**Board of Forestry and Fire Protection**

**Wet Meadows and Other Wet Areas, 2023**

**Title 14 of the California Code of Regulations**

**Division 1.5, Chapter 4,**

**Subchapters 1, 4, 5, 6, & 7**

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**§ 895.1. Definitions**

**Connected Headwall Swale** means a geomorphic feature consisting of a concave depression with convergent slopes, typically of 65 percent or greater steepness that is connected to a Watercourse or lake by way of a continuous linear depression and that has been sculpted over geologic time by shallow landslide events. The slope profile is typically smooth and unbroken by benches, but may be interrupted by recent landslide deposits or scars. Emergent groundwater and W~~w~~et A~~a~~reas may exist at the base of the swale. Soil and colluvium depth is typically greatest at the axis of the swale, thinning to either side.

**Meadows and Wet Areas**: Those areas which are moist on the surface throughout most of the year and/or support aquatic vegetation, grasses ~~and~~or forbs as their principal vegetative cover.

**Riparian** means the banks and other adjacent terrestrial environs of lakes, Watercourses, estuaries, and W~~w~~et A~~a~~reas, where transported surface and subsurface freshwaters provide soil moisture to support mesic vegetation.

**Wet Areas** means a natural area that is wet or moist on the surface in most years and/or supports hydrophytic vegetation.

**~~Wet Meadows and Other Wet Areas~~** ~~means those natural areas which are moist on the surface throughout most of the year and support aquatic vegetation, grasses and forbs as their principal vegetative cover.~~

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**§ 912.7 [932.7, 952.7] Resource Conservation Standards for Minimum Stocking [All Districts]**

The following resource conservation standards constitute minimum acceptable stocking in the Coast [Northern, Southern] Forest District after Timber Operations have been completed.

(a) Rock outcroppings, Meadows and Wet Areas, or other areas not normally bearing commercial species shall not be considered as requiring stocking and are exempt from such provisions.

**§ 913.4 [933.4, 953.4]. Special Prescriptions**

The following special harvesting methods are appropriate under certain conditions:

**(e)** **Aspen, and Meadows and Wet Areas restoration**. All trees within aspen stands (defined as a location with the presence of living aspen (*Populus tremuloides*)), or all trees which are currently within the historical boundaries of Meadows and Wet Areas may be harvested or otherwise treated in order to restore, retain, or enhance these areas for ecological or range values. A primary goal of aspen restoration Projects is the successful regeneration of aspen and recruitment into larger size classes. Projects using this prescription shall be designed to balance the protection and regeneration of aspen stands, Meadows and Wet Areas habitats in California's forest ecosystems with the other goals of forest management as specified in 14 CCR § 897 and meet the following requirements:

 (1) The RPF shall state in the plan each project type(s) that is being proposed (aspen, or Meadows and Wet Areas restoration).

(2) Each project type shall be shown on the plan map, consistent with 14 CCR § 1034(x), and at a scale that shows the locations of planned operations.

(3) The RPF shall describe the extent of the area proposed for harvesting or treatment and the types of harvesting or treatments.

(4) The RPF shall describe the condition of aspen stands, and Meadows and Wet Areas in the project area.

(A) For aspen stands, the condition description shall include, but is not limited to, the determination of whether the aspen stands are upland aspen stands or Riparian aspen stands; spatial extent, species composition, and stand structure (including overstory/understory coverage and whether a stand is pure aspen or mixed with conifer) of the project area; and the relationship of the project area to other known aspen stands in the planning watershed or biological assessment area.

 B) For Meadows and Wet Areas, the condition description shall include current and, if relevant to the restoration, historical spatial extent, species composition, and stand structure (including overstory/understory coverage) of the project area; relevant Watercourse condition factors stated in Board Technical Rule Addendum #2; and other factors indicative of Meadows and Wet Areas geomorphic and hydrological functions.

