Appendix A. Draft Project Design Criteria (PDC)

The National Environmental Policy Act defines "mitigation" as avoiding, minimizing, rectifying, reducing, eliminating or compensating project impacts. The following project design criteria (PDC) are an integral part of this project and would be carried out when the project is implemented. These are draft PDC that may be changed throughout the analysis process. Additional PDC may also be added throughout the analysis process to protect natural and cultural resources within the project area.

Silviculture

1. Gaps (i.e. “openings”) will be created in a variety of sizes no larger than 2 acres. The sizes and total quantity will vary within and between units. Gap locations will be focused in areas with root diseases pockets where possible. Gaps are areas where few trees will be retained and retained trees will be focused on non-susceptible species.
2. Ponderosa pine dominated planting will occur in specific areas where appropriate to assist in restoring and maintaining a historically fire tolerant ecosystem.
3. Gap placements will occur outside of riparian reserves.
4. Pruning should not exceed 6 feet in height, or more than half the tree height, whichever is less.
5. Within pine/oak plant communities maintain at least 2 Douglas-fir greater than 24 inches DBH per acre when available.
    a. Douglas-fir should be insect and disease free.
    b. Do not maintain any within 50 feet of a dripline of legacy ponderosa pine or Oregon white oak.
6. Within pine/oak plant communities Douglas-fir and grand fir greater than 24 inches DBH that are over topping healthy ponderosa pine greater than 18 inches DBH and Oregon white oak greater than 14 inches DBH can be topped, felled, or girdled and left on site with the approval of District Silviculturist and Fuels planners.

Fuels

1. Hand piles would be a minimum of 6’ in diameter and 6’ in height.
2. Machine piles would be a minimum of 8’ in diameter and 8’ in height.
3. All piles shall be as wide as they are tall.
4. No piles would be constructed on stumps or on sections of large down logs.
5. All piles would be as compact and free of dirt as possible.
6. All material would be contained within the general contour of the pile.
7. All hand piles would be covered. Covering would consist of 6 mil black plastic (polyethylene) or an equivalent water-resistant barrier. Forest Service personnel would approve prior to use. Cover when pile is approximately 75% complete, then place remaining material on top.

8. Mechanical piling would be done with equipment capable of picking up (grasping) slash material and piling.
9. All piles would be located so that burning would not cause damage to residual trees or snags. Piles would be located outside the drip line of leave trees.
10. All piles would be located at least 20' inside the unit boundary.
11. Piles would not be placed on or in the following areas: pavement, road surface, ditch lines, the bottom of ephemeral channels, within 100' of perennial or intermittent stream channels, within 120' of the perennial channel in unit 6, (or within 60' of seeps and springs).
12. Slash resulting from fuels reduction and pre-commercial treatments would be piled concurrently with the thinning activities. Piles should be burned within 2 years of construction.

Wildlife

1. No timber harvest activities, mechanical fuels treatments, or temporary road construction within 65 yards of known spotted owl nest patches from March 1 to July 15. If a new spotted owl nest is located during the period of the contract, the same seasonal restrictions would apply.
2. No burning would take place within 0.25 mile of a spotted owl nest patch between March 1 and September 30.
3. No small helicopter (i.e. Vertol, Sikorsky) operation within 150 yards, or large helicopter (Chinook) operation within 265 yards of a spotted owl nest patch from March 1 to September 30.
4. An average of 6 logs per acre in decomposition classes 1, 2 and 3 would be retained. Logs would be at least 20 inches in diameter at the small end and have a volume of 40 cubic feet. Skid trails and skyline locations would avoid disturbing key concentrations of down logs or large individual down logs where possible.
5. Buffers for Survey and Manage species needing protection would be designated on-the-ground prior to ground disturbing activities.
6. If a wolf den or rendezvous site is found in or near the project area, no activities associated with the proposed action would be allowed within one mile of the den or rendezvous site from April 1 through July 15.
7. If a raptor nest is found, the area would be protected according to the buffers as defined by forest plan standards.
8. Snags will be retained in all units where safety permits. If snags must be cut for safety reasons, they will be left on site.
9. Consult wildlife biologist or botanist before placing landings within dry meadows in order to protect floral diversity and wildlife resources.
10. No new temporary roads will be constructed in nest patches.
11. All units within B5 with 50% or greater canopy cover will be maintained at 50% post-commercial treatment.

