watershed-based approach, apply best available science in formulating regulations, incentives, and programs to maintain and, to the degree possible, improve the quality of Kirkland's water resources.***

*Kirkland's Streams, Wetlands, and Wildlife Study* (July, 1998) is a natural resource inventory of wetlands, streams, fish, wildlife, and habitat areas within Kirkland. A drainage basin or watershed approach was used to identify Kirkland's drainage systems, to determine primary and secondary basins, and to evaluate and record the primary functions, existing problems and future opportunities for each drainage basin. This data and analysis forms a scientific basis for system-wide resource management that addresses the distinct characteristics of each basin. The inventory was updated in 2003 with the production of the Natural Resource Management Plan. Figure NE-1 indicates general locations of known sensitive areas and drainage basin boundaries. This study is supplemented by technical information from the Water Resource Inventory Area (WRIA) 8 salmon conservation planning effort and the City's *Surface Water Master Plan*.

***Policy NE-2.2: Protect surface water functions by preserving and enhancing natural drainage systems wherever possible.***

Urban development, through addition of impervious surface and removal of vegetation, increases the volume and rate and decreases the quality of stormwater runoff. This often results in flooding that threatens safety and property, and results in damage to the aquatic environment. Water quality is reduced when

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flooding causes erosion, and when water is not filtered through soils and vegetation prior to entering streams and lakes. Steps to limit this damage include:

- ◆ Minimize creation of new impervious surfaces;
- ◆ Maximize use of soils and vegetation in slowing and filtering runoff;
- ◆ Install structural flow control facilities at new or redeveloping sites where appropriate to mimic the predevelopment hydrologic regime;
- ◆ Prohibit nonessential development activity in and around watercourses. Preserve the natural drainage system to the greatest extent feasible and prohibit nonessential structures, land modifications, or impervious surfaces in the drainage system to assist in ensuring unimpeded flow, maximal stream storage capacity, and optimal natural functioning within the drainage area; and
- ◆ Implement programs and projects to remedy flooding and habitat destruction caused by uncontrolled flows from past development. Using a basin planning process and a watershed perspective, identify projects and programs to reduce flood frequency, address/prevent erosion problems, and restore/enhance fish habitat.

Specific information on the technical and programmatic aspects of surface water management is contained in the City's *Surface Water Master Plan*.

***Policy NE-2.3: Comprehensively manage activities that may adversely impact surface and ground water quality or quantity.***

Increases in impervious surface resulting from development result in decreases in ground water recharge. This, in turn, results in a decline in baseflows and subsequent loss of habitat that impacts fish and wildlife populations.

Urban runoff often contains pollutants such as gasoline, oil, sediment, heavy metals, herbicides, and other contaminants. These materials degrade the quality of water in our streams and lakes. Steps to limit contamination include:

- ◆ Prohibit the dumping of refuse or pollutants in or next to any open watercourse or wetlands or into the storm drainage system. Dumped refuse and pollutants can contaminate surface and subsurface water and can physically block stream flows;
- ◆ Provide education to businesses and residents about the role that each individual plays in maintaining and improving water quality. It is much easier and cheaper to control pollution at its source than it is to clean polluted stormwater. Demonstrate ways that each person can control pollution at its source;
- ◆ Require projects to provide water quality treatment facilities if they propose to alter or increase significant quantities of impervious surface that generate pollution; and
- ◆ Preserve and enhance sensitive area buffers to maximize natural filtration of contaminants. Pursue opportunities to improve buffer viability by improving maintenance of buffer vegetation.

***Policy NE-2.4: Improve management of stormwater runoff from impervious surfaces by employing low impact development practices where feasible through City projects, incentive programs, and development standards.***

As land is developed, the loss of vegetation, the compaction of soils, and the transformation of land to impervious surface all combine to cause stormwater runoff to degrade many streams, wetlands and associated habitat; to increase flooding, and to make many properties wetter. Low impact development practices minimize impervious surfaces, and use vegetated and/or pervious areas to treat and infiltrate stormwater. Such practices can include incentives or standards for landscaped rain gardens, permeable pavement, narrower roads, vegetated rooftops, rain barrels, impervious surface restrictions, downspout disconnection programs, "green" buildings, street edge alternatives and good soil management.

