II. ENVIRONMENT

PURPOSE

Land use plans and major land use decisions should be made with the fullest possible knowledge of the natural environment. Planning and decision making lies in a two-fold truism – land use affects natural conditions and processes, at the same time that natural conditions and processes affect the use of land.

Cowlitz River – Camelot Area

The City recognizes that a healthy environment promotes a high quality of life for the entire community. Natural amenities including the Cowlitz River, forested hillsides, riverfront property, abundant fish and wildlife and many other factors all contribute significantly to the City's atmosphere and success. This chapter attempts to balance protection of critical areas and other natural amenities with the goals and policies found throughout the comprehensive plan.

The attention given to the natural environment in land use planning and decision-making has increased in the past two decades. In local planning, the increased environmental awareness is reflected in such terms and concepts as carrying capacity analysis, land capability analysis, threshold studies, environmental impact statements, and performance controls. What is new with these concepts and related regulatory tools is a shift of focus from what is on the land to how the land functions. The underlying assumption with carrying capacity analysis is that land is a complicated resource, and that there are limits to the amount of growth and development the environment can absorb without threat to public health or permanent loss of animal species and plant life. In this period, land use planning has been invigorated by the realization that decision-making based on environmental knowledge is more effective and efficient in controlling damage from natural hazards than structural, man made solutions.

The increased attention given to the natural environment in planning coincides to some degree with the rise of an environmental ethic in the United States. But it is also related to episodes of damage to life and property that occurred when the natural environment was not adequately considered.

Castle Rock and Cowlitz County on occasion have experienced episodes of damage. For some natural hazards, the only solutions are structural and man-made: dikes, dams, ditches, pumping stations, riprap, and dredging. Such a hazard is the continuing conditions of siltation in the Cowlitz River. But for other hazards including slope instability, poor soil drainage capability, severe soil shrink/swell potential, and presence of

faults – non-structural solutions to prevent damage are desirable and available through planning and informed decision-making.

The Castle Rock Comprehensive Plan falls on the heels of the Castle Rock Critical Areas Ordinance completed in 2002. The Critical Areas ordinance identifies and maps sensitive areas that are in need of special consideration, analyzes the natural processes associated with sensitive areas, and provides tools for maintaining sensitive areas all while allowing compatible development.

The purpose of the natural environment background section is to provide necessary environmental information to City decision-makers, to alert property owners and developers to special problems, to lay groundwork for regulatory tools, and to indicate the basis for the plan's goals, and policies relating to the natural environment.

GENERAL ENVIRONMENTAL INFORMATION

It is advocated that land use plans and decisions should be made with the fullest possible knowledge of the natural environment and processes that are involved. Until recently, the consideration of the natural environment in the development of urban areas has been sorely neglected. Besides the obvious damage wrought by catastrophic natural disasters (floods, earthquakes), less spectacular but far more costly is damage due to such natural hazards as erosion, landslides, and expansive soils.

There are many costly examples of ignoring environmental factors in Cowlitz County as well: flooded basements and entire houses, damage to housing built in geologically unstable areas, wall and foundation damage from expansive soils, septic tank failures, etc. In the final analysis, we all pay for these damages directly as property owners or indirectly as taxpayers. The Aldercrest landslide in Kelso in 1998 (which destroyed around 128 homes) underscores the importance of assessing potential natural hazards and planning accordingly.

Geology

Geologic Hazards pose a risk to public and private property and to the natural systems that make up the city's environment. These lands are susceptible to slides, erosion, seismic effects, and volcanic and mining hazards. The bedrock geology of the study area is varied and complex and only generalized geologic mapping has been done of the area. The surface and near-surface composition of the study area has been formed and modified over time by glaciation, volcanism, faulting, folding, deposition of sediments by rising and falling water bodies, and erosion. The primary geologic functions in the area are:

Alluvium – Consists of sand, gravel, and silt underlying floodplains, valley floors, and low terraces. Most of Castle Rock and the low-lying area along the Cowlitz River and Salmon Creek are alluvium.

