

PLANNING COMMISSION AGENDA ITEM

CITY OF SHORELINE, WASHINGTON

AGENDA TITLE: Study of Critical Areas Ordinance Update – Geologic Hazards
DEPARTMENT: Planning & Community Development
PRESENTED BY: Juniper Nammi, AICP, Associate Planner
Paul Cohen, Planning Manager

Public Hearing
 Discussion

Study Session
 Update

Recommendation Only
 Other

INTRODUCTION

The City of Shoreline began the State required periodic update process of the Critical Areas Ordinance (CAO) in Shoreline Municipal Code (SMC) Chapter 20.80 of the Development Code in May. This meeting is the third of five scheduled meetings with Planning Commission for review of the draft changes to these regulations. This study session will review regulations for Geologic Hazard Areas including landslide hazards, seismic hazards, and erosion hazards.

The purpose of this study session is to:

- Review staff recommended code amendments for Chapter 20.80 Critical Areas, Subchapter 2-Geologic Hazard Areas (SMC 20.80.210 through 20.80.250), and associated definitions (SMC Chapter 20.20) and exemptions (SMC 20.80.030 and 20.80.040).
- Review Geologic Hazards Best Available Science memo prepared by consultant. Todd Wentworth, PE, of AMEC Foster Wheeler, will be available to answer questions.
- Respond to questions.
- Receive feedback from the Commission on the proposed amendments.
- Determine what proposed changes may need more research or analysis.
- Develop recommended code amendments to the CAO Geologic Hazards Subchapter and associated definitions and provisions for the public hearing.

BACKGROUND

The Commission was introduced to the Critical Areas Ordinance periodic update requirements, as mandated by the Growth Management Act (GMA), on May 21, 2015. A summary of the State requirements, history of the CAO, and proposed direction for the code updates is in the staff report from the May 21, 2015, Planning Commission meeting. The changes for the wetlands subchapter and critical area regulations in the Shoreline Master Program were studied June 4, 2015 and can be reviewed in that meeting's staff report.

Approved By: Project Manager _____

Planning Director _____

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The Planning Commission reviews and makes recommendations to Council on the critical area regulations because they are part of the Title 20 Development Code and include regulations that govern environmental protection, which is a stated purpose of the Planning Commission under SMC 2.20.010 and is a specific duty of the Planning Commission under SMC 2.20.060(B).

The decision criteria for these planned Development Code amendments are found in SMC 20.30.350:

B. Decision Criteria. *The City Council may approve or approve with modifications a proposal for the text of the Land Use Code if:*

- 1. The amendment is in accordance with the Comprehensive Plan; and*
- 2. The amendment will not adversely affect the public health, safety or general welfare; and*
- 3. The amendment is not contrary to the best interest of the citizens and property owners of the City of Shoreline.*

The City of Shoreline Comprehensive Plan was updated in December 2012 in compliance with the periodic update requirements of the Growth Management Act. The updated Comprehensive Plan added Element 6-Natural Environment as a new element specifically supporting the City's responsibility for protection of the natural environment. Many of the policies existed previously, but were deemed important enough to separate into their own element and expanded. The Comprehensive Plan goals and policies that support the regulation of land use to protect geologic hazard areas include:

GOALS

Goal NE I. Minimize adverse impacts on the natural environment through leadership, policy, and regulation, and address impacts of past practices where feasible.

Goal NE II. Lead and support efforts to protect and improve the natural environment, protect and preserve environmentally critical areas, minimize pollution, and reduce waste of energy and materials.

Goal NE III. Regulate land disturbances and development to conserve soil resources and protect people, property, and the environment from geologic hazards, such as steep slope, landslide, seismic, flood, or erosion hazard areas.

POLICIES

General

NE2. Preserve environmental quality by taking into account the land's suitability for development, and directing intense development away from *critical areas*.

NE3. Balance the conditional right of private property owners to develop and alter their land with protection of native vegetation and critical areas.

Geological and Flood Hazard Areas

NE11. Mitigate drainage, erosion, siltation, and landslide impacts, while encouraging native vegetation.

NE12. Seek to minimize risks to people and property in hazard areas through education and regulation.

NE13. Research information available on tsunami hazards and map the tsunami hazard areas located in Shoreline. Consider the creation of development standards and emergency response plans for tsunami hazard areas to minimize tsunami-related impacts.

NE14. Inform landowners about site development, drainage, and yard maintenance practices that affect slope stability and water quality.

NE17. Promote public education and encourage preparation in areas that are potentially susceptible to geological and flood hazards.

Vegetation Protection

NE20. Minimize clearing and grading if development is allowed in an environmentally critical area or critical area buffer.

PROPOSAL & ANALYSIS

Proposal Summary

The focus of today's study session is the changes for the Geologic Hazard Areas subchapter of the Critical Areas Ordinance regulations and related definitions and exemptions (**Attachment A**). This subchapter regulates properties that have or are near to landslide hazard areas, seismic hazards, and erosion hazard areas.

The GMA establishes two categories of critical areas – those areas whose functions and values are protected for the beneficial services they provide (e.g. wetlands, fish and wildlife habitat conservation areas, aquifer recharge areas) and those areas for which protection is needed due to the threat these areas pose to person and property (e.g. frequently flooded areas, landslide and seismic hazards) or to water resources in the case of erosion hazard areas. It is the futuristic potential or susceptibility of damage that creates the risk for which critical area designation of a geologic hazard area is needed. Although geologic hazards can be comprised of many types of overlapping critical areas, the City of Shoreline must have regulations to address these areas due to their susceptibility to erosion, sliding, or other geological events that make them ill-suited to the siting of commercial, residential, or industrial development due to public health and safety concerns.

In our research, there is a range of BAS for geologic hazards which amendments can draw from. The threat from some geologic hazard areas can be reduced or mitigated by engineering, design, or modified construction practices so that risks are minimized.

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State law does not specifically prohibit development on any type of geologic hazard areas, including steep slopes. The GMA tasks the City of Shoreline with deciding the level of public safety risk which is acceptable within the City. Generally speaking, under the public duty doctrine, the City cannot be found liable for merely permitting development in its jurisdiction. It is the property owner and their geotechnical engineer that may be liable for failure of a slope and property damage.

Staff recommends that development on Very High Hazard slopes is an unacceptable public safety risk and that development in all other less steep slopes, erosion, and seismic hazards may be acceptable with a complete geotechnical analysis. This is acceptable as the City is only restricting development within those geologic hazard areas which have the highest risks for prospective loss or damage.

The City contracted with a qualified geotechnical engineer, Todd Wentworth, of AMEC Foster Wheeler, to provide the City with a review of best available science (BAS) and recommended code changes to incorporate both BAS and best practices for regulating development in and near these critical areas. The final "Shoreline Geologic Hazards – Best Available Science" memo from AMEC Foster Wheeler is included as **Attachment B** for reference.

The WA Department of Commerce (Commerce) provides guidance to cities for updating critical area regulations to integrate BAS. The Commerce guidance in *Critical Areas Assistance Handbook and Appendices (CTED, 2007)* includes Sample Code Provisions in Appendix A. This sample code appendix is included as **Attachment C** and is being used by City staff for guidance in drafting updates to the critical area regulations. Sample code for geologically hazardous areas can be found on Appendix pages A-77 through A-92 of this attachment.

Staff proposes the following changes and additions to the geologic hazards section of the CAO:

- Add definitions that are currently not included in the CAO or delete definitions that duplicate or conflict with hazard area regulations;
- Revise exemptions and allowed activities language so potential impacts to geologic hazard areas from small projects are mitigated;
- Provide clear standards for when alterations are allowed, allowed with mitigation, or require a reasonable use permit, special use permit, or shoreline variance.
- Report requirements for geologic hazard areas critical area reports added so it is easier to determine when all the required information is included in a critical area report and to provide confidence in City decisions.
- Add new sections for Mapping, Development Standards, and CAO report requirements.

The existing sections to be discussed include:

Chapter 20.20 Definitions, including:

20.20.018 E definitions.

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- 20.20.022 G definitions.
- 20.20.032 L definitions.
- 20.20.046 S definitions.

Chapter 20.80 Critical Areas, Subchapter 1. Critical Areas – General Provisions, including:

- 20.80.030 Exemptions.
- 20.80.040 Partial Exemptions.

Chapter 20.80 Critical Areas, Subchapter 2. Geologic Hazard Areas

- 20.80.210 Designation and purpose.
- 20.80.220 Classification
- 20.80.230 Required buffer areas.
- 20.80.240 Alteration. (moved to new section 20.80.224)
- 20.80.250 Mitigation performance standards and requirements.

In addition to revisions to the above listed sections, the following new sections are proposed:

- 20.80.222 GEOLOGIC HAZARDS – Mapping.**
- 20.80.224 GEOLOGIC HAZARDS – Development standards.**
- 20.80.242 GEOLOGIC HAZARDS – Critical area report requirements.**

Proposed Geologic Hazards Revisions

The GMA specifically identifies the typed of critical areas that cities and counties must include in their regulations. Geologic hazard areas, defined in WAC 365-190-120, are included as critical areas primarily due to the potential risk to public health and safety when development is proposed in or adjacent to these areas.

The proposed revisions to the geologic hazard areas subchapter of the critical area regulations are included in **Attachment A**.

- The existing code is normal text.
- Changes based on the Commerce example code, other jurisdictions codes, or drafted by staff are single underlined.
- Provisions to be deleted are strike-through text.
- Provisions moved from other sections of these regulations are underline, with strike through or double underline showing edits to the original text.

Staff relied primarily on synthesis and guidance provided in the memo: *Shoreline Geologic Hazards – Best Available Science, Wentworth, May 29, 2015 (Attachment B)*.

SMC 20.20 Definitions

The purpose of this code section is to define terms as they shall be applied throughout the City of Shoreline. The definitions reviewed here specifically pertain to geologic hazard areas. Definitions proposed for deletion are actually classifications of geologic hazard types that are in SMC 20.80.220 Classifications section. Proposed changes or new definitions are recommended for incorporation of BAS.

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The definitions to be deleted, added, edited, or moved from the SMP (SMC 20.210) include:

- Engineering Geologist – added
- Erosion Hazard Areas – deleted
- Geologic Hazard Areas – added
- Geologist – edited for accuracy
- Landslide Hazard Areas – deleted
- Seismic Hazard Areas – deleted
- Steep Slope Hazard Areas – deleted

If there are other terms used in the code that would benefit from being defined, please let staff know so they can look for example language for those terms.

SMC Chapter 20.80 Critical Areas

Subchapter 1. Critical Areas – General Provisions.

Two subsections of the critical area general provisions are proposed for revisions to incorporate best available science for Geologic Hazard Areas. These sections contain exemptions specific to geologic hazard areas that are confusing as exemptions and are activities that should be reviewed by qualified professionals prior to approval.

SMC 20.30.030 Exemptions

This section lists activities that are exempted from the provisions of SMC Chapter 20.80. Changes are proposed to one of these exemptions.

Exemption 20.80.030(F) is specific to activities in some very high hazard landslide areas and is confusing in the current location. SMC 20.80.030(F) is as follows:

Activities occurring in areas which may be considered small steep slopes (areas of 40 percent slope or greater with a vertical elevation change of up to, but not greater than 20 feet), such as berms, retaining walls, excavations and small natural slopes, and activities on steep slopes created through prior legal grading activity may be exempted based upon City review of a soils report prepared by a qualified geologist or geotechnical engineer which demonstrates that no adverse impact will result from the exemption.

While this provision exempts activities proposed in small steep slopes, it only does so with City review of a report demonstrating that it is safe to exempt the proposed activities. This is essentially the same as the treatment of moderate and high hazard landslide areas. Exemption of proposed activities does not mean the slope is not a critical area or that the site is without risk of landslide. Since a report is required, it really is not an exemption from Chapter 20.80.

The BAS review memo indicates that landslides can and do occur on slopes of up to 20 vertical feet (Wentworth 2015). Review by a qualified professional of activities proposed on these smaller slopes is recommended.

SMC 20.30.040 Partial Exemptions

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The provision in SMC 20.80.040(A)(2) allows height additions and additions of up to 750 square feet of new footprint to existing, nonconforming structures located within critical areas and/or their buffers. This allows decreased protection of the critical area without review of the potential impacts to the area by a qualified professional or mitigation. The City's consultant recommends not allowing these modifications without a site specific critical area report (Wentworth 2015).

The proposed changes to this section delete the allowance for increased impacts without being subject to the critical area regulations.

SMC Chapter 20.80 Critical Areas Subchapter 2. Geologic Hazard Areas.

The majority of the new regulations proposed for the geologic hazard areas subchapter are derived from the recommendations provided by the City's consultant in the Geologic Hazards BAS memo (Wentworth, 2015).

Additional provisions have been added to provide clarity and predictability in the administration of these regulations. Some of the additions are modeled on the Commerce example code (CTED, 2007) and others are drawn from the regulations of other cities in the region.

SMC 20.80.210 GEOLOGIC HAZARD AREAS – Designation and purpose.

This section reiterates the definition of geologic hazard areas (consistent with RCW 36.70A.030(9)), identifies why they are regulated, and states the City's goals for regulation of this type of critical area. Revision to this definition is proposed for consistency with the definition proposed for SMC 20.20.022 and the state definition of geologic hazard areas (Wentworth, 2015).

Reorganization of the designation section is proposed so the hazard areas are presented in a consistent order throughout these regulations.

SMC 20.80.220 GEOLOGIC HAZARD AREAS – Classification.

This section states what is being regulated in the subchapter and how it is to be identified. Changes recommended by the City's consultant incorporate BAS and are based on best practices of geotechnical engineering and regulation of geologic hazard areas.

The City's consultant recommends that the definition of landslide hazard areas be added to this section based on the original definition of "steep slope hazard areas" from the definitions section and reworded for clarification of how these hazard areas should be delineated when based on percent slope.

Revisions to landslide hazard classifications are proposed to incorporate small steep slope areas up to 20 feet in height into the high hazard classification. These areas were previously classified as very high hazard based on slope, but activities could be exempted based on a report from a qualified professional demonstrating no increased

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risk. The current exemption is difficult to administer because of confusion in how to apply the exemption from the critical areas chapter when the small slopes were within larger moderate or high landslide hazard areas, or overlapped other types of critical areas and their buffers.

BAS indicates that these areas do present risk of landslide and impacts of development should be mitigated (Wentworth, 2015). Under the proposed revisions the process for allowing development in these areas is essentially the same, but reclassifying the slopes to high hazard allows for alteration of the critical area with site and project specific assessment and mitigation.

Clarification of very high hazard areas based on percent slope is proposed in order to assess the classification of areas of steeper slope that may be interrupted by benches or other variations in the topography. The proposed language essentially allows for delineation and protection of very high hazard areas within larger sloped areas that may be moderate or high hazard on average.

It may be helpful to include figures illustrating the proposed hazard area delineation criteria in a plan view and to illustrate when areas greater than 40 percent slope are considered one slope.

Wording changes to seismic and erosion hazard areas are recommended by the City's consultant for consistency with BAS or with other sections of the CAO.

SMC 20.80.222 GEOLOGIC HAZARD AREAS – Mapping. (NEW)

Critical area maps are identified in the general provision SMC 20.80.020, which indicates that critical area maps are adopted by this chapter. The current CAO does not specifically identify or list those maps. The new mapping provisions are intended to identify sources of information for identifying potential geologic hazard critical areas.

SMC 20.80.224 GEOLOGIC HAZARD AREAS – Development standards. (NEW)

This proposed new section adds a list of allowed activities and moves the alterations provisions from 20.80.240 up so that what is allowed can be found all in one place with clear statements of when permit and critical area reports are required, when mitigation is required, and when special approval processes apply.

The current critical areas regulations include exemptions (SMC 20.80.030) and partial exemptions (SMC 20.80.040) for selected activities from the provisions of Chapter 20.80. Some of those exemptions apply only to specific types of critical areas. Impacts may need to be mitigated even if some provisions need not be applied. Other exemptions are better stated at activities. These activities may be allowed within the critical area without a critical area report, but should be subject to permits in order to verify no impact to the critical area and that best practices are being followed as verified by inspection of the project or activity.

Subsection B includes provisions moved from the exemptions, partial exemptions or alterations sections of the existing regulations. It also adds policies that are currently applied as policy, but not explicitly stated. These include activities (in addition to the

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exempted activities in 20.80.030 and 20.80.040) that are allowed without a critical area report. These are activities that have little to no known impact on geologic hazard areas or are beneficial to the long-term stability of the geologic hazard area.

Subsections C through E are moved from 20.80.240 Alterations. Text has been added to clearly indicate whether alterations have to avoid impacts to the hazard area or are allowed with mitigation of the hazard and no increased risk. These provisions do not change substantively what is or is not allowed, but rather it states explicitly how approvals could be obtained.

SMC 20.80.230 GEOLOGIC HAZARD AREAS – Required buffer areas.

Buffers are a tool commonly used to protect critical areas, including geologic hazard areas, from the impacts of development. Landslide hazard areas in particular can become less stable if the landform at risk of sliding is surcharged (additional force from above), undercut (soil removed from below), or cleared (removing naturally stabilizing vegetation). The need for and appropriate size of buffers for landslide hazard areas depends on site and project specific conditions.

Staff drafted new provision SMC 20.80.230(A) to clarify what a buffer for a geologic hazards area is and when building or improvement setbacks may be required in addition to undisturbed buffers based on recommendations from the qualified professional.

The order of the provisions is revised for consistency with other code sections. Required buffers for very high hazard landslide areas are differentiated from buffer requirements for moderate and high hazard areas where buffers may not be needed if it can be approved by a qualified professional.

Erosion and seismic hazard areas do not typically need buffers as the mitigation of these hazards is through structural design or erosion control practices during and after construction.

SMC 20.80.240 Alteration. (moved to 20.80.224)

The current SMC 20.80.240 section setting standards for alteration based on the classification of the geologic hazard areas is proposed to be edited and moved to the new SMC 20.80.224 section setting development standards for geologic hazard areas. Knowing when development activities and uses will be allowed in specific types of geologic hazard areas and under certain conditions follows logically after activities allowed regardless of hazard type and without critical area reports.

SMC 20.80.242 GEOLOGIC HAZARD AREAS – Critical area report requirements. (NEW)

Critical area reports are required under the general provisions in SMC 20.80.110. Additional clarification is planned for this general section. Critical area types are regulated for different reasons and the information needed to evaluate the impacts of a project varies depending on the type.

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For example a wetland report would focus on the potential impacts to habitat, hydrology, water quality and other ecological functions. A geologic hazard area report would look at soils and slope stability for risk of landslide, erosion, seismic hazards for life and safety considerations. For this reason it is useful to provide clear report requirements specific for each type of critical area. Standards for critical area reports are intended to answer the question “What does the report need to include?” clearly and predictably regardless of the qualified professional writing the report or the planner reviewing the application. Staff expects that clear report standards, combined with clarification to the qualified professional and third party review standards, will result in better report submittals with less review time or revision requirements. Third party review by a qualified professional contracted by the City adds cost and time to project reviews.

The language proposed in this section combines recommendations from the BAS memo and language from the Commerce sample code for geologic hazard area reports. This section identifies when a critical area report is required, who prepares it, and who pays for it, as well as, what code provisions are applied to the critical area report.

Subsection A is intended to augment the requirement in SMC 20.80.110 for preparation of the report to be completed by a qualified professional. This section also proposes language identifying when review of the critical area reports will be conducted by a third party qualified professional under contract with the City verses when it is done by City staff assigned to review of the project.

Subsections B through F are intended to identify the sections that should be addressed in a geologic hazard area report and differentiates levels of detail that a critical area report(s) may include. Specific types of analysis for the different types of geologic hazard areas are identified and would apply where that hazard is present.

This new code section could be reorganized to refer to general report requirements common to all types of critical areas in a new section in the Critical Areas General Provisions. Alternately, report requirements could be referenced in Washington Department of Licensing guidance documents for preparing geotechnical engineering reports, rather than included directly in the code. The current draft places all the provisions for critical area reports in the applicable subchapter for that type of critical area, so it is all located in one place and applicants do not have to refer to other subchapters or other documents to find the information.

Staff is doing additional research into options for requiring complete critical area reports without having to pre-identify all specific information that must be included. General provisions that provide a complete outline for any type of critical area report may eliminate the need for critical area specific report standards. Instead the code would reference appropriate technical guidelines for reports of specific critical area types.

SMC 20.80.250 GEOLOGIC HAZARD AREAS –Mitigation performance standards and requirements.

Ensuring that mitigation is correctly and successfully implemented is necessary for adequate protection of public health and safety both on and off site. Mitigation for geologic hazard areas includes measures that will prevent increased risk of the hazard

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both during and after the project construction. Geologic hazard mitigations often include vegetative stabilization that will not survive if it is not adequately maintained. Maintenance, monitoring, and contingency plans are required to ensure successful establishment of the required vegetation. Structural solutions may also require maintenance and monitoring.

The existing mitigation performance standards require use of relevant performance standards in sections for critical areas generally, fish and wildlife habitat, wetlands, and streams. It is often unclear which performance standards might be relevant and these standards may be revised under the current code update process. Staff will review performance standards to be added to this section following drafting of code changes to remaining critical area ordinance sections.

This section should include provisions for:

1. Timing of mitigation relative to the proposed development project;
2. How much and what type of mitigation is required to ensure no increased risk of the hazard;
3. Performance standards for the mitigation projects;
4. Report requirements for mitigation plan reports; and
5. Requirements for monitoring and correcting projects that are not succeeding.

Additional Research Topics

Other jurisdictions use some regulatory tools for managing risk in geologic hazard areas that the City does not currently employ. These mechanisms would be primarily applicable where the risk to life and property could be significant (e.g. very high hazard landslide areas). Staff is looking into the following tools:

- Special bonding requirement for contractors working in geologic/landslide hazard areas;
- Special inspection standards; and
- Liability waiver to be recorded on title for projects in very high hazard landslide areas.

Staff is also developing critical area code enforcement provisions that would apply to violations in all types of critical areas that will be presented with the general provisions update.

Best Available Science

The City contracted with a qualified geotechnical engineer, Todd Wentworth, of AMEC Foster Wheeler, to provide the City with a review of best available science (BAS) and recommend code changes to incorporate both BAS and best practices for regulating development in and near these critical areas. The final “Shoreline Geologic Hazards – Best Available Science” memo from AMEC Foster Wheeler is included as **Attachment**

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B for reference. Refer to the bibliography of this memo for the studies, publications, and codes reviewed by the consultant.

The following documents are included in the record by reference as the Best Available Science reviewed by the City to inform the update of the geologic hazards section of the CAO:

CTED. (Washington State Department of Community, Trade, and Economic Development). 2007. Critical Areas Assistance Handbook: Protecting Critical Areas within the Framework of the Washington Growth Management Act.

Washington State Department of Licensing. 2006. Guidelines for Preparing Engineering Geology Reports in Washington.

Wentworth, Todd. May 29, 2015. *Shoreline Geologic Hazards – Best Available Science*. Memorandum to City of Shoreline from AMEC Foster Wheeler.

Public Comment

At the time of this staff report no additional public comments have been received since the June 4, 2015, Planning Commission Meeting. Refer to the Staff Report and Minutes from the June 4, meeting for record of public comment to date.

SCHEDULE

Staff adjusted the meeting schedule for the Critical Areas Ordinance update in response to cancellation of the July 2, 2015, Planning Commission meeting and repeat comments from the public regarding the short time available to review and comment on the proposed changes to the Critical Areas Ordinance. The updated schedule for Planning Commission study sessions and public hearing is:

- *May 21 – Introduction and Overview*
- *June 4 – Wetlands and Shoreline Master Program*
- **June 18 – Geologic Hazard Areas (Current meeting)**
- *July 16 – Streams and General Critical Area Provisions (updated)*
- *August 20 – Public Hearing and Recommendation (updated)*

City Council review and adoption is now tentatively scheduled for September-October 2015, with staff updates to handouts, forms, processes, and permitting tools to follow thereafter. A more detailed and revised project work plan is included as **Attachment D**.

The State deadline for completing these updates is June 30, 2015. While there are no immediate ramifications for not meeting the deadline, a number of State grant programs are tied to compliance with the GMA and cannot be awarded if we are not in compliance. Shoreline would be considered to be in compliance if we are not more than twelve months past the deadline and demonstrate substantive progress towards compliance.

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This legislative action is subject to the State Environmental Policy Act (SEPA) and notification of the proposed changes must go to Commerce and DOE. The timing of the SEPA Determination and noticing will depend on whether the current schedule is adjusted or not.

RECOMMENDATION

No decision is required of the Planning Commission at this time. This meeting is to discuss the second of three sets of staff recommended updates to the Critical Area Ordinance. Questions and feedback from Planning Commission on the proposed Geologic Hazard Areas code language are requested at this time towards development of a recommended code update package for the public hearing on August 20, 2015.

ATTACHMENTS

Attachment A – CAO Subchapter 2-Geologic Hazard Areas - June2015
Attachment B – BAS Geologic Hazards Memo 150529
Attachment C – GMS-Critical-Areas-Appendix-A-Sample-Code-Provisions
Attachment D – CAO Update Schedule -revised June 2015

Title 20

DEVELOPMENT CODE

Division I. Unified Development Code

- 20.20 Definitions
- 20.80 Critical Areas

Chapter 20.20

Definitions*

Sections:

- 20.20.018 E definitions.
- 20.20.022 G definitions.
- 20.20.032 L definitions.
- 20.20.046 S definitions.

20.20.018 E definitions.

Engineering Geologist

A person trained in geological sciences and licensed by the State of Washington as a professional engineering geologist who specializes in evaluating geologic site characteristics to determine the response of geologic processes and materials to development activities, such as removal of vegetation, site grading, buildings, and civil works.

Definition added for type of qualified professional who can prepared critical area reports for geologic hazard areas. Language based on WA Department of Licensing description.

Erosion

The wearing away of the land surface by running water, wind, ice, or other geological agents, including such processes as gravitational creep. Also, detachment and movement of soil or rock fragments by water, wind, ice, or gravity. (Ord. 531 § 1 (Exh. 1), 2009).

~~Erosion Hazard Areas~~

~~Those areas in the City of Shoreline underlain by soils which are subject to severe erosion when disturbed. Such soils include, but are not limited to, those classified as having a severe to very severe erosion hazard according to the~~

Repetitive, defined under "classification" in the Critical Areas chapter. Remove critical area classifications from definitions and relocate/only include in specific critical area sections.

~~USDA Soil Conservation Service, the 1973 King County Soils Survey or any subsequent revisions or addition by or to these sources. These soils include, but are not limited to, any occurrence of River Wash (Rh) or Coastal Beaches (Cb) and the following when they occur on slopes 15 percent or steeper:~~

~~A. The Alderwood gravelly sandy loam (AgD);~~

~~B. The Alderwood and Kitsap soils (AkF);~~

~~C. The Beausite gravelly sandy loam (BeD and BeF);~~

~~D. The Kitsap silt loam (KpD);~~

~~E. The Ovall gravelly loam (OvD and OvF);~~

~~F. The Ragnar fine sandy loam (RaD); and~~

~~G. The Ragnar Indianola Association (RdE).~~

20.20.022 G definitions.

Geologic Hazard Areas

Critical areas in the City of Shoreline, which are susceptible to erosion, land sliding, seismic, or other geological events as designated by WAC 365-190-080(4) and SMC 20.80.210. These areas may not be suited for any development activities, because they may pose a threat to public health and safety, or environmental standards.

Add a general definition for Geologic Hazard Area critical area type consistent with other critical areas, such as wetlands and streams.

Geologist

~~A person who has earned at least a Bachelor of Science degree in the geological sciences from an accredited college or university or who has equivalent educational training and at least four years of professional experience. A person trained in geological sciences and~~

The licensing of geologists became a requirement in the State of Washington in 2000. Update definition to reflect this.

licensed by the State of
Washington as a professional
geologist.

Geotechnical Engineer

A practicing geotechnical/civil engineer licensed as a professional civil engineer by the State of Washington who has at least four years of professional employment as a geotechnical engineer.

20.20.032 L definitions.

Landslide

Episodic downslope movement of a mass including, but not limited to, soil, rock, or snow.

Landslide Hazard Areas

~~Those areas in the City of Shoreline subject to severe risks of landslides, including the following:~~

~~A. Any area with a combination of:~~

~~1. Slopes steeper than 15 percent;~~

~~2. Impermeable soils, such as silt and clay, frequently interceded with granular soils, such as sand and gravel; and~~

~~3. Springs or ground-water seepage;~~

~~B. Any area which has shown movement during the Holocene epoch, from 10,000 years ago to the present, or which is underlain by mass wastage debris from that epoch;~~

~~C. Any area potentially unstable as a result of rapid stream incision, stream bank erosion or undercutting by wave action;~~

~~D. Any area which shows evidence of or is at risk from snow-avalanches; or~~

Repetitive, defined under "classification" in the Critical Areas chapter. Remove critical area classifications from definitions and relocate/only include in specific critical area sections.

~~E.—Any area located on an alluvial fan, presently subject to or potentially subject to inundation by debris flows or deposition of stream transported sediments.—~~

20.20.046 S definitions.

Seismic Hazard Areas

~~Those areas in the City of Shoreline subject to severe risk of earthquake damage as a result of soil liquefaction in areas underlain by cohesionless soils of low density and usually in association with a shallow ground water table or of other seismically induced settlement.—~~

Repetitive, defined under “classification” in the Critical Areas chapter. Remove critical area classifications from definitions and relocate/only include in specific critical area sections.

Steep Slope Hazard Areas

~~Those areas in the City of Shoreline on slopes 40 percent or steeper within a vertical elevation change of at least 10 feet. A slope is delineated by establishing its toe and top and is measured by averaging the inclination over at least 10 feet of vertical relief. For the purpose of this definition:~~

Term no longer used anywhere else in the SMC.

~~A.—The toe of a slope is a distinct topographic break in slope which separates slopes inclined at less than 40 percent from slopes 40 percent or steeper. Where no distinct break exists, the toe of a steep slope is the lower most limit of the area where the ground surface drops 10 feet or more vertically within a horizontal distance of 25 feet; and~~

Top and toe of slope to be defined in Critical Areas chapter under landslide hazard definition per consultant recommendation.

~~B.—The top of a slope is a distinct, topographic break in slope which separates slopes inclined at less than 40 percent from slopes 40 percent or steeper. Where no distinct break exists, the top of a steep slope is the upper most limit of the area where the ground surface drops 10 feet or more vertically within a horizontal distance of 25 feet.—~~

Chapter 20.80

Critical Areas

Sections:

Subchapter 1. Critical Areas – General Provisions

- 20.80.030 Exemptions.
- 20.80.040 Partial exemptions.
- 20.80.110 Critical areas reports required.

Subchapter 2. Geologic Hazard Areas

- 20.80.210 GEOLOGIC HAZARDS – Designation and purpose.
- 20.80.220 GEOLOGIC HAZARDS – Classification.
- 20.80.222 GEOLOGIC HAZARDS – Mapping.
- 20.80.224 GEOLOGIC HAZARDS – Development standards.
- 20.80.230 GEOLOGIC HAZARDS – Required buffer areas.
- ~~20.80.240 Alteration.~~
- 20.80.240 GEOLOGIC HAZARDS – Critical area report requirements.
- 20.80.250 GEOLOGIC HAZARDS – Mitigation performance standards and requirements.

**Subchapter 1.
Critical Areas – General Provisions**

20.80.030 Exemptions.

The following activities shall be exempt from the provisions of this chapter:

~~F. Activities occurring in areas which may be considered small steep slopes (areas of 40 percent slope or greater with a vertical elevation change of up to, but not greater than 20 feet), such as berms, retaining walls, excavations and small natural slopes, and activities on steep slopes created through prior legal grading activity may be exempted based upon City review of a soils report prepared by a qualified geologist or geotechnical engineer which demonstrates that no adverse impact will result from the exemption;~~

20.80.040 Partial exemptions.

A. The following are exempt from the provisions of this chapter except for the notice to title provisions, and the flood hazard area provisions, if applicable.

- 1. Structural modification of, addition to, or replacement of legally established structures, except single detached residences, in existence before November 27, 1990, which do not meet the building setback or buffer requirements for wetlands, streams, or steep slope geologic hazard areas if the modification, addition, replacement, or related activity does not increase the existing building height, footprint of the structure, or area of hardscape lying within the above-described building setback area, sensitive critical area or buffer.

Subchapter name added to each section for clarity.

New sections recommended to be added and critical area type added to each subsection for clarity. SMC 20.80.240 Alteration deleted and content moved to new 20.80.224.

Definition of moderate to high risk landslide hazard areas in 20.80.220(B)(2) revised to incorporate steep slopes between 10-20 vertical feet.

Slopes less than 10 feet tall do not meet definition of landslide hazard so no exemption needed.

Consultant recommends against small increases to footprint area or height without a site specific study of the potential for geologic hazard area impacts. Staff recommends deleting the provision allowing for increased in footprint for single family residences.

~~2.— Structural modification of, addition to, or replacement of single detached residences in existence before November 27, 1990, which do not meet the building setback or buffer requirements for wetlands, streams, or steep slope hazard areas if the modification, addition, replacement or related activity does not increase the existing footprint of the residence lying within the above described buffer or building-setback area by more than 750 square feet over that existing before November 27, 1990, and no portion of the modification, addition or replacement is located closer to the critical area or, if the existing residence is within the critical area, extend farther into the critical area; and~~

~~3.— Maintenance, or repair of structures which do not meet the development standards of this chapter for landslide or seismic areas if the maintenance or repair does not increase the footprint or height of the structure and there is no increased risk to life or property as a result of the proposed maintenance or repair.—~~

2. Demolition of structures located within geologic hazard areas or their buffers subject to approval of a stormwater pollution prevention plan consistent with the adopted stormwater manual and clearing limits that will adequately protect the critical area.

B. A permit or approval sought as part of a development proposal for which multiple permits are required is exempt from the provisions of this chapter, except for the notice to title provisions, as applicable if:

1. The City of Shoreline has previously reviewed all critical areas on the site; and
2. There is no material change in the development proposal since the prior review; and
3. There is no new information available which may alter previous critical area review of the site or a particular critical area; and
4. The permit or approval under which the prior review was conducted has not expired or, if no expiration date, no more than five years have lapsed since the issuance of that permit or approval; and

**Subchapter 2.
Geologic Hazard Areas**

20.80.210 GEOLOGIC HAZARDS - Designation and purpose.

A. ~~Geologic hazard areas are those lands that are affected by natural processes that make them susceptible to geologic events, such as landslides, seismic activity and severe erosion, especially bluff and ravine areas and steep slopes. Areas susceptible to erosion, landsliding, seismic, or other geological events as designated by WAC 365-190-080(4). These areas may not be suited for any development activities, because they may pose a threat to public health and safety, or environmental standards.~~

Areas susceptible to one or more of the following types of hazards shall be designated as geologically hazardous areas:

Staff recommends moving SMC 20.80.040(A)(3) to new allowed activities section in 20.80.224 since this is specific to some types of geologic hazard area.

Exemption for demolition proposed as removal of a structure typically can be safely done without needing a detailed critical area report.

Consultant recommends updating classification for consistency with proposed definition of Geologic Hazard Areas in 20.20.022.

- ~~1. Erosion hazard;~~
- ~~12. Landslide hazard;~~
- ~~23. Seismic hazard;~~
- 3. Erosion hazard.

B. The primary purpose of geologic hazard area regulations is to avoid and minimize potential impacts to life and property from geologic hazards, conserve soil resources, and minimize structural damage relating to seismic hazards. This purpose shall be accomplished through appropriate levels of study and analysis, application of sound engineering principles, and regulation or limitation of land uses, including maintenance of existing native vegetation, regulation of clearing and grading activities, and control of stormwater. (Ord. 398 § 1, 2006; Ord. 238 Ch. VIII § 3(A), 2000).

