

Chapter 222-24 WAC

ROAD CONSTRUCTION AND MAINTENANCE

WACs in this chapter were in effect 7/2001 except those that have been amended since 7/2001. The effective dates of the amended WACS are shown after the WAC headings.

WAC

WAC 222-24-010 Policy.	1
WAC 222-24-015 Construction in wetlands.	2
WAC 222-24-020 Road location and design.	3
WAC 222-24-026 *Temporary roads.	5
WAC 222-24-030 Road construction.	5
WAC 222-24-035 Landing location and construction.	6
WAC 222-24-038 *Preapplication consultation and road-related forest practices hydraulic projects.	7
WAC 222-24-040 *Water crossing structures for all typed waters.	7
WAC 222-24-041 *Water crossing structures in Type S and F Waters.	8
WAC 222-24-042 *Water crossing structures in Type Np and Ns Waters.	13
WAC 222-24-044 *Temporary bypass culverts, flumes, or channels.	15
WAC 222-24-046 *Bank protection.	15
WAC 222-24-050 *Road maintenance and abandonment.	16
WAC 222-24-051 *Large forest landowner road maintenance schedule.	17
WAC 222-24-0511 *Small forest landowner road maintenance planning.	20
WAC 222-24-052 Road maintenance.	20
WAC 222-24-060 Rock quarries, gravel pits, borrow pits, and spoil disposal areas.	22

Note: Rules marked with an asterisk () pertain to water quality protection and have been adopted or amended by the Forest Practices Board with agreement from the Department of Ecology per WAC 222-12-010.*

WAC 222-24-010 Policy. [Effective 12/30/13]

- *(1) A well designed, located, constructed, and maintained system of forest roads is essential to forest management and protection of the public resources. Riparian areas contain some of the more productive conditions for growing timber, are heavily used by wildlife and provide essential habitat for fish and wildlife and essential functions in the protection of water quality. Wetland areas serve several significant functions in addition to timber production: Providing fish and wildlife habitat, protecting water quality, moderating and preserving water quantity. Wetlands may also contain unique or rare ecological systems.
- *(2) To protect water quality and riparian habitat, roads must be constructed and maintained in a manner that will prevent potential or actual damage to public resources. This will be accomplished by constructing and maintaining roads so as not to result in the delivery of sediment and surface water to any typed water in amounts, at times or by means, that preclude achieving desired fish habitat and water quality by:

- Providing for fish passage at all life stages;
- Preventing mass wasting;
- Limiting delivery of sediment and surface runoff to all typed waters;
- Avoiding capture and redirection of surface or groundwater. This includes retaining streams in their natural drainages and routing subsurface flow captured by roads and road ditches back onto the forest floor;
- Diverting most road runoff to the forest floor;
- Designing water crossing structures to the 100-year flood level to provide for the passage of bedload and some woody debris;
- Protecting stream bank stability, the existing stream channel, and riparian vegetation;
- Minimizing the construction of new roads;
- Assuring no-net-loss of wetland function; and
- Assuring no-net-loss of fish habitat.

The rules for road construction and maintenance and forest practices hydraulic projects must be applied in achieving these goals. Additional guidance is identified in board manual sections 3 and 5. If these goals are not achieved using the rules and the applied guidance, additional management strategies must be employed.

- *(3) Extra protection is required during road construction and maintenance and for forest practices hydraulic projects to protect public resources and timber growing potential. Landowners and fisheries and wildlife managers are encouraged to cooperate in the development of road management and abandonment plans. Landowners are further encouraged to cooperate in sharing roads to minimize road mileage and avoid duplicative road construction.
- *(4) This section covers the location, design, construction, maintenance and abandonment of forest roads, bridges, stream crossings, quarries, borrow pits, and disposal sites used for forest road construction and is intended to assist landowners in proper road planning, construction and maintenance so as to protect public resources.

(Note: Other laws and rules and/or permit requirements may apply. See chapter 222-50 WAC.)

WAC 222-24-015 Construction in wetlands.

- *(1) In order to assure that there is no net loss of wetland function, all road and landing construction near or within wetlands must be conducted so that selection of choices are made in the following order with avoidance being the most preferred and replacement being the least preferred alternative:
- (a) Avoid impacts by selecting the least environmentally damaging landing location, road location and road length. Landowners must attempt to minimize road length concurrently with the attempt to avoid wetlands; or
 - (b) Minimize impacts by reducing the subgrade width, fill acreage and spoil areas; or
 - (c) Restore affected areas by removing temporary fills or road sections upon the completion of the project; or
 - (d) Reduce or eliminate impacts over time by preserving or maintaining areas; or
 - (e) Replace affected areas by creating new wetlands or enhancing existing wetlands.
- *(2) An accurate delineation of wetland boundaries will not be required under this section except where necessary to determine acreage of road or landing construction which fills or drains more than (0.1) one tenth acre of a wetland. All such mapping must follow the delineation and mapping standards outlined in the board manual, section 8.

- * (3) Approximate determination of wetland boundaries, following the guidelines in the board manual, shall be required for the purpose of avoidance during design and construction of roads. Landowners must attempt to minimize road length concurrently with the attempt to avoid wetlands. Delineation, following the guidelines in the board manual, shall be required to determine the length of road constructed within a wetland in order to determine acreage when replacement by substitution or enhancement of a wetland is required. The requirement for accurate delineation shall be limited to the area of the wetland proposed to be filled.
- * (4) Filling or draining more than 0.5 acre of a wetland requires replacement by substitution or enhancement of the lost wetland functions. (See the board manual, section 9.) The objective of successful replacement by substitution of lost wetland area will be generally on a two-for-one basis and of the same type and in the same general location. The objective of enhancing wetlands function is to provide for an equivalent amount of function to replace that which is lost. See WAC 222-16-050 (1)(h).

WAC 222-24-020 Road location and design. *[Effective 12/30/13]*

- (1) **Fit the** road to the topography so that a minimum of alterations to the natural features will occur.
- * (2) Except for crossings, new stream-adjacent parallel roads shall not be located within natural drainage channels, channel migration zones, sensitive sites, equipment limitation zones, and riparian management zones when there would be substantial loss or damage to fish or wildlife habitat unless the department has determined that other alternatives will cause greater damage to public resources. Proposals with new stream-adjacent parallel roads will require an on-site review by an interdisciplinary team. The appropriate federal representative(s) will be invited to attend the interdisciplinary team to determine if the proposal is in compliance with the Endangered Species Act.
- * (3) Roads shall not be constructed in bogs or low nutrient fens.
- * (4) Roads shall not be located in wetlands if there would be substantial loss or damage to wetland functions or acreage, unless the department has determined that alternatives will cause greater damage to public resources.
- * (5) Minimize the number of stream crossings.
- * (6) Where stream crossings are necessary:
 - (a) Design stream crossings to minimize alterations to natural features;
 - (b) Locate and design culverts to minimize sediment delivery;
 - (c) Whenever practical, cross streams at right angles to the main channel; and
 - (d) Design stream crossings in Type S and F Waters so as not to impede fish passage at any life stage.
- * (7) Avoid duplicative roads by keeping the total amount of construction to a minimum. Use existing roads whenever practical and avoid isolating patches of timber which, when removed, may require unnecessary road construction.
- * (8) All new road construction on side slopes that exceed sixty percent, which have the potential to deliver sediment to any typed water or wetland must utilize full bench construction techniques, including end hauling, over hauling or other special techniques. The department may waive the full bench construction requirement if a site review is conducted and the absence of delivery potential to any typed water or wetlands is determined.
- (9) Use the minimum design standard that produces a road sufficient to carry the anticipated traffic load with reasonable safety.

