

**SECTION 5
STRUCTURAL MEASURES
FOR EROSION AND SEDIMENT CONTROL**

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STRUCTURAL MEASURES FOR EROSION AND SEDIMENT CONTROL

General

Uncontrolled runoff and excess erosion often occurs in urban developments, particularly during the construction stage. This erosion forms rills and gullies; washes out roads; scours cut and fill areas; fills road ditches, storm drains, and streams; and does other damage that is costly to the developers and damaging to land and water users below. Careful inclusion of proven conservation practices in the development plan can prevent or alleviate much of this damage and should be a part of every development plan.

These practices will usually be a combination of vegetative and structural measures. They may be temporary and serve only during the construction stage or they may be permanent in nature and become a part of the completed development. Permanent structural practices should be installed as early as possible in the construction stage. This section deals with the more common structural measures that may be used. Adequate designs, plans, and specification should be prepared for the measures to be used. A number of measures and specifications are included throughout this section. The designer shall determine those elements to be installed to control erosion (Section 2) and follow the criteria included in these standards and specifications.

Introduction

Structural erosion and sediment control practices have been classified as either temporary or permanent, according to how they are used. Temporary structural practices are used during construction to prevent offsite sedimentation. The length of time that temporary practices are functional varies from project to project, since the sediment control strategy may change as construction activity progresses. Permanent structural practices are used to convey surface water runoff to a safe outlet. Permanent structural practices will remain in place and continue to function after the completion of construction.

Regardless of whether the practices are temporary or permanent, runoff control measures should be the first items constructed when grading begins, and be completely functional before downslope land disturbance takes place. Earthen structures such as diversions, dikes, and swales should be stabilized before being considered functional. Only after the runoff control structures are operational and sediment control measures are in place, should clearing and grading on the rest of the construction site begin.

While clearing and grading the site, it is important to

minimize the amount of sediment that is produced. In general, it is advantageous to clear only as much area as is necessary to accommodate construction needs. Grade and stabilize large sites in stages whenever possible. Limiting the amount of disturbed area limits the amount of sediment that is generated, thus decreasing the amount of maintenance required on sediment control measures.

Sediment generated during the construction of cut and fill slopes can also be minimized through design and grading techniques. When designing either a cut or fill slope, factors to consider include slope length and steepness, soil type, and upslope drainage area. In general, it is important to leave soil surfaces on disturbed slopes in a roughened condition and to construct a water diversion practice at the top of slopes. Rough soil surfaces do not erode as readily as smooth soil surfaces.

Although design and grading techniques can reduce soil erosion, they cannot eliminate it entirely. Therefore, practices must be installed to prevent offsite sedimentation.

Even though the specific conditions of each site determine what measures are necessary to control erosion and sedimentation, some general principles apply to the selection and placement of sediment control measures.

1. Prevent clean water from becoming turbid, by diverting runoff from upslope areas away from disturbed areas. Earth dikes, temporary swales, perimeter dike/swales, or diversions that outlet in stable areas can be used in this capacity.
2. Remove sediment from turbid water before the water leaves the site. The method of sediment removal depends upon how the water drains from the site. Concentrated flow must be diverted to a trapping device so that suspended sediment can be deposited. Dikes or swales that outlet into traps or basins can accomplish this. A storm drain system may be used to convey concentrated sediment laden water only if the system empties into a trap or basin. Otherwise, all storm drain inlets must be protected so that sediment laden water cannot enter the drainage system before being treated to remove the sediment.
3. Surface runoff draining in sheet flow must be controlled and treated before the water leaves the site. Straw bale dikes, silt fences, or vegetative buffer strips can be used to treat sheet flow.

All practices designed and implemented must be properly maintained in order to remain functional. Sediment accumulated in basins and traps must be removed and disposed of in a manner that stabilizes them on the construction site.

Other factors should be observed during construction in order to make erosion and sediment control measures more effective in pollution control.

These are:

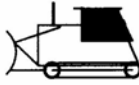
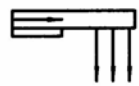







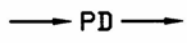


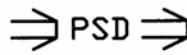

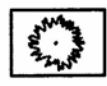
1. Sprinkle or apply dust suppressors. Keep dust down to a tolerable limit on construction sites and haul roads.
2. Use temporary bridges or culverts where fording of streams is objectionable. Avoid borrow areas where pollution from this operation is inevitable.

3. Protect streams from chemicals, fuel, lubricants, sewage, or other pollutants.
4. Avoid disposal of fill in floodplains or drainage ways. This reduces the capacity of these areas to pass flood flows.
5. Do not locate sanitary facilities over, or adjacent to, waterways, wells, or springs.
6. Locate storage yards and stockpiles where erosion and sediment hazards are slight. Where this is not possible, apply necessary erosion control practices.














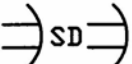

STANDARD SYMBOLS

BRANCH PACKING	
BRUSH LAYER	
BRUSH MATTRESS	
CHECK DAM	
CONSTRUCTION ROAD STABILIZATION	
CURB DROP INLET PROTECTION	
DIVERSION	
DUNE STABILIZATION	
DUST CONTROL	
EARTH DIKE	
EXCAVATED DROP INLET PROTECTION	
FIBER ROLL	
FILTER FABRIC DROP INLET PROTECTION	
GRADE STABILIZATION STRUCTURE	
GRASSED WATERWAY	
<p>ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE</p>	
<p>STANDARD SYMBOLS</p>	



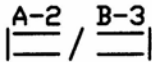





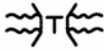
STANDARD SYMBOLS (cont'd)

LAND GRADING	
LEVEL SPREADER	
LINED WATERWAY	
LIVE CRIBWALL	
LIVE CUTTINGS/LIVE STAKES PLANTING	
LIVE FASCINE	
MULCHING	
OPTIONAL SEDIMENT TRAP DEWATERING DEVICE	
PAVED FLUME	
PERIMETER DIKE OR SWALE	
PERMANENT SEEDING	
PIPE OUTLET SEDIMENT TRAP	
PIPE SLOPE DRAIN FLEXIBLE	
PORTABLE SEDIMENT TANK	
PROTECTING VEGETATION	
ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	<h3 style="margin: 0;">STANDARD SYMBOLS</h3>

STANDARD SYMBOLS (cont'd)

RECREATION AREA IMPROVEMENT	
RIP RAP OUTLET PROTECTION	
RIP RAP SLOPE PROTECTION	
RIP RAP STREAMBANK PROTECTION	
ROCK DAM	
SEDIMENT BASIN	
SEDIMENT TRAP	
SEGMENTED RETAINING WALL	
SILT FENCE	
SODDING	
STABILIZED CONSTRUCTION ENTRANCE	
STONE & BLOCK DROP INLET PROTECTION STRUCTURE	
STRAW BALE DIKE	
SUBSURFACE DRAIN	
SUMP PIT	
<p style="font-size: small; margin: 0;">ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE</p>	STANDARD SYMBOLS

STANDARD SYMBOLS (cont'd)

SURFACE ROUGHENING	
TEMPORARY SEEDING	
TEMPORARY SWALE	
TOPSOILING	
TREE REVETMENT	
TURBIDITY CURTAIN	
VEGETATED ROCK GABIONS	
WATER BAR	
WATERWAY CROSSING	
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