20.80.220 GEOLOGIC HAZARDS - Classification.

Geologic hazard areas shall be classified according to the criteria in this section as follows:

A. Landslide Hazard Areas.

Landslide Hazard Areas are those areas potentially subject to landslide activity based on a combination of geologic, topographic and hydrogeologic factors as classified in SMC 20.80.220(B) with slopes 15 percent or steeper within a vertical elevation change of at least 10 feet. A slope is delineated by establishing its toe and top, and is measured by averaging the inclination over at least 10 feet of vertical relief. (see Figure 20.80.220(B)). The edges of the hazard are identified where the characteristics of the slope cross section change from one landslide hazard classification to another or no longer meet any classification.

- 1. The toe of a slope is a distinct topographic break which separates slopes inclined at less than 15 percent from slopes above that are 15 percent or steeper. A distinct topographic break is an area that extends at least 15 feet horizontally away from the slope and that slopes less than 15%.
- 2. The top of a slope is a distinct topographic break which separates slopes inclined at less than 15 percent from slopes that are 15 percent or steeper below. A distinct topographic break is an area that is at least 15 feet horizontally away from the slope and that slopes less than 15%.

Consultant recommends keeping consistent order of hazard areas.

Tsunami Hazards are an additional type of seismic hazard type. The King County Hazard Mitigation Plan and Shoreline Supplement identifies minor risk of damage to property on 27th Ave NW, Echo Lake, and Ronald Bog from Tsunami and seiche. Staff does not recommend adopting any limitations on development for tsunami hazard areas.

Proposed inclusion of Landslide Hazard Area definition within relevant section of Code.

Further clarification to delineate top/toe of slope with the inclusion of 15' horizontal distance which is consistent with reduced buffer distances.

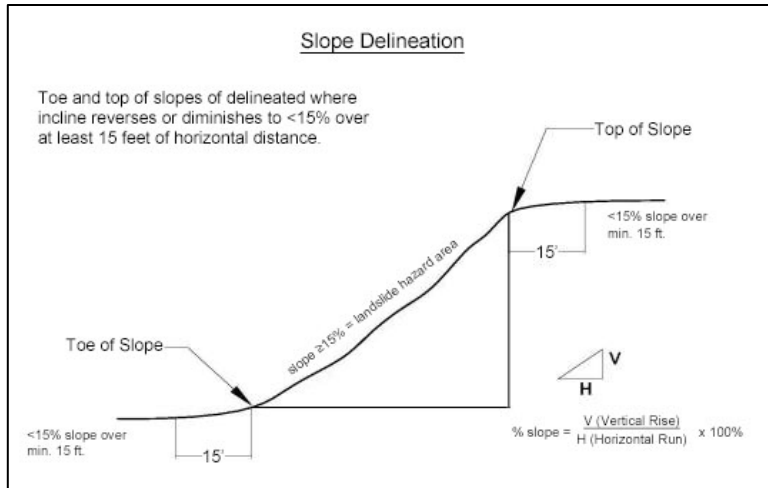


Figure 20.80.220(A): Illustration of slope calculation for determination of top and toe of landslide hazard area.

3. Hazard area classifications differentiated based on percent slope shall be delineated based on topographic change that extends at least 15 feet horizontally away from the slope and that slopes less than 40 percent, as determined by two (2) foot contour intervals, not averaging over the full landslide hazard area.

B. Landslide hazard areas are classified as follows:

1. Moderate to High Risk Hazard:
 - a. Areas with slopes between 15 percent and 40 percent and that are underlain by soils that consist largely of sand, gravel, or glacial till that do not meet the criteria for Very High Risk areas in (3) below.
2. High Hazard:
 - b. Areas with slopes between 15 percent and 40 percent that are underlain by soils consisting largely of silt and clay till and do not meet the criteria for Very High Risk areas in (3) below; and
 - c. All slopes of 10 to 20 feet in height that are 40 percent slope or steeper and do not meet the criteria for Very High Risk in (3)(a) or (3)(b) below.
3. Very High Risk Hazard:
 - a. Areas with slopes steeper than 15 percent with zones of emergent water (e.g., springs or ground water seepage);
 - b. Areas of landslide deposits activity (scarps, movement, or accumulated debris) regardless of slope; and
 - c. All steep slopes hazard areas sloping that are 40 percent or steeper and more than 20 feet in height. Vertical slope height

Figure suggested by Consultant to illustrate top and toe of slope delineation and percent slope calculation.

Standard added for clarification when delineating very high risk hazard classification as differentiated from moderate and high hazard areas when based on slope.

Staff recommends combining moderate and high classifications since they are regulated the same.

Redefine High Hazard Landslide hazard areas to include areas previously defined as small steep slopes.

Consultant recommended adding bullets and rewording for clarity and consistency with science. Delete undefined/outdated terms.

Definition of very high risk hazard clarified when based on percent slope.

shall include all areas of 40 percent or steeper based on slope calculated at up to two (2)-feet of height (rise). Slope height shall include all areas greater than 40 percent slope that are not separated by breaks greater than 15 feet wide (horizontal run) less than 40 percent slope, as illustrated in Figure 20.80.220(B).

[place holder for cross section and plan view illustrations differentiating Moderate to High, and Very High risk landslide hazard areas]

Figure 20.80.220(B): Illustration of landslide hazard area delineation.

BC. Seismic Hazard Areas. Seismic hazard areas are lands that, due to a combination of soil and ground water conditions, are subject to severe moderate to high or high risk of ground shaking, lateral spreading, subsidence, or liquefaction of soils during earthquakes. These areas are typically underlain by soft or loose saturated soils (such as alluvium) or peat deposits and have a shallow ground water table.

CD. Erosion and Sedimentation Hazard Areas. Erosion hazard areas are lands or areas underlain by soils identified by the U.S. Department of Agriculture Natural Resources Conservation Service (formerly the Soil Conservation Service) as having “severe” or “very severe” erosion hazards. This includes, but is not limited to, the following group of soils when they occur on slopes of 15 percent or greater: Alderwood-Kitsap (AkF), Alderwood gravelly sandy loam (AgD), Kitsap silt loam (KpD), Everett (EvD) and Indianola (InD).

20.80.222 GEOLOGIC HAZARDS – Mapping.

A. The approximate location and extent of geologic hazard areas are shown on City of Shoreline critical areas inventory. In addition, resources providing information on the location and extent of geologic hazard areas include:

1. Washington Department of Ecology coastal zone atlas (for marine bluffs);
2. U.S. Geological Survey geologic maps, landslide hazard maps, and seismic hazard maps;
3. Washington State Department of Natural Resources seismic hazard maps for Western Washington, including, but not limited to the *Liquefaction Susceptibility and Site Class Maps of Western Washington State by County*;
4. Washington State Department of Natural Resources slope stability maps;
5. Soils maps produced by the US Department of Agriculture, National Resources Conservation Service; and

Plan and cross section view figures may be helpful in illustrating delineation of very high risk hazard areas as different from high or moderate landslide hazard areas.

Consultant recommended rewording for accuracy.

Consultant suggested change for term consistency.

Consultant suggested adding list of adopted maps for consistency with best available science.

6. Geologic hazard data layers maintained in the City of Shoreline geographic information system (GIS).

B. The critical areas inventory and the resources cited above are to be used as a guide for the City of Shoreline Planning & Community Development department, project applicants, and/or property owners and may be continuously updated as new critical areas are identified. They are a reference and do not provide a final critical area designation.

20.80.224 GEOLOGIC HAZARDS – Development standards.

A. Activities and uses shall be prohibited in geologic hazard areas and their required buffers except as provided for in this Title.

B. Activities allowed in all geologic hazard areas and buffers. The activities listed below are allowed in the identified geologic hazard areas types pursuant to SMC 20.80.0XX Allowed Activities. Additional exemptions are listed in SMC 20.80.030 and 20.80.040, but do not apply within the shoreline jurisdiction. These activities do not require submission of a critical area report.

1. All exempt activities per SMC 20.80.040, unless critical area report is required for the exemption;
2. Installation of fences as allowed without a building permit in Chapter 20.50 Development standards; and
3. Non-structural interior remodel, ~~M~~aintenance, or repair of structures which do not meet the ~~development~~ standards of this chapter ~~for landslide or seismic areas~~, if the maintenance or repair does not increase the footprint or height of the structure and there is no increased risk to life or property as a result of the proposed maintenance or repair.
4. **Landslide and Seismic Hazard Areas.** No additional activities allowed without submission of a critical area report in landslide and seismic hazard areas.
5. **Erosion Hazard Areas.** If the site does not contain another type of critical area or critical area buffer and does not exceed any other threshold contained in SMC 20.50.320, then up to 1,500 square feet may be cleared on any lot in an erosion hazard area without a permit, ~~unless the site also contains another type of critical area or any other threshold contained in SMC 20.50.320 would be exceeded.~~

C. Alteration. The City shall approve, condition, or deny proposals in a geologic hazard area as appropriate based upon the effective mitigation of risks posed to property, health and safety. The objective of mitigation measures shall be to render a site containing a geologic hazard as safe as one not containing such hazard. Conditions may include limitations of proposed uses, modification of density, alteration of site layout, and other appropriate changes to the proposal. Where potential impacts cannot be

This new development standards section adds allowed activities and the alterations standards from 20.80.240.

Allowed activities are based on Commerce example code that explicitly allows activities without submission of a critical area report. Code reference place holder refers to a planned new section that will be presented with the General Provisions discussion.

Provision 3 moved and edited from 20.80.040(A)(3). New text is double underlined.

Erosion hazard allowed activities moved from 20.80.240(E)(1) and reversed order of sentence for clarity. Revision to 20.50.320 needed to support the permit exemption language.

Alteration provisions edited and moved from 20.80.240. New text is double underlined.

effectively mitigated to eliminate a significant risk to public health, safety and property, or important natural resources, the proposal shall be denied.

D. Alteration of Moderate and to High Risk Landslide Hazards.

Development activities and uses that result in unavoidable alterations may be permitted proposed in moderate and to high risk landslide hazard areas or their buffers in accordance with an approved shall be evaluated by a qualified professional through the preparation of the geotechnical-geologic hazard critical area report prepared by a qualified professional. However, for proposals that include no development, construction, or impervious surfaces, the City, in its sole discretion, may waive the requirement for a geotechnical report. The recommendations contained within the geotechnical critical area report shall be incorporated into the proposed alteration of the landslide hazard area or their buffers.

The geotechnical engineer and/or geologist qualified professional preparing the report shall provide assurances that the risk of damage from the proposal, both on-site and off-site, are minimal subject to the conditions set forth in the report, that the proposal will not increase the risk of occurrence of the potential landslide hazard, and that measures to eliminate or reduce risks have been incorporated into the report’s recommendations.

C. Alteration of Very High Risk Landslide Hazard Areas.

Development shall be prohibited in very high risk landslide hazards areas or their buffers except as granted by a critical areas special use permit, or a critical areas reasonable use permit per SMC 20.30.333 and 20.30.336, unless otherwise allowed by the exemptions or allowed activities provisions of this Title, or subject to the provisions of the Shoreline Master Program where the proposed development activity is located within the shoreline jurisdiction.

D. Alteration of Seismic Hazard Areas. Avoidance of alterations in seismic hazard areas per SMC 20.80.080(A) is not required. Development activities and uses that result in impact to seismic hazard areas may be permitted, consistent with SMC 20.80.080(B-F), in accordance with an approved geologic hazards critical area report prepared by a qualified professional. The report must provide assurances that the risk of damage from the proposal, both on-site and off-site, are minimal subject to the conditions set forth in the report, that the proposal will not increase the risk of occurrence of the potential hazard, and that measures to eliminate or reduce risks have been incorporated into the report’s recommendations. The report must include the following:

1. For one-story and two-story residential structures and all nonstructural projects, a qualified professional shall conduct an evaluation of site response and liquefaction potential based on the performance of similar structures with similar foundation conditions current mapping, site reconnaissance, research of nearby studies; or
2. For all other proposals, the applicant shall conduct an evaluation of site response and liquefaction potential including sufficient subsurface exploration to determine the site coefficient for

Organization of Very High, Moderate and High hazard areas changes for consistency.

Consultant recommends removing discretion for waiving the requirement. Instead critical area report scope may be more limited for simpler projects or less sensitive hazard areas.

Update of term used.

Clarified provisions that apply for alteration where it cannot be avoided because reasonable use of a property is denied.

Language added to waive “avoidance” requirement and to clarify information required for alteration to be approved.

Wording edited for consistency with BAS.

use in the static lateral force procedure described in the International Building Code.

E. Alteration of Erosion Hazard Areas. Development activities and uses in erosion hazard areas can be permitted, not subject to 20.80.080(A), based on review of a critical area report prepared by a qualified professional demonstrating that the project is consistent with SMC 20.80.080(B-F) and the following provisions:

1. Up to 1,500 square feet may be cleared on any lot in an erosion hazard area without a permit, unless the site also contains another type of critical area or any other threshold contained in SMC 20.50.320 would be exceeded.

Provision 1 moved to allowed activities 20.80.224(B).

2. All development proposals on sites containing erosion hazard areas shall include a temporary erosion and sediment control stormwater pollution prevention plan consistent with the requirements of the adopted surface water design manual and a revegetation plan to ensure permanent stabilization of the site. Specific requirements for revegetation plans shall be determined on a case-by-case basis during permit review and administrative guidelines shall be developed by the Department. Critical area revegetation plans may be combined with required landscape, tree retention, and/or other critical area mitigation plans as appropriate.

Update of term used.

City does not currently have guidelines for revegetation of geologic hazard areas. Would like to add, but have not found example code language to use as of this code draft.

3. All subdivisions, short subdivisions or binding site plans on sites with erosion hazard areas shall comply with the following additional requirements:

a. Except as provided in this section, existing vegetation shall be retained on all lots until building permits are approved for development on individual lots:

b. If any vegetation on the lots is damaged or removed during construction of the subdivision infrastructure, the applicant shall be required to implement the revegetation plan in those areas that have been impacted prior to final inspection of the site development permit or the issuance of any building permit for the subject property:

c. Clearing of vegetation on individual lots may be allowed prior to building permit approval if the City of Shoreline determines that:

i. Such clearing is a necessary part of a large scale grading plan,

ii. It is not feasible to perform such grading on an individual lot basis, and

iii. Drainage from the graded area will meet water quality standards to be established by administrative rules.

4. Where the City of Shoreline determines that erosion from a development site poses a significant risk of damage to downstream receiving water, the applicant shall be required to provide regular monitoring of surface water discharge from the site. If the project

Monitoring is not always required by Stormwater Manual, because threshold is based on area of disturbance not site soils.

does not meet water quality standards established by law or administrative rules, the City may suspend further development work on the site until such standards are met.

5. The City may require additional mitigation measures in erosion hazard areas, including, but not limited to, the restriction of major soil-disturbing activities associated with site development between October 15th 1st and April 15th 30th to meet the stated purpose contained in SMC 20.80.010 and 20.80.210.

6. The use of hazardous substances, pesticides and fertilizers in erosion hazard areas may be prohibited by the City of Shoreline.

20.80.230 GEOLOGIC HAZARDS – Required buffer areas.

A. Buffers for geologic hazard area shall be maintained as undisturbed native vegetation consistent with SMC 20.80.090. Building and other improvement setbacks will be required in addition to buffers only as recommended by the qualified professional to allow for landscaping, access around structures for maintenance, and location of stormwater facilities at safe distances from geologic hazard areas where native vegetation is not necessary to reduce the risk of the hazard.

B. Required buffer widths for geologic hazard areas shall reflect the sensitivity of the hazard area and the risks associated with development and, in those circumstances permitted by these regulations, the type and intensity of human activity and site design proposed to be conducted on or near the area.

BC. In determining the appropriate buffer width, the City shall consider the recommendations contained in a geotechnical report required by these regulations and prepared by a qualified ~~consultant~~ professional.

D. For moderate and high landslide hazard areas, a qualified professional for geologic hazard areas shall determine whether buffers are required and the width of those buffers.

CE. For very high risk landslide hazard areas, the standard buffer shall be 50 feet from all edges of the landslide hazard area. Larger buffers may be required as needed to eliminate or minimize the risk to people and property based on a geotechnical report prepared by a qualified professional. The standard buffer may be reduced when geotechnical studies demonstrate that the reduction will not increase the risk of hazard to people or property, on or off site, however the minimum shall be 15 feet.

D. — Landslide hazard area buffers may be reduced to a minimum of 15 feet when technical studies demonstrate that the reduction will not increase the risk of the hazard to people or property on or off site.

E. Landslide hazard areas and their associated buffers shall be placed either in a separate tract on which development is prohibited, protected by execution of an easement, dedicated to a conservation organization or land trust, or similarly preserved through a permanent protective

Update dates for consistency with adopted stormwater manual standards.

Sections reorganized for clarity and consistency of hazard type order.

Provision A added to clarify requirement of undisturbed buffer verses setbacks recommended for safety.

Correction of term used.

Consultant recommended buffers for moderate or high hazard areas only when recommended by qualified professional because development can occur in these areas.

Consultant recommended changes to text would apply standard buffers only to “very high” risk landslide hazard areas.

Combined with previous provision.

mechanism acceptable to the City. The location and limitations associated with the critical landslide hazard and its buffer shall be shown on the face of the deed or plat applicable to the property and shall be recorded with the King County Department of Recorder's Office, and Elections. (Ord. 398 § 1, 2006; Ord. 238 Ch. VIII § 3(C), 2000).

~~20.80.240 — Alteration.~~

~~A. — The City shall approve, condition, or deny proposals in a geologic hazard area as appropriate based upon the effective mitigation of risks posed to property, health and safety. The objective of mitigation measures shall be to render a site containing a geologic hazard as safe as one not containing such hazard. Conditions may include limitations of proposed uses, modification of density, alteration of site layout and other appropriate changes to the proposal. Where potential impacts cannot be effectively mitigated to eliminate a significant risk to public health, safety and property, or important natural resources, the proposal shall be denied.~~

~~B. — **Very High Landslide Hazard Areas.** Development shall be prohibited in very high landslide hazards areas or their buffers except as granted by a critical areas special use permit or a critical areas reasonable use permit.~~

~~C. — **Moderate and High Landslide Hazards.**~~

~~Alterations proposed to moderate and high landslide hazards or their buffers shall be evaluated by a qualified professional through the preparation of the geotechnical report. However, for proposals that include no development, construction, or impervious surfaces, the City, in its sole discretion, may waive the requirement for a geotechnical report. The recommendations contained within the geotechnical report shall be incorporated into the alteration of the landslide hazard area or their buffers.~~

~~The geotechnical engineer and/or geologist preparing the report shall provide assurances that the risk of damage from the proposal, both on-site and off-site, are minimal subject to the conditions set forth in the report, that the proposal will not increase the risk of occurrence of the potential landslide hazard, and that measures to eliminate or reduce risks have been incorporated into the report's recommendations.~~

~~D. — **Seismic Hazard Areas.**~~

~~1. — For one story and two story residential, a qualified professional shall conduct an evaluation of site response and liquefaction potential based on the performance of similar structures with similar foundation conditions; or~~

~~2. — For all other proposals, the applicant shall conduct an evaluation of site response and liquefaction potential including sufficient subsurface exploration to determine the site coefficient for use in the static lateral force procedure described in the International Building Code.~~

~~E. — **Erosion Hazard Areas.**~~

~~1. — Up to 1,500 square feet may be cleared on any lot in an erosion hazard area without a permit, unless the site also contains another~~

Updated department name.

Move to new section
20.80.224 Development
Standards.

~~type of critical area or any other threshold contained in SMC 20.50.320 would be exceeded.~~

~~2.— All development proposals on sites containing erosion hazard areas shall include a temporary erosion and sediment control plan consistent with the requirements of the adopted surface water design manual and a revegetation plan to ensure permanent stabilization of the site. Specific requirements for revegetation plans shall be determined on a case by case basis during permit review and administrative guidelines shall be developed by the Department. Critical area revegetation plans may be combined with required landscape, tree retention, and/or other critical area mitigation plans as appropriate.~~

~~3.— All subdivisions, short subdivisions or binding site plans on sites with erosion hazard areas shall comply with the following additional requirements:~~

~~a.— Except as provided in this section, existing vegetation shall be retained on all lots until building permits are approved for development on individual lots;~~

~~b.— If any vegetation on the lots is damaged or removed during construction of the subdivision infrastructure, the applicant shall be required to implement the revegetation plan in those areas that have been impacted prior to final inspection of the site development permit or the issuance of any building permit for the subject property;~~

~~e.— Clearing of vegetation on individual lots may be allowed prior to building permit approval if the City of Shoreline determines that:~~

~~i.— Such clearing is a necessary part of a large scale grading plan;~~

~~ii.— It is not feasible to perform such grading on an individual lot basis, and~~

~~iii.— Drainage from the graded area will meet water quality standards to be established by administrative rules.~~

~~4.— Where the City of Shoreline determines that erosion from a development site poses a significant risk of damage to downstream receiving water, the applicant shall be required to provide regular monitoring of surface water discharge from the site. If the project does not meet water quality standards established by law or administrative rules, the City may suspend further development work on the site until such standards are met.~~

~~5.— The City may require additional mitigation measures in erosion hazard areas, including, but not limited to, the restriction of major soil disturbing activities associated with site development between October 15th and April 15th to meet the stated purpose contained in SMC 20.80.010 and 20.80.210.~~

~~6.—The use of hazardous substances, pesticides and fertilizers in erosion hazard areas may be prohibited by the City of Shoreline. (Ord. 695 § 1 (Exh. A), 2014; Ord. 398 § 1, 2006; Ord. 352 § 1, 2004; Ord. 324 § 1, 2003; Ord. 299 § 1, 2002; Ord. 238 Ch. VIII § 3(D), 2000).~~

20.80.226 GEOLOGIC HAZARDS – Critical area report requirements.

Critical area report requirements for geologically hazardous areas are generally met through submission to the Director of one or more geotechnical engineering reports. In addition to the general critical areas report requirements of SMC 20.80.110, critical areas reports for geologic hazard areas must meet the requirements of this section and Chapters 15.05 and 20.70 as applicable. Critical areas reports for two or more types of critical areas must meet the report requirements for each relevant type of critical area. Geotechnical report(s) submitted for the purpose of critical areas review are required as necessary in addition to reports, data and other information mandated per SMC Titles 13 and 15.

- A. **Preparation by a Qualified Professional.** A critical areas report for assessing potentially geologically hazardous area shall be prepared, stamped, and signed by a qualified geotechnical engineer or engineering geologist licensed in the state of Washington, with experience analyzing geologic, hydrologic, and ground water flow systems, and who has experience preparing reports for the relevant type of hazard consistent with the requirements of SMC 20.80.110. If mitigation measures are necessary, the report detailing the mitigation measures and design of the mitigation shall be prepared by a qualified professional with experience stabilizing geologic hazard areas with similar geotechnical properties and by a qualified vegetation ecologist, landscape architect or arborist with experience designing and monitoring vegetative stabilization of geologic hazard areas.

- B. Critical areas studies and reports on geologically hazardous areas shall be subject to third party review by a qualified professional under contract with the City will be required, at the applicant’s expense in any of the following circumstances:
 - 1. The project requires a critical area reasonable use permit, critical area special use permit, or shoreline variance application;
 - 2. A buffer reduction is proposed for a very high risk landslide hazard areas; or
 - 3. Mitigation is proposed within a very high risk landslide hazard area for projects that are required following any alterations allowed in response to emergencies per SMC 20.80.030.

Consultant Recommended adding report standards specific to geologic hazard areas. Commerce example code sections used with recommended report content adjusted per BAS memo.

SMC 20.80.110 will be revised with general report requirements when general provision changes are drafted.

Qualified professionals specializing in vegetative stabilization of geologic hazard areas are often needed where structural solutions are not allowed.

Staff recommended clarification of when third party review will be required.

- C. **Area Addressed in Critical Area Report.** The following areas shall be addressed in a critical area report for geologic hazard areas:
1. The project area of the proposed activity; and
 2. All geologic hazard areas within 200 feet of the project area or that have the potential to be affected by the proposal.
- D. **Geologic Hazards Assessment.** A critical area report for geologic hazard areas shall include a field investigation and contain an assessment of whether or not each type of geologic hazard identified in SMC 20.80.210 is present or not present and if the proposed development of the site will increase the risk of the hazard on or off site. These reports must include the following site- and proposal-related information at a minimum:
1. **Site and Construction Plans.** The report shall include a copy of the site plans for the proposal, drawn at an engineering scale, showing:
 - a. The type and extent of geologic hazard areas, any other critical areas, and buffers on, adjacent to, within 200 feet of, or that are likely to impact the proposal;
 - b. Proposed development, including the location of existing and proposed structures, fill, significant trees to be removed, vegetation to be removed, storage of materials, and drainage facilities;
 - c. The topography, in two-foot contours, of the project area and all hazard areas addressed in the report;
 - d. Height of slope, slope gradient, and cross-section of the project area;
 - e. The location of springs, seeps, or other surface expressions of ground water on or within 200 feet of the project area or that have the potential to be affected by the proposal;
 - f. The location and description of surface water on or within 200 feet of the project area or that have the potential to be affected by the proposal;
 - g. All known faults within 200 feet of the project area, if any, or that have potential to affect or be affected by the proposal; and
 - h. Clearing limits.
 2. **Assessment of Geological Characteristics.** The report shall include an assessment of the geologic characteristics of the soils, sediments, and/or rock of the project area and potentially affected adjacent properties, and a review of the site history regarding landslides, erosion, and prior grading. Soils analysis shall be accomplished in

Proposed Geologic Hazards Assessment standards are based on Commerce example code with edits and recommended outline from consultant. Alternatively, the Washington State Department of Licensing has published *Guidelines for Preparing Engineering Geology Reports in Washington, Department of Licensing, November 2006*. This document could be referenced in lieu of inserting specific standards into the code.

accordance with accepted classification systems in use in the region. The assessment shall include, but not be limited to:

- a. A general description of the site vicinity and critical areas within at least 200 feet of the project site;
 - b. A detailed overview of the field investigations, published data, and references; data and conclusions from past assessments of the site; and site-specific measurements, tests, investigations, or studies that support the identification of geologically hazardous areas; and
 - c. A summary of the existing site conditions, including:
 - i. the surface topography, existing features, and vegetation found in the project area and in all hazard areas addressed in the report;
 - ii. surface and subsurface geology and soils to sufficient depth based on data from site-specific explorations;
 - iii. geologic cross-section(s) displaying the critical design slope conditions;
 - iv. surface and ground water conditions; and
 - d. A description of the vulnerability of the site to seismic and other geologic events.
3. **Analysis of Proposal.** The report shall contain a hazards analysis including a detailed description of the project, its relationship to the geologic hazard(s), and its potential impact upon the hazard area, the subject property, and affected adjacent properties. The hazards analysis component of the critical areas report shall include the following based on the type(s) of geologic hazard areas identified:
- a. An estimate of slope stability and the effect construction and placement of structures will have on the slope over the estimated life of the structure;
 - b. An estimate of the bluff retreat rate that recognizes and reflects potential catastrophic events such as seismic activity or a one hundred-year storm event;
 - c. Consideration of the run-out hazard of landslide debris and/or the impacts of landslide run-out on down slope properties.
 - d. A study of slope stability including an analysis of proposed cuts, fills, and other site grading;

- e. Recommendations for building siting limitations and buffers consistent with SMC 20.80.230;
 - f. An analysis of proposed surface and subsurface drainage, and the vulnerability of the site to erosion; and
 - g. A complete discussion of the potential impacts of seismic activity on the site (for example, forces generated and fault displacement).
4. **Minimum Buffer and Building Setback.** The report shall make a recommendation for the minimum buffer consistent with 20.80.230, or as recommended, and recommended drainage and building setback from any geologic hazard based upon the geotechnical analysis. Buffers must be maintained consistent with SMC 20.80.090, however the qualified professional may recommend additional setbacks for drainage facilities or structures which do not have to be maintained as undisturbed native vegetation.
5. **Geotechnical Engineering Report.** The technical information for a project within a landslide hazard area or seismic hazard area shall include a geotechnical engineering report prepared by a qualified geotechnical engineer that presents engineering recommendations for the following:
- a. Parameters for design of site improvements including appropriate foundations and retaining structures. These should include allowable load and resistance capacities for bearing and lateral loads, installation considerations, and estimates of settlement performance;
 - b. Recommendations for drainage and subdrainage improvements;
 - c. Earthwork recommendations including clearing and site preparation criteria, fill placement and compaction criteria, temporary and permanent slope inclinations and protection, and temporary excavation support, if necessary; and
 - d. Mitigation of adverse site conditions including slope stabilization measures and seismically unstable soils, if appropriate.
 - e. Additionally, a geotechnical engineering report for a seismic hazard area shall evaluate the physical properties of the subsurface soils, especially the thickness of unconsolidated deposits and their liquefaction potential. If it is determined that the site is subject to liquefaction, mitigation measures appropriate to the scale of the development shall be recommended and implemented.

6. **Stormwater Pollution Prevention Plan (SWPPP).**
For any development proposal on a site containing an erosion hazard area, a stormwater pollution prevention plan (also known as an erosion and sediment control plan) shall be required. The SWPPP, in compliance with the requirements of SMC Chapter 13.10, shall be included in the critical area report or referenced if it is being prepared separately.
- E. **Incorporation of Previous Study.** Where a critical areas report that meets the requirements of SMC 20.80.226 has been prepared within the last five years for a specific site, and where the proposed land use activity and surrounding site conditions are unchanged, said report may be incorporated into the required critical areas report. The applicant shall submit a hazards assessment detailing any changed environmental conditions associated with the site.
- F. **Mitigation of Long-Term Impacts.** When hazard mitigation is required, the mitigation plan shall specifically address how the activity maintains or reduces the preexisting level of risk to the site and adjacent properties on a long-term basis (equal to or exceeding the projected lifespan of the activity or occupation). Proposed mitigation techniques shall be considered to provide long-term hazard reduction only if they do not require regular maintenance or other actions to maintain their function. Mitigation may also be required to avoid any increase in risk above the preexisting conditions following abandonment of the activity.
- G. **Limited Report Requirements for Stable Erosion Hazard Areas.** When recommended by the qualified professional for sites only overlain by erosion hazard areas with suitable slope stability, and no other type of critical area or buffer, detailed critical areas report requirements may be waived. Report requirements for stable erosion hazard areas may be met through construction documents that shall include at a minimum a stormwater pollution plan prepared in compliance with requirements set forth in SMC Chapter 13.10.

20.80.250 GEOLOGIC HAZARDS – Mitigation performance standards and requirements.

The following performance standards shall apply to any mitigations for development proposed within geologic hazard areas located within the City:

- A. Relevant performance standards from SMC 20.80.080, 20.80.300, 20.80.350 and 20.80.500 as determined by the City, shall be incorporated into mitigation plans.
- B. The following **additional** performance standards shall be reflected in proposals within geologic hazard areas:

Standards that are relevant should be inserted directly as these references are changing. Then nothing would be “additional” here.

1. Geotechnical studies shall be prepared by a qualified ~~consultant~~ professional to identify and evaluate potential hazards and to formulate mitigation measures.
2. Construction methods will reduce or not adversely affect geologic hazards.
3. Site planning ~~should~~ to minimize disruption of existing topography and natural vegetation.
4. Minimize ~~Impervious surface coverage, should be minimized.~~
5. Replant ~~Disturbed areas should be replanted~~ as soon as feasible pursuant to an approved landscape plan.
6. Clearing and grading regulations as set forth by the City shall be followed.
7. The use of retaining walls that allow maintenance of existing natural slope areas are preferred over graded slopes.
8. Temporary erosion and sedimentation controls, pursuant to an approved plan, shall be implemented during construction.
9. Undevelopable geologic hazard areas larger than one-half acre shall be placed in a separate tract, provided this requirement does not make the lot nonconforming.
10. A monitoring program shall be prepared for construction activities permitted in geologic hazard areas.
11. A bond, guarantee or other assurance device approved by the City shall be posted to cover the cost of monitoring, maintenance and any necessary corrective actions.
12. Development shall not increase instability or create a hazard to the site or adjacent properties, or result in a significant increase in sedimentation or erosion. (Ord. 398 § 1, 2006; Ord. 238 Ch. VIII § 3(E), 2000).

Edits for term consistency and clarity.

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MEMORANDUM

To Juniper Nammi, AICP
City of Shoreline

File no 5-917-17855-0
cc Paul Cohen
City of Shoreline

From Todd Wentworth, PE, LG
Amec Foster Wheeler
Environment & Infrastructure, Inc.

Date May 29, 2015

Subject Shoreline Geologic Hazards – Best Available Science

The City of Shoreline is in the process of reviewing and updating its Critical Areas Ordinance (CAO), which specifies standards for protection of critical areas, including areas of geologic hazards. Under Washington's Growth Management Act (GMA), and the Revised Code of Washington (RCW) 36.70A, protection of environmentally critical areas must take into account best available science (BAS). This memo provides a summary of the BAS relevant to Geologic Hazard Areas as regulated in the Shoreline Municipal Code (SMC) Sections 20.80.210 through 20.80.250. The intent is to summarize recent studies and to provide recommendations for updating the existing CAO where appropriate. This study focused on review of scientific articles, government agency guidance documents, and critical areas ordinances of other cities with similar geologic hazards.

The Shoreline CAO recognizes three types of geologic hazards:

- Landslide hazards,
- Seismic hazards (earthquakes), and
- Erosion hazards.

These three hazards are discussed below.

LANDSLIDE HAZARDS

This section summarizes the review of available and relevant studies pertaining to landslide hazards for the Puget Sound region in general and for Shoreline specifically.

Puget Sound Wide Issues

Landslides within the Puget Sound region have been studied for decades. Our research revealed that studies of landslide hazards within the Puget Sound region have focused almost entirely on the City of Seattle. The majority of landsliding in the region has been attributed to geologic, climatic, and human factors (Tubbs, 1975). Landslides have been associated with concentrated winter precipitation, steep slopes, and glacial soils that are susceptible to instability (Laprade and Tubbs, 2008). Our review identified the two most significant recent advances pertaining to landslide hazards: (1) the improved ability to identify historic landslides using light distance and ranging (LIDAR) imagery, which provides more detail than aerial photographs in highly vegetated areas; and (2) forecasting the occurrence of landslides based on cumulative rainfall totals.

Identification of Landslide Hazard Areas

Recent studies (Baum et al., 2007) demonstrate the improvements in identification of landslide hazard areas using LIDAR. Researchers have found that LIDAR provided a much more thorough delineation of previous landslide areas than aerial photography and site reconnaissance and identified many heavily vegetated or undeveloped sloping areas within Seattle that have the potential for landsliding. The City of Shoreline utilized LIDAR, obtained in 2002, to map landslide hazard areas, so the maps represent BAS.

Development Issues in Landslide Hazard Areas

New development or redevelopment of property near landslide hazard areas has become a more contentious issue as more property owners attempt to maximize the developable portions of their land within the constraints of the CAO code. Many jurisdictions require site-specific studies to assess site conditions, identify the potential impacts of development proposals in geologic hazard areas, evaluate the risks, and recommend mitigation. The site-specific information required to review development proposals qualifies as the best available science, both for providing relevant and accurate information about site conditions, and identifying the mitigation measures necessary to reduce the risk and impacts of a specific proposal, based on the criteria in Washington Administrative Code (WAC) 365-195-905. Many jurisdictions do not have qualified geologists or geotechnical engineers on staff to determine the adequacy of site-specific CAO studies, and so they either require or have the option of a third-party independent geotechnical review. This peer-review process encourages BAS. Other cities in the region have detailed geotechnical report requirements in their CAO codes to improve the

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review process. If the reporting requirements encourage improvement of the standard of practice, BAS is maintained.

Conditions Unique to the City of Shoreline

Recent geologic mapping of King County (Booth and Wisner, 2006) identifies the City as being underlain primarily by glacially derived or glacially overridden soils. Steep slopes are found where the highlands descend to Puget Sound and within natural drainages, such as ravines. These steep slopes are typically composed of looser alluvial soils or recessional outwash overlying denser glacial soils, such as glacial till or advance outwash. Landslides occur most commonly where a veneer of looser soils overlies the denser soils on steeply inclined hillsides. The definition of landslide hazard areas in the City's CAO includes these types of areas, as well as, other areas that are potentially subject to risk of landslides due to geologic, topographic, and hydrologic conditions. Landslide hazard areas within the City of Shoreline occur predominantly along the western perimeter of the City, where the highlands descend to Puget Sound, or within steeply incised natural drainages, such as Boeing and McAleer Creeks.