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***Policy NE-2.5: Preserve the natural flood storage function of 100-year floodplains. emphasize nonstructural methods in planning for flood prevention and damage reduction.***

Floodplains are lands adjacent to lakes, rivers, and streams that are subject to periodic flooding. Floodplains naturally store flood water, protect water quality, and provide recreation and wildlife habitat. New development or land modification in 100-year floodplains should be designed to maintain natural flood storage functions and minimize hazards to life and property (see Figure NE-1).

***Policy NE-2.6: Regulate development of land along the shoreline of Lake Washington to:***

- ◆ ***Preserve natural systems and maintain and improve the ecological functions of the water and shorelines;***
- ◆ ***Avoid natural hazards;***
- ◆ ***Promote visual and physical access to the water;***
- ◆ ***Provide recreational opportunities;***
- ◆ ***Preserve navigation rights; and***
- ◆ ***Minimize the creation of and reduce existing armored shorelines, overwater and in water structures.***

The Lake Washington shoreline plays a vital role in the ecology of our watershed (which includes land that drains into Lake Washington, the Cedar River, and Lake Sammamish). All species of anadromous salmonids in our watershed migrate through and rear in Lake Washington. The decline of salmonid populations in Lake Washington has been linked to the following factors: vegetation modification and removal, shoreline armoring, overwater and in water structures, storm water runoff and introduction of pollutants. Establishing regulations that avoid, minimize and mitigate impacts to the shoreline and restore degraded ecological functions will substantially aid salmon recovery efforts in our watershed.

Kirkland's Shoreline Master Program (SMP) was adopted pursuant to the Washington State Shoreline Management Act of 1971. It designates all parcels within 200 feet of Lake Washington and associated wetlands as shoreline environments. The SMP goals and policies are contained in the Shoreline Area Chapter of the Comprehensive Plan. Detailed shoreline management regulations in the Kirkland Zoning Code implement these policies. Pursuant to Washington State requirements, the 2010 update of the Kirkland Shoreline Master Program reflects current best management practices. The Shoreline Restoration Plan, a component of the SMP, identifies and prioritizes public restoration projects that are in the Parks Capital Improvement Program. In addition, it lists other public actions and programs and private restoration projects that should be undertaken over a 20-year period.

***Policy NE-2.7: Support regional watershed conservation efforts.***

The federal listing of Puget Sound wild Chinook salmon as a threatened species in 1999 has focused attention on salmon. In addition to the economic, recreational, and cultural value of salmon, they are also a widely accepted indicator of the level of our region's environmental health, because their survival requires that they migrate throughout the watershed – from freshwater headwaters to the marine environment and back again. The decline of salmon points to the need to improve the quality of habitat in the watersheds that drain to Puget Sound.

In the Lake Washington/Cedar River/Lake Sammamish Watershed, Kirkland joined with 26 other local jurisdictions to fund a joint effort to conserve salmon habitat in the shared watershed. The resulting watershed conservation plan, The Lake Washington/Cedar River/Lake Sammamish Watershed (WRIA 8) Chinook Salmon Conservation Plan, was developed through a multi-jurisdictional, multi-stakeholder process with a scientific basis, and was approved by Kirkland in 2005.

Incorporated into the Puget Sound Salmon Recovery Plan, approved by NOAA in 2007, it is implemented by the participating local governments in the watershed as they update their policies, regulations, and

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programs (e.g., capital facilities and road management practices) for critical areas, shorelines, drainage, and clearing/grading to be consistent with the conservation plan. It seeks to provide a Puget Sound-wide conservation plan for a coordinated approach to restoring the wild Chinook salmon of Puget Sound. Kirkland's role in salmon recovery is to protect and restore habitat within the City limits through land use and stream restoration actions, and to participate in regional recovery efforts through the WRIA 8 Salmon Recovery Council.

### VEGETATION

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***Goal NE-3: Manage the natural and built environments to protect and, where possible, to enhance and restore vegetation.***

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***Policy NE-3.1: Work toward increasing Kirkland's tree cover to 40 percent.***

In 2003, Kirkland's overall tree cover was estimated to be 32 percent (see Figure NE-4: Tree Canopy). Significant improvements in storm water management and air quality could be realized if the average tree cover were to be increased to 40 percent<sup>1</sup>. To approach measurable economic and ecologic benefits, Kirkland's regulations, programs, and public outreach should aim toward increasing the City's tree canopy long term, to the extent feasible when balancing other City goals. In order to track progress, it will be important to complete, then monitor and maintain the inventory of public trees, as well as to periodically assess the canopy Citywide. As land develops, care should be taken to preserve and protect trees and other natural resources of value whenever feasible.

