

21

OREGON WATER RESOURCES DEPARTMENT
ADMINISTRATIVE RULES

Dams

General Statement

690-20-021 The following Oregon Administrative Rules (OAR), 690-20-022 through 690-20-040, apply to construction of dams. For administrative purposes dams have been classified as "small" and "dams over the statutory limits." Information concerning small dams is found in 690-20-030, and information concerning dams over the statutory limits is contained in 690-20-035. Small dams are those that are under ten feet in height and store less than 3,000,000 gallons (9.2 acre-feet). OAR 690-20-040 is concerned with enforcement procedures.

Statutory Authority and Definitions

690-20-022 (1) Statutory authority for these rules is:

ORS 537.130

ORS 537.190

ORS 537.211

ORS 537.260

ORS 537.410 through ORS 537.450

ORS 540.330 through ORS 540.400

(2) The statutes in section (1) primarily provide for the protection of life and property, and for protection of other water rights. The following definitions are provided for the applicant's reference.

- (a) Abutment: A natural valley or canyon side against which the dam is built.
- (b) Acre-foot: The equivalent volume of one acre covered with one foot of water (325,900 gallons).
- (c) Conduit: A closed conveyance used to release water through a dam.
- (d) Cutoff Collar: A thin collar placed at uniform intervals along an outlet conduit to retard water seepage.
- (e) Cutoff Trench: A trench excavated beneath the dam foundation and backfilled with impermeable material to retard water seepage.
- (f) Dam Crest: The top of the dam.
- (g) Embankment: An engineered earth fill.
- (h) Emergency Spillway: An overflow structure constructed to bypass flood water and prevent overtopping the dam crest.
- (i) Foundation: The ground surface upon which a dam is constructed.
- (j) Freeboard: The vertical distance between the designed high-water level in the reservoir and the dam crest.
- (k) Gate: A permanent device for regulating water flow.

General Requirements for all Dams

690-20-025 (1) The Water Resources Director may require any information or data in addition to that outlined herein which the Water Resources Director finds necessary for determining the safety of the proposed structure.

- (2) Whenever possible, precipitation or rainfall and runoff records shall be submitted. If records are not available for the basin in which the dam is located, the hydrological/hydraulic criteria used in the design shall be submitted.
- (3) The Water Resources Director may include as part of any permit to construct a reservoir limitations and conditions that pertain to construction, operation, and maintenance. These limitations and conditions become, by reference, part of the certificate and remain in effect throughout the life of the water right.
- (4) Approved plans and specifications for construction are, by reference, considered limitations and conditions placed on the water right permit and water right certificate. The Water Resources Director retains the authority to place additional limitations and conditions on the water right relative to operation and maintenance.
- (5) Dams constructed or operated in violation of limitations and conditions included in the permit or certificate are subject to restricted use and permit cancellation procedures. The certificate affirms the applicant's right to store water subject to the limitations and conditions therein.
- (6) An outlet conduit with a minimum diameter of 8" must be installed in any instream reservoir to permit drainage of the reservoir and for passage of flow to downstream prior rights if necessary. Conduit material should be chosen based on design and site condition requirements. Acceptable conduit materials include reinforced concrete cylinder pipe; cast-in-place, reinforced concrete; zinc-coated, fiber-treated,

bituminous-coated corrugated steel; coal tar enamel-coated welded steel; ductile iron; and cast iron. All joints should be watertight. The conduit valve should be installed at the upstream end and should be industry-manufactured with specifications consistent to the applied usage. Special provisions should be made for pressure conduits gated on the downstream end.