Soils

1. Skid trails would be designated and approved prior to logging by the contract administrator. When feasible, they would be located on previously disturbed areas, such as old landings, spur roads, and skid trails.
2. Landing locations would be approved by the Forest Service prior to operations.
3. Ground-based harvest systems and masticators would not be used on slopes greater than 40 percent to avoid detrimental soil and/or watershed impacts.
4. Convey to all equipment operators the need to limit ground disturbance as much as is feasible. Avoid travelling over undisturbed ground unless necessary.
5. Avoid repetitive passes by heavy equipment except over designated primary routes (i.e., roads, or skid trails). Restrict travel of heavy equipment off designated primary routes to two passes or fewer.
6. Limit, as feasible, heavy equipment, particularly tracked machinery from pivoting or unnecessary side-hill travel on slopes greater than 15 percent. Travel would mostly be down the fall-line and perpendicular to the contour of the slope.
7. Landings and skid trails would have erosion control measures installed following fuels or reforestation treatments.
8. Meadows identified on pre-sale maps would be protected by not allowing new temporary roads, landings or ground based equipment to operate within the delineated area.
9. The contract administrator and soils/hydro resource specialist would coordinate to monitor and evaluate soil conditions to determine when they are suitable (e.g. dry enough) for operations.
    a. Start of operations would be approved on a unit-by unit-basis due to differing soil types in the area since some soils may be more prone to detrimental damage than others.
    b. Monitoring would be conducted to determine when soil conditions are beginning to become too wet for operations.
10. Ground-based operations would be suspended during wet periods when soil moisture is high and off-trail heavy equipment tracks sink deeper than 6 inches below the soil surface with one or two passes (or if tracks in primary skid trails sink deeper than 12 inches); particularly during spring, after heavy or prolonged rain, or in late fall.
    a. Rainfall guidelines for when to temporarily defer or cease ground-based operations:
        i. If it rains at least 0.3 inches per 4-hour period.
        ii. When precipitation for the prior 24- hour period (1:00 A.M. – 12:00 A.M.) as recorded at the Pollywog RAWS site (https://raws.dri.edu/cgi-bin/rawMAIN.pl?orOPOL) is 0.6 inches or greater.
11. For whole-tree harvest systems, primary skid trails would be spaced at least 100 to 150 feet apart at the furthest termini from the landing, except where terrain limitations dictate otherwise.

12. For cut-to-length harvest systems, spacing of primary forwarder trails would be at least 65 feet, except where terrain limitations dictate otherwise. To the extent possible, slash mats would be deposited over primary forwarder trails during cutting operations.
13. All skid trails would be rehabilitated immediately after harvest activities. Existing landings not associated with temporary roads would have erosion control measures installed following fuels or reforestation treatments.
14. Only needed for cable logging methods: Spacing of yarding corridors for parallel settings would be at least 100 feet apart, and 150 feet at the tail-hold for radial settings.
15. Only needed for cable logging methods: Front-end log suspension would be required during yarding operations.
16. Only needed for cable logging methods: Retain trees that have been used as guy line anchors, tail-holds, or intermediate supports for future coarse woody debris (CWD) recruitment.
17. Only needed for tethered logging methods: Spacing of yarding corridors would be at least 65 feet apart.
18. Only needed for tethered logging methods: Tethered logging applications would be approved by the Forest Service Sale Administration on a unit by unit basis.
19. Crushed aggregate or other rock may be used when necessary to reduce erosion, puddling, ponding, rutting, soil displacement, or compaction on temporary roads and landings. Following harvest activities, rock would be removed or incorporated into the soil by decompacting to a depth of 24 inches or scarifying the roadbed to provide an efficient base for vegetative growth and water infiltration.
20. Native Surfaced Roads - Haul would not occur on native surfaced roads during wet conditions unless hardened with crushed aggregate or other rock, and drainage structures or other erosion control measures are installed to prevent sediment delivery to streams and protect the road surface.
21. Haul routes would be inspected weekly, or more frequently if weather conditions warrant. Inspections would focus on road surface condition, drainage maintenance, and sources of soil erosion and sediment delivery to streams. If sediment traps are used, they would be inspected weekly during wet conditions and entrained soil would be removed when the traps have filled to ¾ capacity. Removed materials would be deposited in a stable site that is not hydrologically connected to a stream.
22. Log and rock haul on system and temporary roads would be prohibited at any time there is 0.5 inches of precipitation within any given 24-hour period as measured at the Pollywog RAWS site or if the roads begin to show signs of damage from haul activities. To measure precipitation, the purchaser may install a temporary rain gauge on NFS land near or adjacent to the lowest elevation along the haul route as agreed upon; otherwise, precipitation would be measured according to the Pollywog RAWS site.
23. Aggregate Roads – Haul may occur during wet conditions on aggregate roads. Haul would be stopped immediately if road use is causing rutting of the road surface, ponding of water on the road, failure of any drainage structure, or any other action occurs which increases the sediment delivery to a stream. On some roads, depending on haul volume, this would likely

