3.0 EXISTING ENVIRONMENT

The City of Carnation is a small community at the confluence of the Tolt and Snoqualmie Rivers in eastern King County. The City lies within the Puget Sound lowlands, where climate is greatly influenced by the Pacific Ocean, the Cascade and Olympic mountain ranges, and weather patterns. The Puget Sound basin has a mild, modified marine climate characterized by cloudy, cool, wet winters and relatively dry, mild summers. Temperatures are generally moderate with few extremely cold or hot days throughout the year.[59] Much of the information in this chapter has been summarized or directly excerpted from the information compiled for and presented in the EIS.[60]

3.1 Population

Historical population estimates were presented in the 2004 Comprehensive Sewer Plan.[61] In addition to listing total populations, the 2004 Comprehensive Sewer Plan provides separate population estimates for each basin within the city limits as well as for the PAA. Historical population data for the City are summarized in Table 3.1.

Table 3.1 Historical Population Estimates
Carnation Wastewater Treatment Facility
King County Department of Natural Resources and Parks

Years	Historical Population Estimates	Estimated Growth per Year (%)
1981-1990	951 to 1,243	2.91
1991-2000	1,272 to 1,893	4.32

3.2 Existing Wastewater Collection and Treatment Facilities

3.2.1 City of Carnation

The City has historically used onsite septic systems as the sole method of wastewater treatment and disposal. Although many of the septic systems have been upgraded to septic tanks and drain fields, some cesspools and seepage pits are still in use. Public documents indicate that aging infrastructure and a lack of available drain fields have become areas of particular concern with regard to public health.[62,63,64] These concerns are based on the failure of some business and residential onsite septic systems, as well as changes in onsite septic system regulations.

3.2.2 Surrounding Cities

Within the greater Snoqualmie Valley, the incorporated Cities of North Bend, Snoqualmie, and Duvall and the Echo Glen Children's Center collect and treat wastewater at central facilities.[65]

The City of North Bend has a wastewater collection system that is currently rated for a maximum wet weather flow of 1.2 million gallons per day (mgd). The domestic wastewater is treated by pumping it to the head of the facility and processing the wastewater using a comminutor, aerated grit chamber, oxidation ditch, and secondary clarifier, followed by ultraviolet (UV) disinfection prior to discharge to the Snoqualmie River. The wasted solids from the secondary clarifier are thickened by gravity and transported to the City of Edmonds wastewater treatment facility for further processing.

The City of Snoqualmie currently has an oxidation ditch treatment system for the advanced removal of organic material, solids, and nutrients. The wastewater (2.15-mgd peak flow) is pumped through a set of screens, a grit chamber, and an oxidation ditch with selectors, followed by secondary treatment, tertiary filtration with chemical addition, and UV disinfection. The highly treated water is discharged to the Snoqualmie River or used as irrigation water for landscaping and a golf course.

The City of Duvall has a wastewater treatment facility that treats the domestic wastewater by gravity through a set of fine screens, an oxidation ditch, and secondary clarifiers prior to UV disinfection. Duvall is upgrading and expanding the facility to add an aerated grit chamber, second set of fine screens, and membrane bioreactors (MBRs) to provide up to 4-mgd flow capacity. An equalization basin will allow the facility to be able to handle up to 5.25 mgd. The upgraded facility is expected to be operational by July 2005 and will handle the solids through aerobic digestion and use of a belt filter press.

3.3 Surrounding Environmental Sensitivity

3.3.1 Special-Status Plant and Wildlife Species

As presented in Chapter 7 of the EIS,[66] special-status species include those classified as endangered, threatened, sensitive, or candidate by the Washington Department of Fish and Wildlife (WDFW), as well as species classified as endangered, threatened, candidate, proposed, or species of concern by the U.S. Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service – National Oceanic and Atmospheric Administration (NOAA). Documented special-status species include Chinook and coho salmon, bull trout, bald eagles, great blue and green herons, osprey, and bog clubmoss. Other special-status terrestrial species listed by the USFWS and/or WDFW may be present but have not been mapped by WDFW within two miles of the two potential treatment facility sites. These species are not specifically addressed because of the low potential for them to be affected by construction or operation of the CWWTF.

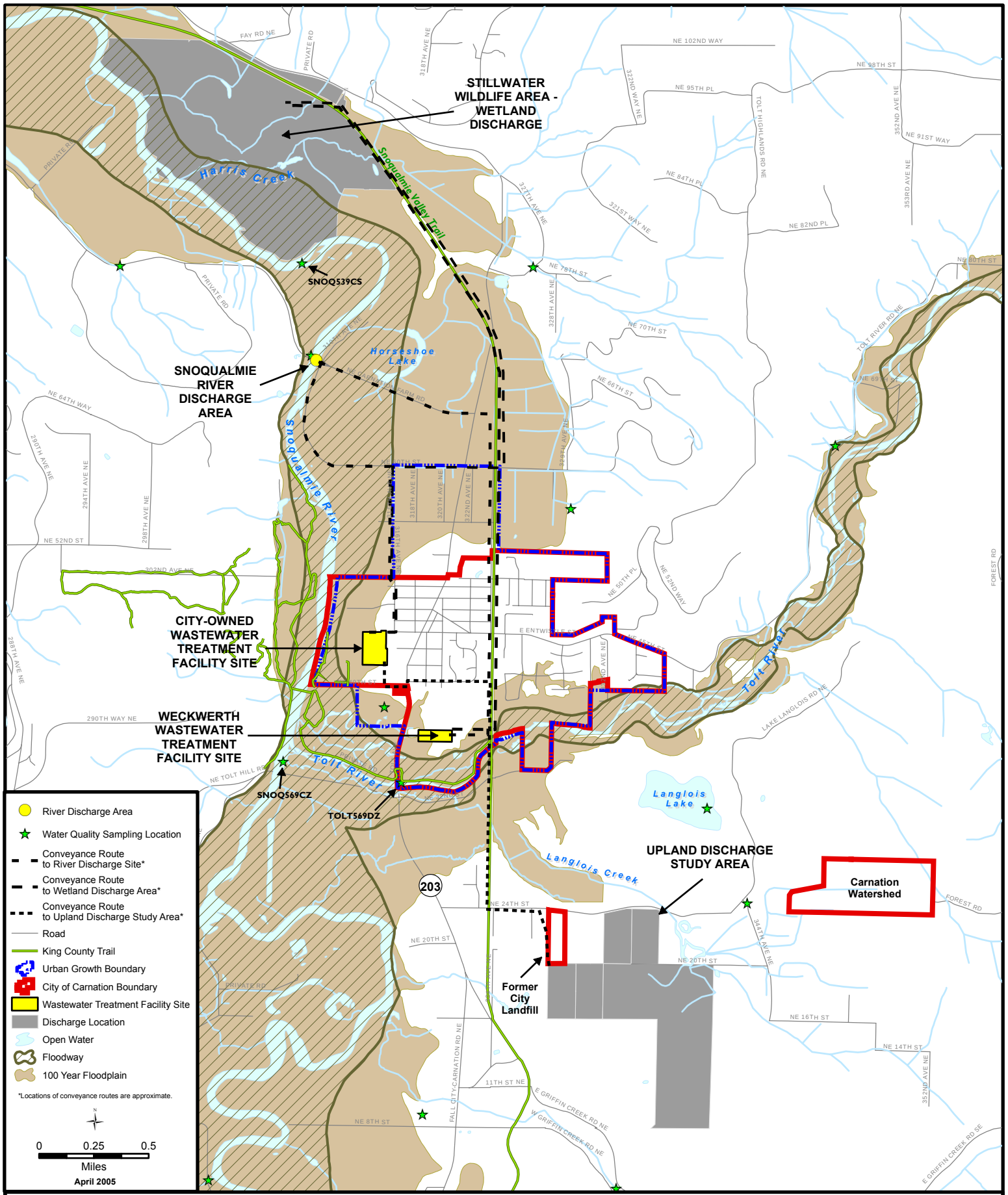
No federally or state-listed special-status species or priority habitats have been mapped by the federal government or WDFW within the boundaries of the City-owned site. The site is more than one mile from the documented occurrences of special-status bird species. The site is within a larger general area where bog clubmoss, a state-sensitive species, has previously been documented. Mapped priority habitats (riparian areas and wetlands associated with the Snoqualmie River) are located offsite to the west.