- * (10) Subgrade width should average not more than thirty-two feet for double lane roads and twenty feet for single lane roads, exclusive of ditches, plus any additional width necessary for safe operations on curves and turnouts. Where road location in wetlands is unavoidable (see WAC 222-24-015 (1)(b)), minimize subgrade width.
- (11) Balance excavation and embankments so that as much of the excavated material as is practical will be deposited in the roadway fill sections. Where full bench construction is necessary, design suitable embankments so that the excavated material may be end hauled to appropriate deposit areas.
- (12) Cut and fill slopes must be designed and constructed in a manner that will assure a high likelihood of remaining stable throughout the life of the road.
- * (13) All roads shall be outsloped or ditched on the uphill side and appropriate surface drainage shall be provided by the use of adequate drainage structures such as: Cross drains, ditches, drivable dips, relief culverts, water bars, diversion ditches, or other such structures demonstrated to be equally effective.
- * (14) Drainage structures shall not discharge onto erodible soils, or over fill slopes unless adequate outfall protection is provided.
- * (15) Relief culverts installed on forest roads shall meet the following minimum specifications: (See board manual section 3 for culvert spacing.)
 - (a) Be at least eighteen inches in diameter or equivalent in western Washington and fifteen inches in diameter or equivalent in eastern Washington.
 - (b) Be installed in a manner that efficiently captures ditchline flow and passes it to the outside of the road.
- * (16) Ditch diversion. Where roadside ditches slope toward any typed water, or Type A or B Wetland, a ditch relief structure must be located as close to the stream crossing or wetland as possible so it drains off before reaching the stream. On stream-adjacent parallel roads, relief culverts shall be located at maximum distances from stream channels to minimize sediment delivery. The relief structure must allow the sediment to be deposited onto the forest floor and not carry surface water or sediment into the stream channel or wetland.
- * (17) Outslope the road surface where practical. Where outsloping is not practical, provide a ditch with drainage structure on the inside of the road, except where roads are constructed in rock or other materials not readily susceptible to erosion.
- * (18) Crown or slope the road to prevent the accumulation of water on the road surface.
- * (19) Install rock armor headwall inlets on all stream-crossing culverts where the stream gradient above the crossing is greater than six percent.
- * (20) Install rock armored headwalls and rock armored ditchblocks for drainage structure culverts located on erodible soils or where the affected road has a gradient greater than six percent.
- * (21) Install drainage structures at locations where seeps and springs are known or discovered during construction to route accumulated surface water across the road prism. The water from the seeps and springs must be returned to the forest floor as close to the point of origin as reasonably practicable.
- * (22) In addition to information required for a complete application, the department may require more detailed information for proposed road construction, including:
 - (a) A map with detailed topographic information showing the location and alignment of the road in relation to all typed water and wetlands as required in WAC 222-16-035;
 - (b) Location, size, alignment and number of water crossing and drainage structures;

- (c) Detailed site plans and designs for fish passage projects, bridges, and large culverts or other complex elements of the proposal; and
- (d) Other information identified by the department.

WAC 222-24-026 *Temporary roads. Temporary roads as defined in WAC 222-16-010 shall:

- (1) Be constructed in a manner to facilitate closure and abandonment when the intended use is completed.
- (2) Be designed to provide the same level of protection for public resources as provided by the rules during the length of its use.
- (3) Be identified on the forest practices application or notification, along with an abandonment date. Abandonment must be accomplished under WAC 222-24-052*(3) to the specifications approved by the department by the date specified in the approved forest practices application.

WAC 222-24-030 Road construction.

- (1) Right of way timber shall be removed or decked in suitable locations where the decks will not be covered by fill material or act as support for the fill or embankment.
- *(2) In permanent road construction, do not bury:
 - (a) Loose stumps, logs or chunks if they will contribute more than 5 cubic feet in the load-bearing portion of the road.
 - (b) Any significant amount of organic debris within the top 2 feet of the load-bearing portion of the road.
 - (c) Excessive accumulation of debris or slash in any part of the load-bearing portion of the road fill.
- (3) Compact fills. During road construction, fills or embankments shall be built up by layering. Each layer shall be compacted by operating the tractor or other construction equipment over the entire surface of the layer. Chemical compacting agents may be used in accordance with WAC 222-38-020.
- *(4) Stabilize soils. Erodible soil disturbed during road construction and located where it could reasonably be expected to enter the stream network must be seeded with noninvasive plant species. The use of local area native species, adapted for rapid revegetation is preferred. Treatment with other erosion control measures may be approved by the department.
- *(5) Channel clearance. Within 50 feet upstream from a culvert inlet clear stream channel of all debris and slash generated by the operations that reasonably may be expected to plug the culvert prior to the removal of equipment from the vicinity, or the winter season, whichever is first. (See the board manual, section 4 for debris removal guidelines.)
- *(6) Drainage.
 - (a) All required ditches and drainage structures shall be installed concurrently with the construction of the roadway.
 - (b) Uncompleted road construction to be left over the winter season or other extended periods of time shall be drained by outsloping or drainage structures. Water bars and/or dispersion ditches may also be used to minimize eroding of the construction area and stream siltation. Water movement within wetlands must be maintained.
- *(7) Moisture conditions. Construction shall be accomplished when moisture and soil conditions are not likely to result in excessive erosion and/or soil movement, so as to avoid damage to public resources.

- * (8) End haul/sidecasts. End haul or overhaul construction is required where significant amounts of sidecast material would rest below the 100-year flood level of any typed water, within the boundary of a Type A or Type B Wetland or wetland management zones or where the department determines there is a potential for mass soil failure from overloading on unstable slopes or from erosion of side cast material causing damage to the public resources.
- * (9) Waste disposal. When spoil, waste and/or other debris is generated during construction, this material shall be deposited or wasted in suitable areas or locations and be governed by the following:
 - (a) Spoil or other debris shall be deposited above the 100-year flood level of any typed waters or in other suitable locations to prevent damage to public resources. The material shall be stabilized using the recommended schedule and procedures found in the board manual, section 3.
 - (b) All spoils shall be located outside of Type A and Type B Wetlands and their wetland management zones. Spoils shall not be located within the boundaries of forested wetlands without written approval of the department and unless a less environmentally damaging location is unavailable. No spoil area greater than 0.5 acre in size shall be allowed within wetlands. (See WAC 222-24-015, Construction in wetlands.)
- (10) Disturbance avoidance for northern spotted owls. Road construction, operation of heavy equipment and blasting within a SOSEA boundary shall not be allowed within 0.25 mile of a northern spotted owl site center between March 1 and August 31, provided that, this restriction shall not apply if:
 - (a) The landowner demonstrates that the owls are not actively nesting during the current nesting season; or
 - (b) The forest practice is operating in compliance with a plan or agreement developed for the protection of the northern spotted owl under WAC 222-16-080 (6)(a), (e), or (f).
- (11) Disturbance avoidance for marbled murrelets.
 - (a) Road construction and operation of heavy equipment shall not be allowed within 0.25 mile of an occupied marbled murrelet site during the daily peak activity periods within the critical nesting season; and
 - (b) Blasting shall not be allowed within 0.25 mile of an occupied marbled murrelet site during the critical nesting season.
 - (c) Provided that, these restrictions shall not apply if the forest practice is operating in compliance with a plan or agreement developed for the protection of the marbled murrelet under WAC 222-16-080 (6)(a) or (c).

