

APPENDIX B

Shorelines Critical Areas Regulations

Shorelines Critical Areas Regulation

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1. Introduction

These Critical Areas Regulations are based on the Castle Rock Municipal Code (CRMC) Chapter 18.10 and have been modified to comply with the provisions of the Washington State Shoreline Management Act. As a result, all non-exempt development activities proposed for areas that involve designated environmentally sensitive areas, also known as critical areas, which are within areas under the jurisdiction of the Shoreline Management Act, must comply with the provisions of this Chapter. Proposed development activities that involve critical areas but do not involve jurisdictional shoreline areas are subject to the provisions of CRMC 18.10 and are not subject to the provisions of the Shoreline Master Program unless otherwise required by the City.

The City believes it important to strike a balance between critical land protection, private property rights, economic development, and diversification. Consequently, these regulations have been designed to encourage landowners to protect critical areas within shoreline jurisdiction by offering a range of incentives intended to provide equitably for such protection. In addition, it is the intent of the City to actively and constructively assist the applicant in the preparation and processing of permits, approvals, plans, requirements or procedures. The ultimate responsibility for providing complete and accurate application material and/or required information falls on the applicant.

1.1 Purpose and Intent

A. "Critical areas" include:

1. Wetlands;
2. Critical aquifer recharge areas;
3. Geologically hazardous areas;
4. Fish and wildlife habitat; and
5. Frequently flooded areas.

These areas contain valuable natural resources, provide natural scenic qualities important to the character of the community, perform important ecological functions and processes, or present a hazard to life and property. Identification, management, and protection of these lands and areas is, therefore, necessary to protect the public health, safety, and general welfare of Castle Rock's citizens.

- B. These regulations also describe the process used to determine whether a critical area exists on or adjacent to a particular parcel of land. The process includes the use
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of maps, physical inspections, and other methods of fact-finding. It is the intent of the city to use, with these regulations, the best available science and data in making a critical area determination. It is the intent of these regulations to:

1. Implement the goals, objectives, and policies of the environmental and land use elements of the City's Comprehensive Plan and the provisions of the Castle Rock Municipal Code;
2. Comply with the requirements of the Growth Management Act (Chapter 36.70A RCW) which mandate such rules and guidelines;
3. Coordinate Castle Rock's critical area protection activities and programs with those of other jurisdictions;
4. Coordinate environmental review and permitting of proposals to avoid duplication and delay;
5. Assist landowners by providing incentives for critical area protection.

It is therefore incumbent upon the developer or proponent of an action, when it is determined that a critical areas permit is required, to work with the city to meet all permit requirements. Also, it is incumbent upon the developer or proponent of an action to provide to the city staff with all identified studies and requested analyses of the project's potential environmental impacts, per RCW 36.70A.172, which directs cities and counties to use the best available science when reviewing proposals that are found to require a critical areas permit.

C. Critical Areas Functions.

1. **Wetlands.** Wetlands provide numerous valuable functions, including but not limited to providing wildlife and fish habitat areas, water quality enhancement, flood and erosion control, aquifer recharge and discharge, shoreline stabilization, research and education opportunities, and recreation.
 2. **Geologic Hazards.** 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. Building and development practices should consider topographical and geological features. Future development shall be directed to more geologically stable areas and restricted on unsuitable ground. Regulating these lands and avoiding or minimizing alteration of geologic hazards is necessary to protect the health, safety, and general welfare; therefore, two categories have been established for review which are as follows: potentially geologically hazardous areas which require more extensive review because of the severity of conditions, and areas of geological concern which may require only a minimal amount of geological information with recommendations for site development suitability.
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3. 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 the public health, safety, and general welfare.
4. Fish and Wildlife Habitat Conservation Areas. Fish and wildlife habitat conservation areas perform many important physical and biological functions that benefit the city and its residents. These functions include but are not limited to: food, cover, nesting, breeding, and movement areas for fish and wildlife; maintaining and promoting diversity of species and habitat; maintaining air and water quality; controlling erosion; providing for recreation, education and scientific study, and aesthetic appreciation; and providing neighborhood separation and visual diversity within urban areas.
5. Frequently Flooded Areas. Frequently flooded areas pose a risk to public and private property and public health. Regulation of these lands will promote efficient use of the land and water resources by allocating frequently flooded areas (as determined by the Federal Emergency Management Agency's Flood Rate Insurance Maps) to the uses for which they are best suited and to discourage obstructions to flood flows or uses which pollute or deteriorate natural waters and watercourses.

1.2 Definitions

Definitions for Appendix B are located in Chapter 2 of the Shoreline Master Program.

1.3 Applicability – Regulated activities

All persons proposing development or any land division in critical areas or their buffers within shoreline jurisdiction shall obtain a shoreline permit pursuant to these regulations, except as exempted pursuant to WAC 173-27-040 and Section 1.4. Developments adjacent to a critical area or its buffer area, not separated by a major arterial or other natural or manmade barriers including but not limited to levees, dikes, revetments, roads, railways, and other rights-of-way, shall be reviewed for impacts to the critical area and/or its buffer.

1.4 Critical Areas Exemptions

- A. Critical Areas Exemptions. The following development, activities, and associated uses shall be exempt from the requirements of the critical areas regulations, provided that:
 1. The critical areas exemptions do not include exemptions from the provisions of the Shoreline Master Program and are not exemptions from substantial development permits provided under WAC 173-27-040; and
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2. Those actions described in WAC 173-27-040 and 173-27-045 are not subject to the Shoreline Master Program, including the provisions of these Critical Area Regulations found in Appendix B.
3. Installation or construction of utility lines where all work is entirely contained within developed City rights-of-way, not including electric substations.
4. The removal or control of noxious weeds in an area smaller than 0.5 acres of land by nonmechanical or nonchemical means.
5. Maintenance of ground cover or other vegetation installed as landscaping in a critical area or buffer area that was legally established disturbed prior to the effective date of this Shoreline Master Program; provided that no further disturbance is created.
6. Minimal site investigative work for future development such as surveys, soil logs, percolation tests, and other related activities, provided that impacts to critical areas are minimized, and disturbed areas are restored to the pre-existing level of function and value as soon as is feasible, and at most within one year after the investigative work is concluded.
7. Passive recreational uses such as sport fishing, scientific or educational review, or similar non-development activities.
8. Maintenance of intentionally created artificial wetlands or surface water systems including irrigation and drainage ditches, grass-lined swales and canals, detention facilities, and landscape or ornamental amenities. Wetlands, streams, lakes, or ponds created as mitigation for approved land use activities or that provide critical habitat are not exempt and shall be regulated according to this appendix and the mitigation plan.

1.5 Critical Areas Permitting Within Shoreline Jurisdiction – Applications and approvals

No separate critical areas permit is required for a development proposal that requires a shoreline development permit. All applicable critical areas requirements in Appendix B shall be incorporated into a Shoreline Substantial Development Permit, Shoreline Conditional Use Permit, Shoreline Variance, or Shoreline Letter of Exemption as applicable, and the applicable shoreline permit or exemption shall be obtained prior to undertaking any development activity regulated by the SMP.

1.6 Optional Incentives for Nondevelopment of Critical Areas

- A. Introduction. This section describes the alternatives available to property owners and incentives they may pursue in lieu of developing or altering their property under the terms and standards of these regulations. The incentives and options listed allow
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property owners to use any or all of the options that best suit their needs. City staff review of a selected incentive option(s) will be undertaken with the advice and consent of the applicable state agency or agencies.

- B. **Open Space.** Any person who owns property containing an identified critical area within shoreline jurisdiction as defined by these regulations may apply for current use assessment pursuant to Cowlitz County Code Chapter 18.52, Open Space Rating Ordinance; and Chapter 84.34 RCW, Open Space, Agricultural, Timber Lands – Current Use – Conservation Futures. The Open Space Tax Act allows Cowlitz County to designate lands which should be taxed at their current use value and results in reduced property tax assessment. The county has programs for agricultural lands, small forest lands less than 20 acres in size, and other open spaces. Cowlitz County has adopted a public benefit rating system which classifies properties on the basis of their relative importance of natural and cultural resources, the availability of public access, and the presence of a conservation easement. These features are given a point value, and the total point value determines the property tax reduction. The open space program has property tax reductions of 50, 70, or 90 percent. Lands with wetlands or an important habitat or species would commonly qualify for this voluntary program. Applications are approved by the Board of Cowlitz County Commissioners at a public meeting.
- C. **Conservation Easement.** Any person who owns property containing an identified critical area within shoreline jurisdiction as defined by these regulations shall be entitled to place a conservation easement over that portion of the property designated a critical area by naming the city as their qualified designee under RCW 64.04.130. The purpose of the conservation easement shall be to protect, preserve, maintain, restore, limit the future use of, or conserve for open space purposes the land designated as critical area(s), in accordance with RCW 64.04.130. Details governing easement restrictions shall be negotiated between the property owners and the City. See subsection (E) of this section, Process for Conservation Easement or Density Incentives.
- D. **Density Adjustments.** The City shall allow transfer of density for residential uses from lands containing critical areas within shoreline jurisdiction, as defined by these regulations, when developed pursuant to CRMC Title 17, Zoning. Residential density may be transferred only from a critical area to an area on the same site which is not a critical area. For development proposals on lands determined to contain critical areas as defined by these regulations, the city shall determine allowable dwelling units for residential development proposals based on the formula below.

Table 1. Residential Density Adjustments

Percentage of Site in Critical	Percentage of Adjustment
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Area	
1 – 10%	100%
11 – 20%	90%
21 – 30%	80%
31 – 40%	70%
41 – 50%	60%
51 – 60%	50%
61 – 70%	40%
71 – 80%	30%
81 – 90%	20%

Density adjustment can be applied only within the development proposal site, and any fractional amounts will be rounded down. The applicant may reduce lot sizes below the minimum required for that zone (designation) to accommodate the transfer of density, but it cannot change the uses permitted in that zone.

Example: Size of proposed development site is 10 acres. Zone is R-1 low density residential. Lot size is 6,000 square feet or seven lots per acre. (10 acres equals 435,600 square feet divided by 6,000 square feet equals 72 lots). There are three acres of critical areas on the 10-acre site, or 30 percent of the total site area. The density adjustment according to the above table is 80 percent. The allowable adjustment is 72 lots multiplied by 80 percent equals 58 lots. Note: without the density adjustment, the developer would exclude the three-acre critical area from development. The site would be seven acres at 6,000 square feet per lot for 50 lots.

E. Process for Conservation Easement or Density Incentives.

1. Contents of Conservation or Density Incentive Application. Recorded owners of real property seeking relief under this section shall file with the City an application for a conservation easement, density incentives, and / or adjustments, as determined by the City.
 2. Pre-application Conference. The City will contact the applicant to establish the date, time, and place for a pre-application conference. The final application fee amount will include the cost of City staff time expended on the pre-application conference in accordance with the provisions of the City fee schedule.
 3. Applicant Responsibilities. The applicant is responsible for submitting a complete and accurate application as described in Chapter 8 of the SMP.
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4. **City Staff Action.** The City shall determine whether the application is complete within 30 working days of the receipt of the application. If additional information is necessary, the application shall be returned to the property owner together with a list identifying the deficiencies and explaining that the 30-day time clock has stopped and will not start again until the newly requested information is supplied in a readable format. When the application is complete, the City staff shall determine, within seven working days, whether all or part of the property is in fact eligible for participation under this section. Staff shall forward written findings to the applicant and to the City Council.
 5. **Council Decision.** The City Council, in consultation with the Planning Commission as appropriate, shall make the final determination on whether all or part of the property is subject to these regulations. For conservation easement applications, if the Council determines that all or part of the property is subject to these regulations, the Council shall accept, as beneficiary on behalf of the City or its qualified designee under RCW 64.04.130, a conservation easement over that portion of the property subject to these regulations the extent requested by the record owner of the property. For residential density incentive applications, the Council shall approve requested density transfers subject to its final approval of CRMC Title 16, Subdivisions, and Title 17, Zoning, and any preliminary site plans developed pursuant to this SMP and Chapter 17.77 CRMC. The application may be filed at any time; provided, that all applications be filed in accordance with the requirements of this section.
- F. **Land Exchange.** State agencies or local government may convey, sell, lease, or trade existing public lands in order to obtain public ownership of a fee interest, leasehold interest, or conservation easement over all or part of a critical area. Such exchanges may occur only upon agreement between the record owner and state or local agencies authorized to exchange the subject land. For the purposes of this section, any requirements to provide information, appraisals, or notice relating to the “property” or “subject property” shall apply to all properties involved in the proposed exchange. The process for land exchange involving the City will be as follows:
1. **Pre-application Conference.** The City will contact the applicant to establish the date, time, and place for a pre-application conference. The final application fee amount will include the cost of City staff time expended on the pre-application conference in accordance with the provisions of the City Fee Schedule.
 2. **Contents of Land Exchange Application.** The applicant is responsible for submitting a complete and accurate application. Such application shall include, at minimum:
 - a. A completed application as described in Chapter 8 of the SMP.
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- b. A map showing the boundaries of all lands reserved in the deeds for the common uses of the property owners;
 - c. A written appraisal from a licensed appraiser of the fair market value of the properties when subject to the critical area these regulations, and a written appraisal by the same appraiser of the fair market value of the property if not subject to these critical area regulations;
 - d. All other information identified by the city staff during any pre-application conference.
3. City Staff Action. The City shall determine whether the land exchange application is complete within 30 working days. If additional information is necessary that will result in requiring more time for review, the application shall be returned to the property owner, together with a list identifying the deficiencies and explaining that the 30-day time clock has stopped, and will not start again until the newly requested information is supplied in a readable format. When the application is complete, the Mayor or his/her designee shall consult with the county assessor for a comparison of the fair market value of the property when subject to these critical area regulations as compared to the same property's value if it were not subject to these regulations. Staff shall forward written findings to the Council.
4. Public Hearing. The City shall hold a public hearing to review all property owner requests, pursuant to this section. Notice of public hearing shall be made at least 30 days prior to the scheduled hearing date. Notice shall consist of the publication of a legal notice in the newspaper of record stating the description of the property, and the purpose, date, time, and location of the hearing. Such notice shall also be mailed first class to the property owner and all persons owning property, as identified in the auditor's records, within 300 feet of the subject property boundaries 30 days prior to the hearing. Two or more notices shall be posted in the vicinity of the subject property 10 days prior to the hearing.
5. Public Hearing. Following the public hearing, the Council shall issue its written decision, with findings, within 30 days. There shall be no time limitation on applications for land exchanges.