3.3.2 Floodplains and Floodways

The Snoqualmie and Tolt River regulatory floodways and 100-year floodplains were reviewed in relation to the proposed CWWTF footprint, conveyance route, and evaluated river outfall discharge areas. Floodway and floodplain mapping is based on the FEMA Flood Insurance Study (FIS) and Flood Insurance Rate Maps (FIRMs). The maps identify which properties are subject to floodplain regulations. Figure 3.1[67] shows a graphical representation of the existing floodway and floodplain areas using County GIS data.

The County GIS data indicates that the ten acre City-owned property proposed for the CWWTF site is approximately 70 percent within the 100-year floodplain. Detailed surveying was completed in December 2004 to update the elevation contours within the proposed site. Ground elevation at the City-owned site ranges approximately between 66 and 74 feet (North American Vertical Datum [NAVD] 1988) with the 100-year floodplain elevation at 72.6 feet. City building codes require building setbacks of 25 feet from the east property line and 30 feet from the north property line. Building setback limits and floodplain limits restrict the area available to site the treatment facility structures to a triangular area of approximately 0.6 acre. The preliminary CWWTF layout indicated that the structural footprint would have fit within the restricted area of the site, outside of the current 100-year floodplain. Hence, floodplain review of the facility was not initially required. As presented in Chapter 6 of the EIS,[68] outfall conveyance and discharge to the river will operate below the surface and therefore were not anticipated to impact the flood storage area or the County floodway and floodway fringes.

However, the County, in collaboration with FEMA and Snohomish County, has begun work on the Lower Snoqualmie and Skykomish River Flood Study. The study will update flood hazard maps for the lower Snoqualmie River as part of a FEMA Map Modernization Program. The project schedule calls for the draft maps to be prepared by mid-2005, preliminary FIRMs in 2006, and official FIRMs in 2007.[69] According to the draft map provided by the County on June 27, 2005, the 100-year flood elevation around the CWWTF facility site is proposed to be set at 74.11 feet (NAVD 88) and the 500-year flood elevation is at 75.60 feet (NAVD 88). This would place the sited facility entirely within the 100-year floodplain.



King County
Department of
Natural Resources and Parks
Wastewater Treatment Division

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Data Source: King County GIS

Figure 3.1

Floodways and Floodplains

CARNATION WASTEWATER TREATMENT FACILITY

According to the City's municipal code 15.64.050, "critical facilities constructed within the Special Flood Hazard Area (SFHA) (100-year floodplain) shall have the lowest floor elevated three feet or to the height of the 500-year flood, whichever is higher".[70] It is also sound engineering judgment to insure that the treatment facility remains fully operational during a 100-year flood event.[71] Assuming that the next revision to the FIRM document would be no more conservative than the draft map elevations, City code would dictate that the floor slabs be set at a minimum of 77.11 feet (three feet above the proposed 100-year floodplain elevation). Initial discussions with both the City's planner and County staff agree on the interpretation of the code's intent. To comply with this requirement, the lowest floor elevation for the CWWTF was revised to be at an elevation of 77.20 feet. In addition, the City's municipal code requires that access to and from the facility should be protected from flooding at the same elevation and access routes around the facility be protected to the extent possible.

3.3.3 Wetlands

The Snoqualmie Valley is part of the Pacific avian flyway route, providing stopover habitats for migratory birds as well as serving as habitat for many native species of wildlife. Within the initial discharge study area (as defined in Figure 2.1), the SWA consists of natural wetlands within the elevation range of a shallow groundwater regime. The SWA is situated on the floodplain of the Snoqualmie River, east of the river and southwest of the valley wall. The floodplain on which the site is situated can be described as a generally flat plain incised by remnant abandoned channel segments or oxbows. During non-flood conditions, surface water enters the floodplain area from the upland area to the northeast as flow from Harris Creek, an unnamed stream, and from various smaller and intermittent surface water drainages. Though groundwater is assumed to flow into the valley from the uplands, there is no observable manifestation of groundwater discharge on or around the SWA site. Three oxbow features dominate the site with a fourth feature, which is either shallower or more filled with sediments or organic material than the others, occupying part of the northwestern portion of the site. The oxbows and swales originate from historical migrations of the Snoqualmie River.