WAC 222-24-035 Landing location and construction.

- (1) Landing location:

Locate landings to prevent potential or actual damage to public resources. Avoid excessive excavation and filling. Landings shall not be located within natural drainage channels, channel migration zones, RMZ core and inner zones, Type Np RMZs, sensitive sites, equipment limitation zones, and Type A or B Wetlands or their wetland management zones. Minimize placement and size of landings within forested wetlands. (See WAC 222-24-015, Construction in wetlands.)
- (2) Landing construction.

- (a) Landings requiring sidecast or fill shall be no larger than reasonably necessary for safe operation of the equipment expected to be used.
 - *(b) Where the slopes exceed 60 percent, fill material used in construction of landings shall be free from loose stumps and excessive accumulations of slash and shall be mechanically compacted where necessary and practical in layers by tractor to prevent soil erosion and mass soil movement. Chemical compacting agents may be used in accordance with WAC 222-38-020.
 - *(c) Truck roads, skid trails, and fire trails shall be outsloped or cross drained uphill of landings and the water diverted onto the forest floor away from the toe of any landing fill.
 - *(d) Landings shall be sloped to minimize accumulation of water on the landing.
 - *(e) Excavation material shall not be sidecast where there is high potential for material to enter wetland management zones or within the bankfull width of any stream or the 100-year flood level of any typed water.
 - *(f) All spoils shall be located outside of Type A and Type B Wetlands and their wetland management zones. Spoils shall not be located within the boundaries of forested wetlands without written approval of the department and unless a less environmentally damaging location is unavailable. No spoil area greater than 0.5 acre in size shall be allowed within wetlands. (See WAC 222-24-015, Construction in wetlands.)
- *(3) **Temporary landings.**
- (a) A temporary landing is intended for use during the life of an approved application/notification.
 - (b) It must be constructed to facilitate abandonment when the intended use is complete or upon seasonal shutdown, whichever is sooner.
 - (c) It must be designed to provide the same level of protection for public resources as provided by the rules during the length of its intended use.
 - (d) Temporary landings must be identified on the forest practices application or notification, along with an abandonment date.
 - (e) Temporary landings must be abandoned to the specifications approved by the department by the date specified on the approved forest practices application.

WAC 222-24-038 *Preapplication consultation and road-related forest practices hydraulic projects. [Effective 12/30/13]

Landowners contemplating forest practices hydraulic projects related to road construction and maintenance are encouraged to consult with the department and the department of fish and wildlife prior to submitting an application to help ensure that project plans and specifications meet fish protection standards.

WAC 222-24-040 *Water crossing structures for all typed waters. [Effective 12/30/13]

- (1) Bridges are required for new crossings and reconstructed crossings of any typed waters regularly used for recreational boating.
- (2) Structures containing concrete must be sufficiently cured prior to contact with water.
- (3) One end of each new or reconstructed permanent log or wood bridge shall be tied or firmly anchored if any of the bridge structure is within ten vertical feet of the 100-year flood level.

- (4) Alterations or disturbance of the stream bed, bank or bank vegetation must be limited to that necessary to construct the project. All disturbed areas must be stabilized and restored according to the recommended schedule and procedures found in board manual section 5. This requirement may be modified or waived by the department, in consultation with the department of fish and wildlife, if precluded by engineering or safety factors.
- (5) When earthen materials are used for bridge surfacing, only clean sorted gravel may be used, a geotextile lining must be installed and curbs of sufficient size shall be installed to a height above the surface material to prevent surface material from falling into the stream bed.
- (6) Wood removed from the upstream end of culverts and bridges will be placed at the downstream end of such culverts and bridges in such a way as to minimize obstruction of fish passage and to the extent practical, while avoiding significant disturbance of sediment in connection with maintenance activities.
- (7) Fords.
 - (a) New ford construction requires a forest practices application.
 - (b) The entry and exit points of a new ford must not be within one hundred feet upstream or downstream of another ford.
 - (c) The following activities associated with established fords require a forest practices application:
 - (i) Ford repair with equipment or construction work waterward of the ordinary high water line;
 - (ii) Driving a vehicle or operating equipment on or across wetted stream beds at areas other than established fords.
 - (d) Driving a vehicle or operating equipment on or across an established ford does not require a forest practices application. "**Established ford**" means a crossing place in a watercourse that was in existence and annually used prior to 1986 or subsequently permitted by the department of fish and wildlife or the department, and has identifiable approaches on the banks.

WAC 222-24-041 *Water crossing structures in Type S and F Waters. [Effective 12/30/13]

- (1) In Type Sand F Waters, bridges are preferred as water crossing structures in order to ensure free and unimpeded fish passage for adult and juvenile fishes and preserve spawning and rearing habitat. Pier placement waterward of the ordinary high water line shall be avoided where practical. Other structures which may be approved include, in descending order of preference: Temporary culverts; bottomless arch culverts; arch culverts; round culverts; and fords. Corrugated culverts are generally preferred over smooth surfaced culverts. Culvert baffles and downstream control weirs are discouraged except to correct fish passage problems at existing structures.
- (2) An approved forest practices application is required for construction, structural work, and maintenance associated with any bridge structure. Typical maintenance includes painting and other activities where there is potential for wastage of paint, sandblasting material, sediments, or bridge parts into the water, or where the work, including equipment operation, occurs waterward of the ordinary high water line.
- (3) Water crossing structure projects shall incorporate mitigation measures as necessary to achieve no-net-loss of productive capacity of fish and shellfish habitat.