occur when there is more than one inch of rain in a 24-hour period or more than two inches of rain in 48 hours.

24. Winter Operations would only occur when the ground is frozen on the surface and to a depth of at least 6 inches, and when the snowpack is at least 24" deep and firm. Temperatures would remain below freezing for at least 8 hours in a day. Winter operations would be considered on a unit by unit basis because of the different soil types in the area.
    a. Guidelines for when conditions are no longer favorable for ground-based operations over the snow:
        i. When rain-on-snow softens the snowpack.
        ii. When the temperature is above freezing for more than 8 hours per day and the snow pack becomes soft.
        iii. When heavy equipment ruts in the snowpack have become mixed with mud.
25. Mechanical piling of post-activity fuels would be limited, as is feasible, to existing primary travel routes and skid trails. Restrict travel of heavy equipment off designated primary routes to two passes or fewer.
26. Machine piling of slash during fuels treatments would generally be avoided on slopes over 30 percent. Minimize impacts of machine piling by piling no more than needed to break up fuel continuity.
27. Maintain effective ground cover and organics, retain >50% of litter/duff depth wherever it exists.

Transportation

1. If in-water work is determined to be required, follow the appropriate Oregon Department of Fish and Wildlife (ODFW) guidelines for timing of in-water work (in this watershed the in-water work window is July 15 to October 31. Exceptions to the ODFW in-water work windows would be requested by the Forest or its contractors, and subsequently approved by ODFW, U.S. Army Corps of Engineers, and Oregon Division of State Lands.
2. All signing requirements on roads that are open for public use within the Mt. Hood National Forest would meet applicable standards as set forth by the Manual of Uniform Traffic Control Devices (MUTCD). Some roads accessing State and County highways would require additional signing to warn traffic of trucks entering onto or across the highway.
3. Unsuitable excavation[1] from ditch cleaning or other operations would be disposed of at Forest Service approved sites. Material disposed of would be spread evenly over an appropriate area outside of riparian reserves and with a maximum layer thickness of 4 feet.

[1] Soil that is silty, sandy, saturated, frozen, or contains clay, organics, or other material that would be unsuitable for use in road construction and maintenance work. (Unsuitable excavation, by specification, is any material containing excess moisture, muck, frozen lumps, roots, sod, or other deleterious material along with certain types of soil that contain unacceptable amounts of silt or clay have insufficient load bearing properties and are considered unsuitable for use in construction of any structural component of a roadway. Therefore this type of material, typically found in ditches or slide material, needs to be end-hauled and disposed of).

All disposals would be seeded and mulched at the completion of operations, and prior to the wet season.

4. The use of steel-tracked equipment on asphalt or similar surface roads would not be used unless approved by a Forest Service representative. If a suitable site for the loading and unloading of equipment and materials is not available, then use of a paved surface may be permitted provided that the purchaser uses approved matting materials (such as wood chip or crushed rock) to protect the road surface. Purchaser is responsible for restoring roads to existing condition.
5. Temporary roads and landings located on or intersecting NFS roads that are asphalt or similar surface would have 3-inch minus or finer dense graded aggregate placed at the approach to prevent surface damage. The purchaser would purchase the material from a commercial source and place the material so that the approach flares are wide enough to accommodate the off-tracking of vehicles entering onto or leaving the site.
6. Appropriate measures would be taken to prevent or reduce mineral soil contamination to aggregate surface roads. If contamination occurs, the purchaser would repair contaminated areas with specified aggregate surfacing. Mineral soil contamination degrades and reduces the load bearing capacity of the existing aggregate surface road.
7. The appropriate Forest Service specialist would be consulted whenever:
    a. Temporary roads would be constructed in areas with an existing cross-slope greater than 40%,
    b. Temporary roads would have a road grade above 15% for any distance greater than 2,000 feet, or
    c. Temporary roads would have a road grade above 18% for any distance greater than 600 feet.
8. Temporary roads and National Forest System roads which are designated for 'project use only' would be closed to public use. The purchaser would sign the entrance to such roads with "Logging Use Only" signs and make every reasonable effort to warn the public of the hazard and to prevent any unauthorized use of the road.
9. All slash created through road reconstruction and/or road maintenance including temporary road construction would be machine grapple piled outside the road prism. Construction and placement of piles would adhere to all fuels related PDC.

