

## **DRAFT**

### **Attachment P**

# **Process for Determining Non-residential Wastewater Loadings to Drain Fields in Moderate and High CARA Susceptibility Areas**

## **Introduction**

This process document describes the process for determining non-residential wastewater loadings in moderate and high susceptibility critical aquifer recharge areas (CARA, Spokane County Code Chapter 11.20.075) in Spokane County. The process includes three levels of site-specific evaluation:

Level 1 evaluation is a spreadsheet model (Level 1 CARA Spreadsheet) based on a nitrogen-to-groundwater analysis. The spreadsheet requires the user to provide basic information about the site and project;

Level 2 evaluation is similar to Level 1 except that the user may provide additional site and project-specific information (Level 2 CARA Spreadsheet);

The Level 3 evaluation is a detailed, site-specific study utilizing the Large On-Site Systems (LOSS) spreadsheet model, a groundwater nitrogen mixing analysis developed by the Washington State Department of Health. The evaluation involves more complicated sites where the Level 1 or Level 2 analyses are not applicable. Level 3 analyses include development and approval of a Level 3 Work Plan and Hydrogeologic Report; it is strongly advised the applicant notify and meet with Spokane County Division of Utilities before initiating a Level 3 evaluation.

The Level 1 and Level 2 evaluations are soil-nitrogen mixing analyses where the spreadsheet calculates specific nitrate concentration in the drain field leachate at the soil/groundwater interface. A calculated value of 10 milligrams/liter (mg/L) is considered acceptable.

The Level 3 spreadsheet calculates specific nitrate concentrations in the drain field leachate. For Level 3 evaluations, potential impacts shall be based on a maximum of 5 mg/L nitrate in groundwater at the edge of the drain field, which is considered the critical trigger value (USEPA 2012a and b).

Level 1, Level 2, and Level 3 spreadsheets are located at:  
[www.spokanecounty/cara/spreadsheets.org](http://www.spokanecounty/cara/spreadsheets.org) and are available by request.

## Level 1: CARA Spreadsheet

The Level 1 CARA Spreadsheet is the simplest, initial step to evaluate the wastewater loading for a project. The Level 1 CARA Spreadsheet includes the following user-supplied information:

- Project name, address, and date of completion.
- Proposed facility type, and general description.
- Parcel lot size, in acres.
- Drain field area in square feet. Drain field sizing is based on design criteria outlined in Washington Administrative Code (WAC) On-Site Sewage Systems Chapter 246-272A.
- Wastewater volume. Enter the design wastewater flow rate (gallons per day, gpd) based on the facility type. Include standard references and other supporting information.
- Distance to nearest surface water body, in feet.
- Approximate depth to groundwater, in feet. Include reference materials and other supporting information.
- Recharge value. Recharge is the rate (inches per year) that meteoric water that moves downward from the surface through the soil and into the groundwater. Select the recharge value for the project based on the attached Spokane County Groundwater Recharge map. If there a multiple recharge values for the parcel, use the lowest recharge value. The Spokane County Groundwater Recharge map is also located at [www.spokanecounty/cara/recharge](http://www.spokanecounty/cara/recharge) and is available upon request.
- Soil type. Select the soil type (based on soil texture) from the dropdown menu in the spreadsheet. Refer to WAC 246-272A-0220 for soil and site evaluation procedures to classify the soil type.

Based on the user-supplied information, the Level 1 CARA Spreadsheet will conduct the Level 1 evaluation. The Level 1 CARA Spreadsheet uses a default value of 45 mg/L for nitrate in wastewater effluent. If the projected wastewater loading from the Level 1 CARA evaluation is less than 10 mg/L at the soil groundwater interface the Level 1 CARA Spreadsheet will indicate a successful completion on Lines 23 and 24. If the outputs of the Level 1 evaluation on Lines 23 or 24 are "Revise", then the data inputs exceed the maximum wastewater loading and more detailed evaluation and data gathering made be necessary. The applicant can either:

- accept the results and implement wastewater loading restrictions per Spokane County Code (SCC) 11.20.075.C.L-3.2.
- modify the input parameters -described above with more detailed, site-specific information (e.g. change wastewater volumes);
- conduct a Level 2 or Level 3 evaluation to further assess site suitability.

