

DESCRIPTION:

A temporary pipe or lined channel that drains the top of a slope to a stable discharge point at the bottom of a slope without causing erosion.

APPLICATIONS:

- ▶ Where concentrated flow of surface runoff must be conveyed down a slope in order to prevent erosion.
- ▶ Drainage for top slope diversion dikes or swales.
- ▶ Emergency spillway for a sediment basin.
- ▶ Drainage for top of cut/fill slopes where water can accumulate.

INSTALLATION/APPLICATION CRITERIA:

- ▶ Secure inlet and surround with dikes to prevent gully erosion, and anchor pipe to slope.
- ▶ Size to convey at least the peak of a 10-year, storm event.
- ▶ Stabilize outlet. (See Outlet Protection BMP).

LIMITATIONS:

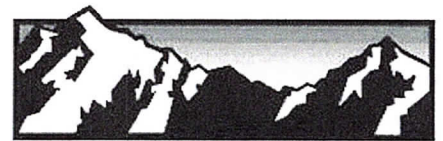
- ▶ Maximum drainage area per slope drain is 5 acres.
- ▶ Clogged slope drains will force water around the pipe and cause slope erosion.
- ▶ Dissipation of high flow velocities at the pipe outlet is required to avoid downstream erosion.
- ▶ Failure can result in flooding and severe erosion.

MAINTENANCE:

- ▶ Structure must be inspected weakly and after storms.
- ▶ Inlet must be free of undercutting and no water should circumvent the entry.
- ▶ Outlet should not produce erosion; velocity dissipators must be maintained.
- ▶ Pipe anchors must be checked to ensure that the pipe remains anchored to the slope.

OBJECTIVES

- Housekeeping Practices
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- Protect Slopes/Channels
- Control Site Perimeter
- Control Internal Erosion



WEBER COUNTY

ENGINEERING DEPARTMENT

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TARGETED POLLUTANTS

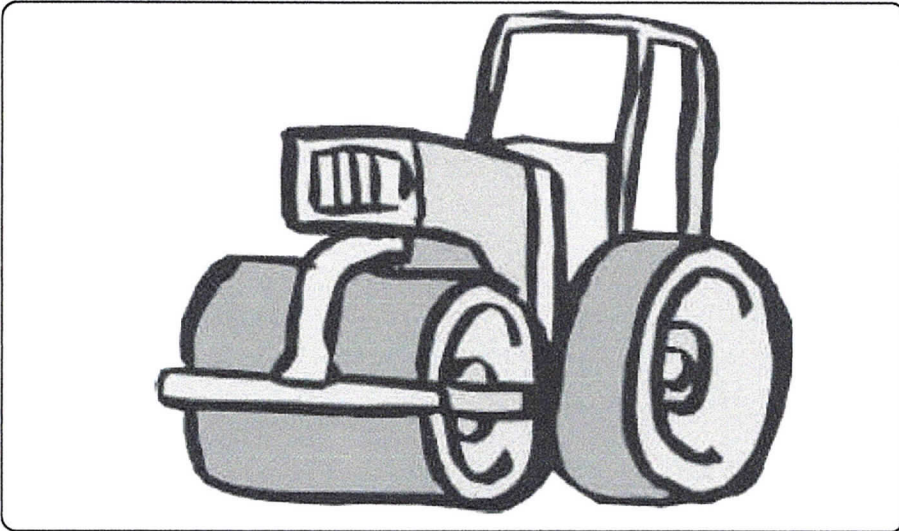
- Sediment
- Nutrients
- Toxic Materials
- Oil & Grease
- Floatable Materials
- Other Waste

- High Impact
- Medium Impact
- Low or Unknown Impact

IMPLEMENTATION REQUIREMENTS

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High
- Medium
- Low



DESCRIPTION:

Use of rolling, tamping, or vibration to stabilize fill materials and control erosion by increasing the soil density. Increasing the density of soil improves soil strength, reduces long-term soil settlement, and provides resistance to erosion.

APPLICATIONS:

- ▶ Stabilize fill material placed around various structures.
- ▶ Improve soil in place as foundation support for roads, parking lots, and buildings.