***Policy NE-3.2: Preserve healthy mature native vegetation whenever feasible.***

Healthy mature native vegetation contributes numerous ecological benefits to the community, including oxygen production, provision of fish and wildlife hab-

itat, filtration of stormwater runoff, erosion reduction, hillside and stream bank stabilization, moderation of temperature, interception of rainfall that would otherwise become surface runoff, and scenic beauty. Of special importance are significant stands of native evergreen trees and sensitive area buffers appropriately vegetated with native plants. Needless removal or destruction of such vegetation should not be allowed. In cases where development necessitates plant removal, every effort should be made to expeditiously replant equivalent and appropriate vegetation.

Preservation of native vegetation requires that noxious and invasive plant species in the native landscape and in environmentally sensitive areas and their buffers be effectively managed. Otherwise, non-native monoculture displaces the diverse habitat necessary to nourish, protect, and support native fish and wildlife. The City should work toward ensuring that noxious and invasive plant species are controlled on public and private property.

***Policy NE-3.3: Ensure that regulations, incentives, and programs maximize the potential benefits of landscaping.***

Trees and plants contribute to an overall sense of community and can bring aesthetic, environmental, and economic benefits. Besides the obvious advantages of adding summer shade, seasonal color, texture, and human scale, certain plants may be used to screen adjacent land uses and activities, define views, and unify and organize disparate site elements. Plants can play a significant role in modifying the climate of the immediate vicinity and moderating daily temperatures. They improve air quality by absorbing pollutants, thereby reducing unpleasant odors and filtering impurities. Foliage can reduce reflection or glare from the sun, street lights or vehicle lights, making an area more hospitable and safe. Too, dense foliage can absorb and disperse sound energy. Economic benefits can be realized through energy savings by arranging plants around buildings for an insulating effect from extreme temperatures and to deflect wind, and by attracting customers by increasing visual appeal. The City's landscaping requirements should be updated to maximize potential benefits and to reflect current knowledge, technology, and industry standards.

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1. Regional Ecosystem Analysis: Puget Sound Metropolitan Area – Calculating the Value of Nature, 1998, by American Forests, [www.americanforests.org](http://www.americanforests.org).

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## SOILS AND GEOLOGY

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***Goal NE-4: Manage the natural and built environment to maintain or improve soils/geologic resources and to minimize risk to life and property.***

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***Policy NE-4.1: Introduce standards and programs to promote sound soil management practices.***

Healthy soil provides nutrients to support vegetation, habitat for subsurface organisms, and it absorbs, cleans, stores, and conveys water, thereby improving water quality and moderating water quantity. Mismanagement or neglect of soil can result in increased flooding, loss of vegetation, sedimentation of watercourses, erosion, and landslides – all of which degrade habitat for humans as well as for other species. Although the City has standards to address soil erosion, additional standards and programs are needed so that valuable topsoil will be conserved and reused and soil for required plantings will be amended as appropriate.

***Policy NE-4.2: Consider updating policies and regulations for geologic hazard areas in light of the new watershed conservation plan, once it has been completed.***

For many years, Kirkland has regulated and mapped geologic hazard areas (see Figure NE-2), based on available geologic and soils information. Landslides are highly probable in some steep slope areas, regardless of development activity. These areas have been designated as “unstable slopes.” Landslides may be triggered by grading operations, land clearing, irrigation, or the load characteristics of buildings on hillsides. Damage resulting from landslides may include loss of life and property, disruptions to utility systems, or blockage of transportation corridors. For these reasons, development is regulated where landslides are likely. In some cases, regulation may result in severe limitations to the scale and placement of development, and land surface modification should be limited to the smallest modification necessary for reasonable site development.

According to recent earthquake hazard evaluation studies of the Puget Sound area, possible damage to structures on some unstable slopes or wetland areas can be caused by low-intensity tremors. This is especially true when hillsides composed of clay and/or organic materials are saturated with water. Slopes with grades of 15 percent or steeper are also subject to seismic hazards. Low-intensity earth tremors could cause liquefaction and damage development in wetland areas composed of organic or alluvial materials. In hillside and wetland areas described above, structures and supporting facilities need to be regulated and designed to minimize hazards associated with earthquakes.