- (4) **Bridge construction.**
- (a) Excavation for and placement of the foundation and superstructure shall be outside the ordinary high water line unless the construction site is separated from the stream by use of an approved dike, cofferdam, or similar structure.
 - (b) The bridge structure or stringers shall be placed in a manner to minimize damage to the bed.
 - (c) Alteration or disturbance of bank or bank vegetation shall be limited to that necessary to construct the project. All disturbed areas shall be protected from erosion within seven days of completion of the project, using vegetation or other means. The banks shall be revegetated with native or other approved woody species, or stabilized with the other erosion control techniques, and maintained as necessary to ensure survival. See board manual section 5 for technical guidance.
 - (d) Removal of existing or temporary structures shall be accomplished so that the structure and associated material does not enter the stream.
 - (e) The bridge shall be constructed, according to the approved design, to pass the 100-year flood level and debris likely to be encountered. Exception shall be granted if applicant provides hydrologic or other information that supports alternative design criteria.
 - (f) Wastewater from project activities and water removed from within the work area shall be routed and deposited to the forest floor in an upland area, or above the 100-year flood level if present, to allow removal of fine sediment and other contaminants prior to being discharged to typed waters.
 - (g) Structures containing concrete shall be sufficiently cured prior to contact with water to avoid leaching.
 - (h) Abutments, piers, piling, sills, approach fills, etc., shall not constrict the flow so as to cause any appreciable increase (not to exceed 0.2 feet) in backwater elevation (calculated at the 100-year flood level) or channel wide scour and shall be aligned to cause the least effect on the hydraulics of the watercourse.
 - (i) Riprap materials used for structure protection shall be angular rock and the placement shall be installed according to an approved design to withstand the 100-year flood level.
 - (j) Wood or other materials treated with preservatives shall be sufficiently cured to minimize leaching into the water or bed. The use of creosote or pentachlorophenol is not allowed.
- (5) **Temporary culvert installation.** The allowable placement of temporary culverts and time limitations shall be determined by the department based on the specific fish resources of concern at the proposed location of the culvert. See board manual section 5 for guidance on temporary culvert installation.
- (a) Where fish passage is a concern, temporary culverts shall be installed according to an approved design to provide adequate fish passage. In these cases, the temporary culvert installation shall meet the fish passage design criteria in Table 1 in subsection (6) of this section.
 - (b) Where culverts are left in place during the period of September 30th to June 15th, the culvert shall be designed to maintain structural integrity to the 100-year flood level with consideration of the debris loading likely to be encountered.

- (c) Where culverts are left in place during the period June 16th to September 30th, the culvert shall be designed to maintain structural integrity at a peak flow expected to occur once in 100 years during the season of installation.
 - (d) Disturbance of the bed and banks shall be limited to that necessary to place the culvert and any required channel modification associated with it. Affected bed and bank areas outside the culvert shall be restored to preproject condition following installation of the culvert.
 - (e) The culvert shall be installed in the dry, or in isolation from stream flow by the installation of a bypass flume or culvert, or by pumping the stream flow around the work area. Exception may be granted if siltation or turbidity is reduced by installing the culvert in the flowing stream. The bypass reach shall be limited to the minimum distance necessary to complete the project. Fish stranded in the bypass reach shall be safely removed to the flowing stream.
 - (f) Wastewater from project activities and dewatering shall be routed and deposited to the forest floor in an upland area, or above the 100-year flood level if present, to allow removal of fine sediment and other contaminants prior to being discharged to typed waters.
 - (g) Imported fill which will remain in the stream after culvert removal shall consist of clean rounded gravel ranging in size from one-quarter to three inches in diameter. The use of angular rock may be approved from June 16th to September 30th, where rounded rock is unavailable. Angular rock shall be removed from the watercourse and the site restored to preproject conditions upon removal of the temporary culvert.
 - (h) The culvert and fill shall be removed and the disturbed bed and bank areas shall be reshaped to preproject configuration. All disturbed areas shall be protected from erosion, within seven days of completion of the project, using vegetation or other means. The banks shall be revegetated with native or other approved woody species, or stabilized with other approved erosion control techniques, and maintained as necessary to ensure survival. See board manual section 5 for technical guidance.
 - (i) The temporary culvert shall be removed and the approaches shall be blocked to vehicular traffic prior to the expiration of the work window as conditioned for the specific hydraulic project in the forest practices application.
 - (j) Temporary culverts must be removed prior to the expiration of the forest practices application.
- (6) **Permanent culvert installation.**
- (a) In fish bearing waters or waters upstream of a fish passage barrier (which can reasonably be expected to be corrected, and if corrected, fish presence would be reestablished), culverts shall be designed and installed so as not to impede fish passage. Culverts shall only be approved for installation in spawning areas where full replacement of impacted habitat is provided by the applicant.
 - (b) To facilitate fish passage, culverts shall be designed to the following standards:
 - (i) Culverts may be approved for placement in small streams if placed on a flat gradient with the bottom of the culvert placed below the level of the stream bed a minimum of twenty percent of the culvert diameter for round culverts, or twenty percent of the vertical rise or structure height for elliptical culverts (this depth consideration does not apply within bottomless culverts). Footings of bottomless culverts shall be buried sufficiently deep so they will not become

exposed by scour within the culvert. The twenty percent placement below the stream bed shall be measured at the culvert outlet. The culvert width at the bed, or footing width, shall be equal to or greater than the average width of the bed of the stream.

- (ii) Where culvert placement is not feasible as described in (b)(i) of this subsection, the culvert design shall include the elements in(b)(ii)(A) through (E) of this subsection:
 - (A) Water depth at any location within culverts as installed and without a natural bed shall not be less than that identified in Table 1. The low flow design, to be used to determine the minimum depth of flow in the culvert, is the two-year seven-day low flow discharge for the subject basin or ninety-five percent exceedance flow for migration months of the fish species of concern. Where flow information is unavailable for the drainage in which the project will be conducted, calibrated flows from comparable gauged drainages may be used, or the depth may be determined using the installed no-flow condition.
 - (B) The high flow design discharge, used to determine maximum velocity in the culvert (see Table 1), is the flow that is not exceeded more than ten percent of the time during the months of adult fish migration. The two-year peak flood flow may be used where stream flow data are unavailable.
 - (C) The hydraulic drop is the abrupt drop in water surface measured at any point within or at the outlet of a culvert. The maximum hydraulic drop criteria must be satisfied at all flows between the low and high flow design criteria.
 - (D) The bottom of the culvert shall be placed below the natural channel grade a minimum of twenty percent of the culvert diameter for round culverts, or twenty percent of the vertical rise or structural height for elliptical culverts (this depth consideration does not apply within bottomless culverts). The downstream bed elevation, used for hydraulic calculations and culvert placement in relation to bed elevation, shall be taken at a point downstream at least four times the average width of the stream (this point need not exceed twenty-five feet from the downstream end of the culvert). The culvert capacity for flood design flow shall be determined by using the remaining capacity of the culvert.