INSTALLATION/APPLICATION CRITERIA:

- ▶ Make sure soil moisture content is at optimum levels.
- ▶ Use proper compaction equipment.
- ▶ Install sediment control and storm water management devices below compacted areas and runoff interceptor devices above these areas. Drainage from compacted areas must be carefully planned to protect adjacent uncompacted soils.
- ▶ The surface of compacted areas should be scarified and seeded or mulched and seeded to increase the effectiveness of compaction.

LIMITATIONS:

- ▶ Compaction tends to increase runoff.
- ▶ Over-compaction will hamper revegetation efforts.

MAINTENANCE:

- ▶ No maintenance required.

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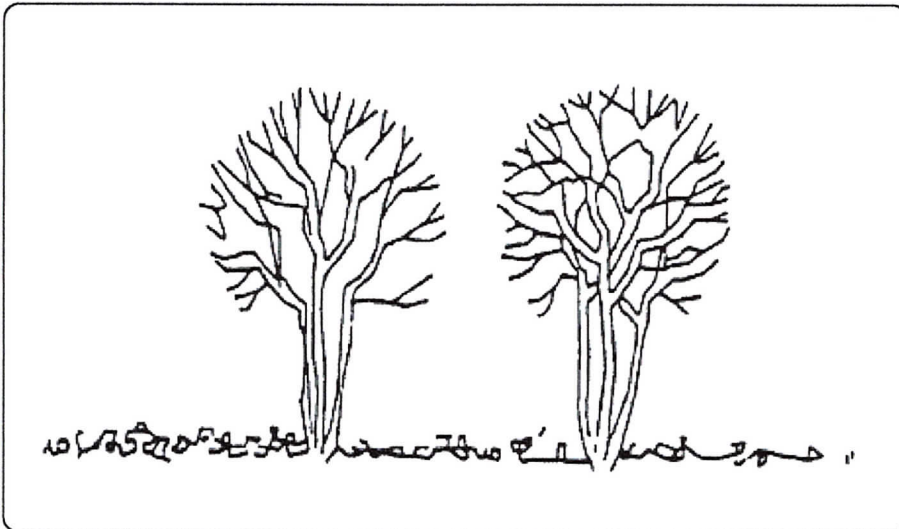
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DESCRIPTION:

Carefully planned preservation of existing vegetation minimizes the potential of removing or injuring existing trees, vines, shrubs and/or grasses that serve as erosion controls.

APPLICATIONS:

- ▶ This technique is applicable to all types of sites. Areas where preserving vegetation can be particularly beneficial are floodplains, wetlands, stream banks, steep slopes, and other areas where erosion controls would be difficult to establish, install, or maintain.

INSTALLATION/APPLICATION CRITERIA:

- ▶ Clearly mark, flag or fence vegetation or areas where vegetation should be preserved.
- ▶ Prepare landscaping plans which include as much existing vegetation as possible and state proper care during and after construction.
- ▶ Define and protect with berms, fencing, signs, etc. a setback area from vegetation to be preserved.
- ▶ Propose landscaping plans which do not include plant species that compete with the existing vegetation.
- ▶ Do not locate construction traffic routes, spoil piles, etc. where significant adverse impact on existing vegetation may occur.

LIMITATIONS:

- ▶ Requires forward planning by the owner/developer, contractor and design staff.
- ▶ For sites with diverse topography, it is often difficult and expensive to save existing trees while grading the site satisfactorily for the planned development.
- ▶ May not be cost effective with high land costs.

MAINTENANCE:

- ▶ Inspection and maintenance requirements for protection of vegetation are low.
- ▶ Maintenance of native trees or vegetation should conform to landscape plan specifications.