1.7 Relationship to Other Regulations

- A. These critical areas regulations shall apply within shoreline jurisdiction in addition to zoning and Shoreline Environment Designations adopted by the City.
 - B. Any individual critical area adjoined by another type of critical area shall have the buffer and meet the requirements that provide the most protection to the critical areas involved. When any provision of this chapter or any other existing regulation,
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easement, covenant, or deed restriction conflicts with this chapter, that which provides the most protection to the critical areas shall apply, as determined by the City.

- C. These critical areas regulations shall apply concurrently with review conducted under this SMP and State Environmental Policy Act (SEPA), as locally adopted. Any conditions required pursuant to this chapter shall be included in the SEPA review and threshold determination and any required shoreline permit.

1.8 Critical Area Inventory Maps

- A. The City shall maintain public maps that may assist in the identification of critical areas. However, it shall be the responsibility of the applicant to obtain a map generated by a qualified professional to identifying critical areas on their property.
 1. The presence of critical areas and jurisdictional shoreline areas or associated buffers on a parcel triggers the requirements of this Chapter, regardless of whether or not a critical area or buffer is depicted on an official map.
 2. The approximate location and extent of critical areas within the City planning area are shown on the map adopted by the City. The map is based on the best available information and is intended to be used as a general guide for the assistance of property owners and as information for the public. Boundaries are generalized; field investigation and analysis by a qualified professional may be required to confirm the existence of a critical area within shoreline jurisdiction. The City will update information and resource material when new data is available and updates are feasible.
 3. In the event of any conflict between the location, designation, or classification of a critical area shown on the city maps and the criteria or standards of this section, the criteria, standards, and determination of any field investigation shall prevail.

Table 2. Summary of Map Sources

The following is a summary listing that highlights the types of maps that may be available through the City. Please contact the City for an up-to-date listing.

Critical Area	Map/Data Source(s)
Geologically Hazardous Areas	1. Geologic Hazard Map of Cowlitz County, Cowlitz County GIS Department. 2. Soil Conservation Service, Cowlitz County Area Soil Survey, 1974, or as amended. 3. Other Department of Natural Resource Maps—when available.

Critical Area	Map/Data Source(s)
	4. 2003 Wegmann Landslide Inventory/Washington State Department of Natural Resources.
Frequently Flooded Areas	5. FEMA, National Flood Insurance Program, Flood Insurance Rate Maps.
Critical Aquifer Recharge Areas	6. Cowlitz County Aquifer Recharge Map, Cowlitz County GIS Department, 1993.
Wetlands	7. City of Castle Rock's Wetland Inventory Map, Cowlitz County Wetlands Map, Cowlitz County, GIS Department, 1993. Source: Hydric Soils, USDA, Soil Conservation Service; National Wetlands Inventory Maps, U.S. Department of the Interior, Fish and Wildlife Service.
Fish and Wildlife Habitat Conservation Areas	8. Priority Habitat and Species Maps, Washington State Department of Fish and Wildlife, 1991, as amended. 9. Forest Practices Act Stream Mapping.

2. Critical Area Wetlands within Shoreline Jurisdiction

2.1 Purpose

The purposes of these regulations are to:

- A. Recognize and protect the beneficial functions performed by many wetlands, which include, but are not limited to, providing food, breeding, nesting, and/or rearing habitat for fish and wildlife; recharging and discharging ground water; contributing to stream flow during low-flow periods; stabilizing stream banks and shorelines; storing storm and flood waters to reduce flooding and erosion; and improving water quality through biofiltration, adsorption, and retention and transformation of sediments, nutrients, and toxicants.
 - B. Regulate land use to avoid adverse effects on wetlands and maintain the functions and values of wetlands throughout Castle Rock.
 - C. Establish review procedures for development proposals in and adjacent to wetlands.
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2.2 Identification and Rating

- A. Identification and Delineation. Identification of wetlands and delineation of their boundaries pursuant to these regulations shall be done in accordance with the approved federal wetland delineation manual and applicable regional supplements. All areas within City shoreline jurisdiction meeting the wetland designation criteria in that procedure are hereby designated critical areas and are subject to the provisions of these regulations. Wetland delineations are valid for five years; after such date the City shall determine whether a revision or additional assessment is necessary.
- B. Rating. Wetlands shall be rated according to the Washington Department of Ecology wetland rating system, as set forth in the *Washington State Wetland Rating System for Western Washington: 2014 Update* (Rating System) (Ecology Publication #14-06-007), or as revised. The descriptions of wetland categories according to the Rating System are as follows:
1. Category I. Category I wetlands are: (1) relatively undisturbed estuarine wetlands larger than 1 acre; (2) wetlands that are identified by scientists of the Washington Natural Heritage Program/DNR as wetlands of high conservation value; (3) bogs; (4) mature and old-growth forested wetlands larger than 1 acre; (5) wetlands in coastal lagoons; (6) interdunal wetlands that score 8 or 9 habitat points and are larger than 1 acre; and (7) wetlands that perform many functions well (scoring 23 points or more). These wetlands: (1) represent unique or rare wetland types; (2) are more sensitive to disturbance than most wetlands; (3) are relatively undisturbed and contain ecological attributes that are impossible to replace within a human lifetime; or (4) provide a high level of functions.
 2. Category II. Category II wetlands are: (1) estuarine wetlands smaller than 1 acre, or disturbed estuarine wetlands larger than 1 acre; (2) interdunal wetlands larger than 1 acre or those found in a mosaic of wetlands; or (3) wetlands with a moderately high level of functions (scoring between 20 and 22 points).
 3. Category III. Category III wetlands are: (1) wetlands with a moderate level of functions (scoring between 16 and 19 points); and (2) interdunal wetlands between 0.1 and 1 acre. Wetlands scoring between 16 and 19 points generally have been disturbed in some ways and are often less diverse or more isolated from other natural resources in the landscape than Category II wetlands.
 4. Category IV. Category IV wetlands have the lowest levels of functions (scoring fewer than 16 points) and are often heavily disturbed. These are wetlands that we should be able to replace, or in some cases to improve. However, experience has shown that replacement cannot be guaranteed in any specific case. These wetlands may provide some important functions, and should be protected to some degree.
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- C. Illegal modifications. Wetland rating categories shall not change due to illegal modifications made by the applicant or with the applicant's knowledge.

2.3 Regulated Activities

- A. For any regulated activity within shoreline jurisdiction, a critical areas report (see Section 2.6 of these regulations) may be required to support the requested activity.
- B. The following activities are regulated if they occur in a wetland or its buffer within shoreline jurisdiction:
 - 1. The removal, excavation, grading, or dredging of soil, sand, gravel, minerals, organic matter, or material of any kind.
 - 2. The dumping of, discharging of, or filling with any material, including discharges of storm water and domestic, commercial, or industrial wastewater.
 - 3. The draining, flooding, or disturbing of the water level, duration of inundation, or water table.
 - 4. Pile driving.
 - 5. The placing of obstructions.
 - 6. The construction, reconstruction, demolition, or expansion of any structure.
 - 7. The destruction or alteration of wetland or buffer vegetation through clearing, harvesting, shading, intentional burning, or planting of vegetation that would alter the character of a regulated wetland.
 - 8. "Class IV - General Forest Practices" under the authority of the "1992 Washington State Forest Practices Act Rules and Regulations," WAC 222-12-030, or as thereafter amended.
 - 9. Activities that result in:
 - a. A significant change of water temperature.
 - b. A significant change of physical, biological, or chemical characteristics of the wetland or sources of water to the wetland.
 - c. A significant change in the quantity, timing, or duration of the water entering the wetland.
 - d. The introduction of pollutants.
 - e. A reduction in buffer functions.

- C. Subdivisions. The subdivision and/or short subdivision of land in wetlands and associated buffers are subject to the following:
1. Land that is located wholly within a wetland or its buffer may not be subdivided.
 2. Land that is located partially within a wetland or its buffer may be subdivided provided that an accessible and contiguous portion of each new lot is:
 - a. Located outside of the wetland and its buffer; and
 - b. Meets the minimum lot size requirements of the CRMC.

2.4 Allowed Uses in Wetlands within Shoreline Jurisdiction

- A. Activities Allowed in Wetlands. The activities listed below are allowed in wetlands, subject to all requirements in the Shoreline Master Program. These activities do not require submission of a critical area report, except where such activities will result in a reduction or loss of the functions and values of a wetland or wetland buffer. These activities include:
1. Conservation or preservation of soil, water, vegetation, fish, shellfish, and/or other wildlife that does not entail changing the structure or functions of the existing wetland.
 2. The harvesting of wild crops in a manner that is not injurious to natural reproduction of such crops and provided the harvesting does not require tilling of soil, planting of crops, chemical applications, or alteration of the wetland by changing existing topography, water conditions, or water sources.
 3. Enhancement of a wetland through the removal of non-native invasive plant species. Removal of invasive plant species shall be restricted to hand removal unless permits from the appropriate regulatory agencies have been obtained for approved biological or chemical treatments. All removed plant material shall be taken away from the site and appropriately disposed of. Plants that appear on the Washington State Noxious Weed Control Board list of noxious weeds must be handled and disposed of according to a noxious weed control plan appropriate to that species. Revegetation using hand-held equipment with appropriate native species at natural densities is allowed in conjunction with removal of invasive plant species.
 4. Educational and scientific research activities that do not degrade the critical area.

2.5 Wetland Buffers

- A. Buffer Requirements. The standard buffer widths in Table 3 have been established in accordance with the best available science. They are based on the category of
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wetland and the habitat score as determined by a qualified wetland professional using the *Washington State Wetland Rating System for Western Washington: 2014 Update*.

1. The use of the standard buffer widths requires the implementation of the measures in Table 4, where applicable, to minimize the impacts of the adjacent land uses.
2. If an applicant chooses not to apply the mitigation measures in Table 4, then a 33% increase in the width of all buffers is required. For example, a 75-foot buffer with the mitigation measures would be a 100-foot buffer without them.
3. The standard buffer widths assume that the buffer is vegetated with a native plant community appropriate for the ecoregion. If the existing buffer is unvegetated, sparsely vegetated, or vegetated with invasive species that do not perform needed functions, the buffer should either be planted to create the appropriate plant community, or the buffer should be widened to ensure that adequate functions of the buffer are provided.
4. Additional buffer widths are added based on habitat points. For example, a Category I wetland scoring 5 points for habitat function would require a buffer of 105 feet (75 + 30).