Review of Existing Regulations in the City of Shoreline

Based on review of CAO codes of similar jurisdictions and our experience with other jurisdictions within Puget Sound, CAO codes, including the City of Shoreline's, generally protect landslide hazard areas by establishing buffers from landslide hazards and restricting activities within buffers. The codes tend to become complex in describing details, such as conditions for exemptions, alterations, or buffer reductions. In some cases, key terms are not defined specifically, and this lack of precision has led to disputes.

Exemptions

Exempt Activities on Slopes: SMC 20.80.030(F) currently allows an exemption for activities occurring on small steep slopes up to 20 feet high. Some other jurisdictions offer a similar exemption for slopes up to 10 feet or 20 feet high, but not all do. It should be noted that in the Seattle Landslide Study (Seattle Public Utilities, 2001) database, about 15% of the reported landslides had occurred on slopes with a height of 20 feet or less. We recommend that the City consider eliminating the exemption for activities occurring on "small steep slopes." As an alternative, the City may consider adjusting the definition of a very high landslide hazard, so that steep slopes less than 20 feet are not included.

Partial Exemption: SMC 20.80.040(A)(2) allows additions of up to 750 square feet (area large enough to construct a three-car garage) to existing structures within a buffer. In terms of BAS, the exemption allows a decrease in critical area protection without mitigation (more impervious surface, loss of vegetation, increased loading, etc.). We recommend the City consider revising this partial exemption

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so that structure modifications may be allowed based on recommendations from a site specific study of the potential for critical area impacts.

Critical Area Maps

According to SMC 20.80.020(A), critical area maps are adopted as part of the SMC. Critical areas are included as data layers in the City Geographic Information System (GIS). These maps identify general areas within the City that contain critical areas and alert the public and city officials of these general areas. They are not intended to define all critical areas precisely within the City. Site specific studies are necessary to determine if a particular parcel contains critical areas and to determine the extent of those areas. The maps currently used by the City serve this purpose sufficiently, in our opinion. Updating the maps based on more recent information could involve considerable effort and yield only minor changes. BAS may be more easily satisfied by the site-specific geologic mapping and reporting required for development near critical areas.

Landslide Hazard Area Buffers

SMC 20.80.230 requires a standard 50-foot buffer from all edges of a landslide hazard area. A standard buffer width of 50 feet has been adopted by many jurisdictions, although some jurisdictions require the buffer to be the vertical height of the slope or 50 feet, whichever is greater (Bainbridge Island, Edmonds). Based on review of available studies and our own experience, 50 feet from the top of the slope is a supportable standard buffer, because most landslides in the Puget Sound Area occur less than 50 feet from the top of the slope, and most landslides are not affected by site development that occurs more than 50 feet away from the top of the slope. Landslide impacts that extend more than 50 feet beyond the toe of the slope are more likely, but still not common. An extreme example of this would be the Oso Landslide in which the debris flow extended several hundred feet beyond the top of the slope (Keaton, et al, 2014). If a landslide occurs, it is possible for the debris flow to accumulate a distance of more than 50 feet away from the toe of the slope, depending on site-specific conditions. This potential extension of a debris flow may be the reason that some jurisdictions call for a buffer of half the vertical height. For the landslide hazards that exist in Shoreline, either standard buffer would be sufficient for most situations, in our opinion.

Many jurisdictions, including the City, allow the standard buffer to be reduced based on findings from site-specific studies. This exception is recommended, since site-specific conditions are unique and site-specific studies represent BAS.

Many jurisdictions require a building setback from the buffer, typically 15 feet. Shoreline does not have a building setback requirement, however site specific studies could recommend different forms of buffers, such as an no disturbance buffer, and an additional buffer for structures.

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The Shoreline Municipal Code provides no definition as to what constitutes the “edge” of a landslide hazard area. Alternatively, we recommend establishing the buffer from the “top” and “toe” of landslide hazard areas related to steep topography and geology. The flanks or sides of landslide hazard areas are already defined in the following ways:

- If the classification is based on previous landslide activity, the flanks can be mapped by the boundary between disturbed and undisturbed ground.
- If the classification is based on the slope angle, then at any point on the ground, the steepest slope can be measured ascending and descending from that point to determine if that point is within a landslide hazard area. In other words, the elevation contours can be measured at various locations on a site map to fully define the landslide hazard area.

The top and toe definition is discussed below.

Code Definitions

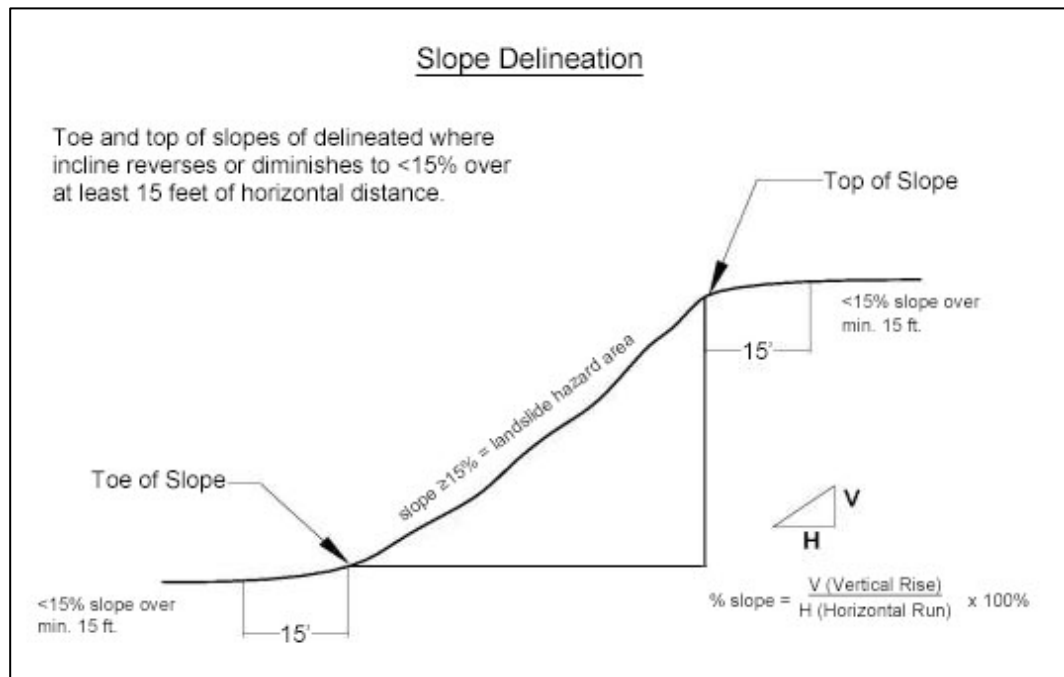
1. Slope

Steep slopes are currently defined in SMC 20.20.046 S definitions. We recommend moving the definitions to be part of the landslide hazard definition in SMC 20.80.220 in order to be near the relevant part of the ordinance. The definition of slope should also be more specific. The “toe” and “top” of slope are currently defined as a “distinct topographic break in a slope.” However, *distinct topographic break* is ambiguous and should be defined in a measureable way to minimize differing interpretations. For example, the following sentence could be added to clarify the definition: “A distinct topographic break is an area that extends at least 15 feet horizontally away from the slope and that slopes less than 15%.” The distance of 15 feet is suggested because it is the same distance as the minimum buffer. This definition is displayed in the figure below. To delineate steep slopes classified as very high hazards, the definition could be modified to read, “A distinct topographic break is an area that extends at least 15 feet horizontally away from the slope and that slopes less than 40%.”

2. Geologist

SMC 20.20.022(G) defines “Geologist” as a person who has earned at least a Bachelor of Science degree in the geological sciences from an accredited college or university or who has equivalent educational training and at least four years of professional experience. We recommend updating the definition to “A professional geologist licensed in the State of Washington.” The licensing of geologists became a requirement in the State of Washington in 2000 (WAC 308-15) and is not currently reflected in the definition.

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Site-Specific Studies by Qualified Professionals

Shoreline requires site-specific critical areas studies to be performed by qualified professionals, and the City created an approved list of qualified professionals based on consultants submitting their credentials, experience, and sample reports for review. This is a suitable method to identify experts and request a sufficient scope of study, even though it is not a common practice among other cities.

SMC 20.80.240(C) states that alterations to moderate and high landslide hazards should be evaluated by a qualified professional through preparation of a geotechnical report. The SMC then goes on, however, to state that the City may waive the requirement for a geotechnical report at its sole discretion. In our opinion, this statement could lead to the appearance of inconsistent decisions by the City regarding alterations of critical areas. We recommend that alterations always be evaluated by a qualified professional with the City's understanding that the type of alteration and site conditions will determine the scope of the evaluation. In other words, some studies might be submitted as a short letter, while others might need detailed engineering analysis and data to evaluate the proposed alteration. For cases where the City may have granted a waiver in the past, they should expect to see a relatively brief geotechnical report, such as a site reconnaissance letter.

Although the City has published detailed Geotechnical Report Guidelines, the guidelines are for general site development and do not specifically discuss critical areas. We understand that the City would like to add report guidelines to the critical area ordinance. In the critical areas codes for other jurisdictions, there are general critical area report requirements, and then additional requirements

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specifically for geologic hazards. Provided below are recommended report requirements for geologic hazards.

- Site Plan. This should be a map of the site, drawn at an engineering scale, with topographic contours, that displays the existing conditions and proposed development. The critical areas and buffers should be shown on the map.
- A general description of the site vicinity and critical areas within at least 200 feet of the project site.
- A general description of the proposed development.
- Description of the site-specific field investigations; exploration logs and laboratory testing results should be included in the report.
- A summary of the existing site conditions, including:
 - The surface topography, existing features, and vegetation;
 - Soil types to a sufficient depth; and
 - Groundwater conditions.
- Analysis of surface and subsurface drainage and the potential for erosion.
- Assessment of the seismic conditions, including design ground motions and the susceptibility for liquefaction.
- For very high landslide hazard areas:
 - A geologic cross-section displaying the critical design slope conditions;
 - Slope stability analysis in accordance with the City's Geotechnical Report Guidelines that considers existing conditions and the proposed development;
 - If the area is a coastal bluff, an estimate of the bluff retreat rate that recognizes and reflects potential episodic and catastrophic events; and
 - An estimate of the impacts of landslide debris flow run-out and accumulation.
- Analysis of impacts due to the development near the critical area, and potential impacts to the development from the critical area.
- Recommended critical area buffers. There could be more than one recommended buffer, such as a no disturbance buffer and an additional buffer for structures.
- A stormwater pollution prevention plan (also known as an erosion control plan) should be described, or should be referenced if it is being prepared separately.

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- Geotechnical engineering recommendations for proposed grading and structures according to the City's Geotechnical Report Guidelines.

These report requirements for site specific studies will encourage BAS and represent the standard of practice (Bainbridge Island, Edmonds, Sammamish).

Many jurisdictions require independent third-party review of geotechnical reports to assure that the study meets the code and achieves the current standard of practice as a minimum, which is a way of achieving BAS (WAC 365-195-905). In our experience, such review is warranted when the jurisdiction employs no qualified engineers or geologists on staff to determine completeness and adequacy of the reports. This review is needed because in many cases developers may try to minimize the cost of the study, and thus the scope of work is reduced and may not be sufficient. The cost of third-party review is usually administered by the City and borne by the applicant.

SEISMIC HAZARDS

“Seismic hazard areas are lands that, due to a combination of soil and groundwater conditions, are subject to severe risk of ground shaking, subsidence or liquefaction of soils during earthquakes” (SMC 20.80.220(B)). The two components that cause earthquake damage are strong ground motions and loose saturated soils that lose strength during ground motion.

Puget Sound-Wide Issues

All of western Washington is generally at risk of strong ground motions resulting from movement of tectonic plates in the Cascadia Subduction Zone. Geologic studies have documented large earthquakes in the past, such as the estimated magnitude 9.0 earthquake that occurred approximately 300 years ago. This earthquake was located near the Washington coast and relatively deep below the surface (Washington DNR, Earthquakes in Washington). Shallow crustal movement along the Seattle Fault represents another potential source of strong ground motion. The Seattle Fault crosses Seattle in an east-west direction from near Alki Beach along I-90 toward Bellevue (Johnson et al., 2004). Geologic studies indicate that surface movement along the Seattle Fault caused an earthquake with an estimated magnitude of 7.5 approximately 1,000 years ago (Washington DNR, Earthquakes in Washington). An earthquake from the Seattle Fault could cause ground motions that are just as strong as that caused by a subduction zone earthquake, because the Seattle Fault is closer to the City of Shoreline and closer to the ground surface. Ground motions could also derive from other crustal faults, such as the magnitude 6.0 Nisqually Earthquake in 2001.

Some land areas are more susceptible to earthquake damage due to local ground conditions. Loose, saturated, cohesionless soils tend to experience the most severe ground shaking during an

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earthquake. When shaken, these soils lose strength and can settle, crack and deform. Some soils will lose strength to the point of behaving like a liquid, in a process called liquefaction. The loss of soil strength damages structures that had been supported by these soils (Washington DNR, Earthquakes in Washington).

These ground conditions are usually located in low-lying areas with recent deposits of unconsolidated soils (alluvial or fluvial soils, or artificial fills) combined with shallow groundwater. Areas with peat deposits are also a hazard, because ground motions can cause large permanent deformations of peat deposits (Palmer et al., 2004)

Conditions Unique to the City of Shoreline

The most significant BAS document for seismic hazard areas for Shoreline is the *Liquefaction Susceptibility and Site Class Maps of Washington State, By County* (Palmer et al., 2004). These maps and report were prepared by the Washington State Department of Natural Resources (DNR) primarily to describe the location and extent of earthquake hazards in Washington State. One of the stated purposes of the maps was to provide an information source for local officials:

Local jurisdictions can use these maps to delineate earthquake hazard areas and enforce critical areas ordinances as required by the State Growth Management Act. Also, local building officials will be able to use these maps to help delineate areas requiring thorough geotechnical investigation in their enforcement of state and local building codes. (Palmer et al., 2004)

Shoreline is located within the area of detailed study on the *Liquefaction Susceptibility Map of King County, Washington*. The detailed map area is based on 1:24,000-scale geologic mapping. Quantitative engineering analysis was utilized to characterize the risk of liquefaction. The analytical methods have been validated by reports of liquefaction during previous earthquakes in the Puget Sound region. More recent and improved engineering analytical methods were used for the detailed map area, as compared to previously published maps.

Another important document is the 2008 U.S. Geological Survey (USGS) *National Seismic Hazard Maps* (Peterson et al., 2008). These maps provide several different probabilities of earthquake ground motions, which are used in seismic provisions of building codes, insurance rate structures, risk assessments, and other public policy. The abstract and web site states that “national seismic maps represent our assessment of the ‘best available science’ in earthquake hazards estimation for the United States” (Peterson et al., 2008).

The following engineering manuals are routinely updated to address potential seismic ground motions for the design of buildings and other structures. They provide engineering design values based on the

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2008 USGS National Seismic Hazard Maps probabilistic and deterministic ground motion parameters for designing structures.

- Recommended Seismic Provisions for New Buildings and Other Structures, FEMA P-750 (“2009 NEHRP Provisions”) (NEHRP, 2009);
- 2010 Minimum Design Loads for Buildings and Other Structures, ASCE 7-10 (“2010 ASCE-7 Standard”) (ASCE, 2010); and
- 2012 International Building Code (International Code Council, 2012).

These three similar manuals represent the best available engineering for seismic design of structures.

The 2006 Geologic Map of King County is another BAS document (Booth & Wisher, 2006). It shows detailed soil types and the zone of the Seattle Fault. The purpose of the map is for more general geology uses, but it appears to be consistent with the 2004 Liquefaction Susceptibility Map in terms of the location of soil types susceptible to liquefaction and the location of peat deposits.

Review of Existing Regulations in the City of Shoreline

Definition

The current CAO definition of seismic hazard areas provides a general description of the type of ground conditions mapped as seismic hazard areas. However, the terminology is not consistent with geologic maps of these hazards. For example, the use of the word “severe” could cause some interpretive arguments since that word is not used on the maps. It would be more specific and legally defensible to use a definition that correlates directly with the BAS geologic map, such as “Those areas mapped as moderate to high and high liquefaction susceptibility and peat deposits on the *Liquefaction Susceptibility Map of King County, Washington*, Washington Division of Geology and Earth Sciences, OFR 2004-20, Palmer, Stephen, et al., September, 2004.”

Map

Currently the City’s Generalized Liquefaction Susceptibility Map uses preliminary data from the Washington State DNR from 1993. Amec Foster Wheeler recommends using Palmer et al.’s (2004) liquefaction susceptibility map. It is based on more detailed geologic mapping and improved engineering analysis (BAS) as compared to previous maps, including the King County Environmentally Sensitive Areas Map. The geospatial data for the map are available from the DNR web site, so this information could be incorporated into the City’s GIS.

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Standards

The City of Shoreline CAO states that development proposals in seismic hazard areas must follow the International Building Code (IBC). By linking the CAO to the current building codes, the City has maintained BAS in the CAO for seismic hazard areas. This is because building permits in seismic hazard areas require detailed, site-specific investigation (BAS) and project-specific mitigation measures (best available engineering) to reduce the risk of damage to structures.

EROSION HAZARDS

Soil erosion is the removal of soil from its original location by wind, water, ice, or gravity (Ecology, 2011). Four principal factors of soil erosion are soil characteristics, climate, topography, and ground cover (Goldman et al., 1986). Erosion is typically associated with sedimentation, which is the settling of soil particles in water by gravity (Ecology, 2011). Because of impacts associated with erosion and sedimentation, erosion and sedimentation control (ESC) plans are typical requirements for ground-disturbing construction throughout Western Washington. Additionally, many jurisdictions limit activities that can contribute to erosion and sedimentation.

Impacts of Erosion and Sedimentation

The impacts of erosion and sedimentation are understood to include (Ecology, 2011):

- Nutrient loading from phosphorus and nitrogen, which are attached to soil particles and transported to lakes and streams, produce eutrophication and changes in water pH, which can lead to algal blooms and oxygen depletion that cause fish kills.
- Eroded soil particles decrease the viability of macroinvertebrates and food-chain organisms and impair the feeding ability of aquatic animals; they also clog gill passages of fish and reduce photosynthesis.
- Sediment-clogged gravel diminishes fish spawning and can smother eggs or young fry.
- Natural, nutrient-rich topsoils erode, making re-establishment of vegetation difficult without applying soil amendments and fertilizers.
- Silt fills culverts and storm drains, decreasing capacities and increasing flooding and maintenance requirements.
- Detention facilities fill rapidly with sediment, decreasing storage capacity and increasing flooding.
- Sediment clogs infiltration devices, causing failure.
- Shallow areas in lakes form rapidly, resulting in growth of aquatic plants and reduced usability.

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- Water treatment for domestic uses becomes more difficult and costly.
- Turbid water replaces aesthetically pleasing, clear, clean water in streams and lakes.

Erosion Hazard Map

Erosion hazard areas are included as a data layer in the City Geographic Information System (GIS). The data appears to be from King County, which is probably from the 1952 Soil Survey of King County (US Dept. of Agriculture, 1952). We were unable to find any updated soil survey for the City of Shoreline. As stated above, the map should be used as a general indicator of erosion hazard areas. By using the definition of erosion hazard areas, site specific studies can determine if erosion hazard areas are present.

Erosion and Sedimentation Control

Based on review of neighboring jurisdictions' CAOs and Amec Foster Wheeler's experience with other jurisdictions across Puget Sound, we have found the following typical main regulatory protections for erosion hazard areas:

- Requirements to prepare and implement a Stormwater Pollution Prevention Plan (SWPPP) for land-disturbing activities;
- Restrictions on developable land;
- Seasonal restrictions on clearing and grading;
- Requirements to control stormwater discharges; and
- Vegetation management requirements.

To address erosion and sedimentation impacts, grading and stormwater codes of agencies and municipalities require preparation of a SWPPP before grading permits are issued. Such plans are prepared based upon the requirements of the adopted Surface Water Design Manual. If the area of ground disturbance exceeds one acre, then a National Pollutant Discharge Elimination System (NPDES) permit is also required. Projects seeking NPDES permit coverage typically conform to the conditions of the Department of Ecology's (Ecology) Construction Stormwater General Permit (CSWGP), which include implementation of a SWPPP and protocols for monitoring site discharges for compliance with water quality standards.

Minimum requirements and best management practices (BMPs) for SWPPP s are established by the Washington State Department of Ecology in the *Stormwater Management Manual for Western Washington* (Stormwater Manual; Ecology, 2012); municipalities typically adopt these minimum requirements and BMP design standards, or their equivalents, as part of their stormwater

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management requirements for site development. The City of Shoreline has adopted the Stormwater Manual and the *Low Impact Technical Guidance Manual for Puget Sound* (LID Manual; Washington State University and Puget Sound Partnership, 2012). The City also encourages the use of emerging technologies that are part of the Washington Department of Ecology's Technology Assessment Protocol (TAPE). These BMPs, together with the erosion and sedimentation control BMPs of the Stormwater Manual, constitute the BAS for prevention of erosion and the treatment of sediment-laden runoff.

Wet Season Restrictions

It is not unusual to have seasonal requirements for clearing and grading stated in critical areas codes, or in stormwater codes that are referenced by critical area codes. Ecology (2011) states that for Western Washington, soils must not remain exposed and unworked for more than 7 days during the dry season (May 1 – September 30), and for no more than 2 days during the wet season (October 1 – April 30). The City of Shoreline CAO states that the City may restrict major earthwork between October 15 and April 15 (SMC 20.80.240 E. 5). These dates are reasonable and similar to other jurisdictions; for example, the City of Seattle restricts activities between October 31 and April 1 (Seattle Municipal Code, Bellevue Municipal Code).

RECOMMENDED CHANGES TO THE CURRENT CODE

Table 1 presents a list of recommended changes to the existing Shoreline Municipal Code.

Table 1 Recommended Changes to the Critical Areas Code, Geologic Hazards

Code	Recommended Changes	Reasons
20.20.022(G) Definitions	Revise the definition of Geologist to: Professional geologist licensed in the State of Washington	Geologists are now licensed by the State for the purposes of providing the services described in this CAO. Requiring studies by licensed geologists and engineers utilizes BAS.
20.20.046(S) Definitions	Delete the definition of Steep Slope Hazard Areas in this section.	Term not used anywhere else in the Code; top and toe of slope defined in Critical Area chapter.
20.80.030 Exemptions	Delete the exemption for small steep slopes up to 20 feet high.	Landslides have been documented on slopes less than 20 feet high.
20.80.040(A)(2) Partial Exemptions	Revise this to say structural modifications may be allowed based on recommendations from a site specific study of the potential for critical area impacts.	The current exemption increases the impact to the critical area buffer without mitigation.

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Table 1 Recommended Changes to the Critical Areas Code, Geologic Hazards

Code	Recommended Changes	Reasons
20.80.220	Insert the slope definition here where Landslide Hazard Areas are classified. Revise to define "distinct topographic break."	The current definition of steep slopes does not provide a measurable way to determine a "distinct topographic break" in the slope. A precise definition is needed in order to determine the critical area and buffer locations.
20.80.220 (B) Seismic Hazard Areas	Update the definition and data source for the map to be consistent with Palmer et al., 2004.	Using the updated map will represent BAS and provide a clear definition of a seismic hazard area.
20.80.240(C) Alterations	Delete the sentence that allows the City to waive the requirement for a geotechnical report.	To avoid the appearance of arbitrary waivers, require a critical area study, but understand that the necessary scope of the study will depend on the proposed alteration and the site conditions.

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**Attachment C - GMS Critical Areas Appendix A
Sample Code Provisions**

Appendix A

**Example Code Provisions
For Designating and Protecting
Critical Areas**

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Sample Code Provisions**

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Example Code Provisions for Designating and Protection Critical Areas

Title X Critical Areas

Chapter X.10	General Provisions
Chapter X.20	Wetlands
Chapter X.30	Critical Aquifer Recharge Areas
Chapter X.40	Frequently Flooded Areas
Chapter X.50	Geologically Hazardous Areas
Chapter X.60	Fish and Wildlife Habitat Conservation Areas

Chapter X.10 General Provisions

Purpose and General Provisions

- X.10.010 Purpose
- X.10.020 Authority
- X.10.030 Relationships to Other Regulations
- X.10.040 Administrative Procedures
- X.10.050 Fees
- X.10.060 Severability
- X.10.070 Administrative Rules
- X.10.080 Interpretation
- X.10.090 Jurisdiction – Critical areas
- X.10.100 Protection of Critical Areas

Best Available Science

- X.10.110 Best Available Science

Applicability, Exemptions, and Exceptions

- X.10.120 Applicability
- X.10.130 Exemptions
- X.10.140 Exceptions – Public Agency and Utility
- X.10.150 Exceptions – Reasonable Use

Allowed Activities

- X.10.160 Allowed Activities

Critical Area Review Process

- X.10.170 General Requirements
- X.10.180 Critical Area Preapplication Consultation
- X.10.190 Critical Area Identification Form
- X.10.200 Public Notice and Initial Determination

Critical Area Report

- X.10.210 Critical Area Report – Requirements

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- X.10.220 Critical Area Report – Modifications to Requirements**
- X.10.230 Mitigation Requirements**
- X.10.240 Mitigation Sequencing**
- X.10.250 Mitigation Plan Requirements**
- X.10.260 Innovative Mitigation**

Determination Process

- X.10.270 Determination**
- X.10.280 Review Criteria**
- X.10.290 Favorable Determination**
- X.10.300 Unfavorable Determination**
- X.10.310 Completion of the Critical Area Review**
- X.10.320 Appeals**

Variances

- X.10.330 Variances**

Unauthorized Alterations and Enforcement

- X.10.340 Unauthorized Critical Area Alterations and Enforcement**

General Critical Area Protective Measures

- X.10.350 Critical Area Markers and Signs**
- X.10.360 Notice on Title**
- X.10.370 Native Growth Protection Areas**
- X.10.380 Critical Area Tracts**
- X.10.390 Building Setbacks**
- X.10.400 Bonds to Ensure Mitigation, Maintenance, and Monitoring**
- X.10.410 Critical Area Inspections**

PURPOSE AND GENERAL PROVISIONS

X.10.010 Purpose

A. The purpose of this Title is to designate and classify ecologically sensitive and hazardous areas and to protect these areas and their functions and values, while also allowing for reasonable use of private property.

B. This Title is to implement the goals, policies, guidelines, and requirements of the [city/county] comprehensive plan and the Growth Management Act.

C. The [city/county] finds that critical areas provide a variety of valuable and beneficial biological and physical functions that benefit the [city/county] and its residents, and/or may pose a threat to human safety or to public and private property. The beneficial functions and values provided by critical areas include, but are not limited to, water quality protection and enhancement, fish and wildlife habitat, food chain support, flood storage, conveyance and attenuation of flood waters, ground water recharge and discharge, erosion control, wave attenuation,

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protection from hazards, historical, archaeological, and aesthetic value protection, and recreation. These beneficial functions are not listed in order of priority.

D. **Goals.** By limiting development and alteration of critical areas, this Title seeks to:

1. Protect members of the public and public resources and facilities from injury, loss of life, or property damage due to landslides and steep slope failures, erosion, seismic events, volcanic eruptions, or flooding;
2. Maintain healthy, functioning ecosystems through the protection of unique, fragile, and valuable elements of the environment, including ground and surface waters, wetlands, and fish and wildlife and their habitats, and to conserve the biodiversity of plant and animal species;
3. Direct activities not dependent on critical areas resources to less ecologically sensitive sites and mitigate unavoidable impacts to critical areas by regulating alterations in and adjacent to critical areas; and
4. Prevent cumulative adverse environmental impacts to water quality, wetlands, and fish and wildlife habitat, and the overall net loss of wetlands, frequently flooded areas, and habitat conservation areas.

These goals should be cross-referenced with the jurisdiction's comprehensive plan goals and policies, as well as with applicable county-wide planning policies.

E. The regulations of this Title are intended to protect critical areas in accordance with the Growth Management Act and through the application of the best available science, as determined according to WAC 365-195-900 through 365-195-925, and in consultation with state and federal agencies and other qualified professionals.

F. This Title is to be administered with flexibility and attention to site-specific characteristics. It is not the intent of this Title to make a parcel of property unusable by denying its owner reasonable economic use of the property or to prevent the provision of public facilities and services necessary to support existing development and planned for by the community without decreasing current service levels below minimum standards.¹

Throughout this example ordinance, authority is generally given to the "director" of the planning and community development department. Depending on the organization of the jurisdiction and department, authority may be placed with the administrator, manager, hearing examiner, or other individual or body charged with implementing these regulations.

G. The [city/county]'s enactment or enforcement of this Title shall not be construed for the benefit of any individual person or group of persons other than the general public.

X.10.020 Authority

A. As provided herein, the [director] is given the authority to interpret and apply, and the responsibility to enforce this Title to accomplish the stated purpose.

B. The [city/county] may withhold, condition, or deny development permits or activity approvals to ensure that the proposed action is consistent with this Title.

¹ See RCW 36.70A.020(12).

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Some general provisions may already be in the adopted zoning code and may be referenced here rather than restated.

See Appendix H for information on related state and federal laws for the nearshore habitat.

Jurisdictions may choose to review critical areas concurrent with other permits, such as shoreline development or HPA permits, and require applicants to submit a combined application of environmental information or a Joint Aquatics Review Permit Application (JARPA).

Whether to make review costs the responsibility of the applicant is a local decision. However, the jurisdiction should make clear what costs might be involved, especially if costs of an outside consultant are to be passed on. Jurisdictions may want to include a multistep fee schedule to recognize the difference between large and small sites/projects.

X.10.030 Relationship to Other Regulations

A. These critical areas regulations shall apply as an overlay and in addition to zoning and other regulations adopted by the [city/county].

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 Title or any existing regulation, easement, covenant, or deed restriction conflicts with this Title, that which provides more protection to the critical areas shall apply.

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

D. Compliance with the provisions of this Title does not constitute compliance with other federal, state, and local regulations and permit requirements that may be required (for example, Shoreline Substantial Development Permits, Hydraulic Permit Act (HPA) permits, Section 106 of the National Historic Preservation Act, U.S. Army Corps of Engineers Section 404 permits, National Pollution Discharge Elimination System permits). The applicant is responsible for complying with these requirements, apart from the process established in this Title.

X.10.040 Administrative Procedures. The administrative procedures followed during the critical area review process shall conform to the standards and requirements of the [city/county development regulations]. This shall include, but not be limited to, timing, appeals, and fees associated with applications covered by this Title.

X.10.050 Fees

A. The [city/county] by resolution shall establish fees for filing of a critical area identification form, critical area review processing, and other services provided by the [city/county] as required by this Title. These fees shall be based on the anticipated sum of direct costs incurred by the [city/county] for any individual development or action and may be established as a sliding scale that will recover all of the [city/county] costs including the enforcement of these code provisions. Basis for these fees shall include, but not be limited to, the cost of engineering and planning review time, cost of inspection time, costs for administration, and any other special costs attributable to the critical area review process.

B. Unless otherwise indicated in this Title, the applicant shall be responsible for the initiation, preparation, submission, and expense of all required reports, assessment(s), studies, plans, reconnaissance(s), peer review(s) by qualified consultants, and other work prepared in support of or necessary to review the application.

X.10.060 Severability. If any clause, sentence, paragraph, section, or part of this Title or the application thereof to any person or circumstances shall be judged by any court of competent jurisdiction to be invalid, such order or judgment shall be confined in its operation to the controversy in which it was rendered. The

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decision shall not affect or invalidate the remainder of any part thereof and to this end the provisions of each clause, sentence, paragraph, section, or part of this law are hereby declared to be severable.

X.10.070 Administrative Rules. Applicable departments within the [city/county] are authorized to adopt such administrative rules and regulations as necessary and appropriate to implement this Title and to prepare and require the use of such forms as necessary for its administration.

X.10.080 Interpretation. In the interpretation and application of this ordinance, the provisions of this Title shall be considered to be the minimum requirements necessary, shall be liberally construed to serve the purpose of this ordinance, and shall be deemed to neither limit nor repeal any other provisions under state statute.

X.10.090 Jurisdiction – Critical Areas

A. The [city/county] shall regulate all uses, activities, and developments within, adjacent to, or likely to affect, one or more critical areas, consistent with the best available science and the provisions herein.

B. Critical areas regulated by this Title include:

1. Wetlands as designated in *Wetlands* [Chapter X.20];
2. Critical aquifer recharge areas as designated in *Critical Aquifer Recharge Areas* [Chapter X.30];
3. Frequently flooded areas as designated in *Frequently Flooded Areas* [Chapter X.40];
4. Geologically hazardous areas as designated in *Geologically Hazardous Areas* [Chapter X.50]; and
5. Fish and wildlife habitat conservation areas as designated in *Fish and Wildlife Habitat Conservation Areas* [Chapter X.60].

C. All areas within the [city/county] meeting the definition of one or more critical areas, regardless of any formal identification, are hereby designated critical areas and are subject to the provisions of this Title.

D. Areas Adjacent to Critical Areas Subject to Regulation. Areas adjacent to critical areas shall be considered to be within the jurisdiction of these requirements and regulations to support the intent of this Title and ensure protection of the functions and values of critical areas. Adjacent shall mean any activity located:

1. On a site immediately adjoining a critical area;
2. A distance equal to or less than the required critical area buffer width and building setback;

“Adjacent” is used as a way to allow for various inclusion distances, rather than rely on a single arbitrary distance for all critical areas.

Jurisdictions with several types of critical areas will find that this allows the regulations to be applied to site-specific conditions. The distances included should be the maximums that might be encountered and should be based on the best available science.

Jurisdictions with few critical areas may prefer to use the alternative shown on the next page.

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3. A distance equal to or less than one-half mile (2,640 feet) from a bald eagle nest;²
4. A distance equal to or less than three hundred (300) feet upland from a stream, wetland, or water body;³
5. Within the floodway, floodplain, or channel migration zone; or
6. A distance equal to or less than two hundred (200) feet from a critical aquifer recharge area.⁴

If the alternative option shown here is used, it would replace the specific distances of Subsection X.10.090(A) and Subsection (D) would no longer be needed. The blank would be filled in using the maximum buffer width that might be applied, so that all lesser buffers are included and the same distance is always used. However, consider that the recommended buffer for Great Blue Heron colonies, which are found throughout the state, is 984 feet.

Alternative Option

A. The [city/county] shall regulate all uses within [____ feet] of, or that are likely to affect, one or more critical areas, consistent with the best available science and the provisions herein.⁵

X.10.100 Protection of Critical Areas

Any action taken pursuant to this Title shall result in equivalent or greater functions and values of the critical areas associated with the proposed action, as determined by the best available science. All actions and developments shall be designed and constructed in accordance with *Mitigation Sequencing* [Section X.10.240] to avoid, minimize, and restore all adverse impacts. Applicants must first demonstrate an inability to avoid or reduce impacts, before restoration and compensation of impacts will be allowed. No activity or use shall be allowed that results in a net loss of the functions or values of critical areas.

BEST AVAILABLE SCIENCE

X.10.110 Best Available Science

A. **Protect Functions and Values of Critical Areas With Special Consideration to Anadromous Fish.** Critical area reports and decisions to alter critical areas shall rely on the best available science to protect the functions and values of critical areas and must give special consideration to conservation or protection measures necessary to preserve or enhance anadromous fish, such as salmon and bull trout, and their habitat.⁶

² Distance of 2,640 feet is based on the Washington Department of Fish and Wildlife's *Management Recommendations for Washington's Priority Species, Volume IV: Birds*, 2000.

³ Distance of three hundred (300) feet is based on maximum recommended riparian habitat area width from Washington Department of Fish and Wildlife's *Management Recommendations for Washington's Priority Habitats: Riparian*, 1997.

⁴ Distance of two hundred (200) feet is a suggested distance to ensure that activities within the critical aquifer recharge area are included under the application of this Title, even when the exact boundaries of the critical aquifer recharge area are not known at the time of application.