Table 1
Fish Passage Design Criteria for Culvert Installation

Criteria	Adult Trout > 6 in. (150 mm)	Adult Pink, Chum Salmon	Adult Chinook, Coho, Sockeye, Steelhead
1. Velocity, Maximum (fps)			
Culvert Length (ft)			
a. 10 - 60	4.0	5.0	6.0
b. 60 - 100	4.0	4.0	5.0
c. 100 - 200	3.0	3.0	4.0
d. > 200	2.0	2.0	3.0
2. Flow Depth Minimum (ft)	0.8	0.8	1.0
3. Hydraulic Drop, Maximum (ft)	0.8	0.8	1.0

- (E) Appropriate statistical or hydraulic methods must be applied for the determination of flows in (b)(ii)(A) and (B) of this subsection. These design flow criteria may be modified for specific proposals as necessary to address unusual fish passage requirements, where other approved methods of empirical analysis are provided, or where the fish passage provisions of other special facilities are approved by the department.
- (F) Culvert design shall include consideration of flood capacity for current conditions and future changes likely to be encountered within the stream channel, and debris and bedload passage.
- (c) Culverts shall be installed according to an approved design to maintain structural integrity to the 100-year flood level with consideration of the debris loading likely to be encountered. Exception may be granted if the applicant provides justification for a different level or a design that routes the flow past the culvert without jeopardizing the culvert or associated fill.
- (d) Disturbance of the bed and banks shall be limited to that necessary to place the culvert and any required channel modification associated with it. Affected bed and bank areas outside the culvert and associated fill shall be revegetated with native or other approved woody species, or stabilized with other approved erosion control techniques, and maintained as necessary to ensure survival. See board manual section 5 for technical guidance.
- (e) Fill associated with the culvert installation shall be protected from erosion to the 100-year flood level.
- (f) Culverts shall be designed and installed to avoid inlet scouring and shall be designed in a manner to prevent erosion of stream banks downstream of the project.

- (g) Where fish passage criteria are required, the culvert facility shall be maintained by the landowner(s), such that fish passage design criteria in Table 1 are not exceeded. If the structure becomes a hindrance to fish passage, the landowner shall be responsible for obtaining an approved forest practices application and providing prompt repair.
 - (h) The culvert shall be installed in the dry or in isolation from the stream flow by the installation of a bypass flume or culvert, or by pumping the stream flow around the work area. Exception may be granted if siltation or turbidity is reduced by installing the culvert in the flowing stream. The bypass reach shall be limited to the minimum distance necessary to complete the project. Fish stranded in the bypass reach shall be safely removed to the flowing stream.
 - (i) Wastewater from project activities and dewatering shall be routed to the forest floor in an upland area, or above the 100-year flood level if present, as necessary to allow removal of fine sediment and other contaminants prior to being discharged to any typed water or wetland.
- (7) **Alternative designs** will be considered if they can be demonstrated to meet or exceed fish protection standards. Alternative designs may require additional review.

WAC 222-24-042 *Water crossing structures in Type Np and Ns Waters. [Effective 12/30/13]

- * (1) **Bridges over Type Np and Ns Waters.** In addition to the applicable general provisions in WAC 222-24-040, the installation, maintenance, and removal of permanent bridges in or across Type Np and Ns Waters are subject to the following:
- (a) Permanent bridges must not constrict clearly defined channels and must be designed and installed to pass the 100-year flood. The bridge and its associated embankments and fills must provide sufficient erosion protection to withstand a 100-year flood event.
 - (b) Excavation for and placement of the bridge foundation and superstructure must be located and conducted from outside the outer edge of the bankfull width. This requirement may be waived by the department if it can be demonstrated that these activities may be conducted in such a manner to prevent damage to public resources.
 - (c) Earthen embankments constructed for use as bridge approaches must be provided with sufficient erosion protection to withstand a 100-year flood event.
- * (2) **Culvert installation for Type Np and Ns Waters.** In addition to applicable general provisions in WAC 222-24-040, the installation, maintenance and removal of permanent culverts in or across Type Np and Ns Waters are subject to the following provisions:
- (a) All permanent culverts must be designed to pass the 100-year flood event with consideration for the passage of debris likely to be encountered.
 - (b) The culvert and its associated embankments and fills must have sufficient erosion protection to withstand the 100-year flood event. Erosion protection may include armored overflows or the use of clean coarse fill material.
 - (c) If the department determines that because of unstable slopes the culvert size shown in board manual section 5, "Determining Culvert Size, Method A" would be inadequate to protect public resources, it may require a larger culvert designed using generally accepted engineering principles that meet the standards in (a) and (b) of this subsection.
 - (d) No permanent culverts shall be installed that are smaller than:
 - (i) Twenty-four inches for Type Np Waters;

- (ii) Eighteen inches for Type Ns Waters in western Washington; and
 - (iii) Fifteen inches for Type Ns Waters in eastern Washington.
 - (e) The alignment and slope of the culvert shall parallel the natural flow of the stream whenever possible.
 - (f) Culverts must be designed and installed so they will not cause scouring of the stream bed and erosion of the banks in the vicinity of the project.
 - (g) When the department determines that installing a culvert in a flowing stream will result in excessive siltation and turbidity, and siltation and turbidity would be reduced if stream flow were diverted, the department shall require the stream flow be diverted using a bypass flume or culvert, or by pumping the stream flow around the work area. This may include culvert installations that are within 0.25 miles of a Type S or F Water or within two miles of a hatchery intake in consultation with the department of fish and wildlife.
 - (h) Fill associated with culvert installation must have sufficient erosion protection to withstand the 100-year flood event.
 - (i) Stream beds shall be cleared for a distance of fifty feet upstream from the culvert inlet of such slash or debris that reasonably may be expected to plug the culvert.
 - (j) The entrance of all culverts shall have adequate headwalls constructed to minimize the possibility of erosion or fill failure.
- * (3) **Temporary water crossings in Type Np and Ns Waters.** In addition to the applicable general provisions above, installation, maintenance and removal of temporary bridges or other structures in or across Type Np and Ns Waters are subject to the following:
- (a) A temporary water crossing is intended for use during the life of an approved application/notification.
 - (b) It must be constructed to facilitate abandonment when the intended use is complete or upon seasonal shutdown, whichever is sooner.
 - (c) Temporary water crossings must be identified on the forest practices application or notification, along with an abandonment date.
 - (d) Temporary water crossings may be used:
 - (i) In western Washington if installed after June 1st and removed by September 30th of the same year.
 - (ii) In eastern Washington if installed after the spring runoff and removed prior to October 15th.
 - (iii) At other times, when the department and applicant can agree to specific dates of installation and removal and the extended dates result in equivalent levels of resource protection.
 - (e) Temporary water crossings must be designed to pass the highest peak flow event expected to occur during the length of its intended use.
 - (f) When the department determines that installing a culvert in a flowing stream will result in excessive siltation and turbidity, and siltation and turbidity would be reduced if stream flow were diverted, the department shall require the stream flow be diverted using a bypass flume or culvert, or by pumping the stream flow around the work area. This may include culvert installations that are within 0.25 miles of a Type S or F Water or within two miles of a hatchery intake.
 - (g) Temporary water crossings shall be promptly removed and abandoned to the specifications approved by the department upon completion of use or by the date

specified in the approved forest practices application, whichever is earlier.

Approaches to the crossing shall be water barred and stabilized at the time of the crossing removal. The department may waive removal of the water crossing if the applicant secures an amended forest practices application, and the structure and its approaches meet all of the requirements of a permanent water crossing structure.

- (h) Temporary wetland crossings shall be abandoned and restored based on a written plan approved by the department prior to construction.
- (i) Temporary water crossings must be designed to provide the same level of protection for public resources as provided by rules during the length of its use.

