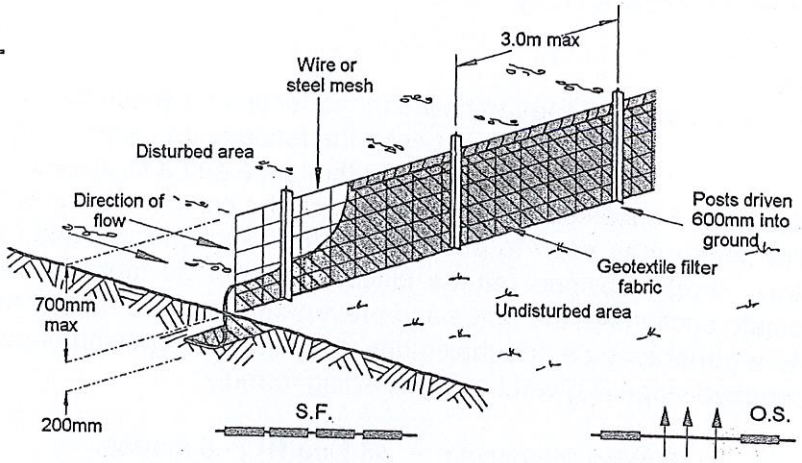
SEDIMENT FENCES

SEDIMENT CONTROL



STANDARD SYMBOL

Application/Function

- Temporarily reduce the velocity of contaminated sheet flow to induce gravitational settlement of the entrained sediment.
- Control of sediment runoff from exposed land, unsealed roads and stockpiles.
- Sediment Fences may also be used at regular spacings down a disturbed grade to limit the rutting caused by concentration of sheet flow.

Description

- Filter fabric attached to a wire and post fence at a maximum height of 700 mm with an additional 200 mm (min.) buried and compacted into an upstream trench.
- The filter cloth may also be backed by well-anchored *Straw Bales*.
- Sediment Fences should be installed along the contour.

Limitations

- Often called 'silt fences', these structures have little impact on fine silts (< 0.02 mm).
- Design flows limited to around 40 litres per second in areas of concentrated flow.
- Drainage area limited to 0.6 hectares per 100 metres of fence, or a max. slope length of 60 m.
- Service life of around 6 months.

Variations/Alternatives

- Geotextile filters are manufactured from either woven fabric or non-woven, needle punched fabric. Woven fabrics are preferred on large sites when the service life exceeds 1 month during the wet season. Non-woven, needle punched fabrics are preferred on small disturbances such a building sites.
- Alternatives include *Straw Bales, Buffer Zones, Catch Drains* and *Brushwood Banks.*

Advantages

- Easy to install.
- Controls sediment runoff close to the source of the erosion.
- Highly visible sediment control measure.
- Cannot introduce weeds/seeds - a problem experienced with hay bales.
- Generally more efficient than *Straw Bales.*

Disadvantages

- Easily damaged by construction equipment and stock piles.
- Can cause concentration of sheet flow if poorly located, installed or maintained.
- Limited service life of around 6 months or less during the wet season.
- Often incorrectly installed and maintained.

Special Requirements

- When used to control rutting, regular turn-backs and a firm wire mesh backing are required to prevent the further concentration of flow.
- If the Sediment Fence must be installed across the contour, then the fence should be segmented into a series of L-shaped fences to avoid the concentration of flow along the fence.
- Where possible, avoid installing Sediment Fences along property boundaries in new subdivisions unless the property boundary aligns closely with the contour, otherwise regular turn-backs are required.

Maintenance

- Long-term maintenance requirements and sediment retention are generally inversely proportional the quality of the fence installation.
- Regular inspections and maintenance are required to repair damage caused by on-site vehicles or the movement of stockpile material.
- Inspect after each storm event that results in runoff.
- Remove excessive sediment deposits.
- Investigate the source of excessive sediment.
- If the fence is regularly damaged, install a second fence at least 1 metre downslope of the existing fence.