Wilkes Formation – Consists of nonmarine semiconsolidated claystone,

siltstone, sandstone, and conglomerate. Most of the material in the Wilkes Formation was derived from explosive volcanoes and erosion of volcanic flows. It is seen around water bodies in the study area.

Terrace deposits – Composed of pebbles, cobbles, and boulders in a poorly sorted sandy matrix. Most of the deposit is partly cemented with limonite derived from ground water. East of Castle Rock along Interstate-5 the terraces are believed to have been formed by continental glaciations which brought material down the ancient Cowlitz. South and east of Salmon Creek the terrace has been reduced to an erosional feature marked by thin patches of gravel a few feet or less in thickness.

Logan Hill Formation – Consists of deposits of gravel and sand with minor amounts of silt and clay. In the study area, the formation is found adjacent to the terrace deposits and runs in a north-south direction east of Interstate-5.

Cowlitz Formation – Composed of marine sandstone and siltstone; brackish water siltstone and sandstone; and nonmarine sandstone and siltstone, and coal beds. In the study area, the formation lies east of Interestate-5 intermingled with the terrace deposits and the Logan Hill Formation.

Hatchet Mountain Formation – The ridge line (Newell Ridge or Ubheloe Hill) that basically separates Castle Rock, Interstate-5, and the terrace hillside along I-5 from Silver Lake is characterized as Hatchet Mountain Formation. The rugged ridges and mountains are formed of lava flows, flow breccias, pyroclastic rocks, and sedimentary rocks overlying the Cowlitz Formation.

Topography

Much of Castle Rock is located along the Cowlitz River floodplain which is very flat. The hillsides immediately west and southwest of Castle Rock have slopes up to 30 percent.

Elevation in the study area varies from 40 feet above sea level at Castle Rock and the Cowlitz River Valley to approximately 1,000 feet at Newell Ridge.

Climate

The climate of the study area is mid-latitude, West Coast marine type with moist air and a small daily range in temperature. The major climate influences are the position and intensity of large high and low pressure centers in the North Pacific Ocean.

The average maximum temperature in the summer exceeds 75 degrees for July and August, while the average minimum temperature in January, the coldest month, has a low just below freezing at 31.8 degrees and a high of 44.5 degrees. There are approximately 175 frost-free days annually. Humidity is rarely a problem, but sometimes reaches uncomfortable levels in the summer. Annual precipitation in nearby Longview averages above 46 inches, while the Castle Rock area receives closer to 60 inches of precipitation

annually. Around 80% of the precipitation occurs between the month of October and March. Snowfall is light in the study area, although increases in higher areas. Average annual evaporation is 25 inches. Undeveloped areas in and around the city are generally forested. The predominant tree species growing in the region are Douglas fir, maple, hemlock, alder, cottonwood and other deciduous trees. Some wetlands and scrub are also in the vicinity.

Hydrology & Watershed Characteristics

The study area is drained by the Cowlitz River; one of its major tributaries, the Toutle River; and a number of creeks and intermittent watercourses. The Cowlitz River drains an area of 2,480 square miles, of which 1,170 square miles, or 47 percent, is controlled by the Mayfield and Mossyrock dams, owned and operated by Tacoma City light. About 68 percent of the Cowlitz drainage basin is in Lewis County, 22 percent in Cowlitz, and the remaining 20 percent in Skamania and Pierce. Glaciers and snowfields on Mount Rainier and Mount Adams as well as Mount St. Helens are the headwaters of the major tributaries to the Cowlitz. At Castle Rock, the average daily discharge is 9,198 cubic feet per second.

Cowlitz River looking South

The Toutle-Cowlitz watershed has long been known for its fish resources. Prior to the May 18, 1980 eruption of Mount St. Helens the Cowlitz and Toutle rivers supported wild runs of anadromous salmon and trout plus resident trout. These included fall Chinook and Coho salmon, winter and summer steelhead trout, and sea-run cutthroat trout. Fish hatcheries have supplemented the wild natural runs for years.