Previous discussions with regulatory agencies and special-interest groups have indicated that the supply of highly treated water from the CWWTF could provide a unique opportunity to restore natural wetlands in the SWA. Owned and managed by the WDFW, the SWA is approximately 540 acres and currently serves as public land for recreational use, including hunting. In the past, the area was used for tenant farming. The northern part of the area contains a number of fields, which could continue to serve as a viable agricultural production area. Most of the area south of Harris Creek has been overgrown, effectively cutting off access routes to farmers. It is bordered to the south by privately owned properties, to the west by the Snoqualmie River, to the north by the King County Stillwater Natural Area, and to the northeast by Highway 203 (Carnation-Duvall Road NE). Natural berms create favorable landscapes for complex communities of wildlife and microhabitats.

A number of invasive species, including reed canary grass, blackberries, and a number of conifer trees have infiltrated the area.

3.4 Potable Water

The City's main potable water supply is a 380-gallon-per-minute (gpm) capacity, gravity-fed natural spring, located to the southwest of the city limits. The existing water system also includes a well with a 700-gpm capacity serving as a backup source located within the city limits, a storage reservoir, and transmission/distribution mains. The City's current water pumping capacity is estimated to have sufficient capacity to satisfy the projected growth beyond the 2030 wastewater treatment facility design year. At present, the spring supplies approximately 90 percent of the City's daily water demand. Potable water from the spring is directed to an intake structure and chlorinated (the water from the well is not chlorinated) and conveyed to the central distribution system. As both the well and the springs utilize the same distribution system, the overall distribution system maintains a residual chlorine content. [72] In addition, a number of residents both within and outside of the UGA use private wells.[73] None of the well logs on file with Ecology indicate that water is being withdrawn from the shallowest groundwater regime. Instead, all water appears to be drawn from deeper aquifers.[74]

3.5 Hydrogeology

Located within the East King County Groundwater Management Area, most of the valley surrounding the City is designated as a critical aquifer recharge area.[75] The GMA[76] requires the establishment of developmental regulations to protect recognized critical areas. As such, the County approved a critical aquifer recharge ordinance (Ordinance 15051) in October 2004. Figure 3.2 indicates that the entire area around the City is highly susceptible to groundwater contamination.[77] The groundwater table in the UGA is estimated to be relatively shallow, generally five to ten feet below the ground surface. East of the UGA, the shallow groundwater regime is generally deeper at 15 to 20 feet below ground surface. The King County Soil Survey[78] indicates that seasonally high water tables in the floodplain area are approximately one to three feet below ground surface, likely a result of increased precipitation.[79]

The upper soils within areas of the City are suitable for infiltration. Those areas identified have a surface geology dominated by recessional outwash gravels and related soil types. The recessional deposits are, in turn, underlain by thin, possibly discontinuous till deposits. These are in turn underlain by pre-Vashon silt and clay deposits. Well logs examined for wells in this area indicate that Vashon advance deposits are locally absent. Till and pre-Vashon deposits act similarly to impede vertical groundwater flow.

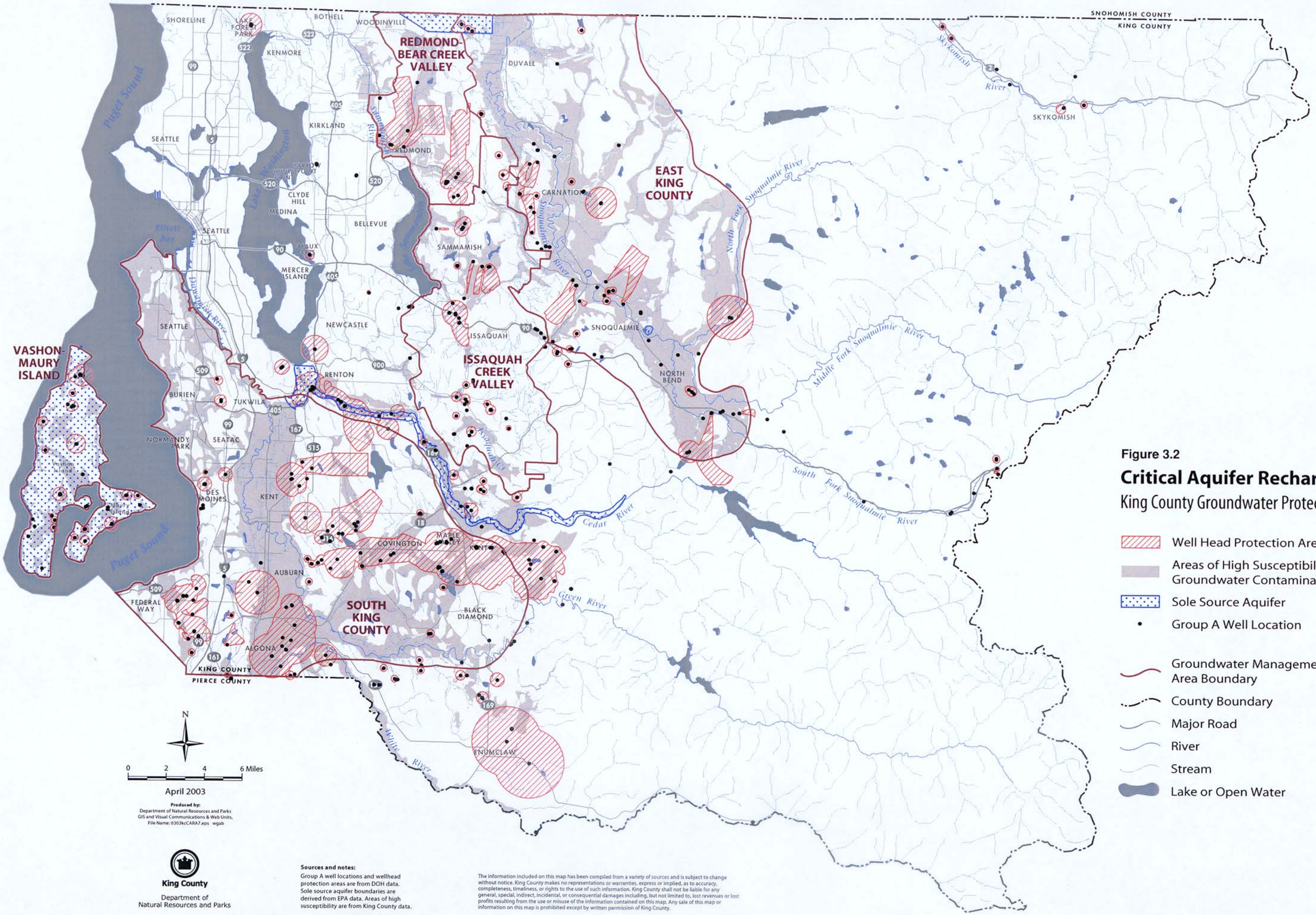


Figure 3.2

Critical Aquifer Recharge Areas

King County Groundwater Protection Program

- Well Head Protection Area
- Areas of High Susceptibility to Groundwater Contamination
- Sole Source Aquifer
- Group A Well Location
- Groundwater Management Area Boundary
- County Boundary
- Major Road
- River
- Stream
- Lake or Open Water