All user-supplied input values in the Level 1 CARA Spreadsheet are subject to review and approval by Spokane County Division of Utilities. Spokane County may request additional information or request a Level 2 or Level 3 evaluation based on site-specific conditions.

## Level 2: CARA Spreadsheet with Site Specific Modifications

For Level 2 evaluations the applicant can modify the Level 1 CARA spreadsheet to include more detailed site specific information about the project. Allowable modifications to the Level 1 CARA Spreadsheet include the following site specific information:

- Total nitrogen (TN) concentration in effluent wastewater.
- Soil denitrification factor.
- Nitrate concentration in precipitation.

Based on the user-supplied information, the If the projected wastewater loading from the Level 2 evaluation is less than 10 mg/L at the soil/groundwater interface, the Level 2 CARA Spreadsheet will indicate a successful completion on Lines 23 and 24. If the output of the Level 2 evaluation is “Revise” on Lines 23 or 24, then the applicant can either:

- accept the results and implement wastewater loading restrictions per SCC 11.20.075.C.L-3.2
- conduct a Level 3 evaluation to further assess site suitability.

All input values in the Level 2 CARA Spreadsheet are subject to review and approval by Spokane County Division of Utilities. Spokane County may request additional information or request a Level 3 evaluation based on site-specific conditions.

### **Level 3: Detailed Study**

If the Level 2 evaluation is not successful, then a Level 3 – Detailed Study may be conducted.

- The applicant must provide a Hydrogeologic Report per SCC 11.20.075.D to support the Level 3 evaluation. The applicant shall also utilize the Large On-site Sewage System (LOSS) Level 1 Nitrate Balance Spreadsheet developed by the Washington State Department of Health (WDOH) for assessing nitrate mixing in groundwater. It is strongly encouraged the applicant consults with Spokane County Division of Utilities to develop a Work Plan prior to initiating a Level 3 evaluation.

In addition to the requirements SCC 11.20.075.D, the Hydrogeologic Report shall contain the following information, which also serves as a checklist of information needed to support the Level 3 Work Plan:

#### **Project Information**

- Date of application.
- Name and address of the property owner and the applicant at the head of each page of submission.
- Name, signature and stamp (Professional Engineer) of the designer.
- Name of nearest surface water body.
- Distance to shoreline.
- Depth to groundwater.

#### **Parcel Information**

- Parcel number, and if available, address of the site.
- Size of the parcel.
- A dimensioned site plan.
- General topography and/or slope.
- Drainage characteristics.
- Designated areas for the proposed on-site treatment system and the drain field reserve area.

#### Effluent Information

- System operating capacity and design flow.
- Source of sewage, for example, residence, restaurant, or other type of business.
- Characteristics of sewage: flow, concentration of nitrate, and concentration of phosphorus.

#### Soil Information

- Soil type.
- A soil and site evaluation as specified under WAC 246-272A-0220.
- The location of all soil logs and other soil tests used to support permitting of the on-site treatment system.
- The depth of the soil dispersal component, the vertical separation, and depth of cover material.

#### Groundwater Mixing Zone Information (WDOH 2011)

- Hydraulic conductivity value source.
- Hydraulic gradient.
- Depth to groundwater.
- Distance to surface water.
- Background constituent concentrations.

For Level 3-Detailed Study evaluations, potential impacts shall be based on a maximum of 5 mg/L nitrate in groundwater at the edge of the drain field, which is considered the critical trigger value (USEPA 2012a and b). For example:

- If the background/upgradient nitrate groundwater concentration is less than 5.0 mg/L, an increase in nitrate may be granted so that the groundwater concentration at the point of compliance is no more than 5.0 mg/L nitrate.
- When the background/upgradient nitrate groundwater concentration is equal to or greater than 5.0 mg/L, then no net increase in groundwater nitrate is allowed. For modeling purposes, a calculated nitrate increase of 0.1 mg/L or less at the point of compliance is acceptable for demonstrating no net increase.

#### References

WDOH, 2011, Level 1 Nitrate Balance Instructions for Large On-site Sewage Systems. WDOH  
Publication #337-069. Olympia, WA.

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