

H-9188-1 - NONPOINT SOURCE POLLUTION CONTROL

RECOMMENDED MANAGEMENT PRACTICES

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B. Land Treatment and Improvement

1. Tillage

a. Tillage practices for vegetation enhancement or control are to be conducted following the contours of terrain.

b. As nearly as possible, conduct tillage operations at right angles to the prevailing winds.

c. Natural swales and/or common natural watercourses of drainage areas are to remain undisturbed.

d. Terminus of tillage practices must not encroach upon natural swales, drainage areas, or watercourses.

e. Tillage operations should leave as much plant residue on the soil surface or partially incorporated into the soil surface as possible for seedling protection, moisture conservation, and erosion control.

2. Chaining (Reserved)

3. Clearing or Grubbing (Reserved)

4. Chemicals.

a. Apply only those pesticides (herbicides) specifically approved by the Bureau for the pest or pests to be controlled.

b. Follow guidance in Manual Section 9222 and Manual Handbook H-9222-1.

5. Seeding (Reserved)

C. Other Program Management Practices.

These are primarily the responsibility of the benefiting activity and appropriate Manual directives should be consulted for specifics to mitigate environmental impacts.

1. Grazing (Reserved)

2. Timber.

a. Conduct timber operations in a manner to protect soil resources.

b. Provide for and locate soil erosion control features on tractor roads, skid trails, landings, logging roads, and firebreaks.

3. Prescribed Fire Management.

a. Burn only to achieve the desired results, considering such factors as the amount of burn necessary to achieve the desired results, the visual impairment of remaining unburned vegetation, and impact on soil erosion and vegetative recovery.

b. Apply smoke management principles to minimize impacts of emissions from prescribed fire.

c. Follow guidance in Manual Sections 9211 and 9214 for prescribed fire management.

4. Waste Management.

a. Provide for the collection and retention of wastes from concentrated waste areas, including animal wastes (i.e., livestock or wild horse holding pens).

b. Exclude clean water from waste areas to the fullest practical extent possible through the use of interceptor ditches or diversion dikes. (See Illustration 6.)

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c. Adequate waste storage from runoff must be provided within the system to allow for unfavorable conditions.

d. Avoid establishing waste collection facilities that might contribute to the contamination of subsurface water through leakage.

e. Locate waste management holding facilities as far as practical from watercourse to avoid watercourse contamination (See Illustration 6.)

5. Energy and Minerals.

a. The booklet on Surface Operating Standards for Oil and Gas Exploration and Development (Gold Book), contain illustrations that depict Recommended Management Practices for energy and mineral exploration and development areas, which may also be applicable to other disturbed areas.

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MULCHES AND PROTECTIVE COVERINGS

TYPE MULCH	EFFECTIVENESS IN IMMEDIATE EROSION PROTECTION	EFFECTIVENESS IN ESTABLISHING VEGETATION	COMMENT
Plastic Sheet	High		Temporary use; mulch protection for shrubs.
Straw Alone	Medium	Medium	For flat slopes and nonwindy areas.
Punched Straw	Medium	High	Ideal for vegetating fill.
Net-Anchored straw	High	High	Retains straw on slope.
Tackifiers with straw	High	Medium-High	Straw glued with tackifiers prevents its blowing away.
Wood Chip, Sawdust	Medium	Medium	For flat slopes, stepped slopes, seed spot basins.
Gravel, Stones	High	Medium	Provides for mechanical protection and vegetative growth.
Mulch Blanket	Medium	Medium	Binder dissolved leaving fiber mat with net.
Wood Fiber	Medium	Medium	Applied on roughened surface.
Washed Dairy	Medium	Medium	Equivalent to wood fiber.
Wood Chips and Asphalt	Medium-High	Medium	Good use of timber waste.
Chemical Mulch	Medium-High	None-Low	Chemical film increases cohesion but reduces porosity.
Wood Fiber and Chemical Mulch	High	High	Improved retention of fiber on slope and improved germination.
Wood Excelsior Mat	High	High	Covered by net and stapled in steep or windy areas.
Fiberglass	Medium	Medium	Available in loose or matted form.
Fiberglass and Asphalt	High	High	May be difficult to mow.
Jute	Medium-High	Medium-High	Slope must be smooth.
Jute and Straw	High	High	Slope may be rough.
Sod	High	High	Some maintenance required.
Building Block	High	High	Stabilizes steep slopes and provides for vegetation.