Recharge to this area occurs primarily through direct precipitation. Precipitation typically infiltrates quickly into the subsurface in areas where recessional outwash gravels and materials is at the surface. Additional recharge to the recessional outwash-covered area is also derived from surface runoff and shallow subsurface flow moving downgradient from higher elevations. Initially, the major component of infiltrating water moves vertically downward through the recessional materials until it reaches the base of the unit. Once the water encounters the lower-permeability till and clay units, it saturates the recessional sediments until it has generated a sufficient gradient to cause the water to flow laterally through the more permeable sediments downgradient to the floodplain area, eventually discharging to either the Tolt or Snoqualmie Rivers.

The septic system drain fields that currently serve the City's sewage needs release water to the ground, which also provides some recharge to the shallow groundwater regime. The drain fields recharge the shallow groundwater regime, although downward seepage ultimately reaches the lower confined aquifer. In addition to the downward seepage, the shallow groundwater regime likely discharges to local streams and wetlands.

The near-surface geology in the SWA is dominated by silt and clay deposits and underlain by presumably more permeable fluvial deposits from the Snoqualmie River. Little surface water and groundwater interaction is expected due to the presence of low-permeability sediments at the surface.[80] Surface water entering the area through stream flow or precipitation does not likely reach groundwater, and it is unlikely that there is considerable upward transfer of water in the area.

3.6 Surface Water

3.6.1 Snoqualmie River

The major surface water body in the initial discharge study area is the Snoqualmie River, which defines the western edge of the City and generally flows from the southeast to northwest. The Snoqualmie River, part of the Snohomish watershed, joins the Skykomish River to form the Snohomish River. The upper drainage basin is mainly forestland managed by the U.S. Forest Service (USFS) or private entities, along with commercial and residential pockets of development. Population centers and mixed agricultural uses such as dairies, berry fields, pastures, and row crops are numerous throughout the lower valley.[81] Snoqualmie Falls, located 17 miles upstream of the City at River Mile (RM) 40.4, is a predominant feature of the river.

The Snoqualmie River system is highly valued for its recreational, aquatic habitat, and domestic water supply uses.[82] Documented salmonid species in the lower Snoqualmie River include Chinook, chum, coho, pink, and sockeye salmon; mountain whitefish, steelhead (winter and summer); and bull, cutthroat, and rainbow trout.[83] Typical summer

activities on the Snoqualmie River include inner-tubing, canoeing, swimming, and the use of small watercraft.

As presented in Chapter 6 of the EIS,[84] the Snoqualmie River near the City is reported by U.S. Geological Survey (USGS) to have a mean annual flow of over 3,700 cubic feet per second (cfs) and winter peak flows of over 15,500 cfs. Since 1930, the USGS has maintained a stream flow gauging station (Number 1214900) near the City at RM 23.0. Based on 73 years of records, the average discharge at this station is 3,738 cfs, with a maximum discharge of 65,200 cfs recorded on November 24, 1990, and a minimum discharge of 239 cfs recorded on August 21, 1945.[85] Historically, most of the major floods in the Snoqualmie River have occurred between the months of November and February. Under the existing surface water quality regulation, the Snoqualmie River is designated as "Salmon and Trout Spawning, Core Rearing, and Migration for extraordinary primary contact recreation" (formerly Class A) waters from RM 9.1 to the headwaters of the South Fork.[86] The headwaters mainly originate from the Alpine Lakes Wilderness in the central Cascade Mountains,[87] east of the City. Portions of the Snoqualmie River are included on the 1998 list of impaired water bodies for temperature and pH.[88] Historical water quality data for the Snoqualmie River have indicated previous violations of the former "Class A" Surface Water standards[89] for dissolved oxygen, pH, and fecal coliform bacteria.[90] Agricultural, residential, and silvicultural areas have been documented as nonpoint sources of pollutants throughout the lower Snoqualmie River system.[91]

3.6.2 Tolt River

As presented in Chapter 6 of the EIS,[92] the Tolt River, which drains a 101-square-mile basin, is the largest tributary to the lower Snoqualmie River. The Tolt River enters the Snoqualmie River just south of the City at RM 24.9. The upper reaches of the Tolt River watershed are forestland. The Tolt River watershed is sparsely developed with roads and residences.[93]

The County collected water quality samples from the Snoqualmie and Tolt Rivers from February 2003 to January 2004 as part of the CWWTF project to further assess ambient water quality conditions.[94] Monthly samples were collected at three river locations and tested for pH, dissolved oxygen, temperature, ammonia, ortho-phosphorus, total phosphorus, total suspended solids (TSS), turbidity, and bacteria. Testing results from these samples indicate that pH did not meet the minimum "Salmon and Trout Spawning, Core Rearing, and Migration for extraordinary primary contact recreation" water quality standard of 6.5 to 8.5 pH on some occasions. Dissolved oxygen, ammonia, fecal coliform bacteria, and turbidity met state water quality standards on all occasions. "Salmon and Trout Spawning, Core Rearing, and Migration for extraordinary primary contact recreation" water quality standards do not exist for ortho-phosphorus and TSS. Water quality samples were also collected quarterly at the three stations and tested for trace metals and trace organics. Testing results from these samples reveal low levels for both total and dissolved metals, many of which were at or below the method detection limit (MDL) or the reporting

detection limit (RDL), and most of the organics were at or below the MDL. These levels were all well below water quality standards or aquatic effects thresholds, indicating that the river continues to be consistent with its use designation. The concentration ranges for the samples collected are summarized in Table 3.2.