Table 3. Wetland Buffer Requirements within Shoreline Jurisdiction

Wetland Category	Buffer width if wetland scores:			
	3-4 habitat points	5 habitat points	6-7 habitat points	8-9 habitat points
Category I: Based on total score	75 ft	Add 30 ft	Add 90 ft	Add 150 ft
Category I: Bogs and Wetlands of High Conservation Value	190 ft			
Category I: Forested	75 ft	Add 30 ft	Add 90 ft	Add 150 ft
Category II	75 ft	Add 30 ft	Add 90 ft	Add 150 ft
Category III (all)	75 ft	Add 45 ft	Add 105 ft	Add 165 ft
Category IV (all)	40 ft			

Table 4. Required Measures to Minimize Impacts to Wetlands

Disturbance	Required Measures to Minimize Impacts
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Disturbance	Required Measures to Minimize Impacts
Lights	<ul style="list-style-type: none"> • Direct lights away from wetland.
Noise	<ul style="list-style-type: none"> • Locate activity that generates noise away from wetland. • If warranted, enhance existing buffer with native vegetation plantings adjacent to noise source. • For activities that generate relatively continuous, potentially disruptive noise, such as certain heavy industry or mining, establish an additional 10 ft heavily vegetated buffer strip immediately adjacent to the outer wetland buffer.
Toxic runoff	<ul style="list-style-type: none"> • Route all new, untreated runoff away from wetland while ensuring wetland is not dewatered. • Establish covenants limiting use of pesticides within 150 ft of wetland. • Apply integrated pest management.
Stormwater runoff	<ul style="list-style-type: none"> • Retrofit stormwater detention and treatment for roads and existing adjacent development. • Prevent channelized flow from lawns that directly enters the buffer. • Use Low Intensity Development techniques (per PSAT publication on LID techniques).
Change in water regime	<ul style="list-style-type: none"> • Infiltrate or treat, detain, and disperse into buffer new runoff from impervious surfaces and new lawns.
Pets and human disturbance	<ul style="list-style-type: none"> • Use privacy fencing OR plant dense vegetation to delineate buffer edge and to discourage disturbance using vegetation appropriate for the ecoregion. • Place wetland and its buffer in a separate tract or protect with a conservation easement.
Dust	<ul style="list-style-type: none"> • Use best management practices to control dust.
Disruption of corridors or connections	<ul style="list-style-type: none"> • Maintain connections to offsite areas that are undisturbed. • Restore corridors or connections to offsite habitats by replanting.

5. Increased Wetland Buffer Area Width. Buffer widths shall be increased on a case-by-case basis as determined by the City when a larger buffer is necessary to protect wetland functions and values. This determination shall be supported by appropriate documentation showing that it is reasonably related to protection of the functions and values of the wetland. The documentation must include but not be limited to the following criteria, when applicable:

- a. The wetland is used by a plant or animal species listed by the federal or state government as endangered, threatened, candidate, sensitive, monitored, or documented priority species or habitats; or the wetland has essential or outstanding habitat for those species or has unusual nesting or resting sites such as heron rookeries or raptor nesting trees; or
- b. The adjacent land is susceptible to severe erosion, and erosion-control measures will not effectively prevent adverse wetland impacts; or

- c. The adjacent land has minimal vegetative cover or slopes greater than 30 percent.
 6. Buffer averaging to improve wetland protection may be permitted when all of the following conditions are met:
 - a. The wetland has significant differences in characteristics that affect its habitat functions, such as a wetland with a forested component adjacent to a degraded emergent component or a “dual-rated” wetland with a Category I area adjacent to a lower-rated area.
 - b. The buffer is increased adjacent to the higher-functioning area of habitat or more-sensitive portion of the wetland and decreased adjacent to the lower-functioning or less-sensitive portion as demonstrated by a critical areas report from a qualified wetland professional.
 - c. The total area of the buffer after averaging is equal to the area required without averaging.
 - d. The buffer at its narrowest point is never less than either $\frac{3}{4}$ of the required width or 75 feet for Category I and II, 50 feet for Category III, and 25 feet for Category IV, whichever is greater.
 7. Buffer averaging to allow reasonable use of a parcel may be permitted when all of the following are met:
 - a. There are no feasible alternatives to the site design that could be accomplished without buffer averaging.
 - b. The averaged buffer will not result in degradation of the wetland’s functions and values as demonstrated by a critical areas report from a qualified wetland professional.
 - c. The total buffer area after averaging is equal to the area required without averaging.
 - d. The buffer at its narrowest point is never less than either $\frac{3}{4}$ of the required width or 75 feet for Category I and II, 50 feet for Category III, and 25 feet for Category IV, whichever is greater.
 - B. To facilitate long-range planning using a landscape approach, the City may identify and pre-assess wetlands using the rating system and establish appropriate wetland buffer widths for such wetlands.
 - C. Measurement of Wetland Buffers within Shoreline Jurisdiction. All buffers shall be measured perpendicular from the wetland boundary as surveyed in the field. The buffer for a wetland created, restored, or enhanced as compensation for approved
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wetland alterations shall be the same as the buffer required for the category of the created, restored, or enhanced wetland. Only fully vegetated buffers will be considered. Lawns, walkways, driveways, and other mowed or paved areas will not be considered buffers or included in buffer area calculations.

- D. Buffers on Mitigation Sites. All mitigation sites shall have buffers consistent with the buffer requirements of these regulations. Buffers shall be based on the expected or target category of the proposed wetland mitigation site.
 - E. Buffer Maintenance. Except as otherwise specified or allowed in accordance with this Chapter, wetland buffers within shoreline jurisdiction shall be retained in an undisturbed or enhanced condition. In the case of compensatory mitigation sites, removal of invasive non-native weeds is required for the duration of the mitigation bond (Section 2.7.J.2.a.viii).
 - F. Impacts to Buffers. Requirements for the compensation for impacts to buffers are outlined in Section 2.7 of these regulations.
 - G. Overlapping Critical Area Buffers. If buffers for two contiguous critical areas overlap (such as buffers for a stream and a wetland), the wider buffer applies.
 - H. Allowed Buffer Uses. The following uses may be allowed within a wetland buffer in accordance with the review procedures of these regulations, provided they are not prohibited by any other applicable law, and they are conducted in a manner so as to minimize impacts to the buffer and adjacent wetland:
 - 1. Conservation and Restoration Activities. Conservation or restoration activities aimed at protecting the soil, water, vegetation, or wildlife.
 - 2. Passive recreation. Passive recreation facilities designed and in accordance with an approved critical area report, including:
 - a. Walkways and trails, provided that those pathways are limited to minor crossings having no adverse impact on water quality. They should be generally parallel to the perimeter of the wetland, located only in the outer twenty-five percent (25%) of the wetland buffer area, and located to avoid removal of significant trees. They should be limited to pervious surfaces no more than five (5) feet in width for pedestrian use only. Raised boardwalks utilizing non-treated pilings may be acceptable.
 - b. Wildlife-viewing structures.
 - 3. Educational and scientific research activities.
 - 4. Normal and routine maintenance and repair of any existing public or private facilities within an existing right-of-way, provided that the maintenance or repair does not increase the footprint or use of the facility or right-of-way.
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5. The harvesting of wild crops in a manner that is not injurious to natural reproduction of such crops and provided the harvesting does not require tilling of soil, planting of crops, chemical applications, or alteration of the wetland by changing existing topography, water conditions, or water sources.
 6. Enhancement of a wetland buffer through the removal of non-native invasive plant species. Removal of invasive plant species shall be restricted to hand removal. All removed plant material shall be taken away from the site and appropriately disposed of. Plants that appear on the Washington State Noxious Weed Control Board list of noxious weeds must be handled and disposed of according to a noxious weed control plan appropriate to that species. Revegetation with appropriate native species at natural densities is allowed in conjunction with removal of invasive plant species.
 7. Stormwater management facilities. Stormwater management facilities are limited to stormwater dispersion outfalls and bioswales. They may be allowed within the outer twenty-five percent (25%) of the buffer of Category III or IV wetlands only, provided that:
 - a. No other location is feasible; and
 - b. The location of such facilities will not degrade the functions or values of the wetland; and
 - c. Stormwater management facilities are not allowed in buffers of Category I or II wetlands.
 - I. Non-Conforming Uses. Repair and maintenance of non-conforming uses or structures, where legally established within the buffer, provided they do not increase the degree of nonconformity.
 - J. Signs and Fencing of Wetlands and Buffers:
 1. Temporary markers. The outer perimeter of the wetland buffer and the clearing limits identified by an approved permit or authorization shall be marked in the field with temporary "clearing limits" fencing in such a way as to ensure that no unauthorized intrusion will occur. The marking is subject to inspection by the City prior to the commencement of permitted activities. This temporary marking shall be maintained throughout construction and shall not be removed until permanent signs, if required, are in place.
 2. Permanent signs. As a condition of any permit or authorization issued pursuant to these regulations, the City may require the applicant to install permanent signs along the boundary of a wetland or buffer.
 - a. Permanent signs shall be made of an enamel-coated metal face and attached to a metal post or another non-treated material of equal durability. Signs
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must be posted at an interval of one (1) per lot or every fifty (50) feet, whichever is less, and must be maintained by the property owner in perpetuity. The signs shall be worded as follows or with alternative language approved by the City:

- i. Protected Wetland Area
 - ii. Do Not Disturb
 - iii. Contact City of Castle Rock
 - iv. Regarding Uses, Restrictions, and Opportunities for Stewardship
- b. The provisions of Subsection (a) may be modified as necessary to assure protection of sensitive features or wildlife.
3. Fencing
 - a. The applicant shall be required to install a permanent fence around the wetland or buffer when domestic grazing animals are present or may be introduced on site.
 - b. Fencing installed as part of a proposed activity or as required in this Subsection shall be designed so as to not interfere with species migration, including fish runs, and shall be constructed in a manner that minimizes impacts to the wetland and associated habitat.

2.6 Critical Area Reports for Wetlands within Shoreline Jurisdiction

- A. If the City determines that the site of a proposed development includes, is likely to include, or is adjacent to a wetland, a wetland report, prepared by a qualified professional, shall be required (see Appendix B-5 for details). The expense of preparing the wetland report shall be borne by the applicant.

2.7 Compensatory Mitigation

- A. Mitigation Sequencing. Before impacting any wetland or its buffer, an applicant shall demonstrate that the following actions have been taken. Actions are listed in the order of preference:
 1. Avoid the impact altogether by not taking a certain action or parts of an action.
 2. Minimize impacts by limiting the degree or magnitude of the action and its implementation, by using appropriate technology, or by taking affirmative steps to avoid or reduce impacts.
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3. Rectify the impact by repairing, rehabilitating, or restoring the affected environment.
 4. Reduce or eliminate the impact over time by preservation and maintenance operations.
 5. Compensate for the impact by replacing, enhancing, or providing substitute resources or environments.
 6. Monitor the required compensation and take remedial or corrective measures when necessary.
- B. Requirements for Compensatory Mitigation:
1. Compensatory mitigation for alterations to wetlands shall be used only for impacts that cannot be avoided or minimized and shall achieve equivalent or greater biologic functions. Compensatory mitigation plans shall be consistent with *Wetland Mitigation in Washington State – Part 2: Developing Mitigation Plans--Version 1*, (Ecology Publication #06-06011b, Olympia, WA, March 2006 or as revised), and *Selecting Wetland Mitigation Sites Using a Watershed Approach* (Western Washington) (Publication #09-06-32, Olympia, WA, December 2009).
 2. Mitigation ratios shall be consistent with Section 2.7.H of these regulations.
 3. Mitigation requirements may also be determined using the credit/debit tool described in *Calculating Credits and Debits for Compensatory Mitigation in Wetlands of Western Washington: Final Report* (Ecology Publication #10-06-011, Olympia, WA, March 2012, or as revised) consistent with Section 2.7.I of these regulations.
- C. Compensating for Lost or Affected Functions. Compensatory mitigation shall address the functions affected by the proposed project, with an intention to achieve functional equivalency or improvement of functions. The goal shall be for the compensatory mitigation to provide similar wetland functions as those lost, except when either:
1. The lost wetland provides minimal functions, and the proposed compensatory mitigation action(s) will provide equal or greater functions or will provide functions shown to be limiting within a watershed through a formal Washington state watershed assessment plan or protocol; or
 2. Out-of-kind replacement of wetland type or functions will best meet watershed goals formally identified by the City, such as replacement of historically diminished wetland types.
- D. Preference of Mitigation Actions. Mitigation for lost or diminished wetland and buffer functions shall rely on the types below in the following order of preference:
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1. Restoration (re-establishment and rehabilitation) of wetlands:
 - a. The goal of re-establishment is returning natural or historic functions to a former wetland. Re-establishment results in a gain in wetland acres (and functions). Activities could include removing fill material, plugging ditches, or breaking drain tiles.
 - b. The goal of rehabilitation is repairing natural or historic functions of a degraded wetland. Rehabilitation results in a gain in wetland function but does not result in a gain in wetland acres. Activities could involve breaching a dike to reconnect wetlands to a floodplain or return tidal influence to a wetland.
 2. Creation (establishment) of wetlands on disturbed upland sites such as those with vegetative cover consisting primarily of non-native species. Establishment results in a gain in wetland acres. This should be attempted only when there is an adequate source of water and it can be shown that the surface and subsurface hydrologic regime is conducive to the wetland community that is anticipated in the design.
 - a. If a site is not available for wetland restoration to compensate for expected wetland and/or buffer impacts, the approval authority may authorize creation of a wetland and buffer upon demonstration by the applicant's qualified wetland scientist that:
 - i. The hydrology and soil conditions at the proposed mitigation site are conducive for sustaining the proposed wetland and that creation of a wetland at the site will not likely cause hydrologic problems elsewhere;
 - ii. The proposed mitigation site does not contain invasive plants or noxious weeds or that such vegetation will be controlled at the site;
 - iii. Adjacent land uses and site conditions do not jeopardize the viability of the proposed wetland and buffer (e.g., due to the presence of invasive plants or noxious weeds, stormwater runoff, noise, light, or other impacts); and
 - iv. The proposed wetland and buffer will eventually be self-sustaining with little or no long-term maintenance.
 3. Enhancement of significantly degraded wetlands in combination with restoration or creation. Enhancement should be part of a mitigation package that includes replacing the altered area and meeting appropriate ratio requirements. Enhancement is undertaken for specified purposes such as water quality improvement, flood water retention, or wildlife habitat. Enhancement alone will result in a loss of wetland acreage and is less effective at replacing the functions
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lost. Applicants proposing to enhance wetlands or associated buffers shall demonstrate:

- a. How the proposed enhancement will increase the wetland's/buffer's functions;
 - b. How this increase in function will adequately compensate for the impacts; and
 - c. How all other existing wetland functions at the mitigation site will be protected.
4. Preservation. Preservation of high-quality, at-risk wetlands as compensation is generally acceptable when done in combination with restoration, creation, or enhancement, provided that a minimum of 1:1 acreage replacement is provided by re-establishment or creation. Ratios for preservation in combination with other forms of mitigation generally range from 10:1 to 20:1, as determined on a case-by-case basis, depending on the quality of the wetlands being altered and the quality of the wetlands being preserved.

Preservation of high-quality, at-risk wetlands and habitat may be considered as the sole means of compensation for wetland impacts when the following criteria are met:

- a. The area proposed for preservation is of high quality. The following features may be indicative of high-quality sites:
 - i. Category I or II wetland rating (using the wetland rating system for western Washington- Section 2.2 of these regulations)
 - ii. Rare wetland type (for example, bogs, mature forested wetlands, estuarine wetlands)
 - iii. The presence of habitat for priority or locally important wildlife species.
 - iv. Priority sites in an adopted watershed plan.
 - b. Wetland impacts will not have a significant adverse impact on habitat for listed fish, or other ESA listed species.
 - c. There is no net loss of habitat functions within the watershed or basin.
 - d. Mitigation ratios for preservation as the sole means of mitigation shall generally start at 20:1. Specific ratios should depend upon the significance of the preservation project and the quality of the wetland resources lost.
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- e. Permanent preservation of the wetland and buffer will be provided through a conservation easement or tract held by a land trust.
- f. The impact area is small (generally <math>< \frac{1}{2}</math> acre) and/or impacts are occurring to a low-functioning system (Category III or IV wetland).

All preservation sites shall include buffer areas adequate to protect the habitat and its functions from encroachment and degradation.

- E. Location of Compensatory Mitigation. Compensatory mitigation actions shall be conducted within the same sub-drainage basin and on the site of the alteration except when all of paragraphs 1-4 below apply. In that case, mitigation may be allowed off-site within the subwatershed of the impact site. When considering off-site mitigation, preference should be given to using alternative mitigation, such as a mitigation bank, an in-lieu fee program, or advance mitigation.
- 1. There are no reasonable opportunities on site or within the sub-drainage basin (e.g., on-site options would require elimination of high-functioning upland habitat), or opportunities on site or within the sub-drainage basin do not have a high likelihood of success based on a determination of the capacity of the site to compensate for the impacts. Considerations should include: anticipated replacement ratios for wetland mitigation, buffer conditions and proposed widths, available water to maintain anticipated hydrogeomorphic classes of wetlands when restored, proposed flood storage capacity, and potential to mitigate riparian fish and wildlife impacts (such as connectivity);
 - 2. On-site mitigation would require elimination of high-quality upland habitat.
 - 3. Off-site mitigation has a greater likelihood of providing equal or improved wetland functions than the altered wetland.
 - 4. Off-site locations shall be in the same sub-drainage basin unless:
 - a. Established watershed goals for water quality, flood storage or conveyance, habitat, or other wetland functions have been established by the City and strongly justify location of mitigation at another site; or
 - b. Credits from a state-certified wetland mitigation bank are used as compensation, and the use of credits is consistent with the terms of the certified bank instrument;
 - c. Fees are paid to an approved in-lieu fee program to compensate for the impacts.
- F. Design of Compensatory Mitigation. The design for the compensatory mitigation project needs to be appropriate for its location (i.e., position in the landscape). Therefore, compensatory mitigation should not result in the creation, restoration, or
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enhancement of an atypical wetland. An atypical wetland refers to a compensation wetland (e.g., created or enhanced) that does not match the type of existing wetland that would be found in the geomorphic setting of the site (i.e., the water source(s) and hydroperiod proposed for the mitigation site are not typical for the geomorphic setting). Likewise, it should not provide exaggerated morphology or require a berm or other engineered structures to hold back water. For example, excavating a permanently inundated pond in an existing seasonally saturated or inundated wetland is one example of an enhancement project that could result in an atypical wetland. Another example would be excavating depressions in an existing wetland on a slope, which would require the construction of berms to hold the water.

G. Timing of Compensatory Mitigation. It is preferred that compensatory mitigation projects be completed prior to activities that will disturb wetlands. At the least, compensatory mitigation shall be completed immediately following disturbance and prior to use or occupancy of the action or development. Construction of mitigation projects shall be timed to reduce impacts to existing fisheries, wildlife, and flora.

1. The City may authorize a one-time temporary delay in completing construction or installation of the compensatory mitigation when the applicant provides a written explanation from a qualified wetland professional as to the rationale for the delay. An appropriate rationale would include identification of the environmental conditions that could produce a high probability of failure or significant construction difficulties (e.g., project delay lapses past a fisheries window, or installing plants should be delayed until the dormant season to ensure greater survival of installed materials). The delay shall not create or perpetuate hazardous conditions or environmental damage or degradation, and the delay shall not be injurious to the health, safety, or general welfare of the public. The request for the temporary delay must include a written justification that documents the environmental constraints that preclude implementation of the compensatory mitigation plan. The justification must be verified and approved by the City.

H. Wetland Mitigation Ratios:

Table 5. Wetland Mitigation Ratios

Category and Type of Wetland	Creation or Re-establishment	Rehabilitation	Enhancement
Category I: Bog, Natural Heritage site	Not considered possible	Case by case	Case by case
Category I: Mature Forested	6:1	12:1	24:1
Category I: Based on functions	4:1	8:1	16:1

Category and Type of Wetland	Creation or Re-establishment	Rehabilitation	Enhancement
Category II	3:1	6:1	12:1
Category III	2:1	4:1	8:1
Category IV	1.5:1	3:1	6:1

- I. Credit/Debit Method. To more fully protect functions and values, and as an alternative to the mitigation ratios found in the joint guidance *Wetland Mitigation in Washington State Parts I and II* (Ecology Publication #06-06-011a-b, Olympia, WA, March, 2006), the City may allow mitigation based on the “credit/debit” method developed by the Department of Ecology in *Calculating Credits and Debits for Compensatory Mitigation in Wetlands of Western Washington: Final Report*, (Ecology Publication #10-06-011, Olympia, WA, March 2012, or as revised).

- J. Compensatory Mitigation Plan. When a project involves wetland and/or buffer impacts, a compensatory mitigation plan prepared by a qualified professional shall be required, meeting the following minimum standards:
 1. Wetland Critical Area Report. A critical area report for wetlands must accompany or be included in the compensatory mitigation plan and include the minimum parameters described in Appendix B-5 of these regulations.

 2. Compensatory Mitigation Report. The report must include a written report and plan sheets that must contain, at a minimum, the following elements. Full guidance can be found in *Wetland Mitigation in Washington State—Part 2: Developing Mitigation Plans* (Version 1) (Ecology Publication #0606-011b, Olympia, WA, March 2006) or as revised.
 - a. The written report must contain, at a minimum:
 - i. The name and contact information of the applicant; the name, qualifications, and contact information for the primary author(s) of the compensatory mitigation report; a description of the proposal; a summary of the impacts and proposed compensation concept; identification of all the local, state, and/or federal wetland-related permit(s) required for the project; and a vicinity map for the project.

 - ii. Description of how the project design has been modified to avoid, minimize, or reduce adverse impacts to wetlands.

 - iii. Description of the existing wetland and buffer areas proposed to be altered. Include acreage (or square footage), water regime, vegetation,

soils, landscape position, surrounding lands uses, and functions. Also describe impacts in terms of acreage by Cowardin classification, hydrogeomorphic classification, and wetland rating, based on Wetland Ratings (Section 2.2) of these regulations.

- iv. Description of the compensatory mitigation site, including location and rationale for selection. Include an assessment of existing conditions: acreage (or square footage) of wetlands and uplands, water regime, sources of water, vegetation, soils, landscape position, surrounding land uses, and functions. Estimate future conditions in this location if the compensation actions are NOT undertaken (i.e., how would this site progress through natural succession?).
 - v. A description of the proposed actions for compensation of wetland and upland areas affected by the project. Include overall goals of the proposed mitigation, including a description of the targeted functions, hydrogeomorphic classification, and categories of wetlands.
 - vi. A description of the proposed mitigation construction activities and timing of activities.
 - vii. A discussion of ongoing management practices that will protect wetlands after the project site has been developed, including proposed monitoring and maintenance programs (for remaining wetlands and compensatory mitigation wetlands).
 - viii. A bond estimate for the entire compensatory mitigation project, including the following elements: site preparation, plant materials, construction materials, installation oversight, maintenance twice per year for up to five (5) years, annual monitoring field work and reporting, and contingency actions for a maximum of the total required number of years for monitoring.
 - ix. Proof of establishment of Notice on Title for the wetlands and buffers on the project site, including the compensatory mitigation areas.
- b. The scaled plan sheets for the compensatory mitigation must contain, at a minimum:
- i. Surveyed edges of the existing wetland and buffers, proposed areas of wetland and/or buffer impacts, location of proposed wetland and/or buffer compensation actions.
 - ii. Existing topography, ground-proofed, at two-foot contour intervals in the zone of the proposed compensation actions if any grading activity is
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proposed to create the compensation area(s). Also existing cross-sections of on-site wetland areas that are proposed to be altered, and cross-section(s) (estimated one-foot intervals) for the proposed areas of wetland or buffer compensation.

- iii. Surface and subsurface hydrologic conditions, including an analysis of existing and proposed hydrologic regimes for enhanced, created, or restored compensatory mitigation areas. Also, illustrations of how data for existing hydrologic conditions were used to determine the estimates of future hydrologic conditions.
 - iv. Conditions expected from the proposed actions on site, including future hydrogeomorphic types, vegetation community types by dominant species (wetland and upland), and future water regimes.
 - v. Required wetland buffers for existing wetlands and proposed compensation areas. Also, identify any zones where buffers are proposed to be reduced or enlarged outside of the standards identified these regulations.
 - vi. A plant schedule for the compensation area, including all species by proposed community type and water regime, size and type of plant material to be installed, spacing of plants, typical clustering patterns, total number of each species by community type, timing of installation.
 - vii. Performance standards (measurable standards reflective of years post-installation) for upland and wetland communities, monitoring schedule, and maintenance schedule and actions by each biennium.
- K. Buffer Mitigation Ratios. Impacts to buffers shall be mitigated at a 1:1 ratio. Compensatory buffer mitigation shall replace those buffer functions lost from development.
- L. Protection of the Mitigation Site. The area where the mitigation occurred and any associated buffer shall be located in a critical area tract or a conservation easement consistent with these regulations.
- M. Monitoring. Mitigation monitoring shall be required for a period necessary to establish that performance standards have been met, but not for a period less than five years. If a scrub-shrub or forested vegetation community is proposed, monitoring may be required for ten years or more. The project mitigation plan shall include monitoring elements that ensure certainty of success for the project's natural resource values and functions. If the mitigation goals are not obtained within the initial five-year period, the applicant remains responsible for restoration of the
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natural resource values and functions until the mitigation goals agreed to in the mitigation plan are achieved.

