

Appendix A

Characteristics of Storm Proofed Roads⁶

Storm-proofed stream crossings

- All stream crossings have a drainage structure designed for the 100-year flow (with debris).
- Stream crossings have no diversion potential (functional critical dips are in place).
- Stream crossing inlets have low plug potential (trash barriers & graded drainage).
- Protect stream crossing outlets from erosion (extended, transported or dissipated).
- Culvert inlet, outlet and bottom are open and in sound condition.
- Undersized culverts in deep fills (greater than backhoe reach) have emergency overflow culvert.
- Bridges have stable, non-eroding abutments and do not significantly restrict 100-year flood flow.
- Fills are stable (unstable fills are removed or stabilized).
- Road surfaces and ditches are “disconnected” from streams and stream crossing culverts.
- Class I stream crossings meet Department of Fish and Game and National Marine Fisheries Service fish passage criteria (California Salmonid Stream Habitat Restoration Manual, Part IX).

Storm-proofed fills

- Unstable and potentially unstable road and landing fills are excavated or structurally stabilized.
- Excavated spoil is placed in locations where it will not enter a stream.
- Excavated spoil is placed where it will not cause a slope failure or landslide.

Road surface drainage

- Road surfaces and ditches are “disconnected” from streams and stream crossing culverts.
- Ditches are drained frequently by functional rolling dips or ditch relief culverts.
- Outflow from ditch relief culverts do not discharge to streams.
- Gullies (including those below ditch relief culverts) are dewatered to the extent possible.
- Ditches do not discharge (through culverts or rolling dips) onto active or potential landslides.
- Fine sediment contributions from roads, cutbanks and ditches are minimized by utilizing seasonal closures and installing a variety of surface drainage techniques including berm removal, road surface shaping (outsloping, insloping or crowning), rolling dips, ditch relief culverts, water bars and other measures to disperse road surface runoff and reduce or eliminate sediment delivery to the stream.

Characteristics of Decommissioned Roads⁷

Decommissioning is the same as road closure. It can be permanent or temporary, but the aim is the same. It is the removal of those elements of a road that reroute hillslope drainage and present slope stability hazards. Another term for this is “hydrologic obliteration”. It involves such tasks as decompacting road surfaces and installing road surface drainage (e.g., cross road drains or road outsloping), excavating unstable sidecast and road fill, and fully excavating stream crossing fills (not just culvert removal). Decommissioning essentially involves reverse road construction, except that full topographic obliteration of the roadbed is rarely required to accomplish sediment prevention goals. In order to protect the aquatic ecosystem, the objective is to 1) hydrologically decommission the road by dispersing runoff, 2) reestablish drainage patterns, and 3) remove or stabilize all potential sources of sediment delivery that could occur along the alignment. Decommissioned roads have permanent drainage and do not rely on ditches. Estimating the sediment savings and treatment cost-effectiveness of such projects will help identify which roads in the watershed are truly the best targets for decommissioning.

⁶ California Salmonid Stream Habitat Restoration Manual, Part X, March 2006, Figure X-9. Common characteristics of storm-proofed roads, p. X-55.

⁷ California Salmonid Stream Habitat Restoration Manual, Part X, March 2006, p. X-53.