

WAC 173-351-490 The hydrogeologic report contents. (1) The hydrogeologic report must meet all of the following performance standards as follows:

(a) Examine existing site conditions for compliance with groundwater and surface water location restrictions under WAC 173-351-130, 173-351-140, and 173-351-300(7);

(b) Determine existing or background groundwater quality conditions, including any groundwater contamination; and

(c) Define a detection groundwater monitoring program capable of immediate and early warning detection for potential contamination as required in WAC 173-351-400 and the information required in subsection (2) of this section.

(2) The hydrogeologic report contents must include the following information:

(a) A summary of local and regional geology and hydrology, including faults, zones of joint concentrations, unstable slopes and subsidence areas on site; areas of groundwater recharge and discharge; stratigraphy; erosional and depositional environments and facies interpretation(s);

(b) A borehole program which identifies all performance criteria of WAC 173-351-405 including lithology, soil/bedrock types and properties, preferential groundwater flow paths or zones of higher hydraulic conductivity, the presence of confining unit(s) and geologic features such as fault zones, cross-cutting structures etc., and the target hydrostratigraphic unit(s) to be monitored. The borehole program must meet the following standards:

(i) A minimum of twenty subsurface borings is required for MSWLF sites which are 50 acres or less in aerial extent. For sites greater than fifty acres, twenty borings, plus three borings for each additional ten acres thereafter, is required. Soil borings must be established in a grid pattern with a boring in each major geomorphic feature such as topographic divides and lowlands;

(ii) Each boring will be of sufficient depth below the proposed grade of the bottom liner as to identify soil, bedrock and hydrostratigraphic unit(s) conditions as required in WAC 173-351-405;

(iii) The jurisdictional health department, with the written concurrence of the department, may approve alternate methods including geophysical techniques, either surface or downhole including electric logging, sonic logging, nuclear logging, seismic profiling, electromagnetic profiling and resistivity profiling in lieu of some of the number of borings required in the subsurface borehole program of (b)(i) of this subsection, provided sufficient hydrogeological site characterization can be accomplished and prior approval is obtained;

(iv) Each boring sample must be collected from each lithologic unit and tested for all of the following:

(A) Particle size distribution by both sieve and hydrometer analyses in accordance with approved ASTM methods (D422 and D1120);

(B) Atterburg limits following approved ASTM methods (D4318); and

(C) Classification under the unified soil classification system, following ASTM standard D2487-85.

(v) Each lithologic unit on site will be analyzed for:

(A) Moisture content, following approved ASTM methods (D2216); and

(B) Hydraulic conductivity by an in-situ field method or laboratory method approved by the jurisdictional health department and the department. All samples collected for the determination of permeability must be collected by standard ASTM procedures.

(vi) All boring logs must be submitted with the following information:

- (A) Soil and rock descriptions and classifications;
- (B) Method of sampling;
- (C) Sample depth;
- (D) Date of boring;
- (E) Water level measurements;
- (F) Soil test data;
- (G) Boring location; and
- (H) Standard penetration number of ASTM standard D1586-67.

(vii) All borings not converted to monitoring wells or piezometers must be carefully backfilled, plugged and recorded in accordance with WAC 173-160-420;

(viii) During the borehole drilling program, any on-site drilling and lithologic unit identification must be performed by a geologist or other licensed professional in accordance with the requirements of chapter 18.220 RCW, Geologists, who is trained to sample and identify soils and bedrock lithology.

(c) Depths to groundwater and hydrostratigraphic unit(s) including transmissive and confining units;

(d) Potentiometric surface elevations and contour maps; direction and rate of horizontal and vertical groundwater flow;

(e) A description of regional groundwater trends including vertical and horizontal flow directions and rates;

(f) All elevations and top of well casings must be related to the North American vertical datum of 1988 (NAVD88) and the horizontal datum must be in accordance with chapter 58.20 RCW, Washington Coordinate System and as amended per chapter 332-130 WAC;

(g) Quantity, location, and construction (where available) of private and public wells within a two thousand foot (six hundred ten meter) radius of site;

(h) Tabulation of all water rights for groundwater and surface water within a two thousand foot (six hundred ten meter) radius of the site;

(i) Identification and description of all surface waters within a one-mile (1.6 kilometer) radius of the site;

(j) A summary of all previously collected groundwater and surface water analytical data, and for expanded facilities, identification of impacts from the existing facility on ground and surface waters;

(k) Calculation of a site water balance;

(l) Conceptual design of a groundwater and surface water monitoring system, including proposed installation methods for all devices and well construction diagrams, and where applicable a vadose zone monitoring plan;

(m) Land use in the area, including nearby residences;

(n) A topographic map of the site and drainage patterns; an outline of the waste management area and MSWLF units, property boundary, the proposed location of groundwater monitoring wells; and

(o) Geologic cross-sections.

(3) Groundwater flow path analysis. The hydrogeologic report must include a summary groundwater flow path analysis which includes all supportive documentation, and calculations of the performance criteria of WAC 173-351-405.

[Statutory Authority: RCW 70.95.020(3), 70.95.060(1), and 70.95.260(1), (6). WSR 12-23-009 (Order 07-15), § 173-351-490, filed 11/8/12, effective 12/9/12. Statutory Authority: Chapter 70.95 RCW and 40

C.F.R. 258. WSR 93-22-016, § 173-351-490, filed 10/26/93, effective 11/26/93.]