

Straw Bale Sediment Trap (SST)



Practice Description

A straw bale sediment trap is a temporary catch basin consisting of a row or more of entrenched and anchored straw bales. The purpose is to intercept and detain small amounts of sediment to prevent sediment from leaving the construction site. This practice applies within disturbed areas with small drainage basins.

Planning Considerations

In certain situations, straw bales can be used as an alternative to silt fence for trapping sediment. The practice should be used to trap sediment only for a short duration from small drainage areas. Straw bales' comparatively low flow rate should be considered before choosing to use this practice. Ponding above the bales can occur rapidly due to the low flow rate. Overtopping and bypass of the bales can cause significant damage to the site. Additional measures should be used if turbidity leaving the site served by this practice is an issue.

Design Criteria and Construction

Drainage Area

For disturbed areas subject to sheet erosion the drainage area should be restricted to $\frac{1}{4}$ acre per 100 feet of barrier. The slope length behind the barrier should be restricted according to Table SST-1.

If used in minor swales, the swale should be relatively flat in grade (3 percent or less) and the drainage area should be limited to 1 acre.

Table SST-1 Criteria for Straw or Hay Bale Placement

Land Slope (Percent)	Maximum Slope Length Above Bale (Feet)
<2	75
2 to 5	50
5 to 10	35
10 to 20	20
>20	10

Bale Size

Bales should be 14" x 18" x 36".

Anchors

Two 36" long (minimum) 2" x 2" hardwood stakes should be driven through each bale after the bales are properly entrenched. Alternate anchors can be two pieces of No. 4 steel rebar, 36" long (minimum). See Figures SST-1 and SST-2 for details on proper installation of straw bales.

Effective Life

Straw and hay bales have a relatively short period of usefulness and should not be used if the project duration is expected to exceed 3 months. Bale placement should result in the twine or cord being on the side and not the bottom of the bale.

Location

This practice should be used on nearly level ground and be placed at least 10 feet from the toe of any slope. The barrier should follow the land contour. The practice should never be used in live streams or in swales where there is a possibility of washout. The practice should also not be used in areas where rock or hard surfaces prevent the full and uniform anchoring of the bales.

