CITY OF BLACK DIAMOND

March 8, 2016 Special Joint Meeting Agenda
City Council and Planning Commission
25510 Lawson St., Black Diamond, Washington

6:15 P.M. – CALL TO ORDER, FLAG SALUTE, ROLL CALL

WORK SESSION -

1. City's Comprehensive Plan Update
    a. Public Participation Recap
    b. Summary of Revisions from February 9th Joint Meeting
    c. Review of Natural Resources Element
    d. Public Comment

ADJOURNMENT:

NATURAL ENVIRONMENT ELEMENT

4.1 Introduction

This Natural Environment chapter is the framework for protecting the natural resources of the City. Black Diamond has an abundance of natural resources. The forests and fields, lakes, streams and natural drainage systems provide rich habitat for fish and wildlife unlike any other city in King County. The City's extensive natural beauty and intricate ecosystems form the basis of our natural resource and open space network that is integral to enjoying a high quality of life.

4.2 Sensitive Areas

Washington's Growth Management Act (GMA) requires cities and counties to designate critical (or sensitive) areas, which GMA defines as wetlands; critical aquifer recharge areas; fish and wildlife habitat conservation areas; frequently flooded areas; and geologically hazardous areas. According to GMA, critical areas must be protected using the "best available science" for designating, preserving, and mitigating for impacts when critical areas are affected by development.

The goals and policies in this chapter provide for the protection, preservation, and maintenance of sensitive areas to provide open space for the enjoyment of City residents; furnish habitat for fish, wildlife, flora and fauna; improve water quality; and reduce the risk to residents of flooding and geologic hazards. The City's sensitive areas ordinance (Black Diamond Municipal Code Chapter 19.10) regulates land use and development consistent with this Chapter.

4.2.1 General Sensitive Areas Policies.

Goal Designate and protect the City's sensitive areas.

Policy NE-1: Use best available science to preserve and enhance the functions and values of sensitive areas through policies, regulation programs, and incentives.

Policy NE-2: Initiate a stewardship program to encourage private landowners to manage their land in ways that support the preservation of sensitive areas. This program would seek to acquire long-term commitments of private landowners to the conservation of sensitive areas.

Policy NE-3: Encourage the use of creative and appropriate site design and housing types to balance environmental protection and achievable density.

Policy NE-4: Encourage clustering and density transfers for both commercial and residential development to help retain significant natural features and sensitive areas as open space.

Policy NE-5: Coordinate with adjacent jurisdictions and tribes to identify, protect, and develop enhancement plans and actions for habitat networks and wetlands that cross jurisdictional lines.

4.2.2 Wetlands Policies

Wetlands are areas that are inundated through ground or surface waters, either permanently or seasonally, such that they are able to support vegetation typically adapted to saturated soils. Wetlands perform many ecological functions, including flood control, reductions of erosion and siltation, water storage, groundwater recharge, water quality maintenance, nutrient absorption, and supplying fish and wildlife habitat. Additionally, wetlands provide opportunities for open space enjoyment, research and scientific study, and outdoor education, and are economic resources for hunting, fishing, and recreation.

Goal Protect wetlands as ecosystems, and essential elements of watersheds.

Policy NE-6: Conserve areas of native vegetation that connect wetland systems, through incentives and non-regulatory means.

Policy NE-7: Ensure wetlands are able to fulfill their natural functions as recipients of floodwaters and as habitat for wildlife through the critical areas ordinance.

4.2.3 Fish and Wildlife Conservation Area Policies

Fish and wildlife habitat conservation areas are lands meant for maintaining populations of species in suitable habitats within their natural geographic distribution so that the habitat available is sufficient to support viable populations over the long term. Fish and wildlife areas are fundamental to the quality of life of the Black Diamond community. Healthy systems that sustain fish and wildlife habitat provide ecosystem services that include clean and abundant water, protection from flooding and climate extremes, and recreational opportunities, and are sources of aesthetic and educational values.

Goal Promote preservation of fish and wildlife habitats.

Policy NE-8: Avoid disturbance to valuable fish and wildlife habitat through the proper location, design, construction, and management of new development.

Policy NE-9: Minimize disruption of areas in current use by endangered wildlife species or by unique wildlife populations.

Policy NE-10: Protect and preserve habitats for species which have been identified as endangered, threatened, or sensitive by the State or federal government.

Policy NE-11: Implement salmon habitat protection and restoration priorities identified in the Water Resource Inventory Area 09 plans.

Policy NE-12: Minimize habitat fragmentation by linking wildlife habitats via corridors. Connect wildlife habitats with each other within the City and the region to achieve a continuous network.

Policy NE-13: Coordinate land use planning and management of fish and wildlife resources with adjacent jurisdictions and Tribes.

Policy NE-14: Maintain a long-term management strategy to prevent the spread of noxious weeds, and manage these weeds where they are present in the City.

Policy NE-15: Implement the Shoreline Master Program Restoration Plan.

4.2.4 Geologically Hazardous Areas Policies

The City of Black Diamond contains areas that are susceptible to the geologic hazards of erosion, sliding, earthquakes, or other geologic events such as differential settlement. In addition, portions of the Black Diamond area are subject to the hazards caused by geological events to areas of coal extraction, known as coal mine hazards. All of these types of hazards pose a threat to health and safety of the Black Diamond community when incompatible development is sited in areas of significant hazards.

Goal Avoid and/or minimize potential impacts to life and property from geologic hazards such that the site is rendered as safe as one not containing such hazard.

Policy NE-16: Permit development in geologic hazard areas where it can be demonstrated that conditions can be stabilized through engineering or structural solutions.

Policy NE-17: Minimize areas of vegetation loss and grading disturbance to protect water quality and prevent erosion, when developing on moderate and highly erodible soils.

4.2.5 Critical Aquifer Recharge Areas Policies

The City is located within the South King County groundwater management area. The groundwater management plan for South King County identifies the western and northwestern portions of the City as having the potential to serve as aquifer recharge areas but offer little contaminant removal ability, leaving groundwater susceptible to contamination. The King County Comprehensive Plan mapped these areas as “Areas Highly Susceptible to Ground Water Contamination” (Figure 4-6). As shown on the figure, the map is intended for informational purposes only and is not specific enough to be integrated into City regulations.

Goal Protect the quality and quantity of groundwater used for public water supplies.

Policy NE-18: Encourage the reduction of the use of pesticides and chemical fertilizers to the extent feasible and identify alternatives that minimize risk to human health and the environment.

Policy NE-19: Reduce the rate of expansion of impervious surface in the City.

Policy NE-20: Improve programs and management strategies designed to prevent and reduce contamination of street runoff and other sources of stormwater.

4.2.6 Frequently Flooded Areas Policies

Frequently flooded areas are floodplains and other areas that are subject to flooding. They typically include areas within the 100-year floodplain, which is designated by the Federal Emergency Management Agency (FEMA). Frequently flooded areas are generally flat and low-lying and are adjacent to rivers or streams that flood during storm events. These areas perform important hydrologic functions and may present a risk to persons and property from the movement of large volumes of water and debris downstream during storm events.

Goal Reduce flood related financial and public safety impacts

Policy NE-21: Minimize the alteration of natural surface water features that retain or carry floodwaters and prevent land alterations that would increase potential flooding.

Policy NE-22: Seek to meet regulatory standards for floodplain development as these standards are updated for consistency with relevant federal requirements including those related to the Endangered Species Act.

4.3 Climate Change

Goal Recognize the value of ongoing preparation and planning climate change impacts

Policy NE-23. Reduce greenhouse gases through energy conservation and a reduction in vehicle emissions.

Policy NE-24. Encourage the innovation of renewable energy resources.

Policy NE-25. Promote energy consumption and maximize energy efficiency with programs and educational initiatives aimed to “reduce, re-use, and recycle” at individual and community-wide levels.

Policy NE-26. Support the use of renewable resources and improvements in energy efficiency for new and existing development.

4.4 Air Quality

Because of its geographic and climatic characteristics, the City experiences prevailing winds, long summer days, and temperatures higher than those experienced in coastal areas of King County. Although there are no air quality monitoring stations in the planning area, southeast King County has a higher concentration of ozone pollution than the rest of the county.

Goal Identify and reduce or eliminate sources of air pollution

Policy NE-27: Adopt local land use planning and development control procedures designed to avoid and mitigate adverse cumulative air quality impacts prior to project approval and construction.

Policy NE-28: Discourage using wood as a source of heat for residential development in low-lying areas susceptible to pollution accumulations.

Policy NE-29: Conform to the federal and state clean air acts.

4.5 Water Quality

The City's policies regarding water quality recognize the importance of groundwater as a resource and a critical source of drinking water, especially in rural areas. Groundwater is also used for industrial purposes, to generate power, and to irrigate farmland. A finite amount of precipitation is available to replenish local water resources and most of this occurs during the fall and winter. The precipitation that reaches the ground replenishes groundwater and provides base flow for streams, wetlands, and rivers during the dry months of spring and summer. The base flows sustain fish, wildlife, and their habitats, and recreational values.

Goal Ensure the long term protection of the quality and quantity of groundwater resources within the City.

Policy NE-30: The City recognizes the need for aquifer protection and will continue to coordinate planning efforts with King County in maintaining the management plan for South King County ground water through the South King County Ground Water Advisory Committee.

Policy NE-31: Adopt stormwater regulations consistent with Ecology's Surface Water Management Manual for Western Washington (2012 or as revised).

Policy NE-32: Require the installation of temporary erosion control measures before construction begins and, after the completion of construction, their maintenance through the stabilization of the site to control the quantity of sediment entering surface water.

Policy NE-33: The City should encourage low impact development approaches for managing stormwater to protect water quality by controlling pollutants and minimizing flooding and erosion.