⁵ This distance should be the maximum possible buffer/zone width that might occur within the jurisdiction. Many priority habitat species require regulation of uses within several hundred feet. At a minimum, it is suggested that this distance not be less than three hundred (300) feet to account for buffers/zones that may be required for wetlands and riparian habitat areas.

⁶ See RCW 36.70A.172(1).

Refer to the Citations of Recommended Sources of Best Available Science for Designating and Protecting Critical Areas distributed by CTED for a list of applicable science documents.

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B. Best Available Science to be Consistent With Criteria. The best available science is that scientific information applicable to the critical area prepared by local, state, or federal natural resource agencies, a qualified scientific professional, or team of qualified scientific professionals that is consistent with criteria established in WAC 365-195-900 through WAC 365-195-925.

C. 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 permit review process is reliable scientific information, the [director] shall determine whether the source of the information displays the characteristics of a valid scientific process. Such characteristics are as follows:

For further guidance about key characteristics of a valid scientific process, refer to Table 1 of WAC 365-105-905.

1. **Peer Review.** The information has been critically reviewed by other persons who are qualified scientific experts in that scientific discipline. The proponents of the information have addressed the criticism of the peer reviewers. Publication in a refereed scientific journal usually indicates that the information has been appropriately peer-reviewed;
2. **Methods.** The methods used to obtain the information are clearly stated and reproducible. The methods are standardized in the pertinent scientific discipline or, if not, the methods have been appropriately peer-reviewed to ensure 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; and
6. **References.** The assumptions, analytical techniques, and conclusions are well referenced with citations to relevant, credible literature and other pertinent existing information.

D. Nonscientific Information. Nonscientific information may supplement scientific information, but it is not an adequate substitute for valid and

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available scientific information. Common sources of nonscientific information include the following:

1. **Anecdotal Information.** One or more observations that are not part of an organized scientific effort (for example, “I saw a grizzly bear in that area while I was hiking”);
2. **Non-Expert Opinion.** Opinion of a person who is not a qualified scientific expert in a pertinent scientific discipline (for example, “I do not believe there are grizzly bears in that area”); and
3. **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”).

E. **Absence of Valid Scientific Information.** Where there is an absence of valid scientific information or incomplete scientific information relating to a critical area leading to uncertainty about the risk to critical area function of permitting an alteration of or impact to the critical area, the [director] shall:

1. Take a “precautionary or a no-risk approach,” that strictly limits development and land use activities until the uncertainty is sufficiently resolved; and
2. Require application of an effective adaptive management program that relies on scientific methods to evaluate how well regulatory and nonregulatory actions protect the critical area. An adaptive management program is a formal and deliberate scientific approach to taking action and obtaining information in the face of uncertainty. An adaptive management program shall:
 - a. Address funding for the research component of the adaptive management program;
 - b. Change course based on the results and interpretation of new information that resolves uncertainties; and
 - c. Commit to the appropriate timeframe and scale necessary to reliably evaluate regulatory and nonregulatory actions affecting protection of critical areas and anadromous fisheries.

APPLICABILITY, EXEMPTIONS, AND EXCEPTIONS

X.10.120 Applicability

A. The provisions of this Title shall apply to all lands, all land uses and development activity, and all structures and facilities in the [city/county], whether or not a permit or authorization is required, and shall apply to every person, firm, partnership, corporation, group, governmental agency, or other entity that owns, leases, or administers land within the [city/county]. No person, company, agency,

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or applicant shall alter a critical area or buffer except as consistent with the purposes and requirements of this Title.

B. The [city/county] shall not approve any permit or otherwise issue any authorization to alter the condition of any land, water, or vegetation, or to construct or alter any structure or improvement in, over, or on a critical area or associated buffer, without first ensuring compliance with the requirements of this Title, including, but not limited to, the following:

1. Building permit;
2. Clearing and grading permit;
3. Forest practices permit;
4. Conditional use permit;
5. Shoreline conditional use permit;
6. Shoreline substantial development permit;
7. Shoreline exemption;
8. Shoreline variance;
9. Short subdivision;
10. Subdivision;
11. Planned unit development;
12. Binding site plan;
13. Zoning variance;
14. Zoning code amendment; or
15. Any other adopted permit or required approval not expressly exempted by this Title.

C. Approval of a permit or development proposal pursuant to the provisions of this Title does not discharge the obligation of the applicant to comply with the provisions of this Title.

X.10.130 Exemptions

A. **Exemption Request and Review Process.** The proponent of the activity may submit a written request for exemption to the [director] that describes the activity and states the exemption listed in this Section that applies.

The [director] shall review the exemption request to verify that it complies with this Title and approve or deny the exemption. If the exemption is approved, it

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shall be placed on file with the [department]. If the exemption is denied, the proponent may continue in the review process and shall be subject to the requirements of this Title.

B. Exempt Activities and Impacts to Critical Areas. All exempted activities shall use reasonable methods to avoid potential impacts to critical areas. To be exempt from this Title does not give permission to degrade a critical area or ignore risk from natural hazards. Any incidental damage to, or alteration of, a critical area that is not a necessary outcome of the exempted activity shall be restored, rehabilitated, or replaced at the responsible party's expense.

C. Exempt Activities. The following developments, activities, and associated uses shall be exempt from the provisions of this Title, provided that they are otherwise consistent with the provisions of other local, state, and federal laws and requirements:

- 1. Emergencies.** Those activities necessary to prevent an immediate threat to public health, safety, or welfare, or that pose an immediate risk of damage to private property and that require remedial or preventative action in a timeframe too short to allow for compliance with the requirements of this Title.

Emergency actions that create an impact to a critical area or its buffer shall use reasonable methods to address the emergency; in addition, they must have the least possible impact to the critical area or its buffer. The person or agency undertaking such action shall notify the [city/county] within one (1) working day following commencement of the emergency activity. Within thirty (30) days, the [director] shall determine if the action taken was within the scope of the emergency actions allowed in this Subsection. If the [director] determines that the action taken, or any part of the action taken, was beyond the scope of an allowed emergency action, then enforcement provisions of *Unauthorized Alterations and Enforcement* [Section X.10.340] shall apply.

After the emergency, the person or agency undertaking the action shall fully fund and conduct necessary restoration and/or mitigation for any impacts to the critical area and buffers resulting from the emergency action in accordance with an approved critical area report and mitigation plan. The person or agency undertaking the action shall apply for review, and the alteration, critical area report, and mitigation plan shall be reviewed by the [city/county] in accordance with the review procedures contained herein. Restoration and/or mitigation activities must be initiated within one (1) year of the date of the emergency, and completed in a timely manner;

- 2. Operation, Maintenance, or Repair.** Operation, maintenance, or repair of existing structures, infrastructure improvements, utilities, public or private roads, dikes, levees, or drainage systems, that do not require construction permits, if the activity does not further alter or increase the impact to, or encroach further within, the critical area or

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- buffer and there is no increased risk to life or property as a result of the proposed operation, maintenance, or repair. Operation and maintenance includes vegetation management performed in accordance with best management practices that is part of ongoing maintenance of structures, infrastructure, or utilities, provided that such management actions are part of regular and ongoing maintenance, do not expand further into the critical area, are not the result of an expansion of the structure or utility, and do not directly impact an endangered or threatened species;
3. **Passive Outdoor Activities.** Recreation, education, and scientific research activities that do not degrade the critical area, including fishing, hiking, and bird watching. Trails must be constructed pursuant to *Public and Private Pedestrian Trails* [Section X.10.160(C)(5)]; and
 4. **Forest Practices.** Forest practices regulated and conducted in accordance with the provisions of Chapter 76.09 RCW and forest practices regulations, Title 222 WAC, and those that are exempt from [city/county]'s jurisdiction, provided that forest practice conversions are not exempt.

X.10.140 Exception – Public Agency and Utility

A. If the application of this Title would prohibit a development proposal by a public agency or public utility, the agency or utility may apply for an exception pursuant to this Section.

B. **Exception Request and Review Process.** An application for a public agency and utility exception shall be made to the [city/county] and shall include a critical area identification form; critical area report, including mitigation plan, if necessary; and any other related project documents, such as permit applications to other agencies, special studies, and environmental documents prepared pursuant to the State Environmental Policy Act (Chapter 43.21C RCW). The [director] shall prepare a recommendation to the [hearing body/examiner] based on review of the submitted information, a site inspection, and the proposal's ability to comply with public agency and utility exception review criteria in Subsection (D).

C. **[Hearing Body/Examiner] Review.** The [hearing body/examiner] shall review the application and [director]'s recommendation, and conduct a public hearing pursuant to the provisions of the [*applicable city/county chapter*]. The [hearing body/examiner] shall approve, approve with conditions, or deny the request based on the proposal's ability to comply with all of the public agency and utility exception criteria in Subsection (D).

D. **Public Agency and Utility Review Criteria.** The criteria for review and approval of public agency and utility exceptions follow:

1. There is no other practical alternative to the proposed development with less impact on the critical areas;

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2. The application of this Title would unreasonably restrict the ability to provide utility services to the public;
3. The proposal does not pose an unreasonable threat to the public health, safety, or welfare on or off the development proposal site;
4. The proposal attempts to protect and mitigate impacts to the critical area functions and values consistent with the best available science; and
5. The proposal is consistent with other applicable regulations and standards.

E. **Burden of Proof.** The burden of proof shall be on the applicant to bring forth evidence in support of the application and to provide sufficient information on which any decision has to be made on the application.

A reasonable use exception is a measure of last resort for use only in those situations where all economic use of a property would be denied by the critical areas regulations.

X.10.150 Exception – Reasonable Use

A. If the application of this Title would deny all reasonable economic use of the subject property, the [city/county] shall determine if compensation is an appropriate action, or the property owner may apply for an exception pursuant to this Section.

B. **Exception Request and Review Process.** An application for a reasonable use exception shall be made to the [city/county] and shall include a critical area identification form; critical area report, including mitigation plan, if necessary; and any other related project documents, such as permit applications to other agencies, special studies, and environmental documents prepared pursuant to the State Environmental Policy Act (Chapter 43.21C RCW) (SEPA documents). The [director] shall prepare a recommendation to the [hearing body/examiner] based on review of the submitted information, a site inspection, and the proposal's ability to comply with reasonable use exception criteria in Subsection (D).

C. **[Hearing Body/Examiner] Review.** The [hearing body/examiner] shall review the application and conduct a public hearing pursuant to the provisions of the [applicable city/county chapter]. The [hearing body/examiner] shall approve, approve with conditions, or deny the request based on the proposal's ability to comply with all of the reasonable use exception review criteria in Subsection (D).

D. **Reasonable Use Review Criteria.** Criteria for review and approval of reasonable use exceptions follow, one or more may apply:

1. The application of this Title would deny all reasonable economic use of the property;
2. No other reasonable economic use of the property has less impact on the critical area;
3. The proposed impact to the critical area is the minimum necessary to allow for reasonable economic use of the property;

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4. The inability of the applicant to derive reasonable economic use of the property is not the result of actions by the applicant after the effective date of this Title, or its predecessor;
5. The proposal does not pose an unreasonable threat to the public health, safety, or welfare on or off the development proposal site;
6. The proposal will result in no net loss of critical area functions and values consistent with the best available science; or
7. The proposal is consistent with other applicable regulations and standards.

E. **Burden of Proof.** The burden of proof shall be on the applicant to bring forth evidence in support of the application and to provide sufficient information on which any decision has to be made on the application.

ALLOWED ACTIVITIES

X.10.160 Allowed Activities

A. **Critical Area Report.** Activities allowed under this Title shall have been reviewed and permitted or approved by the [city/county] or other agency with jurisdiction, but do not require submittal of a separate critical area identification form or critical area report, unless such submittal was required previously for the underlying permit. The [director] may apply conditions to the underlying permit or approval to ensure that the allowed activity is consistent with the provisions of this Title to protect critical areas.

B. **Required Use of Best Management Practices.** All allowed activities shall be conducted using the best management practices, adopted pursuant to [*locally adopted best management practices, such as the stormwater management regulations*], that result in the least amount of impact to the critical areas. Best management practices shall be used for tree and vegetation protection, construction management, erosion and sedimentation control, water quality protection, and regulation of chemical applications. The [city/county] shall observe the use of best management practices to ensure that the activity does not result in degradation to the critical area. Any incidental damage to, or alteration of, a critical area shall be restored, rehabilitated, or replaced at the responsible party's expense.

C. **Allowed Activities.** The following activities are allowed:

1. **Permit Requests Subsequent to Previous Critical Area Review.** Development permits and approvals that involve both discretionary land use approvals (such as subdivisions, rezones, or conditional use permits), and construction approvals (such as building permits) if all of the following conditions have been met:

Allowed activities are similar to exemptions in that they do not require critical area review. However, unlike exemptions, allowed activities must follow the critical areas standards. Conditions may be applied to the underlying permit, such as the building permit, to ensure critical area protection.

The purpose of Subsection (C)(1), regarding previous reviews, is to recognize that an applicant should not need to complete a new critical area review for a project that has just had a previous review completed. For example, if critical areas were reviewed and addressed during platting,

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they should not need to be readdressed during reconstruction of individual homes as long as the construction is consistent with the original approval. If previous codes did not adequately include the best available science, it may be appropriate to limit this. It may be appropriate to reference Subsection (C)(1)(d) to the subdivision regulations to ensure that they are linked; the time limit for expiration should be consistent with that used for preliminary plat approvals.

- a. The provisions of this Title have been previously addressed as part of another approval;
 - b. There have been no material changes in the potential impact to the critical area or buffer since the prior review;
 - c. There is no new information available that is applicable to any critical area review of the site or particular critical area;
 - d. The permit or approval has not expired or, if no expiration date, no more than [five years] has elapsed since the issuance of that permit or approval; and
 - e. Compliance with any standards or conditions placed upon the prior permit or approval has been achieved or secured;
2. **Modification to Existing Structures.** Structural modification of, addition to, or replacement of an existing legally constructed structure that does not further alter or increase the impact to the critical area or buffer and there is no increased risk to life or property as a result of the proposed modification or replacement, provided that restoration of structures substantially damaged by fire, flood, or act of nature must be initiated within one (1) year of the date of such damage, as evidenced by the issuance of a valid building permit, and diligently pursued to completion;
3. **Activities Within the Improved Right-of-Way.** Replacement, modification, installation, or construction of utility facilities, lines, pipes, mains, equipment, or appurtenances, not including substations, when such facilities are located within the improved portion of the public right-of-way or a [city/county] authorized private roadway except those activities that alter a wetland or watercourse, such as culverts or bridges, or result in the transport of sediment or increased stormwater; subject to the following:
- a. Critical area and/or buffer widths shall be increased, where possible, equal to the width of the right-of-way improvement, including disturbed areas; and
 - b. Retention and replanting of native vegetation shall occur wherever possible along the right-of-way improvement and resulting disturbance;
4. **Minor Utility Projects.** Utility projects which have minor or short-duration impacts to critical areas, as determined by the [director] in accordance with the criteria below, and which do not significantly impact the function or values of a critical area(s), provided that such projects are constructed with best management practices and additional restoration measures are provided. Minor activities shall not result in

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the transport of sediment or increased stormwater. Such allowed minor utility projects shall meet the following criteria:

1. There is no practical alternative to the proposed activity with less impact on critical areas;
 2. The activity involves the placement of a utility pole, street signs, anchor, or vault or other small component of a utility facility; and
 3. The activity involves disturbance of an area less than 75 square feet;
5. **Public and Private Pedestrian Trails.** Public and private pedestrian trails, except in wetlands, fish and wildlife habitat conservation areas, or their buffers, subject to the following:
- a. The trail surface shall meet all other requirements including water quality standards set forth in the [*locally adopted stormwater management regulations*];
 - b. Critical area and/or buffer widths shall be increased, where possible, equal to the width of the trail corridor, including disturbed areas; and
 - c. Trails proposed to be located in landslide or erosion hazard areas shall be constructed in a manner that does not increase the risk of landslide or erosion and in accordance with an approved geotechnical report;
6. **Select Vegetation Removal Activities.** The following vegetation removal activities, provided that no vegetation shall be removed from a critical area or its buffer without approval from the [director]:
- a. The removal of the following vegetation with hand labor and light equipment:
 - i. Invasive and noxious weeds;⁷
 - ii. English Ivy (*Hedera helix*);
 - iii. Himalayan blackberry (*Rubus discolor*, *R. procerus*); and
 - iv. Evergreen blackberry (*Rubus laciniatus*);
 - b. The removal of trees from critical areas and buffers that are hazardous, posing a threat to public safety, or posing an imminent risk of damage to private property, provided that:
 - i. The applicant submits a report from a certified arborist, registered landscape architect, or professional forester that

While removing debris is often disruptive to the ecosystem, leaving the brush can lead to increased pest damage and fire hazards and raise legal issues for communities. In addition, debris disposal is required under the Forest Practices Act, and care must be taken to follow requirements in state forest fire laws (RCW 76.04.660).

⁷ Jurisdictions are advised to include a reference to locally adopted lists of invasive and noxious weeds. Sometimes these are adopted at the county level.

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documents the hazard and provides a replanting schedule for the replacement trees;

- ii. Tree cutting shall be limited to pruning and crown thinning, unless otherwise justified by a qualified professional. Where pruning or crown thinning is not sufficient to address the hazard, trees should be removed or converted to wildlife snags;
 - iii. All vegetation cut (tree stems, branches, etc.) shall be left within the critical area or buffer unless removal is warranted due to the potential for disease or pest transmittal to other healthy vegetation;
 - iv. The landowner shall replace any trees that are removed with new trees at a ratio of two replacement trees for each tree removed (2:1) within one (1) year in accordance with an approved restoration plan. Replacement trees may be planted at a different, nearby location if it can be determined that planting in the same location would create a new hazard or potentially damage the critical area. Replacement trees shall be species that are native and indigenous to the site and a minimum of one (1) inch in diameter-at-breast height (dbh) for deciduous trees and a minimum of six (6) feet in height for evergreen trees as measured from the top of the root ball;
 - v. If a tree to be removed provides critical habitat, such as an eagle perch, a qualified wildlife biologist shall be consulted to determine timing and methods of removal that will minimize impacts; and
 - vi. Hazard trees determined to pose an imminent threat or danger to public health or safety, to public or private property, or of serious environmental degradation may be removed or pruned by the landowner prior to receiving written approval from [city/county] provided that within fourteen (14) days following such action, the landowner shall submit a restoration plan that demonstrates compliance with the provisions of this Title.
- c. Measures to control a fire or halt the spread of disease or damaging insects consistent with the state Forest Practices Act; Chapter 76.09 RCW, *[and local forest practices regulations if adopted]* provided that the removed vegetation shall be replaced in-kind or with similar native species within one (1) year in accordance with an approved restoration plan; and
 - d. Unless otherwise provided, or as a necessary part of an approved alteration, removal of any vegetation or woody debris from a habitat conservation area or wetland shall be prohibited;

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7. **Chemical Applications.** The application of herbicides, pesticides, organic or mineral-derived fertilizers, or other hazardous substances, if necessary, as approved by the [city/county], provided that their use shall be restricted in accordance with state Department of Fish and Wildlife Management Recommendations and the regulations of the state Department of Agriculture and the U.S. Environmental Protection Agency;⁸
8. **Minor Site Investigative Work.** Work necessary for land use submittals, such as surveys, soil logs, percolation tests, and other related activities, where such activities do not require construction of new roads or significant amounts of excavation. In every case, impacts to the critical area shall be minimized and disturbed areas shall be immediately restored; and
9. **Navigational Aids and Boundary Markers.** Construction or modification of navigational aids and boundary markers.

The Washington Department of Fish and Wildlife recommends restricting the use of pesticides and herbicides in many types of habitat. Additionally, the Washington State Department of Agriculture and/or the U.S. Environmental Protection Agency have regulations specific to the use of pesticides, fertilizers, and other chemicals that must be adhered to under federal law, and generally appear on the packaging. A jurisdiction should understand and identify which chemicals are acceptable in specific critical areas prior to approving chemical applications.

CRITICAL AREA PROJECT REVIEW PROCESS

X.10.170 General Requirements

- A. As part of this review, the [city/county] shall:
 1. Verify the information submitted by the applicant;
 2. Evaluate the project area and vicinity for critical areas;
 3. Determine whether the proposed project is likely to impact the functions or values of critical areas; and
 4. Determine if the proposed project adequately addresses the impacts and avoids impacts to the critical area associated with the project.
- B. If the proposed project is within, adjacent to, or is likely to impact a critical area, the [city/county] shall:
 1. Require a critical area report from the applicant that has been prepared by a qualified professional;
 2. Review and evaluate the critical area report;
 3. Determine whether the development proposal conforms to the purposes and performance standards of this Title, including the criteria in *Review Criteria* [Section X.10.280];

⁸ More information on commercial and residential use of chemicals can be found in the Washington State Department of Ecology's *Guidance Document for Establishment of Critical Aquifer Recharge Areas Ordinances*, Version 3.0, Publication #97-30; and from the Washington State Department of Agriculture, <http://agr/wa.gov>.

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4. Assess the potential impacts to the critical area and determine if they can be avoided or minimized; and
5. Determine if any mitigation proposed by the applicant is sufficient to protect the functions and values of the critical area and public health, safety, and welfare concerns consistent with the goals, purposes, objectives, and requirements of this Title.

Local jurisdictions are encouraged to provide applicants with a pre-application opportunity so that property owners and developers can determine whether critical area regulations might apply before extensive plans and engineering information are prepared.

The critical area identification form is a tool to be used by the applicant to assist him or her in identifying areas of potential critical areas near the project area. Similar in some ways to a SEPA checklist, the critical area identification form should be straightforward. It asks questions that individual property owners can answer without the help of a scientist or professional consultant (although the jurisdiction may need to provide information to the applicant, such as critical area maps). The questions on the project checklist should be tailored to the local environment and may be consolidated with the SEPA environmental checklist. An outline of potential project checklist questions is included in Appendix F.

X.10.180 Critical Area Preapplication Consultation. Any person preparing to submit an application for development or use of land that may be regulated by the provisions of this Title shall conduct a consultation meeting with the [director] prior to submitting an application for development or other approval. At this meeting, the [director] shall discuss the requirements of this Title; provide critical area maps, scientific information, and other source materials; outline the review process; and work with the activity proponent to identify any potential concerns that might arise during the review process, in addition to discussing other permit procedures and requirements.

X.10.190 Critical Area Identification Form

A. **Submittal.** Prior to the [city/county]'s consideration of any proposed activity not found to be exempt under *Exemptions* [Section X.10.130] or allowed pursuant to *Allowed Activities* [Section X.10.160], the applicant shall submit to the department a complete critical area identification form on forms provided by the [city/county].

B. **Site Inspection.** Upon receipt of a project application and a critical area identification form, the [director] shall conduct a site inspection to review critical area conditions on site. The [director] shall notify the property owner of the inspection prior to the site visit. Reasonable access to the site shall be provided by the property owner for the purpose of inspections during any proposal review, restoration, emergency action, or monitoring period.

C. **Critical Area Identification Form Review Process.** The [director or his/her designee] shall review the critical area identification form, conduct a site inspection, and review other information available pertaining to the site and the proposal and make a determination as to whether any critical areas may be affected by the proposal and if a more detailed critical area report shall be submitted.

1. **Decision Indicators.** The [director] may use the following indicators to assist in determining the need for a critical area report:
 - a. Indication of a critical area on the [city/county] critical areas maps that may be impacted by the proposed activity;
 - b. Information and scientific opinions from appropriate agencies, including but not limited to the departments of Fish and Wildlife, Natural Resources, and Ecology;
 - c. Documentation, from a scientific or other reasonable source, of the possible presence of a critical area; or

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- d. A finding by a qualified professional or a reasonable belief by the [director] that a critical area may exist on or adjacent to the site of the proposed activity.

D. Decision on Identification Form

1. **No Critical Areas Present.** If after a site visit the [director]'s analysis indicates that the project area is not within or adjacent to a critical area or buffer and that the proposed activity is unlikely to degrade the functions or values of a critical area, then the [director] shall rule that the critical area review is complete and note on the identification form the reasons that no further review is required. A summary of this information shall be included in any staff report or decision on the underlying permit.
2. **Critical Areas Present, But No Impact – Waiver.** If the [director] determines that there are critical areas within or adjacent to the project area, but that the best available science shows that the proposed activity is unlikely to degrade the functions or values of the critical area, the [director] may waive the requirement for a critical area report. A waiver may be granted if there is substantial evidence that all of the following requirements will be met:
 - a. There will be no alteration of the critical area or buffer;
 - b. The development proposal will not impact the critical area in a manner contrary to the purpose, intent, and requirements of this Title; and
 - c. The proposal is consistent with other applicable regulations and standards.

A summary of this analysis and the findings shall be included in any staff report or decision on the underlying permit.

3. **Critical Areas May Be Affected by Proposal.** If the [director] determines that a critical area or areas may be affected by the proposal, then the [director] shall notify the applicant that a critical area report must be submitted prior to further review of the project, and indicate each of the critical area types that should be addressed in the report.

E. [Director]'s Determination Subject to Reconsideration. A determination regarding the apparent absence of one or more critical areas by the [director] is not an expert certification regarding the presence of critical areas and the determination is subject to possible reconsideration and reopening if new information is received.

If the applicant wants greater assurance of the accuracy of the critical area review determination, the applicant may choose to hire a qualified professional to provide such assurances.

During project review, a city/county may determine that some or all of the potential environmental impacts of the project have been addressed by its development regulations, comprehensive plan, or other applicable local, state, or federal laws or rules. (See RCW 43.21C.240 and WAC 197-11-158.)

The city/county may make this consistency determination during the course of environmental review and preparation of a SEPA threshold determination (including initial consistency review), if the impacts have been adequately addressed in the applicable regulations (see WAC 365-197-030, Integrated Project Review).

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The notice of application code section of the jurisdiction's land use code should also be updated to include a requirement that critical area reviews, when required, are listed on the notice of application.

It is recommended that the jurisdiction determine if a report is required, and insist on submittal of the report, if needed, prior to determining an application complete and issuing the notice of application. The public may be a valuable source for verifying the presence or absence of critical areas.

A critical area report is required to include the documentation and address the relevant issues required in the applicable critical area chapter in addition to providing the contents listed here, in Section X.10.210(C). For example, a critical area report for a wetland should include all the information listed here and all the information listed in Section X.20.030 "Critical Area Report – Additional Report Requirements for Wetlands."

X.10.200 Public Notice of Initial Determination. The [city/county] shall notify the public of proposals in accordance with [notice of application section of the local land use code].

A. If the [director] determines that no critical area report is necessary, the [city/county] shall state the reasons for this determination in the notice of application issued by the [city/county] for the proposal.

B. If the [director] determines that there are critical areas on the site that the proposed project is unlikely to impact and the project meets the requirements for and has been granted a waiver from the requirement to complete a critical area report, a summary of the analysis and findings for this decision shall be stated in the notice of application for the proposal.

C. If the [director] determines that critical areas may be affected by the proposal and a critical area report is required, public notice of the application shall include a description of the critical area that might be affected and state that a critical area report(s) is required.

CRITICAL AREA REPORT

X.10.210 Critical Area Report – Requirements

A. **Preparation by Qualified Professional.** If required by the [director] in accordance with [Section X.10.190(D)(3)], the applicant shall submit a critical area report prepared by a qualified professional as defined herein.

B. **Incorporating of Best Available Science.** The critical area report shall use scientifically valid methods and studies in the analysis of critical area data and field reconnaissance and reference the source of science used. The critical area report shall evaluate the proposal and all probable impacts to critical areas in accordance with the provisions of this Title.

C. **Minimum Report Contents.** At a minimum, the report shall contain the following:

1. The name and contact information of the applicant, a description of the proposal, and identification of the permit requested;
2. A copy of the site plan for the development proposal including:
 - a. A map to scale depicting critical areas, buffers, the development proposal, and any areas to be cleared; and
 - b. A description of the proposed stormwater management plan for the development and consideration of impacts to drainage alterations.
3. The dates, names, and qualifications of the persons preparing the report and documentation of any fieldwork performed on the site;

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4. Identification and characterization of all critical areas, wetlands, water bodies, and buffers adjacent to the proposed project area;
5. A statement specifying the accuracy of the report, and all assumptions made and relied upon;
6. An assessment of the probable cumulative impacts to critical areas resulting from development of the site and the proposed development;
7. An analysis of site development alternatives including a no development alternative;
8. A description of reasonable efforts made to apply mitigation sequencing pursuant to *Mitigation Sequencing* [Section X.10.240] to avoid, minimize, and mitigate impacts to critical areas;
9. Plans for adequate mitigation, as needed, to offset any impacts, in accordance with *Mitigation Plan Requirements* [Section X.10.250], including, but not limited to:
 - a. The impacts of any proposed development within or adjacent to a critical area or buffer on the critical area; and
 - b. The impacts of any proposed alteration of a critical area or buffer on the development proposal, other properties and the environment;
10. A discussion of the performance standards applicable to the critical area and proposed activity;
11. Financial guarantees to ensure compliance; and
12. Any additional information required for the critical area as specified in the corresponding chapter.

D. Unless otherwise provided, a critical area report may be supplemented by or composed, in whole or in part, of any reports or studies required by other laws and regulations or previously prepared for and applicable to the development proposal site, as approved by the [director].

A financial guarantee, such as a performance bond or deposit, should be required to ensure implementation of any mitigation that might be necessary to offset impacts to critical areas.

X.10.220 Critical Area Report – Modifications to Requirements

A. **Limitations to Study Area.** The [director] may limit the required geographic area of the critical area report as appropriate if:

1. The applicant, with assistance from the [city/county], cannot obtain permission to access properties adjacent to the project area; or
2. The proposed activity will affect only a limited part of the subject site.

B. **Modifications to Required Contents.** The applicant may consult with the [director] prior to or during preparation of the critical area report to obtain

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[city/county] approval of modifications to the required contents of the report where, in the judgment of a qualified professional, more or less information is required to adequately address the potential critical area impacts and required mitigation.

C. **Additional Information Requirements.** The [director] may require additional information to be included in the critical area report when determined to be necessary to the review of the proposed activity in accordance with this Title. Additional information that may be required, includes, but is not limited to:

1. Historical data, including original and subsequent mapping, aerial photographs, data compilations and summaries, and available reports and records relating to the site or past operations at the site;
2. Grading and drainage plans; and
3. Information specific to the type, location, and nature of the critical area.

X.10.230 Mitigation Requirements

A. The applicant shall avoid all impacts that degrade the functions and values of a critical area or areas. Unless otherwise provided in this Title, if alteration to the critical area is unavoidable, all adverse impacts to or from critical areas and buffers resulting from a development proposal or alteration shall be mitigated using the best available science in accordance with an approved critical area report and SEPA documents, so as to result in no net loss of critical area functions and values.

B. Mitigation shall be in-kind and on-site, when possible, and sufficient to maintain the functions and values of the critical area, and to prevent risk from a hazard posed by a critical area.

C. Mitigation shall not be implemented until after [city/county] approval of a critical area report that includes a mitigation plan, and mitigation shall be in accordance with the provisions of the approved critical area report.

X.10.240 Mitigation Sequencing. Applicants shall demonstrate that all reasonable efforts have been examined with the intent to avoid and minimize impacts to critical areas. When an alteration to a critical area is proposed, such alteration shall be avoided, minimized, or compensated for in the following sequential order of preference:

A. Avoiding the impact altogether by not taking a certain action or parts of an action;

B. Minimizing impacts by limiting the degree or magnitude of the action and its implementation, by using appropriate technology, or by taking affirmative steps, such as project redesign, relocation, or timing, to avoid or reduce impacts;

C. Rectifying the impact to wetlands, critical aquifer recharge areas, frequently flooded areas, and habitat conservation areas by repairing, rehabilitating,

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or restoring the affected environment to the historical conditions or the conditions existing at the time of the initiation of the project;

D. Minimizing or eliminating the hazard by restoring or stabilizing the hazard area through engineered or other methods;

E. Reducing or eliminating the impact or hazard over time by preservation and maintenance operations during the life of the action;

F. Compensating for the impact to wetlands, critical aquifer recharge areas, frequently flooded areas, and habitat conservation areas by replacing, enhancing, or providing substitute resources or environments; and

G. Monitoring the hazard or other required mitigation and taking remedial action when necessary.

Mitigation for individual actions may include a combination of the above measures.

X.10.250 Mitigation Plan Requirements. When mitigation is required, the applicant shall submit for approval by [city/county] a mitigation plan as part of the critical area report. The mitigation plan shall include:

A. **Environmental Goals and Objectives.** The mitigation plan shall include a written report identifying environmental goals and objectives of the compensation proposed and including:

1. A description of the anticipated impacts to the critical areas and the mitigating actions proposed and the purposes of the compensation measures, including the site selection criteria; identification of compensation goals; identification of resource functions; and dates for beginning and completion of site compensation construction activities. The goals and objectives shall be related to the functions and values of the impacted critical area;
2. A review of the best available science supporting the proposed mitigation and a description of the report author's experience to date in restoring or creating the type of critical area proposed; and
3. An analysis of the likelihood of success of the compensation project.

B. **Performance Standards.** The mitigation plan shall include measurable specific criteria for evaluating whether or not the goals and objectives of the mitigation project have been successfully attained and whether or not the requirements of this Title have been met.

C. **Detailed Construction Plans.** The mitigation plan shall include written specifications and descriptions of the mitigation proposed, such as:

1. The proposed construction sequence, timing, and duration;

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2. Grading and excavation details;
3. Erosion and sediment control features;
4. A planting plan specifying plant species, quantities, locations, size, spacing, and density; and
5. Measures to protect and maintain plants until established.

These written specifications shall be accompanied by detailed site diagrams, scaled cross-sectional drawings, topographic maps showing slope percentage and final grade elevations, and any other drawings appropriate to show construction techniques or anticipated final outcome.

D. Monitoring Program. The mitigation plan shall include a program for monitoring construction of the compensation project and for assessing a completed project. A protocol shall be included outlining the schedule for site monitoring (for example, monitoring shall occur in years 1, 3, 5, and 7 after site construction), and how the monitoring data will be evaluated to determine if the performance standards are being met. A monitoring report shall be submitted as needed to document milestones, successes, problems, and contingency actions of the compensation project. The compensation project shall be monitored for a period necessary to establish that performance standards have been met, but not for a period less than five (5) years.

E. Contingency Plan. The mitigation plan shall include identification of potential courses of action, and any corrective measures to be taken if monitoring or evaluation indicates project performance standards are not being met.

F. Financial Guarantees. The mitigation plan shall include financial guarantees, if necessary, to ensure that the mitigation plan is fully implemented. Financial guarantees ensuring fulfillment of the compensation project, monitoring program, and any contingency measures shall be posted in accordance with *Bonds to Ensure Mitigation, Maintenance, and Monitoring* [Section X.10.400].

X.10.260 Innovative Mitigation

A. The [city/county] may encourage, facilitate, and approve innovative mitigation projects that are based on the best available science. Advance mitigation or mitigation banking are examples of alternative mitigation projects allowed under the provisions of this Section wherein one or more applicants, or an organization with demonstrated capability, may undertake a mitigation project together if it is demonstrated that all of the following circumstances exist:

1. Creation or enhancement of a larger system of critical areas and open space is preferable to the preservation of many individual habitat areas;
2. The group demonstrates the organizational and fiscal capability to act cooperatively;
3. The group demonstrates that long-term management of the habitat area will be provided; and

This innovative mitigation section is one example of including allowances for innovative practices within critical areas regulations.

Also, keep in mind that new concepts for innovative mitigation, such as habitat banking, are being developed and may be appropriate to include at a later date.

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4. There is a clear potential for success of the proposed mitigation at the identified mitigation site.

B. Conducting mitigation as part of a cooperative process does not reduce or eliminate the required replacement ratios.

DETERMINATION PROCESS

When evaluating environmental conditions, jurisdictions use a slightly different review process. Often, environmental regulations are applied concurrent with permit review. Here, a “determination” process instructs the director to issue a “notice of determination” (similar to issuing a SEPA threshold determination). By issuing a notice of determination, the critical area review process and decision is well documented, although the decision could also be adequately documented in the staff report for the permit. Another option, used by some jurisdictions, is to require a critical areas permit that must be obtained for applicable projects.