The watershed conservation planning effort discussed in Policy NE-2.7 is expected to produce recommendations for managing geologic hazard areas based on newly available scientific studies specific to our watershed. Kirkland’s programs and regulations relating to geologic hazard areas, clearing and grading, vegetation, and critical areas should be evaluated and possibly updated to achieve consistency with the watershed conservation plan, once it has been completed.

***Policy NE-4.3: Retain vegetation where needed to stabilize slopes.***

Significant vegetation as cover on hazard slopes can be important, because plants intercept precipitation reducing peak flow, runoff, and erosion; which all can impact water quality and slope stabilization. Vegetated ravines also provide habitat linkages for wildlife. Avoiding disturbance of steep slopes and their vegetative cover should be a high priority for the City. An increased effort to establish Natural Growth Protection Easements in such areas will be key.

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### AIR

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#### ***Goal NE-5: Improve air quality and reduce Kirkland's contribution to climate change.***

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The surrounding air, both outdoors, and indoors, has the potential to affect human health. It is important to maintain the quality of outdoor air since all life forms depend on it, and the quality of indoor air is dependent on that of the outdoors. Although all Washington counties currently meet federal health standards for air pollution, it is necessary to remain vigilant. Air pollution that includes greenhouse gases also contributes to climate change or global warming.

The largest source of air pollution in Kirkland is motor vehicle use. Kirkland should continue to adopt and promote smart transportation and land use choices as part of a strategy to reduce air pollution and slow climate change. The Kirkland community also contributes to air pollution and greenhouse gas emissions through energy consumption and landfilled waste, among other things.

A comprehensive approach, including transportation and land use strategies, waste reduction, urban forest preservation, protection, and enhancement, purchasing decisions, and public outreach, is necessary to reduce Kirkland's contribution to air pollution and climate change.

#### ***Policy NE-5.1: Continue and enhance current actions to improve air quality and reduce greenhouse gas emissions.***

The City pursues several actions to help reduce vehicle emissions to improve regional air quality and address climate change. First, great care has been taken to provide a pedestrian friendly environment in Kirkland. In 1995, adoption of the Non-Motorized Transportation Plan (now referred to as the Active Transportation Plan), provided additional guidance for a systematic enhancement of a network of pedestrian and bicycle facilities linking important destinations both inside and outside the City. Second, Kirkland works to implement the State Commute Trip Reduction Law through a transportation management

program. The program includes providing incentives to City employees to walk, bike, use transit, and ride-share to work, and the City coordinates with regional agencies to assist Kirkland employers in meeting their Single Occupancy Vehicle (SOV) trip reduction and vehicle miles traveled (VMT) targets. Third, many City vehicles utilize an alternative fuel to reduce pollution and boost fuel efficiency. Fourth, the City implements the Electric Vehicle Infrastructure (EVI) Act (RCW 43.31.970) through its development regulations and installation provisions. The regulations allow EVI to be located in all appropriate locations in the City and to consider incentive programs, to encourage the retrofitting of existing structures with EVI. In addition, for the many important functions trees serve, including improving air quality, the City supports street tree planting throughout the city and retention of existing trees on private property. Too, Kirkland is at the forefront in the area of waste reduction. The City is focusing on environmental outreach and development of new programs to reduce waste through reduction and recycling in both the residential and business communities. Finally, the City strives to purchase energy efficient and renewable technology products and services whenever feasible.

#### ***Policy NE-5.2: Inventory global warming emissions in City operations and in the community, set reduction targets and create an action plan.***

Climate disruption is an urgent threat to the environmental and economic health of our communities. With less than five percent of the world's population, the United States produces more than 25 percent of the global greenhouse gas emissions, and those emissions are continuing to grow. There is a broad scientific consensus that carbon dioxide (CO<sub>2</sub>) and other greenhouse gases released into the atmosphere have a profound effect on the Earth's climate and there is clear evidence of human influences on climate due to changes in greenhouse gases. Local government actions taken to reduce greenhouse gas emissions and increase energy efficiency provide multiple local benefits by decreasing air pollution, creating jobs, reducing energy expenditures, and saving money. Seattle, along with a growing number of other U.S. cities, is leading the way by committing to the *U.S. Mayors*

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## V. NATURAL ENVIRONMENT

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*Climate Protection Agreement.* On May 17, 2005, the Kirkland City Council signed a resolution endorsing the *U.S. Mayors Climate Protection Agreement*.