Heritage

1. In accordance with 36 CFR 800 and Section 106 of the National Historic Preservation Act (1966), all known cultural and archaeological sites within the project planning area which are eligible or potentially eligible (unevaluated) for listing on the National Register of Historic Places (NRHP) will be protected throughout the life of the project.
2. Cultural and archaeological site boundaries within or immediately adjacent (~30 meters) to project activities will be flagged for avoidance. A map will be provided to the sale administration and fuels planning resources prior to implementation with buffered site boundaries labeled as "Sensitive Resource – Area to Protect."

3. The project lead will consult with a Forest Service Archaeologist on locations of equipment staging and access routes and any modifications in project location or design before any activities proceed.
4. If during project activities cultural material is encountered, all work will cease immediately, and a Forest Archaeologist will be contacted to evaluate the inadvertent discovery. A mitigation plan, if needed, will be developed in consultation with the Oregon State Historic Preservation Office (SHPO) and the Confederated Tribes of Warm Springs Reservation of Oregon, the Confederated Tribes of Grand Ronde, and Tribal Historic Preservation Office (THPO) as appropriate.
5. Fire control line would be constructed, using either wet line or hand line, around all fire sensitive heritage resources. Prescribed burning may occur within heritage resources which are not fire-sensitive, but piling may not occur within the flagged buffer zones.

Recreation

1. Minimum of two weeks advance notice and informational signs of harvest and fuels activities would be posted at affected trailheads and trail junctions and at Knebel Springs and Eightmile Campgrounds.
2. Work with recreation specialist to develop public information materials and outreach plan using a combination of key entry/exit portals, visitor information boards and outreach via websites and other information sources.
3. Trail crossings would occur on the Bottle Prairie trail (#455) within units 37, 38, 45, 54 and the Eightmile Loop trail (#496) with units 48, 49. Crossings used for operations (i.e., temp roads, skid trails, piling/mastication equipment) would be minimized to the extent practical. Where these crossings occur, the trail would be rehabilitated to meet standards associated with their designed use.
4. A 100-foot protection buffer would be retained on either side of the (#455 and #496) non-motorized trails within the planning area. The buffer would be utilized to retain moisture in the trail tread and reduce future maintenance needs resulting from opening the canopy and allowing for the encroachment of brush. Inside the buffer all downed wood 20” or greater would be retained to maintain the visual integrity and existing shade along the trail corridors. Mechanical fuels reduction will occur within the protection buffer including but not limited to mastication and thinning of general small diameter trees less the 8" DBH, brushing, and burning.
5. Piling will not occur inside of the 100-foot protection buffer.
6. Landings would not be located on system trails or trailheads. They could be adjacent to system trailheads outside the 100-foot protection buffer.
7. To minimize conflicts with forest visitors/recreationists no fuels reduction, harvest, haul or road maintenance or road reconstruction would take place on weekends and holidays.
8. If treatments are anticipated to continue beyond the current operating season, then temporary effective closure of temporary roads and skid trails would occur to prevent unauthorized use.
9. Harvest, haul, and fuels reduction activities would not preclude public access to Fivemile Lookout via Forest Road 4400122.

10. Fivemile Lookout renters would be notified of planned harvest, haul or fuels reduction activities that may be audible, visible or otherwise noticeable from the lookout prior to making reservations via the reservation service Recreation.gov.