(5) The RPF shall state the project goals and the measures of success for the proposed aspen, Meadows and Wet Areas restoration project. For purposes of this subsection, measures of success means criteria related to a physical condition that can be measured using conventional forestry equipment or readily available technology to indicate the level of accomplishment of the project goals.

(A) Aspen, or Meadows and Wet Areas project goals and measures of success shall be based on the condition assessment required in 14 CCR §§ 913.4, 933.4, and 953.4, subsection (e)(4), and identification of problematic aspen, Meadows and Wet Areas conditions and their agents/causes. Information shall include a description of factors that may be putting aspen stands, or Meadows and Wet Areas at risk, and presence of any unique physical conditions. Projects shall be designed to contribute to rectifying factors that are limiting restoration, to the extent feasible.

(6) For Projects of twenty (20) acres or less in size, the RPF has the option to not include the requirements of 14 CCR §§ 913.4, 933.4, and 953.4, subsections (e)(4) and (5) if the RPF consults with CDFW prior to plan submittal and, if restoration of a Wet Area is ~~wet areas are~~ proposed, the RPF shall also consult with the appropriate RWQCB. ~~in those locations where the applicable basin plan identifies wet areas as a beneficial use. The results of the consultation(s) shall be included in the plan,~~

(7) The Department shall review post-harvest field conditions of the portions of plans using the aspen, Meadows and Wet Areas restoration silvicultural prescription and prepare a monitoring report every five (5) years for the Board. The monitoring report shall summarize information on use of the prescription including:

 (i) The level of achievement of the measures of success as stated in the plan per 14 CCR §§ 913.4, 933.4, and 953.4, subsection (e)(5);

(ii) Any post-harvest adverse environmental Impacts resulting from use of the prescription;

 (iii) Any regulatory compliance issues; and

 (iv) Any other significant findings resulting from the review. The review shall include photo point records.

(8) Exemptions from other FPRs:

(A) Silvicultural standards for opening size, adjacency requirements, or conifer stocking standards in 14 CCR §§ 913.1-913.3, 933.1-933.3, and 953.1-953.3]; 14 CCR §§ 913.6, 933.6, and 953.6; and 14 CCR § 913.8 do not apply to use of this prescription.

 (B) Minimum resource conservation standards in 14 CCR §§ 912.7, 932.7, and 952.7 do not apply to use of this prescription.

 (C) For purposes of this prescription, Timberland productivity and MSP requirements as stated in 14 CCR §§ 913.10, 933.10, and 953.10; and 14 CCR §§ 913.11, 933.11, and 953.11 are compatible with implementing actions that contribute to attaining the measures of success approved by the Department for this prescription.

**§ 953.7 Riparian Vegetation [Southern]**

All noncommercial Riparian vegetation found along Streams and lakes and within Meadows and Wet Areas shall be retained and protected insofar as practical.

**§ 916.3 [936.3, 956.3] General Limitations Near Watercourses, Lakes, Marshes, ~~Wet Meadows~~ and ~~Other~~ Wet Areas**

The quality and beneficial uses of water shall not be unreasonably degraded by Timber Operations. During Timber Operations, the Timber Operator shall not place, discharge, or dispose of or deposit in such a manner as to permit to pass into the water of this state, any substances or materials, including, but not limited to, soil, silt, bark, Slash, sawdust, or petroleum, in quantities deleterious to fish, wildlife, or the quality and beneficial uses of water. All provisions of this article shall be applied in a manner which complies with this standard.

(c) The Timber Operator shall not construct or use tractor roads in Class I, II, III or IV Watercourses, in the WLPZ, marshes, ~~Wet Meadows,~~ and ~~Other~~ Wet Areas

unless explained and justified in the plan by the RPF, and approved by the Director, except as follows:

(1) At prepared tractor road crossings as described in 14 CCR §§ 914.8(b), 934.8(b), 954.8(b).

(2) Crossings of Class III Watercourses that are dry at the time of use.