SEDIMENT FENCES

DESIGN INFORMATION

Location:

- Allow at least: 4.5 metres between the fence and single-story buildings;
  7.5 metres between the fence and multiple-story buildings;
  2.0 metres between the fence and a fill slope or stockpile.
- Sediment Fences should be aligned with the contour wherever possible.
- The fence may need to be constructed in sections to avoid the concentration of sheet flow. Small upslope returns placed at about 30 metres spacing, should be used to isolate sections of the fence and prevent the concentration of sheet flow.
- As a general guide, the maximum recommended spacing of parallel fences down a long exposed slope is given by the following formula:

Maximum spacing $\approx$ 48 [log(**H**)] - 6 metres

$\equiv$ 90 - 48 [log(**% slope**)] metres

Where: **H** is the horizontal slope component defined by **H**(H):1(V)
and (**% slope**) = (100/**H**)

- **Sediment Fences should not be located across streams, ditches, channels or gullies.**

Hydraulic conditions:

- Maximum concentrated flow of around 40 L/s.
- Maximum drainage area of around 0.6 hectares per 100 metres of fence.
- Sufficient area must exist upslope of the fence to allow the temporary ponding.
- The ends of the fence should be turned upslope to prevent flow bypassing the fence.
- On long fences, spill-through weirs should be installed at 20 – 30 metres spacing.

Fences adjacent to fill slopes and stockpiles:

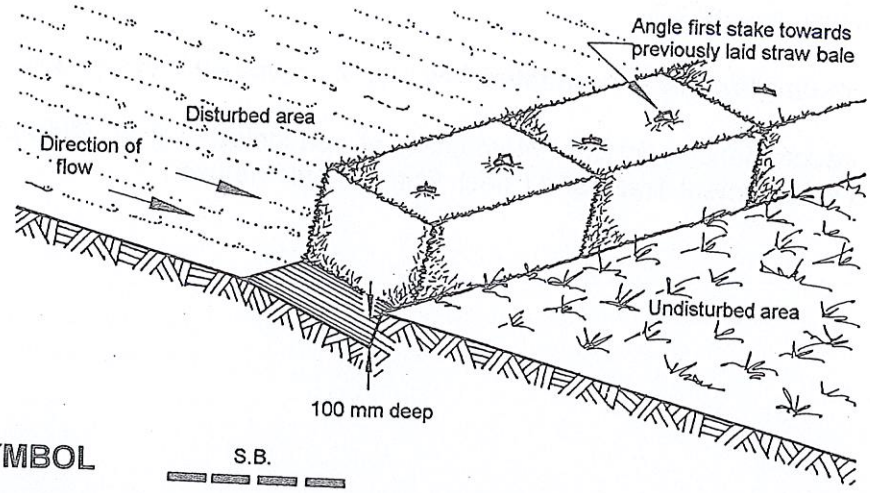
- Locate at least 2 metres from the base of the fill slope or stockpile to avoid being damaged by falling rocks or shifting soil. Otherwise, parallel fences should be installed with the second fence at least 1 metre downslope of the first fence.

Installation:

- Filter fabric should be anchored into a 150 to 200 mm deep trench.
- Excavated spoil should be deposited upslope of the fence.
- In locations where a trench cannot be excavated, a continuous layer of gravel may be placed over a minimum 200 mm length of the fabric laid upslope of the fence.
- Minimum 300 mm sewn overlap at joints, or securely attached to twin posts.
- The fence may be backed with securely anchored Straw Bales or gabions.
- Maximum post spacing: 3 metres with wire mesh (200 mm opening) backing;
  2 metres without wire mesh backing;
  0.5 metres when installed in a U-shape across minor drains.

STRAW BALES

SEDIMENT CONTROL



STANDARD SYMBOL S.B.

Application/Function
- Straw Bales provide a similar, but less efficient, function to that of a sediment fence.
- Straw Bale Perimeter Banks (bales lined with filter fabric) can be installed downslope of disturbed areas to direct sediment-laded runoff into sediment traps.
- Generally not recommended if an alternative sediment trap can be used.
- Best used as a source of mulch.

Description
- Bales bound with wire or plastic and securely anchored into a recessed trench with two stakes or pickets.
- Bales should be placed lengthwise in rows, single or twin.

Limitations
- Limited control over fine silts and clay runoff.
- Maximum design flow of around 40 L/s.
- Effective on catchments of less than 0.4 hectares.
- Not recommended in areas of concentrated flow.
- Bales should not be installed on top of pavements.
- Maximum slope gradient of 1(H):2(V).
- Effective service life of 3 to 4 months.

Variations/Alternatives
- Bales may be constructed of straw (the stalk without the seed, normally of cereal species); or hay (complete stalks including seed of cereal or long grass species), but the use of Hay Bales is not recommended.
- Bales may be covered with a geosynthetic filter to improve performance.
- Alternatives include *Sediment Fences* and *Brushwood Banks*.