4.6 Native Vegetation

The City's native vegetation policies address the value of protecting native vegetation and enhancing Black Diamond by planting native vegetation. It helps stabilize the environment's ecological balance by helping to cool and purify the air, generating oxygen, absorbing carbon, slowing and absorbing stormwater runoff, stabilizing slopes,

reducing erosion, masking noise, containing glare, and conserving energy. Native vegetation enhances the community's appearance, identity, and natural beauty while providing habitat for fish and wildlife.

Along waterways, wetlands and lakes, native vegetation provides many important functions: it shades the water, thus reducing its temperature in the summer, and it slows stormwater, thus reducing its erosive forces and stabilizing steep slopes. Native vegetation is the basis of the food web that supports local fish and wildlife and it provides habitat elements for their survival.

Clearing and grading native vegetation for development can affect the community negatively because it can increase stormwater runoff by removing the vegetation and organic soils that absorb rainwater. Excessive erosion can be very damaging to water quality on adjacent and downstream water bodies, including those that support salmon and other fish. Requirements for clearing and grading and for preserving and replanting native vegetation help prevent these negative impacts by minimizing runoff and erosion.

Goal Preserve trees and native vegetation to protect habitat and ecological functions.

Policy NE-34: Require protection of significant trees and limit unnecessary disturbance of vegetation during all phases of development and require mitigation as needed, including replacement for trees removed during development.

Policy NE-35: Preserve existing natural trees and vegetation on steep hillsides, along stream banks and other habitat areas, and where visual buffers between uses or activities are desirable.

Policy NE-36: Preserve native vegetation within streams, wetlands, and their associated buffers.

Policy NE-37: Plant suitable native vegetation within degraded stream, wetland, and lake buffers. Encourage planting suitable native trees and native vegetation within steep slopes.

Policy NE-38: Encourage removal of invasive species as a significant threat to native ecosystems.

Policy NE-39: Require native vegetation that supports wildlife instead of nonnative plant species and eliminate the use of invasive species when landscaping new developments.

NATURAL ENVIRONMENT APPENDIX

This appendix contains information and analysis that was used to create and support the Natural Resources Element of the comprehensive plan.

4.1 Existing Natural Features

Drainage within the planning area is an interrelated system of surface water, groundwater, and wetlands. In order to identify existing drainage characteristics and potential impacts from urbanization, an understanding of the site-specific hydrologic interaction among the components of the drainage system is required.

4.1.1 Surface Water Drainage Basins

Nearly all of the planning area is located in the Rock Creek and Ravensdale Creek Drainage Basins. Rock Creek and Ravensdale Creek are two headwater drainage systems of Lake Sawyer and Covington Creek. Rock Creek drains to the south and southeast portion of Lake Sawyer, while Ravensdale Creek drains to the north and northeast portion of the Lake Sawyer area. Lake Sawyer is the fourth largest natural lake in King County.

Lake Sawyer's outlet is Covington Creek which flows west into the Big Soos Creek drainage system. The Big Soos Creek discharges into the Green River about 1 mile east of the City of Auburn and about 7 miles west of the City. The southern and western most portions of the planning area touch upon watersheds oriented toward Green River and the Crisp Creek drainage basin (including Horseshoe Lake), respectively. The Lake 12 Annexation Area drains to the middle Cedar River indirectly via the lake and wetlands extending east from the lake.

Types of land cover presently found in the Rock Creek and Ravensdale Drainage Basins include remnant forest stands (second and third generation growth); grass; and limited impervious surfaces (roads and a few structures). Forest covered surfaces typically display higher infiltration capacity and less surface runoff potential than grass covered surfaces because the root system of trees is more extensive and deeper than that of grass. The flat to moderate topography of the Rock Creek Drainage Basin further reduces surface runoff potential.

Surface impoundments caused by lakes, wetlands, and streams influence surface runoff by providing storage that helps attenuate the peak rate of discharge. The storage effect of streams is less pronounced than that of lakes and wetlands. In streams, increased surface runoff volumes and prolonged duration of peak rates of discharge results in more impact.

The surface water drainage system in the planning area is shown in Figure 4-1.

4.1.2 Streams and Lakes

Both the Rock Creek and Ravensdale Creek basins drain to Lake Sawyer and ultimately to the Green River. A small portion of the planning area drains either to the Green River via an unnamed drainage network or via Lake Keevies and Crisp Creek, or to Horseshoe Lake, which has no outlet.

Major creeks in the City were inventoried in 1991 using guidelines provided by the Washington State Department of Natural Resources (DNR), in compliance with the Growth Management Act (GMA).

Creeks located in the planning area are Covington Creek, Ginder Creek, Lawson Creek, Mud Lake Creek, Ravensdale Creek, Rock Creek and several unnamed tributaries. These streams and water bodies are shown in Figure 4-2.

Covington Creek is classified as a Shoreline of the State, subject to the Shoreline Master Program. There is a small segment of Covington Creek where it exits Lake Sawyer within the City limits and continues into the City's Urban Growth Area (UGA).

In their present state, all of the larger streams are moderately important for water supplies, recreation, fish and wildlife habitat, and protection of water quality. Lawson Creek influences water quality in Jones Lake and the Rock Creek wetlands, and Mud Lake Creek influences the water quality of Ginder Creek. All other drainage courses within the Rock Creek watershed are considered minor.

The lakes within the planning area are Lake Sawyer, Black Diamond Lake, Frog Lake, Horseshoe Lake, Jones Lake, Lake Marjorie (also known as Oak Lake), Mud Lake, Lake Number 12, and .

- Lake Sawyer is the fourth largest natural lake in King County at 286 acres with a watershed of 13 square miles. Lake Sawyer is considered a "shoreline of the state" and is subject to the SMA and the City's Shoreline Master Program. The lake is fed by the Rock Creek and Ravensdale Creek drainage systems. Lake Sawyer has experienced water quality problems from various sources, including discharge of inadequately treated sewage from the decommissioned sewage treatment plant located in the Rock Creek drainage. A lake management plan for Lake Sawyer was completed by King County in 2000. The City and King County have conducted stormwater monitoring in the lake's watershed to help identify sources of phosphorus. Data collected by volunteer lake monitors indicate that Lake Sawyer is low to moderate in primary productivity with very good water quality. Ravensdale Creek has a disproportionately high discharge to drainage area ratio likely due to a high influx of groundwater. Although its drainage area is about half that of Rock Creek's drainage area, Ravensdale Creek has a discharge about 3 times greater than that of Rock Creek during the dry summer months. The phosphorus concentrations in Ravensdale Creek are relatively low during the wet season but exceed those of Rock Creek during the dry season when most of the flow is comprised of naturally

phosphorus rich groundwater. Consequently, Ravensdale Creek contributes about half as much phosphorus to Lake Sawyer as Rock Creek. Lake Sawyer is an important migration corridor for a late run of coho salmon that pass upstream just before the first of the year. The fish spawn in upper Ravensdale Creek. Lake Sawyer also provides year-round recreational fishing for stocked rainbow trout and warm water fish. The lake is also used extensively for boating, water-skiing, and other recreation. Public access is provided at a boat launch on the northwest side of the lake. An undeveloped 168 acre park is located along the southern part of the lake.

- Black Diamond Lake is part of an extended high quality wetlands system. Black Diamond Lake is approximately 11 acres in size with an average depth of 6 feet and a maximum depth of 8 feet and is fed by surface water from a roughly 700-acre watershed and groundwater. Black Diamond Lake has recreational fishing values provided by bass and other warm water fish. The lake was stocked with rainbow trout by the Washington Department of Fish and Wildlife in 1958, 1963, and 1965. There is a high quality peat wetland area located upstream from the open water lake.

- Frog Lake is located in the northwestern part of the planning area just southeast of Lake Sawyer. Frog Lake is approximately 25 acres in size. It is largely a forested wetland with an open water area. It is identified as Wetland 22 on King County's iMap Sensitive Areas layer. As a wetland related to Lake Sawyer, Frog Lake is considered a shoreline of the state regulated by the City's SMP.

- Jones Lake is 23 acres in size with a watershed of 740 acres. It is fed by Lawson Creek and two other unnamed tributaries, but is a highly groundwater-dependent lake that displays a seasonal fluctuation in water level. Jones Lake is classified as a dystrophic lake, characterized by relatively high concentrations of acidic organic materials in solution. These chemical conditions can reduce the rate or prevent the processes of bacterial breakdown that would otherwise recycle nutrients from dead organic material at the bottom. The bottom deposits of Jones Lake consist largely of unrated organic material which accumulates as peat. Jones Lake and Jones Lake Open Space have been acquired by the City using funds from the King County Open Space Bond Fund. Jones Lake has recreational fishing values. Stocking records available for Jones Lake (previously known as Lake 14) show the following plantings: 1915 - yellow perch; 1922, 1926, 1928, 1929 and 1930 - eastern brook trout; 1932 - kokanee; 1950 - rainbow trout; and 1956 - rainbow trout. Bass, crappie and brown bullheads have also been introduced into this system. Warm water species such as yellow perch, bass, crappie, and bullheads can spawn in lakes and establish self-reproducing populations.

- Horseshoe Lake, located just west of the City limits, is situated in a topographic depression with no outlet. It is fed by both surface water and groundwater and is particularly sensitive to local changes in the shallow groundwater table.

- Lake Marjorie has not been researched other than to identify it as an open water wetland. It is approximately 5 acres in size and is described as a groundwater depression. Lake Marjorie is isolated from the other lakes and the Rock Creek drainage system.

- Mud Lake is largely a wetland with a drainage basin of 378 acres. It was once part of a mining plan. However, disturbance of the lake is no longer proposed.