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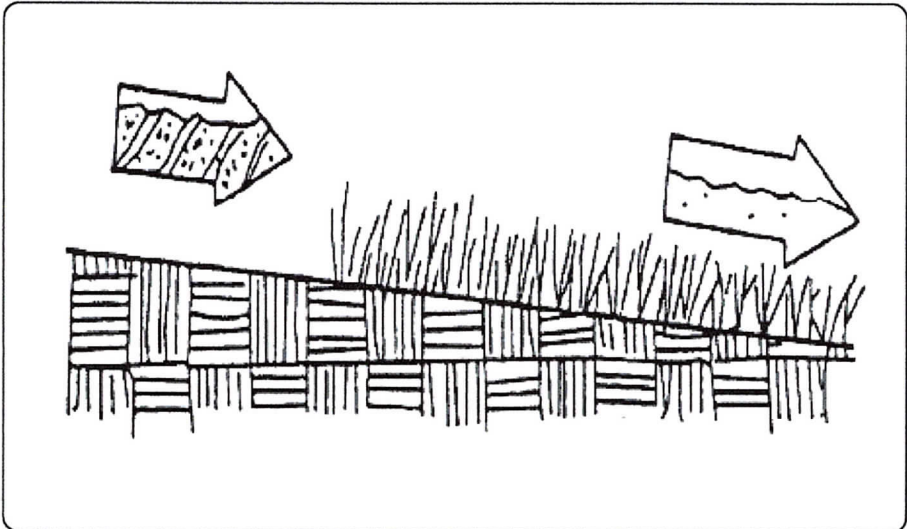
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DESCRIPTION:

- ▶ Seeding of grass and plantings of trees, shrubs, vines and ground covers provide long-term stabilization of soil. In some areas, with suitable climates, grasses can be planted for temporary stabilization.

APPLICATION:

- ▶ Appropriate for site stabilization both during and after construction
- ▶ Any graded/cleared areas where construction activities have ceased.
- ▶ Open space cut and fill areas.
- ▶ Steep slopes, spoil piles, vegetated swales, landscape corridors, stream banks.

INSTALLATION/APPLICATION CRITERIA:

Type of vegetation, site and seedbed preparation, planting time, fertilization and water requirements should be considered for each application. Grasses:

- ▶ Ground preparation: fertilize and mechanically stabilize the soil.
- ▶ Tolerant of short-term temperature extremes and waterlogged soil composition.
- ▶ Appropriate soil conditions: shallow soil base, good drainage, slope 2:1 or flatter.
- ▶ Mowing, irrigating, and fertilizing are vital for promoting vigorous grass growth.

Trees and Shrubs:

- ▶ Selection criteria: vigor, species, size, shape & wildlife food source.
- ▶ Soil conditions: select species appropriate for soil, drainage & acidity.
- ▶ Other factors: wind/exposure, temperature extremes, and irrigation needs.

Vines and Ground Covers:

- ▶ Ground preparation: lime and fertilizer preparation.
- ▶ Use proper seeding rates.
- ▶ Appropriate soil conditions: drainage, acidity and slopes.
- ▶ Generally avoid species requiring irrigation.

LIMITATIONS:

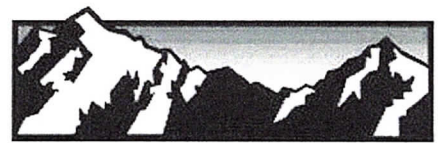
- ▶ Permanent and temporary vegetation may not be appropriate in dry periods without irrigation.
- ▶ Fertilizer requirements may have potential to create stormwater pollution.

MAINTENANCE:

- ▶ Shrubs and trees must be adequately watered and fertilized and if needed pruned.
- ▶ Grasses may need to be watered and mowed.

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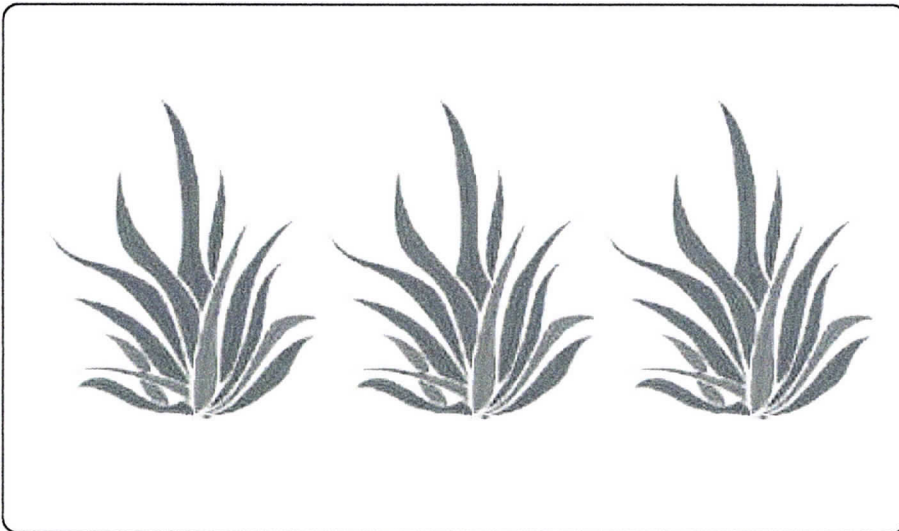
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DEFINITION:

- ▶ Temporary seeding - establishment of short term cover by application of rapidly germinating seed mix (alternatively hydroseeding may be utilized).
- ▶ Permanent seeding - establishment of final term cover by application of perennial seed mix (alternatively sod may be utilized).