X.10.270 Determination

The [director] shall make a determination as to whether the proposed activity and mitigation, if any, is consistent with the provisions of this Title. The [director]’s determination shall be based on the criteria of *Review Criteria* [Section X.10.280].

X.10.280 Review Criteria

A. Any alteration to a critical area, unless otherwise provided for in this Title, shall be reviewed and approved, approved with conditions, or denied based on the proposal’s ability to comply with all of the following criteria:

1. The proposal minimizes the impact on critical areas in accordance with *Mitigation Sequencing* [Section X.10.240];
2. The proposal does not pose an unreasonable threat to the public health, safety, or welfare on or off the development proposal site;
3. The proposal is consistent with the general purposes of this Title and the public interest;
4. Any alterations permitted to the critical area are mitigated in accordance with *Mitigation Requirements* [Section X.10.230];
5. The proposal protects the critical area functions and values consistent with the best available science and results in no net loss of critical area functions and values; and
6. The proposal is consistent with other applicable regulations and standards.

B. The [city/county] may condition the proposed activity as necessary to mitigate impacts to critical areas and to conform to the standards required by this Title.

While the determination section speaks of a “notice of determination” document that could be written for review of each project, in implementation it is likely that the determination would become incorporated into the staff report required for a permit – as environmentally sensitive area issues are commonly addressed in staff reports – or the determination could be completed on a pre-produced form that requires the director to sign and check “favorable” or “unfavorable.”

The “determination” should be included in the notice of application, if one is required under RCW 36.70B.110 and local regulations, and in any environmental determinations issued under SEPA (i.e., in the threshold determination and an environmental impact statement, if required).

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C. Except as provided for by this Title, any project that cannot adequately mitigate its impacts to critical areas in the sequencing order of preferences in Section X.10.240 shall be denied.

X.10.290 Favorable Determination

If the [director] determines that the proposed activity meets the criteria in *Review Criteria* [Section X.10.280] and complies with the applicable provisions of this Title, the [director] shall prepare a written notice of determination and identify any required conditions of approval. The notice of determination and conditions of approval shall be included in the project file and be considered in the next phase of the [city/county]'s review of the proposed activity in accordance with any other applicable codes or regulations.

Any conditions of approval included in a notice of determination shall be attached to the underlying permit or approval. Any subsequent changes to the conditions of approval shall void the previous determination pending re-review of the proposal and conditions of approval by the [director].

A favorable determination should not be construed as endorsement or approval of any underlying permit or approval.

X.10.300 Unfavorable Determination

If the [director] determines that a proposed activity does not adequately mitigate its impacts on the critical areas and/or does not comply with the criteria in *Review Criteria* [Section X.10.280] and the provisions of this Title, the [director] shall prepare written notice of the determination that includes findings of noncompliance.

No proposed activity or permit shall be approved or issued if it is determined that the proposed activity does not adequately mitigate its impacts on the critical areas and/or does not comply with the provisions of this Title.

Following notice of determination that the proposed activity does not meet the review criteria and/or does not comply with the applicable provisions of this Title, the applicant may request consideration of a revised critical area report. If the revision is found to be substantial and relevant to the critical area review, the [director] may reopen the critical area review and make a new determination based on the revised report.

X.10.310 Completion of the Critical Area Review

The [city/county]'s determination regarding critical areas pursuant to this Title shall be final concurrent with the final decision to approve, condition, or deny the development proposal or other activity involved.

X.10.320 Appeals

Any decision to approve, condition, or deny a development proposal or other activity based on the requirements of this Title may be appealed according to, and as part of, the appeal procedure for the permit or approval involved.

Jurisdictions may want to reference the vesting of critical areas review decisions to locally adopted vesting policies.

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VARIANCES

X.10.330 Variances

A. Variances from the standards of this Title may be authorized by the [city/county] in accordance with the procedures set forth in the [locally adopted zoning variance section] of the [city/county] code. The [hearing body] shall review the request and make a written finding that the request meets or fails to meet the variance criteria.

B. **Variance Criteria.** A variance may be granted only if the applicant demonstrates that the requested action conforms to all of the criteria set forth as follows:

1. Special conditions and circumstances exist that are peculiar to the land, the lot, or something inherent in the land, and that are not applicable to other lands in the same district;
2. The special conditions and circumstances do not result from the actions of the applicant;
3. A literal interpretation of the provisions of this Title would deprive the applicant of all reasonable economic uses and privileges permitted to other properties in the vicinity and zone of the subject property under the terms of this Title, and the variance requested is the minimum necessary to provide the applicant with such rights;
4. Granting the variance requested will not confer on the applicant any special privilege that is denied by this Title to other lands, structures, or buildings under similar circumstances;
5. The granting of the variance is consistent with the general purpose and intent of this Title, and will not further degrade the functions or values of the associated critical areas or otherwise be materially detrimental to the public welfare or injurious to the property or improvements in the vicinity of the subject property;
6. The decision to grant the variance includes the best available science and gives special consideration to conservation or protection measures necessary to preserve or enhance anadromous fish habitat; and
7. The granting of the variance is consistent with the general purpose and intent of the [locally adopted city/county comprehensive plan] and adopted development regulations.

C. **Conditions May Be Required.** In granting any variance, the [city/county] may prescribe such conditions and safeguards as are necessary to secure adequate protection of critical areas from adverse impacts, and to ensure conformity with this Title.

D. **Time Limit.** The [city/county] shall prescribe a time limit within which the action for which the variance is required shall be begun, completed, or both.

Variances from the critical areas regulations should be subject to public review through a public hearing and notice process. If existing land use variance regulations do not require a public hearing, it is recommended that such sections be revised to require a public hearing for variances concerning critical areas.

Proposals needing variances from critical areas regulations should be subject to notice and public hearing requirements consistent with the requirements and limitations in Chapter 36.70B RCW. Notices and hearings for a project should be consolidated and integrated with the environmental and permit review process.

Time limits for variances should generally be consistent with other adopted time limits, such as those for preliminary plats.

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Failure to begin or complete such action within the established time limit shall void the variance.

E. **Burden of Proof.** The burden of proof shall be on the applicant to bring forth evidence in support of the application and upon which any decision has to be made on the application.

UNAUTHORIZED ALTERATIONS AND ENFORCEMENT

X.10.340 Unauthorized Critical Area Alterations and Enforcement

A. When a critical area or its buffer has been altered in violation of this Title, all ongoing development work shall stop and the critical area shall be restored. The [city/county] 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 this Title.

B. **Requirement for Restoration Plan.** All development work shall remain stopped until a restoration plan is prepared and approved by [city/county]. Such a plan shall be prepared by a qualified professional using the best available science and shall describe how the actions proposed meet the minimum requirements described in Subsection (C). The [director] shall, at the violator's expense, seek expert 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

1. For alterations to critical aquifer recharge areas, frequently flooded areas, wetlands, and habitat conservation areas, the following minimum performance standards shall be met for the restoration of a critical area, provided that if the violator can demonstrate that greater functional and habitat values can be obtained, these standards may be modified:
 - a. The historic structural and functional values shall be restored, including water quality and habitat functions;
 - b. The historic soil types and configuration shall be replicated;
 - c. The critical area 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; and
 - d. Information demonstrating compliance with the requirements in Section X.10.250 (*Mitigation Plan Requirements*) shall be submitted to the [director].
2. For alterations to flood and geological hazards, the following minimum performance standards shall be met for the restoration of a

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critical area, provided that, if the violator can demonstrate that greater safety can be obtained, these standards may be modified:

- a. The hazard shall be reduced to a level equal to, or less than, the pre-development hazard;
- b. Any risk of personal injury resulting from the alteration shall be eliminated or minimized; and
- c. The hazard area and buffers shall be replanted with native vegetation sufficient to minimize the hazard.

D. Site Investigations. The [director] is authorized to make site inspections and take such actions as are necessary to enforce this Title. The [director] shall present proper credentials and make a reasonable effort to contact any property owner before entering onto private property.

E. Penalties. Any person, party, firm, corporation, or other legal entity convicted of violating any of the provisions of this Title shall be guilty of a misdemeanor. Each day or portion of a day during which a violation of this Title is committed or continued shall constitute a separate offense. Any development carried out contrary to the provisions of this Title shall constitute a public nuisance and may be enjoined as provided by the statutes of the state of Washington. The [city/county] may levy civil penalties against any person, party, firm, corporation, or other legal entity for violation of any of the provisions of this Title. The civil penalty shall be assessed at a maximum rate of _____ dollars per day per violation.

The amount of the penalty needs to be decided locally and should be consistent with other adopted civil penalties. Commonly, the penalty is \$1,000 per day per violation.

GENERAL CRITICAL AREA PROTECTIVE MEASURES

X.10.350 Critical Area Markers and Signs

A. The boundary at the outer edge of critical area tracts and easements shall be delineated with permanent survey stakes, using iron or concrete markers as established by local survey standards.

B. The boundary at the outer edge of the critical area or buffer shall be identified with temporary signs prior to any site alteration. Such temporary signs shall be replaced with permanent signs prior to occupancy or use of the site.

C. These provisions may be modified by the [director] as necessary to ensure protection of sensitive features or wildlife needs.

Some jurisdictions may prefer to have critical areas marked with posts rather than signs. Posts are an alternative that retain the function of marking the edge of the critical area or buffer, giving staff and property owners the ability to identify the edge of allowed development activities.

X.10.360 Notice on Title

A. In order to inform subsequent purchasers of real property of the existence of critical areas, the owner of any property containing a critical area or buffer on which a development proposal is submitted shall file a notice with the county records and elections division according to the direction of the [city/county]. The notice shall state the presence of the critical area or buffer on the property, the application of this Title to the property, and the fact that limitations on actions in or affecting the critical area or buffer may exist. The notice shall “run with the land.”

Jurisdictions may want to provide, either in the code section or in a guidance document outside of the code, specific language indicating what should be stated on the title notice.

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B. This notice on title shall not be required for a development proposal by a public agency or public or private utility:

1. Within a recorded easement or right-of-way;
2. Where the agency or utility has been adjudicated the right to an easement or right-of-way; or
3. On the site of a permanent public facility.

C. The applicant shall submit proof that the notice has been filed for public record before the [city/county] approves any site development or construction for the property or, in the case of subdivisions, short subdivisions, planned unit developments, and binding site plans, at or before recording.

X.10.370 Native Growth Protection Areas

A. Unless otherwise required in this Title, native growth protection areas shall be used in development proposals for subdivisions, short subdivisions, planned unit developments, and binding site plans to delineate and protect those contiguous critical areas and buffers listed below:

1. All landslide hazard areas and buffers;
2. All wetlands and buffers;
3. All habitat conservation areas; and
4. All other lands to be protected from alterations as conditioned by project approval.

B. Native growth protection areas shall be recorded on all documents of title of record for all affected lots.

C. Native growth protection areas shall be designated on the face of the plat or recorded drawing in a format approved by the [city/county attorney]. The designation shall include the following restrictions:

1. An assurance that native vegetation will be preserved for the purpose of preventing harm to property and the environment, including, but not limited to, controlling surface water runoff and erosion, maintaining slope stability, buffering, and protecting plants, fish, and animal habitat; and
2. The right of the [city/county] to enforce the terms of the restriction.

X.10.380 Critical Area Tracts

A. Critical area tracts shall be used in development proposals for subdivisions, short subdivisions, planned unit developments, and binding site plans to delineate and protect those contiguous critical areas and buffers listed below that total [five thousand (5,000)] or more square feet:

Critical areas may be protected by requiring protection areas, easements, tracts, or other methods of segregating land. Relatively small and isolated critical areas might be best protected in a recorded easement, such as a native growth protection area. It may be appropriate to require larger or more significant critical areas, such as riparian areas, to be set aside in tracts that are dedicated to the jurisdiction. One or both of the sections shown here or another method may be used. Jurisdictions may wish to evaluate their density requirements and consider possible opportunities for density bonuses to make protective easements more attractive to developers.

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1. All landslide hazard areas and buffers;
2. All wetlands and buffers;
3. All habitat conservation areas; and
4. All other lands to be protected from alterations as conditioned by project approval.

B. Critical area tracts shall be recorded on all documents of title of record for all affected lots.

C. Critical area tracts shall be designated on the face of the plat or recorded drawing in a format approved by the [city/county attorney]. The designation shall include the following restriction:

1. An assurance that native vegetation will be preserved for the purpose of preventing harm to property and the environment, including, but not limited to, controlling surface water runoff and erosion, maintaining slope stability, buffering, and protecting plants, fish, and animal habitat; and
2. The right of the [city/county] to enforce the terms of the restriction.

D. The [city/county] may require that any required critical area tract be dedicated to the [city/county], held in an undivided interest by each owner of a building lot within the development with the ownership interest passing with the ownership of the lot, or held by an incorporated homeowner's association or other legal entity (such as a land trust, which ensures the ownership, maintenance, and protection of the tract).

X.10.390 Building Setbacks. Unless otherwise provided, buildings and other structures shall be set back a distance of fifteen (15) feet from the edges of all critical area buffers or from the edges of all critical areas, if no buffers are required.⁹ The following may be allowed in the building setback area:

- A. Landscaping;
- B. Uncovered decks;

⁹ Primary protection of the critical area should be accomplished through the designation of a sufficiently wide buffer area based on science and site specific conditions, not by adhering to the building setback shown here. The building setback distance is intended to provide adequate room for construction, use, and access without infringing upon the critical area or buffer. Fifteen (15) feet is a commonly required setback distance from critical areas and buffers; a larger setback may be appropriate in some instances. Jurisdictions should consider revisions to their land use codes so that typical setbacks are measured from the critical area or buffer. For example, if a residential zone requires thirty-foot (30) rear yards, that setback should generally be measured from the critical area buffer.

Each jurisdiction should establish the relationship between setbacks and critical areas so that it is clear how close one can build adjacent to a critical area or buffer. The setback from the critical area should allow enough space for construction and use of the buildable area without impact to the critical area or buffer.

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C. Building overhangs, if such overhangs do not extend more than eighteen (18) inches into the setback area; and

D. Impervious ground surfaces, such as driveways and patios, provided that such improvements may be subject to water quality regulations as adopted in the [*locally adopted stormwater management regulations*].

X.10.400 Bonds to Ensure Mitigation, Maintenance, and Monitoring

A. When mitigation required pursuant to a development proposal is not completed prior to the [city/county] final permit approval, such as final plat approval or final building inspection, the [city/county] shall require the applicant to post a performance bond or other security in a form and amount deemed acceptable by the [city/county]. If the development proposal is subject to mitigation, the applicant shall post a mitigation bond or other security in a form and amount deemed acceptable by the [city/county] to ensure mitigation is fully functional.

B. The bond shall be in the amount of one hundred and twenty-five percent (125%) of the estimated cost of the uncompleted actions or the estimated cost of restoring the functions and values of the critical area that are at risk, whichever is greater.

C. The bond shall be in the form of a surety bond, performance bond, assignment of savings account, or an irrevocable letter of credit guaranteed by an acceptable financial institution with terms and conditions acceptable to the [city/county] attorney.

D. Bonds or other security authorized by this Section shall remain in effect until the [city/county] determines, in writing, that the standards bonded for have been met. Bonds or other security shall be held by the [city/county] for a minimum of five (5) years to ensure that the required mitigation has been fully implemented and demonstrated to function, and may be held for longer periods when necessary.

E. Depletion, failure, or collection of bond funds shall not discharge the obligation of an applicant or violator to complete required mitigation, maintenance, monitoring, or restoration.

F. Public development proposals shall be relieved from having to comply with the bonding requirements of this Section if public funds have previously been committed for mitigation, maintenance, monitoring, or restoration.

G. Any failure to satisfy critical area requirements established by law or condition including, but not limited to, the failure to provide a monitoring report within thirty (30) days after it is due or comply with other provisions of an approved mitigation plan shall constitute a default, and the [city/county] may demand payment of any financial guarantees or require other action authorized by the [city/county] code or any other law.

H. Any funds recovered pursuant to this Section shall be used to complete the required mitigation.

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X.10.410 Critical Area Inspections. Reasonable access to the site shall be provided to the [city/county], state, and federal agency review staff for the purpose of inspections during any proposal review, restoration, emergency action, or monitoring period.

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Sample Chapter XX.20 Wetlands, pages A-35 through A-50, not included in this Attachment. See CAO Update Staff Report Attachment C from June 4, 2015, Planning Commission meeting for sample wetlands code.

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Critical Aquifer Recharge Areas

Chapter X.30 Critical Aquifer Recharge Areas

Designation, Rating, and Mapping

X.30.010 Critical Aquifer Recharge Areas Designation

X.30.020 Aquifer Recharge Area Susceptibility Ratings

X.30.030 Mapping of Critical Aquifer Recharge Areas

Allowed Activities – Critical Aquifer Recharge Areas

X.30.040 Activities Allowed in Critical Aquifer Recharge Areas

Additional Report Requirements – Critical Aquifer Recharge Areas

X.30.050 Critical Area Report – Additional Requirements for Critical Aquifer Recharge Areas

Performance Standards – Critical Aquifer Recharge Areas

X.30.060 Performance Standards – General Requirements

X.30.070 Performance Standards – Specific Uses

Prohibited Uses

X.30.080 Uses Prohibited From Critical Aquifer Recharge Areas

DESIGNATION, RATING, and MAPPING

X.30.010 Critical Aquifer Recharge Areas Designation.¹⁶ Critical aquifer recharge areas (CARAs) are those areas with a critical recharging effect on aquifers used for potable water as defined by WAC 365-190-030(2). CARAs have prevailing geologic conditions associated with infiltration rates that create a high potential for contamination of ground water resources or contribute significantly to the replenishment of ground water. These areas include the following:

A. **Wellhead Protection Areas.**¹⁷ Wellhead protection areas may be defined by the boundaries of the ten (10) year time of ground water travel or boundaries established using alternate criteria approved by the Washington State Department of Health in those settings where ground water time of travel is not a reasonable delineation criterion, in accordance with WAC 246-290-135.

B. **Sole Source Aquifers.**¹⁸ Sole source aquifers are areas that have been designated by the U.S. Environmental Protection Agency pursuant to the Federal Safe Water Drinking Act.

¹⁶ See WAC 365-190-080(2).

¹⁷ See WAC 365-190-080(2)(d)(iii).

¹⁸ See WAC 365-190-080(2)(d)(i).

Protection of ground water quality and quantity cannot be separated. Impact to one will cause impact to the other. Therefore, when local governments develop regulations for critical aquifer recharge areas (CARAs), they should attempt to incorporate water quantity protection concepts from Chapter 90.44 RCW (Regulation of Public Ground Waters), with the water quality protection provisions from Chapter 90.48 RCW (Water Pollution Control Act), Chapter 90.54 RCW (Water Resources Act of 1971), Chapter 173-200 WAC (Ground Water Quality Standards), and Washington state's anti-degradation policy.

Guidance Document for the Establishment of Critical Aquifer Recharge Area Ordinances, published by the state Department of Ecology, provides methodology for determining susceptibility based on soil permeability, geologic matrix, infiltration, and depth to water.

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C. **Susceptible Ground Water Management Areas.** Susceptible ground water management areas are areas that have been designated as moderately or highly vulnerable or susceptible in an adopted ground water management program developed pursuant to WAC 173-100.

D. **Special Protection Areas.**¹⁹ Special protection areas are those areas defined by WAC 173-200-090.

E. **Moderately or Highly Vulnerable Aquifer Recharge Areas.** Aquifer recharge areas that are moderately or highly vulnerable to degradation or depletion because of hydrogeologic characteristics are those areas delineated by a hydrogeologic study prepared in accordance with the state Department of Ecology guidelines.

F. **Moderately or Highly Susceptible Aquifer Recharge Areas.** Aquifer recharge areas moderately or highly susceptible to degradation or depletion because of hydrogeologic characteristics are those areas meeting the criteria established by the state Department of Ecology.

X.30.020 Aquifer Recharge Area Susceptibility Ratings. Aquifer recharge areas shall be rated as having high, moderate, or low susceptibility based on soil permeability, geologic matrix, infiltration, and depth to water as determined by the criteria established by the state Department of Ecology.

X.30.030 Mapping of Critical Aquifer Recharge Areas

A. The approximate location and extent of critical aquifer recharge areas are shown on the adopted critical areas maps.

B. These maps are to be used as a guide for the [city/county], project applicants, and/or property owners and may be continuously updated as new critical areas are identified. They are a reference and do not provide a final critical area designation.

Some CARAs may be mapped by the Washington State Department of Health or the local water purveyor. Other CARAs may need to be mapped using soil maps and other information.

ALLOWED ACTIVITIES – CRITICAL AQUIFER RECHARGE AREAS

X.30.040 Activities Allowed in Critical Aquifer Recharge Areas. The following activities are allowed in critical aquifer recharge areas pursuant to *Allowed Activities* [Section X.10.150] and do not require submission of a critical area report:

A. Construction of structures and improvements, including additions, resulting in less than five percent (5%) or 2,500 square feet (whichever is greater) total site impervious surface area that does not result in a change of use or increase the use of a hazardous substance.²⁰

¹⁹ See WAC 365-190-080(2)(d)(ii).

²⁰ This section is to recognize that some minor developments may be acceptable within a CARA without mitigation. However, while five percent (5%) and 2,500 square feet may generally be acceptable thresholds, each community should consider thresholds that are appropriate based on local conditions and supported by science.

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B. Development and improvement of parks, recreation facilities, open space, or conservation areas resulting in less than five percent (5%) total site impervious surface area that do not increase the use of a hazardous substance.

C. On-site domestic septic systems releasing less than 14,500 gallons of effluent per day and that are limited to a maximum density of one (1) system per one (1) acre.²¹

Jurisdictions may also provide for enhanced septic systems as allowed by the state Department of Ecology, although project review of enhanced septic system may require a higher level of expertise.

ADDITIONAL REPORT REQUIREMENTS – CRITICAL AQUIFER RECHARGE AREAS

X.30.050 Critical Area Report – Additional Requirements for Critical Aquifer Recharge Areas. In addition to the general critical area report requirements of Section X.10.210, critical area reports for critical aquifer recharge areas must meet the requirements of this Section. Critical area reports for two or more types of critical areas must meet the report requirements for each relevant type of critical area.

A. Preparation by a Qualified Professional. An aquifer recharge area critical area report shall be prepared by a qualified professional who is a hydrogeologist, geologist, or engineer, who is licensed in the state of Washington and has experience in preparing hydrogeologic assessments.

B. Hydrogeologic Assessment. For all proposed activities to be located in a critical aquifer recharge area, a critical area report shall contain a level one (1) hydrogeological assessment. A level two (2) hydrogeologic assessment shall be required for any of the following proposed activities:

1. Activities that result in five percent (5%) or more impervious site area;²²
2. Activities that divert, alter, or reduce the flow of surface or ground waters, or otherwise reduce the recharging of the aquifer;
3. The use of hazardous substances, other than household chemicals used according to the directions specified on the packaging for domestic applications;
4. The use of injection wells, including on-site septic systems, except those domestic septic systems releasing less than 14,500 gallons of effluent per day and that are limited to a maximum density of one (1) system per one (1) acre; or

²¹ Maximum density of septic systems is based on *Guidance Document for the Establishment of Critical Aquifer Recharge Area Ordinances*, by the Washington State Department of Ecology, 2000, Publication #97-30.

²² Impervious surface areas may limit the infiltration of surface water, and therefore may limit the recharging of aquifers. A threshold of five percent (5%) is suggested but may vary depending on local soil and ground water conditions.

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5. Any other activity determined by the [director] likely to have an adverse impact on ground water quality or quantity or on the recharge of the aquifer.

C. **Level One Hydrogeologic Assessment.** A level one hydrogeologic assessment shall include the following site- and proposal-related information at a minimum:

1. Available information regarding geologic and hydrogeologic characteristics of the site including the surface location of all critical aquifer recharge areas located on site or immediately adjacent to the site, and permeability of the unsaturated zone;
2. Ground water depth, flow direction, and gradient based on available information;
3. Currently available data on wells and springs within 1,300 feet of the project area;²³
4. Location of other critical areas, including surface waters, within 1,300 feet of the project area;
5. Available historic water quality data for the area to be affected by the proposed activity; and
6. Best management practices proposed to be utilized.

D. **Level Two Hydrogeologic Assessment.** A level two hydrogeologic assessment shall include the following site- and proposal-related information at a minimum, in addition to the requirements for a level one hydrogeological assessment:

1. Historic water quality data for the area to be affected by the proposed activity compiled for at least the previous five (5) year period;
2. Ground water monitoring plan provisions;
3. Discussion of the effects of the proposed project on the ground water quality and quantity, including:
 - a. Predictive evaluation of ground water withdrawal effects on nearby wells and surface water features; and
 - b. Predictive evaluation of contaminant transport based on potential releases to ground water; and

²³ Distance of 1,300 feet is based on *Guidance Document for the Establishment of Critical Aquifer Recharge Area Ordinances*, by the Washington State Department of Ecology, 2000, Publication #97-30.

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4. A spill plan that identifies equipment and/or structures that could fail, resulting in an impact. Spill plans shall include provisions for regular inspection, repair, and replacement of structures and equipment that could fail.

PERFORMANCE STANDARDS – CRITICAL AQUIFER RECHARGE AREAS

X.30.060 Performance Standards – General Requirements

A. Activities may only be permitted in a critical aquifer recharge area if the applicant can show that the proposed activity will not cause contaminants to enter the aquifer and that the proposed activity will not adversely effect the recharging of the aquifer.

B. The proposed activity must comply with the water source protection requirements and recommendations of the U.S. Environmental Protection Agency, Washington State Department of Health, and the [local health district].

C. The proposed activity must be designed and constructed in accordance with the [locally adopted surface water management or water quality regulations].

Jurisdictions in Western Washington should reference stormwater management standards, such as the state Department of Ecology Stormwater Management Manual for Western Washington or the King County Stormwater Management Manual. Jurisdictions in Eastern Washington may reference the new Ecology manual for the area or federal stormwater standards.

X.30.070 Performance Standards – Specific Uses

A. **Storage Tanks.** All storage tanks proposed to be located in a critical aquifer recharge area must comply with local building code requirements and must conform to the following requirements:

1. **Underground Tanks.** All new underground storage facilities proposed for use in the storage of hazardous substances or hazardous wastes shall be designed and constructed so as to:
 - a. Prevent releases due to corrosion or structural failure for the operational life of the tank;
 - b. Be protected against corrosion, constructed of noncorrosive material, steel clad with a noncorrosive material, or designed to include a secondary containment system to prevent the release or threatened release of any stored substances; and
 - c. Use material in the construction or lining of the tank that is compatible with the substance to be stored.
2. **Aboveground Tanks.** All new aboveground storage facilities proposed for use in the storage of hazardous substances or hazardous wastes shall be designed and constructed so as to:
 - a. Not allow the release of a hazardous substance to the ground, ground waters, or surface waters;
 - b. Have a primary containment area enclosing or underlying the tank or part thereof; and

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- c. A secondary containment system either built into the tank structure or a dike system built outside the tank for all tanks.

B. Vehicle Repair and Servicing

1. Vehicle repair and servicing must be conducted over impermeable pads and within a covered structure capable of withstanding normally expected weather conditions. Chemicals used in the process of vehicle repair and servicing must be stored in a manner that protects them from weather and provides containment should leaks occur.
2. No dry wells shall be allowed in critical aquifer recharge areas on sites used for vehicle repair and servicing. Dry wells existing on the site prior to facility establishment must be abandoned using techniques approved by the state Department of Ecology prior to commencement of the proposed activity.

C. **Residential Use of Pesticides and Nutrients.** Application of household pesticides, herbicides, and fertilizers shall not exceed times and rates specified on the packaging.

D. **Use of Reclaimed Water for Surface Percolation or Direct Recharge.** Water reuse projects for reclaimed water must be in accordance with the adopted water or sewer comprehensive plans that have been approved by the state departments of Ecology and Health.

1. Use of reclaimed water for surface percolation must meet the ground water recharge criteria given in Chapter 90.46.080(1) and Chapter 90.46.010(10) RCW. The state Department of Ecology may establish additional discharge limits in accordance with Chapter 90.46.080(2) RCW.
2. Direct injection must be in accordance with the standards developed by authority of Chapter 90.46.042 RCW.

E. **State and Federal Regulations.** The uses listed below shall be conditioned as necessary to protect critical aquifer recharge areas in accordance with the applicable state and federal regulations.

Statutes, Regulations, and Guidance Pertaining to Ground Water Impacting Activities

Activity	Statute – Regulation – Guidance
Above Ground Storage Tanks	Chapter 173-303-640 WAC
Animal Feedlots	Chapter 173-216 WAC, Chapter 173-220 WAC
Automobile Washers	Chapter 173-216 WAC, Best Management Practices for Vehicle and Equipment Discharges (Washington Department of Ecology WQ-R-95-56)
Below Ground Storage Tanks	Chapter 173-360 WAC

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Activity	Statute – Regulation – Guidance
Chemical Treatment Storage and Disposal Facilities	Chapter 173-303-182 WAC
Hazardous Waste Generator (<i>Boat Repair Shops, Biological Research Facility, Dry Cleaners, Furniture Stripping, Motor Vehicle Service Garages, Photographic Processing, Printing and Publishing Shops, etc.</i>)	Chapter 173-303 WAC
Injection Wells	Federal 40 CFR Parts 144 and 146, Chapter 173-218 WAC
Junk Yards and Salvage Yards	Chapter 173-304 WAC, Best Management Practices to Prevent Stormwater Pollution at Vehicles Recycler Facilities (Washington State Department of Ecology 94-146)
Oil and Gas Drilling	Chapter 332-12-450 WAC, Chapter 173-218 WAC
On-Site Sewage Systems (Large Scale)	Chapter 173-240 WAC
On-Site Sewage Systems (< 14,500 gal/day)	Chapter 246-272 WAC, Local Health Ordinances
Pesticide Storage and Use	Chapter 15.54 RCW, Chapter 17.21 RCW
Sawmills	Chapter 173-303 WAC, Chapter 173-304 WAC, Best Management Practices to Prevent Stormwater Pollution at Log Yards (Washington State Department of Ecology, 95-53)
Solid Waste Handling and Recycling Facilities	Chapter 173-304 WAC
Surface Mining	Chapter 332-18-015 WAC
Wastewater Application to Land Surface	Chapter 173-216 WAC, Chapter 173-200 WAC, Washington State Department of Ecology Land Application Guidelines, Best Management Practices for Irrigated Agriculture

PROHIBITED USES

X.30.080 Uses Prohibited From Critical Aquifer Recharge Areas.

The following activities and uses are prohibited in critical aquifer recharge areas:²⁴

A. **Landfills.** Landfills, including hazardous or dangerous waste, municipal solid waste, special waste, woodwaste, and inert and demolition waste landfills;

²⁴ Prohibited uses are based on *Guidance Document for the Establishment of Critical Aquifer Recharge Area Ordinances*, by Washington State Department of Ecology, 2000, Publication #97-30.

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B. Underground Injection Wells. Class I, III, and IV wells and subclasses 5F01, 5D03, 5F04, 5W09, 5W10, 5W11, 5W31, 5X13, 5X14, 5X15, 5W20, 5X28, and 5N24 of Class V wells;

C. Mining

1. Metals and hard rock mining; and
2. Sand and gravel mining, prohibited from critical aquifer recharge areas determined to be highly susceptible or vulnerable;

D. Wood Treatment Facilities. Wood treatment facilities that allow any portion of the treatment process to occur over permeable surfaces (both natural and manmade);

E. Storage, Processing, or Disposal of Radioactive Substances. Facilities that store, process, or dispose of radioactive substances; and

F. Other Prohibited Uses or Activities

1. Activities that would significantly reduce the recharge to aquifers currently or potentially used as a potable water source;
2. Activities that would significantly reduce the recharge to aquifers that are a source of significant baseflow to a regulated stream; and
3. Activities that are not connected to an available sanitary sewer system, prohibited from critical aquifer recharge areas associated with sole source aquifers.

Sample Chapter XX.40 Frequently Flooded Areas, pages A-58 through A-76, not included in this Attachment. No changes proposed to SMC 20.80 Critical Areas, Subchapter 5. Flood Hazard Areas as this section was updated in 2012.

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Geologically Hazardous Areas

Chapter X.50 Geologically Hazardous Areas

Designation, Classification, and Mapping

- X.50.010 Designation of Geologically Hazardous Areas
- X.50.020 Designation of Specific Hazard Areas
- X.50.030 Classification of Geologically Hazardous Areas
- X.50.040 Mapping of Geologically Hazardous Areas

Allowed Activities – Geologically Hazardous Areas

- X.50.050 Activities Allowed in Geologically Hazardous Areas

Critical Areas Report Requirements – Geologically Hazardous Areas

- X.50.060 Critical Area Report – Additional Requirements for Geologically Hazardous Areas
- X.50.070 Critical Area Report – Additional Requirements for Specific Hazards

Performance Standards – Geologically Hazardous Areas

- X.50.080 Performance Standards – General Requirements
- X.50.090 Performance Standards – Specific Hazards

DESIGNATION, CLASSIFICATION, AND MAPPING – GEOLOGICALLY HAZARDOUS AREAS

X.50.010 Designation of Geologically Hazardous Areas.

Geologically hazardous areas include areas susceptible to erosion, sliding, earthquake, or other geological events. They pose a threat to the health and safety of citizens when incompatible development is sited in areas of significant hazard. Such incompatible development may not only place itself at risk, but also may increase the hazard to surrounding development and use. Areas susceptible to one or more of the following types of hazards shall be designated as a geologically hazardous area.³⁷

- A. Erosion hazard;
- B. Landslide hazard;
- C. Seismic hazard;
- D. Mine hazard;
- E. Volcanic hazard; and

³⁷ See WAC 365-190-080(4)(a).

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F. Other geological events including tsunamis, mass wasting, debris flows, rock falls, and differential settlement.

X.50.020 Designation of Specific Hazard Areas

A. **Erosion Hazard Areas.** Erosion hazard areas are at least those areas identified by the U.S. Department of Agriculture's Natural Resources Conservation Service as having a "moderate to severe," "severe," or "very severe" rill and inter-rill erosion hazard.³⁸ Erosion hazard areas are also those areas impacted by shore land and/or stream bank erosion and those areas within a river's channel migration zone.

B. **Landslide Hazard Areas.** Landslide hazard areas are areas potentially subject to landslides based on a combination of geologic, topographic, and hydrologic factors. They include areas susceptible because of any combination of bedrock, soil, slope (gradient), slope aspect, structure, hydrology, or other factors. Example of these may include, but are not limited to the following:

1. Areas of historic failures, such as:³⁹
 - a. Those areas delineated by the U.S. Department of Agriculture's Natural Resources Conservation Service as having a "severe" limitation for building site development;
 - b. Those areas mapped by the Washington State Department of Ecology (*Coastal Zone Atlas*) or the Washington State Department of Natural Resources (slope stability mapping) as unstable (U or class 3), unstable old slides (UOS or class 4), or unstable recent slides (URS or class 5); or
 - c. Areas designated as quaternary slumps, earthflows, mudflows, lahars, or landslides on maps published by the U.S. Geological Survey or Washington State Department of Natural Resources;
2. Areas with all three of the following characteristics:⁴⁰
 - a. Slopes steeper than fifteen percent (15%);
 - b. Hillsides intersecting geologic contacts with a relatively permeable sediment overlying a relatively impermeable sediment or bedrock; and
 - c. Springs or ground water seepage.
3. Areas that have shown movement during the Holocene epoch (from ten thousand years ago to the present) or that are underlain or covered by mass wastage debris of that epoch;⁴¹

³⁸ See WAC 365-190-080(4)(c).

³⁹ See WAC 365-190-080(4)(d)(i).

⁴⁰ See WAC 365-190-080(4)(d)(ii).

⁴¹ See WAC 365-190-080(4)(d)(iii).