WAC 222-24-044 *Temporary bypass culverts, flumes, or channels. [Effective 12/30/13]

Temporary bypass culvert, flume, or channel projects shall incorporate mitigation measures as necessary to achieve no-net-loss of productive capacity of fish and shellfish habitat. The following shall apply to temporary bypass culvert, flume, or channel projects:

- (1) The temporary bypass culvert, flume, or channel shall be in place prior to initiation of other work in the wetted perimeter.
- (2) A sandbag revetment or similar device shall be installed at the inlet to divert the entire flow through the culvert, flume, or channel.
- (3) A sandbag revetment or similar device shall be installed at the downstream end of the culvert, flume, or channel to prevent backwater from entering the work area.
- (4) The culvert, flume, or channel shall be of sufficient size to pass flows and debris for the duration of the project.
- (5) For diversion of flow into a temporary channel the relevant provisions of WAC 222-110-080, channel change/realignment, shall apply.
- (6) Prior to releasing the water flow to the project area, all bank protection or armoring shall be completed. See board manual section 5 for project site preparation best management practices.
- (7) Upon completion of the project, all material used in the temporary bypass shall be removed from the site and the site returned to preproject conditions.
- (8) The department may require fish capture and safe transport from the project site to the nearest free-flowing water if fish could be adversely impacted as a result of the project. The department of fish and wildlife may assist in capturing and safely removing fish to free-flowing water if personnel are available.
- (9) Alteration or disturbance of the banks and bank vegetation shall be limited to that necessary to construct the project. All disturbed areas shall be protected from erosion within seven days of completion of the project using vegetation or other means. The banks shall be revegetated with native or other approved woody species, or stabilized with other approved erosion control techniques, and maintained as necessary to ensure survival. See board manual section 5 for technical guidance.

WAC 222-24-046 *Bank protection. [Effective 12/30/13]

Bio-engineering is the preferred method of bank protection where practical. Bank protection projects shall incorporate mitigation measures as necessary to achieve no-net-loss of productive capacity of fish and shellfish habitat. The following shall apply to bank protection projects:

- (1) Bank protection work shall be restricted to work necessary to protect eroding banks.

- (2) Bank protection material placement waterward of the ordinary high water line shall be restricted to the minimum amount necessary to protect the toe of the bank, or for installation of mitigation features approved by the department.
- (3) The toe shall be designed to protect the integrity of bank protection material.
- (4) Bank sloping shall be accomplished in a manner that avoids release of overburden material into the water. Overburden material resulting from the project shall be deposited so as not to reenter the water.
- (5) Alteration or disturbance of the bank and bank vegetation shall be limited to that necessary to construct the project. All disturbed areas shall be protected from erosion within seven days of completion of the project using vegetation or other means. The banks, including riprap areas, shall be revegetated with native or other approved woody species, or stabilized with other approved erosion control techniques, and maintained to ensure survival. See board manual section 5 for technical guidance.
- (6) Fish habitat components such as logs, stumps, and/or large boulders may be required as part of the bank protection project to mitigate project impacts. These fish habitat components shall be installed according to an approved design to withstand 100-year peak flows.
- (7) When rock or other hard materials are approved for bank protection, the following provisions shall apply:
 - (a) Bank protection material shall be angular rock. The project shall be designed and the rock installed to withstand 100-year peak flows. River gravels shall not be used as exterior armor, except as specifically approved by the department.
 - (b) Bank protection and filter blanket material shall be placed from the bank or a barge. Dumping onto the bank face shall be permitted only if the toe is established and the material can be confined to the bank face.

WAC 222-24-050 *Road maintenance and abandonment. *[Effective 10/3/2011]*

The goals for road maintenance are established in WAC 222-24-010. Guidelines for how to meet these goals and standards are in board manual section 3. Replacement will not be required for existing culverts functioning with little risk to public resources or for culverts installed under an approved forest practices application or notification and are capable of passing fish, until the end of the culvert's functional life.

The goals for road maintenance outlined in this chapter are expected to be achieved by October 31, 2016. The strategies for achieving the goals are different for large forest landowners and small forest landowners.

For large forest landowners, all forest roads must be improved and maintained to the standards of this chapter prior to October 31, 2016; however, large or small forest landowners may request an extension of up to five years, or October 31, 2021, as outlined in WAC 222-24-051 (8). Work performed toward meeting the standards must generally be even flow over the performance period with priorities for achieving the most benefit to the public resources early in the period. These goals will be achieved through the road maintenance and abandonment plan process outlined in WAC 222-24-051.

For small forest landowners, the goals will be achieved through the road maintenance and abandonment plan process outlined in WAC 222-24-0511, by participation in the state-led family forest fish passage program, and by compliance with the Forest Practices Act and rules. The purpose of the family forest fish passage program is to assist small forest landowners in providing fish

passage by offering cost-share funding and prioritizing projects on a watershed basis, fixing the worst fish passage barriers first. The department, in consultation with the departments of ecology and fish and wildlife, will monitor the extent, effectiveness, and progress of checklist road maintenance and abandonment plan implementation and report to the legislature and the board by December 31, 2008, and December 31, 2013.

WAC 222-24-051 *Large forest landowner road maintenance schedule. [Effective 10/3/11]

All forest roads must be included in an approved road maintenance and abandonment plan by July 1, 2006. This includes all roads that were constructed or used for forest practices after 1974. Inventory and assessment of orphan roads must be included in the road maintenance and abandonment plans as specified in WAC 222-24-052(4).

- * (1) Landowners must maintain a schedule of submitting plans to the department that cover 20% of their roads or land base each year.
- (2) For those portions of their ownership that fall within a watershed administrative unit covered by an approved watershed analysis plan, chapter 222-22 WAC, landowners may follow the watershed administrative unit-road maintenance plan, providing the roads they own are covered by the plan. A proposal to update the road plan to meet the current road maintenance standards must be submitted to the department for review on or before the next scheduled road maintenance plan review. If annual reviews are not required as part of the watershed analysis road plan, the plan must be updated by October 1, 2005. All roads in the planning area must be in compliance with the current rules by October 31, 2016 or by the extension deadline approved by the department under subsection (8) of this section.
- * (3) Plans will be submitted by landowners on a priority basis. Road systems or drainages in which improvement, abandonment or maintenance have the highest potential benefit to the public resource are the highest priority. Based upon a “worst first” principle, work on roads that affect the following are presumed to be the highest priority:
 - (a) Basins containing, or road systems potentially affecting, waters which either contain a listed threatened or endangered fish species under the federal or state law or a water body listed on the current 303(d) water quality impaired list for road related issues.
 - (b) Basins containing, or road systems potentially affecting, sensitive geology/soils areas with a history of slope failures.
 - (c) Road systems or basins where other restoration projects are in progress or may be planned coincident to the implementation of the proposed road plan.
 - (d) Road systems or basins likely to have the highest use in connection with future forest practices.
- * (4) Based upon a “worst first” principle, road maintenance and abandonment plans must pay particular attention to:
 - (a) Roads with fish passage barriers;
 - (b) Roads that deliver sediment to typed water;
 - (c) Roads with evidence of existing or potential instability that could adversely affect public resources;
 - (d) Roads or ditchlines that intercept ground water; and
 - (e) Roads or ditches that deliver surface water to any typed waters.
- * (5) Road maintenance and abandonment plans must include:

- (a) Ownership maps showing all forest roads, including orphan roads; planned and potential abandonment, all typed water, Type A and B Wetlands that are adjacent to or crossed by roads, stream adjacent parallel roads and an inventory of the existing condition; and
 - (b) Detailed description of the first years work with a schedule to complete the entire plan within the performance period; and
 - (c) Standard practices for routine road maintenance; and
 - (d) Storm maintenance strategy that includes prestorm planning, emergency maintenance and post storm recovery; and
 - (e) Inventory and assessment of the risk to public resources or public safety of orphaned roads; and
 - (f) The landowner or landowner representative's signature.
- * (6) Priorities for road maintenance work within plans are:
- (a) Removing fish passage barriers beginning on roads affecting the most habitat first, generally starting at the bottom of the basin and working upstream;
 - (b) Preventing or limiting sediment delivery (areas where sediment delivery or mass wasting will most likely affect bull trout habitat will be given the highest priority);
 - (c) Correcting drainage or unstable sidecast in areas where mass wasting could deliver to public resources or threaten public safety;
 - (d) Disconnecting road drainage from typed waters;
 - (e) Repairing or maintaining stream-adjacent parallel roads with an emphasis on minimizing or eliminating water and sediment delivery;
 - (f) Improving hydrologic connectivity by minimizing the interruption of surface water drainage, interception of subsurface water, and pirating of water from one basin to another; and
 - (g) Repair or maintenance work which can be undertaken with the maximum operational efficiency.
- * (7) Initial plans must be submitted to the department during the year 2001 as scheduled by the department.
- * (8) Requests to extend the completion date of road maintenance and abandonment plans may lead to the reapproval of the road maintenance and abandonment plan for up to five years, or October 31, 2021.
- (a) Landowner requests must be made at least one hundred twenty days prior to the plan's anniversary date of 2014 and must include:
 - (i) The length of time for the extension period; and
 - (ii) A revised road maintenance and abandonment plan according to subsections (3) through (6) of this section.
 - (b) The department shall provide forty-five days for the departments of ecology and fish and wildlife, affected tribes, and interested parties to review a revised road maintenance and abandonment plan.
 - (c) The approval or a denial of a road maintenance and abandonment plan's extension request will occur at least thirty days prior to the anniversary date of the initial plan's submittal.
 - (d) A landowner with an approved extension and revised road maintenance and abandonment plan must report work accomplished in accordance with subsection (9) of this section.

- * (9) Each year on the anniversary date of the plan's submittal, landowners must report work accomplished for the previous year and submit to the department a detailed description of the upcoming year's work including modifications to the existing work schedule. The department's review and approval will be conducted in consultation with the departments of ecology and fish and wildlife, affected tribes, and interested parties. The department will:
- (a) Review the progress of the plans annually with the landowner to determine if the plan is being implemented as approved; and
 - (b) The plan will be reviewed by the department and approved or returned to the applicant with concerns that need to be addressed within forty-five days of the plan's submittal.
 - (c) Additional plans will be signed by the landowner or the landowner's representative.
- * (10) The department shall require the use of standardized forms as referenced in board manual section 3 for landowners requesting extensions under subsection (8) of this section and for annual reporting under subsection (9) of this section.
- * (11) The department will facilitate an annual water resource inventory area (WRIA) meeting with landowners, the departments of fish and wildlife and ecology, affected tribes, the National Marine Fisheries Service, the U.S. Fish and Wildlife Service, affected counties, local U.S. Forest Service, watershed councils, and other interested parties. The purpose of the meeting is to:
- (a) Suggest priorities for road maintenance and abandonment planning; and
 - (b) Exchange information on road maintenance and stream restoration projects.
- * (12) Regardless of the schedule for plan development, roads that are currently used or proposed to be used for timber hauling must be maintained in a condition that prevents potential or actual damage to public resources. If the department determines that log haul on such a road will cause or has the potential to cause material damage to a public resource, the department may require the applicant to submit a plan to address specific issues or segments on the haul route.
- * (13) If a landowner is found to be out of compliance with the work schedule of an approved road maintenance and abandonment plan and the department determines that this work is necessary to prevent potential or actual damage to public resources, then the department will exercise its authority under WAC 222-46-030 (notice to comply) and WAC 222-46-040 (stop work order) to restrict use of the affected road segment.
- (a) The landowner may submit a revised maintenance plan for maintenance and abandonment and request permission to use the road for log haul.
 - (b) The department must approve use of the road if the revised maintenance plan provides protection of the public resource and maintains the overall schedule of maintenance of the road system or basin.
- * (14) If a landowner is notified by the department that their road(s) has the potential to damage public resources, the landowner must, within 90 days, submit to the department for review and approval a plan or plans for those drainages or road systems within the area identified by the department.
- * (15) The department will notify the departments of ecology and fish and wildlife, affected tribes, and interested parties if actions taken under this section result in a change to an approved road maintenance and abandonment plan.

- (16) When the department approves or denies a road maintenance and abandonment plan extension under subsection (8) of this section, that decision may be appealed to the appeals board in accordance with RCW 43.21B.110 and 43.21B.230.

WAC 222-24-0511 *Small forest landowner road maintenance planning. *[Effective 12/30/13]*

- (1) Small forest landowners who own a total of eighty acres or less forest land in Washington state are not required to submit any road maintenance and abandonment plan for any block of forest land that contains twenty contiguous acres or less.
- (2) Small forest landowners other than those described in subsection (1) of this section, are only required to submit a checklist road maintenance and abandonment plan when they submit a forest practices application or notification that includes timber harvest or salvage. The checklist must include all their forest roads that are used for the forest practice. Instead of a checklist, landowners may submit a road maintenance and abandonment plan as described in WAC 222-24-051 with the following modifications:
 - They are not required to submit an annual report.
 - If they participate in the family forest fish passage program, they may schedule their barrier projects accordingly.
- (3) Forest roads must be maintained only to the extent necessary to prevent damage to public resources.
- *(4) If the department determines that a road will cause or has the potential to cause damage to a public resource, the department may require the applicant to submit a compliance schedule of work to fix the problem(s) identified by the department.
- (5) Fish passage barriers will be assessed on a watershed basis focusing on fixing the worst barriers first.
 - (a) The department's family forest fish passage program is available to assist with the removal, replacement, or repair of fish passage barriers that were installed prior to May 14, 2003. The program includes limits on landowner costs and the opportunity for in-kind contributions. One hundred percent public funding shall be provided if an existing barrier was installed under an approved forest practices application or a hydraulics project approval acquired prior to December 29, 2013, and that barrier becomes a high priority for replacement.
 - (b) Small forest landowners who participate in the family forest fish passage program are not required to remove, replace or repair barriers until cost share funding is available and higher priority barriers on lands within the watershed have been removed or funded. Small forest landowners participating in the program may make use of prioritization without any obligations to receive funding from the program.

WAC 222-24-052 Road maintenance.