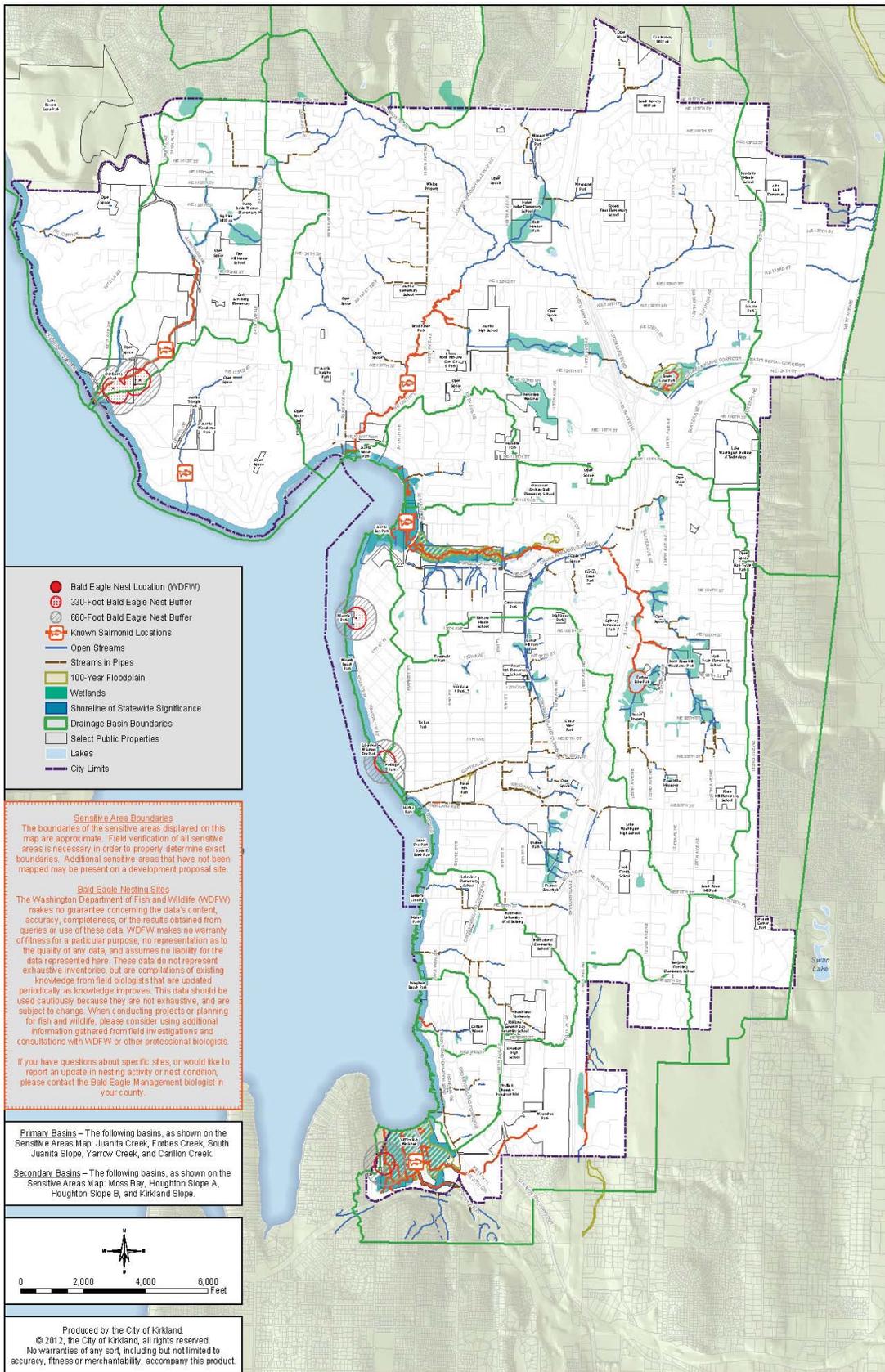
The City is pursuing five milestones to reduce greenhouse gas emissions in City operations and throughout the community:

1. Conduct a greenhouse gas emissions inventory and forecast to determine the source and quantity of greenhouse gas emissions in the City;
2. Establish a greenhouse gas emissions reduction target;
3. Develop an action plan with both existing and future actions which, when implemented, will meet the local greenhouse gas reduction target;
4. Implement the action plan; and
5. Monitor and report progress.