(3) At new and existing tractor road crossings approved as part of the Fish and Game Code process (F&GC § 1600 et seq.).

(d) Vegetation, other than commercial species, bordering and covering Meadows and Wet Areas shall be retained and protected during Timber Operations unless explained and justified in the THP and approved by the Director. Soil within the Meadows and Wet Areas shall be protected to the maximum extent possible.

**§ 921.4, 961.4 Stocking Requirements [Coast, Southern, STA]**

Site classification shall be determined by the RPF who prepared the plan. Rock outcroppings, Meadows and Wet Areas, or other areas not normally bearing timber shall not be considered as requiring stocking and are exempt from such provisions.

**§ 921.6 Hazard Reduction [Coast, Special Treatment Area]**

(c) Snags: All snags within the WLPZ and within 100 feet (30.48 m) of meadow edges shall be left standing with the following exceptions:

 (1) When felling is required for fire or safety reasons, as specified by the Rules or CAL OSHA regulations, or when necessary in sanitation-salvage operations.

 (2) When a snag of commercial value is marked for felling by an RPF or supervised designee after an initial preharvest inspection and consultation with CDFW and the Timber Owner.

**§ 923.1 [943.1, 963.1] Planning for Logging Roads and Landings. [All Districts]**

Logging Roads and Landings shall be planned and located within the context of a systematic layout pattern that considers 14 CCR § 923(b), uses existing Logging Roads and Landings where feasible and appropriate, and provides access for fire and resource protection activities.

(a) Logging Roads and Landings shall be planned and located to minimize the following:

(3) Construction and reconstruction near Watercourses, lakes, marshes, and ~~Wet Meadows, and~~ ~~Other~~ Wet Areas.

(b) No Logging Roads or Landings shall be planned for construction (i) within 150 feet of the Class I Watercourse transition line, (ii) within 100 feet of the Class II Watercourse Transition Line on slopes greater than 30%, (iii) within Class I, II, III, or IV Watercourses or lakes, (iv) within a WLPZ, or (v) in marshes~~,~~ or ~~Wet Meadows, and~~ ~~Other~~ Wet Areas, except as follows:

(1) At existing Logging Road Watercourse crossings.

(2) At Logging Road Watercourse crossings to be constructed or Reconstructed that are approved as part of the Fish and Game Code process (F&GC § 1600 et seq.).

(3) At Logging Road Watercourse crossings of Class III Watercourses that are dry at the time of use.

(c) No Logging Roads or Landings shall be planned for reconstruction (i) within Class I, II, III, or IV Watercourses or lakes, (ii) within a WLPZ, or (iii) in marshes~~,~~ or ~~Wet Meadows, and~~ ~~Other~~ Wet Areas, except as follows:

(1) At existing Logging Road Watercourse crossings.

(2) At Logging Road Watercourse crossings to be constructed or Reconstructed that are approved as part of the Fish and Game Code process (F&GC § 1600 et seq.).

(3) At Logging Road Watercourse crossings of Class III Watercourses that are dry at the time of use.

**§ 923.4 [943.4, 963.4] Construction and Reconstruction of Logging Roads and Landings [All Districts]**

Logging Roads and Landings shall be constructed or Reconstructed in accordance with the approved Plan and the following requirements. If a change in designation of Logging Road classification is made after the Plan is approved, the change shall be reported in accordance with 14 CCR §§ 1039, 1040, 1090.14, 1092.26, 092.27, 1094.23 or 1094.24 as appropriate

(b) No Logging Roads or Landings shall be constructed (i) within 150 feet of the Class I Watercourse transition line, (ii) within 100 feet of the Class II Watercourse Transition Line on slopes greater than 30%, (iii) within Class I, II, III, or IV Watercourses or lakes, (iv) within a WLPZ, or (v) in marshes, ~~Wet Meadows, and Other~~ Wet Areas, except as follows:

(1) At existing Logging Road Watercourse crossings.