N. Wetland Mitigation Banks.

1. Credits from a wetland mitigation bank may be approved for use as compensation for unavoidable impacts to wetlands when:
 - a. The bank is certified under state rules;
 - b. The City determines that the wetland mitigation bank provides appropriate compensation for the authorized impacts; and
 - c. The proposed use of credits is consistent with the terms and conditions of the certified bank instrument.
2. Replacement ratios for projects using bank credits shall be consistent with replacement ratios specified in the certified bank instrument.
3. Credits from a certified wetland mitigation bank may be used to compensate for impacts located within the service area specified in the certified bank instrument. In some cases, the service area of the bank may include portions of more than one adjacent drainage basin for specific wetland functions.

O. In-Lieu Fee. To aid in the implementation of off-site mitigation, the City may develop an in-lieu fee program. This program shall be developed and approved through a public process and be consistent with federal rules, state policy on in-lieu fee mitigation, and state water quality regulations. An approved in-lieu-fee program sells compensatory mitigation credits to permittees whose obligation to provide compensatory mitigation is then transferred to the in-lieu program sponsor, a governmental or non-profit natural resource management entity. Credits from an approved in-lieu-fee program may be used when paragraphs 1-6 below apply:

1. The approval authority determines that it would provide environmentally appropriate compensation for the proposed impacts.
 2. The mitigation will occur on a site identified using the site selection and prioritization process in the approved in-lieu-fee program instrument.
 3. The proposed use of credits is consistent with the terms and conditions of the approved in-lieu-fee program instrument.
 4. Land acquisition and initial physical and biological improvements of the mitigation site must be completed within three years of the credit sale.
 5. Projects using in-lieu-fee credits shall have debits associated with the proposed impacts calculated by the applicant's qualified wetland scientist using the
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method consistent with the credit assessment method specified in the approved instrument for the in-lieu-fee program.

6. Credits from an approved in-lieu-fee program may be used to compensate for impacts located within the service area specified in the approved in lieu-fee instrument.
- P. Advance Mitigation. Mitigation for projects with pre-identified impacts to wetlands may be constructed in advance of the impacts if the mitigation is implemented according to federal rules, state policy on advance mitigation, and state water quality regulations.
- Q. Alternative Mitigation Plans. The City may approve alternative critical areas mitigation plans that are based on best available science, such as priority restoration plans that achieve restoration goals identified in the SMP. Alternative mitigation proposals must provide an equivalent or better level of protection of critical area functions and values than would be provided by the strict application of regulations.

The City shall consider the following for approval of an alternative mitigation proposal:

1. The proposal uses a watershed approach consistent with *Selecting Wetland Mitigation Sites Using a Watershed Approach* (Western Washington) (Ecology Publication #09-06-32, Olympia, WA, December 2009).
 2. Creation or enhancement of a larger system of natural areas and open space is preferable to the preservation of many individual habitat areas.
 3. Mitigation according to Section 2.7.E is not feasible due to site constraints such as parcel size, stream type, wetland category, or geologic hazards.
 4. There is clear potential for success of the proposed mitigation at the proposed mitigation site.
 5. The plan shall contain clear and measurable standards for achieving compliance with the specific provisions of the plan. A monitoring plan shall, at a minimum, meet the provisions in Section 2.7.M.
 6. The plan shall be reviewed and approved as part of overall approval of the proposed use.
 7. A wetland of a different type is justified based on regional needs or functions and values; the replacement ratios may not be reduced or eliminated unless the reduction results in a preferred environmental alternative.
 8. Mitigation guarantees shall meet the minimum requirements as outlined in Section 2.7.J.2.a.viii.
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9. Qualified professionals in each of the critical areas addressed shall prepare the plan.
10. The City may consult with agencies with expertise and jurisdiction over the resources during the review to assist with analysis and identification of appropriate performance measures that adequately safeguard critical areas.

2.8 Unauthorized Alterations and Enforcement

- A. When a wetland or its buffer has been altered in violation of these regulations, all ongoing development work shall stop, and the critical area shall be restored. The City shall have the authority to issue a “stop-work” order to cease all ongoing development work and order restoration, rehabilitation, or replacement measures at the owner’s or other responsible party’s expense to compensate for violation of provisions of these regulations.
 - B. Requirement for Restoration Plan. All development work shall remain stopped until a restoration plan is prepared and approved by the City. Such a plan shall be prepared by a qualified professional using the currently accepted scientific principles and shall describe how the actions proposed meet the minimum requirements described in 2.8.C. The City shall, at the violator’s expense, seek professional advice in determining the adequacy of the plan. Inadequate plans shall be returned to the applicant or violator for revision and resubmittal.
 - C. Minimum Performance Standards for Restoration. The following minimum performance standards shall be met for the restoration of a wetland, provided that if the violator can demonstrate that greater functions and habitat values can be obtained, these standards may be modified:
 1. The historic structure, functions, and values of the affected wetland shall be restored, including water quality and habitat functions.
 2. The historic soil types and configuration shall be restored to the extent practicable.
 3. The wetland and buffers shall be replanted with native vegetation that replicates the vegetation historically found on the site in species types, sizes, and densities. The historic functions and values should be replicated at the location of the alteration.
 4. Information demonstrating compliance with other applicable provisions of these regulations shall be submitted to the City.
 - D. Site Investigations. The City is authorized to make site inspections and take such actions as are necessary to enforce these regulations. Representatives of the City
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shall present proper credentials and make a reasonable effort to contact any property owner before entering onto private property.

- E. Penalties. Any person failing to conform to the terms of a permit issued in accordance with the Program or who undertakes development on the shorelines of the state without first obtaining any permit required by the Program shall be subject to a civil penalty per WAC Sections 173-27-240 through 173-27-300 and the City of Castle Rock Municipal Code as it now exists or is subsequently amended.

3. Fish and Wildlife Habitat Conservation Areas within Shoreline Jurisdiction

- A. Designation of Critical Fish and Wildlife Habitat Conservation Areas. Critical fish and wildlife habitat conservation areas are designated according to the classifications in the following table:

Table 6. Fish and Wildlife Conservation Area Classifications

Classifications WAC 365-190-130	Description
(1) Areas with which state/federal-designated endangered, threatened, candidate, or sensitive species have a primary association.	Areas which, if altered, may reduce the likelihood that the species will reproduce over the long term. Habitats associated with these species are those identified by Washington State Department of Fish and Wildlife’s current system for mapping species of concern. These habitats are designated as critical areas, where endangered, threatened, candidate, and sensitive species are verified to have a primary association.
(2) Species and habitats of local importance, as set forth in WDFW’s Priority Habitats and Species (PHS) list as defined in WAC 365-190-030	<p>Habitat: Unique or significant habitats which regionally rare wildlife species depend upon and that have high wildlife concentrations, including:</p> <ol style="list-style-type: none"> 1. Caves, urban, and rural natural open spaces; 2. Talus slopes, riparian systems, oak/conifer associations; 3. Snag and log-rich areas (outside forest practices); and 4. Old growth/mature forests, shrub-steppe areas, etc., see WAC 365-190-030. <p>Species: Wildlife species which require protective measures for their continued existence due to their population status or sensitivity to habitat alterations or are highly valued by the local citizens. Species meeting the above criteria but not depending upon a habitat of local importance (as listed above) to meet criteria habitat needs are those documented, verified, and mapped in Cowlitz County by the Department of Fish and Wildlife.</p>

Classifications WAC 365-190-130	Description
(3) Commercial and recreational shell fish areas.	There are no known commercial and recreational shell fish areas in Castle Rock.
(4) Kelp and eelgrass beds; herring and smelt spawning areas.	There are no kelp, eelgrass beds, or herring spawning areas known to occur in Castle Rock, but smelt have spawning areas along the shorelines of the Cowlitz River. The Washington State Hydraulic Code guidelines (WAC Title 232) and information from the Washington State Department of Fish and Wildlife are used to identify smelt spawning areas.
(5) Naturally occurring ponds under 20 acres and their submerged aquatic beds that provide fish or wildlife habitat	Naturally occurring ponds are waters with a surface area of less than 20 acres but greater than one acre and manmade ponds developed as mitigation as part of a permitting process or mitigation agreement. Naturally occurring ponds do not include ponds deliberately created such as canals, detention facilities, wastewater treatment facilities, farm ponds, temporary construction ponds (of less than three years' duration), and landscape amenities.
(6) Waters of the state.	Waters of the state shall be those defined in WAC 222-16-030, Forest Practices Board, Definitions.
(7) Lakes, ponds, streams, and rivers planted with game fish by a governmental or tribal entity.	Waters of the state which regularly have game fish introduced.
(8) State natural area preserves and natural resource conservation areas.	Currently, there are no known areas in the City of Castle Rock.
(9) Unintentionally created ponds.	Ponds with a surface area of less than 20 acres, but greater than one acre.

B. Habitat Protection for Classification 5, 6 and 7 (Table 6). Buffer depth determination for these habitat areas shall be through the Shoreline Management Act, SEPA, the Federal Clean Water Act, and the State Hydraulic Code and/or best management practices. Within Classification 6, Type 1 through 5 waters, as defined in Chapter 222-16-030 WAC, Forest Practices Board, Definitions, are regulated streams.

1. Within Shoreline Management Act jurisdiction, the following shall apply: The stream typing system as provided in WAC 222-16-030k as hereafter amended shall be utilized for stream classification. The Department of Natural Resources stream classification maps shall be used to determine classification, unless the critical areas report provides a basis for reclassification. The Administrative official may consult with the Department of Natural Resources and Washington Department of Fish and Wildlife to gain concurrence on any change in classification.

a. "Type S Water" means all waters, within their bankfull width, as inventoried as "shorelines of the state" under chapter 90.58 RCW and the rules

promulgated pursuant to chapter 90.58 RCW including periodically inundated areas of their associated wetlands.

- b. "Type F Water" means segments of natural waters other than Type S Waters, which are within the bankfull widths of defined channels and periodically inundated areas of their associated wetlands, or within lakes, ponds, or impoundments having a surface area of 0.5 acre or greater at seasonal low water and which in any case contain fish habitat or are described by one of the following four categories:
 - i. Waters, which are diverted for domestic use by more than 10 residential or camping units or by a public accommodation facility licensed to serve more than 10 persons, where such diversion is determined by the department to be a valid appropriation of water and the only practical water source for such users. Such waters shall be considered to be Type F Water upstream from the point of such diversion for 1,500 feet or until the drainage area is reduced by 50 percent, whichever is less;
 - ii. Waters, which are diverted for use by federal, state, tribal or private fish hatcheries. Such waters shall be considered Type F Water upstream from the point of diversion for 1,500 feet, including tributaries if highly significant for protection of downstream water quality. The department may allow additional harvest beyond the requirements of Type F Water designation provided the department determines after a landowner-requested on-site assessment by the department of fish and wildlife, department of ecology, the affected tribes and interested parties that:
 - a. The management practices proposed by the landowner will adequately protect water quality for the fish hatchery; and
 - b. Such additional harvest meets the requirements of the water type designation that would apply in the absence of the hatchery;
 - iii. Waters, which are within a federal, state, local, or private campground having more than 10 camping units: Provided, That the water shall not be considered to enter a campground until it reaches the boundary of the park lands available for public use and comes within 100 feet of a camping unit, trail or other park improvement;
 - iv. Riverine ponds, wall-based channels, and other channel features that are used by fish for off-channel habitat. These areas are critical to the maintenance of optimum survival of fish. This habitat shall be identified based on the following criteria:
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- a. The site must be connected to a fish habitat stream and accessible during some period of the year; and
 - b. The off-channel water must be accessible to fish.
 - c. “Type Np Water” means all segments of natural waters within the bankfull width of defined channels that are perennial nonfish habitat streams. Perennial streams are flowing waters that do not go dry any time of a year of normal rainfall and include the intermittent dry portions of the perennial channel below the uppermost point of perennial flow.
 - d. “Type Ns Water” means all segments of natural waters within the bankfull width of the defined channels that are not Type S, F, or Np Waters. These are seasonal, nonfish habitat streams in which surface flow is not present for at least some portion of a year of normal rainfall and are not located downstream from any stream reach that is a Type Np Water. Ns Waters must be physically connected by an above-ground channel system to Type S, F, or Np Waters.
2. The following buffers shall apply to the water bodies classified above. Buffer widths shall be measured on a horizontal plane landward from the OHWM.

