

MUCK DISPOSAL PLAN

Annexure-A2

INTRODUCTION

A minimum quantity of muck may be expected to be generated as a result of the construction of roads. Muck generated from the excavation of any project component is required to be disposed of in a planned manner so that it takes the least possible space and is not hazardous to the environment. The muck disposal sites cause increased sedimentation in the rivers (though insignificant compared to natural sedimentation) and totally spoils the visual aesthetics of the area. It is of prime importance that these sites will have to be rehabilitated as soon as the disposal sites are full.

Muck generally lacks nutrients and therefore, are difficult to re-vegetate. However, if no attempts to vegetate the slopes are made, the muck could slide further lower down during rain and may eventually wash off other trees and structures. Since, top soils are not available in large quantities in Himalayas, it may not be possible to apply a thin layer of soil over the muck. Bio-fertiliser technique developed by National Environmental Engineering Research Institute (NEERI) can be adopted in such projects.

METHODOLOGY OF MUCK DISPOSAL

The main objectives of process of muck dumping and restoration of these muck disposal sites are:

- To protect and control soil erosion
- To create greenery in the muck disposal areas
- To improve and develop the sites into recreational sites
- To ensure maximum utilization of muck for the construction purpose
- To develop the muck disposal sites/ dumping yards to blend with the surrounding landscape and to minimize damages due to the spoilage of muck in the project area.

During identification of the dumping sites above mentioned aspects have to be kept in mind. All possible alternate sites have to be inspected and examined before rejecting or selecting any site. All the dumping sites should adhere to the following points:

- All the dumping sites have minimum possible forest cover,
- At All the dumping sites, the settlement areas are far away from the identified dumping sites so as to have least impact on human life,
- The proposed dumping sites are located at a distance varying from 30m to 40m away from the HFL(highest flood level) of rivers.
- Muck disposal sites are close to the sites from where muck is to be generated to avoid hazards related to transport of muck to long distances.

DUMPING PROCESS

The generated muck will be carried in dumper trucks covered with heavy duty tarpaulin properly tied to the vehicle in accordance with best international practices. All precautionary measures will be followed during the dumping of muck. All dumpers will be well maintained to avoid any chances of loose soil from being falling during the transportation. All routes will be periodically wetted with the help of sprinklers prior to the movement of dumper trucks. Dumping would be avoided during the high speed wind, so that suspended particulate matters (SPM) level could be maintained. Further, the dumping will be avoided during heavy traffic. After the dumping the surface of dumps will be sprayed with water with the help of sprinklers and then compacted. A retaining wall of 6m has been proposed to hold the muck on the lower part of the dumping site and shall be constructed prior to dumping of muck. Loose muck would be compacted layer-wise. The height of Gabion Wall is proposed to be 6 m

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on an average. The muck brought by dumpers will be spread in layers behind the wire crate walls and then compacted by rollers till the top level is achieved. The retaining wall shall be laid with proper berm and the muck dumped behind it in layers and compacted by rollers. The process shall be repeated up to 50 cm level below the desired height which shall be laid with good soil for providing grass cover. At a regular vertical interval of 1.5 m and 3.0 m c/c masonry drains (catch water drains) shall be provided to drain off the rain water. Proper fencing of the entire area will be done. The muck disposal area will ultimately be covered with fertile soil and suitable plants will be planted adopting suitable bio-technological measures. The project authorities would ensure that the dumping yards blend with the natural landscape by developing the site with gentle slope, patches of greenery in and around them. These sites can also be developed later as recreational parks and tourist spots with sufficient greenery by planting trees.

REHABILITATION OF DUMPING SITES

The Rehabilitation plan of muck dumping sites includes engineering and biological measures. Most of the total unused excavated muck would be placed at an angle of repose to avoid any slippage of the muck at the proposed dumping sites. Besides, required quantity would be stacked along the roads, which would be utilized either in widening of the road or in newly constructed roads. In the former case slopes would be broken up by creating benches across the slope. This will be done to provide stability to the slopes and also to provide ample space for planting of trees which would further help in holding and consolidating the material stacked at different sites. As stated earlier, efforts will be made to dispose the muck within short distances from sites of its generation. The project authorities would ensure that the dumping yards blend with the natural landscape to develop the sites with gentle slopes, bunds, terraces, water ponds, and patches of greenery in and around them. These sites can also be developed later as recreational parks and tourist spots with sufficient greenery by planting ornamental plants. The re-vegetation of dumping yards through 'Integrated Biotechnological Approach' would be undertaken. It may be necessary to inoculate the spoil dumps for development of landscape as the soils would be poor in nutrients. This can be developed through culture of microorganism or vermiculture practices at the nurseries developed for this purpose. All the spoiled areas will be developed as per the latest technology of dumping, impact of rain, time and angle of soil setting. In addition sprinkling of water may also be resorted to, if required to avoid or minimize dust pollution. Proper drainage system also has to be provided to ensure unobstructed flow of runoff. Planting with suitable species of trees, shrubs and other biomass will also be initiated.

The following engineering and biological measures have been proposed for the development of spoiled areas.

BIOLOGICAL MEASURES

Top surfaces and slopes of all dumping areas would be left. These areas will be treated for the purpose of plantation. Vegetation cover controls the hydrological and mechanical effects on soils and slopes. Therefore, biological measures to stabilize the loose slope are essential. In order to implement the biological measures in dumping areas the following activities would be taken into account. The biological measures include the following:

Soil treatment- Muck dumped at various sites is not considered to be nutrient rich as it is excavated from tunnels and other structures. In order to make it suitable for the plantation it will be provided bio treatment. The work plan will be formulated for re-vegetation of the dumping sites through Integrated Biotechnological Approach.

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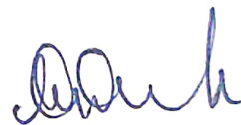
Plantation-The selected species will be planted after their nurseries have been developed. The dumping areas are very small therefore; separate nursery would not be required.

In order to stabilize the stacked dumped material, vegetation cover would be provided to hold dumped material over a period of time. Following steps are envisaged:

- Plantation of suitable tree species and soil binding using bio-fertilizer technology.
- Turfing of the exposed area and improvement of environment with ornamental species.
- Protection with mechanical support.
- Social fencing through mass public awareness.

The work plan formulated for re-vegetation of the dumping sites through 'Integrated Biotechnological Approach' is based on following parameters:

- Evaluation of dumped material for their physical and chemical properties to assess the nutrient status to support vegetation.
- Formulation of appropriate blends of organic waste and soil to enhance the nutrient status of rhizosphere.
- Isolation and screening of specialized strains of mycorrhizal fungi, rhizobium, azotobacter and phosphate solubilizers (biofertilizers inoculum) suitable for the dumped material.
- Mass culture of plant specific biofertilizer and mycorrhizal fungi.



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