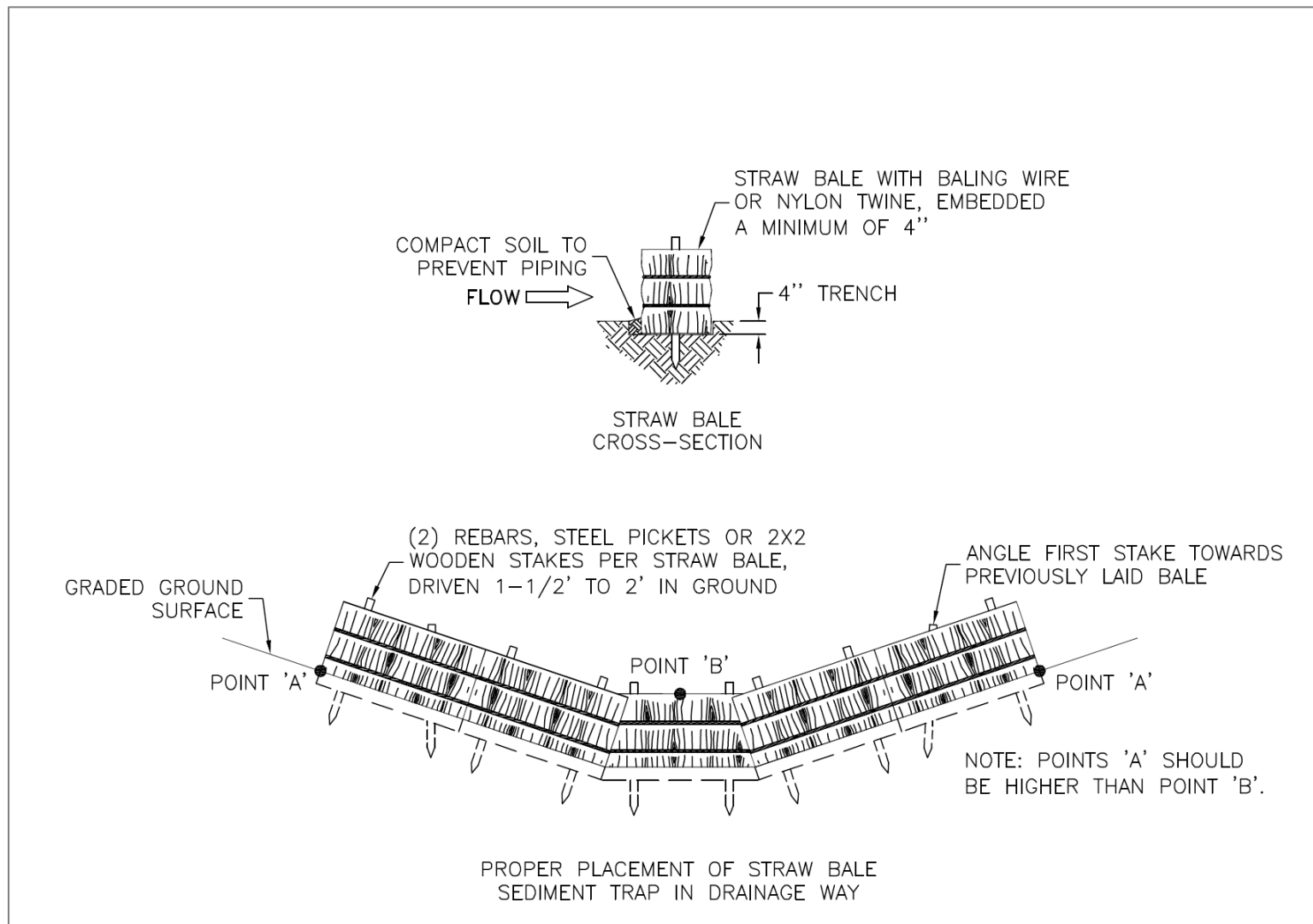


Figure SST-1 Placement of Straw Bale

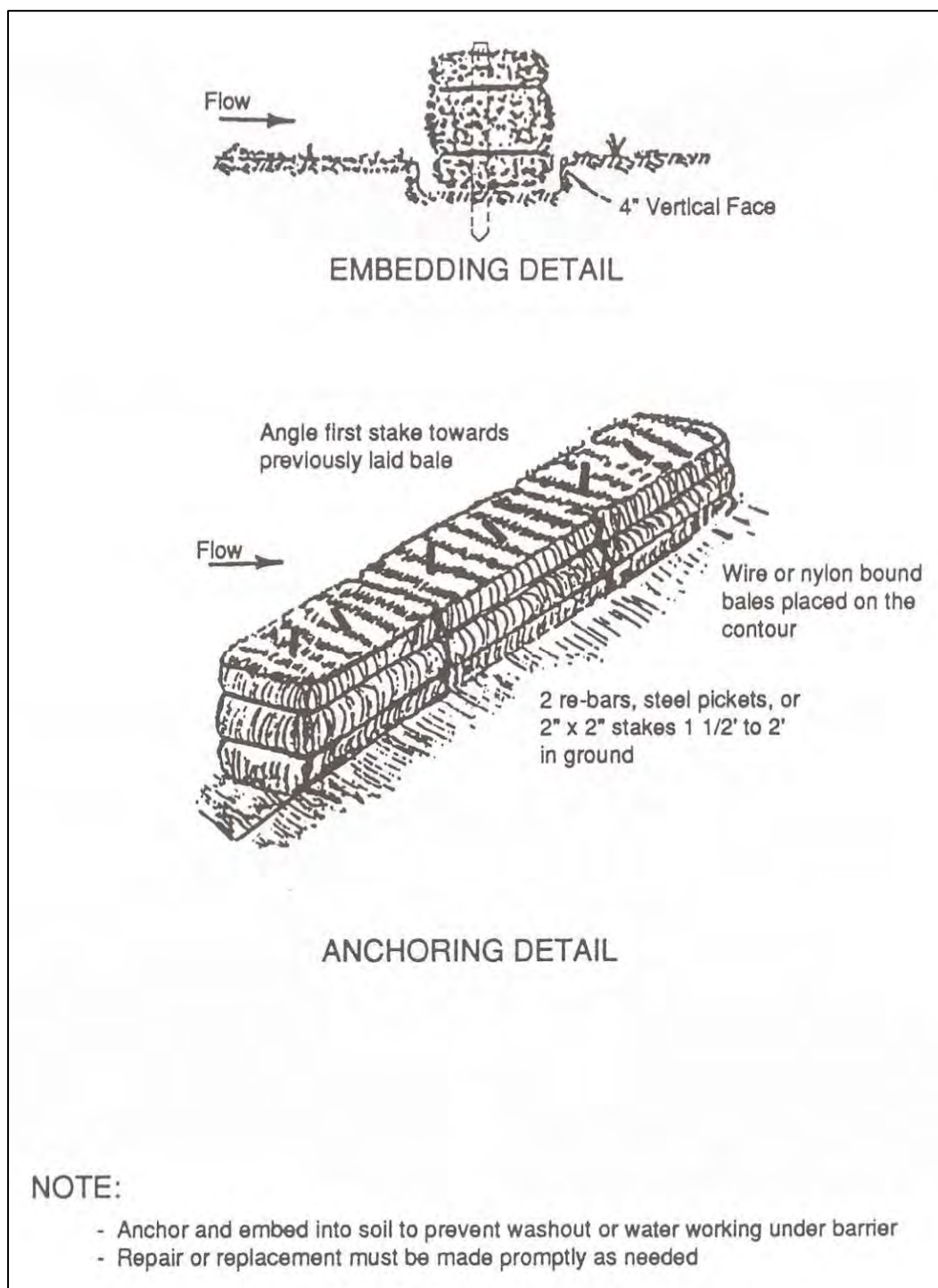


Figure SST-2 Anchoring Technique for Straw Bales

Construction

Prior to start of construction, straw bale sediment traps should be designed by a qualified professional. Plans and specifications should be referred to by field personnel throughout the construction process. The straw bale sediment trap should be built according to planned grades and dimensions.

Site Preparation

Determine exact location of underground utilities so that locations for digging or placement of stakes can be selected where utilities will not be damaged.

Smooth the construction zone to provide a broad, nearly level area for the row of bales. The area should be wide enough to provide storage of runoff and sediment behind the straw bales.

To facilitate maintenance, provide good access for cleanout of sediment during maintenance period.

Installation of Straw Bale

Excavate a trench to the dimensions shown on the drawings. The trench should be long enough that the end bales are somewhat upslope of the sediment pool to ensure that excess flows go over the bales and not around the bales.

Place each bale end-to-end in the trench so the bindings are oriented around the sides rather than top and bottom.

Anchor the bales by driving two 36" long 2" x 2" hardwood stakes through each bale at least 18" into the ground. Drive the first stake toward the previously laid bale to force the bales together.

Wedge loose straw into any gaps between the bales to slow the movement of sediment-laden water.