Table 7. Water Body Buffers within Shoreline Management Act Jurisdiction

Stream	Riparian Habitat Area (RHA) Buffer (ft)
Type S Water	See Table 8
Type F Water (Type 2)	150
Type F Water (Type 3)	100
Type Np Water	50
Type Ns Water	50

Table 8. Shoreline Reach Based RHA Buffers

Code Reach Number	Shoreline Environment Designation	Water Body	Buffer
CR-01	High-Intensity	Cowlitz River	150 feet
CR-02	High-Intensity	Cowlitz River	150 feet
CR-03	Residential	Cowlitz River	100 feet
CR-04	High-Intensity	Cowlitz River	75 feet
CR-05	Parallel Designation:	Cowlitz River	From the OHWM to the edge of existing

Code Reach Number	Shoreline Environment Designation	Water Body	Buffer
	High-Intensity / Recreation		impervious surface; Or, as specified in an approved Park Management Plan
CR-06	Parallel Designation: Recreation / High-Intensity / Residential	Cowlitz River	From the OHWM to the waterward toe of the levee.
CR-07	Recreation	Cowlitz River	150 feet; Or, to the waterward toe of the levee, as applicable.
CR-08	Parallel Designation: Recreation / High-Intensity / Residential	Cowlitz River	From the OHWM to the waterward toe of the levee.
CR-09	Recreation	Cowlitz River	150 feet
CR-10	Recreation	Cowlitz River	150 feet; Or, edge of impervious surface of existing development, where applicable.
CR-11	Recreation	Cowlitz River	50 feet (due to existing fairgrounds road)
CR-12	Parallel: Recreation/High-Intensity/Residential	Cowlitz River	From the OHWM to the waterward edge of the right-of-way.
CR-13	Recreation	Cowlitz River	<i>Boat Launch</i> – From the OHWM to the waterward side of the boat launch. <i>Other uses</i> – 100 feet
CR-14	Recreation	Cowlitz River	150 feet
CR-15	Residential	Cowlitz River	150 feet
CR-16	Recreation	Cowlitz River	150 feet
CR-17	Residential	Arkansas Creek	100 feet
CR-18	Recreation	Arkansas Creek	150 feet
CR-19	Recreation	Arkansas Creek	150 feet
CR-20	High-Intensity	Salmon Creek	From the OHWM to the waterward edge of the right-of-way.
CR-21	High-Intensity	Salmon Creek	<i>West bank</i> – 100 feet <i>East bank</i> – From the OHWM to the waterward edge of the right-of-way.

3. The recommended RHA buffer widths may be increased when the City determines that the recommended width is insufficient to prevent habitat degradation and to protect the structure and functions of the habitat area.
4. The following uses are allowed in the buffers shown in Table 8 and building setbacks in all SEDs consistent with Table 7-1 of the SMP, provided that mitigation sequencing is demonstrated and any adverse impacts to ecological functions are mitigated.

- i. Water-dependent uses. Water-dependent uses, modifications and activities may be located in shoreline buffers at the water's edge without obtaining a Shoreline Variance, provided the project complies with all other provisions this Program.
 - ii. Linear transportation and utility crossings. New linear transportation and utility crossings may be located in shoreline buffers without obtaining a Shoreline Variance, provided the project complies with all other provisions of this Program.
 - iii. Shoreline residential access. A private access pathway constructed of pervious materials may be installed, a maximum of four (4) feet wide, through the shoreline buffer to the OHWM. Impervious materials may be used only as needed to comply with ADA requirements to construct a safe, tiered pathway down a slope. A railing may be installed on one edge of the pathway, a maximum of 36 inches tall and of open construction. Pathways to the shoreline should take the most direct route feasible consistent with any applicable ADA standards.
5. Buffer averaging may be allowed where the applicant demonstrates:
- a. There are no feasible alternatives to the site design that could be accomplished without buffer averaging;
 - b. Within the existing buffer there are areas with significant differences in characteristics that affect its habitat functions and would not be addressed by revegetation.
 - c. The buffer is increased adjacent to the higher-functioning area of habitat or more sensitive portion of the water body and decreased adjacent to the lower functioning or less sensitive portion;
 - d. The buffer averaging does not reduce the functions or values of the water body or riparian habitat, or the buffer averaging, in conjunction with vegetation enhancement, increases the habitat function;
 - e. The total area of the buffer after averaging is equal to the area required without averaging and all increases in buffer dimension for averaging are generally parallel to the water's edge;
 - f. The buffer at its narrowest point is never less than 75% of the required width; unless an existing human improvement that cannot be feasibly relocated is located closer to the water body.
- C. Development Performance Standards. Development activities, as described in Section 1.3 Applicability – Regulated activities, shall conform and be governed by the
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following items in this subsection, and in subsections (D) through (K) of this section. When impacts to critical fish and wildlife habitat and the associated buffer cannot be avoided, the performance standards contained in this section shall be used to develop plans submitted for regulated activities. Shoreline permits including critical areas impacts may be conditioned (that is, approved with conditions) to reflect the following performance standards:

1. Best available science shall be used to conduct any biological assessments of fish and wildlife habitats and to propose mitigation steps required for specific developments;
 2. Locate buildings and structures in a manner that preserves the habitat or minimizes adverse impacts;
 3. Consolidate habitat and vegetated open space in contiguous blocks, and where possible locate habitat contiguous to other habitat, open space or landscaped areas to contribute to a continuous system or corridor that provides connections to adjacent habitat areas;
 4. Use native species in any landscaping of disturbed or undeveloped areas and in any enhancement of habitat or buffers. Emphasize diversity in selection of plant materials and structure of landscaping;
 5. Remove and/or control any noxious or undesirable species of plants as identified by the Cowlitz County weed control board;
 6. Demonstrate how existing trees will be preserved, preferably in groves;
 7. Preserve and introduce native plant species which serve as a food source for wildlife; provide shelter from climatic extremes and predators; provide structure and cover for reproduction and rearing of young;
 8. Preserve the natural hydraulic and ecological functions of drainage systems;
 9. Preserve critical fish and wildlife habitat areas through maintenance of stable channels, adequate low flows, management of stormwater runoff, erosion, and sedimentation;
 10. Manage access to critical fish and wildlife habitat areas to protect species which are sensitive to human disturbance;
 11. Maintain or enhance water quality through control of runoff and use of best management practices.
- D. Overlap of Critical Areas. Section 1.7, Relationships to Other Regulations, notwithstanding, if a fish or wildlife habitat classification is determined to be a wetland then the wetland regulations in Section 2, Critical Area Wetlands Within
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- Shoreline Jurisdiction, shall apply. If two or more critical areas overlap, then the more protective standards of the two shall apply.
- E. Habitat Management Plan for Classification 1 Only (Table 6). A habitat management plan shall be required (Appendix B-6) if the regulated activity is within 250 feet of a Classification 1 habitat area, or identified within 1,000 feet of a point location (nests, dens, etc.) for a Classification 1 habitat area. To ensure that potential conflicts between habitat and species protection measures and development activities are adequately identified, all projects within a minimum of 1,300 feet from endangered, threatened or sensitive species or habitat locations shall be reviewed for possible habitat management plan requirements set forth in Appendix B-6.
 - F. Habitat Management Plan Requirements.
 - 1. The habitat management plan will be prepared by a qualified fish and/or wildlife professional. See Appendix B-6.
 - 2. Habitat management plans will be sent to the Washington State Department of Fish and Wildlife, National Oceanic and Atmospheric Administration – Fisheries and other appropriate state and federal agencies as an attachment to the SEPA checklist.
 - G. Habitat Protection for Classification 2 (Table 6). Protection for these habitat areas shall be through the development performance standards listed above.
 - H. Habitat Protection for Classification 3 and 4 (Table 6). If found to occur, protection of these areas shall be coordinated by the city with the Washington State Department of Fish and Wildlife.
 - I. Habitat Protection for Classification 5, 6 and 7 (Table 6). Buffer depth determination for these habitat areas shall be through the Shoreline Management Act, SEPA, the Federal Clean Water Act, and the State Hydraulic Code and/or best management practices. Within Classification 6, Type 1 through 5 waters, as defined in Chapter 222-16-030 WAC, Forest Practices Board, Definitions, are regulated streams.
 - J. Habitat Protection for Classification 8 (Table 6). Protection for state natural area preserves and natural resource conservation area habitats will be achieved through assistance from the Washington State Department of Natural Resources, Department of Fish and Wildlife and the Department of Ecology.
 - K. Habitat Protection for Classification 9 (Table 6). Protection for habitat provided by unintentionally created ponds shall be through the development performance standards in subsection (C) of this section.

4. Frequently Flooded Critical Areas

- A. Frequently Flooded Area Classifications and Designations. All lands identified in the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps, as amended, and approved by the city as within the 100-year floodplain are designated as frequently flooded areas.
- B. Development Limitations. All development within designated frequently flooded areas shall comply with Chapter 15.24 CRMC, Flood Damage Prevention dated 1988.

5. Geologic Hazard Areas

- A. Geologic hazard areas fall within two designations:
 - 1. Areas of Geological Concern. Slopes between 12 percent and 25 percent (an area that may only require a minimal amount of geologic information with recommendations for site development);
 - 2. Areas of Potential Geological Hazard. Slopes greater than 26 percent (such areas require more extensive review because of the severity of conditions).
 - B. Geotechnical Assessments and/or Reports.
 - 1. A geotechnical assessment of the effects of potential site development shall be conducted to determine if a site is an area of geologic concern or an area of potential geologic hazard. It shall take into consideration steepness of slope, retention of natural vegetation, soil characteristics, geology, drainage, groundwater discharge, and engineering recommendations relating to slope and structural stability. The geotechnical assessment shall be prepared by a geotechnical engineer meeting the minimum qualifications as defined by these regulations. See Appendices B-1 and B-2.
 - 2. If the assessment indicates an area of potential geological hazard on the site, a geotechnical report (Appendix B-3) will be required. A geotechnical report involves greater detailed surface and subsurface examinations than does a geotechnical assessment. The minimum requirements for the erosion hazard, geotechnical assessments and the geotechnical report are included in the appendices.
 - C. Classification – Landslide Hazard Areas. Landslide hazard areas are those areas meeting any of the following criteria:
 - 1. Areas of historic failure, such as areas designated as quaternary slumps, earthflows, mudflows, or landslides;
 - 2. Any area with all of the following:
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- a. Slope greater than 26 percent; and
 - b. Steep hillsides intersecting geologic contacts with a relatively permeable sediment overlying a relatively impermeable sediment or bedrock; and
 - c. Springs or groundwater seepage;
3. Slopes that are parallel or subparallel to planes of weakness, such as bedding planes, joint systems, and fault planes;
 4. Slopes having gradients greater than 80 percent (38 to 39 degrees) and subject to rockfall during seismic shaking;
 5. Areas potentially unstable as a result of rapid stream incision, stream bank erosion, and undercutting by wave action;
 6. Areas located in a canyon, on an active alluvial fan, or that are presently subject to inundation by debris flows or catastrophic flooding;
 7. Areas identified as being unstable or very unstable through on-site investigations;
 8. Steep slopes that are greater than 30 percent and higher than 10 feet;
 9. Areas that include soil creep, which is a gradual movement of soil in response to gravity and weather. Severe soil creep can be an indicator of future landslide activity.
- D. Classification – Erosion Hazard. Erosion hazard areas are those areas identified by the presence of soils which are recognized as having a severe erosion hazard by the Natural Resources Conservation Service, Cowlitz County Area, Washington.
- E. Development Standards for Landslide Hazard and Erosion Hazard Classifications. Any area identified as potential geological hazard for landslides and erosion will require further studies and methods of mitigation prior to any consideration of development in the area. Any allowed or regulated activity on areas identified as landslide or erosion hazards or their buffers shall conform to the following standards:
1. Grading. The City has adopted Chapter 33 of the Appendix to the Uniform Building Code, Excavation and Grading. Unless activity is exempted, an excavation and grading permit is required.
 - a. Clearing, grading, and other construction activities shall not aggravate or result in slope instability or surface sloughing.
 - b. Slope disturbance shall be minimized. Clearing, grading or filling of sloped areas containing landslide or erosion hazard areas shall be limited to the period between April 30th and October 1st, unless the applicant provides an
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erosion control plan that specifically identifies methods of erosion control for wet-weather conditions, that is consistent with the standards set forth in the *1982 Puget Sound Stormwater Management Manual* as adopted by the City.