Small Dams, Recommended Minimum Standards

690-20-030 The following information is presented for the applicant's assistance in constructing small earthfill dams less than 10 feet in height or impounding less than 3,000,000 gallons (9.2 acre-feet) (see Exhibit 1):

- (1) The crest width of the dam should not be less than 8 feet.
- (2) The upstream slope of the dam should be no steeper than 3:1.
- (3) The downstream slope of the dam should be no steeper than 2:1.
- (4) The spillway channel should be constructed around the dam, not over the top of the fill. The spillway is normally excavated in natural material and, if necessary, lined to prevent erosion. The spillway should be large enough to pass the 50-year flood flow without overtopping the dam. Assistance is available from this office or the watermaster in sizing the spillway. Flow passing through the spillway should be returned to the creek channel at a sufficient distance downstream to prevent erosion of the fill.

- (5) All brush, stumps, roots, and organic matter should be cleared from the area to be occupied by the dam. All such material should also be removed from the borrow area.
- (6) A minimum of two cutoff collars should be constructed on the outlet conduit. These cutoff collars are normally constructed of concrete with a minimum thickness of 6 inches and should extend from the outside of the conduit a minimum of 24 inches in all directions. Prefabricated asphalt-dipped metal cutoff collars are acceptable, provided that a watertight joint is obtained between conduit and collar.
- (7) Embankment material should be spread parallel with the dam axis in layers not exceeding 8 inches in thickness and adequately compacted with sheepfoot roller or other similar equipment.

Dams Over the Statutory Limits; Minimum Engineering Design Requirements

690-20-035(1) All maps, plans, and specifications for the construction, enlargement, repair, or alteration of all dams which are, or will be, 10 feet or more in height, or will impound 3,000,000 gallons (9.2 acre-feet) or more, must be prepared by a professional engineer licensed to practice in the State of Oregon.

(2) Before initiating design, the engineer shall obtain design criteria from the Department.

(3) No newly constructed dam that is 10 feet or more in height, or impounds 3,000,000 gallons (9.2 acre-feet) or more, shall be permitted to store water

until written approval is received from the Water Resources Department. Approval will be given after construction has been completed and is certified by the supervising engineer to have been constructed in accordance with the approved plans and specifications.

(4) Design documents shall include the following:

(a) Plans. Plans for dams submitted for approval must accurately portray the work to be accomplished and be of sufficient detail to adequately define all features of the project. Plans must be submitted on good-quality mylar or vellum and must be neatly and accurately drawn to a scale sufficiently large, with an adequate number of views, for the drawing to be readily interpreted.

Several sheets may be used to eliminate the necessity of large, bulky drawings. No map or plan should be larger than 24 x 36 inches. The following information will be required:

(A) A contour map of the reservoir site which will show the location of the dam by quarter-quarter section, township, range and tax lot; and the name and location of the stream flowing through the reservoir. Government survey lines must be indicated on this map, along with a survey tie to the dam axis from a government land corner. Area and capacity curves and/or tables of the proposed reservoir must be shown.

(B) A map of the drainage basin showing the location of the dam and reservoir and the streams within the drainage area. This map may be prepared from existing reliable topographical maps and it must include:

the number of square miles of drainage area; a brief description of the area; the percentage of bare and timbered lands; and general characteristics of the watershed, whether precipitous, rolling, or comparatively flat.

(C) A topographic map of the damsite with contour intervals not exceeding 5 feet. A plan of the dam should be superimposed on this map showing the location of spillways, outlet conduits, and cutoff walls.

(D) A profile of the damsite taken on the axis of the dam and a profile of the spillway along its axis. The profile should also show the location of the outlet conduit and spillway. A log showing the classification of materials encountered below the surface as shown by test pits or borings should be included.

(E) A cross section of the dam at maximum section showing complete details and dimensions.

(F) Plans showing sections of the outlet conduit, control works, and spillways. These sections should be in sufficient number and detail to make definite all features of the structure.

(b) Specifications. All plans for dams must be accompanied by specifications.

(A) The specifications shall describe in detail the methods to be followed in performing each class of work and shall set forth the requirements for the various types of material to be used in the permanent construction.

(B) The specifications must contain a provision for supervision by the engineer during the construction and for inspection by the Director of the Water Resources Department at any time during the construction period.