Visual Quality (Scenic Resources)

1. When marking trees to be left, mark side of tree facing away from road within 100 feet of Forest Service roads 4430, 4440, 4440-160, and 1722-160.
2. Boundary tags, flagging, and markers would be removed from visual foreground areas (i.e. 100 feet) in treatment units after completion of activities. Foreground occurs along Forest Service roads 4430, 4440, 4440-160, and 1722-160. Foreground also occurs along Forest Trails #455 and #496.
3. Within 100 feet of the travel corridor, stumps would not exceed 8 inches in height for both commercial and pre – commercial units. This will be required along Forest Service roads 4430, 4440, 4440-160, and 1722-160. and along Forest Trails #455 and #496.
4. Landings created around Forest Trail #455 should be placed at least 200 feet from the trail
5. Hand piling should occur in unit 83 to protect visual integrity along the visible corridor surrounding Forest Trail #496.

Botany and Invasive Plants

1. Protection buffers will be placed around known sensitive plant, lichen, bryophyte and fungi sites (multiple species). Required fungi surveys will be finalized in Spring 2022. Protection buffer locations will be provided to sale administration and fuels planning resources.
2. Only low to moderate intensity prescribed fire activities would occur within the vicinity of mapped sensitive sites. Maps will be provided to fire staff.
3. In order to prevent the spread of invasive plants, all equipment would be cleaned of dirt and weeds before entering National Forest System lands. This practice would not apply to service vehicles traveling frequently in and out of the project area that would remain on the roadway.
4. If the need for restoration/revegetation of skid trails and landings is identified, the use of native plant materials are the first choice for meeting this objective where timely natural regeneration of the native plant community is not likely to occur. Non-native, non-invasive plant species may be used in any of the following situations:
    a. when needed in emergency conditions to protect basic resource values (e.g., soil stability, water quality and to help prevent the establishment of invasive species)
    b. as an interim, non-persistent measure designed to aid in the re-establishment of native plants
    c. if native plant materials are not available
    d. in permanently altered plant communities
5. If using straw, hay or mulch for restoration/revegetation in any areas, use only certified, weed-free materials.

6. Inspect active gravel, fill, sand stockpiles, quarry sites, and borrow material for invasive plants before use and transport. Treat or require treatment of infested sources before any use of pit material. Use only gravel, fill, sand, and rock that is judged to be weed free by District or Forest weed specialists.
7. Coordination for project sites and staging areas would occur with botanical staff to avoid areas that have high concentrations of invasive species. If use of these areas is identified, effort should be made to treat populations ahead of time to reduce the spread of infestations.

Aquatic Resources

1. No ground based mechanized equipment will operate within 60' of seeps or springs, or where identified in the Mount Hood Vegetation Programmatic Biological Opinion.
2. Only needed for cable logging methods: If cable logging systems require use of hold trees that are within the Riparian Reserves, avoid using western redcedar, western white pine species, and any tree greater than 30 inches, when possible.

Other Project Design Criteria from the *Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the Mt. Hood National Forest Timber Sale Program* (National Marine Fisheries Service (NMFS) Reference No. WCRO-2020-03469)

A. General Criteria

A3. Spill Prevention - An approved Spill Prevention Control and Containment Plan (SPCCP) would be created, as required by contract provisions G.3.4.1/BT6.341, which describe measures to prevent or reduce impacts from potential spills. The SPCCP would include a description of the hazardous materials that would be used; and a spill containment kit would be located on-site. All trucks used for refueling would carry a hazardous material recovery kit. All vehicles and machinery would be free of petroleum leaks. Any leaks that occur would be immediately repaired. Power equipment would be refueled at least 150 feet from water bodies to prevent direct delivery of contaminants into a water body. If local site conditions do not allow for a 150-foot setback, then refueling would be as far away as possible from the water body; defined in the NWFP as portions of a watershed directly coupled to streams and rivers, that is, the portions of a watershed required for maintaining hydrologic, geomorphic, and ecologic processes that directly affect standing and flowing waterbodies such as lakes and ponds, wetlands, streams, stream processes, and fish habitats. For all immobile equipment, absorbent pads would be used. All petroleum products being transported or stored would be in approved containers meeting Occupational Safety and Health Administration and Oregon Department of Transportation standards. The Contracting Officer would be notified of any spills. Any contaminated soil, vegetation or debris must be removed from National Forest System lands and disposed of in accordance with state laws.

A4. Ground-based mechanized equipment, such as skidders, dozers, and feller-bunchers, operation will not be allowed outside the Normal Operating (Dry) Season (generally June 1 – October 15) within Riparian Reserves unless approved through the existing waiver process by a soil, hydrology, and/or fisheries specialist.