- c. All authorized clearing for roads and utilities shall be limited to the minimum necessary to construct the engineered design.
 - d. Undergrowth and vegetation shall be retained to the maximum extent feasible.
 - e. No dead vegetation or other foreign material shall be placed within landslide or erosion hazard areas, other than approved for bank stabilization or if such grading is consistent with authorized activities specified in a geotechnical report.
2. Erosion Control. Compliance with Chapter 15.24 CRMC, Flood Damage Prevention; the Shorelines Master Program; and applicable provisions of *1982 Puget Sound Stormwater Management Manual* is required and includes the use of best management practices (BMP).
- a. Disturbance of trees and vegetation shall be minimized to reduce erosion and maintain existing stability of hazard areas.
 - b. Vegetation removal on the slopes of waterways between the ordinary high watermark and the top of the banks shall be minimized because of the potential for erosion.
 - c. Vegetation and organic soil material shall be removed from fill sites prior to the placement of fill.
 - d. Thinning of limbs of individual trees is preferred over tree removal as a means to provide view corridors.
 - e. Vegetative cover or engineered ground covers shall be placed on any disturbed surface to the extent feasible.
3. Drainage.
- a. Surface drainage, including down spouts, shall not be directed across the face of a hazard area. If drainage must be discharged from the top of a hazard area to its toe, it shall be collected above the top and directed to the toe by tight line drain, which is an energy dissipating device at the toe for discharge to a swale or other acceptable natural drainage areas.
 - b. Stormwater retention and detention systems, including percolation systems utilizing buried pipe, are prohibited unless a geotechnical assessment proves
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that such a system shall not affect slope stability and the systems are designed in accordance with City standards.

- c. The proposed project will not increase the rate of surface water discharge or sedimentation and will not decrease the adjacent property slope stability.
4. Buffers.
 - a. An undisturbed 50-foot buffer, as measured on the surface, is required from the top, toe, and along all sides of any existing landslide or erosion hazard areas.
 - b. Based on the results of the geotechnical assessment, the City may increase or decrease the buffer as indicated.
 - c. The buffer shall be clearly staked before and during any construction or clearing.
 5. Sanitary Sewage Lines. For the purpose of landslide or erosion control, the sanitary sewage lines shall be located outside of the hazard area buffer, unless otherwise determined by the City. The placement of all sanitary sewage lines must be in compliance with all local government health regulations.
 6. Design Guidelines.
 - a. Structures should be clustered where possible to reduce disturbance and removal of vegetation.
 - b. Foundations shall be stepped to the contours of the slope to the extent possible.
 - c. Roads, walkways, and parking areas should be designed to parallel the natural contours of the site.
 - d. Development proposals shall be designed to minimize the impacts of the project resulting in the least disturbance to the adjacent affected areas.
 - F. Classification – Seismic Hazard Areas. For the purposes of this classification, a seismic hazard area is any area indicated by a Zone 2B or higher rating as defined by the Seismic Risk Map of the United States, adopted by the Washington State Legislature and defined in the Uniform Building Code (UBC).
 - G. Development Standards – Seismic Hazard Areas. All development within areas that meet the classification for seismic hazard areas shall comply with the Uniform Building Code. A critical areas permit is not required by these regulations for seismic hazards.
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- H. Classification – Mine Hazard Areas. For the purposes of this classification, mine hazard areas are:
1. Abandoned mines, shafts, tunnels, and/or workings where locations are known;
 2. Abandoned mines, shafts, tunnels, and/or workings where exact locations are unknown, but based upon the best available information that there is good cause to believe it is within an area which may be reasonably delineated;
 3. Abandoned powder magazines or bunkers.
- I. Development Standards – Mine Hazard Areas. Development adjacent to (as defined in these regulations) a mine hazard area is prohibited unless the applicant can demonstrate the development will be safe. If a proposal is located adjacent to a mine hazard area, a geotechnical report shall be required.
- J. Classification – Volcanic Hazard Areas. For the purposes of this classification, all volcanic mudflow hazard areas shall be identified as the 500-year floodplain areas identified in FEMA maps.
- K. Development Standards – Volcanic Hazard Areas. Development shall comply with existing Federal Emergency Management Agency regulations for floodplain management.
- L. Designations. Lands within the City of Castle Rock meeting the classification criteria for geologic hazard areas are hereby designated, under Chapter 36.70A RCW, as geologic hazard areas. Maps that illustrate critical areas include, but are not limited to:
1. Soil Conservation Service, Cowlitz County Area Soil Survey, 1996 (Critical Soils);
 2. Flood Insurance Rate Map for Castle Rock, FEMA, 1998 (Flood Plain);
 3. USGS, Derived from 10 Meter Digital Elevation Model, 2001 (Steep Slope);
 4. National Wetlands Inventory, U.S. Fish and Wildlife Service, 1989 (Wetlands).
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6. Critical Aquifer Recharge Areas

- A. Classification – Critical Aquifer Recharge Areas. For the purposes of this classification, the critical aquifer recharge areas are determined by the combined effects of soil types and hydrogeology. (Critical Aquifer Recharge Map, Cowlitz-Wahkiakum Council of Governments, 1993.)

Classification 1: High susceptibility areas, identified on the Aquifer Recharge Map, with a very high susceptibility to contamination of the underlying aquifer due to high soil permeability and high water table.

- B. Regulated Activities – Classification 1. The following activities are regulated in classification critical aquifer recharge areas located within jurisdictional shoreline areas:
1. Aboveground and Underground Storage Tanks and Vaults. Aboveground or underground storage tanks or vaults for the storage of hazardous substances or dangerous wastes as defined in Chapter 173-303 WAC, Dangerous Waste Regulations, or any other substances, solids, or liquids in quantities identified by the county health department, consistent with Chapter 173-303 WAC, as a risk to groundwater quality, shall conform to the Uniform Fire Code, Chapter 173-360 WAC, Underground Storage Tank Regulations.
 2. Utility Transmission Facilities. Utility facilities which carry liquid petroleum products or any other hazardous substance as defined in Chapter 173-303 WAC.
 3. Land Divisions. Subdivisions, short subdivisions and other divisions of land will be evaluated for their impact on groundwater quality within the Classification 1 aquifer recharge areas. The following measures may be required:
 - a. An analysis of the potential contaminate loading;
 - b. Alternative site designs, phased development and/or groundwater quality monitoring;
 - c. Open spaces within development proposals.
- C. Hydrogeologic Testing and Site Evaluation.
- D. Hydrogeologic testing and site evaluation may be required for any regulated activity. If federal or state regulations require hydrogeologic testing, the City may waive the requirement for additional testing provided the staff has adequate factual information to evaluate the proposal.
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- E. If hydrogeologic testing and site evaluation are required, they shall be conducted by a qualified professional (at the applicant's cost), and must include but are not limited to the requirements in Appendix B.
 - F. Development which negatively impacts the quality of any Classification 1 critical aquifer recharge area shall be prohibited unless the hydrogeologic testing and site evaluation satisfactorily demonstrate that significant adverse impacts will be mitigated.
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7. Mitigation Plan Performance Standards

- A. Mitigation Planning Requirements. All critical areas mitigation projects required pursuant to these regulations, either as a permit condition or as the result of an enforcement action, shall follow a mitigation plan approved by the City and prepared by a qualified professional on behalf of the applicant.

Mitigation in order of preference is as follows:

1. Avoiding the impact altogether by not taking a certain action or parts of actions;
2. Minimizing impacts by limiting the degree or magnitude of an action and its implementation;
3. Rectifying impacts by repairing, rehabilitating, or restoring the affected environment;
4. Reducing or eliminating an impact over time by preservation and maintenance operations during the life of the action;
5. Compensating for an impact by replacing or providing substitute resources or environments. When a mitigation plan is required it shall be approved by the City prior to any site disturbance. The City may seek assistance from state and/or federal resource agencies prior to making a decision. At a minimum the plan shall meet the following standards:
 - a. The mitigation plan shall be prepared by a qualified professional and shall be acceptable to the City. The cost of preparation is paid by the applicant.
 - b. The mitigation plan shall include:
 - i. An assessment of the existing function and values of the critical area;
 - ii. The functions and values that will be lost;
 - iii. The critical area's expected functions and values after mitigation.
 - c. Objectives shall be stated in measurable terms, if feasible.
 - d. The mitigation plan shall specify and describe how functions and values will be replaced.
 - e. The mitigation plan shall include provisions for monitoring the mitigation area as reasonably necessary to determine whether stated objectives have been accomplished. A contingency plan shall be included in the event the stated objectives are not accomplished.

- f. Mitigation shall be provided on site, except where on-site mitigation is not scientifically feasible, economical, or practical due to physical features of the property. The burden of proof shall be on the applicant to demonstrate that mitigation cannot be provided on site, and found acceptable by the City Council.
 - g. When mitigation cannot be provided on site, mitigation shall be provided in the immediate vicinity of the permitted activity on property owned or controlled by the applicant where such mitigation is practical and beneficial to the critical area and associated resources. Where possible, this means within the same hydrologic unit as the location of the proposed project.
 - h. Mitigation plans shall be approved by the City prior to any site alterations.
6. Restoration shall be required when a critical area has been altered after the adoption of these regulations and prior to project approval.

Appendix B-1 Qualified Professional and Valid Scientific Process.

A. Qualified Professional.

WAC 365-195-905(4) states:

Whether a person is a qualified scientific expert with expertise appropriate to the relevant critical areas is determined by the person's professional credentials and/or certification, licenses, and any advanced degrees earned in the pertinent scientific discipline, recognized leadership in the discipline of interest, formal training in the specific area of expertise, and field and/or laboratory experience with evidence of the ability to produce peer-reviewed publications or other professional literature. No one factor is determinative in deciding whether a person is a qualified scientific expert. Where pertinent scientific information implicates multiple scientific disciplines, counties and cities are encouraged to consult a team of qualified scientific experts representing the various disciplines to ensure the identification and inclusion of the best available science.

For the purposes of these regulations, the term qualified professional is defined in Chapter 2 of this Shoreline Master Program.

B. Valid Scientific Process.

WAC 365-195-905(5) states:

Scientific information can be produced only through a valid scientific process. To ensure that the best available science is being included, a county or city should consider the following:

(a) Characteristics of a valid scientific process. In the context of critical areas protection, a valid scientific process is one that produces reliable information useful in understanding the consequences of a local government's regulatory decisions and in developing critical areas policies and development regulations that will be effective in protecting the functions and values of critical areas.

To determine whether information received during the public participation process is reliable scientific information, the City of Castle Rock will review each report to ensure that the report's information was obtained and formatted in a manner that displays the characteristics of a valid scientific process as follows:

1. Peer Review. The information has been critically reviewed by other persons who are qualified scientific professionals in that scientific discipline. The criticism of the peer reviews has been addressed by the proponents of the information. Publication in a refereed scientific journal usually indicates that the information has been appropriately peer reviewed.
 2. Methods. The methods that were used to obtain the information are clearly stated and able to be replicated. The methods are standardized in the pertinent scientific discipline or, if not, the methods have been appropriately peer-reviewed to assure their reliability and validity.
 3. Logical Conclusions and Reasonable Inferences. The conclusions presented are based on reasonable assumptions supported by other studies and consistent with the general theory underlying the assumptions. The conclusions are logically and reasonably derived from the assumptions and supported by the data presented. Any gaps in information and inconsistencies with other pertinent scientific information are adequately explained.
 4. Quantitative Analysis. The data have been analyzed using appropriate statistical or quantitative methods.
 5. Context. The information is placed in proper context. The assumptions, analytical techniques, data and conclusions are appropriately framed with respect to the prevailing body of pertinent scientific knowledge.
 6. References. The assumptions, analytical techniques, and conclusions are well referenced with citations to relevant, credible literature and other pertinent existing information.
 - a. Common Sources of Scientific Information. Some sources of information routinely exhibit all or some of the characteristics listed in subsection (A) of this section. Information derived from one of these sources may be considered scientific information if the source possesses the characteristics listed in the following table. Castle Rock may consider information to be scientifically valid if the source possesses the characteristics listed in
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subsection (A) of this section. The information found in the following table provides a general indication of the characteristics of a valid scientific process typically associated with common sources of scientific information.