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4. Slopes that are parallel or subparallel to planes of weakness (such as bedding planes, joint systems, and fault planes) in subsurface materials;⁴²
5. Slopes having gradients steeper than eighty percent (80%) subject to rock fall during seismic shaking;⁴³
6. Areas potentially unstable because of rapid stream incision, stream bank erosion, and undercutting by wave action;⁴⁴
7. Areas that show evidence of, or are at risk from snow avalanches;⁴⁵
8. Areas located in a canyon or on an active alluvial fan, presently or potentially subject to inundation by debris flows or catastrophic flooding;⁴⁶ and
9. Any area with a slope of forty percent (40%) or steeper and with a vertical relief of ten (10) or more feet except areas composed of consolidated rock. A slope is delineated by establishing its toe and top and is measured by averaging the inclination over at least ten (10) feet of vertical relief.⁴⁷

C. Seismic Hazard Areas. Seismic hazard areas are areas subject to severe risk of damage as a result of earthquake induced ground shaking, slope failure, settlement, soil liquefaction, lateral spreading, or surface faulting. One indicator of potential for future earthquake damage is a record of earthquake damage in the past. Ground shaking is the primary cause of earthquake damage in Washington. The strength of ground shaking is primarily affected by:⁴⁸

1. The magnitude of an earthquake;
2. The distance from the source of an earthquake;
3. The type of thickness of geologic materials at the surface; and
4. The type of subsurface geologic structure.

Settlement and soil liquefaction conditions occur in areas underlain by cohesionless, loose, or soft-saturated soils of low density, typically in association with a shallow ground water table.

D. Mine Hazard Areas. Mine hazard areas are those areas underlain by or affected by mine workings such as adits, gangways, tunnels, drifts, or airshafts, and those areas of probable sink holes, gas releases, or subsidence due to mine

⁴² See WAC 365-190-080(4)(d)(iv).

⁴³ See WAC 365-190-080(4)(d)(v).

⁴⁴ See WAC 365-190-080(4)(d)(vi).

⁴⁵ See WAC 365-190-080(4)(d)(vii).

⁴⁶ See WAC 365-190-080(4)(d)(viii).

⁴⁷ See WAC 365-190-080(4)(d)(ix).

⁴⁸ See WAC 365-190-080(4)(e).

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workings. Factors that should be considered include: proximity to development, depth from ground surface to the mine working, and geologic material.⁴⁹

E. **Volcanic Hazard Areas.** Volcanic hazard areas are areas subject to pyroclastic flows, lava flows, debris avalanche, and inundation by debris flows, lahars, mudflows, or related flooding resulting from volcanic activity.⁵⁰

F. **Tsunami Hazard Areas.** Tsunami hazard areas are coastal areas and large lake shoreline areas susceptible to flooding and inundation as the result of excessive wave action derived from seismic or other geologic events.⁵¹

G. **Other Hazard Areas.** Geologically hazardous areas shall also include areas determined by the [director] to be susceptible to other geological events including mass wasting, debris flows, rock falls, and differential settlement.

WAC 365-190-080 encourages jurisdictions to classify geologically hazardous areas.

X.50.030 Classification of Geologically Hazardous Areas. All geologic hazard areas should be classified according to the following categories for each geologic hazard type.

Classification	Documentation and Data Sources
Known or Suspected Risk	Documentation or projection of the hazard by a qualified professional exists.
Risk Unknown	Documentation or projection of the lack of hazard by a qualified professional exists, or data are not available to determine the presence or absence of a geologic hazard.

X.50.040 Mapping of Geologically Hazardous Areas.

A. The approximate location and extent of geologically hazardous areas are shown on the adopted critical area maps. The adopted critical areas maps include:

1. *Coastal Zone Atlas* (for marine bluff hazards);
2. U.S. Geological Survey landslide hazard, seismic hazard, and volcano hazard maps;
3. Washington State Department of Natural Resources seismic hazard maps for Western Washington;
4. Washington State Department of Natural Resources slope stability maps;
5. National Oceanic and Atmospheric Administration tsunami hazard maps;

⁴⁹ See WAC 365-190-080(4)(f)(ii).

⁵⁰ See WAC 365-190-080(4)(f)(i).

⁵¹ See WAC 365-190-080(3)(d).

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6. Federal Emergency Management Administration flood insurance maps; and
7. Locally adopted maps.

B. These maps are to be used as a guide for the [city/county], project applicants and/or property owners and may be continuously updated as new critical areas are identified. They are a reference and do not provide a final critical area designation.

ALLOWED ACTIVITIES – GEOLOGICALLY HAZARDOUS AREAS

X.50.050 Activities Allowed in Geologically Hazardous Areas. The following activities are allowed in geologically hazardous areas pursuant to *Allowed Activities* [Section X.10.160] and do not require submission of a critical area report:

A. **Erosion and Landslide Hazard Areas.** Except as otherwise provided for in this Title, only those activities approved and permitted consistent with an approved critical area report in accordance with this Title shall be allowed in erosion or landslide hazard areas.

B. **Seismic Hazard Areas.** The following activities are allowed within seismic hazard areas:

1. Construction of new buildings with less than 2,500 square feet of floor area or roof area, whichever is greater, and which are not residential structures or used as places of employment or public assembly;⁵²
2. Additions to existing single-story residences that are two hundred fifty (250) square feet or less;⁵³ and
3. Installation of fences.

C. **Mine Hazard Areas.** The following activities are allowed within mine hazard areas:

1. Construction of new buildings with less than 2,500 square feet of floor area or roof area, whichever is greater, and which are not residential structures or used as places of employment or public assembly;
2. Additions to existing residences that are two hundred fifty (250) square feet or less; and
3. Installation of fences.

D. **Volcanic Hazard Areas.** The following activities are allowed within volcanic hazard areas:

Allowing construction and additions of some buildings of a certain size should be considered for each hazard area. It may be scientifically acceptable to allow limited development in some hazard areas, as shown here, but not in others. Whether to allow limited construction, and to what extent, needs to be evaluated based on the severity of the hazard. Thresholds of 2,500 square feet and 250 square feet have been adopted by some jurisdictions for some hazards, but these should be scientifically evaluated in relation to the applicable environment before being adopted locally.

⁵² See sidebar.

⁵³ See sidebar.

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1. Construction of new buildings with less than 2,500 square feet of floor area or roof area, whichever is greater, and which are not residential structures or used as places of employment or public assembly;
2. Additions to existing residences that are two hundred fifty (250) square feet or less; and
3. Installation of fences.

E. **Tsunami Hazard Areas.** The following activities are allowed within tsunami hazard areas:

1. Construction of new buildings with less than 2,500 square feet of floor area or roof area, whichever is greater, and which are not residential structures or used as places of employment or public assembly;
2. Additions to existing residences that are two hundred fifty (250) square feet or less; and
3. Installation of fences.

F. **Other Hazard Areas.** The [director] may allow the following activities within other geologically hazardous areas, if the activity will not increase the risk of the hazard:

1. Construction of new buildings with less than 2,500 square feet of floor area or roof area, whichever is greater, and which are not residential structures or used as places of employment or public assembly;
2. Additions to existing residences that are two hundred fifty (250) square feet or less; and
3. Installation of fences.

CRITICAL AREA REPORT REQUIREMENTS – GEOLOGICALLY HAZARDOUS AREAS

X.50.060 Critical Area Report – Additional Requirements for Geologically Hazardous Areas

A. **Preparation by a Qualified Professional.** A critical areas report for a geologically hazardous area shall be prepared by an engineer or geologist, licensed in the state of Washington, with experience analyzing geologic, hydrologic, and ground water flow systems, and who has experience preparing reports for the relevant type of hazard.

B. **Area Addressed in Critical Area Report.** The following areas shall be addressed in a critical area report for geologically hazardous areas:

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1. The project area of the proposed activity; and
2. All geologically hazardous areas within two hundred (200) feet of the project area or that have potential to be affected by the proposal;

C. **Geological Hazards Assessment.** A critical area report for a geologically hazardous area shall contain an assessment of geological hazards including the following site- and proposal-related information at a minimum:

*See Appendix I for
a Sample
Geological
Hazards
Assessment
Review Checklist.*

1. **Site and Construction Plans.** The report shall include a copy of the site plans for the proposal showing:
 - a. The type and extent of geologic hazard areas, any other critical areas, and buffers on, adjacent to, within two hundred (200) feet of, or that are likely to impact the proposal;
 - b. Proposed development, including the location of existing and proposed structures, fill, storage of materials, and drainage facilities, with dimensions indicating distances to the floodplain, if available;
 - c. The topography, in two-foot contours, of the project area and all hazard areas addressed in the report; and
 - d. Clearing limits; and
2. **Assessment of Geological Characteristics.** The report shall include an assessment of the geologic characteristics of the soils, sediments, and/or rock of the project area and potentially affected adjacent properties, and a review of the site history regarding landslides, erosion, and prior grading. Soils analysis shall be accomplished in accordance with accepted classification systems in use in the region. The assessment shall include, but not be limited to:
 - a. A description of the surface and subsurface geology, hydrology, soils, and vegetation found in the project area and in all hazard areas addressed in the report;
 - b. A detailed overview of the field investigations, published data, and references; data and conclusions from past assessments of the site; and site specific measurements, test, investigations, or studies that support the identification of geologically hazardous areas; and
 - c. A description of the vulnerability of the site to seismic and other geologic events;
3. **Analysis of Proposal.** The report shall contain a hazards analysis including a detailed description of the project, its relationship to the geologic hazard(s), and its potential impact upon the hazard area, the subject property, and affected adjacent properties; and

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4. **Minimum Buffer and Building Setback.** The report shall make a recommendation for the minimum no-disturbance buffer and minimum building setback from any geologic hazard based upon the geotechnical analysis.

D. **Incorporation of Previous Study.** Where a valid critical areas report has been prepared within the last five (5) years for a specific site, and where the proposed land use activity and surrounding site conditions are unchanged, said report may be incorporated into the required critical area report. The applicant shall submit a hazards assessment detailing any changed environmental conditions associated with the site.

E. **Mitigation of Long-Term Impacts.** When hazard mitigation is required, the mitigation plan shall specifically address how the activity maintains or reduces the pre-existing level of risk to the site and adjacent properties on a long-term basis (equal to or exceeding the projected lifespan of the activity or occupation). Proposed mitigation techniques shall be considered to provide long-term hazard reduction only if they do not require regular maintenance or other actions to maintain their function. Mitigation may also be required to avoid any increase in risk above the pre-existing conditions following abandonment of the activity.

X.50.070 Critical Area Report – Additional Technical Information Requirements for Specific Hazards. In addition to the general critical area report requirements of [sections X.10.210 and X.50.060], critical area reports for geologically hazardous areas must meet the requirements of this Section. Critical area reports for two or more types of critical areas must meet the report requirements for each relevant type of critical area.

A. **Erosion and Landslide Hazard Areas.** In addition to the basic critical area report requirements, the technical information for an erosion hazard or landslide hazard area shall include the following information at a minimum:

1. **Site Plan.** The critical area report shall include a copy of the site plan for the proposal showing:
 - A. The height of slope, slope gradient, and cross-section of the project area;
 - b. The location of springs, seeps, or other surface expressions of ground water on or within two hundred (200) feet of the project area or that have potential to be affected by the proposal;⁵⁴ and
 - c. The location and description of surface water runoff features;

⁵⁴ A distance of two hundred (200) feet is suggested so that geological features that might affect the proposal are included in the critical area report. It may be necessary to include features further than two hundred (200) feet from the project area in some instances, such as a series of related geological features that extend more than two hundred (200) feet.

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2. **Hazards Analysis.** The hazards analysis component of the critical areas report shall specifically include:
 - a. A description of the extent and type of vegetative cover;
 - b. A description of subsurface conditions based on data from site-specific explorations;
 - c. Descriptions of surface and ground water conditions, public and private sewage disposal systems, fills and excavations, and all structural improvements;
 - d. An estimate of slope stability and the effect construction and placement of structures will have on the slope over the estimated life of the structure;
 - e. An estimate of the bluff retreat rate that recognizes and reflects potential catastrophic events such as seismic activity or a one hundred-year storm event;
 - f. Consideration of the run-out hazard of landslide debris and/or the impacts of landslide run-out on down slope properties.
 - g. A study of slope stability including an analysis of proposed cuts, fills, and other site grading;
 - h. Recommendations for building siting limitations; and
 - i. An analysis of proposed surface and subsurface drainage, and the vulnerability of the site to erosion;

3. **Geotechnical Engineering Report.** The technical information for a project within a landslide hazard area shall include a geotechnical engineering report prepared by a licensed engineer that presents engineering recommendations for the following:
 - a. Parameters for design of site improvements including appropriate foundations and retaining structures. These should include allowable load and resistance capacities for bearing and lateral loads, installation considerations, and estimates of settlement performance;
 - b. Recommendations for drainage and subdrainage improvements;
 - c. Earthwork recommendations including clearing and site preparation criteria, fill placement and compaction criteria, temporary and permanent slope inclinations and protection, and temporary excavation support, if necessary; and
 - d. Mitigation of adverse site conditions including slope stabilization measures and seismically unstable soils, if appropriate;

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4. **Erosion and Sediment Control Plan.** For any development proposal on a site containing an erosion hazard area, an erosion and sediment control plan shall be required. The erosion and sediment control plan shall be prepared in compliance with requirements set forth in the [*locally adopted stormwater management regulations*];
5. **Drainage Plan.** The technical information shall include a drainage plan for the collection, transport, treatment, discharge, and/or recycle of water prepared in accordance with the [*locally adopted surface water management plan*]. The drainage plan should consider on-site septic system disposal volumes where the additional volume will affect the erosion or landslide hazard area;
6. **Mitigation Plans.** Hazard and environmental mitigation plans for erosion and landslide hazard areas shall include the location and methods of drainage, surface water management, locations and methods of erosion control, a vegetation management and/or replanting plan, and/or other means for maintaining long-term soil stability; and
7. **Monitoring Surface Waters.** If the [director] determines that there is a significant risk of damage to downstream receiving waters due to potential erosion from the site, based on the size of the project, the proximity to the receiving waters, or the sensitivity of the receiving waters, the technical information shall include a plan to monitor the surface water discharge from the site. The monitoring plan shall include a recommended schedule for submitting monitoring reports to the [city/county].

B. **Seismic Hazard Areas.** In addition to the basic report requirements, a critical area report for a seismic hazard area shall also meet the following requirements:

1. The site map shall show all known and mapped faults within two hundred (200) feet of the project area or that have potential to be affected by the proposal.
2. The hazards analysis shall include a complete discussion of the potential impacts of seismic activity on the site (for example, forces generated and fault displacement).
3. A geotechnical engineering report shall evaluate the physical properties of the subsurface soils, especially the thickness of unconsolidated deposits and their liquefaction potential. If it is determined that the site is subject to liquefaction, mitigation measures appropriate to the scale of the development shall be recommended and implemented.

C. **Mine Hazard Areas.** In addition to the basic report requirements, a critical area report for a mine hazard critical area shall also meet the following requirements:

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1. **Site Plan.** The site plan shall delineate the following found within two hundred (200) feet of or directly underlying the project area, or that have potential to be affected by the proposal:
 - a. The existence of mines, including all significant mine features, such as mine entries, portals, adits, mine shafts, air shafts, and timber shafts;
 - b. The location of any nearby mines that may impact or be affected by the proposed activities;
 - c. The location of any known sinkholes, significant surface depressions, trough subsidence features, coal mine spoil piles, and other mine-related surface features; and
 - d. The location of any prior site improvements that have been carried out to mitigate abandoned coal mine features; and

2. **Hazards Analysis.** The hazards analysis shall include a discussion of the potential for subsidence on the site and classify all mine hazards areas within two hundred (200) feet of the project area, or that have potential to be affected by the proposal, as either low, moderate, or severe. The hazards analysis shall include a mitigation plan containing recommendations for mitigation of the potential for future trough subsidence, as appropriate, for the specific proposed alteration and recommendations for additional study, reports, and development standards if warranted.

D. **Volcanic Hazard Areas.** In addition to the basic report requirements, a critical area report for a volcanic hazard area shall also meet the following requirements:

1. **Site Plan.** The site plan shall show all areas within two hundred (200) feet of the project area that have potential to be affected by pyroclastic flows, lahars, or mud and debris flows derived from volcanic events;
2. **Hazards Analysis.** The hazards analysis shall include a complete discussion of the potential impacts of volcanic activity on the site (for example, inundation by mud flows resulting from volcanic activity); and
3. **Emergency Management Plan.** The emergency management plan shall include plans for emergency building exit routes, site evacuation routes, emergency training, notification of local emergency management officials, and an emergency warning system.

E. **Tsunami Hazard Areas.** In addition to the basic report requirements, a critical area report for a tsunami hazard area shall also meet the following requirements:

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1. **Site Plan.** The site plan shall show all areas within two hundred (200) feet of the project area that have potential to be inundated by wave action derived from a seismic event;
2. **Hazards Analysis.** The hazards analysis shall include a complete discussion of the potential impacts of the tsunami hazard on the site; and
3. **Emergency Management Plan.** The emergency management plan shall include plans for emergency building exit routes, site evacuation routes, emergency training, notification of local emergency management officials, and an emergency warning system.

F. **Other Geologically Hazardous Areas.** In addition to the basic requirements, the [director] may require additional technical information to be submitted when determined to be necessary to the review the proposed activity and the subject hazard. Additional technical information that may be required, includes, but is not limited to:

1. **Site Plan.** The site plan shall show all hazard areas located within two hundred (200) feet of the project area or that have potential to be affected by the proposal; and
2. **Hazards Analysis.** The hazards analysis shall include a complete discussion of the potential impacts of the hazard on the project area and of the proposal on the hazard.

PERFORMANCE STANDARDS – GEOLOGICALLY HAZARDOUS AREAS

X.50.080 Performance Standards – General Requirements

A. Alterations of geologically hazardous areas or associated buffers may only occur for activities that:

1. Will not increase the threat of the geological hazard to adjacent properties beyond pre-development conditions;
2. Will not adversely impact other critical areas;
3. Are designed so that the hazard to the project is eliminated or mitigated to a level equal to or less than pre-development conditions; and
4. Are certified as safe as designed and under anticipated conditions by a qualified engineer or geologist, licensed in the state of Washington.

B. **Critical Facilities Prohibited.** Critical facilities shall not be sited within geologically hazardous areas unless there is no other practical alternative.

Each jurisdiction may want to customize the restrictions it places on the siting of critical facilities. For example, if a city is entirely within a hazard area, such as volcano hazard, it may not be practical to locate the critical facility outside of the hazard. However, if options exist, it is advisable to restrict critical facilities from locating within hazard areas.

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X.50.090 Performance Standards – Specific Hazards

A. **Erosion and Landslide Hazard Areas.** Activities on sites containing erosion or landslide hazards shall meet the standards of *Performance Standards – General Requirements* [Section X.50.080] and the specific following requirements:

1. **Buffer Requirement.** A buffer shall be established from all edges of landslide hazard areas. The size of the buffer shall be determined by the [director] to eliminate or minimize the risk of property damage, death, or injury resulting from landslides caused in whole or part by the development, based upon review of and concurrence with a critical area report prepared by a qualified professional.⁵⁵
 - a. **Minimum Buffer.** The minimum buffer shall be equal to the height of the slope or fifty (50) feet, whichever is greater.
 - b. **Buffer Reduction.** The buffer may be reduced to a minimum of ten (10) feet when a qualified professional demonstrates to the [director]’s satisfaction that the reduction will adequately protect the proposed development, adjacent developments, and uses and the subject critical area.
 - c. **Increased Buffer.** The buffer may be increased where the [director] determines a larger buffer is necessary to prevent risk of damage to proposed and existing development;
2. **Alterations.** Alterations of an erosion or landslide hazard area and/or buffer may only occur for activities for which a hazards analysis is submitted and certifies that:
 - a. The development will not increase surface water discharge or sedimentation to adjacent properties beyond pre-development conditions;
 - b. The development will not decrease slope stability on adjacent properties; and
 - c. Such alterations will not adversely impact other critical areas;
3. **Design Standards.** Development within an erosion or landslide hazard area and/or buffer shall be designed to meet the following basic requirements unless it can be demonstrated that an alternative design that deviates from one or more of these standards provides greater long-term slope stability while meeting all other provisions of this Title. The requirement for long-term slope stability shall exclude designs that require regular and periodic maintenance to maintain their level of function. The basic development design standards are:

⁵⁵ Buffer distances of fifty (50) feet, height of slope, or potentially ten (10) feet are commonly used by jurisdictions to protect against erosion and landslide hazards. However, such distances may not be appropriate in all jurisdictions, and they should be scientifically evaluated in relation to local hazards before being adopted.

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- a. The proposed development shall not decrease the factor of safety for landslide occurrences below the limits of 1.5 for static conditions and 1.2 for dynamic conditions. Analysis of dynamic conditions shall be based on a minimum horizontal acceleration as established by the current version of the Uniform Building Code;
 - b. Structures and improvements shall be clustered to avoid geologically hazardous areas and other critical areas;
 - c. Structures and improvements shall minimize alterations to the natural contour of the slope, and foundations shall be tiered where possible to conform to existing topography;
 - d. Structures and improvements shall be located to preserve the most critical portion of the site and its natural landforms and vegetation;
 - e. The proposed development shall not result in greater risk or a need for increased buffers on neighboring properties;
 - f. The use of retaining walls that allow the maintenance of existing natural slope area is preferred over graded artificial slopes; and
 - g. Development shall be designed to minimize impervious lot coverage;
4. **Vegetation Retention.** Unless otherwise provided or as part of an approved alteration, removal of vegetation from an erosion or landslide hazard area or related buffer shall be prohibited;
 5. **Seasonal Restriction.** Clearing shall be allowed only from May 1 to October 1 of each year provided that the [city/county] may extend or shorten the dry season on a case-by-case basis depending on actual weather conditions, except that timber harvest, not including brush clearing or stump removal, may be allowed pursuant to an approved forest practice permit issued by the [city/county] or the Washington State Department of Natural Resources;⁵⁶
 6. **Utility Lines and Pipes.** Utility lines and pipes shall be permitted in erosion and landslide hazard areas only when the applicant demonstrates that no other practical alternative is available. The line or pipe shall be located above ground and properly anchored and/or designed so that it will continue to function in the event of an underlying slide. Stormwater conveyance shall be allowed only through a high-density polyethylene pipe with fuse-welded joints, or similar product that is technically equal or superior;
 7. **Point Discharges.** Point discharges from surface water facilities and roof drains onto or upstream from an erosion or landslide hazard area shall be prohibited except as follows:

Adoption of cluster, planned unit development, and density averaging regulations may make it more feasible for developers to meet the design standards listed here.

⁵⁶ Rainy-season restrictions are applicable to communities in Western Washington.

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- a. Conveyed via continuous storm pipe downslope to a point where there are no erosion hazards areas downstream from the discharge;
 - b. Discharged at flow durations matching predeveloped conditions, with adequate energy dissipation, into existing channels that previously conveyed stormwater runoff in the predeveloped state; or
 - c. Dispersed discharge upslope of the steep slope onto a low-gradient undisturbed buffer demonstrated to be adequate to infiltrate all surface and stormwater runoff, and where it can be demonstrated that such discharge will not increase the saturation of the slope;
8. **Subdivisions.** The division of land in landslide hazard areas and associated buffers is subject to the following:
- a. Land that is located wholly within a landslide hazard area or its buffer may not be subdivided. Land that is located partially within a landslide hazard area or its buffer may be divided provided that each resulting lot has sufficient buildable area outside of, and will not affect, the landslide hazard or its buffer.
 - b. Access roads and utilities may be permitted within the landslide hazard area and associated buffers if the [city/county] determines that no other feasible alternative exists; and
9. **Prohibited Development.** On-site sewage disposal systems, including drain fields, shall be prohibited within erosion and landslide hazard areas and related buffers.

B. **Seismic Hazard Areas.** Activities proposed to be located in seismic hazard areas shall meet the standards of *Performance Standards – General Requirements* [Section X.50.080].

C. **Mine Hazard Areas.** Activities proposed to be located in mine hazard area shall meet the standards of *Performance Standards – General Requirements* [Section X.50.080] and the specific following requirements:

1. **Alterations.** Alterations of a mine hazard area and/or buffer are allowed, as follows:
 - a. All alterations are permitted within a mine hazard area with a low potential for subsidence;
 - b. Within a mine hazard area with a moderate potential for subsidence and at coal mine by-product stockpiles, all alterations are permitted subject to a mitigation plan to minimize risk of structural damage using appropriate criteria to evaluate the proposed use, as recommended in the hazard analysis; and

It is likely that local jurisdictions that have mine hazard areas understand the issues associated with the hazards very well and may already have well developed regulations in place to manage mine hazards. The standards here are representative of general guidelines and are not meant to replace well developed standards created for specific, known hazard areas.

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- c. Within a mine hazard area with a severe potential for subsidence only those activities allowed in accordance with Section X.50.050 will be allowed.
2. **Subdivisions.** The division of land in mine hazard areas and associated buffers is subject to the following:
 - a. Land that is located within two hundred (200) feet of a mine hazard area with a severe potential for subsidence may not be subdivided. Land that is located partially within a mine hazard area may be divided provided that each resulting lot has sufficient buildable area that is two hundred (200) feet away from the mine hazard area with a severe potential for subsidence. Land that is located within a mine hazard area with a low or moderate potential for subsidence may be subdivided.
 - b. Access roads and utilities may be permitted within two hundred (200) feet of a mine hazard area with a moderate or severe potential for subsidence if the [city/county] determines that no other feasible alternative exists.
 3. **Reclamation Activities.** For all reclamation activities, including grading, filling, and stockpile removal, as-built drawings shall be submitted to the [city/county] in a format specified by the [director].

Primary damage from tsunamis is caused by lateral forces. Structures should be designed to comply with code criteria for seismic resistance, including anchoring and robust sill plates. Such measures will protect structures from moderate tsunami events. To date, there are no criteria that can reliably protect structures from the massive forces of a large tsunami or volcanic event.

D. Volcanic and Tsunami Hazard Areas. Activities on sites containing areas susceptible to inundation due to volcanic or tsunamis hazards shall require an evacuation and emergency management plan. The [city/county] may use the performance standards for coastal high hazard areas (see Chapter X.40, *Frequently Flooded Areas*) as guidance in reviewing new structures proposed in volcanic and tsunami hazard areas.

E. Other Hazard Areas. Activities on sites containing or adjacent to volcanic, tsunamis, or other geologically hazardous areas, shall meet the standards of *Performance Standards – General Requirements* [Section X.50.080].

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Fish and Wildlife Habitat Conservation Areas

The types of fish, wildlife, and plant species that need protection vary from community to community throughout the state, and the standards necessary for protection vary with each species. Information about priority habitats and species, including their status and geographic range, is contained in the Washington Department of Fish and Wildlife (WDFW) Priority Habitats and Species List. Additionally, the department has published management recommendations that include recommended protection standards for many priority species and habitats. Information on rare plant species and high quality ecosystems, including their status, location, and distribution, is maintained by the Washington State Department of Natural Resources Natural Heritage Program.⁵⁷ This Example Code Chapter is organized to be applicable in a generalized manner. Additional protection standards may need to be included depending on the species that might be found in each community.

Standards included here for riparian habitat areas are intended to be applicable to all natural resource lands, rural areas, and lands within urban growth areas. Degraded riparian areas should be individually evaluated to determine opportunities to improve and restore stream and terrestrial habitat functions. Functional improvements, such as those addressing breeding locations, migration routes, rearing areas, feeding grounds, roosting locations, and water temperature and quality may be required as permit conditions of approval.

⁵⁷ See Appendix J.

**Attachment C - GMS Critical Areas Appendix A
Sample Code Provisions**

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Chapter X.60 Fish and Wildlife Habitat Conservation Areas

Designation and Mapping

X.60.010 Designation of Fish and Wildlife Habitat Conservation Areas

Additional Report Requirements – Habitat Conservation Areas

X.60.020 Critical Area Report – Additional Requirements for Habitat Conservation Areas

Performance Standards

X.60.030 Performance Standards – General Requirements

X.60.040 Performance Standards – Specific Habitats

DESIGNATION AND MAPPING

X.60.010 Designation of Fish And Wildlife Habitat Conservation Areas

A. Fish and wildlife habitat conservation areas include:

1. **Areas With Which State or Federally Designated Endangered, Threatened, and Sensitive Species Have a Primary Association.**⁵⁸
 - a. Federally designated endangered and threatened species are those fish and wildlife species identified by the U.S. Fish and Wildlife Service and the National Marine Fisheries Service that are in danger of extinction or threatened to become endangered. The U.S. Fish and Wildlife Service and the National Marine Fisheries Service should be consulted for current listing status.
 - b. State designated endangered, threatened, and sensitive species are those fish and wildlife species native to the state of Washington identified by the Washington Department of Fish and Wildlife, that are in danger of extinction, threatened to become endangered, vulnerable, or declining and are likely to become endangered or threatened in a significant portion of their range within the state without cooperative management or removal of threats. State designated endangered, threatened, and sensitive species are periodically recorded in WAC 232-12-014 (state endangered species) and WAC 232-12-011 (state threatened and sensitive species). The state Department of Fish and Wildlife maintains the most current listing and should be consulted for current listing status.

A combined list of federally and state identified species is included in Appendix D.

The nature of fish and wildlife habitat areas varies considerably throughout the state and while some habitats, such as shorelines, streams and wetlands, are often easily recognizable, other important habitat areas, such as snags, prairies, caves, or urban open space, may go unnoticed. It is advisable for each local jurisdiction to contact the Washington Department of Fish and Wildlife for assistance with identifying and mapping fish and wildlife habitat conservation areas.

RCW 36.70A.172(1) requires that local governments give special consideration to conservation and protection measures necessary to preserve or enhance anadromous fish.

⁵⁸ See WAC 365-190-080(5)(a)(i).

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This Subsection shall not apply to hair seals and sea lions that are threatening to damage or are damaging commercial fishing gear being utilized in a lawful manner or when said mammals are damaging or threatening to damage commercial fish being lawfully taken with commercial gear.⁵⁹

2. **State Priority Habitats and Areas Associated With State Priority Species.**⁶⁰ Priority habitats and species are considered to be priorities for conservation and management. Priority species require protective measures for their perpetuation due to their population status, sensitivity to habitat alteration, and/or recreational, commercial, or tribal importance. Priority habitats are those habitat types or elements with unique or significant value to a diverse assemblage of species. A priority habitat may consist of a unique vegetation type or dominant plant species, a described successional stage, or a specific structural element. Priority habitats and species are identified by the state Department of Fish and Wildlife.

A state list of priority habitats is included in Appendix E.

3. **Habitats and Species of Local Importance.**⁶¹ Habitats and species of local importance are those identified by the [city/county], including but not limited to those habitats and species that, due to their population status or sensitivity to habitat manipulation, warrant protection. Habitats may include a seasonal range or habitat element with which a species has a primary association, and which, if altered, may reduce the likelihood that the species will maintain and reproduce over the long term.
 - a. **Designation Process.** The [city/county] shall accept and consider nominations for habitat areas and species to be designated as locally important on an annual basis.
 - i. Habitats and species to be designated shall exhibit the following characteristics:
 - (a) Local populations of native species are in danger of extirpation based on existing trends:
 1. Local populations of native species that are likely to become endangered; or
 2. Local populations of native species that are vulnerable or declining;⁶²

⁵⁹ See WAC 232-12-011(3). Hair seals and sea lions are protected under the federal Marine Mammal Protection Act.

⁶⁰ See WAC 365-190-080(5)(c)(ii).

⁶¹ See WAC 365-190-030(19).

⁶² See WAC 232-12-297.

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- (b) The species or habitat has recreation, commercial, game, tribal, or other special value;
 - (c) Long-term persistence of a species is dependent on the protection, maintenance, and/or restoration of the nominated habitat;
 - (d) Protection by other county, state, or federal policies, laws, regulations, or nonregulatory tools is not adequate to prevent degradation of the species or habitat in [city/county]; and
 - (e) Without protection, there is a likelihood that the species or habitat will be diminished over the long term.
- ii. Areas nominated to protect a particular habitat or species must represent either high-quality native habitat or habitat that has a high potential to recover to a suitable condition and which is of limited availability, highly vulnerable to alteration, or provides landscape connectivity which contributes to the integrity of the surrounding landscape.
 - iii. Habitats and species may be nominated for designation by any person.
 - iv. The nomination should indicate whether specific habitat features are to be protected (for example, nest sites, breeding areas, and nurseries), or whether the habitat or ecosystem is being nominated in its entirety.
 - v. The nomination may include management strategies for the species or habitats. Management strategies must be supported by the best available science, and where restoration of habitat is proposed, a specific plan for restoration must be provided prior to nomination.
 - vi. The [director] shall determine whether the nomination proposal is complete, and if complete, shall evaluate it according to the characteristics enumerated in subsection (i) and make a recommendation to the [planning commission] based on those findings.
 - vii. The [planning commission] shall hold a public hearing for proposals found to be complete in accordance with [locally adopted hearing procedures] and make a recommendation to the [city council or county commissioners] based on the characteristics enumerated in subsection (i).
 - viii. Following the recommendation of the [planning commission], the [city council or county commissioners] shall designate a Habitat or Species of Local Importance.

Designating commercial and recreational shellfish growing areas as critical areas enables jurisdictions to regulate adjacent uses and areas to protect water quality. Another tool for protection of commercial shellfish areas is designation as agricultural lands of long-term commercial significance to protect the resource use of the land and to allow for adjacent shellfish processing operations as accessory uses. Jurisdictions should evaluate these options and decide which works best given local conditions. More information on these tools is discussed under Stronger Safeguards for Shellfish Beds, available on the Puget Sound Water Quality Action Team Web site at: <http://www.psat.wa.gov/>.

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ix. Approved nominations will be subject to the provisions of this Title.

4. **Commercial and Recreational Shellfish Areas.**⁶³ These areas include all public and private tidelands or bedlands suitable for shellfish harvest, including shellfish protection districts established pursuant to Chapter 90.72 RCW.⁶⁴
5. **Kelp and Eelgrass Beds and Herring and Smelt Spawning Areas.**⁶⁵
6. **Naturally Occurring Ponds Under Twenty Acres.**⁶⁶ Naturally occurring ponds are those ponds under twenty (20) acres and their submerged aquatic beds that provide fish or wildlife habitat, including those artificial ponds intentionally created from dry areas in order to mitigate impacts to ponds. Naturally occurring ponds do not include ponds deliberately designed and created from dry sites, such as canals, detention facilities, wastewater treatment facilities, farm ponds, temporary construction ponds, and landscape amenities, unless such artificial ponds were intentionally created for mitigation.⁶⁷
7. **Waters of the State.**⁶⁸ Waters of the state include lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, and all other surface waters and watercourses within the jurisdiction of the state of Washington, as classified in WAC 222-16-031 (*or WAC 222-16-030 depending on classification used*).
8. **Lakes, Ponds, Streams, and Rivers Planted With Game Fish by a Governmental or Tribal Entity.**⁶⁹
9. **State Natural Area Preserves and Natural Resource Conservation Areas.**⁷⁰ Natural area preserves and natural resource conservation areas are defined, established, and managed by the Washington State Department of Natural Resources.
10. **Areas of Rare Plant Species and High Quality Ecosystems.**⁷¹ Areas of rare plant species and high quality ecosystems are identified by the Washington State Department of Natural Resources through the Natural Heritage Program.

⁶³ See WAC 365-190-080(5)(a)(iii).

⁶⁴ See WAC 365-190-080(5)(c)(iii).

⁶⁵ See WAC 365-190-080(5)(a)(iv).

⁶⁶ See WAC 365-190-080(5)(a)(v).

⁶⁷ See WAC 365-190-080(5)(c)(v).

⁶⁸ See WAC 365-190-080(5)(a)(vi).

⁶⁹ See WAC 365-190-080(5)(a)(vii).

⁷⁰ See WAC 365-190-080(5)(a)(viii).

⁷¹ Chapter 79.70 RCW provides for the classification and inventory of natural heritage resources.