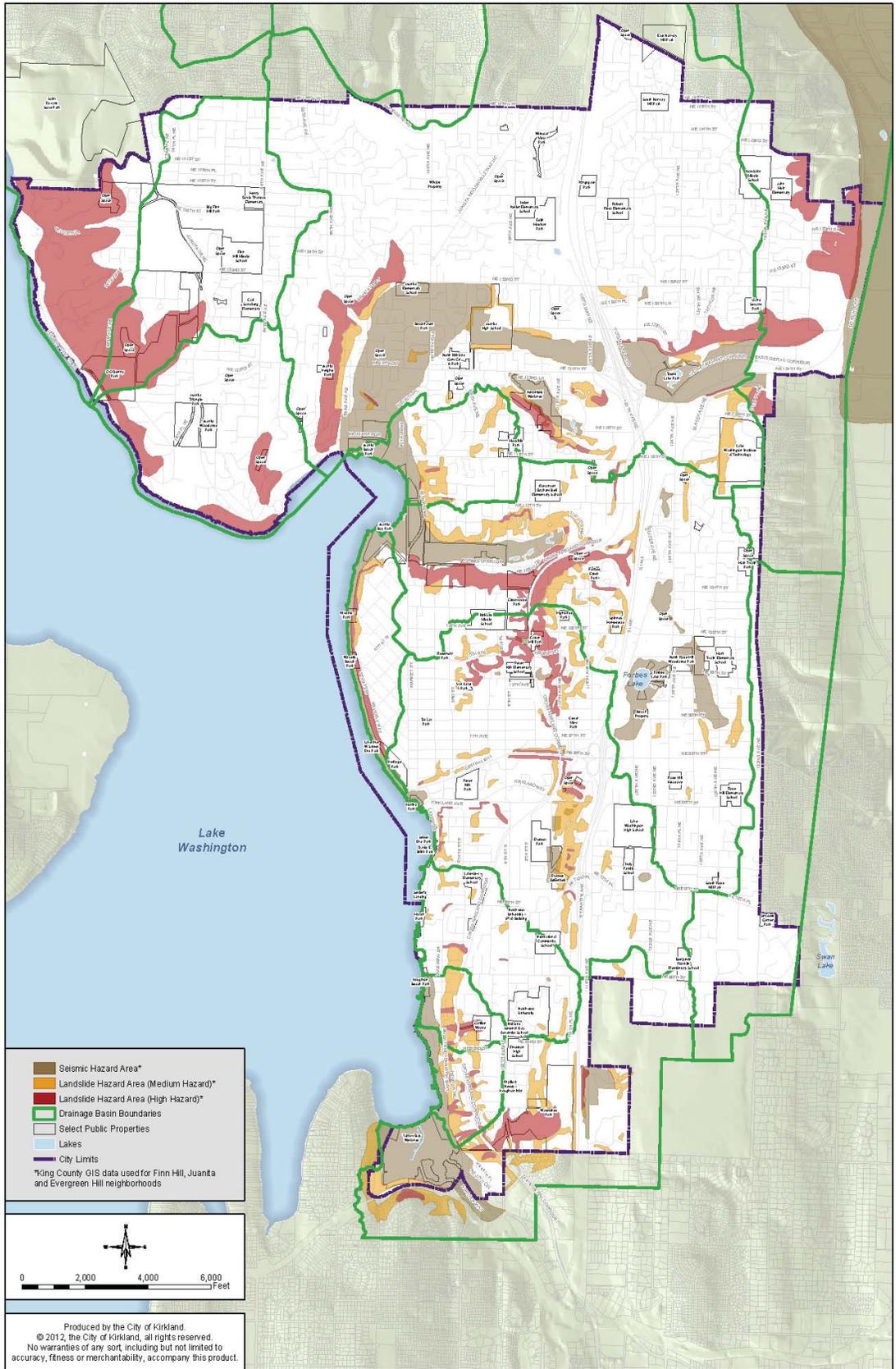
The Kirkland Council by resolution committed to the following greenhouse gas reduction targets for the Kirkland community and governmental operations:

- ◆ Interim: 10% below 2005 levels by 2012
- ◆ Primary: 20% below 2005 levels by 2020
- ◆ Long-term: 80% below 2007 levels by 2050

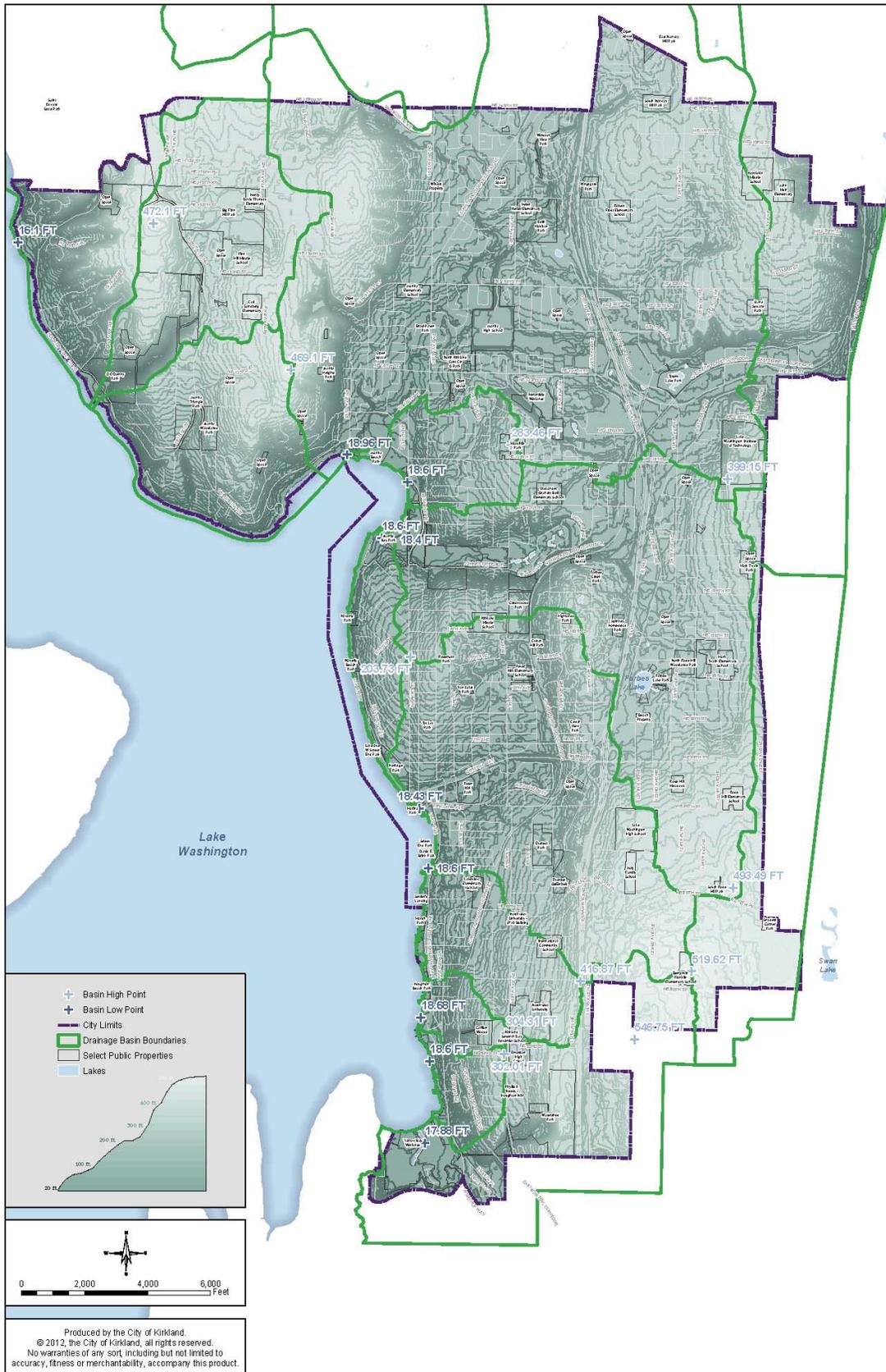
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