

**WAC 173-175-130 Engineering design reports.** (1) Engineering design reports summarizing the various engineering investigations and pertinent project information are an important element of the project design documents. All pertinent engineering design reports that have been prepared during project formulation shall be submitted for review. The engineering design report(s) must bear the seal and signature of the project engineer.

(2) The engineering design reports shall be sufficiently complete so as to support the development of plans and specifications without substantial change or additional information.

(3) The engineering design report(s) shall be comprehensive in description of the various engineering investigations.

(a) For new project construction, the engineering design report(s) shall include, as a minimum, the items listed in subsection (4) of this section:

(b) For modifications of existing dams, the engineering design report(s) shall include, as a minimum, those items listed in subsection (4) of this section which represent changed conditions from original construction or which address items that have not been previously addressed in prior reports that were submitted to the department.

(4) Contents of engineering design report(s):

(a) A description of the basic purposes of the project, normal operational characteristics and any unique or important design considerations associated with the site or project configuration.

(b) A description of the site geology, seismicity and geotechnical considerations including: A presentation of the findings from subsurface explorations based on test pits and/or boring logs; field tests; laboratory testing and classification of samples; and an identification of the seismotectonic provinces that could generate earthquakes large enough to significantly affect the project site.

(c) A description of the climatic and hydrologic characteristics of the site and tributary watershed including the computation of the inflow design flood and, where applicable, a listing of the input and output data for the computer model used to determine the inflow design flood.

(d) A listing of all sources of inflow to the reservoir.

(e) The size classification of the proposed project as defined by Table 1.

TABLE 1. DAM SIZE CLASSIFICATION

SIZE CLASSIFICATION	DAM HEIGHT
Small Dam	Less than 15 feet
Intermediate Dam	15 feet or greater but less than 50 feet
Large Dam	50 feet or greater

(f) The reservoir operation classification of the proposed project as defined by Table 2.

TABLE 2. RESERVOIR OPERATION CLASSIFICATION

RESERVOIR OPERATION CLASSIFICATION	DETERMINING FACTOR
Permanent Pool or Seasonal Pool Operation	Steady state seepage or saturated flow conditions occur in impounding barrier and foundation at or near normal pool conditions.

RESERVOIR OPERATION CLASSIFICATION	DETERMINING FACTOR
Intermittent Operation	Duration of normal high pool condition is insufficient for steady state seepage or saturated flow conditions to develop in impounding barrier and foundation.

(g) An assessment of the consequences of dam failure on downstream areas, including:

(i) An estimation of the magnitude of the dam break flood hydrographs resulting from hypothetical dam failures occurring with the reservoir at normal storage elevation and maximum storage elevation;

(ii) A general description of the areas downstream of the dam that could be affected by floodwater from a dam failure;

(iii) If there is the potential for loss of life, an inundation map delineating the maximum areal extent of flooding that could be produced by a dam failure. Inundation mapping should extend to a point downstream where the inundation from the dam failure is within the 100-year flood plain for the affected watercourse;

(iv) The downstream hazard classification as defined by Table 3, which reflects the current conditions of development in downstream areas. The most serious potential consequences of failure of those listed in columns 3A, 3B, and 3C shall be used to establish the appropriate downstream hazard classification.

TABLE 3. DOWNSTREAM HAZARD CLASSIFICATION

DOWNSTREAM HAZARD POTENTIAL	DOWNSTREAM HAZARD CLASSIFICATION	COLUMN 3A POPULATION AT RISK	COLUMN 3B ECONOMIC LOSS GENERIC DESCRIPTIONS	COLUMN 3C ENVIRONMENTAL DAMAGES
Low	3	0	Minimal. No inhabited structures. Limited agricultural development.	No deleterious materials in reservoir contents
Significant	2	1 to 6	Appreciable. 1 or 2 inhabited structures. Notable agriculture or work sites. Secondary highway and/or rail lines.	Limited water quality degradation from reservoir contents and only short term consequences.
High	1C	7 to 30	Major. 3 to 10 inhabited structures. Low density suburban area with some industry and work sites. Primary highways and rail lines.	Severe water quality degradation potential from reservoir contents and long term effects on aquatic and human life.
High	1B	31-300	Extreme. 11 to 100 inhabited structures. Medium density suburban or urban area with associated industry, property and transportation features.	
High	1A	More than 300	Extreme. More than 100 inhabited structures. Highly developed, densely populated suburban or urban area with associated industry, property, transportation and community life line features.	

(h) Engineering calculations and data supporting the detailed design of project elements. This would include, as a minimum:

(i) The design step levels used in design of the various critical project elements, based on guidance contained in the department's *Dam Safety Guidelines*;

(ii) Stability analyses corroborating the design of the proposed embankment/barrier section under static and seismic loadings and rapid drawdown conditions;

(iii) Calculations for the design of any hydraulic structures, which are subject to high lateral earth pressures, relatively large seismic loads and/or uplift pressures;

(iv) Computations for sizing the principal and emergency spillway, including, where applicable, reservoir routing computations defining the reservoir inflow and outflow design flood hydrographs.

[Statutory Authority: RCW 43.21A.064, [43.21A.]080 and 86.16.061. WSR 92-12-055 (Order 91-17), § 173-175-130, filed 6/1/92, effective 7/2/92.]