3.6.3 Harris Creek

Harris Creek enters the Snoqualmie River from the east at RM 21.3.[95] Riparian conditions within the lower reaches are considered good to fair with a fairly natural shoreline.[96] Harris Creek is a classic small Coho stream with good spawning productivity. Other fish species that use the creek include Chinook salmon, chum salmon, winter steelhead, and cutthroat trout.[97]

The surface water in the area is monitored as part of the County's gauging station network. The Harris Creek gauge, upstream of the SWA, shows an annual minimum daily base flow discharge of 0.41 and 0.14 cfs for the 2002 and 2003 water years, respectively.[98] Wet-season mean daily flows are generally around 50 cfs with peak flows of over 400 cfs. Using similar base characteristics, the average flow of the approximately two-square-mile catchment associated with the unnamed creek immediately north of Harris Creek should be approximately 10 cfs.[99]

3.7 Soils

As reported in Chapter 4 of the EIS,[100] the City is situated near the eastern edge of the Puget Sound Lowlands. This regional basin is generally trough-shaped and trends approximately north-south between the Olympic and Cascade mountain ranges. Within the study area, Tertiary-age bedrock (alternating sequence of glacial and interglacial sediments) is interpreted to occur between 200 and 400 feet below the surface and outcrops at the surface less than three miles to the east.[101]

The King County Soil Survey[102] generally classifies soils in the area as part of a group of soils known as the Oridia-Seattle-Woodinville Association.[103] This soil group occurs in major stream valleys or nearby level areas. Major soil types within this group include Oridia soils, Seattle soils, and Woodinville soils. Minor soils in the group include Briscot, Edgewick, Newberg, Nooksack, Pilchuck, Puget, Puyallup, Renton, Si, Sultan, Snohomish, Shalcar and Tukwila soils. In general, soils in the Oridia-Seattle-Woodinville Association are well-suited for farming and pasture. However, poor drainage and a seasonal high water table result in moderate to severe limitations for urban development. Geologic units present at effective depths within the study area are composed exclusively of unconsolidated sediments and can be subdivided into three general categories, from youngest to oldest: 1) recent alluvium associated with local rivers, 2) deposits of the Vashon Glaciation, and 3) pre-Vashon non-glacial or transitional deposits.[104]

Table 3.2 Concentration Ranges for Samples Collected on the Snoqualmie and Tolt Rivers Near Carnation from February 2003 to January 2004
Carnation Wastewater Treatment Facility
King County Department of Natural Resources and Parks

Parameter	Units[a]	Sampling Location		
		Snoqualmie River, Chinook Bend	Snoqualmie River, Upstream of Tolt	Tolt River, Upstream of Snoqualmie)
Turbidity	ntu	.81 to 13.7	0.91 to 9.04	0.69 to 27.2
TSS	mg/L	23.3 to 1	0.6 to 20.1	< 1 to 44.6
Fecal coliform bacteria	CFU/100mL	2 to 21	3 to 68	0 to 50
pH	pH	6.3 to 7.1	6.1 to 6.9	6.6 to 7.7
Dissolved oxygen	mg/L	9.2 to 13.1	8.5 to 12.3	10.5 to 14.1
Ammonia-N	mg/L	< 0.01 to .017	< 0.01 to .015	< .01 to .011
Phosphorus, total	mg/L	.023 to .0067	.007 to .0235	< .002 to .024
Ortho-phosphorus	mg/L	< .002 to .0043	< .002 to .0049	< .002 to .0123
Arsenic, total	mg/L	.00095 to .0013	.0011 to .0014	< .0005
Arsenic, dissolved	mg/L	.00058 to .00096	.00065 to .0012	< .0005
Copper, total	mg/L	.00061 to .0013	.0006 to .00201	.00043 to .00436
Copper, dissolved	mg/L	< .0004 to .00063	.0004 to .0008	< .0004 to .00081
Cadmium, total	mg/L	< .0001	< .0001	< .0001
Cadmium, dissolved	mg/L	< .0001	< .0001	< .0001
Chromium, total	mg/L	< .0004 to .0015	< .0004 to .0014	< .0004 to .00249
Chromium, dissolved	mg/L	< .0004	< .0004	< .0004
Lead, total	mg/L	< .0002 to .00029	< .0002 to .00029	< .0002 to .00051
Lead, dissolved	mg/L	< .0002	< .0002	< .0002
Mercury, total	mg/L	< .000005	< .000005	< .000005 to .0000093
Mercury, dissolved	mg/L	< .000005	< .000005	< .000005
Nickel, total	mg/L	< .0003 to .0014	< .0003 to .0013	< .0003 to .00214
Nickel, dissolved	mg/L	< .0003	< .0003	< .0003
Zinc, total	mg/L	< .0005 to .0021	< .0005 to .0021	< .0005 to .00394
Zinc, dissolved	mg/L	< .0005	< .0005	< .0005

CFU = colony forming units
mg/L = milligrams per liter
mL = milliliter
ntu = nephelometric turbidity units

a. Conventional parameters were collected on a monthly basis; 12 samples are reported. Metals were collected quarterly; 4 samples are reported.

Source: King County Department of Natural Resources and Parks, Water and Land Resources Division, *Draft Existing Water Quality Conditions in the Snoqualmie River near the City of Carnation: 2003-2004 Monitoring Results*, February 2005.

Recent alluvium (Qal) includes fluvial materials deposited on present-day floodplains and adjacent to the major streams in the area. Grain size and associated permeability of the Qal are variable within the study area, ranging from low-permeability clay and silt in floodplain deposits, to coarser, high-permeability sand and gravel in deposits more closely associated with stream channels.

Vashon glacial deposits generally include the extensive sequence of glacial material deposited in the Puget Sound Lowland during the Vashon Stade of the Fraser Glaciation. These deposits are usually laid down by meltwater or deposited in-situ from the advancing Vashon glacier. This geologic unit is typically composed of compacted sand and gravel with variable amounts of silt. As such, deposits are usually highly impermeable and act to constrain groundwater flow. The thickest till deposits found in the area generally form caps on the tops of the hills in the higher upland areas. However, thin till-like deposits (likely lodgment till deposited directly below the advancing glacier) are indicated by well logs to be present within the shallow subsurface below the floodplain, and some lower deposits are also found in the initial upland discharge study area. Coarser materials were laid down by meltwater streams, and finer material was deposited in lakes or other still-water environments formed by or associated with the receding glacier. Due to the nature of the depositional mechanism in the study area (i.e., stagnating ice melting in place), the recessional deposits tend to be less sorted than the advance deposits within the primary area of interest. Inasmuch as they were not overridden by the glacier, they tend to be less compacted. Generally, the recessional deposits are moderately to highly permeable in comparison to the underlying till. Within the lower portions of the upland area (east of the Snoqualmie floodplain), recessional outwash accounts for much of the surficial geology and ranges in thickness from a thin veneer to several hundred feet.