Since the 1980 eruption of Mount St. Helens, the Cowlitz River's fish habitat has, tremendously. This is due to the loss of habitat, and an infill of sediment. During the last five years there has been a slow increase in the number of fish re-entering the Cowlitz River basin since the eruption. We see numbers rising once again but they are still lower than past fish populations. This is a result of many factors including, loss of habitat, development, logging and road construction, passage barriers, and natural climatic processes.

Floods of the Cowlitz and Toutle rivers historically occur rapidly but are of short duration. Deep snowfalls followed by heavy rains in the October-March rainy season or warm Chinook winds produce heavy surface water runoff that may result in flooding. Already saturated ground conditions from steady winter rain preceding the heavy rain contributes to the flood event.

Soils

The Soil Conservation Service (now Natural Resource Conservation Service) published the soil survey for Cowlitz County in 1974. The majority of the City of Castle Rock, especially along the Cowlitz River, is classified as part of the Caples-Clato-Newberg Soils Association. These soils are primarily sand, sandy loam and silty loam. They form on the alluvium of flood plains. To the east of Interstate-5, the more upland area is part of the Bear Prairie-Loper Association, consisting of volcanic ash, basalt, and andesite. These soils form on ridge tops and mountainsides.
Each type of soil has a set of characteristics that determine whether that particular soil type is suitable for development. These characteristics consist of percent of slope, depth of bedrock, depth of seasonally high water table, shrink/swell potential, bearing strength, agricultural capability class, and natural hazard (soil slippage potential).

In order to facilitate use of the soil-characteristics information in planning, National Resource Conservation Service has developed a table on the suitability of the various soils for specific uses. The soils are rated as having low, moderate, or severe limitations for the specific use based on one or more of the soil characteristics. The three uses used in the rating system include septic drain fields, foundation for low buildings, and secondary roads and trails.

SHORELINE CONSIDERATIONS

The City of Castle Rock has approximately 3.4 miles of shoreline within the city limits. For the most part, the land that falls in the jurisdiction of state Shoreline Management Act is occupied by open space and recreation, and is diked along the city limits. There are no other rivers or lakes of sufficient size within the city limits that are subject to the shoreline rules. The City has adopted by ordinance, Cowlitz County's Shoreline Master Program, which was adopted in 1977. Cowlitz County is not required to update their Master Program until 2012.

CRITICAL AREAS ORDINANCE

Critical areas, as defined by the Growth Management Act, includes those areas and lands classified as wetlands, geologic hazard areas, fish and wildlife conservation areas (including streams), frequently flooded areas and critical aquifer recharge areas.

The City passed an updated version of its "Critical Areas Ordinance" in September 2002 as required by RCW 36.70A.060. Anyone wanting detailed information on critical areas should consult the City of Castle Rock Critical Areas Ordinance. A brief and

Lions Pride park

generalized description of each critical area appears below:

Wetlands

Areas that are inundated or saturated by surface water or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. Wetlands do not include those artificial wetlands intentionally created from non-wetland sites, including, but not limited to, irrigation and drainage ditches, grasslined swales, canals, detention facilities, wastewater treatment facilities, farm ponds, and landscape amenities.

Wetlands provide numerous valuable functions, including but not limited to supplying fish and wildlife habitat, water quality enhancement, flood and erosion control, aquifer recharge and discharge, shoreline stabilization, research and education opportunities and recreation.

The City has a wetland inventory map as well as wetland information on file from the National Wetland inventory (NWI), Cowlitz County, Natural Resource Conservation Service (NRCS) and others. Overall, there are not a tremendous amount of wetland features in or around the city.

In addition to local wetland regulations, federally regulated wetlands are also protected under Section 404 of the Clean Water Act. Fill, dredging and grading activities are regulated by the U.S. Army Corps of Engineers (USACE). Proposals involving potential or probable impacts to wetlands may have to go through a permitting and application process administered by the USACE. The Washington State Department of Ecology (DOE) also reviews applications for compliance with wetland regulations.