- b. **Common Sources of Nonscientific Information.** Many sources of information usually do not produce scientific information because they do not exhibit the necessary characteristics for scientific validity and reliability. Nonscientific information may provide valuable information to supplement scientific information, but it is not an adequate substitute for scientific information. Nonscientific information should not be used as a substitute for valid and available scientific information. Common sources of nonscientific information include the following:
 - i. **Anecdotal Information.** One or more observations which are not part of unorganized scientific effort (for example, “I saw grizzly bears in that area while I was hiking”).
 - ii. **Nonexpert Opinion.** Opinion of a person who is not a qualified scientific professional in a pertinent scientific discipline (for example, “I do not believe there are grizzly bears in that area”).
 - iii. **Hearsay.** Information repeated from communication with others (for example, “At a lecture last week, Dr. Smith said there were no grizzly bears in that area”).
- c. The City of Castle Rock will monitor and evaluate its efforts in critical areas protection and update this appendix to include new scientific information as it becomes available.

Table B-1. Characteristics

Sources of Scientific Information	Peer Review	Methods	Logical Conclusions and Reasonable Inference	Quantitative Analysis	Context	References
A. Research. Research data collected and analyzed as part of a controlled experiment (or other appropriate methodology) to test a specific hypothesis.	X	X	X	X	X	X
B. Monitoring. Monitoring data collected periodically over time to determine a resource trend or evaluate a management program.		X	X	Y	X	X

Sources of Scientific Information	Peer Review	Methods	Logical Conclusions and Reasonable Inference	Quantitative Analysis	Context	References
C. Inventory. Inventory data collected from an entire population or population segment (e.g., individuals in a plant or animal species) or an entire ecosystem or ecosystem segment (e.g., the species in a particular wetland).		X	X	Y	X	X
D. Survey. Survey data collected from a statistical sample from a population or ecosystem.		X	X	Y	X	X
E. Modeling. Mathematical or symbolic simulation or representation of a natural system. Models generally are used to understand and explain occurrences that cannot be directly observed.	X	X	X	X	X	X
F. Assessment. Inspection and evaluation of site-specific information by a qualified scientific professional. An assessment may or may not involve collection of new data.		X	X		X	X
G. Synthesis. A comprehensive review and explanation of pertinent literature and other relevant existing knowledge by a qualified scientific professional.	X	X	X		X	X
H. Expert Opinion. Statement of a qualified scientific professional based on his or her best professional judgment and experience in the pertinent scientific discipline. The opinion may or may not be based on site-specific information.				X	X	X

x = Characteristic must be present for information derived to be considered scientifically valid and reliable.

y = Presence of characteristic strengthens scientifically validity and reliability of information derived, but is not essential to ensure scientific validity and reliability.

Appendix B-2 Geotechnical assessments.

- A. The applicant must submit a geotechnical assessment prepared by a qualified geotechnical engineer, licensed by the state of Washington in accordance with RCW 18.220
- B. The technical assessment shall include at a minimum the following:
 - 1. A discussion of the surface and subsurface geologic conditions of the site;
 - 2. A site plan of the area delineating all areas of the site subject to landslide hazards based on mapping and field examination;
 - 3. A contour map of the proposed site, at a reasonable scale (not smaller than one inch equals 200 feet) that clearly delineates slopes for ranges between 12 and 25 percent and 26 percent or greater, and includes figures for area coverage of each slope category on the site.
- C. Site Evaluation. A written evaluation of the ability of the site to accommodate the proposed activity without causing either soil slippage, landslide or soil erosion.

Appendix B-3 Geotechnical report.

- A. The geotechnical report shall include at a minimum the following. Technical justification shall be provided where any information is not deemed applicable by the qualified professional.
 - 1. Site Geology Information Required.
 - a. Topographic Data. Contour map of proposed site at a scale of one inch equals 200 feet, that clearly delineates the slopes between 12 and 25 percent and 26 percent or greater, including figures for area coverage of each slope category on the site;
 - b. Subsurface Data. Boring logs and exploratory methods, soil and rock stratification, groundwater levels including seasonal changes;
 - c. Site History. Description of any prior grading, soil instability, or slope failure;
 - d. Seismic Hazard. Data concerning the vulnerability of the site to seismic events.
 - 2. Geotechnical Engineering Information Required.
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- a. Slope stability studies and opinion of slope stability;
 - b. Proposed angles of cut and fill slopes and site grading requirements;
 - c. Structural foundation requirements and estimated foundation settlements;
 - d. Soil compaction criteria;
 - e. Proposed surface and subsurface drainage;
 - f. Lateral earth pressures;
 - g. Erosion vulnerability of site; illustration of steps that will be taken to prevent soil erosion or stormwater runoff;
 - h. Suitability for fill;
 - i. Laboratory data and soil index properties for soil samples; and
 - j. Building limitations.
3. Site Evaluation. A written evaluation of the ability of the site to accommodate the proposed activity without causing either soil slippage, landslide or soil erosion. Where a valid geotechnical report has been prepared within the last five years for a specific site, and where the proposed activity and surrounding site conditions are unchanged, said report may be referenced in a new report.

Appendix B-4 Erosion hazard assessments.

- A. The applicant must submit an erosion hazard assessment (as set forth in Section 5, Geologic Hazard Areas) prepared by a qualified professional.
 - B. The erosion hazard assessment shall include, at a minimum, the following:
 1. An overview of the existing channel or drainage way characteristics and stream hydraulics at the entrance and exit to and from the subject property.
 2. An assessment of the probability for storm-induced erosion to occur along the drainageway on the subject property and the estimated extent of the property that would be affected and what steps the applicant will take to prevent erosion damage to subject property and/or adjacent properties, including public stormwater drainage ditches.
 3. A site map of the property, drawn to scale, delineating the relationship of any streams and drainageway to the property, and existing erosion areas and/or potential erosion areas, and the proposed development, including structural dimensions.
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4. A cross-section map, drawn to scale and at five-foot contour intervals, from the edge of the stream or drainageway or river's surface to the furthest landward boundary of the property, and including the proposed development.

Appendix B-5 Wetland critical areas report.

If the City determines that the site of a proposed development includes, is likely to include, or is adjacent to a wetland, a wetland report, prepared by a qualified professional, shall be required. The expense of preparing the wetland report shall be borne by the applicant. A wetland critical areas report shall include the following. If the qualified professional deems any of the following information inapplicable by, he or she shall provide technical justification.

- A. Narrative. The report narrative must include all of the following:
 1. The name and contact information of the applicant;
 2. The name, qualifications, and contact information of the primary author(s) of the wetland critical area report;
 3. Identification of all the local, state, and/or federal wetland-related permit(s) required for the project;
 4. Location information (legal description, parcel number, and address);
 5. Site characteristics, including topography, total acreage, delineated wetland acreage, vegetation, soil types, etc.;
 6. Identification and characterization of all critical areas, water bodies, shorelines, floodplains, and buffers on or adjacent to the proposed project area. For areas off site of the project site, estimate conditions within 300 feet of the project boundaries using the best available information;
 7. Identification of the wetland's rating as defined in these regulations;
 8. Analysis of functions and values of existing wetlands and buffers, including flood control, water quality, aquifer recharge, fish and wildlife habitat, and hydrology characteristics;
 9. A complete description of the proposed project and its potential impacts to wetlands and buffers and, if applicable, adjacent off-site wetlands and buffers, including an estimation of acreages of impacts to wetlands and buffers based on the field delineation and survey;
 10. Discussion of project alternatives, including total avoidance of impacts to wetlands and buffers;
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11. If mitigation for wetland impacts is proposed, a description and analysis of that mitigation;
 12. For all wetlands on or adjacent to the site, a wetland buffer width recommendation and rationale therefore;
 13. A description of the methodologies used to conduct the wetland delineations, ratings, or impact analyses, including references.
 14. For each wetland identified on site provide the wetland rating forms, including a description of and score for each function, per Wetland Ratings section (Section 2.2) of these regulations; hydrogeomorphic classification; wetland acreage based on a professional survey from the field delineation (acreages for on-site portion and estimates for entire wetland area including off-site portions, if field delineation of the off-site portion is infeasible); Cowardin classification of vegetation communities; habitat elements; soil conditions based on site assessment and/or soil survey information; and to the extent possible, hydrologic information such as location and condition of inlets/outlets (if they can be legally accessed), estimated water depths within the wetland, and estimated hydroperiod patterns based on visual cues (e.g., algal mats, drift lines, flood debris, etc.). Provide acreage estimates, classifications, and ratings based on entire wetland complexes, not only the portion present on the proposed project site;
 15. A discussion of the potential impacts to the wetland(s) associated with anticipated hydroperiod alterations from the project;
 16. A description of reasonable efforts made to apply mitigation sequencing pursuant to Mitigation Sequencing (Section 2.7) to avoid, minimize, and mitigate impacts to critical areas;
 17. A discussion of measures, including avoidance, minimization, and compensation, proposed to preserve existing wetlands and restore any wetlands that were degraded prior to the current proposed land-use activity;
 18. A conservation strategy for habitat and native vegetation that addresses methods to protect and enhance on-site habitat and wetland functions;
- B. Vicinity map drawn to scale and including a north arrow, public roads, and other known landmarks in the vicinity.
 - C. A copy of the Cowlitz County wetlands inventory map and the National Wetlands Inventory Map (U.S. Fish and Wildlife Service) identifying wetlands on or adjacent to the site.
 - D. Site Map. This map must be drawn to a usable scale, one inch equals 100 feet or better, and must include a north arrow and all of the following requirements:
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1. Site boundary/property lines and dimensions;
 2. Wetland boundaries based upon a qualified wetland professional's delineation and depicting sample points and differing wetland types, if any;
 3. Recommended wetland buffer boundary;
 4. Buffers for off-site critical areas that extend onto the project site;
 5. Internal property lines, such as rights-of-way, easements, etc.;
 6. Existing physical features of the site, including buildings and other structures, fences, roads, utilities, parking lots, etc.;
 7. The location of the development proposal, including grading and clearing limits;
 8. Topographical variations.
- E. An on-site wetland delineation report, with data sheets, prepared by a qualified professional. The report shall include photos documenting that the wetland boundaries have been staked and flagged.
- F. Documentation of any other fieldwork performed on the site, e.g., baseline hydrologic data, etc.;
- G. A copy of the site plan sheet(s) for the project must be included with the written report and must include, at a minimum:
1. Maps (to scale) depicting delineated and surveyed wetland and required buffers on site, including buffers for off-site critical areas that extend onto the project site; the development proposal; other critical areas; grading and clearing limits; and areas of proposed impacts to wetlands and/or buffers (include square footage estimates).
 2. A depiction of the proposed stormwater management facilities and outlets (to scale) for the development, including estimated areas of intrusion into the buffers of any critical areas

Appendix B-6. Habitat management plan requirements.

At a minimum, the habitat management plan shall typically contain the following information. Technical justification shall be provided where any information is not deemed applicable by the qualified professional. A qualified professional is defined in Chapter 2 of this Program, Definitions.

- A. A description of state or federally designated endangered, threatened or sensitive fish or wildlife species, or indigenous species of local importance, on site or adjacent to the subject property within a distance typical of the normal range of the species.
- B. A description of the critical wildlife habitat for the identified species known or expected to be located on site or immediately adjacent to the subject property.
- C. A site plan that clearly identifies and delineates fish and wildlife habitats found above.
- D. An evaluation of the project's effects on fish and wildlife habitat both on and adjacent to the subject property.
- E. A summary of any federal, state, or local management recommendations which have been developed for the critical fish or wildlife species or habitats located at the site.
- F. A statement of measures proposed to preserve existing habitats and restore wildlife habitat area(s) degraded as a result of the proposed activities.
- G. A description of proposed measures that mitigate the impacts to wildlife habitats resulting from the proposed project.
- H. An evaluation of ongoing management practices which will protect fish and wildlife habitats after the project site has been fully developed, including a proposed adaptive management program, in concert with monitoring and maintenance programs of the subject property.

Appendix B-7. Hydrogeologic testing and site evaluation.

If hydrogeologic testing and site evaluation are required, they shall be conducted by a qualified professional and include at least the following. Technical justification shall be provided where any information is not deemed applicable by the qualified professional.

- A. A characterization of the site and its relationship to the aquifer and evaluation of the ability of the site to accommodate the proposed activity;
 - B. A discussion of the effects of the proposed project on groundwater quality and quantity; and
 - C. Recommendations on appropriate mitigation, if any, to assure that there shall be no significant degradation of groundwater quality or quantity.
 - D. In addition, the testing and evaluation must include, but not be limited to, an analysis of:
 - 1. Geologic setting and soils information of the site and surrounding area;
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2. Water quality data, including pH, temperature, conductivity, nitrates, and bacteria;
 3. Location and depth to perched water tables;
 4. Recharge potential of facility site (permeability/transmittancy);
 5. Local groundwater flow, direction and gradient;
 6. Surface water locations within 1,000 feet of the site.
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