APPLICATION:

- ▶ Disturbed areas that are at final grade and which will not be disturbed by continuing activities on site. Also areas that are not at final grade but which will be left untouched in excess of one year.

LIMITATIONS:

- ▶ Limited to areas that will not be subject to traffic or high usage.
- ▶ May require irrigation and fertilizer which creates potential for impacting runoff quality.
- ▶ May only be applied during appropriate planting season, temporary cover required until that time.

INSTALLATION:

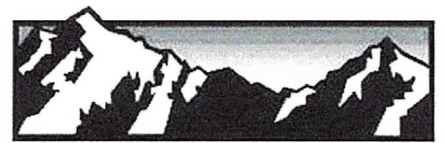
- ▶ Roughen soil to a depth of 2 inches. Add fertilizer, manure, topsoil as necessary.
- ▶ Evenly distribute seed using a commonly accepted method such as; breast seeding, drilling, hydroseeding.
- ▶ Use a seed mix appropriate for soil and location that will provide rapid germination and growth. Check with County for recommended mix and application rate.
- ▶ Cover area with mulch if required due to steep slopes or unsuitable weather conditions.

MAINTENANCE:

- ▶ Provide irrigation as required to establish growth and to maintain plant cover through duration of project.
- ▶ Reseed as necessary to provide 75% coverage
- ▶ Remediate any areas damaged by erosion or traffic.
- ▶ When 75% coverage is achieved inspect monthly for damage and remediate as necessary.

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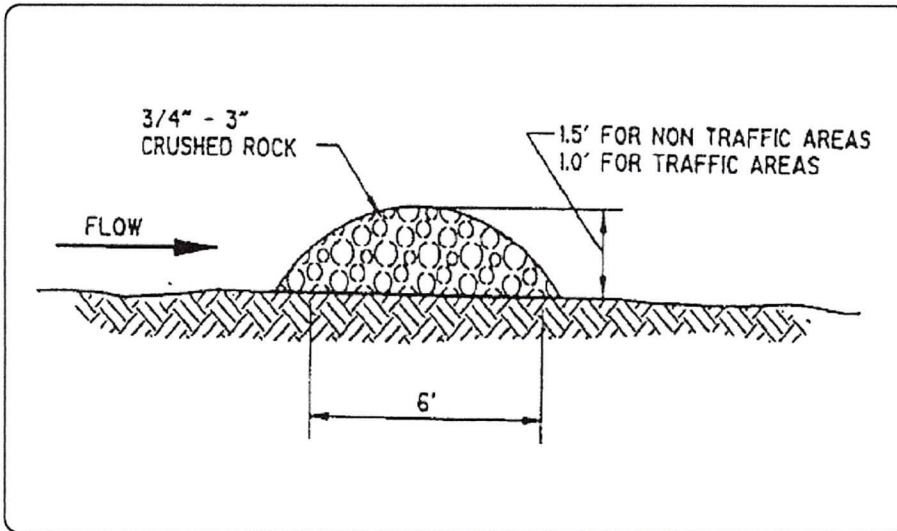
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DESCRIPTION:

A rock filter is made of rock 3/4 - 3" in diameter and placed along a level contour. A brush filter is composed of brush (usually obtained during the site clearing) wrapped in filter cloth and anchored to the toe of the slope. If properly anchored brush or rock filters may be used for sediment trapping and velocity reduction.

APPLICATION:

- ▶ As check dams across mildly sloped construction roads.
- ▶ Below the toe of slopes.
- ▶ Along the site perimeter.
- ▶ In areas where sheet or rill flow occurs.
- ▶ Around temporary spoil areas.
- ▶ At sediment traps or culvert/pipe outlets.