- Lake Number 12 covers 44 acres and is fed by surface runoff from a 500-acre drainage area and shallow groundwater flow over a less permeable substrate layer. The lake is known to have an aquatic weed growth problem associated with high phosphorus concentrations. Lake 12 is considered a "shoreline of the state" and is regulated by King County's Shoreline Master Program. Lake 12 is in the City's UGA northeast of the current City limits.

4.1.3 Groundwater

Ground water either moves laterally or remains in place as an isolated body of water and slowly moves downward. Shallow groundwater will generally reflect the influence of local precipitation and surface water phenomena. Deep groundwater is generally regional both in terms of size and immunity to local surface water changes. Groundwater characteristics depend largely on subsurface geologic features (stratigraphy) and surficial geologic features (soil type).

Major groundwater sources in the Puget Sound area are found in the glacial and non-glacial deposits formed during the Pleistocene epoch. Subsurface and surficial geologic features in the Rock Creek, Ravensdale Creek, and Crisp Creek watersheds resulted from the Vashon ice flow. The Vashon ice flow left deposits of outwash and till which form the major groundwater sources in the Rock Creek, Ravensdale, and Crisp Creek drainage basins. Glacial outwash is a medium to highly permeable sand and gravel that produces nominal surface runoff. Precipitation and surface discharges infiltrate the outwash, which generally contributes to recharging deep, regional groundwater aquifers.

Groundwater occurs in three aquifer systems beneath the planning area. These aquifer systems include 1) a seasonal shallow or perched unconfined aquifer in the weathered soil and recessional outwash overlying till or bedrock, 2) an intermediate depth, regional unconfined and confined aquifer system within the pre-Vashon glacial and interglacial sediments, and 3) a confined regional aquifer system within the bedrock.

The shallow aquifer system is the primary water resource penetrated by most of the domestic wells in the planning area. The shallow aquifer is particularly vulnerable to contamination from the surface and may dry out seasonally in some areas. The intermediate depth aquifer is recharged over a very large area and is generally protected from contamination from the surface. The bedrock aquifer often contains water with elevated level of minerals, such as iron and sulfur that may affect water quality.

Ground water flow patterns have both vertical and horizontal components. In the planning area, the primary vertical component of flow is downward percolation from the shallow aquifer, through the underlying till or fractures in the bedrock, and into the intermediate or deep bedrock aquifer. Horizontal groundwater flow in the shallow aquifer discharges to surface water features in the Rock Creek, Ravensdale Creek, and Crisp Creek drainage systems.

Ground water recharge to the shallow aquifer is primarily from precipitation or infiltration of surface water runoff from adjacent areas. As precipitation falls on the ground surface, a portion infiltrates into the soil. Precipitation that does not infiltrate remains on the surface, filling small depressions or moving downslope as surface runoff. Some shallow infiltrated water (soil moisture) is used by plants and returns to the atmosphere by evaporation. When the soil moisture content is high, such as occurs after a long period of rainfall, water within the soil migrates downward. Downward percolation of water is impeded by relatively impermeable till or bedrock that underlies most of the land. Where water is concentrated within topographically low areas, lowlands such as wetlands and streams, there is generally more recharge than in topographically high, upland, areas where the surficial aquifer is dry much of the time. The intermediate depth and deep bedrock aquifer systems are recharged by infiltrating water over an area much larger than the planning area.

4.1.4 Public Water Supplies

Groundwater withdrawal has not been necessary to supply the City's water needs. The City currently obtains all of its municipal water from a series of springs (Spring No. 1 through Spring No. 4) located on the east slope of Green River gorge about 2 miles southeast of the City. The City does not maintain any water wells at present. The spring system is located in a geologically active area of the Green River gorge as demonstrated by a large landslide in February 1996 immediately downstream of Spring No. 1. The water quality and quantity are very good; limited only by the approved water rights consumptive allocation of the spring water.

The City has a wholesale contract for water supply from the City of Tacoma that will provide future water supply. The City will continue to withdraw water supply from its springs so long as this source remains feasible.

4.2 Sensitive Areas

The City conducted an extensive sensitive areas update in 2008 including best available science. The city used King County mapping data as well as data from WA DNR, Parametrix and Jones & Stokes for the updated maps.

Development adjacent sensitive areas; wetlands, streams and fish and wildlife habitat conservation areas inside the City are regulated by Chapter 19.10 BDMC (Black Diamond Municipal Code). The sensitive areas code contains requirements for designating, rating and mapping wetlands and streams, requires the establishment of buffers, identifies

activities allowed within the buffers and describes applicable performance standards, and outlines appropriate mitigation requirements.

4.2.1 Wetlands

The City's sensitive areas ordinance designates and rates wetlands according to the Washington State Department of Ecology (Ecology) wetland ratings system (Ecology Publication #04-06-025). The ordinance also provides additional protection for "core wetland and stream complex" areas associated with Rock Creek, Jones Lake, Jones Creek, Black Diamond Lake, Black Diamond Creek, and Ravensdale Creek and for "headwater wetlands" associated with the headwaters of Ginder Creek, Lawson Creek, and Ravensdale Creek. For project proposals, wetland classifications will be determined using the definitions, criteria, and procedures contained in the ordinance. During the Sensitive Areas Study, extensive wetlands were identified and classified (see figure 4-3).

4.2.2 Fish and Wildlife Habitat Conservation Areas

The GMA requires cities and counties across the state to address land use issues that directly and indirectly impact fish and wildlife habitat. Fish and wildlife habitat conservation is the management of land for maintaining species in suitable habitats within their natural geographic distribution so that isolated subpopulations are not created. This does not mean that all individuals of all species must be maintained at all times, but it does mean cooperative and coordinated land use planning is critically important among counties and cities in a region. In some cases, intergovernmental cooperation and coordination may show that it is sufficient to ensure that a species will usually be found in counties and cities in a region. In some cases, the designation of fish and wildlife habitat conservation areas should include:

- Areas with which endangered, threatened, sensitive, and candidate species have a primary association;
- Habitats and species of local importance.
- Naturally occurring ponds under 20 acres and their submerged aquatic beds that provide fish or wildlife habitat.
- Waters of the state.
- Lakes, ponds, streams, and rivers planted with game fish by a governmental or tribal entity.
- State natural area preserves and natural resource conservation areas.
- Areas critical for habitat connectivity, which can include open space corridors designated in comprehensive plans under RCW 36.70A.160.

The "core stream and wetland complex" habitats in the City identified in the sensitive areas ordinance include the streams, lakes, ponds, and wetland complex associated with Rock Creek, Jones Lake, Black Diamond Lake, and Ravensdale Creek along with several unnamed creeks. Other fish and wildlife habitats in the City were identified during the sensitive areas update. These other fish and wildlife habitat conservation areas include the Rock Creek and Ginder Creek corridors, open water ponds, lakes, and riparian

forests as areas of high quality habitat. The sensitive areas code contains requirements for designating and mapping fish and wildlife habitat conservation areas, sets buffer requirements and performance standards for activities allowed within them and their buffers, and outlines appropriate mitigation requirements.

The general types of habitat in the Black Diamond area include mixed deciduous and unmanaged evergreen forest, areas of regenerating managed forest, wetlands, lakes, riparian areas, and creeks. Wetlands, riparian areas, and lakes meeting certain criteria are listed as "priority habitats" in the Washington Department of Fish and Wildlife Priority Habitats and Species (PHS) program. The city reviews maps of priority habitat areas for development proposals.

Wildlife – particularly species that roam widely or have large home ranges – move freely within and among habitat types via wildlife corridors or networks (Figure 4-4). In urban areas, creeks and streams and their associated buffers function as wildlife corridors. Rock Creek, Ravensdale Creek, and their associated riparian habitat function as a corridor between the upper and lower Soos Creek basin. The Rock Creek corridor likely serves as a route to the Green River and upper parts of the Green River watershed as well, linking wildlife that use the lower Green River watershed and the upper Soos Creek basin.

The following list of drainages and the known fish species are updated from the Water Resource Inventory Area (WRIA) 9 Fish Distribution maps (2000, King County DNR):

- Covington Creek. Coho, cutthroat trout and steelhead are known to inhabit Covington Creek. The WRIA 9 Fish Distribution Map indicates that Covington Creek also provides good habitat for Chinook salmon, though presence of that species has not been verified.

- Lake Sawyer. Covington Creek drains Lake Sawyer, which is fed by Ravensdale and Rock Creeks. Lake Sawyer supports populations of cutthroat trout, steelhead, largemouth and smallmouth bass, yellow perch, and rainbow trout (WRIA 9 2000 and WDFW 1991). The lake is impounded by a small dam at the head of Covington Creek. The dam has a fish ladder that allows passage of migrating coho. Due to low water flows and creekbed infiltration, however, the fish ladder is not typically passable until December. This factor limits coho use of the upper watershed, including Rock Creek.

- Ravensdale Creek. Ravensdale Creek has significant fisheries value and is known to support coho and cutthroat trout. The headwater wetlands are important for maintaining perennial flow, as well as maintaining water quality in Rock Creek.

- Rock Creek. A small portion of the planning area drains to Black Diamond Lake and the wetlands surrounding it. The Black Diamond Lake wetlands serve as partial

headwaters of Rock Creek. Rock Creek is listed as supporting coho salmon, cutthroat trout, and steelhead in the WRIA 9 Fish Distribution Map.

- Ginder Creek. The northeast portion of the planning area drains to Ginder Creek, which drains into Rock Creek. Ginder Creek historically provided good habitat for salmonid spawning and rearing. The WRIA 9 Fish Distribution Map (2000) shows Cutthroat trout presence in Ginder Creek. Based on a 1982 sampling, Ginder Lake supports warm water fish including black crappie, largemouth bass, and pumpkinseed. An obstruction limits the passage of adult salmonids upstream as far as Ginder Lake. Electroshocking done during the 1982 survey indicated that Ginder Creek, above State Route (SR) 169 may be able to support other species of fish if passage barriers were removed. The survey generally indicated that Ginder Creek is a relatively productive tributary (John Henry Mine, SEIS).

