

# Critical Area Type Summary Sheets

CRITICAL AQUIFER RECHARGE AREA
Why are critical aquifer recharge areas being protected?
Critical aquifer recharge areas (CARAs) are protected to preserve the quantity and quality of groundwater used for drinking water. CARAs are vulnerable to contamination or susceptible to reduced recharge. CARAs are one of the five types of critical areas identified in the Growth Management Act (GMA) <sup>1</sup> .
What is protected within critical aquifer recharge area?
The ground that water seeps through before reaching the aquifers must be free of heavy metals, harmful chemicals, and pollutants, including “forever chemicals,” that can contaminate the City’s water supplies. The ground itself within CARAs must also be somewhat pervious in order for rainwater to replenish the aquifers.
How is a critical aquifer recharge area defined?
<p>Critical aquifer recharge areas are areas in the City of Sammamish that have a critical effect on aquifers used for potable water. CARAs include <i>wellhead protection areas</i>, which are the surface and subsurface areas surrounding the well, through which contaminants are reasonably likely to move toward and reach the aquifer beneath it.</p> <p>The <i>capture zone</i> of a wellhead protection area is how long it takes a molecule of water to reach the well.</p> <p>CARAs are classified based on the following criteria:</p> <ul style="list-style-type: none"> <li>a) Class 1 CARAs include those areas located within the mapped <b>one- or five-year capture zone of a wellhead protection area</b>.</li> <li>b) Class 2 CARAs include those areas located within the mapped <b>10-year capture zone of a wellhead protection area</b>.</li> <li>c) Class 3 CARAs include those areas outside wellhead protection areas that are identified as <b>high aquifer recharge potential areas</b> based on geology and soil types.</li> </ul>
How are critical aquifer recharge areas currently protected?
<p>CARAs are currently protected by requiring additional standards for activities within designated CARAs, including prohibiting activities that have the potential to increase the risk of contamination of drinking water supplies.</p> <p>In all CARAs, applicants are required to follow certain surface water infiltration standards to preserve and protect drinking water. Activities may only be permitted in a CARA if the proposed activity will not result in a significant increased risk of contamination of drinking water supplies.</p>

<sup>1</sup> [RCW 36.70A.030\(11\)](#)

**Using Best Available Science (BAS), how should critical aquifer recharge areas be protected?**

Additional development standards are required to protect the groundwater quantity and quality within designated CARAs. Certain uses or activities should be prohibited based on the potential impact to the aquifer or may require additional report requirements to ensure adverse impacts can be minimized or mitigated. For example, a hydrogeologic critical area assessment report is required to be prepared by a qualified professional to determine potential impacts of contaminants on the aquifer for facilities handling and storing hazardous materials that are regulated by the State Department of Ecology.

Regulatory protections for groundwater quality and quantity could be improved by defining injection wells in relation to low-impact development techniques.

The current 2021 Ecology (ECY) CARA Guidance recommends the following steps to characterize and protect CARAs in a local community:

1. Identify where groundwater resources are located.
2. Analyze the susceptibility of the natural setting where groundwater occurs.
3. Inventory existing potential sources of groundwater contamination.
4. Classify the relative vulnerability of groundwater to contamination events.
5. Designate areas that are most at risk of contamination events.
6. Protect by minimizing activities and conditions that pose contamination risks.
7. Ensure that contamination prevention plans and best management practices are implemented and followed, including application of BMPs in the Stormwater Management and Site Development Manual for new developments in aquifer recharge areas. Review BMPs for infiltration designs with water quality treatment. Stormwater control usually affects the vadose zone and seasonal water tables with low risk to deeper water supply aquifers. Some exceptions are those glacial outwash plains with extensive deposits of coarse gravel near the surface.
8. Manage groundwater withdrawals and recharge impacts to:
  - a. Maintain availability for drinking water sources.
  - b. Maintain stream base flow from groundwater to support in-stream flows, especially for salmon-bearing streams.

**How are critical aquifer recharge areas currently identified in the field, as well as on a map?**

CARAs are mapped within Sammamish city limits, the King County designated Potential Annexation Areas, and the City-King County Joint Study Area. The City of Sammamish Critical Aquifer Recharge Areas Map shows Class 1, Class 2, and Class 3 CARA locations within and around the City. The CARAs include wellhead protection areas drawn from time-of-travel calculations for Group A and Group B wells as an interactive map tool available to the public through the City’s website.

The City does not currently have a process in place for reviewing and updating the City’s CARA map.

**Using BAS, how should critical aquifer recharge areas be identified in the field and on a map?**

The City could consider identifying specific types of critical aquifer recharge area maps that may be produced, including the following:

- Maps indicating the location of existing wells and their respective aquifers to be used in a well monitoring program for tracking groundwater level trends and groundwater quality changes.
- Maps of abandoned wells within designated CARAs to ensure the wells do not become pathways for contamination of local aquifers.
- Maps indicating the location of existing activities<sup>2</sup> that should be discontinued, removed, and decommissioned in Class 1, 2, and 3 CARAs.
- Wording for CARAs in the Sammamish Municipal Code should match the wording for CARAs used in the City’s mapping systems.