(2) At Logging Road Watercourse crossings to be constructed or Reconstructed that are approved as part of the Fish and Game Code process (F&GC § 1600 et seq.)

(3) At Logging Road Watercourse crossings of Class III Watercourses that are dry at the time of use.

(c) No Logging Roads or Landings shall be Reconstructed (i) within Class I, II, III, or IV Watercourses or lakes, (ii) within a WLPZ, or (iii) in marshes, and ~~Wet Meadows and~~ ~~Other~~ Wet Areas, except as follows:

(1) At existing Logging Road Watercourse crossings.

(2) At Logging Road Watercourse crossings to be constructed or Reconstructed that are approved as part of the Fish and Game Code process (F&GC § 1600 et seq.)

(3) At Logging Road Watercourse crossings of Class III Watercourses that are dry at the time of use.

**§ 927.12 Hazard Reduction [Marin County]**

(b) Snags: All snags within the WLPZ and within 100 ft. of meadow edges shall be left standing with the following exceptions:

(1) When felling is required for fire or safety reasons (CAL-OSHA CCR § 6259) or when necessary in sanitation-salvage operations.

(2) When a snag of commercial value is marked for felling by the RPF after an initial preharvest inspection and consultation with the CDFW and the Timber Owner.

**§ 1034 Contents of Plan**

The plan shall serve two functions: to provide information the Director needs to determine whether the proposed timber operation conforms to the Rules of the Board; and to provide information and direction to Timber Operators so that they comply with the Rules of the Board. For the plan to serve these functions, it shall, as a minimum, contain the following information:

(x) On titled USGS (if available) or equivalent topographic maps of a scale not less than 2" to the mile, the information in subsections (1)-(3), (4)(A), (B) and (E) ((4)(B) and (E) for sites within the harvest area), (8), (9), and (11)-(13) shall be clearly shown. Additional maps, which may be topographic or planimetric, may be used to provide the information required in the other subsections, to show specific details, and to improve map clarity. The appurtenant roads referenced in subsections (4)(B), (C), (D), and (E) ((4)(B) and (E) for sites not within the harvest area) may be shown on a map which may be planimetric with a scale as small as one-half inch equals one mile. Color coding shall not be used. A legend shall be included indicating the meaning of the symbols used. See the district Rules for the appropriate minimum mapping acreages.

(4) Location of all roads to be used for, or potentially Impacted by, Timber Operations. This shall include:

(B) Roads and Landings located in Watercourses, lakes, WLPZs, marshes, and ~~Wet Meadows and~~ ~~Other~~ Wet Areas, other than at road Watercourse crossings

(16) Location of any in lieu use of heavy equipment and location of tractor roads in Watercourses, lakes, WLPZs, marshes, Wet Meadows and Other Wet Areas.

(cc) Explanation and justification for use of Watercourses, marshes, and ~~Wet Meadows and~~ ~~Other~~ Wet Areas as tractor roads.

**§ 1038.2 Mapping Standards for Notices of Exemption**

A submitted notice of exemption shall include a seven-and-one-half (7½) minute USGS quadrangle map, or its equivalent, depicting the information as required in Table 1 below. Additional maps, which may be topographic or planimetric, may be used to provide additional information, to show specific details, and to improve map clarity. A larger scale map such as an assessor parcel map showing the location of the Timber Operations shall be included for exemptions conducted under 14 CCR § 1038 (c). The Appurtenant Roads included within the Logging Area pursuant to subsection (b) below may be shown on a map which may be planimetric with a scale as small as one-half inch equals one mile. Color coding shall not be used. A legend shall be included indicating the meaning of the symbols used. The submitted notice of exemption shall indicate if more than one Yarding system is to be used and identify the systems (if more than one is used).

(e) Road(s) and Landing(s) located in a Watercourse, Lake, WLPZ, ~~Meadows and~~ Wet Areas other than at road Watercourse crossings.