- Mud Lake Creek. This stream provides some habitat for spawning and rearing of salmonids. The cascading portion over sandstone bedrock would prevent passage of salmonids. High turbidity was also identified in the 1982 sampling in Mud Creek, especially at the inlet to Mud Lake. Mud Lake Creek, however, represents an important source of water for Ginder Creek below the confluence near SR 169, at least during the winter months. Fish populations were essentially non-existent in Mud Creek (1982) and in the inlet to Mud Lake (John Henry Mine, SEIS).

- Crisp Creek. The eastern edge of the Crisp Creek drainage basin crosses into the City. The Crisp Creek basin drains an area approximately 5.0 square miles with the majority of the basin located upstream of the Keta Creek Hatchery. Crisp Creek and Keta Springs are the water supply for the Hatchery. Crisp Creek is also the sole water supply for the state owned rearing ponds, located on the mainstem and upstream of the Hatchery. Coho, chum and Chinook salmon as well as steelhead have been produced at the Keta Creek Hatchery.

- Green River. The planning area lies within 1 mile to the north of the lower end of the Green River Gorge, between river mile (RM) 42 and RM 47. In this vicinity, the river flows through a steep-sided eroded gorge. The Green River supports significant runs of coho, Chinook, and chum salmon as well as steelhead and sea run cutthroat trout. These salmonid runs support important sport and retail fisheries in the Puget Sound Region and the Pacific Ocean as well as within the river system.

All of these creeks need highly effective groundwater and stormwater protection to maintain the water quality and ensure sufficient supplies of water for natural production or successful hatchery production. Stream buffers and limitations on land uses contained in the City's sensitive area ordinance help protect the functions and values of these streams as critical fish and wildlife corridors.

4.2.3 Geologically Hazardous Areas

Geologically hazardous areas include erosion hazards, landslide hazards, and mine hazards. Erosion hazards areas and steep slopes are shown in Figure 4-5 and areas of abandoned coal mine workings are identified and mapped in Figure 4-6. Geologically hazardous areas are regulated by the City's Sensitive Areas regulations.

Erosion Hazard Areas are susceptible to prevailing agents of erosion, such as wind, rain, water, and other natural agents. The severity of erosion depends on factors such as the size of soil grains, soil cohesion, slope gradient, rainfall frequency and intensity, surface composition and permeability, and the type of vegetation cover. Erosion hazard areas are those areas where there is a "severe" to "very severe" rill and inter-rill erosion hazard.

The sensitive areas layer of the King County IMap indicates five small locations within the planning area, including the Ravensdale Creek corridor, as "erosion hazard." Among the Natural Resources Conservation Service soil types identified within the planning area, Alderwood/Kitsap and Alderwood gravelly sandy loam soils are identified by King County as potentially severely erosive. These erosion-prone soils are constrained for development– especially in the area of Alderwood and Kitsap loam soils near Black Diamond Lake.

Landslide Hazard Areas are defined in the City's sensitive areas ordinance as areas that are potentially subject to risk of mass movement due to a geologic landslide resulting from a combination of geologic, topographic, and hydrologic factors. These areas are typically susceptible to landslides because of a combination of factors including: bedrock, soil, slope gradient, slope aspect, geologic structure, groundwater, or other factors. According to the IMap sensitive areas layer, there are no known landslide hazard areas within the planning area.

Seismic Hazard Areas are at severe risk of earthquake damage as a result of earthquake-induced ground shaking, slope failure, settlement, or soil liquefaction. These conditions occur in areas underlain by soils of low density, usually in association with a shallow groundwater table. According to the IMap sensitive areas layer, no seismic hazard areas are identified within the planning area.

Coal Mine Hazard areas include abandoned and improperly sealed mine openings and areas underlain by shallow mine workings. Workings that are shallower than 200 feet in depth (steeply dipping seams) or shallower than 15 times the thickness of the seam or workings (gently dipping seams) may be affected by collapse or other subsidence.

Although numerous coal mines underlie the City, the number and extent of mine hazard areas are limited because of the accuracy of past mapping and the depth of most of the shafts. The King County IMap sensitive areas layer identifies one large area of "coal mine hazard" in the central part of the City, and a smaller area to the east in the Lawson Hill

neighborhood. The King County map layer does not provide specific information on the degree of hazard.

Information provided by Palmer Coking Coal indicates that much of the existing City is built over coal mine workings that are deep underground. Most underground coal mining in the Black Diamond area consisted of the "room and pillar" mining technique. "Pillars" of coal were left to support the roof above and allow the mining of adjacent areas, creating rooms. Once abandoned, these "pillars" would collapse and the "rooms" would fill with collapsed roof material, coal debris, and water.

There are known coal mine entrances and stockpiles of coal tailings or mine spoil in the planning area. Mining records indicate that underground mining has occurred in sections 2, 10, 11, 12, 13, 14, 15, and 23 of the City. Most of these are areas underlain by deep underground coal workings. The coal mine hazards identified in Figure 4-6 are based on maps available at the Washington State Department of Natural Resources.

Chapter 19.10.430 BDMC defines the degree of hazard as low, moderate and severe and regulates the allowed uses and activities within these categories.

Steep Slopes. Areas of steep slopes are identified in City Sensitive Areas maps and regulated by the sensitive area ordinance. The steepest slope in the City occurs along the south side of Lawson Hill (aka Franklin Hill), where isolated portions of the hillside approach 30% slope. Most of Lawson Hill contains 6% to 15% slopes with an area of 16% to 24% slopes. Some isolated slopes which are in the 16% to 24% slope range, are located east of the Black Diamond Lake, along Lawson Road east of Mud Lake, near SE 288th Street and crossing SR 169 north of the City limits. The remainder of the City of Black Diamond Comprehensive Plan area appears to contain slopes from 0 to 15%. Isolated steep slopes may exist throughout the City.

The City's sensitive area ordinance contains designation and mapping requirements, a description of allowed activities and performance standards, and appropriate mitigation requirements for erosion, landslide, and mine hazard areas.

4.2.4 Critical aquifer Recharge Areas

This area contains a shallow aquifer serving as a source of water to the City of Kent system and Lake Sawyer. Lake Sawyer, Ravensdale Creek, and Rock Creek are identified as being hydraulically coupled to this shallow aquifer. Figure 4-8 shows areas with high susceptibility to groundwater contamination surrounding Lake Sawyer in the northwestern portion of the City and in the southwestern portion of the City. An area southeast of Lake Sawyer and a small area in the southeastern part of the City are shown as having medium susceptibility to groundwater contamination. Areas around wellheads are also protected. Figure 4-8 shows the "time of travel" that it takes contaminants to reach wellheads from surrounding areas within 6 months and 1, 5 and 10 year periods.

To protect the critical groundwater recharge areas that supply the aquifers that in turn supply our domestic and drinking water, the City requires development that is within the City limits and is served by City utilities also be served by sanitary sewers. Areas served by the Soos Creek Water and Sewer District where sewer service is not available are still allowed to use septic systems.

Maintaining the water quality and quantity of stormwater runoff within aquifer recharge areas is important to protecting aquifers from pollutants. Allowing stormwater runoff to infiltrate in recharge areas renews the amount of water in the aquifer. The City's storm drainage ordinance requires that runoff be treated before it can be discharged as surface water. The storm drainage ordinance also encourages infiltration. Using the appropriate treatment and infiltration techniques in aquifer recharge areas will help protect aquifer recharge areas and the quality and quantity of water available for drinking and domestic use.

4.2.5 Frequently Flooded Areas

Floodplains ordinarily provide riparian habitat for fish and wildlife, connectivity to wetlands and other habitats, storage and conveyance of stormwater and floodwater, and groundwater recharge. Floodplains are also critical habitat for fish species as safe havens during flood events.

The City has classified and designated frequently flooded areas using the FEMA flood map (Figure 4-9). This map identifies the following areas as being at hazard of inundation by a 100-year flood: along Rock Creek from Morganville to Jones Lake, the southern portion of Ginder Creek, and surrounding Jones Lake and along the east side of Highway 169 (across from Jones Lake). New development in these areas will continue to be regulated by the City.

The King County Interactive Map Folio Flooding Info layer shows a segment of Rock Creek and Jones Lake in the 100-year floodplain in the City.

4.3 Air Quality

The City experiences relatively higher ozone pollution concentrations than other areas in King County. This is common for much of southeast King County (the City contributes only marginally to this regional pollution). Zone monitoring is conducted at Enumclaw on a seasonal basis.

Particulate Matter (PM10) consists of very small particles, either solid or liquid, which float in the air and settle very slowly. Soot and dust are examples. PM10 stands for particulate matter that is smaller than 10 micrometers or one-hundredth of a millimeter. Most particulate comes from wood smoke, road dust, outdoor burning, and industry. In the City and surrounding area, the sources of PM10 include local mining operations, a smokehouse, and outdoor burning. Inside the City, the requirements of

the Puget Sound Air Pollution Control Agency (PSAPCA) and WAC 173-425-040 prohibit outdoor burning within designated UGAs.