Kelp and eelgrass beds have been identified and mapped by the Washington State Department of Natural Resources in some areas. Herring and smelt spawning times and locations are outlined in WAC 220-110-240 through 220-110-260. Locations for both may be found by referring to Critical Spawning Habitat for Herring, Surf Smelt, Sand Lance and Rock Sole in Puget Sound, Washington: A Guide for Local Governments and Interested Citizens, 2002, and the Puget Sound Environmental Atlas.

Jurisdictions should give preference to preserving connections between high quality habitat and areas of high diversity when considering designating lands essential for preserving habitat connections. Priority should also be given to areas that would provide connections between otherwise isolated, but valuable, habitat areas.

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11. Land Useful or Essential for Preserving Connections Between Habitat Blocks and Open Spaces.⁷²

B. All areas within the [city/county] meeting one or more of these criteria, regardless of any formal identification, are hereby designated critical areas and are subject to the provisions of this Title and shall be managed consistent with the best available science, such as the Washington Department of Fish and Wildlife's Management Recommendations for Priority Habitat and Species.

C. **Mapping.** The approximate location and extent of habitat conservation areas are shown on the critical area maps adopted by the [city/county], as most recently updated. The following critical area maps are hereby adopted:

1. Washington Department of Fish and Wildlife Priority Habitat and Species maps;
2. Washington State Department of Natural Resources, Official Water Type Reference maps, as amended;
3. Washington State Department of Natural Resources Puget Sound Intertidal Habitat Inventory maps;
4. Washington State Department of Natural Resources Shorezone Inventory;
5. Washington State Department of Natural Resources Natural Heritage Program mapping data;
6. Washington State Department of Health Annual Inventory of Shellfish Harvest Areas;
7. Anadromous and resident salmonid distribution maps contained in the Habitat Limiting Factors reports published by the Washington Conservation Commission;
8. Washington State Department of Natural Resources State Natural Area Preserves and Natural Resource Conservation Area maps; and
9. [City/county] official habitat maps.

Jurisdictions are encouraged to overlay the information from available maps to better understand how landscape features and critical areas are integrated, rather than consider each map individually.

These maps are to be used as a guide for the [city/county], project applicants, and/or property owners and should be continuously updated as new critical areas are identified. They are a reference and do not provide a final critical area designation.

⁷² See WAC 365-190-080(5)(b)(i).

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ADDITIONAL REPORT REQUIREMENTS – HABITAT CONSERVATION AREAS

X.60.020 Critical Area Report – Additional Requirements for Habitat Conservation Areas. In addition to the general critical area report requirements of [Section X.10.210], critical area reports for habitat conservation areas must meet the requirements of this Section. Critical area reports for two or more types of critical areas must meet the report requirements for each relevant type of critical area.

A. **Preparation by a Qualified Professional.** A critical areas report for a habitat conservation area shall be prepared by a qualified professional who is a biologist with experience preparing reports for the relevant type of habitat.

B. **Areas Addressed in Critical Area Report.** The following areas shall be addressed in a critical area report for habitat conservation areas:⁷³

1. The project area of the proposed activity;
2. All habitat conservation areas and recommended buffers within three hundred (300) feet of the project area; and
3. All shoreline areas, floodplains, other critical areas, and related buffers within three hundred (300) feet of the project area.

C. **Habitat Assessment.** A habitat assessment is an investigation of the project area to evaluate the potential presence or absence of designated critical fish or wildlife species or habitat. A critical area report for a habitat conservation area shall contain an assessment of habitats including the following site- and proposal-related information at a minimum:

1. Detailed description of vegetation on and adjacent to the project area and its associated buffer;
2. Identification of any species of local importance, priority species, or endangered, threatened, sensitive, or candidate species that have a primary association with habitat on or adjacent to the project area, and assessment of potential project impacts to the use of the site by the species;
3. A discussion of any federal, state, or local special management recommendations, including Washington Department of Fish and Wildlife habitat management recommendations, that have been developed for species or habitats located on or adjacent to the project area;

*The Washington
Department of Fish and
Wildlife habitat
management
recommendations for
priority habitats and
species are located on the
Web site at:
<http://www.wa.gov/wdfw/hab/phisrecs.htm>.*

⁷³ Critical area reports for habitat areas should consider protected habitats and species and their buffers located within three hundred (300) feet. Three hundred feet (300) is a suggested distance so that habitat areas that might be affected by the proposal are included in the critical area report. Three hundred (300) feet allows for the potential riparian habitat area widths and for buffers/zones that may not be accurately mapped at the time of application.

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4. A detailed discussion of the direct and indirect potential impacts on habitat by the project, including potential impacts to water quality;
5. A discussion of measures, including avoidance, minimization, and mitigation, proposed to preserve existing habitats and restore any habitat that was degraded prior to the current proposed land use activity and to be conducted in accordance with *Mitigation Sequencing* [Section X.10.240]; and
6. A discussion of ongoing management practices that will protect habitat after the project site has been developed, including proposed monitoring and maintenance programs.

D. Additional Information May Be Required. When appropriate due to the type of habitat or species present or the project area conditions, the [director] may also require the habitat management plan to include:

1. An evaluation by an independent qualified professional regarding the applicant's analysis and the effectiveness of any proposed mitigating measures or programs, to include any recommendations as appropriate;
2. A request for consultation with the Washington Department of Fish and Wildlife or the local Native American Indian Tribe or other appropriate agency; and
3. Detailed surface and subsurface hydrologic features both on and adjacent to the site.

PERFORMANCE STANDARDS

X.60.030 Performance Standards – General Requirements.

A. Alterations. A habitat conservation area may be altered only if the proposed alteration of the habitat or the mitigation proposed does not degrade the quantitative and qualitative functions and values of the habitat. All new structures and land alterations shall be prohibited from habitat conservation areas, except in accordance with this Title.

B. Non-indigenous Species. No plant, wildlife, or fish species not indigenous to the region shall be introduced into a habitat conservation area unless authorized by a state or federal permit or approval.

C. Mitigation and Contiguous Corridors.⁷⁴ Mitigation sites shall be located to preserve or achieve contiguous wildlife habitat corridors in accordance with a mitigation plan that is part of an approved critical area report to minimize the isolating effects of development on habitat areas, so long as mitigation of aquatic habitat is located within the same aquatic ecosystem as the area disturbed.

The performance standards of Section X.60.030 apply to all habitat conservation areas. Additional performance standards for specific habitat types are listed in Section X.60.040. Projects related to specific habitat areas need to meet the requirements of the general section and the section specific to that habitat, if applicable.

⁷⁴ See WAC 365-190-080(5)(b)(i).

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D. Approvals of Activities. The [director] shall condition approvals of activities allowed within or adjacent to a habitat conservation area or its buffers, as necessary to minimize or mitigate any potential adverse impacts. Conditions shall be based on the best available science and may include, but are not limited to, the following:

1. Establishment of buffer zones;
2. Preservation of critically important vegetation and/or habitat features such as snags and downed wood;
3. Limitation of access to the habitat area, including fencing to deter unauthorized access;
4. Seasonal restriction of construction activities;
5. Establishment of a duration and timetable for periodic review of mitigation activities; and
6. Requirement of a performance bond, when necessary, to ensure completion and success of proposed mitigation.

E. Mitigation and Equivalent or Greater Biological Functions. Mitigation of alterations to habitat conservation areas shall achieve equivalent or greater biologic and hydrologic functions and shall include mitigation for adverse impacts upstream or downstream of the development proposal site. Mitigation shall address each function affected by the alteration to achieve functional equivalency or improvement on a per function basis.

F. Approvals and the Best Available Science. Any approval of alterations or impacts to a habitat conservation area shall be supported by the best available science.

G. Buffers

1. **Establishment of Buffers.**⁷⁵ The [director] shall require the establishment of buffer areas for activities adjacent to habitat conservation areas when needed to protect habitat conservation areas. Buffers shall consist of an undisturbed area of native vegetation or areas identified for restoration established to protect the integrity, functions, and values of the affected habitat. Required buffer widths shall reflect the sensitivity of the habitat and the type and intensity of human activity proposed to be conducted nearby and shall be consistent with the management recommendations issued by the Washington Department of Fish and Wildlife. Habitat conservation areas and their buffers shall be preserved in perpetuity through the use of native growth protection areas and critical area tracts in accordance with Section X.10.370 through Section X.10.380.

⁷⁵ See WAC 365-190-080(5)(b)(v).

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2. **Seasonal Restrictions.** When a species is more susceptible to adverse impacts during specific periods of the year, seasonal restrictions may apply. Larger buffers may be required and activities may be further restricted during the specified season.
3. **Habitat Buffer Averaging.** The [director] may allow the recommended habitat area buffer width to be reduced in accordance with a critical area report, the best available science, and the management recommendations issued by the Washington Department of Fish and Wildlife, only if:
 - a. It will not reduce stream or habitat functions;
 - b. It will not adversely affect salmonid habitat;
 - c. It will provide additional natural resource protection, such as buffer enhancement;
 - d. The total area contained in the buffer area after averaging is no less than that which would be contained within the standard buffer; and
 - e. The buffer area width is not reduced by more than twenty-five percent (25%) in any location.⁷⁶

Habitat management recommendations for some species specify larger buffers for time periods when the species is more susceptible to impacts. Jurisdictions should only allow activities within the larger buffer (and outside of the standard buffer) if they can be sure that the activity will cease or be relocated during the seasonal period. If the activity cannot be effectively monitored, it is recommended that the seasonal buffer be used as the standard buffer.

H. Signs and Fencing of Habitat Conservation Areas

1. **Temporary Markers.** The outer perimeter of the habitat conservation area or buffer and the limits of those areas to be disturbed pursuant to an approved permit or authorization shall be marked in the field in such a way as to ensure that no unauthorized intrusion will occur and verified by the [director] 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 this Chapter, the [director] may require that applicant to install permanent signs along the boundary of a habitat conservation area or buffer.
 - a. Permanent signs shall be made of a metal face and attached to a metal post or another material of equal durability. Signs must be posted at an interval of one per lot or every fifty (50) feet, whichever is less and must be maintained by the property owner in perpetuity. The sign shall be worded as follows or with alternative language approved by the director:

The sample sign language shown on the following page is a recommended minimum. Jurisdictions may wish to consider sign language that not only designates the habitat area, but also provides educational information about the need to protect habitat.

⁷⁶ The Washington Department of Fish and Wildlife recommends not allowing habitat buffers to be reduced by more than twenty-five percent (25%).

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Habitat Conservation Area
Do Not Disturb
Contact [Local Jurisdiction]
Regarding Uses and Restriction

- b. The provisions of subsection (a) may be modified by the [director] as necessary to assure protection of sensitive features or wildlife.

Specific fencing may be required to prevent damage to habitat by either livestock or people, and the type of fence may vary depending on the nature of the site conditions and the type of habitat. Care should be taken so that fencing does not interfere with species migration. A determination should be made by the director whether fencing is necessary to protect the functions and values of a critical area.

3. Fencing

- a. The [director] shall determine if fencing is necessary to protect the functions and values of the critical area. If found to be necessary, the [director] shall condition any permit or authorization issued pursuant to this Chapter to require the applicant to install a permanent fence at the edge of the habitat conservation area or buffer, when fencing will prevent future impacts to the habitat conservation area.
- b. The applicant shall be required to install a permanent fence around the habitat conservation area or buffer when domestic grazing animals are present or may be introduced on site.
- c. Fencing installed as part of a proposed activity or as required in this Subsection shall be design so as to not interfere with species migration, including fish runs, and shall be constructed in a manner that minimizes habitat impacts.

I. **Subdivisions.** The subdivision and short subdivision of land in fish and wildlife habitat conservation areas and associated buffers is subject to the following:

1. Land that is located wholly within a habitat conservation area or its buffer may not be subdivided.
2. Land that is located partially within a habitat conservation area or its buffer may be divided provided that the developable portion of each new lot and its access is located outside of the habitat conservation area or its buffer and meets the minimum lot size requirements of [*locally adopted zoning dimensions*].
3. Access roads and utilities serving the proposed may be permitted within the habitat conservation area and associated buffers only if the [city/county] determines that no other feasible alternative exists and when consistent with this Title.

A table of allowable work windows, or "fish windows," is provided by WDFW for guidance regarding the best time of year for projects to occur. A final draft of the freshwater fish timing is currently being forwarded to the U.S. Fish and Wildlife Service, National Marine Fisheries Service and U.S. Army Corps of Engineers for their review and comment and will be followed by a draft for marine fish.

X.60.040 Performance Standards – Specific Habitats

A. Endangered, Threatened, and Sensitive Species

1. No development shall be allowed within a habitat conservation area or buffer with which state or federally endangered, threatened, or sensitive species have a primary association, except that which is provided for by a management plan established by the Washington Department of Fish and Wildlife or applicable state or federal agency.

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2. Whenever activities are proposed adjacent to a habitat conservation area with which state or federally endangered, threatened, or sensitive species have a primary association, such area shall be protected through the application of protection measures in accordance with a critical area report prepared by a qualified professional and approved by the [city/county]. Approval for alteration of land adjacent to the habitat conservation area or its buffer shall not occur prior to consultation with the Washington Department of Fish and Wildlife for animal species, the Washington State Department of Natural Resources for plant species, and other appropriate federal or state agencies.
3. Bald eagle habitat shall be protected pursuant to the Washington State Bald Eagle Protection Rules (WAC 232-12-292). Whenever activities are proposed adjacent to a verified nest territory or communal roost, a habitat management plan shall be developed by a qualified professional. Activities are adjacent to bald eagle sites when they are within eight hundred (800) feet or within one half mile (2,640 feet) and in a shoreline foraging area. The [city/county] shall verify the location of eagle management areas for each proposed activity. Approval of the activity shall not occur prior to approval of the habitat management plan by the Washington Department of Fish and Wildlife.

B. Anadromous Fish

1. All activities, uses, and alterations proposed to be located in water bodies used by anadromous fish or in areas that affect such water bodies shall give special consideration to the preservation and enhancement of anadromous fish habitat, including, but not limited to, adhering to the following standards:
 - a. Activities shall be timed to occur only during the allowable work window as designated by the Washington Department of Fish and Wildlife for the applicable species;
 - b. An alternative alignment or location for the activity is not feasible;
 - c. The activity is designed so that it will not degrade the functions or values of the fish habitat or other critical areas;
 - d. Shoreline erosion control measures shall be designed to use bioengineering methods or soft armoring techniques, according to an approved critical area report, and
 - e. Any impacts to the functions or values of the habitat conservation area are mitigated in accordance with an approved critical area report.
2. Structures that prevent the migration of salmonids shall not be allowed in the portion of water bodies currently or historically used by anadromous fish. Fish bypass facilities shall be provided that allow

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the upstream migration of adult fish and shall prevent fry and juveniles migrating downstream from being trapped or harmed.

3. Fills, when authorized by the [*locally adopted shoreline management program*], shall not adversely impact anadromous fish or their habitat or shall mitigate any unavoidable impacts and shall only be allowed for a water-dependent use.

C. Wetland Habitats. All proposed activities within or adjacent to habitat conservation areas containing wetlands shall conform to the wetland development performance standards set forth in *Wetlands* [Chapter X.20]. If non-wetlands habitat and wetlands are present at the same location, the provisions of this Chapter or the Wetlands Chapter, whichever provides greater protection to the habitat, apply.

D. Riparian Habitat Areas. Unless otherwise allowed in this Title, all structures and activities shall be located outside of the riparian habitat area.

1. **Establishment of Riparian Habitat Areas.** Riparian habitat areas shall be established for habitats that include aquatic and terrestrial ecosystems that mutually benefit each other and that are located adjacent to rivers, perennial or intermittent streams, seeps, and springs.⁷⁷
2. **Riparian Habitat Area Widths.** Recommended riparian habitat area widths are shown in the table below. A riparian habitat area shall have the width recommended, unless a greater width is required pursuant to Subsection (3), or a lesser width is allowed pursuant to Subsection (4). Widths shall be measured outward in each direction, on the horizontal plane, from the ordinary high water mark, or from the top of bank, if the ordinary high water mark cannot be identified. Riparian areas should be sufficiently wide to achieve the full range of riparian and aquatic ecosystem functions, which include but are not limited to protection of instream fish habitat through control of temperature and sedimentation in streams; preservation of fish and wildlife habitat; and connection of riparian wildlife habitat to other habitats.⁷⁸

⁷⁷ See Washington Department of Fish and Wildlife's *Management Recommendations for Washington's Priority Habitats: Riparian*, 1997, page xi.

⁷⁸ Recommended riparian habitat widths are from the Washington Department of Fish and Wildlife's *Management Recommendations for Washington's Priority Habitats: Riparian*, 1997, page xii.

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Riparian Habitat Areas⁷⁹	
Stream type	Recommended RHA widths
Type 1 and 2; or shorelines of the state, or shorelines of statewide significance	250 feet
Type 3; or other perennial or fish bearing streams, 5-20 feet wide	200 feet
Type 3; or other perennial or fish bearing streams, < 5 feet wide	150 feet
Type 4 and 5; or intermittent streams and washes with low mass wasting potential ⁸⁰	150 feet
Type 4 and 5; or intermittent streams and washes with high mass wasting potential ⁸¹	225 feet

3. **Increased Riparian Habitat Area Widths.** The recommended riparian habitat area widths shall be increased, as follows:
- a. When the [director] determines that the recommended width is insufficient to prevent habitat degradation and to protect the structure and functions of the habitat area;
 - b. When the frequently flooded area exceeds the recommended riparian habitat area width, the riparian habitat area shall extend to the outer edge of the frequently flooded area;
 - c. When a channel migration zone is present, the riparian habitat area width shall be measured from the outer edge of the channel migration zone;
 - d. When the habitat area is in an area of high blowdown potential, the riparian habitat area width shall be expanded an additional fifty (50) feet on the windward side;⁸² or
 - e. When the habitat area is within an erosion or landslide hazard area, or buffer, the riparian habitat area width shall be the recommended

⁷⁹ While water typing is used here to classify riparian habitat areas, regulations regarding riparian habitat areas listed here are applicable to areas containing aquatic systems containing perennial or intermittent flowing water. See the definition for riparian habitat. Habitats associated with marine and standing water are by the general and other performance standards in this Chapter.

⁸⁰ Mass wasting is a general term for a variety of processes by which large masses of rock or earth material are moved down slope by gravity, either slowly or quickly.

⁸¹ See previous footnote.

⁸² See *Management Recommendations for Washington's Priority Habitats: Riparian*, from Washington Department of Fish and Wildlife, 1997.

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The Washington State Department of Natural Resources has developed a new stream typing system organized by S, F, Np, and Ns, which is defined under WAC 222-13-030. The Type 1-5 system is defined under WAC 222-13-031, which includes an explanation of converting to the newer system. The Washington Department of Fish and Wildlife is working to prepare a table of recommended riparian habitat widths based on the new state Department of Natural Resources typing.

Recommended riparian habitat area widths are generalized for predictable applications across the Washington landscape and are intended to meet the goal of maintaining structural and functional integrity of riparian habitat and associated aquatic systems needed to perpetually support fish and wildlife populations. In areas where the habitat is already largely degraded, restoration may be more beneficial than preservation of degraded areas. Jurisdictions may refer to the Tri-County's ESA Response documents for information about protecting and enhancing stream functions in urban areas, available at <http://www.salmoninfo.org>.

distance, or the erosion or landslide hazard area or buffer, whichever is greater.

4. **Riparian Habitat Area Width Averaging.** The [director] may allow the recommended riparian habitat area width to be reduced in accordance with a critical area report only if:
 - a. The width reduction will not reduce stream or habitat functions, including those of nonfish habitat;
 - b. The width reduction will not degrade the habitat, including habitat for anadromous fish;
 - c. The proposal will provide additional habitat protection;
 - d. The total area contained in the riparian habitat area of each stream on the development proposal site is not decreased;
 - e. The recommended riparian habitat area width is not reduced by more than twenty-five percent (25%) in any one location;⁸³
 - f. The width reduction will not be located within another critical area or associated buffer; and
 - g. The reduced riparian habitat area width is supported by the best available science.
5. **Riparian Habitat Mitigation.** Mitigation of adverse impacts to riparian habitat areas shall result in equivalent functions and values on a per function basis, be located as near the alteration as feasible, and be located in the same sub-drainage basin as the habitat impacted.
6. **Alternative Mitigation for Riparian Habitat Areas.** The performance standards set forth in this Subsection may be modified at the [city/county]'s discretion if the applicant demonstrates that greater habitat functions, on a per function basis, can be obtained in the affected sub-drainage basin as a result of alternative mitigation measures.

E. **Aquatic Habitat.**⁸⁴ The following specific activities may be permitted within a riparian habitat area, pond, lake, water of the state, and marine habitat or associated buffer when the activity complies with the provisions set forth in the [locally adopted shoreline management program] and subject to the standards of this Subsection. The standards that provide the most protection to protected habitat and species shall apply.

⁸³ The Washington Department of Fish and Wildlife recommends not allowing riparian habitat area widths to be reduced by more than twenty-five percent (25%).

⁸⁴ The performance standards for riparian habitat areas, ponds, lakes, waters of the state, and marine habitat are partially derived from the *Pierce County Draft Critical Areas Development Regulations*, 2002.

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1. **Clearing and Grading.** When clearing and grading is permitted as part of an authorized activity or as otherwise allowed in these standards, the following shall apply:
 - a. Grading is allowed only during the dry season, which is typically regarded as beginning on May 1 and ending on October 1 of each year, provided that the [city/county] may extend or shorten the dry season on a case-by-case basis, determined on actual weather conditions.⁸⁵
 - b. Filling or modification of a wetland or wetland buffer is permitted only if it is conducted as part of an approved wetland alteration.
 - c. The soil duff layer shall remain undisturbed to the maximum extent possible. Where feasible, any soil disturbed shall be redistributed to other areas of the project area.
 - d. The moisture-holding capacity of the topsoil layer shall be maintained by minimizing soil compaction or reestablishing natural soil structure and infiltrative capacity on all areas of the project area not covered by impervious surfaces.
 - e. Erosion and sediment control that meets or exceeds the standards set forth in the [*locally adopted stormwater management regulations*] shall be provided.
2. **Shoreline Erosion Control Measures.** New, replacement, or substantially improved shoreline erosion control measures may be permitted in accordance with an approved critical area report that demonstrates the following:
 - a. Natural shoreline processes will be maintained. The project will not result in increased beach erosion or alterations to, or loss of, shoreline substrate within one-quarter (1/4) mile of the project area.
 - b. The shoreline erosion control measures will not degrade fish or wildlife habitat conservation areas or associated wetlands.
 - c. Adequate mitigation measures ensure that there is no net loss of the functions or values of intertidal habitat or riparian habitat as a result of the proposed shoreline erosion control measures.
 - d. The proposed shoreline erosion control measures do not result in alteration of intertidal migration corridors.
3. **Streambank Stabilization.** Streambank stabilization to protect new structures from future channel migration is not permitted except when such stabilization is achieved through bioengineering or soft

Each jurisdiction should review their adopted Shoreline Management Program to ensure consistency between the shoreline and critical area regulations. Some of these standards may already be addressed in the adopted shoreline regulations.

⁸⁵ Applicable in Western Washington.

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armoring techniques in accordance with an approved critical area report.

4. **Launching Ramps – Public or Private.** Launching ramps may be permitted in accordance with an approved critical area report that has demonstrated the following:
 - a. The project will not result in increased beach erosion or alterations to, or loss of, shoreline substrate within one-quarter (1/4) mile of the site;
 - b. The ramp will not adversely impact critical fish or wildlife habitat areas or associated wetlands;
 - c. Adequate mitigation measures ensure that there is no net loss of the functions or values of intertidal habitat or riparian habitat as a result of the ramp; and
 - d. No alteration of intertidal migration corridors will occur as a result of the ramp.

5. **Docks.** Repair and maintenance of an existing dock or pier may be permitted in accordance with an approved critical area report subject to the following:
 - a. There is no increase in the use of materials creating shade for predator species or eelgrass;
 - b. There is no expansion in overwater coverage;
 - c. There is no new spanning of waters between three (3) and thirteen (13) feet deep;
 - d. There is no increase in the size and number of pilings; and
 - e. There is no use of toxic materials (such as creosote) that come in contact with the water.

6. **Roads, Trails, Bridges, and Rights-of-Way.** Construction of trails, roadways, and minor road bridging, less than or equal to thirty (30) feet wide, may be permitted in accordance with an approved critical area report subject to the following standards:
 - a. There is no other feasible alternative route with less impact on the environment;
 - b. The crossing minimizes interruption of downstream movement of wood and gravel;
 - c. Roads in riparian habitat areas or their buffers shall not run parallel to the water body;

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- d. Trails shall be located on the outer edge of the riparian area or buffer, except for limited viewing platforms and crossings;
 - e. Crossings, where necessary, shall only occur as near to perpendicular with the water body as possible;
 - f. Mitigation for impacts is provided pursuant to a mitigation plan of an approved critical area report;
 - g. Road bridges are designed according to the Washington Department of Fish and Wildlife *Fish Passage Design at Road Culverts*, 1999, and the National Marine Fisheries Service *Guidelines for Salmonid Passage at Stream Crossings*, 2000; and
 - h. Trails and associated viewing platforms shall not be made of continuous impervious materials.
7. **Utility Facilities.** New utility lines and facilities may be permitted to cross watercourses in accordance with an approved critical area report, if they comply with the following standards:
- a. Fish and wildlife habitat areas shall be avoided to the maximum extent possible;
 - b. Installation shall be accomplished by boring beneath the scour depth and hyporheic zone of the water body and channel migration zone, where feasible;
 - c. The utilities shall cross at an angle greater than sixty (60) degrees to the centerline of the channel in streams or perpendicular to the channel centerline whenever boring under the channel is not feasible;
 - d. Crossings shall be contained within the footprint of an existing road or utility crossing where possible;
 - e. The utility route shall avoid paralleling the stream or following a down-valley course near the channel; and
 - f. The utility installation shall not increase or decrease the natural rate of shore migration or channel migration.
8. **Public Flood Protection Measures.** New public flood protection measures and expansion of existing ones may be permitted, subject to the [city/county]'s review and approval of a critical area report and the approval of a Federal Biological Assessment by the federal agency responsible for reviewing actions related to a federally listed species.
9. **Instream Structures.** Instream structures, such as, but not limited to, high flow bypasses, sediment ponds, instream ponds, retention and

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detention facilities, tide gates, dams, and weirs, shall be allowed only as part of an approved watershed basin restoration project approved by the [city/county] and upon acquisition of any required state or federal permits. The structure shall be designed to avoid modifying flows and water quality in ways that may adversely affect habitat conservation areas.

10. **Stormwater Conveyance Facilities.** Conveyance structures may be permitted in accordance with an approved critical area report subject to the following standards:
- a. No other feasible alternatives with less impact exist;
 - b. Mitigation for impacts is provided;
 - c. Stormwater conveyance facilities shall incorporate fish habitat features; and
 - d. Vegetation shall be maintained and, if necessary, added adjacent to all open channels and ponds in order to retard erosion, filter out sediments, and shade the water.

11. On-Site Sewage Systems and Wells

- a. New on-site sewage systems and individual wells may be permitted in accordance with an approved critical area report only if accessory to an approved residential structure, for which it is not feasible to connect to a public sanitary sewer system.
- b. Repairs to failing on-site sewage systems associated with an existing structure shall be accomplished by utilizing one of the following methods that result in the least impact:
 - i. Connection to an available public sanitary sewer system;
 - ii. Replacement with a new on-site sewage system located in a portion of the site that has already been disturbed by development and is located landward as far as possible, provided the proposed sewage system is in compliance with the [local health district]; or
 - iii. Repair to the existing on-site septic system.

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Definitions

Words not defined in this Title shall be as defined in the [city/county] code, the Washington Administrative Code, or the Revised Code of Washington. Words not found in either code shall be as defined in the Webster's Third New International Dictionary, latest edition.

A

Active Fault – A fault that is considered likely to undergo renewed movement within a period of concern to humans. Faults are commonly considered to be active if the fault has moved one or more times in the last 10,000 years, but faults may also be considered active in some cases if movement has occurred in the last 500,000 years.

Adaptive Management – Adaptive management relies on scientific methods to evaluate how well regulatory and nonregulatory actions protect the critical area. An adaptive management program is a formal and deliberate scientific approach to taking action and obtaining information in the face of uncertainty.

Adjacent – Immediately adjoining (in contact with the boundary of the influence area) or within a distance that is less than that needed to separate activities from critical areas to ensure protection of the functions and values of the critical areas. Adjacent shall mean any activity or development located:

- A. On a site immediately adjoining a critical area;
 - B. A distance equal to or less than the required critical area buffer width and building setback;
 - C. A distance equal to or less than one-half mile (2,640 feet) from a bald eagle nest;⁸⁶
 - D. A distance equal to or less than three hundred (300) feet upland from a stream, wetland, or water body;⁸⁷
 - E. Bordering or within the floodway, floodplain, or channel migration zone;
- or
- F. A distance equal to or less than two hundred (200) feet from a critical aquifer recharge area.⁸⁸

Advance Mitigation – Mitigation of an anticipated critical area impact or hazard completed according to an approved critical area report and prior to site development.

Agricultural Land – Land primarily devoted to the commercial production of horticultural, viticultural, floricultural, dairy, apiary, or animal products or of

⁸⁶ Distance of 2,640 feet is based on the Washington Department of Fish and Wildlife's *Management Recommendations for Washington's Priority Species, Volume IV: Birds*, 2000.

⁸⁷ Distance of 300 feet is based on maximum recommended riparian habitat area width from the Washington Department of Fish and Wildlife's *Management Recommendations for Washington's Priority Habitats: Riparian*, 1997.

⁸⁸ Distance of 200 feet is a suggested distance to ensure that activities within the critical aquifer recharge area are included under this Title, even when the exact boundaries of the critical aquifer recharge area are not known at the time of application.

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berries, grain, hay, straw, turf, seed, Christmas trees not subject to the excise tax imposed by RCW 84.33.100 through 84.33.140, or livestock, and or that has been designated as long-term commercial significance for agricultural production.

Alluvial Fan Flooding – Flooding occurring on the surface of an alluvial fan or similar landform which originates at the apex and is characterized by high-velocity flows; active processes of erosion, sediment transport, and deposition; and unpredictable flow paths.

Alteration – Any human induced change in an existing condition of a critical area or its buffer. Alterations include, but are not limited to grading, filling, channelizing, dredging, clearing (vegetation), construction, compaction, excavation, or any other activity that changes the character of the critical area.

Anadromous Fish – Fish that spawn and rear in freshwater and mature in the marine environment. While Pacific salmon die after their first spawning, adult char (bull trout) can live for many years, moving in and out of saltwater and spawning each year. The life history of Pacific salmon and char contains critical periods of time when these fish are more susceptible to environmental and physical damage than at other times. The life history of salmon, for example, contains the following stages: upstream migration of adults, spawning, inter-gravel incubation, rearing, smoltification (the time period needed for juveniles to adjust their body functions to live in the marine environment), downstream migration, and ocean rearing to adults.

Applicant – A person who files an application for permit under this Title and who is either the owner of the land on which that proposed activity would be located, a contract purchaser, or the authorized agent of such a person.

Aquifer – A geological formation, group of formations, or part of a formation that is capable of yielding a significant amount of water to a well or spring.

Aquifer, Confined – An aquifer bounded above and below by beds of distinctly lower permeability than that of the aquifer itself and that contains ground water under sufficient pressure for the water to rise above the top of the aquifer.

Aquifer Recharge Areas – Areas that, due to the presence of certain soils, geology, and surface water, act to recharge ground water by percolation.

Aquifer, Sole Source – An area designated by the U.S. Environmental Protection Agency under the Safe Drinking Water Act of 1974, Section 1424(e). The aquifer(s) must supply fifty percent (50%) or more of the drinking water for an area without a sufficient replacement available.

Aquifer Susceptibility – The ease with which contaminants can move from the land surface to the aquifer based solely on the types of surface and subsurface materials in the area. Susceptibility usually defines the rate at which a contaminant will reach an aquifer unimpeded by chemical interactions with the vadose zone media.

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Aquifer, Unconfined – An aquifer not bounded above by a bed of distinctly lower permeability than that of the aquifer itself and containing ground water under pressure approximately equal to that of the atmosphere. This term is synonymous with the term "water table aquifer."

Area of Shallow Flooding – An area designated AO or AH Zone on the flood insurance map(s). The base flood depths range from one (1) to three (3) feet; a clearly defined channel does not exist; the path of flooding is unpredictable and indeterminate; and velocity flow may be evident. AO is characterized as sheet flow and AH indicates ponding.

Avalanche Hazard – An area susceptible to a large mass of snow or ice, sometimes accompanied by other material, moving rapidly down a mountain slope.

B

Base Flood – A flood event having a one percent (1%) chance of being equaled or exceeded in any given year, also referred to as the 100-year flood. Designations of base flood areas on flood insurance map(s) always include the letters A or V.

Basement – Any area of the building having its floor below ground level on all sides.

Best Available Science – Current scientific information used in the process to designate, protect, or restore critical areas, that is derived from a valid scientific process as defined by WAC 365-195-900 through 925. Sources of the best available science are included in *Citations of Recommended Sources of Best Available Science for Designating and Protecting Critical Areas* published by the Washington State Department of Community, Trade and Economic Development.

Best Management Practices (BMPs) – Conservation practices or systems of practices and management measures that:

- A. Control soil loss and reduce water quality degradation caused by high concentrations of nutrients, animal waste, toxics, and sediment;
- B. Minimize adverse impacts to surface water and ground water flow and circulation patterns and to the chemical, physical, and biological characteristics of wetlands;
- C. Protect trees and vegetation designated to be retained during and following site construction and use native plant species appropriate to the site for re-vegetation of disturbed areas; and
- D. Provide standards for proper use of chemical herbicides within critical areas.

When adopting best management practices, each jurisdiction should ensure that the adopted best management practices are consistent with the best available science.

The [city/county] shall monitor the application of best management practices to ensure that the standards and policies of this Title are adhered to.

Biodiversity – The variety of animal and plant life and its ecological processes and interconnections – represented by the richness of ecological systems and the life that depends on them, including human life and economies.

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Breakaway Wall – A wall that is not part of the structural support of the building and is intended through its design and construction to collapse under specific lateral loading forces, without causing damage to the elevated portion of the building or supporting foundation system.

Buffer or Buffer Zone – An area that is contiguous to and protects a critical area which is required for the continued maintenance, functioning, and/or structural stability of a critical area.

C

Channel Migration Zone (CMZ) – The lateral extent of likely movement along a stream or river during the next one-hundred (100) years as determined by evidence of active stream channel movement over the past one-hundred (100) years. Evidence of active movement over the one-hundred (100) year time frame can be inferred from aerial photos or from specific channel and valley bottom characteristics. The time span typically represents the time it takes to grow mature trees that can provide functional large woody debris to streams. A CMZ is not typically present if the valley width is generally less than two (2) bankfull widths, if the stream or river is confined by terraces, no current or historical aerial photographic evidence exists of significant channel movement, and there is no field evidence of secondary channels with recent scour from stream flow or progressive bank erosion at meander bends. Areas separated from the active channel by legally existing artificial channel constraints that limit bank erosion and channel avulsion without hydraulic connections shall not be considered within the CMZ.

Coastal High Hazard Area – An area of special flood hazard extending from offshore to the inland limit of a primary frontal dune along an open coast and any other area subject to high velocity wave action from storms or seismic sources. The area is designated on the flood insurance map(s) as Zone V1-30, VE, or V.

Compensation Project – Actions necessary to replace project-induced critical area and buffer losses, including land acquisition, planning, construction plans, monitoring, and contingency actions.

Compensatory Mitigation – Replacing project-induced losses or impacts to a critical area, and includes, but is not limited to, the following:

Restoration – Actions performed to reestablish wetland functional characteristics and processes that have been lost by alterations, activities, or catastrophic events within an area that no longer meets the definition of a wetland.

Creation – Actions performed to intentionally establish a wetland at a site where it did not formerly exist.

Enhancement – Actions performed to improve the condition of existing degraded wetlands so that the functions they provide are of a higher quality.

Preservation – Actions taken to ensure the permanent protection of existing, high-quality wetlands.