**§ 1038.4. Mapping Standards for the Forest Fire Prevention Exemption**

An exemption pursuant to this 14 CCR § 1038.4 will be mapped on a USGS 7 ½ minute quadrangle map, or equivalent topographic maps, and shall contain all required information stated within this section. Additional maps, which may be topographic or planimetric, may be used to provide the information required in this section, to show specific details, and to improve map clarity. Appurtenant Roads may be shown on a separate map which may be planimetric with a scale as small as one-half inch equals one mile. Color coding may not be used. A legend shall be included indicating the meaning of symbols used.

(c) Location of all roads to be used for, or potentially impacted by, Timber Operations. This shall include:

(2) Roads and Landings located in Watercourses, Lakes, WLPZs, marshes, and ~~Wet Meadows and~~ ~~Other~~ Wet Areas, other than at road Watercourse crossings.

**§ 1051 Modified THP**

(a) On an ownership of 160 acres, or a quarter (¼) section or less of Timberland, a modified timber harvest plan may be filed by a plan submitter, providing that the following conditions and mitigations are met:

(9) No heavy equipment operations shall occur within a Watercourse or lake protection zone, or ~~Wet Meadows and~~ ~~Other~~ Wet Areas, except as follow:

(A) For maintenance of existing Logging Roads, drainage facilities or structures, or

(B) For logging and tractor road Watercourse crossing construction or reconstruction.

**§ 1051.4. Modified THP for Fuel Hazard Reduction Conditions and Mitigations.**

(a) A Modified THP for Fuel Hazard Reduction (hereafter also referred to as “MTHP-FHR”) may be filed by a plan submitter for a project area not to exceed 2,500 acres, providing that the following conditions and mitigations are met:

(9) Timber harvesting in a Class II WLPZ for a Watercourse that is dry by July 15 of any year may be proposed by the RPF and approved by the Director. When proposed, the RPF shall explain and justify the treatment, and provide a written analysis of the potential for significant adverse effects to the Class II WLPZ that could result from the proposed operations. The focus of Class II WLPZ treatments shall be removal of surface and ladder fuels, and no less than 70% of the existing overstory canopy layer shall be retained. Unless explained and justified, retention of the overstory canopy layer shall be accomplished by leaving the existing larger dominant and codominant trees.

(A) No tractor operations shall occur within a Class II WLPZ, or ~~Wet Meadows and~~ ~~Other~~ Wet Areas, except where the Director determines that the threat of catastrophic wildfire is sufficient to justify the necessity of operations, or for maintenance of existing roads, drainage facilities or structures. Where the Director has made such a determination, operations may only occur where the Erosion Hazard Rating (EHR) pursuant to 14 CCR §§ 912.5, 932.5, and 952.5 is Moderate or less and slopes are no greater than 30%

**§ 1072.4 Exclusions**

Roads and Landings that will not be regenerated, Meadows and Wet Areas, rocky areas, and areas not normally bearing timber shall not be used as plot centers for sampling purposes.

**§ 1090.5 Contents of NTMP**

The plan shall serve three functions: 1) to provide information the Director needs to determine whether the proposed NTMP conforms to the Rules of the Board; 2) to provide information and direction for timber management so it complies with the Rules of the Board and the management objectives of the landowner; and 3) to disclose the potential effects of timber management to the public. For the Plan to serve these functions, it shall, as a minimum, contain the following information:

(o) A description of potential Impacts and protections for the quality and beneficial uses of waters within Watercourses, Lakes, and ~~Wet Meadows and~~ ~~Other~~ Wet Areas.

(w) On a USGS quadrangle or equivalent topographical map of a scale not less than two (2") inches to the mile, the following information shall be clearly provided. Additional maps may be required to show specific details, and may be planimetric. Color coding shall not be used. A legend shall be included indicating the meaning of the symbols used. See the district Rules for the appropriate minimum mapping acreages.