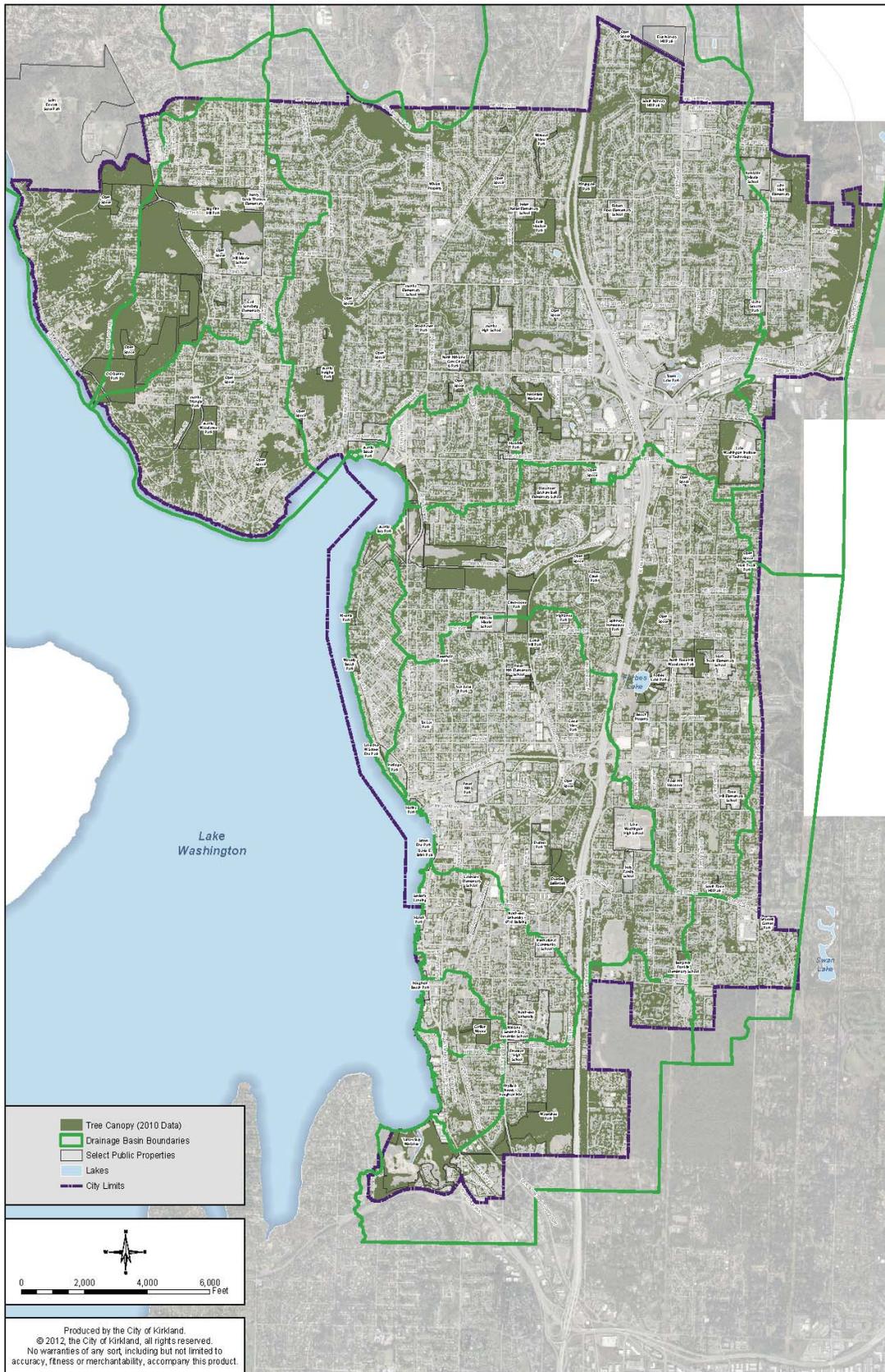
**Figure NE-1: Sensitive Areas**



**Figure NE-2: Landslide and Seismic Hazard Areas**



**Figure NE-3: Topography**



**Figure NE-4: Tree Canopy**