4.4 Geology, Soils, and Topography

4.4.1 Geology

The City lies in a geographic area known as the Puget Lowlands, a large land trough extending from the Fraser Valley in British Columbia, Canada, to the Willamette Valley in Oregon and from the Cascade Mountains in the east to the Olympic Mountains in the west. Geologic characteristics in the northern portion of the Puget lowlands are the result of glaciation that occurred during the Pleistocene Era (beginning about 20,000 years ago). Glaciers were once as thick as 3,000 feet during the Vashon Period of the Fraser Glaciation (roughly 15,000 years ago). They deposited till, outwash, and material mixed with volcanic ash in the Puget Lowlands on top of a thick sequence of interbedded sandstones, quartzose sandstones, siltstones, and numerous coal beds. The Black Diamond area is located on the Covington Drift Plain. Two types of deposits occur in the planning area: Vashon till which is generally an impervious mix of gravel, cobbles, and clayey, sandy silt (known as "hardpan"); and the Vashon stratified drift deposits (generally, permeable) composed of outwash gravels, rocks, and cobbles. Since the last glaciation, urbanization, rural development, logging, gravel mining activities, erosion, and sedimentation have modified the land surface. Weathering and erosion of native soils has resulted in the development of topsoil at the ground surface. The topsoil in undeveloped areas consists of a few inches of silt and sand with decayed leaves and roots. The weathered soils underlying the topsoil consist of a few inches of organic matter, silt, and sand with roots generally extending to a depth of 2 to 6 feet. Topographic depressions and low gradient stream channels and wetlands have accumulated organic silt and peat.

Vashon recessional outwash mantles the west portion of the planning area. This soil consists of sand and gravel with variable amounts of alluvial silt and cobbles deposited by rivers emanating from the melting front of the Vashon ice sheet. This soil is considered a valuable gravel resource in this area depending on its thickness and silt content.

Vashon till is at the ground surface in some areas of the east portion of the planning area. Till consists of unstratified silt, sand, gravel, and cobbles that are in very dense condition due to being overridden by the glacial ice. Till is usually 20 to 40 inches thick and probably underlies the recessional outwash but may be absent where eroded during deglaciation meltwater runoff.

Pre-Vashon glacial and interglacial sediments underlie the Vashon till; generally in the west portion of the planning area where bedrock is deep. The pre-Vashon glacial and interglacial sediments consist of interbedded and/or stratified silt, sand gravel and till. These soils are not exposed at the ground surface in the planning area, but are exposed

in the upper walls of the Green River gorge south of the planning area and are penetrated by water wells in the west portion of the planning area.

Bedrock of the Puget Group underlies the entire planning area. The bedrock is locally exposed at the surface in the east portion of the planning area and in the walls of the Green River gorge south of the planning area. The bedrock consists of sedimentary sandstone, mudstone, shale, and coal. Based on elevations of surface exposures and water well logs, bedrock underlies the land at a depth of 200 feet or more in the west portion of the planning area.

4.4.2 Soils

Weathered soils derived from native geologic deposits cover the ground surface in most of the planning area. The following soil information was taken from the November 1973 NRCS "Soils Survey of King County Area." Because this information is based on mapping from aerial photos and may not be totally representative it is used for comparing the general suitability of areas for different land uses. Field verification may be required for specific sites as part of specific project review.

Specific to the Black Diamond vicinity, weathered gravel, sand, and clay left in glacial till plains, terraces and outwash plains at the end of the Pleistocene Era, have formed the local soils. The NRCS characterizes soils by the mixture of clay, silt, sand and organic materials that make up the soil and the degree of slope where the soils are located. Soil types found in Black Diamond are shown in Figure 4-10.

The soil types mapped in the planning area are:

- Alderwood gravelly sandy loam, 6-15% slope (AgC);
- Alderwood gravelly sandy loam, 15-30% slope (AgD);
- Alderwood gravelly sandy loam, with Kitsap Silty Loam (AgF);
- Alderwood and Kitsap soils, 25% to 70% slope (AkF);
- Beausite gravelly sandy loam, 6 - 15% slope (BeC);
- Beausite gravelly sandy loam, 14 to 30% slope (BeD);
- Bellingham silt loam, 0% slope (Bh), hydric;
- Buckley silt loam, 0% slope (Bu), hydric;
- Everett gravelly sandy loam, 0- 6% slope (EvB);
- Everett gravelly sandy loam, 6-15% slope (EvC);
- Everett gravelly sandy loam, 15- 30% slope (EvD)
- Mixed Alluvial, less than 2% slope (Ma);
- Norma sandy loam, less than 2% slope (No), hydric;
- Ragnar-Indianola association, 2-15% slope (RdC);
- Seattle muck, less than 1% slope (Sk), hydric;
- Shalcar muck, less than 1% slope (Sm), hydric, and
- Urban land, filled (Ur).

Alderwood soils (principally AgC) are the most abundant soils present in the planning area. These soils were formed on till plains and roughly correspond with the Vashon Till (Qvt). Alderwood surface and subsoils consist of a very gravelly sandy loam that is moderately deep, averaging approximately 30 inches. Extending downward from depths of approximately 20 to 40 inches, the soil layer has been compacted. This material is known as "hardpan". Alderwood soils have the characteristic of moderately rapid permeability above the hardpan layer and very slow permeability through it. Water has a tendency to perch on top of the hardpan layer. In winter, water moves laterally along the top of the hardpan, or it saturates surface soils in topographic low areas creating local areas of hydric soils and wetlands. These wetlands typically do not contribute to aquifer recharge because water does not percolate easily through the hardpan to the aquifer below.

A notable complex of wetlands in Section 23 occurs in topographic depressions on Alderwood soils. These wetlands are consistently oriented in a northwest to southeast direction presumably related to the direction of glacial movement in the area. According to the Site Evaluation and Land Use Concepts prepared for Plum Creek Timber Company properties (Hewitt Isley, 1991), the regional groundwater table occurs within the preglacial soils that underlie the glacial till. The regional groundwater table is below and hydrologically separate from the glacial till where the perched groundwater occurs and supports wetlands.

Alderwood soils are stony and commonly experience summer drought after seasonally high (winter), perched water tables diminish. The erosion potential on 6 15% slopes (AgC) is moderate due to the relatively unconsolidated nature of the till above the hardpan. The erosion potential on 15-30% slopes (AgD) is severe and slippage is moderate; however, only a small area lying within Section 23 exhibits this soil type. Related to agricultural purposes, Alderwood soils are used mostly for timber. If cleared, the soils are suited to grasses.

According to the NRCS, continuous vegetative cover is important to protect the soils adequately against the hazards of severe erosion and sedimentation to maintain the quality of water in streams, and to control runoff. Alderwood soils are not suited to field crops requiring annual tilling and re-seeding.

In general, glacial drift soils, other than the loose weathered colluvium/topsoil, provide excellent support for buildings and roadways and are generally suitable for development. Development limitations that exist are related to areas of seasonal high water table and steep slopes with erosion potential. The limitations for stormwater infiltration and septic tank drainfields are severe due to the very slow permeability in the substratum (hardpan). Urban development on Alderwood soils requires sanitary sewers.

Alderwood Kitsap soils (AkF) is about 50% Alderwood gravelly sandy loam and 25% Kitsap silt loam. Slopes are 25% to 70%. The distribution of these soils varies greatly

within short distances. Drainage and permeability vary. Runoff is rapid to very rapid, and erosion hazard is severe to very severe. The slippage potential is severe. Alderwood Kitsap soil is located along the west edge of the Black Diamond Lake wetland.

Beausite Gravelly Sandy Loam. The Beausite series (BeC, BeD, and BeF) consists of moderately deep, well drained soils formed in sandstone and conglomerate. These soils are on glaciated mountains and foothills at elevations of near sea level to about 1,500 feet. These soils are well drained with moderate permeability, and runoff is medium to rapid. Beausite soils occur in the area of downtown Black Diamond and east to the city limits.

Bellingham silt loam (Bh) is a poorly drained soil formed in alluvium. These soils are nearly level and are mostly in depressions on the upland glacial till. Permeability is slow. Runoff is slow and the hazard of erosion is slight. Bellingham soils occur along sections of Ginder Creek and Rock Creek.

Everett gravelly sandy loam (EvC), 5-15% slopes, is the second most abundant soil type present within the planning area. These soils were formed in glacial outwash on terraces and outwash plains, and were deposited on top of older Alderwood soils described above. Everett soils roughly correspond with Vashon Stratified Drift Deposits (Qvs). These gravelly sandy loam soils are very deep and somewhat excessively well drained. The surface and subsurface soils can be found to a depth of 60 inches, with a weakly cemented layer in the substratum in some areas.

Rainfall in these soils is quickly absorbed and percolates to the groundwater table. Creeks that drain into areas dominated by Everett soils typically intercept the groundwater table and receive most of their flow from groundwater discharge. Runoff is slow to medium. The erosion hazard is slight to moderate. Everett soils are used for timber, pasture, and urban development. Everett soils are also generally suitable for urban development, except in areas of steep slopes. Limitations for septic tank drainfields exist where Everett soils are present because of the potential for aquifer and stream contamination, particularly where slopes exceed 8%. Urban development on Everett soils requires sanitary sewers. Everett gravels provide sand and gravel resources for the gravel pit located in Section 10.

Mixed alluvium (Ma) consists of a variety of alluvial soils in areas too small and too closely associated to map at the scale of the NRCS survey. This land ranges from very well drained to poorly drained. The hazard of stream overflow is severe. Mixed alluvium is located east of Jones Lake and SR 169.

Ragnar-Indianola (RdC) soil is about equal parts Ragnar fine sandy loam and Indianola loamy fine sand. Permeability is moderately rapid in the upper part of this soil and rapid in the substratum. Runoff and erosion hazard is moderate. This soil is used for timber and for urban development. This soil type is located near Morganville.

Urban land (Ur) is soil that has been modified by disturbance of the natural layers with additions of fill material several feet thick to accommodate urban development. Urban land is mapped near the intersection of Roberts Road and SR 169.