The Department of Ecology has well construction and licensing maps.<sup>3</sup> The City could combine this publicly available GIS data with any of the site-specific data noted above to improve mapping resources.

**How would a critical aquifer recharge area map updated?**

The mapping systems should be updated based on GIS data provided by the various water districts and by information provided to the City by applicants during development review.

**Who would be responsible for updating the map for critical aquifer recharge areas?**

A site-specific CARA map would be updated based on the field verification of the Class and boundary of a CARA by a qualified professional hydrogeologist licensed in the state of Washington<sup>4</sup> through a hydrogeologic report.

<sup>2</sup> Listed in [Table 21.03.020X.4.b](#)

<sup>3</sup> [Ecology Well Construction & Licensing maps](#)

<sup>4</sup> Professional qualifications are defined in [RCW 18.220](#) and [WAC 308.15](#).

## Summary of Critical Aquifer Recharge Area Changes Being Considered

### CATEGORY 1 – No Action Needed; Changes Integrated into Draft Code Amendments

Changes required by the Growth Management Act, clarifications, and other minor changes.

- Include the WAC definition for ‘critical aquifer recharge area’ in the *Technical Terms and Land Use Definition* section<sup>5</sup>.
- Consider listing the areas within the city that are designated as CARAs or reference the City’s Online Map Application for ease of reference.
- Update maps to provide consistent references with the Classes of CARAs.
- Include a definition for injection well and provide additional regulations to protect the quality and quantity of groundwater.
- Reference the current or most up-to-date version of the Stormwater Management Manual for Western Washington (SWMMWW) and the City of Sammamish Surface Water Design Manual Addendum.
- The *Groundwater Quality Protection Standards*<sup>6</sup> allows the City to condition development permits based on known, available, and reasonable methods of prevention, control, and treatment. It is recommended to consider including language that conditions should also be based on BAS to improve compliance.
- Revise the *Regulation of Facilities Handling and Storing Hazardous Materials Regulated by the State Department of Ecology*<sup>7</sup> section reference to RCW 90.48 (Water Pollution Control) and that these reports should address and comply with the standards of this Chapter of the RCW.
- Review references to other documents to ensure the most accurate information is being used and include “as amended” to be consistent with BAS.

### CATEGORY 2 - Requires Planning Commission & City Council Direction for Code Amendment Integration

Changes don’t impact the project timeline, require additional budget, or require further policy/impact analysis.

- Include parameters outlining what is considered a ‘significant increased risk’ in the *Groundwater Quality Protection Standards* for clarity. These parameters can be developed with the help of a professional hydrologist.
- Improve regulations for on-site infiltration of stormwater to ensure adequate protection of wellheads.
- Provide clarification on types of infiltration tests that are triggered for certain activities.
- Review allowances for *Work exempt from permit*<sup>8</sup> to determine if these activities should require authorization.
- Review the criteria for *Use of Pesticides, Herbicides, and Fertilizers* to encourage integrated pest management.
- Encourage signage along the right-of-way to identify to the public where designated CARAs are located and what class of CARA is present.

<sup>5</sup> [SMC 21.04.040.70](#)

<sup>6</sup> [SMC 21.03.020.X.2](#)

<sup>7</sup> [SMC 21.03.020.X.3](#)

<sup>8</sup> [SMC 16.20.200](#)

- Determine if additional regulations are needed to address ‘forever chemicals,’ known as PFAS. PFAS stands for per- and polyfluoralkyl substances. Common sources of PFAS include stain-resistant carpets, water-repellant clothing, and non-stick cookware.<sup>9</sup>

Suggested modifications provided by water purveyors within the City of Sammamish:

- Continue protection of groundwater quality through the prohibition of infiltration/injection in Wellhead Protection Areas (WHPA), which includes Class 1 and 2 CARAs.
- For areas outside of Class 1 and 2 CARAs, consider adopting regulations for permitting requirements for infiltration and/or injection of stormwater to an aquifer used for public drinking water supply.

**CATEGORY 3 - Requires Planning Commission & City Council Direction for Future Workplans**

Changes may impact stakeholders and/or require additional budget and staff time.

- Consider identifying specific types of CARA maps that may be produced, including the following:
  - Maps indicating the location of existing wells and their respective aquifers to be used in a well monitoring program for tracking groundwater level trends and groundwater quality changes.
  - Maps of abandoned wells within designated CARAs to assure the wells do not become pathways for contamination of local aquifers.
  - Maps indicating the location of currently prohibited land uses<sup>3</sup> that should be discontinued, removed, and decommissioned, if existing in Class 1, Class 2, and Class 3 CARAs.

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<sup>9</sup> [Focus on PFAS, Ecology information sheet](#)