A6. Erosion control measures will be implemented to prevent off-site movement of disturbed or exposed soil associated with road and landing construction, use and decommissioning/closure, (including cut-banks, fills, ditches, etc.) on road segments that have the potential to directly or indirectly deliver sediment to any stream channel. Erosion control measures include silt fences, wattles, straw bales, matting, mulch, slash, water bars, ditch check dams, grass seed, or other products. Existing vegetation in ditch lines hydrologically connected to streams (as defined in NWFP) must not be removed unless a biodegradable sediment control feature such as check dams constructed of bio-bags, straw bales, or other materials are installed. Sediment control features will be maintained in working order during the sale and left in place when the sale is released.

B. Tree Felling:

B1. Streams within the project area must be protected with stream protection buffers as shown below. Within these buffers, no commercial harvest is allowed. Stream buffers are measured from the edge of active channel (stream banks) on both sides of the stream. Buffers will be expanded to include slope breaks, where applicable. If stream temperature is currently impaired in a particular system, the Northwest Forest Plan (NWFP) Temperature Total Maximum Daily Load (TMDL) Implementation Strategy (2012) guidance should be referenced.

Table PDC B1. Minimum Stream Protection No-harvest Buffer Widths by Stream Class.

Stream Type	No-harvest buffer
Fish-bearing* stream (almost all are usually perennial)	100’ within 1,000’ of a LFH stream, 75’ outside of 1,000’ from a LFH stream
Intermittent stream	30’

*If not field verified by fish biologists or there is no information on file, perennial streams are presumed to be fish-bearing.

B4. Riparian Reserve treatments to attain ACSO require at least 50% canopy cover remain in treated areas. (This element of the PDC will only apply to unit 6).

All legacy trees must also be retained.

B10. Trees may be felled in protection buffers to allow for tail-hold tree (stump) anchor points for skyline cable, or other similar, logging system. Felled trees would be left in place unless they need to be moved to facilitate safe operations.

B11. Trees for harvest must be felled away or parallel to the stream protection buffer. Trees that are inadvertently felled into the stream protection buffer, fall and leave trees, or trees felled to create yarding corridors or non-system roads within the stream buffer, must be left on site.

B12. In pre-commercial thinning, require only hand equipment within the protection buffer, prohibit cutting of streambank stabilizing trees, and maintain a minimum of 200 trees per acre. Felled trees within the protection buffer will be left on site, and/or piled and burned. Felled trees in the outer zone (outside of protection buffers) of Riparian Reserve may be removed for other uses, such as firewood sales.

In pre-commercial thinning where piling occurs within riparian reserves, piles will not be placed on or in the following areas: ditch lines, the bottom of ephemeral channels, or within 100' of perennial or intermittent stream channels, (or within 60' of seeps and springs).

C. Yarding

C2. Full suspension is required when cable yarding (including lateral yarding) over perennial stream channels. Full suspension over intermittent streams (more than 1,000' from LFH) will occur whenever feasible, however, bump logs within the channel will be utilized if full suspension cannot be achieved.

C3. Require cable yarding operations to maintain a minimum of one-end suspension except at the landing and tail trees where it is not possible. During lateral yarding, use one-end suspension to the extent practicable.

C4. Limit the establishment of skyline yarding corridors that clear corridors of trees over all streams to no more than five corridors per 1,000 lineal feet of stream. Individual corridor widths must not exceed 12 feet. Corridors will be spaced at least 100 feet apart (along the stream). (Relevant only in unit 6)

C5. In Riparian Reserve, ground-based mechanical equipment will be required to operate on continuous slash-covered path, as much as practical, to minimize soil compaction.

C6. Ground-based mechanical equipment is prohibited within protection buffers of all streams except as allowed under C7, or if on existing system roads.

C7. Skid trails should not be designated to cross streams. (streams include perennial and intermittent channels).

C8. Prohibit designating skid trails through wetlands or other wet areas. (Reference allowance of skid trails over streams crossings are described in PDC C7)

C9. Untethered mechanical equipment would generally operate on slopes less than 35%, but may operate on slopes from 35 to 40% if equipment stays on existing approved skid trails or moves straight up and down the slope without turning. Tethered ground-based equipment would operate on a layer of woody debris that would be as thick as possible given the slash available from harvested trees and other available material.