4.4.3 Hydric Soils

The definition of a hydric soil is a soil that formed under conditions of saturation, flooding or ponding long enough during the growing season to develop anaerobic conditions in the upper part.

Notable, high value wetlands exhibiting hydric (poorly drained) soils such as Buckley silt loam, Norma sandy loam, Shalcar muck and Seattle muck include Black Diamond Lake and the Rock Creek wetland corridors.

Buckley Silt Loam – Buckley silt loam (Bu) occurs in a small, isolated area in the far, southeastern portion of Section 23. Typically, a seasonally high water table occurs at or near the surface of this hydric soil unit and these soils are typically associated with wetlands. Erosion hazard is slight and runoff is slow. The limitations for septic tank drainfields are severe due to the very slow permeability in the substratum (hardpan).

Norma Sandy Loam – A small, isolated area of Norma sandy loam (No) is located to the north of Black Diamond Lake. This hydric soil is poorly drained and is typically alluvium, in basins and along stream bottoms. Permeability is moderately rapid, and the seasonal water table is at or near the surface. Runoff is slow, and the erosion hazard is slight. This soil is used mostly for pasture and is severely limited for use with septic drainfields due the saturated condition.

Seattle Muck – Seattle Muck (Sk) soils occur in limited areas associated with wetlands adjacent to Black Diamond Lake and Rock Creek. These hydric soils are composed of peaty soils originating mostly from sedges. There is a seasonal high water table at or near the surface, and soil permeability is moderate. Surface water “ponds,” and there is little or no erosion hazard. Like the Norma series, Seattle muck is unsuited for septic drainfields due to saturation and the presence of organic soils. The Seattle muck soil (muck peat, muck, and peat) is generally not suitable for urban development because of the seasonal high water table and organic soils.

Shalcar Muck – Shalcar muck (Sm) is located at the connection of Rock Creek to Lake Sawyer. This hydric soil is poorly drained organic soils. They are formed in deposits of sedge peat and alluvium along stream bottoms. Slopes are 0% to 1%. Permeability is moderate in organic layers and moderate to rapid in the lower soils. There is a seasonal high water table at or near the surface. Runoff is ponded and there is no erosion hazard. This soil is typically used for pasture and is severely limited for use with septic drainfields due to the saturated condition.

4.4.4 Topography

The planning area is located in a small valley on an upland plateau ranging roughly from 525 to 750 feet in elevation, and includes the hillside east of the City up to an elevation of 1,180 feet. The plateau is approximately 300 feet above the Green River Gorge. Much of the planning area is characterized by rolling terrain with wetlands and drainage courses located in topographically low areas. Figures 4-11 and 4-12 show the topology of the city.

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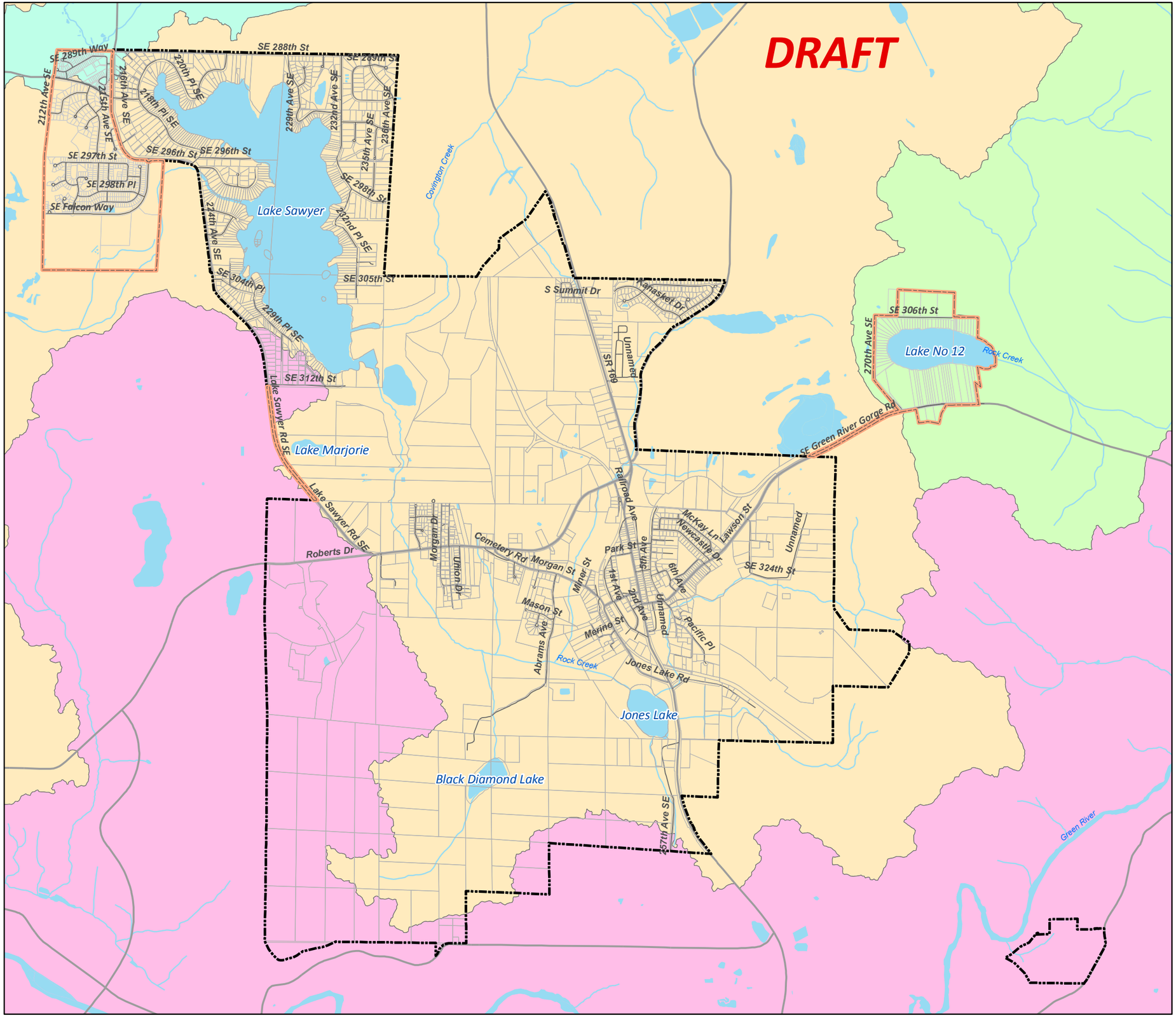
DRAINAGE BASINS

Figure 4-1



Urban Growth Area (UGA)

City Limits

Parcels

Basins

Covington Creek

Jenkins Creek

Lower Cedar River

Middle Green River

N

W E

S

0.5 0.25 0 0.5 Miles

GIS data source: King County and City of Black Diamond.

Map prepared March 2015

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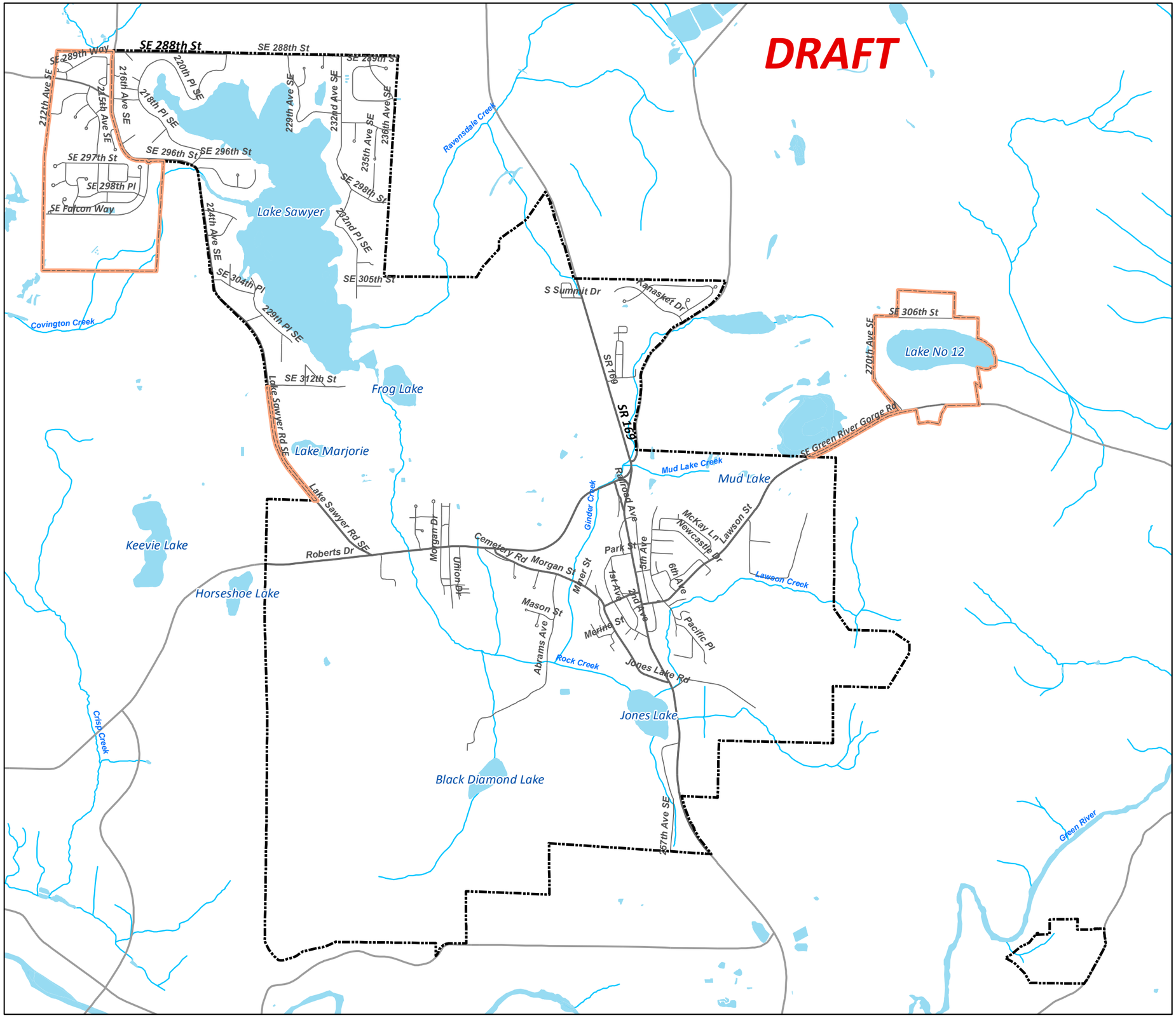
LAKES & STREAMS

Figure 4-2



- Urban Growth Area (UGA)
- City Limits
- Lakes & Waterbodies
- Streams

N
W E
S

0.5 0.25 0 0.5 Miles

GIS data source: King County and City of Black Diamond.