Advantages
- Quick to install and repair.
- Provide instant service.

Disadvantages
- Generally ineffective and rarely installed correctly.
- When used to control sheet flow on long slopes, isolated failure points can result in the concentration of flow. Consequently, the use of filter fabric is preferable.
- The bales can release unwanted seed to downstream creeks and rivers.
- Bales are regularly burnt or otherwise vandalised.

Special Requirements
- Bales should be anchored into at least a 75 mm deep trench.
- Bales should be free of seed.

Maintenance
- Inspect after each runoff event.
- Replacement at intervals of 3 to 4 months, or more frequently during the wet season.

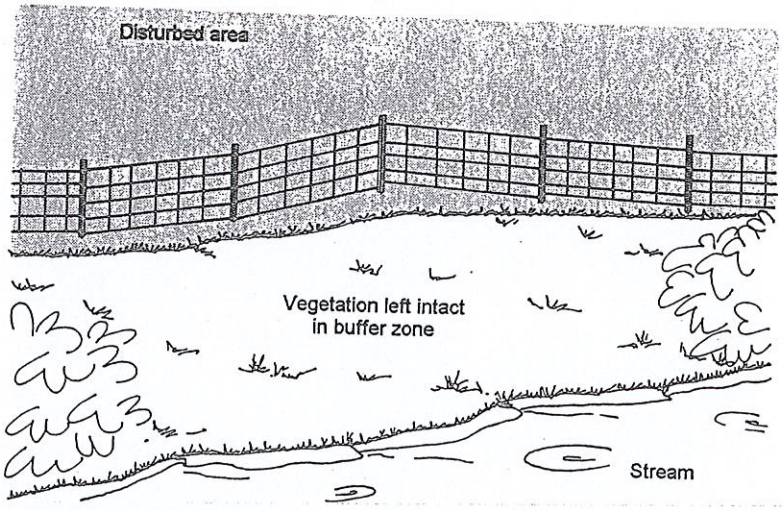
STRAW BALES

DESIGN INFORMATION

- When used as diversion structures or perimeter banks, the upstream face should be lined with a geotextile.
- Maximum allowable concentrated flow rate of around 40 litres per second.
- Not recommended for the interception of concentrated flow, alternative techniques such as Sediment Traps and Check Dams should be used.

BUFFER ZONES

SEDIMENT CONTROL



STANDARD SYMBOL

Application/Function

- Used to control of sediment runoff from access roads, stockpiles, masonry cutting areas, and building sites.
- Wetlands, streams, rivers and bushland areas adjacent to construction sites should be protected with vegetated Buffer Zones wherever possible.
- Non-disturbance areas contained within the site can also be used as sediment traps.
- Often used in rural residential developments.

Description

- Buffer Zones are corridors of vegetation that separate disturbed land from an adjacent watercourse, protected bushland or other sensitive areas.
- Buffer Zones can be areas of remnant bushland or specially prepared grasslands. However, it is noted that remnant bushland may itself require protection, in which case it should not be used as a Buffer Zone.

Limitations

- Buffer Zones generally only trap coarse sediments.
- Clays and fine silt particles will generally pass through a Buffer Zone during periods of heavy rain.
- Suitable for slopes between 1% and 10% grade.

Variations/Alternatives

- Alternatives include *Sediment Fences*, *Catch Drains* and *Diversion Channels* that direct flow to *Sediment Basins*.

Advantages

- Buffer Zones can reduce the need for on-site erosion and sediment control measures during the construction phase.
- Particularly useful on low to medium slopes.
- On-site Buffer Zones can reduce the total sediment transport to down-slope sediment traps.

Disadvantages

- Ineffective during periods of very heavy rain.
- Buffer Zones can be easily disturbed or destroyed by poor site management.
- Require large areas of land.

Special Requirements

- Fencing may be required to exclude traffic from the Buffer Zone and to prevent damage to the vegetation.
- Rills and gullies will concentrate runoff decreasing the effectiveness of the Buffer Zone.
- Stockpiles should not be located in Buffer Zones.

Maintenance

- Excessive sediment should be removed after each storm event or evenly raked into the soil.
- Buffer Zones should be regularly inspected for vegetation damage and signs of concentrated flow.
- The sources of excessive sediment should be investigated.
- Fencing should be regularly inspected for damage.