

Livestock Watering FACTSHEET



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IMPROVED LIVESTOCK ACCESS TO WATER USING GEOSYNTHETICS AND GRAVEL

This Factsheet outlines the use of a support material applied under a gravel layer when stabilizing soft or muddy ground. A description of the material and its uses is followed by an outline of a demonstration project.

While this project used one particular manufacturer's product, this cannot imply or constitute endorsement of the product by the Ministry.

INTRODUCTION A common problem with direct access by livestock to a dugout, pond, or stream is the muddy conditions that sometimes occur. Keeping livestock 'out of the mud' is good for the health of both the animal and the environment, improving water quality for all users.

A common remedy to reduce the soft ground conditions is to add a layer of gravel over the mud producing a stable, firm footing. However, the gravel will often mix with the mud and the benefit may be quickly lost. To overcome this problem, materials called geosynthetics are available.

GEOSYNTHETICS are a range of man-made materials used in conjunction with gravel to stabilize soft or muddy ground. Most are composed of polymer materials ("plastics") for lightweight, strength and long life. They are inert, not reacting or affecting the soil or water they are placed into. The geogrid used in this project is one type of geosynthetic.

Although various manufacturers' products are available, one particular geogrid is discussed in this demonstration project concerning range cattle access to a small lake as shown in Figure 1. A developed access site of gravel over a "Tensor Polygrid GS" geogrid (manufactured by Tensor Polytechnologies of the U.S.) shows promise in these difficult muddy situations.

GEOGRIDS can be used for ground stabilization to provide a stable underlayer for gravel in otherwise "bottomless" mud holes. Gravel laid over the geogrid binds together in the openings as shown in Figure 2. By binding the gravel together, a mat is formed that spreads

out the load over a wide area of the muddy surface, providing support. It is comparable to how snowshoes will support a person in soft snow.

Material costs of the geogrid should be paid back in reduced gravel costs and improved access to the water. Roads, feed lot areas etc. can be treated in the same manner.



Figure 1 Turtle Lake - Habitat Protection Site

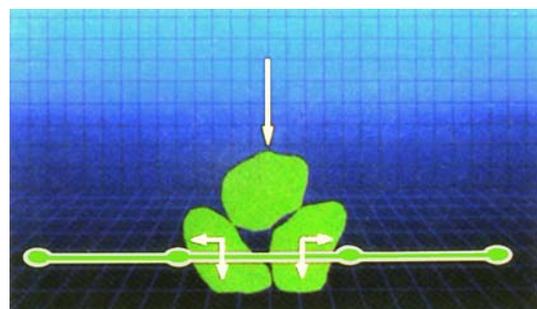


Figure 2 Gravel Locks into Grid



Geogrid is pulled into place



Gravel is placed directly onto the Geogrid

Figure 3 Installation of Geogrid and Gravel at Turtle Lake Cattle Access Site

THE GRID STRENGTH required to stabilize these areas is attributed to the product by its manufacturing process. Rather than extrusion only, a patented process extrudes then stretches the "plastic" in two directions to form a high strength grid.

INSTALLATION of the geogrid is quite simple as shown in Figure 3. Available in 3 meter (9.8ft) and 4 meter (13.1 ft) widths, it is rolled out, cut to length and grveled. For areas wider than the roll width, adjacent strips are laid out with a 0.6-metre (2ft) overlap and tied together. The lap joint should face in the direction gravel will be spread. Gravel depth depends on the ground conditions and will vary from 150 to 300 millimeters (6 to 12 inches). No ground preparation is required except removal of any large rocks, etc. that would interfere with the geogrid.

THE DEMONSTRATION PROJECT using the geogrid for a cattle watering site was installed at Turtle Lake in the South Okanagan as shown in Figure 3, above. This lake is a Habitat Protection Project of the B.C. Ministry of Environment. It had been fenced off from cattle use in 1991, except for one access site. It was apparent after the first year of use that by concentrating the cattle access, mud was a problem.

IN MARCH 1992 before the second year of cattle use of the lake, a mat of geogrid was laid over the access area 10.7 meters wide by 7.6 meters long (35 ft by 25 ft) going from the dry lakeshore into the water. Three lengths of 4 meter (13.1 ft) wide geogrid, 7.6 meters (25 ft) meters long, were tied together with a 0.6 meter (2 ft) overlap. Twenty eight cubic meters (36 yd³) of shale gravel was laid over the grid for an average depth of 300 millimeters (1 ft).

A backhoe was used to remove some of the mud to deepen the water access. However, on completion of this installation it was felt that this was not required and would not be recommended in future installations.

COSTS of the geogrid for this project were \$240. The cost per areas covered was \$2.95 per square meter (27.4 cents per square foot). The gravel cost will depend on local hauling distances. While the backhoe is useful to spread and compact the gravel, it is not considered essential although compaction is recommended where possible.

MONITORING of cattle use of this improved water access site is expected to confirm the benefits of this technique. However, it was very apparent when both the gravel truck and the backhoe could back out onto the grid supported area that cattle should easily be able to use this site with continued firm ground conditions.

This demonstration was to show the benefits of the geogrid/gravel combination for livestock watering access. Three important points were learned that should be considered:

1. Build the geogrid/gravel area slightly beyond the fenced off area to ensure livestock are not on the edges where the gravel may be pushed off the grid.
2. Anticipate the lowest level of the water source to ensure the developed access area is not left "high & dry".
3. **For livestock use, other less costly geosynthetics have been demonstrated since 1992 giving the same benefits. Refer to Factsheet #644.000-1 Geosynthetic Materials.**

COOPERATING on this project were:

Mike Sarell, Ministry of Environment, Penticton

* Coordinator for the Habitat Protection Project

Carol Long, Longs Ranch, OK Falls

* Cattle grazier for the area

Evelyn Hassell, Tensar Corporation, Calgary, and

Shirley Claassen, Twin Maples Marketing, Abbotsford

* Suppliers of Tensar Polygrid GS

John Parsons, Ministry of Agriculture and Lands, Oliver

RESOURCE MANAGEMENT BRANCH

Ministry of Agriculture and Lands
1767 Angus Campbell Road
Abbotsford, BC V3G 2M3 Phone: (604) 556-3100

WRITTEN BY

Lance Brown
Engineering Technologist
Kamloops Office