Conservation Easement – A legal agreement that the property owner enters into to restrict uses of the land. Such restrictions can include, but are not limited to, passive recreation uses such as trails or scientific uses and fences or other barriers to protect habitat. The easement is recorded on a property deed, runs with

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the land, and is legally binding on all present and future owners of the property, therefore, providing permanent or long-term protection.

Critical Aquifer Recharge Area – Areas designated by WAC 365-190-080(2) that are determined to have a critical recharging effect on aquifers used for potable water as defined by WAC 365-190-030(2).

Critical Areas – Critical areas include any of the following areas or ecosystems: aquifer recharge areas, fish and wildlife habitat conservation areas, frequently flooded areas, geologically hazardous areas, and wetlands, as defined in RCW 36.70A and this Title.

Critical Area Tract – Land held in private ownership and retained in an open condition in perpetuity for the protection of critical areas. Lands within this type of dedication may include but are not limited to, portions and combinations of forest habitats, grasslands, shrub steppe, on-site watersheds, 100-year floodplains, shorelines or shorelines of statewide significance, riparian areas, and wetlands.

Critical Facility – A facility for which even a slight chance of flooding, inundation, or impact from a hazard event might be too great. Critical facilities include, but are not limited to, schools, nursing homes, hospitals, police, fire and emergency response installations, and installations that produce, use, or store hazardous materials or hazardous waste.

Critical Species – All animal and plant species listed by the state or federal government as threatened or endangered.

Cumulative Impacts or Effects – The combined, incremental effects of human activity on ecological or critical areas functions and values. Cumulative impacts result when the effects of an action are added to or interact with other effects in a particular place and within a particular time. It is the combination of these effects, and any resulting environmental degradation, that should be the focus of cumulative impact analysis and changes to policies and permitting decisions.

D

Developable Area – A site or portion of a site that may be utilized as the location of development, in accordance with the rules of this Title.

Development – Any activity upon the land consisting of construction or alteration of structures, earth movement, dredging, dumping, grading, filling, mining, removal of any sand, gravel, or minerals, driving of piles, drilling operations, bulkheading, clearing of vegetation, or other land disturbance. Development includes the storage or use of equipment or materials inconsistent with the existing use. Development also includes approvals issued by the [city/county] that binds land to specific patterns of use, including but not limited to, subdivisions, short subdivisions, zone changes, conditional use permits, and binding site plans. Development activity does not include the following activities:

- A. Interior building improvements.
- B. Exterior structure maintenance activities, including painting and roofing.

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C. Routine landscape maintenance of established, ornamental landscaping, such as lawn mowing, pruning, and weeding.

D. Maintenance of the following *existing* facilities that does not expand the affected area: septic tanks (routine cleaning); wells; individual utility service connections; and individual cemetery plots in established and approved cemeteries.

Development Permit – Any permit issued by the [city/county], or other authorized agency, for construction, land use, or the alteration of land.

Director – The [director] of the [city/county] planning department or other responsible official, or other city staff granted the authority to act on behalf of the director.

E

Elevated Building – A building that has no basement and its lowest elevated floor is raised above ground level by foundation walls, shear walls, post, piers, pilings, or columns.

Emergent Wetland – A wetland with at least thirty percent (30%) of the surface area covered by erect, rooted, herbaceous vegetation extending above the water surface as the uppermost vegetative strata.

Erosion – The process whereby wind, rain, water, and other natural agents mobilize and transport particles.

Erosion Hazard Areas – At least those areas identified by the U.S. Department of Agriculture National Resources Conservation Service as having a “severe” rill and inter-rill erosion hazard.

Exotic – Any species of plants or animals, which are foreign to the planning area.

F

Fish and Wildlife Habitat Conservation Areas – Areas necessary for maintaining species in suitable habitats within their natural geographic distribution so that isolated subpopulations are not created as designated by WAC 365-190-080(5). These areas include:

A. Areas with which state or federally designated endangered, threatened, and sensitive species have a primary association;

B. Habitats of local importance, including but not limited to areas designated as priority habitat by the Washington Department of Fish and Wildlife;

C. Commercial and recreational shellfish areas;

D. Kelp and eelgrass beds;

E. Herring and smelt spawning areas;

F. Naturally occurring ponds under twenty (20) acres and their submerged aquatic beds that provide fish or wildlife habitat, including those artificial ponds intentionally created from dry areas in order to mitigate impacts to ponds;

G. Waters of the state, including lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, and all other surface waters and watercourses within the jurisdiction of the state of Washington;

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H. Lakes, ponds, streams, and rivers planted with game fish by a governmental or tribal entity;

I. State natural area preserves and natural resource conservation areas; and

J. Land essential for preserving connections between habitat blocks and open spaces.

Fish Habitat – Habitat that is used by fish at any life stage at any time of the year, including potential habitat likely to be used by fish that could be recovered by restoration or management and includes off-channel habitat.⁸⁹

Flood or Flooding – A general and temporary condition of partial or complete inundation of normally dry land areas from the overflow of inland waters and/or the unusual and rapid accumulation of runoff of surface waters from any source.

Flood Insurance Map – The official map on which the Federal Insurance Administration has delineated the areas of special flood hazards and include the risk premium zones applicable to the community. Also known as “flood insurance rate map” or “FIRM.”

Flood Insurance Study – The official report provided by the Federal Insurance Administration that includes flood profiles, the Flood Boundary-Floodway Map, and the water surface elevation of the base flood.

Floodplain – The total land area adjoining a river, stream, watercourse, or lake subject to inundation by the base flood.

Flood Protection Elevation – The elevation that is one (1) foot above the base flood elevation.

Flood Resistant Material – Materials designed to be resistant to the impacts associated with flooding and defined and described in detail in the Federal Emergency Management Agency’s Technical Bulletin #2-93, 1993 and FEMA publication FEMA-348, *Protecting Building Utilities from Flood Damage*.

Floodway – The channel of a river or other watercourse and the adjacent land area that must be reserved in order to discharge the base flood without cumulatively increasing the surface water elevation more than one (1) foot. Also known as the "zero rise floodway."

Forested Wetland – A wetland with at least thirty percent (30%) of the surface area covered by woody vegetation greater than twenty (20) feet in height that is at least partially rooted within the wetland.

Formation – An assemblage of earth materials grouped together into a unit that is convenient for description or mapping.

Formation, Confining – The relatively impermeable formation immediately overlying a confined aquifer.

⁸⁹ See WAC 222-16-030(5)(h).

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Frequently Flooded Areas – Lands in the floodplain subject to a one percent (1%) or greater chance of flooding in any given year and those lands that provide important flood storage, conveyance, and attenuation functions, as determined by the [director] in accordance with WAC 365-190-080(3). Frequently flooded areas perform important hydrologic functions and may present a risk to persons and property. Classifications of frequently flooded areas include, at a minimum, the 100-year floodplain designations of the Federal Emergency Management Agency and the National Flood Insurance Program.

Functions and Values – The beneficial roles served by critical areas including, but are not limited to, water quality protection and enhancement; fish and wildlife habitat; food chain support; flood storage, conveyance and attenuation; ground water recharge and discharge; erosion control; wave attenuation; protection from hazards; historical, archaeological, and aesthetic value protection; educational opportunities; and recreation. These beneficial roles are not listed in order of priority. Critical area functions can be used to help set targets (species composition, structure, etc.) for managed areas, including mitigation sites.

G

Geologically Hazardous Areas – Areas that may not be suited to development consistent with public health, safety, or environmental standards, because of their susceptibility to erosion, sliding, earthquake, or other geological events as designated by WAC 365-190-080(4). Types of geologically hazardous areas include: erosion, landslide, seismic, mine, and volcanic hazards.

Ground Water – Water in a saturated zone or stratum beneath the surface of land or a surface water body.

Ground Water Management Area – A specific geographic area or subarea designated pursuant to Chapter 173-100 WAC for which a ground water management program is required.

Ground Water Management Program – A comprehensive program designed to protect ground water quality, to ensure ground water quantity, and to provide for efficient management of water resources while recognizing existing ground water rights and meeting future needs consistent with local and state objectives, policies, and authorities within a designated ground water management area or subarea and developed pursuant to Chapter 173-100 WAC.

Ground Water, Perched – Ground water in a saturated zone is separated from the underlying main body of ground water by an unsaturated rock zone.

Growth Management Act – RCW 36.70A and 36.70B, as amended.

H

Habitat Conservation Areas – Areas designated as fish and wildlife habitat conservation areas.

Habitats of Local Importance – These areas include a seasonal range or habitat element with which a given species has a primary association, and which, if

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altered may reduce the likelihood that the species will maintain and reproduce over the long-term. These might include areas of high relative density or species richness, breeding habitat, winter range, and movement corridors. These might also include habitats that are of limited availability or high vulnerability to alterations such as cliffs, talus, and wetlands. (WAC 365-190-030)

Hazard Areas – Areas designated as frequently flooded areas or geologically hazardous areas due to potential for erosion, landslide, seismic activity, mine collapse, or other geological condition.

Hazardous Substances – Any liquid, solid, gas, or sludge, including any material, substance, product, commodity, or waste, regardless of quantity, that exhibits any of the physical, chemical, or biological properties described in WAC 173-303-090 or 173-303-100.

High Intensity Land Use – Land uses which are associated with high levels of human disturbance or substantial habitat impacts including, but not limited to, medium- and high-density residential (more than one home per five acres), multifamily residential, some agricultural practices, and commercial and industrial land uses.

High Quality Wetlands – Those wetlands that meet the following criteria:

- A. No, or isolated, human alteration of the wetland topography;
- B. No human-caused alteration of the hydrology or the wetland appears to have recovered from the alteration;
- C. Low cover and frequency of exotic plant species;
- D. Relatively little human-related disturbance of the native vegetation, or recovery from past disturbance;
- E. If the wetland system is degraded, it still contains a viable and high quality example of a native wetland community; and
- F. No known major water quality problems.

Historic Condition – Condition of the land, including flora, fauna, soil, topography, and hydrology that existed before the area and vicinity were developed or altered by human activity.

Hydraulic Project Approval (HPA) – A permit issued by the Washington Department of Fish and Wildlife for modifications to waters of the state in accordance with Chapter 75.20 RCW.

Hydric Soil – A soil that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part. The presence of hydric soil shall be determined following the methods described in the *Washington State Wetland Identification and Delineation Manual*.

Hydrologic Soil Groups – Soils grouped according to their runoff-producing characteristics under similar storm and cover conditions. Properties that influence runoff potential are depth to seasonally high water table, intake rate and permeability after prolonged wetting, and depth to a low permeable layer. Hydrologic soil groups are normally used in equations that estimate runoff from

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rainfall, but can be used to estimate a rate of water transmission in soil. There are four hydrologic soil groups:

Low Runoff potential and a high rate of infiltration potential;

Moderate Infiltration potential and a moderate rate of runoff potential;

Slow Infiltration potential and a moderate to high rate of runoff potential;

and

High Runoff potential and very slow infiltration and water transmission rates.

Hydrophytic Vegetation – Macrophytic plant life growing in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content. The presence of hydrophytic vegetation shall be determined following the methods described in the *Washington State Wetland Identification and Delineation Manual*.

Hyporheic Zone – The saturated zone located beneath and adjacent to streams that contains some portion of surface waters, serves as a filter for nutrients, and maintains water quality.

Impervious Surface – A hard surface area that either prevents or retards the entry of water into the soil mantle as under natural conditions prior to development or that causes water to run off the surface in greater quantities or at an increased rate of flow from the flow present under natural conditions prior to development. Common impervious surfaces include, but are not limited to, rooftops, walkways, patios, driveways, parking lots or storage areas, concrete or asphalt paving, gravel roads, packed earthen materials, and oiled macadam or other surfaces which similarly impede the natural infiltration of stormwater.

In-Kind Compensation – To replace critical areas with substitute areas whose characteristics and functions closely approximate those destroyed or degraded by a regulated activity. It does not mean replacement "in-category."

Isolated Wetlands – Those wetlands that are outside of and not contiguous to any 100-year floodplain of a lake, river, or stream and have no contiguous hydric soil or hydrophytic vegetation between the wetland and any surface water.

Infiltration – The downward entry of water into the immediate surface of soil.

Injection Well(s)

A. **Class I** – A well used to inject industrial, commercial, or municipal waste fluids beneath the lowermost formation containing, within one quarter (1/4) mile of the well bore, an underground source of drinking water.

B. **Class II** – A well used to inject fluids:

1. Brought to the surface in connection with conventional oil or natural gas exploration or production and may be commingled with wastewaters from gas plants that are an integral part of production operations, unless those waters are classified as dangerous wastes at the time of injection;
2. For enhanced recovery of oil or natural gas; or

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3. For storage of hydrocarbons that are liquid at standard temperature and pressure.

C. **Class III** – A well used for extraction of minerals, including but not limited to the injection of fluids for:

1. In-situ production of uranium or other metals that have not been conventionally mined;
2. Mining of sulfur by Frasch process; or
3. Solution mining of salts or potash.

D. **Class IV** – A well used to inject dangerous or radioactive waste fluids.

E. **Class V** – All injection wells not included in Classes I, II, III, or IV.

Inter-Rill – Areas subject to sheet wash.

J

Joint Aquatic Resource Permits Application – A single application form that may be used to apply for hydraulic project approvals, shoreline management permits, approvals of exceedance of water quality standards, water quality certifications, coast guard bridge permits, Washington State Department of Natural Resources use authorization, and U.S. Army Corps of Engineers permits.

L

Lahars – Mudflows and debris flows originating from the slopes of a volcano.

Land Use, High Intensity – See “High Intensity Land Use.”

Land Use, Low Intensity – See “Low Intensity Land Use.”

Land Use, Moderate Intensity – See “Moderate Intensity Land Use.”

Landslide Hazard Areas – Areas that are potentially subject to risk of mass movement due to a combination of geologic landslide resulting from a combination of geologic, topographic, and hydrologic factors. These areas are typically susceptible to landslides because of a combination of factors including: bedrock, soil, slope gradient, slope aspect, geologic structure, ground water, or other factors.

Low Intensity Land Use – Land uses which are associated with low levels of human disturbance or low habitat impacts, including, but not limited to, passive recreation, open space, or forest management land uses.

Lowest Floor – The lowest floor of the lowest enclosed area, including the basement. An unfinished or flood resistant enclosure, usable solely for parking of vehicles, building access, or storage in an area other than a basement area, which is not considered a building’s lowest floor, provided that such enclosure is not built so as to render the structure in violation of the applicable requirements of this Title.

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M

Manufactured Home – A structure, transportable in one or more sections, which is built on a permanent chassis and is designed for use with or without a permanent foundation when attached to the required utilities. The term “manufactured home” does not include a “recreational vehicle.”

Manufactured Home Park or Subdivision – A parcel (or contiguous parcels) of land divided into two or more manufactured home lots for rent or sale.

Mine Hazard Areas – Areas that are underlain by, adjacent to, or affected by mine workings such as adits, gangways, tunnels, drifts, or airshafts, and those areas of probable sink holes, gas releases, or subsidence due to mine workings. Factors that should be considered include: proximity to development, depth from ground surface to the mine working, and geologic material.

Mitigation – Avoiding, minimizing, or compensating for adverse critical areas impacts. Mitigation, in the following sequential order of preference, is:

- A. Avoiding the impact altogether by not taking a certain action or parts of an action;
- B. Minimizing impacts by limiting the degree or magnitude of the action and its implementation, by using appropriate technology, or by taking affirmative steps, such as project redesign, relocation, or timing, to avoid or reduce impacts;
- C. Rectifying the impact to wetlands, critical aquifer recharge areas, and habitat conservation areas by repairing, rehabilitating, or restoring the affected environment to the conditions existing at the time of the initiation of the project;
- D. Minimizing or eliminating the hazard by restoring or stabilizing the hazard area through engineered or other methods;
- E. Reducing or eliminating the impact or hazard over time by preservation and maintenance operations during the life of the action;
- F. Compensating for the impact to wetlands, critical aquifer recharge areas, and habitat conservation areas by replacing, enhancing, or providing substitute resources or environments; and
- G. Monitoring the hazard or other required mitigation and taking remedial action when necessary.

Mitigation for individual actions may include a combination of the above measures.

Moderate Intensity Land Use – Land uses which are associated with moderate levels of human disturbance or substantial habitat impacts including, but not limited to, low-density residential (no more than one home per five acres), active recreation, and moderate agricultural land uses.

Monitoring – Evaluating the impacts of development proposals on the biological, hydrological, and geological elements of such systems, and assessing the performance of required mitigation measures throughout the collection and analysis of data by various methods for the purpose of understanding and documenting changes in natural ecosystems and features, including gathering baseline data.

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N

Native Vegetation – Plant species that are indigenous to the area in question.

Native Growth Protection Area (NGPA) – An area where native vegetation is preserved for the purpose of preventing harm to property and the environment, including, but not limited to, controlling surface water runoff and erosion, maintaining slope stability, buffering, and protecting plants and animal habitat;

Natural Waters – Waters, excluding water conveyance systems that are artificially constructed and actively maintained for irrigation.⁹⁰

Non-conformity – A legally established existing use or legally constructed structure that is not in compliance with current regulations.

Non-indigenous – See “Exotic.”

O

Off-Site Compensation – To replace critical areas away from the site on which a critical area has been impacted.

On-site Compensation – To replace critical areas at or adjacent to the site on which a critical areas has been impacted.

Ordinary High Water Mark (OHM) – That mark which is found by examining the bed and banks and ascertaining where the presence and action of waters are so common and usual, and so long continued in all ordinary years, that the soil has a character distinct from that of the abutting upland in respect to vegetation.

Out-of-Kind Compensation – To replace critical areas with substitute critical areas whose characteristics do not closely approximate those destroyed or degraded. It does not refer to replacement "out-of-category."

P

Perched Ground Water – See “Ground Water, Perched.”

Permeability – The capacity of an aquifer or confining bed to transmit water. It is a property of the aquifer or confining bed and is independent of the force causing movement.

Porous Soil Types – Soils, as identified by the National Resources Conservation Service, U.S. Department of Agriculture, that contain voids, pores, interstices, or other openings which allow the passing of water.

Potable Water – Water that is safe and palatable for human use.

⁹⁰ See WAC 222-16-030(5)(d) and WAC 222-16-031(6)(d).

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Practical Alternative – An alternative that is available and capable of being carried out after taking into consideration cost, existing technology, and logistics in light of overall project purposes, and has less impacts to critical areas.

Primary Association Area – The area used on a regular basis by, is in close association with, or is necessary for the proper functioning of the habitat of a critical species. Regular basis means that the habitat area is normally, or usually known to contain a critical species, or based on known habitat requirements of the species, the area is likely to contain the critical species. Regular basis is species and population dependent. Species that exist in low numbers may be present infrequently yet rely on certain habitat types.

Priority Habitat – Habitat type or elements with unique or significant value to one or more species as classified by the state Department of Fish and Wildlife. A priority habitat may consist of a unique vegetation type or dominant plant species, a described successional stage, or a specific structural element.⁹¹

Project Area – All areas within fifty (50) feet of the area proposed to be disturbed, altered, or used by the proposed activity or the construction of any proposed structures. When the action binds the land, such as a subdivision, short subdivision, binding site plan, planned unit development, or rezone, the project area shall include the entire parcel, at a minimum.

Q

Qualified Professional – A person with experience and training in the pertinent scientific discipline, and who is a qualified scientific expert with expertise appropriate for the relevant critical area subject in accordance with WAC 365-195-905(4). A qualified professional must have obtained a B.S. or B.A. or equivalent degree in biology, engineering, environmental studies, fisheries, geomorphology, or related field, and two years of related work experience.

A. A qualified professional for habitats or wetlands must have a degree in biology and professional experience related to the subject species.

B. A qualified professional for a geological hazard must be a professional engineer or geologist, licensed in the state of Washington.

C. A qualified professional for critical aquifer recharge areas means a hydrogeologist, geologist, engineer, or other scientist with experience in preparing hydrogeologic assessments.

R

Recharge – The process involved in the absorption and addition of water to ground water.

Reclaimed Water – Municipal wastewater effluent that has been adequately and reliability treated so that it is suitable for beneficial use. Following treatment it is no longer considered wastewater (treatment levels and water quality requirements are given in the water reclamation and reuse standards adopted by the state departments of Ecology and Health).

⁹¹ See WAC 173-26-020(34).

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Recreation Vehicle – A vehicle that is:

- A. Built on a single chassis;
- B. Four hundred (400) square feet or less when measured at the largest horizontal projection;
- C. Designed to be self-propelled or permanently towable by a light duty truck; and
- D. Designed primarily not for use as a permanent dwelling but as temporary living quarters for recreational, camping, travel, or seasonal use.

Repair or Maintenance – An activity that restores the character, scope, size, and design of a serviceable area, structure, or land use to its previously authorized and undamaged condition. Activities that change the character, size, or scope of a project beyond the original design and drain, dredge, fill, flood, or otherwise alter critical areas are not included in this definition.

Restoration – Measures taken to restore an altered or damaged natural feature including:

- A. Active steps taken to restore damaged wetlands, streams, protected habitat, or their buffers to the functioning condition that existed prior to an unauthorized alteration; and
- B. Actions performed to reestablish structural and functional characteristics of the critical area that have been lost by alteration, past management activities, or catastrophic events.

Rills – Steep-sided channels resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery. Rill erosion tends to occur on slopes, particularly steep slopes with poor vegetative cover.

Riparian Habitat – Areas adjacent to aquatic systems with flowing water that contain elements of both aquatic and terrestrial ecosystems that mutually influence each other. The width of these areas extends to that portion of the terrestrial landscape that directly influences the aquatic ecosystem by providing shade, fine or large woody material, nutrients, organic and inorganic debris, terrestrial insects, or habitat for riparian-associated wildlife. Widths shall be measured from the ordinary high water mark or from the top of bank if the ordinary high water mark cannot be identified. It includes the entire extent of the floodplain and the extent of vegetation adapted to wet conditions as well as adjacent upland plant communities that directly influence the stream system. Riparian habitat areas include those riparian areas severely altered or damaged due to human development activities.⁹²

River – See “Watercourse.”

S

Scientific Process – A valid scientific process is one that produces reliable information useful in understanding the consequences of a decision. The characteristics of a valid scientific process are as follows:

⁹² See Washington Department of Fish and Wildlife’s *Management Recommendations for Washington’s Priority Habitats – Riparian*, 1997, page 4.

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A. **Peer Review.** The information has been critically reviewed by other qualified scientific experts in that scientific discipline.

B. **Methods.** The methods that were used are standardized in the pertinent scientific discipline or the methods have been appropriately peer-reviewed to ensure their reliability and validity.

C. **Logical Conclusions and Reasonable Inferences.** The conclusions presented are based on reasonable assumptions supported by other studies and are logically and reasonably derived from the assumptions and supported by the data presented.

D. **Quantitative Analysis.** The data have been analyzed using appropriate statistical or quantitative methods.

E. **Context.** The assumptions, analytical techniques, data, and conclusions are appropriately framed with respect to the prevailing body of pertinent scientific knowledge.

F. **References.** The assumptions, techniques, and conclusions are well referenced with citations to pertinent existing information.

Scrub-Shrub Wetland – A wetland with at least thirty percent (30%) of its surface area covered by woody vegetation less than twenty (20) feet in height as the uppermost strata.

Section 404 Permit – A permit issued by the U.S. Army Corps of Engineers for the placement of dredge or fill material or clearing in waters of the United States, including wetlands, in accordance with 33 USC § 1344. Section 404 permits may also be for endangered species consultation. They require a consultation under Section 7 of the Federal Endangered Species Act.

Seeps – A spot where water oozes from the earth, often forming the source of a small stream.

Seismic Hazard Areas – Areas that are subject to severe risk of damage as a result of earthquake-induced ground shaking, slope failure, settlement, or soil liquefaction.

Serviceable – Presently usable.

SEPA – Washington State Environmental Policy Act, Chapter 43.21C RCW.

Shorelines – All of the water areas of the state as defined in RCW 90.58.030, including reservoirs and their associated shorelands, together with the lands underlying them except:

A. Shorelines of statewide significance;

B. Shorelines on segments of streams upstream of a point where the mean annual flow is twenty cubic feet per second (20 cfs) or less and the wetlands associated with such upstream segments; and

C. Shorelines on lakes less than twenty (20) acres in size and wetlands associated with such small lakes.

Shorelines of the State – The total of all “shorelines,” as defined in RCW 90.58.030(2)(d), and “shorelines of statewide significance” within the state, as defined in RCW 90.58.030(2)(c).

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Shorelines of Statewide Significance – Those areas defined in RCW 90.58.030(2)(e).

Shorelands or Shoreland Areas – Those lands extending landward for two hundred (200) feet in all directions as measured on a horizontal plane from the ordinary high water mark; floodways and contiguous floodplain areas landward two hundred (200) feet from such floodways; and all wetlands and river deltas associated with the streams, lakes, and tidal waters which are subject to the provisions of Chapter 90.58 RCW.

Significant Portion of its Range – That portion of a species range likely to be essential to the long-term survival of the population in Washington.

Soil Survey – The most recent soil survey for the local area or county by the National Resources Conservation Service, U.S. Department of Agriculture.

Special Flood Hazard Areas – The land in the floodplain within an area subject to a one percent (1%) or greater chance of flooding in any given year. Designations of special flood hazard areas on flood insurance map(s) always include the letters A or V.

Special Protection Areas – Aquifer recharge areas defined by WAC 173-200-090 that require special consideration or increased protection because of unique characteristics, including, but not limited to:

- A. Ground waters that support an ecological system requiring more stringent criteria than drinking water standards;
- B. Ground water recharge areas and wellhead protection areas that are vulnerable to pollution because of hydrogeologic characteristics; and
- C. Sole source aquifer status.

Sole Source Aquifer – See “Aquifer, Sole Source.”

Species – Any group of animals classified as a species or subspecies as commonly accepted by the scientific community.

Species, Endangered – Any fish or wildlife species that is threatened with extinction throughout all or a significant portion of its range and is listed by the state or federal government as an endangered species.

Species of Local Importance – Those species of local concern due to their population status or their sensitivity to habitat manipulation, or that are game species.

Species, Priority – Any fish or wildlife species requiring protective measures and/or management guidelines to ensure their persistence as genetically viable population levels as classified by the Washington Department of Fish and Wildlife, including endangered, threatened, sensitive, candidate and monitor species, and those of recreational, commercial, or tribal importance.

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Species, Threatened – Any fish or wildlife species that is likely to become an endangered species within the foreseeable future throughout a significant portion of its range without cooperative management or removal of threats, and is listed by the state or federal government as a threatened species.

Stream – See “Watercourse.”

Sub-drainage Basin or Subbasin – The drainage area of the highest order stream containing the subject property impact area. Stream order is the term used to define the position of a stream in the hierarchy of tributaries in the watershed. The smallest streams are the highest order (first order) tributaries. These are the upper watershed streams and have no tributaries of their own. When two first order streams meet, they form a second order stream, and when two second order streams meet they become a third order stream, and so on.

Substantial Damage – Damage of any origin sustained by a structure whereby the cost of restoring the structure to its before damaged condition would equal or exceed fifty percent (50%) of the market value of the structure before the damage occurred.

Substantial Improvement – Any repair, reconstruction, or improvement of a structure, the cost of which equals or exceeds fifty percent (50%) of the market value of the structure either: before the improvement or repair is started; or if the structure has been damaged and is being restored, before the damage occurred.

U

Unavoidable – Adverse impacts that remain after all appropriate and practicable avoidance and minimization have been achieved.⁹³

V

Volcanic Hazard Areas – Areas that are subject to pyroclastic flows, lava flows, debris avalanche, or inundation by debris flows, mudflows, or related flooding resulting from volcanic activity.

Vulnerability – The combined effect of susceptibility to contamination and the presence of potential contaminants.

W

Water Dependent – A use or portion of a use that cannot exist in a location that is not adjacent to the water, but is dependent on the water by reason of the intrinsic nature of its operations. A use that can be carried out only on, in, or adjacent to water. Examples of water dependent uses include: ship cargo terminal loading areas; fishing; ferry and passenger terminals; barge loading, ship building, and dry docking facilities; marinas, moorage, and boat launching facilities; aquaculture; float plane operations; surface water intake; and sanitary sewer and storm drain outfalls.

⁹³ See RCW 90.84.010(9).

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Water Resource Inventory Area (WRIA) – One of sixty-two (62) watersheds in the state of Washington, each composed of the drainage areas of a stream or streams, as established in Chapter 173-500 WAC as it existed on January 1, 1997.

Water Table – That surface in an unconfined aquifer at which the pressure is atmospheric. It is defined by the levels at which water stands in wells that penetrate the aquifer just far enough to hold standing water.

Water Table Aquifer – See “Aquifer, Unconfined.”

Water Typing System – Waters classified according to WAC 222-16-031 as follows:

A. **Type 1 Water** – All waters, within their ordinary high-water mark, as inventoried as "shorelines of the state" under Chapter 90.58 RCW and the rules promulgated pursuant to Chapter 90.58 RCW, but not including those waters' associated wetlands as defined in Chapter 90.58 RCW.

B. **Type 2 Water** – Segments of natural waters that are not classified as Type 1 Water and have a high fish, wildlife, or human use. These are segments of natural waters and periodically inundated areas of their associated wetlands, which:

1. Are diverted for domestic use by more than one hundred (100) residential or camping units or by a public accommodation facility licensed to serve more than ten (10) persons, where such diversion is determined by the Washington State Department of Natural Resources to be a valid appropriation of water and only considered Type 2 Water upstream from the point of such diversion for 1,500 feet or until the drainage area is reduced by fifty percent (50%), or whichever is less;
2. Are diverted for use by federal, state, tribal, or private fish hatcheries. Such waters shall be considered Type 2 Water upstream from the point of diversion for 1,500 feet, including tributaries if highly significant for protection of downstream water quality;
3. Are within a federal, state, local, or private campground having more than thirty (30) 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 one hundred (100) feet of a camping unit;
4. Are used by fish for spawning, rearing or migration. Waters having the following characteristics are presumed to have highly significant fish populations:
 - a. Stream segments having a defined channel twenty (20) feet or greater within the bankfull width and having a gradient of less than four percent (4%).
 - b. Lakes, ponds, or impoundments having a surface area of one (1) acre or greater at seasonal low water; or
5. 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:

WAC 222-16-030 has been converted to the Washington State Department of Natural Resources' new water typing system – S, F, Np, Ns – and the previous water typing system, shown here. It is now documented under WAC 222-16-031. Jurisdictions are encouraged to convert to the new water typing system when critical areas maps and information for the local area using the new system is available.

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- a. The site must be connected to a fish bearing stream and be accessible during some period of the year; and
- b. The off-channel water must be accessible to fish through a drainage with less than a five percent (5%) gradient.

C. Type 3 Water – Segments of natural waters that are not classified as Type 1 or 2 Waters and have a moderate to slight fish, wildlife, and human use. These are segments of natural waters and periodically inundated areas of their associated wetlands which:

1. Are diverted for domestic use by more than ten (10) residential or camping units or by a public accommodation facility licensed to serve more than ten (10) persons, where such diversion is determined by the Washington State Department of Natural Resources to be a valid appropriation of water and the only practical water source for such users. Such waters shall be considered to be Type 3 Water upstream from the point of such diversion for 1,500 feet or until the drainage area is reduced by fifty percent (50%), whichever is less; or
2. Are used by fish for spawning, rearing, or migration. The requirements for determining fish use are described in the State Forest Practices Board Manual, Section 13. If fish use has not been determined:
 - a. Waters having the following characteristics are presumed to have fish use:
 - i. Stream segments having a defined channel of two (2) feet or greater within the bankfull width in Western Washington; or three (3) feet or greater in width in Eastern Washington; and having a gradient of sixteen percent (16%) or less;
 - ii. Stream segments having a defined channel or two (2) feet or greater within the bankfull width in Western Washington; or three (3) feet or greater within the bankfull width in Eastern Washington; and having a gradient greater than sixteen percent (16%) and less than or equal to twenty percent (20%), and having greater than fifty (50) acres in contributing basin size in Western Washington or greater than 175 acres contributing basin size in Eastern Washington, based on hydrographic boundaries;
 - iii. Ponds or impoundments having a surface area of less than one (1) acre at seasonal low water and having an outlet to a fish stream; and
 - iv. Ponds of impoundments having a surface area greater than one half (0.5) acre at seasonal low water.
 - b. The Washington State Department of Natural Resources shall waive or modify the characteristics in (a) of this Subsection where:
 - i. Waters have confirmed, long-term, naturally occurring water quality parameters incapable of supporting fish;

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- ii. Snowmelt streams have short flow cycles that do not support successful life history phases of fish. These streams typically have no flow in the winter months and discontinue flow by June 1; or
- iii. Sufficient information about a geomorphic region is available to support a departure from the characteristics in (a) of this Subsection, as determined in consultation with the Washington Department of Fish and Wildlife, Washington State Department of Ecology, affected tribes, and interested parties.

D. Type 4 Water – All segments of natural waters within the bankfull width of defined channels that are perennial nonfish habitat streams. Perennial streams are waters that do not go dry any time of a year of normal rainfall. However, for the purpose of water typing, Type 4 Waters include the intermittent dry portions of the perennial channel below the uppermost point of perennial flow. If the uppermost point of perennial flow cannot be identified with simple, nontechnical observations (see *State Forest Practices Board Manual*, Section 23), then Type 4 Waters begin at a point along the channel where the contributing basin area is:

1. At least thirteen (13) acres in the Western Washington coastal zone (which corresponds to the Sitka spruce zone defined in Franklin and Dyrness, 1973);
2. At least fifty two (52) acres in other locations in Western Washington;
or
3. At least three hundred (300) acres in Eastern Washington.

E. Type 5 Waters – All segments of natural waters within the bankfull width of the defined channels that are not Type 1, 2, 3, or 4 Waters. These are seasonal, nonfish habitat streams in which surface flow is not present for at least some portion of the year and are not located downstream from any stream reach that is a Type 4 Water. Type 5 Waters must be physically connected by an above-ground channel system to Type 1, 2, 3, or 4 Waters.

Watercourse – Any portion of a channel, bed, bank, or bottom waterward of the ordinary high water line of waters of the state including areas in which fish may spawn, reside, or through which they may pass, and tributary waters with defined beds or banks, which influence the quality of fish habitat downstream. This definition includes watercourses that flow on an intermittent basis or which fluctuate in level during the year and applies to the entire bed of such watercourse whether or not the water is at peak level. This definition does not include irrigation ditches, canals, stormwater run-off devices, or other entirely artificial watercourses, except where they exist in a natural watercourse that has been altered by humans.

Well – A bored, drilled, or driven shaft, or a dug hole whose depth is greater than the largest surface dimension for the purpose of withdrawing or injecting water or other liquids.

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Wellhead Protection Area (WHPA) – The portion of a zone of contribution for a well, wellfield, or spring, as defined using criteria established by the Washington State Department of Ecology.

Wetlands – Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. Wetlands do not include those artificial wetlands intentionally created from non-wetland sites, including, but not limited to, irrigation and drainage ditches, grass-lined swales, canals, detention facilities, wastewater treatment facilities, farm ponds, and landscape amenities, or those wetlands created after July 1, 1990, that were unintentionally created as a result of the construction of a road, street, or highway. Wetlands may include those artificial wetlands intentionally created from non-wetland areas to mitigate the conversion of wetlands. For identifying and delineating a wetland, local government shall use the *Washington State Wetland Identification and Delineation Manual*.

Wetland Classes, Classes of Wetlands, or Wetland Types – The descriptive classes of the wetlands taxonomic classification system of the U.S. Fish and Wildlife Service (Cowardin, et al. 1979).

Wetland Edge – The boundary of a wetland as delineated based on the definitions contained in this Title.

Wetlands Mitigation Bank – A site where wetlands are restored, created, enhanced, or in exceptional circumstances, preserved expressly for the purpose of providing compensatory mitigation in advance of authorized impacts to similar resources.⁹⁴

Z

Zone of Contribution – The area surrounding a well or spring that encompasses all areas or features that supply ground water recharge to the well or spring.

⁹⁴ See RCW 90.84.010(5).