C10. Tethered ground-based equipment may operate on slopes up to 60% but the following shall be applied:

- Limited to dry season (generally June 1 – October 15).
- Shall operate on slash mat.
- Outside of 1 SPTH, or protection buffer; whichever is greater.
- Required monitoring on all units with this methodology for 5 years after BO finalized, even if not in Riparian Reserves (any unit where used).

D. Road and Landing Construction

D1. Prohibit the construction of new landings within Riparian Reserves.

D7. Use of existing landings within Riparian Reserves will be allowed if there are no erosion potential and sedimentation concerns to area streams, or those concerns can be mitigated, as determined by a Soil Scientist, Hydrologist or Fish Biologist.

If a landing is approved for use in Riparian Reserves, erosion control measures will be installed prior to use, where appropriate, to prevent soil movement downslope from the landing. Erosion control measures may include, but are not limited to, straw bales around landing perimeter, wattles, rock surfacing, or avoidance during wet conditions. The portion of the landing outside a system road prism would be rehabilitated after use (compacted soils fractured, covered with slash or seeded and mulched).

E. Road Work (System Road Maintenance and Reconstruction)

E1. Generally require road maintenance and reconstruction activities to be implemented during the dry season (generally June 1 to October 15) unless the road segment has no hydrologic connection to streams. Addition of gravel (including blading and compacting) for wet season haul and unforeseen slide removal is allowed in the wet season.

E2. Require all waste material generated from road maintenance (ditch cleaning, blading, etc.) be placed in a pre-designated area outside of Riparian Reserves.

E3. It is always preferred that dich lines remain vegetated, but conditions occur where ditch lines eventually need to be deepened/cleaned. When removing vegetation from ditch lines where ditches are hydrologically connected to any stream, install an effective sediment trap to prevent ditch erosion from entering streams (e.g. wattles, mulching cleared ditches within 100' of stream crossing culverts) until vegetation is re-established. Ditchlines should be deepened/cleaned the year prior to haul to allow for vegetation to reestablish prior to haul activities.

E4. All new replacement culverts will be designed to pass at least a 100-year flood streamflow, including associated bedload and debris.

E5. Culvert and bridge replacements occurring on fish-bearing streams will adhere to the design criteria in the Aquatic Restoration Biological Opinion II (ARBOII). Projects will follow all provisions in the following sections:

a) Section 1.3.2: General Aquatic Conservation Measures

b) Section 1.3.2 #20: Work Area Isolation & Fish Capture and Release

c) Section 1.3.3 #21. Project Design Criteria for Aquatic Restoration Activity Categories: Fish Passage Restoration.

E6. Require an approved dewatering plan for all perennial stream crossing culvert replacements that maintains downstream flow, if stream flow is sufficient for de-watering to be possible. On fish-bearing streams, maintaining continuous stream flow is required.

E7. Require the complete excavation of fill material over the culvert at each replacement site prior to extracting the existing culvert.

E10. Dust abatement is limited to the application of water.

E11. Surface water may be diverted to meet dust abatement, maintenance or construction needs, but only if developed sources are unavailable or inadequate. In LFH, diversions may not exceed 10% of the available flow and fish screen(s) will be installed, operated, and maintained according to NMFS's fish screen criteria (NMFS 2011e stating that pipe intakes would be screened with woven wire screens having a maximum 1.75 mm gap, and

perforated plate screens would have a maximum opening of 3/32nd inch). No more than a 50% reduction in flow may occur in non-ESA streams and fish screens will be used in all streams.

F. Rock Quarry Operation

No PDCs from this section of the BO were applicable to this project

G. System Road Decommissioning and Closure

G2. Road closure will follow PDCs in the Aquatic Restoration Biological Opinion (ARBO II) programmatic, including culvert removal on fish bearing streams shall adhere to the measures as described in Fish Passage Restoration.

G3. Closed roads will be hydrologically stabilized. This usually includes removing all stream culverts and water-barring, but sometimes deep fill stream crossings will be stabilized by reducing the fill material over culverts left in place, or other measures to hydrologically stabilize the road as determined by a hydrologist.

G7. All non-system roads will be rehabilitated after completion of project activities. At a minimum rehabilitation includes removing all stream crossings, and closing the road to vehicle access. Non-system roads, temporary roads, and most existing alignments would be rehabilitated using a suite of techniques site-specifically designed for each, and may include placement of one or more berms at the road's entrance, construction of water bars, and/or placement of debris such as root wads, slash, logs or boulders where available. Native surfaced roads would be decompacted as needed with the jaws of a log loader or excavator. Roads or sections of roads that have rock surfacing may be decompacted where site-specific circumstances warrant. The technique known as "cratering," which is a standard practice often used for system road decommissioning, may be used to decompact temporary roads or reused existing road alignments.

