

DPD

Director's Rule 13-2008

Applicant: City of Seattle Department of Planning and Development	Page 1 of 3	Supersedes: N/A
	Publication: 8/25/08	Effective: 11/1/08
Subject: Requirements for Measuring the Annual High Static Groundwater Level	Code and Section Reference: SMC 25.09	
	Type of Rule: Code Interpretation	
	Ordinance Authority: SMC 3.06.040	
Index: Environmental/Technical Requirements	Approved	Date
	(signature on file) Diane M. Sugimura, Director, DPD	10/21/08

PURPOSE

The purpose of this rule is to define the Department's requirements for geotechnical reports assessing the location of the annual high static groundwater level.

The Environmentally Critical Areas Code regulates areas of peat-rich soils that are prone to settlement. These regulations restrict and generally preclude subsurface development below the "annual high static groundwater level". Seattle Municipal Code Section 25.09.110 states, in part, that "A geotechnical study detailing the location of the annual high static groundwater level is required for development in peat settlement-prone areas that involve excavation more than thirty (30) inches below the existing grade."

RULE

Geotechnical studies assessing the location of the annual high state groundwater level must meet the following guidelines:

EXPLORATION METHODS

To evaluate the annual high groundwater level, exploration below the groundwater table is necessary. The following exploration methods may be used:

- a) Drilling Rig
- b) Excavator (for use on single family projects only)

Hand augering may also be an acceptable method of exploration if the depths of exploration required to adequately evaluate groundwater levels can be achieved.

MONITORING DEVICE GENERAL REQUIREMENTS

Monitoring devices are required for accurate measurement of the groundwater table. Observation of the groundwater level encountered during excavation of the boring does not meet the requirements of this method since the groundwater level at time of drilling is typically lower than the actual groundwater level. The following devices are acceptable.

- a) Monitoring/observation well. A variance must be obtained from the Department of Ecology if the borehole diameter and well seal standards in WAC 173-160 will not be met. The monitoring well must be developed by flushing three casing volumes from the well. Groundwater level measurements from the well can be collected a minimum of one day after development.
- b) Vibrating wire piezometer.
- c) No monitoring device is required for single family residential applications; however, the exploration must remain open for a minimum of one hour before backfilling. The exploration and monitoring device installation must meet the depth requirements in the Monitoring Device Depth Requirements section.

MONITORING DEVICE DEPTH REQUIREMENTS

The monitoring device must be installed according to the following general conditions:

- a) The monitoring device must be placed a minimum of 5 feet below excavation subgrade; this shall be performed even if such soils are not saturated.
- b) If saturated soils are encountered, the monitoring device must be placed a minimum of 5 feet below the water table.
- c) If bedrock or glacial till are encountered below the water table; the boring can be completed at the contact and the monitoring device will be installed immediately above the contact.
- d) If a soil layer that could act as an aquitard is encountered (e.g., peat, clay, or organic silt), the monitoring device should be installed below the aquitard unless not feasible.
- e) The boring and monitoring device installation must be observed and logged by or under the supervision of a Washington State Licensed Hydrogeologist, Engineering Geologist, Geologist, or Registered Professional Civil Engineer in the State of Washington. The depth requirements in (a) through (c) are meant to provide guidance for most subsurface conditions that may be encountered in ECA Peat areas and their buffers. The Engineer or Geologist installing the device should use judgment, the details of the boring logs, and their experience with the area's

groundwater regime to determine meaningful installation depths of the monitoring device.

MONITORING PERIOD

To estimate the annual high groundwater level, groundwater levels should be measured at the site in the months of December through April. If groundwater levels are measured outside of the recommended monitoring period, the Director may require additional information to support the determination of the annual high groundwater level. Additional information is likely to include (but not limited to) observations of color changes or staining noted in subsurface explorations and water levels measured on adjacent properties during the wet season. Depending on the quality of the additional information, the Director expects the design professional to develop a more conservative estimate of the annual high groundwater level if groundwater level measurements are taken during drier times of the year. Groundwater level data must be obtained within five years of permit application.

- a) For single family residential applications, one measurement is sufficient.
- b) For other uses, a minimum of two measurements separated by a one month period are required. Both measurements should be made within the December through April monitoring period listed above.
- c) Measurement data from existing monitoring devices (no more than 400 feet from the subject site) may be acceptable as long as the above monitoring device requirements are satisfied and information is provided to demonstrate that the data is relevant to the subject site. The Director may ask for additional information and monitoring based on the area topographic and geologic characteristics as well as seasonal rainfall (or lack of rainfall) during the monitoring period.

DATA SOURCE

The following data sources may be used for planning purposes for the geotechnical evaluation.

- a) City of Seattle Peat Settlement-prone Area Map
- b) Chapter 173-160 WAC, Minimum Standards for Construction and Maintenance of Wells:
<http://www.ecy.wa.gov/biblio/wac173160.html>
- c) Washington State Department of Ecology well log files:
<http://apps.ecy.wa.gov/welllog/>
- d) GeoMapNW geology maps and resources:
<http://geomapnw.ess.washington.edu/index.php>
- e) Other geotechnical reports for projects in the vicinity of the site.

REPORTING

The groundwater levels, soil data, and recommended design groundwater level shall be presented in a report stamped by a licensed Professional Civil Engineer in the State of Washington or a Washington State Licensed Hydrogeologist, Engineering Geologist, or Geologist. The report must present the methods used to instrument and collect the data, a boring (or test pit) and monitoring device construction log, date and time of monitoring well development, time and date of groundwater level measurements, ground surface elevation, and site exploration plan. The recommended design groundwater level shall consider historic and current precipitation levels to account for potential fluctuations in groundwater level between different years.