(4) Location of all roads to be used for, or potentially Impacted by, Timber Operations. This shall include:

(B) Roads and Landings located in Watercourses, lakes, WLPZs, marshes, and ~~Wet Meadows and~~ ~~Other~~ Wet Areas, other than at road watercourse crossings.

(bb) Explanation and justification for use of Watercourse, marshes, and ~~Wet Meadows and~~ ~~Other~~ Wet Areas as Landings, roads, or skid trails.

**§ 1092.09 PTHP Contents**

The purpose of the PTHP is to provide guidance for implementation of the standards and protective measures in the certified PTEIR. For the PTHP to serve these functions it shall contain the following:

(l) On a titled USGS quadrangle or equivalent topographic map of a scale not less than 2" to the mile, the information subsections (1)-(5)(A)5., (6)(A)-(G), if applicable, and (7)-(11) shall be clearly shown. Additional maps, which may be topographic or planimetric may be used to provide the information required in other subsections or show specific details, and to improve map clarity. The appurtenant roads referenced in subsection (5) may be shown on a map which may be planimetric with a scale as small as one-half inch equals one mile. Color coding shall not be used. A legend shall be included indicating the meaning of the symbols used. See the district Rules for the appropriate minimum mapping acreage.

(5) The following Logging Road- and Landing-related features shall be shown on a map of the appropriate type and scale as described in subsection (l) above:

(A) Location of all roads to be used for, or potentially Impacted by, Timber Operations. This shall include:

2. Roads and Landings located in Watercourses, lakes, WLPZs, marshes, and ~~Wet Meadows and~~ ~~Other~~ Wet Areas, other than at road Watercourse crossings.

**§ 1094.6 Contents of WFMP**

The WFMP shall serve three functions: 1) to provide information the Director needs to determine whether the proposed WFMP conforms to the Board Rules; 2) to provide information and direction for timber management so it complies with the Board Rules and the management objectives of the landowner(s); and 3) to disclose the potential effects of timber management to the public. For the WFMP to serve these functions, it shall, at a minimum, contain the following information:

(e) A United States Geological Survey quadrangle map or equivalent, of a scale not less than 2" per mile. Additional maps may be required to show specific details, and may be planimetric. Color coding on maps may be used if they are able to be reproduced in black and white and clearly show all details. A legend shall be included indicating the meaning of the symbols used. See the District Rules for the appropriate minimum mapping acreages. The map shall include:

(4) Location of all roads to be used for, or potentially Impacted by, Timber Operations. This shall include:

B) Roads and Landings located in Watercourses, Lakes, WLPZs, and ~~Wet Meadows and~~ ~~Other~~ Wet Areas, other than at road Watercourse crossings.

(18) Location of any in lieu use of heavy equipment and location of tractor roads in Watercourses, lakes, WLPZs, marshes, and ~~Wet Meadows and~~ ~~Other~~ Wet Areas, except where the WFMP has a standard operating practice(s) pursuant to 14 CCR § 1094.6 (jj).

(cc) Explanation and justification for use of Landings, Logging Roads and skid trails in the protection zones of Watercourses, Lakes, and ~~Wet Meadows and~~ ~~Other~~ Wet Areas.

(ii) A description of Lakes, and ~~Wet Meadows and~~ ~~Other~~ Areas.

**§ 1094.8 Working Forest Harvest Notice Content**

The Working Forest Harvest Notice shall be a public record. The Department shall post the Working Forest Harvest Notice on the Department’s Internet Website. All necessary deviations shall be approved by the Director, pursuant to 14 CCR §§ 1094.23 and 1094.24, prior to submission of a Working Forest Harvest Notice. The Working Forest Harvest Notice shall include all of the following information:

(s) A description of Lakes, and ~~Wet Meadows and~~ ~~Other~~ Wet Areas.