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EROSION CONTROL PRACTICES

Treatment Practice	Advantages	Problems
ROADWAY DITCHES		
Check Dam	Maintain low velocities. Catch sediment. Can be constructed of logs, shot, rock, lumber, masonry, or concrete.	Close spacing on steep grades. Require clean-out. Unless keyed at sides and bottom, erosion may occur.
Sediment Traps/ Straw Bait Filters	Can be located as necessary to collect sediment during construction. Clean-out often can be done with on-the-job equipment. Simple to construct.	Little direction on spacing and size Sediment disposal may be difficult Specification must include provisions for periodic clean-out. May require seeding, sodding or pavement when removed during final clamp.
Sodding	Easy to place with a minimum of preparation. Can be repaired during construction. Immediate protection. May be used on sides of paved ditches to provide increased capacity.	Requires water during first few weeks Sod not always available. Will not withstand high velocity or. Severe abrasion from sediment load.
Seeding with Mulch and Matting	Usually least expensive. Effective for ditches with low velocity. Easily placed in small quantities with inexperienced personnel.	Will not withstand sodding to high velocity.
Paving, Riprap, Rubble	Effective for high velocities. May be part of the permanent erosion control effort.	Cannot always be placed when needed because of construction traffic and final grading and dressing. Initial cost is high.
ROADWAY SURFACE		
Crowning to Ditch or Sloping to Single Berm	Directing the surface water to a prepared or protected ditch minimizes erosion.	None - should be part of good construction procedures.
Compaction	The final lift of each day's work should be well compacted and bladed to drain to ditch or bars section. Loose or uncompacted material is more subject to erosion.	None - should be part of good construction procedures
Aggregate Cover	Minimizes surface erosion Permits construction traffic during adverse weather. may be used as part of permanent base construction,	Requires reworking and compaction if exposed for long periods of time. Loss of surface aggregates can be anticipated.
Seed/Mulch	Minimizes surface erosion	Must be removed or is lost when construction of pavement is commenced.

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Treatment Practice	Advantages	Problems
CUT SLOPES		
Berm @ top of cut	Diverts water from cut. Collects water for slope drains/paved ditches. May be constructed before grading is started.	Access to top of cut. Difficult to build on steep natural slope or rock, surface. Concentrates water and may require channel protection or energy dissipation devices. Can cause water to enter ground, resulting in sloughing of the cut. slope.
Diversion Dike	Collects and diverts water at a location selected to reduce erosion potential. May be incorporated in the permanent project drainage.	Access for construction. May be continuing maintenance problem if not paved or protected. Disturbed material or berm is easily eroded.
Slope Bench"	Slows velocity of surface runoff. Collects sediment. Provides access to slope for seeding, mulching, and maintenance. Collects water for slope drains or may divert water to natural ground.	May cause sloughing of slopes if water infiltrates. Requires additional ROW. Not always possible due to rotten material etc. Requires maintenance to be effective. Increases excavation quantities.
Slope Drains (pipe, paved, etc.)	Prevents erosion on the slope. Can be temporary or part of permanent construction. Can be constructed or extended as grading progresses.	Requires supporting effort to collect water. Permanent construction is not always compatible with other project work. Usually requires some type of energy dissipation.
Seeding/Mulching	The end objective is to have a completely grassed slope. Early placement is a step in this direction. The mulch provides temporary erosion protection until grass is rooted. Temporary or permanent seeding may be used. Mulch should be anchored. Larger slopes can be seeded and mulched with smaller equipment if stage techniques are used.	Difficult to schedule high production units for small increments. Time of year may be less desirable. May require supplemental water. Contractor may perform this operation with untrained or inexperienced personnel and inadequate equipment if stage seeding is required.
Sodding	Provides immediate protection. Can be used to protect adjacent property from sediment and turbidity.	Difficult to place until cut is complete. Sod not always available. May be expensive.
Slope Pavement. Riprap	Provides immediate protection for high risk areas, and under structures. May be cast in place or off site.	Expensive. Difficult to place on high slopes. May be difficult to maintain.
Temporary Cover	Plastics are available in wide rolls and large sheets that may be used to provide temporary protection for cut or fill slopes. Easy to place and remove. Useful to protect high risk areas from temporary erosion.	Provides only temporary protection. Original surface usually requires additional treatment when plastic is removed. Must be anchored to prevent wind damage.
Serrated slope	Lowers velocity of surface runoff. Collects sediment. Holds moisture. Minimizes amount of sediment reaching roadside ditch.	May cause minor sloughing if water infiltrates. Constriction compliance.