Map prepared December 2015

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WETLANDS & HYDRIC SOILS

Figure 4-3

- Urban Growth Area (UGA)
- City Limits
- Wetlands
- Hydric Soils

N
W E
S

0.5 0.25 0 0.5 Miles

GIS data source: King County and City of Black Diamond.

Map prepared December 2015

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FISH & WILDLIFE HABITAT NETWORK

Figure 4-4

- Urban Growth Area (UGA)
- City Limits
- F&W Habitat Conservation Areas

N W E S

0.5 0.25 0 0.5 Miles

GIS data source: King County and City of Black Diamond.

Map prepared February 2016

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GEOLOGICALLY HAZARDOUS AREAS

Figure 4-5

- Urban Growth Area (UGA)
- City Limits
- Slopes > 40%
- Erosion Hazard Areas

N
W E
S

0.5 0.25 0 0.5 Miles

GIS data source: King County and City of Black Diamond.

Map prepared February 2016

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COAL MINE HAZARD AREAS

Figure 4-6

- Urban Growth Area (UGA)
- City Limits
- Coal Mine Hazard

N
W E
S

0.5 0.25 0 0.5 Miles

GIS data source: King County and City of Black Diamond.

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AREAS SUSCEPTABLE TO GROUNDWATER CONTAMINATION

Figure 4-7

- Urban Growth Area (UGA)
- City Limits
- High susceptability
- Medium susceptability
- Low susceptability

N
W E
S

0.5 0.25 0 0.5 Miles

GIS data source: King County and City of Black Diamond.

Map prepared February 2016

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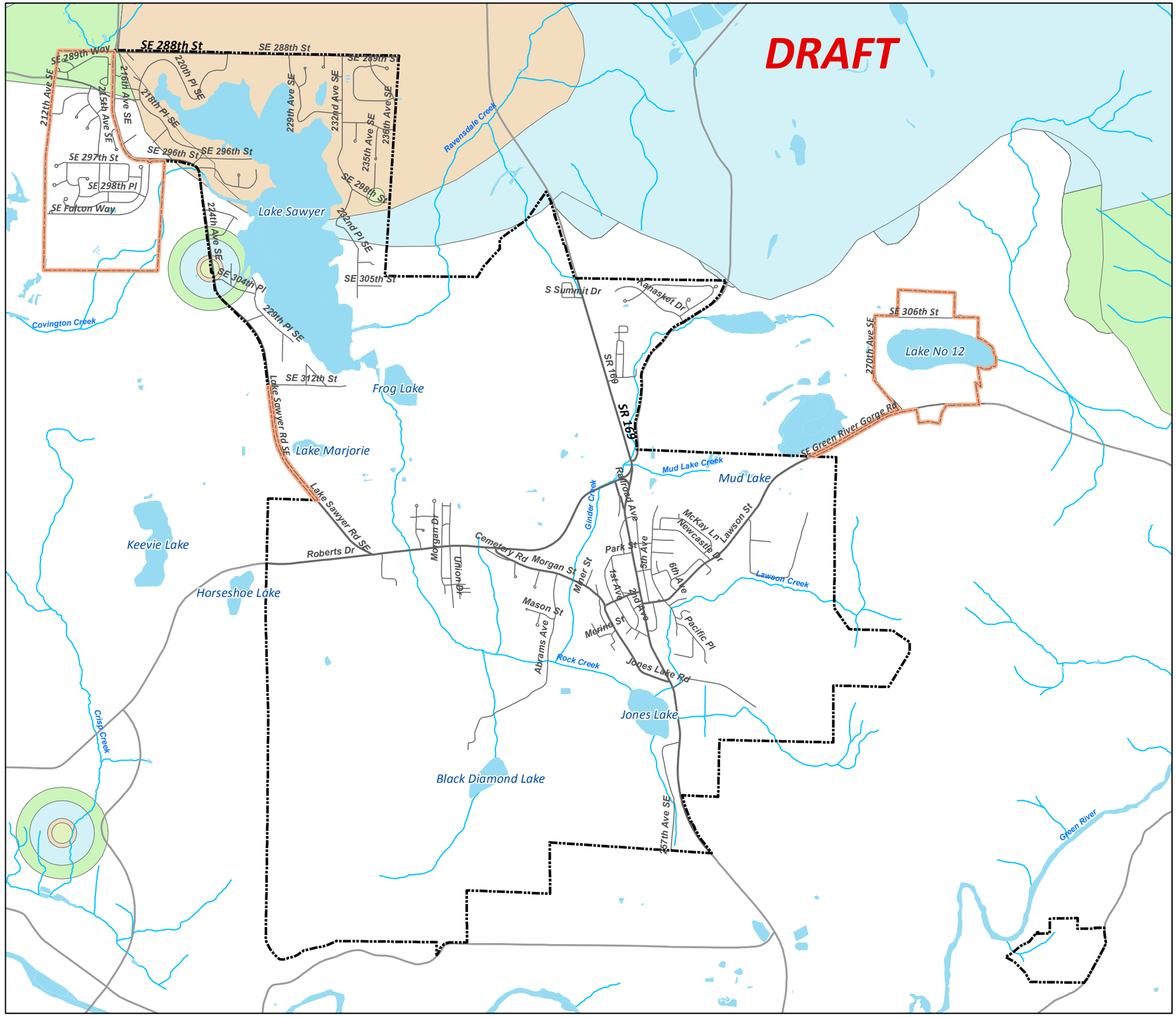

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WELLHEAD PROTECTION AREAS

Figure 4-8

Urban Growth Area (UGA)

City Limits

Wellhead Protection Areas

- 6 Month
- 1 Year
- 5 Year
- 10 Year

N
W E
S

0.5 0.25 0 0.5 Miles

GIS data source: King County and City of Black Diamond.

Map prepared February 2016

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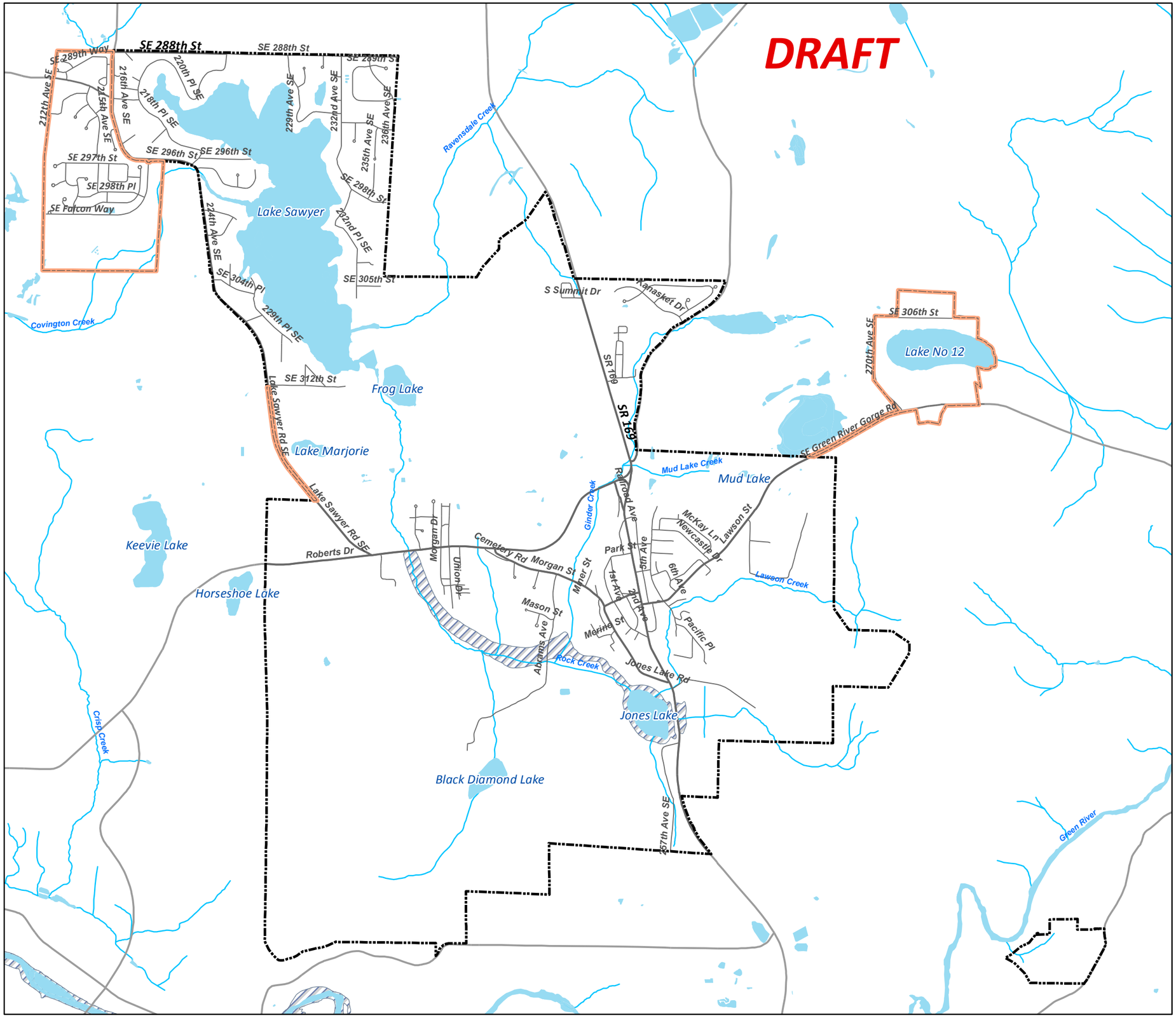

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FLOOD HAZARD AREAS

Figure 4-9

- Urban Growth Area (UGA)
- City Limits
- Flood Hazard Area

N
W E
S

0.5 0.25 0 0.5 Miles

GIS data source: King County and City of Black Diamond.