Anchor the bales in place according to the details shown on the drawings. If specific details are not shown, backfill and compact the excavated soil against the bales to ground level on the downslope side and to 4" above ground level on the upslope side.

Erosion Control

Stabilize disturbed areas in accordance with the vegetation plan. If no vegetation plan exists, consider planting and mulching as part of the installation and select planting information from either the *Permanent Seeding* or *Temporary Seeding Practice*. Select mulching information from the *Mulching Practice*.

Construction Verification

Check finished grades and dimensions of the straw bale sediment trap. Check materials for compliance with specifications.

Common Problems

Consult with a registered design professional if any of the following occurs:

Variations in topography on site indicate sediment trap will not function as intended; changes in plan may be needed.

Design specifications for materials cannot be met; substitutions may be required. Unapproved substitutions could lead to failure.

Maintenance

Inspect straw bale barriers after each storm event and remove sediment deposits promptly after it has accumulated to ½ of the original capacity, taking care not to undermine the entrenched bales.

Inspect periodically for deterioration or damage from construction activities. Repair damaged barrier immediately.

After the contributing drainage area has been stabilized, remove all straw bales and sediment, bring the disturbed area to grade, and stabilize it with vegetation or other materials shown in the design plan.

Straw bales may be recycled as mulch.

References

BMPs from Volume 1

Chapter 4

Mulching (MU)	4-48
Permanent Seeding (PS)	4-53
Temporary Seeding	4-103