INSTALLATION/APPLICATION CRITERIA:

- ▶ For rock filter, use larger rock and place in staked, woven wire sheathing if placed where concentrated flows occur.
- ▶ Install along a level contour.
- ▶ Leave area behind berm where runoff can pond and sediment can settle.
- ▶ Drainage areas should not exceed 5 acres.

LIMITATIONS:

- ▶ Rock berms may be difficult to remove.
- ▶ Removal problems limit their usefulness in landscaped areas.
- ▶ Runoff will pond upstream of the filter, possibly causing flooding if sufficient space does not exist.

MAINTENANCE:

- ▶ Inspect monthly after each rainfall.
- ▶ If berm is damaged, reshape and replace lost/dislodged rock.
- ▶ Remove sediment when depth reaches 1/3 of berm height, or 1 ft.

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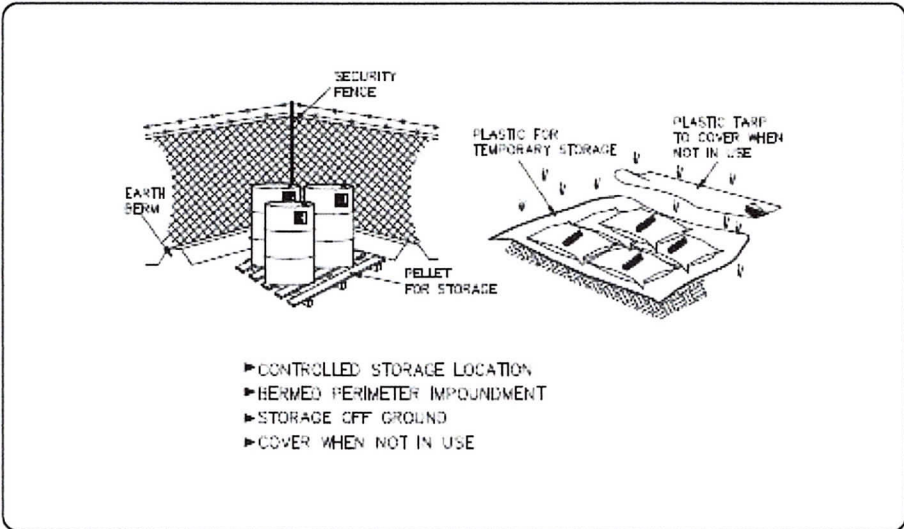
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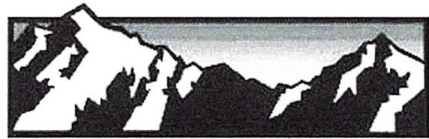
IMPLEMENTATION REQUIREMENTS

- Capital Costs
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- High
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- OBJECTIVES**
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DESCRIPTION:

Controlled storage of on-site materials.

APPLICATION:

- ▶ Storage of hazardous, toxic, and all chemical substances.
- ▶ Any construction site with outside storage of materials.

INSTALLATION/APPLICATION CRITERIA:

- ▶ Designate a secured area with limited access as the storage location. Ensure no waterways or drainage paths are nearby.
- ▶ Construct compacted earthen berm (See Earth Berm Barrier Information Sheet), or similar perimeter containment around storage location for impoundment in the case of spills.
- ▶ Ensure all on-site personnel utilize designated storage area. Do not store excessive amounts of material that will not be utilized on site.
- ▶ For active use of materials away from the storage area ensure materials are not set directly on the ground and are covered when not in use. Protect storm drainage during use.

LIMITATIONS:

- ▶ Does not prevent contamination due to mishandling of products.
- ▶ Spill Prevention and Response Plan still required.
- ▶ Only effective if materials are actively stored in controlled location.

MAINTENANCE:

- ▶ Inspect daily and repair any damage to perimeter impoundment or security fencing.
- ▶ Check materials are being correctly stored (i.e. standing upright, in labeled containers, tightly capped) and that no materials are being stored away from the designated location.

- TARGETED POLLUTANTS**
- Sediment
 - Nutrients
 - Toxic Materials
 - Oil & Grease
 - Floatable Materials
 - Other Construction Waste
-
- High Impact
 - Medium Impact
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- IMPLEMENTATION REQUIREMENTS**
- Capital Costs
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OBJECTIVES

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DESCRIPTION:

Prevent or reduce the discharge of pollutants to storm water from material use by using alternative products, minimizing hazardous material use on-site, and training employees and subcontractors.