Map prepared February 2016

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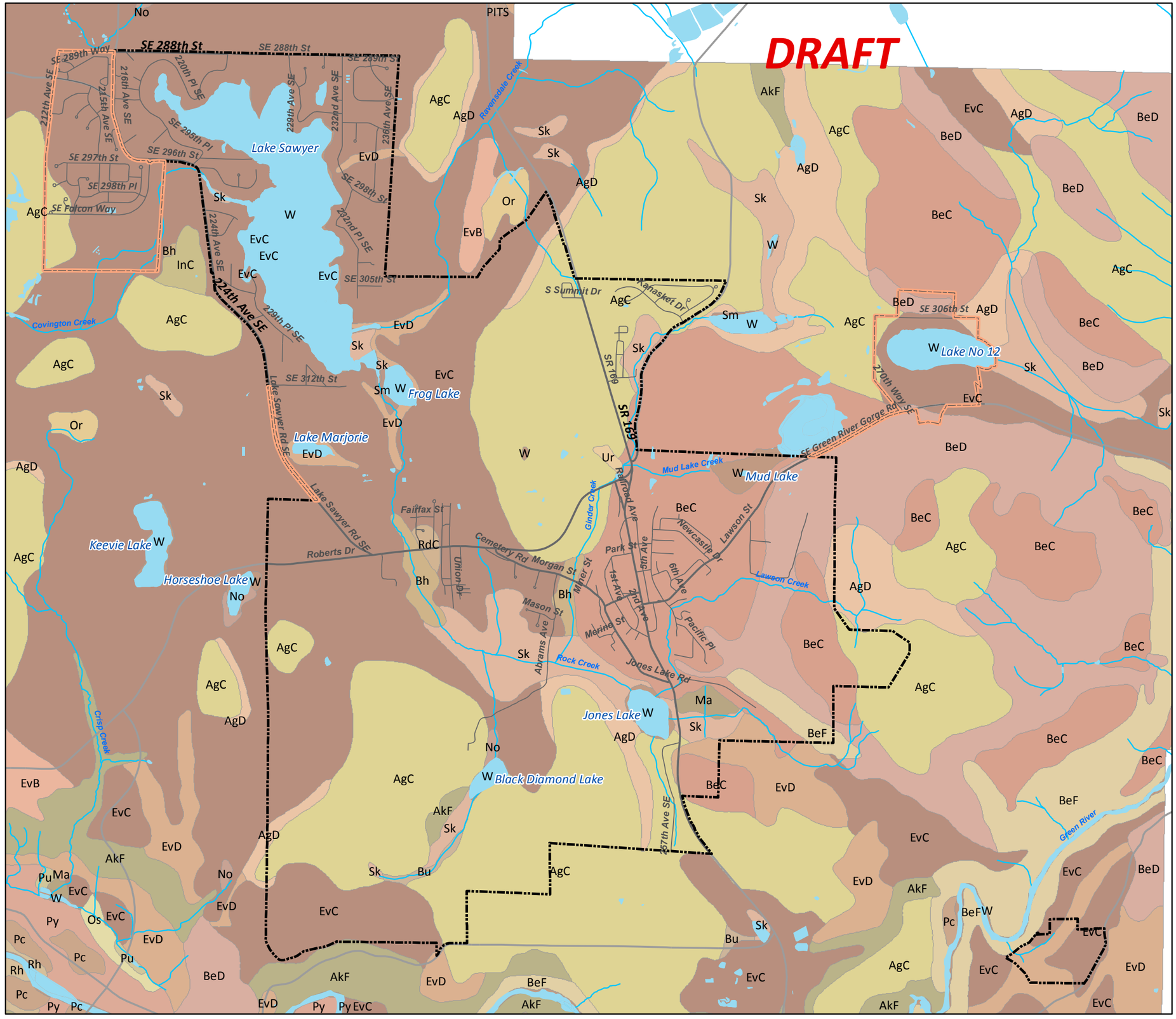

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SOIL TYPES

Figure 4-10

Urban Growth Area (UGA)

City Limits

N

W E

S

0.5 0.25 0 0.5 Miles

GIS data source: King County and City of Black Diamond.

Map prepared February 2016

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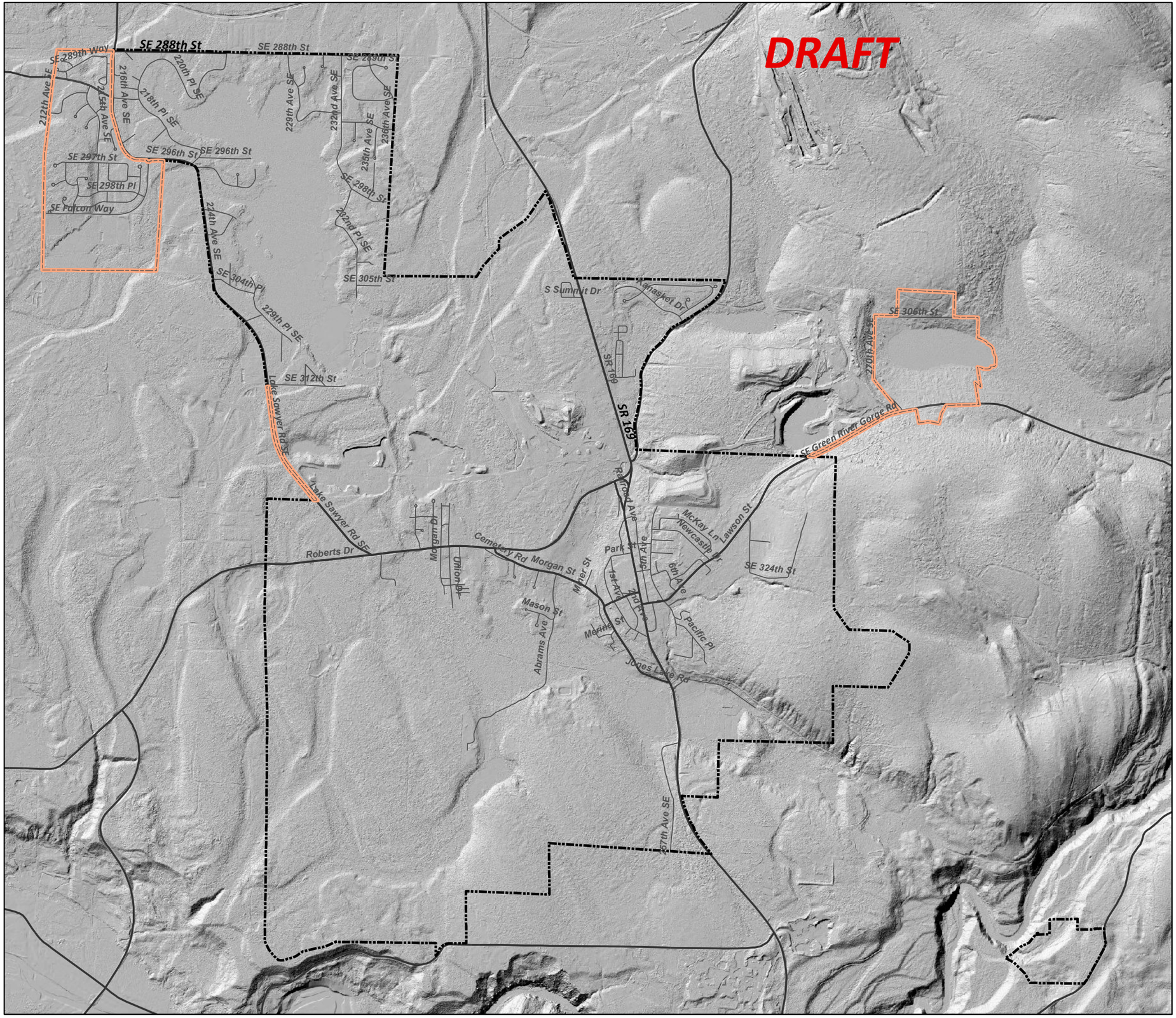

City of Black Diamond

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TOPOLOGY

Figure 4-11

Urban Growth Area (UGA)

City Limits

N

W E

S

0.5 0.25 0 0.5 Miles

GIS data source: King County and City of Black Diamond.

Map prepared February 2016

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TOPOLOGY WITH AERIAL

Figure 4-12

Urban Growth Area (UGA)

City Limits

N

W E

S

0.5 0.25 0 0.5 Miles

GIS data source: King County and City of Black Diamond.

Map prepared February 2016

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