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Treatment Practice	Advantages	Problems
FILL SLOPES		
Berms at Top of Embankment	Prevent runoff from embankment Surface from flowing over face of fill. Collect runoff for slope drains or protected ditch. Can be placed as a part of the normal construction operation and incorporated into fill or shoulders.	Cooperation of construction operators to place final lifts at edge for shaping into berm. Failure to compact outside lift when work is resumed. Sediment buildup and berm failure.
Slope Drains	Prevent fill slope erosion caused by embankment surface runoff. Can be constructed of full or half section pipe, bituminous, maul, concrete, plastic or other waterproof material. Can be extended as construction progresses. May be either temporary or permanent.	Permanent construction as needed may not be considered desirable by contractor. Removal of temporary drains may disturb growing vegetation. Energy dissipation devices are required at the outlets.
Fill Berms or Benches	Slow velocity of slope runoff. Collects Sediment. Provides access for maintenance. Collects, water for slope drains. May utilize waste.	Requiring additional fill material if waste is not available. May cause sloughing. Additional ROW may be needed.
Seeding/Mulching	Timely application of mulch and seeding decreases the period a slope is subject to severe erosion. Mulch that is cut in or otherwise anchored will collect sediment. The furrows made will also hold water and sediment.	Seeding Season may not be favorable. Not 100 percent effective in preventing erosion. Watering may be necessary. Steel; slopes or locations with low velocities way requiring supplemental treatment.
ROTECTION Of ADJACENT PROPERTY		
Brush Barriers	Use slashing and logs from clearing operation. Can be covered and seeded rather than removed. Eliminates need for burning or disposal off ROW.	May be considered unsightly in urban areas.
Straw Bale Barriers	Straw is readily available in many areas. When properly installed, they filter sediment and some turbidity from runoff.	Rewire removal. Subject to vandal damage. Flow is slow through straw requiring considerable area.
Sediment Traps	Collect much of the sediment spill from fill slopes and storm drain ditches. Inexpensive. Can be cleaned and expanded to met need.	Do not eliminate all sediment and turbidity. Space is not always available. Must be removed (usually).
Sediment pools	Can be designed to handle large volumes of flow. Both sediment and turbidity are removed. May be incorporated into permanent erosion control plan.	Require Prior planning additional ROW and/or flow easement. If removal is necessary, can present a major effort during final construction stage. Clean-out volumes can be large. Access for clean-out not always convenient.

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Treatment Practice	Advantages	Problems
PROTECTION OF ADJACENT PROPERTY (continued)		
Energy Dissipators	Slow velocity to permit sediment collection and to minimize channel erosion off project.	Collect debris and require cleaning. Require special design and construction of large shot rock or other suitable material from project.
Level Spreaders	Convert collected channel or pipe flow back to sheet flow. Avoid channel easements and construction off project. Simple to construct.	Adequate spreader length may not be available. Sodding of overflow berm is usually required. Must be a part of the permanent erosion control effort. Maintenance forces must maintain spreader until no longer required.
PROTECTION OF STREAM		
Construction Dike	Permits work to continue during normal stream stages. Controlled flooding can be accomplished during periods of inactivity.	Usually requires pumping of work site water into sediment pond. Subject to erosion from stream and from direct rainfall on dike.
Cofferdam	Work can be continued during most anticipated stream conditions. Clear water can be pumped directly back into stream. No material deposited in stream. .	Expensive.
Temporary Stream Channel Change	Prepared channel keeps normal flows away from construction.	New channel usually will require protection. Stream must be returned to old channel and temporary channel refilled.
Riprap	Sacked sand with cement or stone easy to stockpile and place. Can be installed in increments as needed.	Expensive.
Temporary Culverts for Haul Roads	Eliminate straw turbulence and turbidity. Provide unobstructed passage for fish and other water life. Capacity for normal flow can be provided with storm water flowing over the roadway	Space not always available without conflicting with permanent structure work. May be expensive, especially for larger sizes of pipe. Subject to washout.
Rock-lined Low-Level Crossing	Minimizes stream turbidity. Inexpensive. May also serve as ditch check or sediment trap.	May not be fordable during rainstorms. During periods of low flow passage of fish may be blocked.

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Practice/Treatment	Advantages	Problems
BORROW AREAS		
Selective Grading and Shaping	Water can be directed to minimize Off-site damage. Flatter slopes enable mulch to be cut into soil.	May not be most economical work method for contractor.
Stripping and Replacing of Topsoil	Provides better seed bed. Conventional equipment can be used to stockpile and spread topsoil.	May restrict volume of material that can be obtained for a site. Topsoil stockpiles must be located to minimize sediment damage. Cost of rehandling material.
Dikes, Berms Diversion Ditches Settling Basins Sediment Traps Seeding & Mulch	See other practices.	See other practices.