Pre-Vashon interglacial or transitional deposits are the oldest sediments identified in the study area. The majority of these deposits consist of thick sequences of lower-permeability silts and clays interspersed with much thinner, discontinuous lenses of sand and gravel. The generally fine-grained nature of the unit indicates that it functions as an aquitard in the regional hydrogeology, impeding the vertical movement of groundwater from the Vashon outwash sediments to deeper groundwater regimes.

3.8 Land Use and Shoreline Areas

The Snoqualmie Valley has been shifting away from a historically natural resource-based economy (e.g., agriculture and forestry) toward one that is more retail and service oriented. Developing capital facilities and services, including wastewater facilities and services, to accommodate planned growth are integral to achieving the goals identified in the City of Carnation 1996 General Comprehensive Plan.[105] Recently, the industrial sector has more than doubled the amount of land it occupies within city limits.[106] The historical industrial lands consist mainly of older warehouse buildings. It is anticipated that much of the future commercial development will occur within the City's existing downtown area. The expansion

of the City's commercial base will depend on the provision of a sound wastewater treatment system that has the capacity to accommodate new development and will protect important sources of groundwater and surface water.

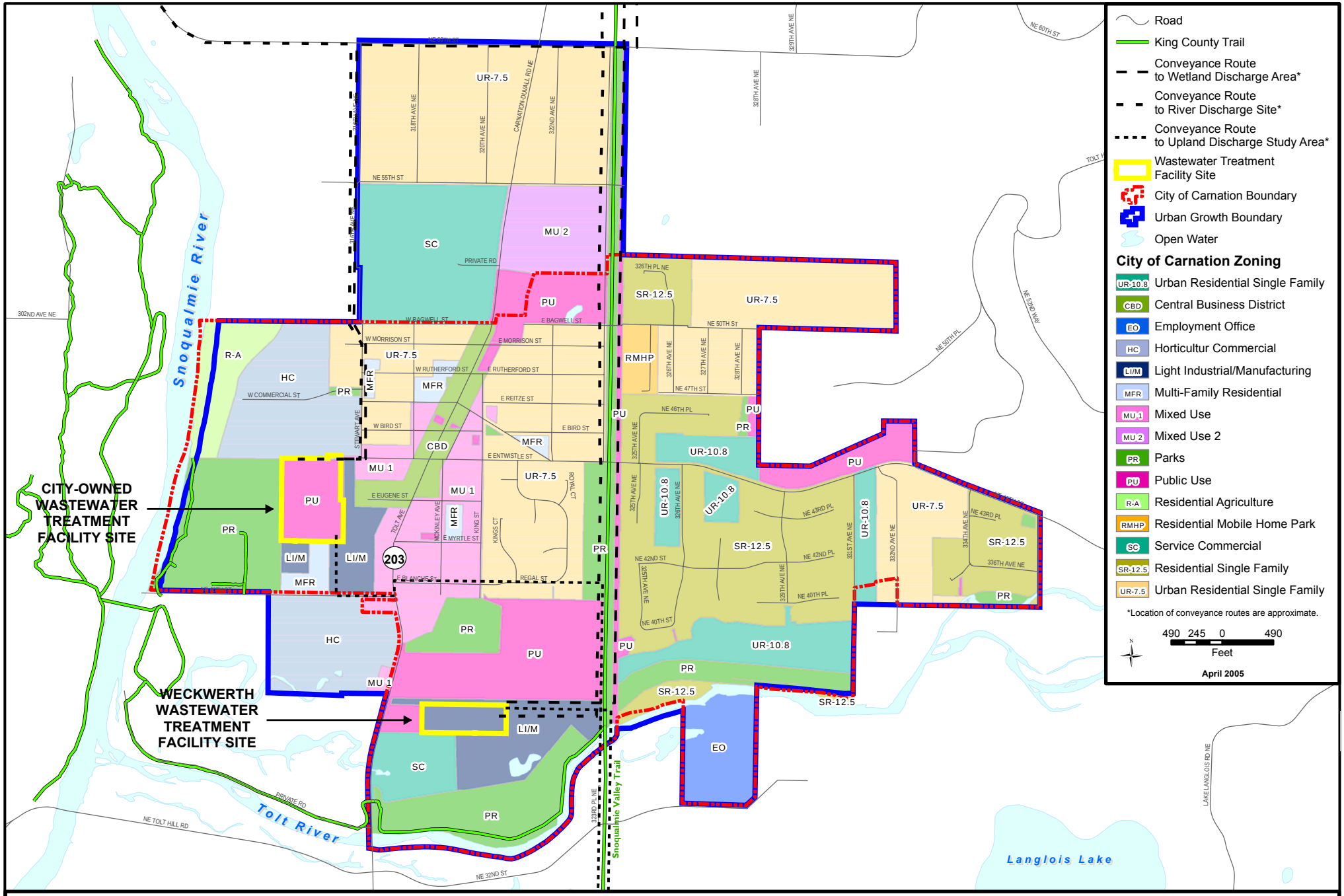
Figure 3.3[107] illustrates the current zoning designations within the City. Figure 3.4[108] illustrates the designated shoreline environment in the area surrounding the City.

3.9 Air Quality

As reported in Chapter 5 of the EIS,[109] the City lies within the Puget Sound airshed, where air quality is greatly influenced by urban development, the Pacific Ocean, the mountains, and weather patterns. When onshore airflow to the region is interrupted, the combination of urban activities, weather, and topography can lead to air stagnation and rising air pollution.[110] The average wind velocity within the Puget Sound Lowland is less than ten miles per hour (mph). The prevailing wind direction is primarily from the southwest during the wet season (winter) and north or northwest during the summer. Occasional severe winter storms produce strong northerly winds. Existing air quality in the City is typical of urban residential, commercial, rural, and agricultural areas. The proposed project is located in the eastern part of King County. This area is currently a "maintenance area" under the U.S. Environmental Protection Agency (EPA) classifications.[111] The standards for carbon monoxide and ozone have been violated in the past but are now being met and closely monitored under a State Implementation Plan (SIP) for attainment of air quality standards. The proposed treatment facility site lies within the carbon monoxide and ozone maintenance areas, and thus the facility will be subject to the requirements of the SIP.