- *(1) Forest roads. Forest roads are defined in WAC 222-16-010. To the extent necessary to prevent potential or actual damage to public resources, the following maintenance shall be conducted on forest roads, except as addressed in subsections *(5) and *(6) of this section:
- (a) Drainage structures shall be kept functional.
 - (b) Ground water that has been captured by ditchline must be diverted onto stable portions of the forest floor by using ditchouts, culverts or drivable dips.
 - (c) Road surface must be maintained as necessary to:

- (i) Minimize erosion of the surface and the subgrade; and
 - (ii) Minimize direct delivery of surface water to typed water; and
 - (iii) Minimize sediment entry to typed water; and
 - (iv) Direct any ground water that is captured by the road surface onto stable portions of the forest floor.
- (d) During and on completion of the following operations, the road surface shall be crowned, outsloped, or water barred and berms removed from the outside edge except those intentionally constructed for protection of fills:
- (i) Log, pulp, chip, or specialized forest product haul;
 - (ii) Rock haul; and
 - (iii) Road building.
- (e) Before the first winter rainy season following termination of operations, drainage structures must be cleared and the road surface must be crowned, outsloped, water barred or otherwise left in a condition which prevents accelerated erosion, interruption of water movement within wetlands, mass wasting, or direct delivery of water or sediment to a typed water. (See the board manual section 3 for specific guidance.)
- (f) Thereafter, except as provided in (d) of this subsection, the landowner must clear or repair ditches or drainage structures that are known or should be known to be nonfunctional and causing or likely to cause material damage to a public resource.
- (g) The landowner will not be liable for penalties or monetary damages, under the act, for damage occurring from a condition brought about by public use, unless the landowner fails to make repairs as directed by a notice to comply.
- (h) During the regular course of road maintenance on stream-adjacent parallel roads, down wood that is blocking vehicle passage shall be placed on the side of the road closest to the adjacent water.
- * (2) **Additional drainage structure maintenance.** If the department determines, based on a field inspection and physical evidence, that the above road maintenance has been or will be inadequate to protect public resources, and that additional measures will provide adequate protection, the department will require the landowner or operator to install additional or larger drainage structures or other drainage improvements identified as necessary by the department.
- * (3) **Abandoned roads.** An abandoned road is a road which the forest landowner has abandoned in accordance with procedures of (a) through (e) of this subsection. Roads are exempt from maintenance under this section only after (e) of this subsection is completed.
- (a) Roads are outsloped, water barred, or otherwise left in a condition suitable to control erosion and maintain water movement within wetlands and natural drainages;
 - (b) Ditches are left in a suitable condition to reduce erosion;
 - (c) The road is blocked so that four wheel highway vehicles cannot pass the point of closure at the time of abandonment;
 - (d) Water crossing structures and fills on all typed waters are removed, except where the department determines other measures would provide adequate protection to public resources; and

- (e) The department shall determine whether the road has been abandoned according to procedures of this subsection. If the department determines the road is properly abandoned, it must notify the landowner in writing within thirty days that the road is officially abandoned.
- * (4) **Orphaned roads.** An orphaned road is a road or railroad grade that the forest landowner has not used for forest practices activities since 1974. Many of these roads are overgrown or closed off, but have not satisfied the abandonment process.
 - (a) An inventory and assessment, of the risk to public resources, or public safety must be completed by the landowner in conjunction with the road maintenance and abandonment plan.
 - (b) Five years after the effective date of this rule, when the extent of any problems associated with the orphaned roads is known, the hazard-reduction statute will be evaluated to determine if it is still needed and if funds for cost-sharing are needed to effect repair or abandonment of orphan roads. See RCW 76.09.300.
 - (c) Landowners are not obligated under this rule to repair or abandon such roads before the end of the five year period, but they can voluntarily take this action.
- * (5) **Brush control.** Chemical control of roadside brush will be done in accordance with WAC 222-38-020.
- * (6) **Road surface treatment.**
 - (a) Apply oil to the road surface only when the temperature is above 55 degrees F and during the season when there is a minimal chance of rain for the next 48 hours. Use of waste oil is subject to RCW 70.95I.060(5).
 - (b) Water the road surface prior to application of oil to assist in penetration.
 - (c) Construct a temporary berm along the road shoulder wherever needed to control runoff of the applied chemical.
 - (d) Take extreme care to avoid excess application of road chemicals. Shut off the flow at all bridges.
 - (e) Dispose of the rinse water fluids on the road surface or in a place safe from potential contamination of water when cleaning out chemical storage and application equipment tanks used for storage and application of road treatment materials.
 - (f) Comply with WAC 222-38-020 when using dry road chemicals.

WAC 222-24-060 Rock quarries, gravel pits, borrow pits, and spoil disposal areas. Not covered by the Surface Mine Reclamation Act of 1971 (chapter 78.44 RCW).

- * (1) **Location of pits.** Except as approved by the department, rock quarries and gravel pits opened after January 1, 1975 shall be located above the 100-year flood level.
- * (2) **Location of spoil disposal areas.** Except as approved by the department, spoil disposal areas shall be located:
 - (a) Above the 100-year flood level.
 - (b) Where the final slope after disposal will be no steeper than 1 1/2:1.
 - (c) Where practical, on areas having low potential timber productivity.
 - (d) Where the risk of sediment delivery from soil erosion and/or mass soil movement is minimal.
 - (e) All spoils shall be placed to allow drainage without additional water ponding.

- (f) All spoils shall be located outside of Type A and Type B Wetlands and their wetland management zones. Spoils shall not be located within the boundaries of forested wetlands without written approval of the department and unless a less environmentally damaging location is unavailable. No spoil area greater than 0.5 acre in size shall be allowed within wetlands. (See WAC 222-24-015.)
- * (3) **Pit drainage.** During construction and use of rock quarries, gravel pits, or borrow pits, runoff water shall be either diverted onto a stable portion of the forest floor or be passed through one or more settling basins as approved by the department.
- * (4) **Rehabilitation required.** All rock quarries, gravel pits, spoil disposal areas and borrow pits used after January 1, 1975 shall be reclaimed within 2 years from the time the rock or gravel source is either exhausted or abandoned.
- * (5) **Rehabilitation standards.** Where rehabilitation is required:
- (a) Remove all deleterious material that has potential for damaging the public resource, the soil productivity, or that would prevent reforestation of an otherwise plantable area.
 - (b) Grade slopes to less than the angle of repose unless otherwise approved.
 - (c) Reforest in accordance with chapter 222-34 WAC to the extent practical.
 - (d) Seed nonforested exposed erodible soils with grass, clover or other ground cover.
- * (6) **Major spoil disposal operations.** Where a spoil disposal operation involves more than 1,000 cubic yards of spoils:
- (a) The spoils shall be placed to provide drainage onto a stable portion of the forest floor without water ponding within the disposal area;
 - (b) The site shall be reforested in accordance with chapter 222-34 WAC to the extent practical; and
 - (c) If significant erosion of the spoils develops, the eroding areas shall be water barred and any unreforested areas shall be matted, mulched, or seeded with grass or ground cover.