Cross-drains or water bars would typically be installed every 150 feet, or more frequently, where the road grade exceeds 5%. Actual placement distances may vary with topography to ensure proper drainage. Temporary culverts would be removed.

Available logging slash, logs or root wads would be placed across the road and landing surface. Where slash, logs or root wads are not available in sufficient quantities, bare soils would be seeded and mulched. The coverage of effective ground cover would be sufficient to prevent off-site movement of soils as guided by Forest Plan standard and guideline FW-025 and by Forest Service Handbook 2509 (R6 supplement).

H. Timber Transport (Haul)

H1. Require system roads used for haul to meet minimum design standards to ensure safe haul without road failure. Prohibit timber haul on roads that are failing, or likely to fail, if failure causes direct sediment impacts to streams.

H2. Haul operations will be stopped immediately, even in the dry season, if road use is causing deep rutting of the road surface, there is ponding of water on the road, there is failure of any drainage structure, or other situation occurs which may result in sediment delivery to a stream. The road must be repaired before haul can continue.

H3. There are no timing restrictions on haul over paved roads.

H4. Log and rock haul on aggregate or native (system and temporary) roads shall be prohibited at any time there is 0.5 inch of precipitation within any given 24-hour period as measured at the lowest elevation along the haul route. To measure precipitation, the purchaser may install a temporary rain gauge on National Forest System land near or adjacent to the lowest elevation along the haul route; otherwise, precipitation would be measured according to a running average of the data measured from an agreed upon RAWS station. Data for these RAWS stations can be found at: https://www.wrh.noaa.gov/pqr/raws.php

H5. Hauling on aggregate roads is allowed during the dry season (generally June 1 to October 15).

H6. Haul on native surfaced roads and landings is only allowed during the dry season (generally June 1 to October 15). No waivers will be granted outside of this season if there are any hydrologic connection of native surface haul routes to streams.

I. Fuels Treatment

I1. Fuels treatment of any kind is prohibited within the protection buffers (BA Table 4 and Appendix PDC B1), with 2 exceptions: fire backing into the protection buffers during under-burning that will be kept to a minimal extent, and pile burning of pre-commercial thin material.

I2. Low severity burns shall constitute the dominant type of controlled burn within Riparian Reserves, resulting in a mosaic pattern of burned and unburned landscape.

Moderate severity burns are permitted in no more than 20% of Riparian Reserves to invigorate desirable deciduous species.

Ignition could occur within the Riparian Reserve, but outside of the protection buffer.

I3. Piling of fuels intended for burning is prohibited closer than 20 feet from the protection buffer, with the exception for pre-commercial thin material (reference PDC B12 and PDC I1). Where piling occurs within riparian reserves, piles will also not be placed on or in ditch lines or the bottom of ephemeral channels, (or within 60’ of seeps and springs).

I4. Mechanical fuels treatment, or the construction of mechanical fire control line is prohibited within the protection buffers.

I5. Mechanical fuels treatments are subject to the same slope standards as ground-based yarding equipment (generally <40% if untethered, and up to 60% if tethered).

I6. Prohibit the construction of hand-built fire lines where water could be channeled into areas of instability, headwalls or streams. Construct waterbars on fire line to reduce soil erosion.

I7. Water used for fuels treatment may be drawn from sources near the units treated. In LFH, diversions may not exceed 10% of the available flow and fish screen(s) will be installed, operated, and maintained according to NMFS’s fish screen criteria (NMFS 2011e stating that pipe intakes would be screened with woven wire screens having a maximum 1.75 mm gap, and perforated plate screens would have a maximum opening of 3/32nd inch). No more than a 50% reduction in flow may occur in non-ESA streams, and fish screens will be used in all streams. The District Fish Biologist or District Hydrologist will be consulted prior to utilizing any water sources.

I8. Do not pump directly from a water source if chemical products are going to be injected into the pump or pumping system. If chemicals are needed, use a fold-a-tank from which to pump water. Do not use surfactant and foam near waterbodies and in Riparian Reserves.