APPLICATION:

The following materials are commonly used on construction sites:

- ▶ Pesticides and herbicides, fertilizers, detergents, plaster and other products, petroleum products such as fuel, oil, and grease.
- ▶ Other hazardous chemicals such as acids, lime, glues, paints, solvents, and curing compounds.

INSTALLATION/APPLICATION CRITERIA:

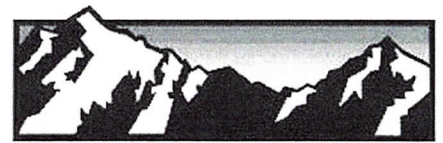
- ▶ Use less hazardous, alternative materials as much as possible.
- ▶ Minimize use of hazardous materials on-site.
- ▶ Use only materials where and when needed to complete the construction activity.
- ▶ Follow manufacturer's instructions regarding uses, protective equipment, ventilation, flammability, and mixing of chemicals.
- ▶ Personnel who use pesticides should be trained in their use.
- ▶ Do not over apply fertilizers, herbicides, and pesticides. Prepare only the amount needed.
- ▶ Unless on steep slopes, till fertilizers in to the soil rather than hydroseeding.
- ▶ Do not apply these chemicals just before it rains.

LIMITATIONS:

- ▶ Alternative materials may not be available, suitable, or effective in every case.

MAINTENANCE:

- ▶ Maintenance of this best management practice is minimal.



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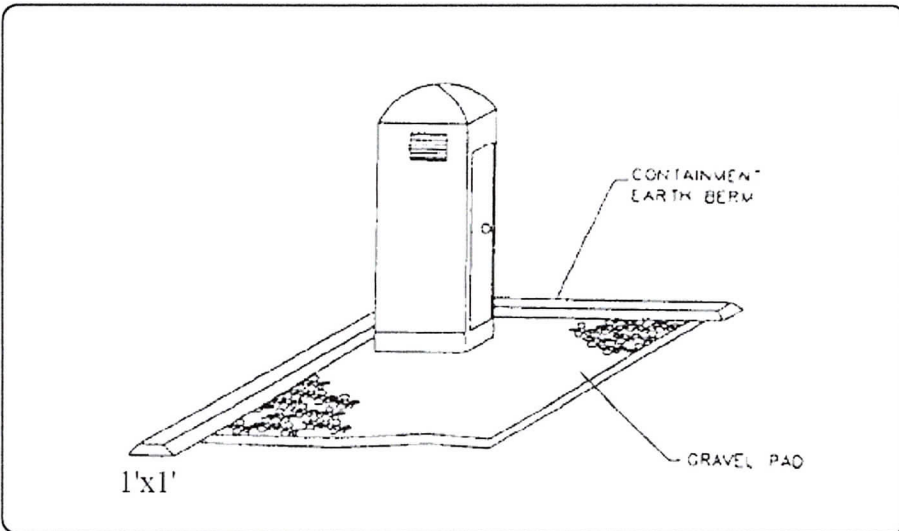
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IMPLEMENTATION REQUIREMENTS

- Capital Costs
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- High
- Medium
- Low



DESCRIPTION:

Temporary on-site sanitary facilities for construction personnel.

APPLICATION:

- ▶ All sites with no permanent sanitary facilities or where permanent facility is too far from activities.

INSTALLATION/APPLICATION CRITERIA:

- ▶ Locate portable toilets in convenient locations throughout the site.
- ▶ Prepare level, gravel surface and provide clear access to the toilets for servicing and for on-site personnel.
- ▶ Construct earth berm perimeter (See Earth Berm Barrier Information Sheet), control for spill/protection leak.

LIMITATIONS:

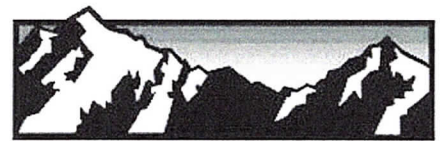
No limitations.

MAINTENANCE:

- ▶ Portable toilets should be maintained in good working order by licensed service with daily observation for leak detection.
- ▶ Regular waste collection should be arranged with licensed service.
- ▶ All waste should be deposited in sanitary sewer system for treatment with appropriate agency approval.

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