3.10 Historic and Archaeological Sites

As reported in Chapter 13 of the EIS,[112] the study areas are within the hunter-fisher-gatherer territory of the Snoqualmie and Tulalip Tribes. A historical village that served as an administrative center for the Snoqualmie Tribe was located on the west bank of the Snoqualmie River near the confluence with the Tolt River. Evidence of this village and an associated burial ground area has been obliterated by successive flooding of the Snoqualmie River.[113] In the *Carnation Wastewater Treatment Facility Project EIS Cultural Resources Overview,* the report studied an area encompassing Sections 4, 5, 9, 10, 15, 16, 21, 22, and 27 of Township 25 North Range 7 East.[114] Eleven former areas occupied or used by hunter-fisher-gather peoples, such as villages and encampments and traditional were identified in the cultural resources overview. In addition, Government Land Office (GLO) records refer to the "Snoqualmie Trail," a trail that extends along the east bank of the Snoqualmie River. This trail may have been part of a well-established trail network that the Snoqualmie used to trade and socialize with neighboring tribes.[115]



King County
Department of
Natural Resources and Parks
Wastewater Treatment Division

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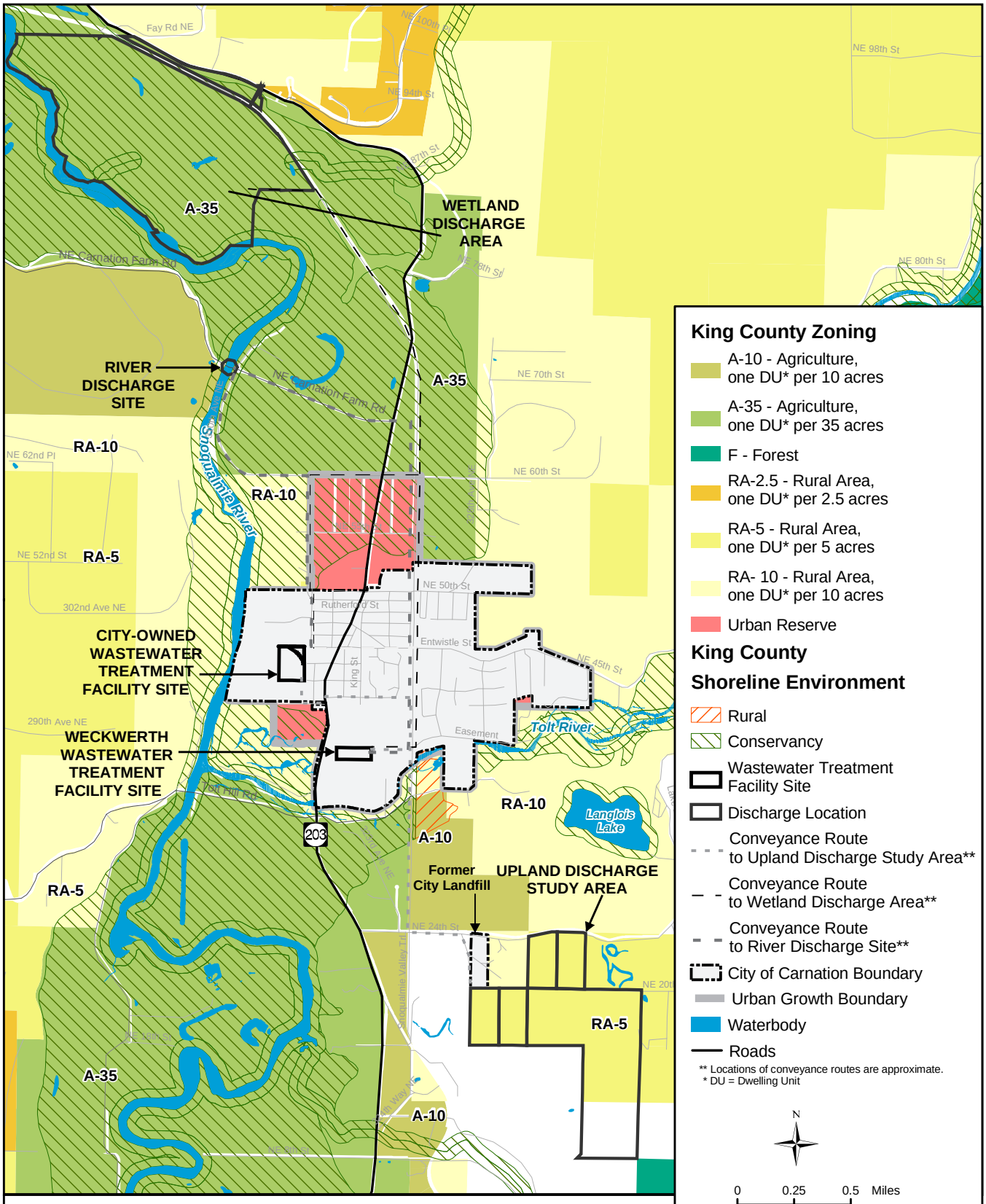
Data Source: King County GIS

Figure 3.3

City Zoning Areas

CARNATION WASTEWATER TREATMENT FACILITY



King County
Department of Natural Resources and Parks
Wastewater Treatment Division

Figure 3.4

King County Zoning and Shoreline Designations
CARNATION WASTEWATER TREATMENT FACILITY

Data Sources: King County GIS, 2003 **File Name:** L:\ENVIR IMPACTS\2003 Projects\23016 Carnation WWTP\GIS\KC&carnation_Zones.mxd 6/18/2004 cm **Prepared by:** King County WLR Visual Communications & Web Unit

The overall discharge study area in and around the City contains numerous sites and resources and in recent years has continued to reveal sites for excavation.[116] The Cultural Resources Overview reported at least 17 archaeological resources studies conducted within approximately two miles of their study area between 1980 and 2003.[117] Typical sites documented include hunter-fisher-gatherer sites on the Snoqualmie River floodplain, which suggests that additional intact archaeological deposits may be buried under relatively shallow deposits of alluvial soils, near abandoned channels or the confluences of rivers.[118]

Properties and structures listed on the National Register of Historic Places (NRHP), the Washington Heritage Register (formerly State Register of Historic Places), and/or the Register of King County Landmarks have been inventoried and evaluated for their local historical significance. The locations of these properties and structures in relation to the proposed CWWTF alternatives are shown on Figure 3.5.[119] A Cultural Resources Overview[120] also identified 14 other historic buildings (i.e., buildings more than 40 years old) that are within 50 feet of the conveyance alignments or near CWWTF and discharge site alternatives but are not identified in Figure 3.5. The EIS concluded that there would be no significant unavoidable adverse impacts to cultural resources at any of the site alternates or corridors investigated. All potential impacts are avoidable or can be mitigated.