Castle Rock is required to comply with Section 404 and takes appropriate measures to notify project proponents of required permits. Compliance with section 404 is also achieved through the city's Critical Areas Ordinance. It is possible that a proposed development could be exempt from the city's Critical Areas Ordinance, but still subject to the USACE regulations.

Geologically Hazardous Areas

Geologic hazards pose a risk to public and private property and to the health, safety and general welfare of citizens. These lands are susceptible to erosion, sliding, earthquake, or other geological events, and mining hazards. Development should be directed to more geologically stable areas and restricted on unsuitable ground. Within this broad heading, there are two classes of hazards known as "potential geologic hazards" (slopes greater than 26%) and areas of "geologic concerns" (slopes between 12% and 25%) each requiring different levels of review.

Geotechnical assessments of the effects of potential site development shall be conducted to determine if a site is of concern. This assessment takes into consideration steepness of slope, retention of natural vegetation, soil characteristics, geology, drainage, groundwater discharge, and engineering recommendations related to slope and structural stability. A geotechnical

engineer shall prepare the geotechnical assessment.

Fish and Wildlife Conservation Areas
Fish and wildlife habitat conservation areas perform a variety of important physical and biological functions. These areas provide food, cover, nesting, breeding and movement for fish and wildlife and maintain and promote diversity of species and habitat.

Additional benefits include maintaining air and water quality, controlling erosion, recreation, education and scientific study and aesthetic appreciation and providing neighborhood separation and visual diversity within urban areas. Fish and wildlife areas include riparian habitat areas such as creeks and streams, waters of the state, species and habitats of local importance and several other classified features. The city has a number of smaller perennial and intermittent streams within its jurisdiction.

Conservation and protection of fish and wildlife areas is primarily achieved through establishment of riparian buffers adjacent to regulated stream features. Stream buffers are based on the type of stream present, as classified by the Washington State Department of Natural Resources.

Frequently Flooded Areas
Areas frequently inundated by floodwaters pose serious risk to property and public health. All lands identified in the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps, as amended and approved by the city, that include lands within the 100-year floodplain are designated as frequently flooded areas. The City of Castle Rock has adopted a Flood Plain Management Ordinance as Castle Rock Municipal Code (CRMC) Chapter 18. The FEMA floodplain map for the City of Castle Rock and Cowlitz County indicates that the majority of the city lies outside of the 100-year floodplain. Portions of the city north and east of Buland Drive. and south along Interetate-5 lie within special flood hazard areas. The floods of 1996 underscore the importance of planning for floods and reducing their impact to the city and its residents.

Critical Aquifer Recharge Areas
Aquifer recharge areas perform many important biological and physical functions that benefit the city and its residents, including but not limited to, storing and conveying groundwater. Protection of aquifer recharge areas is, therefore, necessary to protect public health, safety and welfare.

The primary surface water features within or near the City of Castle Rock is the Cowlitz River. Other features include Arkansas Creek, Whittle Creek, and Salmon Creek. The Cowlitz River flows southerly past Castle Rock on the western side of the City. The Cowlitz River and its aquifer provide the city and surrounding area its main water supply. Arkansas and Whittle Creek originate in the hills to the west of the city. Salmon Creek originates in the hills to the east of the city. All the creeks flow into the Cowlitz River within the city limits of Castle Rock.

OPEN SPACE

The City of Castle Rock seeks to preserve open space in an effort to protect vital habitat, improve the quality of life for residents and to buffer various land uses. Open space may occur in all land use classifications, but is particularly prevalent in the public/quasi public and open space recreation areas, which occupy significant areas of the city. Designated open space includes all environmentally sensitive areas (e.g. wetlands, stream buffers, steep slopes, etc.) and any other protective measures required by the Critical Areas Ordinance. The city maintains various maps identifying wetlands and steep slopes.

A large majority of the land outside of the City is managed forestland, which will be preserved as open space, unless the market crashes and the larger companies transform the property for a different use. The City is also very conscious about providing parks and trails for its residents.