(C) The specifications must also contain a provision to the effect that plans or specifications shall not be altered or changed without the written approval of the Director of the Water Resources Department or the Director's authorized representative.

(5) Construction

Construction should be supervised by an engineer licensed to practice in Oregon. As a minimum the following notices and construction reports shall be submitted to the department:

Notice of beginning of construction.

Notice of intent to begin placement of fill material.

Completion report including test results, "as-built" drawings, and certificate of completion in accordance with approved plans and specifications.

Enforcement Procedures

690-20-040 The Water Resources Director shall maintain a program of inspecting existing hydraulic structures. When any structure is found to be in violation of the terms and conditions of the permit or certificate or

directly threatens life or property, or when any structure is found where lack of maintenance or unauthorized alterations could lead to a direct threat to life or property, the department shall notify the owner in writing of the violation and the action necessary to bring the structure up to design, operation, or maintenance standards. Failure by the owner to perform the required action may result in proceedings for one or more of the following:

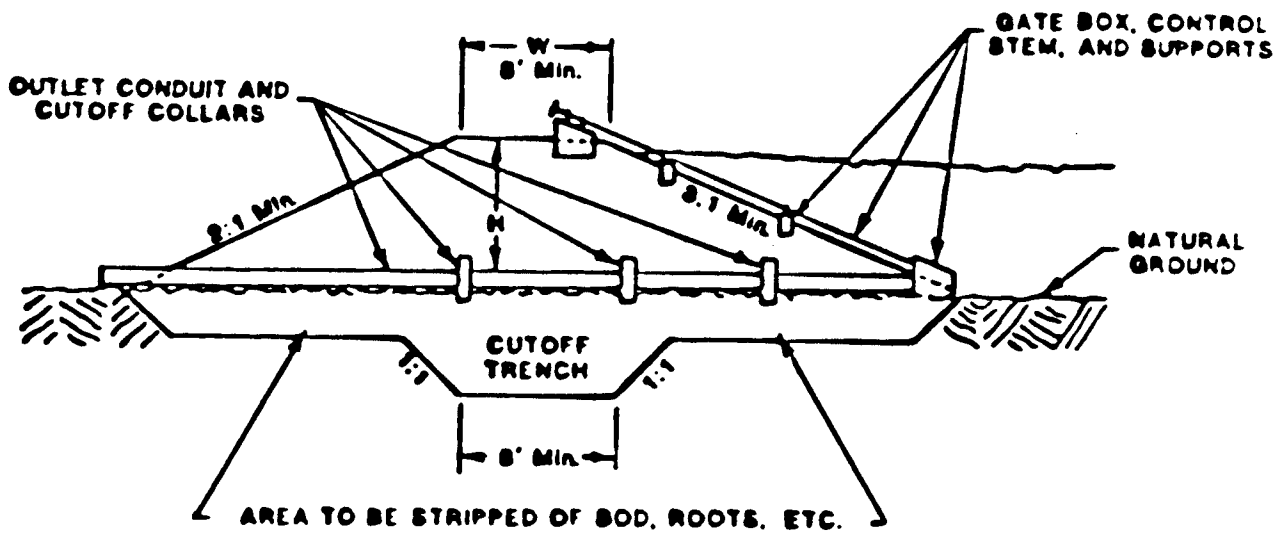
- (1) Notice and opportunity for a contested case hearing as provided for in ORS 540.350(5).
- (2) Cancellation of the permit.
- (3) Posting of the structure to prevent storage or to limit operation until the owner has complied with the requested action required to fulfill conditions of the permit or certificate.
- (4) Instituting legal action by the District Attorney or Attorney General to have the facility declared a public nuisance.
- (5) Issuance of an order to prevent storage or to breach the embankment as provided for in ORS 540.370.
- (6) Any other enforcement action permitted by law.

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EXHIBIT 1
(690-20-030)



TYPICAL CROSS SECTION OF SMALL DAM AND CONDUIT