No recorded archaeological sites listed on federal, state, or local registers are located on or immediately adjacent to the proposed CWWTF site. The site has a high probability for unrecorded hunter-fisher-gatherer, ethnographic period, and historic Indian period archaeological resources and a moderate to low probability for historic period archaeological resources. Shovel probe surveys that were conducted in 2004 and 2005 by professional archaeologists in conjunction with the monitoring of the geotechnical exploration during the CWWTF design process did not identify materials of cultural significance directly on the City-owned site. It is not anticipated that cultural or historical resources will be affected by construction or operation and maintenance of the CWWTF. As the project moves ahead, further survey work and or construction monitoring by a professional archeologist may occur on the City-owned site.

The proposed outfall conveyance pipe lies along a 1.6-mile-long route located almost entirely within previously disturbed rights-of-way. Two buildings (one of which has been historically inventoried) are located within 50 feet of the alignment and could potentially be affected by construction vibration. However, this type of construction activity rarely results in vibration levels that could cause structural damage to buildings.[121] Although no historical or culturally significant sites listed on federal, state, or local registers are located on or immediately adjacent to the proposed conveyance route, the route has a high probability for containing unrecorded hunter-fisher-gatherer, ethnographic period, and historic Indian period archaeological resources, and a low probability for historic period archaeological resources. It is possible that trench excavation below the depths previously disturbed material may encounter archaeological resources.

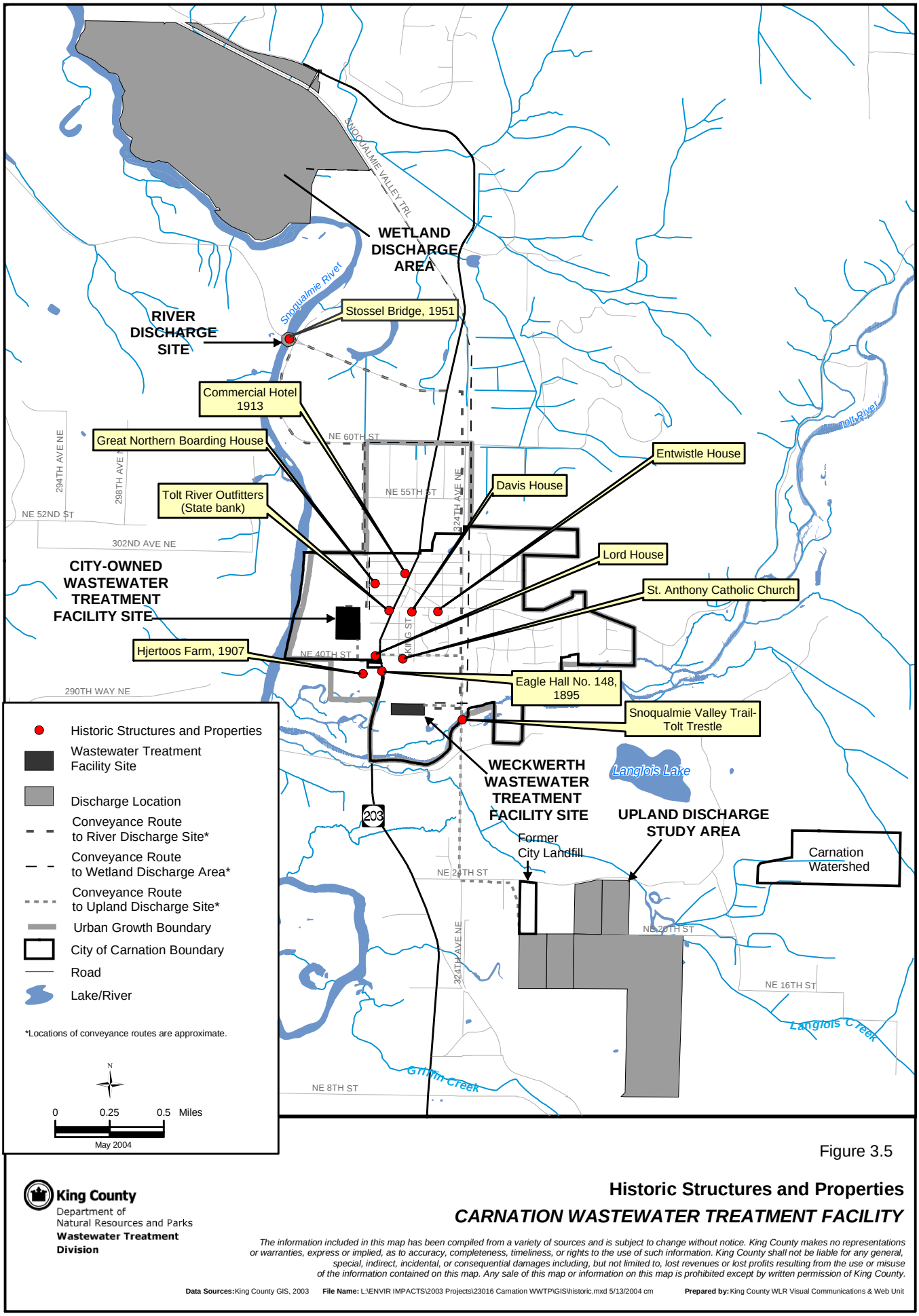


Figure 3.5

King County
Department of Natural Resources and Parks
Wastewater Treatment Division

Historic Structures and Properties
CARNATION WASTEWATER TREATMENT FACILITY

Data Sources: King County GIS, 2003 **File Name:** L:\ENVIR IMPACTS\2003 Projects\23016 Carnation WWTP\GIS\historic.mxd 5/13/2004 cm **Prepared by:** King County WLR Visual Communications & Web Unit

The proposed river outfall is located at the right-of-way intersection of NE Carnation Farm Road and the Snoqualmie River at the Bridge (also referred to as the Stossel Bridge). The bridge is a designated County landmark, listed on the Washington State Register and eligible for listing on the NRHP. Impacts to the bridge could include vibration from heavy machinery operating in close proximity to the bridge. Although no historical or culturally significant sites listed on federal, state, or local registers are located immediately adjacent to the Bridge, the immediate area has a high probability for containing unrecorded hunter-fisher-gatherer, ethnographic period, and historic Indian period archaeological resources and a low probability for historic period archaeological resources.

Notes

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