(u) On a USGS quadrangle or equivalent map, of a scale not less than 2" to the mile, the following information pertinent to the Working Forest Harvest Notice shall be clearly provided. Additional maps may be required to show specific details, and may be planimetric. Color coding on maps may be used if they are able to be reproduced in black and white maps and clearly show all details. A legend shall be included indicating the meaning of the symbols used. See the District Rules for the appropriate minimum mapping acreages. Maps shall be updated to reflect current field conditions.

(4) Location of all roads to be used for, or potentially Impacted by, Timber Operations. This shall include:

(B) Roads and Landings located in Watercourses, Lakes, WLPZs, and ~~Wet Meadows and~~ ~~Other~~ Wet Areas, other than at road Watercourse crossings.

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**APPENDIX**

**TECHNICAL RULE ADDENDUM NO. 2**

**CUMULATIVE IMPACTS ASSESSMENT GUIDELINES**

Cumulative watershed Effects (CWEs) occur within and near bodies of water or ~~Wet Meadows and~~ ~~Other~~ Wet Areas, where individual Impacts are combined to produce an effect that is greater than any of the individual Impacts acting alone.

**C. BIOLOGICAL RESOURCES**

Significant adverse Cumulative Impacts may be expected where there is a substantial reduction in required habitat or the Project will result in substantial interference with the movement of resident or migratory Species. Biological assessment areas can vary with the habitat and Species being evaluated. Factors to consider in the evaluation of cumulative biological Impacts include:

**4.** The biological habitat condition of the Plan and immediate surrounding area. The following factors are commonly used when evaluating biological habitat. The factors described are general and may not be appropriate for all situations. The RPF may also need to consider factors which are not listed below. Each set of ground conditions are unique and the assessment conducted must reflect those conditions.

**h.** Special Habitat Elements: Special habitat elements are specific physical and biological attributes of the landscape without which certain Species are not expected to be present or, if present, are at relatively low population numbers. The biological assessment area may contain special habitat or critical Functional elements that are not otherwise discussed within this Appendix (e.g., meadows that may be critical for fawning success of local deer population, etc...). Each Species may have several key limiting factors to consider during the assessment of Cumulative Impacts.

**BOARD OF FORESTRY TECHNICAL RULE ADDENDUM NO. 5:**

**GUIDANCE ON HYDROLOGIC DISCONNECTION, ROAD DRAINAGE, MINIMIZATION OF DIVERSION POTENTIAL, AND HIGH RISK CROSSINGS (1st EDITION, revised 10/27/14)**

**II. Road Drainage, Energy Dissipation, Outsloping and Rolling Dips**

**A. Location of Drainage Facilities and Structures**

In addition to drainage structures and facilities being located: (1) to disconnect road drainage upslope of Watercourses, and (2) at a sufficient interval (spacing) to avoid volume concentrations and associated erosion, as discussed above, there are additional factors that should be considered prior to placing drainage structures and facilities in the field. To assist in identifying sites best suited for a drainage structure or facility, the following criteria should be considered. These criteria should be evaluated and appropriately weighted based on site-specific conditions, so that the effectiveness of the drainage structure or facility is maximized and potential problems are avoided or minimized. RPFs should maintain or restore natural drainage patterns as much as possible, while considering the factors listed below. Drainage structures and facilities should be placed:

• To avoid the concentration of flow onto unstable or potentially unstable areas, such as known active landslides, hummocky ground, concave headwalls, or steep fillslopes.

• To discharge onto divergent (convex) to planar slopes where possible, to allow for better dispersion and infiltration (Refer to Figure 3).

• Before hydrologic divides to prevent water from one hydrologic basin mixing with, and potentially Impacting, another hydrologic basin not conditioned to receiving the additional flows.

• Above breaks in the road grade that transition from low-gradient to high-gradient to remove the water off of the road before it gains velocity and erosive power on the downslope steep road segment.

• To drain localized or emergent groundwater, springs, and W~~w~~et A~~a~~reas present in the road prism.