

**MUCK DISPOSAL PLAN LONG THE STRETCH FROM CH 0.00 TO CH 51.78**  
**AS PROPOSED**

**General introduction**

The excavations shall result in large quantity of excavated material i.e. muck which have to be evacuated, disposed off and laid on mild slopes pari-passu with the excavation work to such designated areas where the muck piles do not substantially interfere with either environment / ecology or the river flow regime and do not cause turbidity impairing the quality of water. The disposal of muck has to be scientifically planned keeping in view the economic aspects necessitating nearness to the muck generating component of work, which understandably reduce the travel time of dumpers. Less interference to surface flow and groundwater aquifer and disposition of habitation.

Based on the quantities of surface and hill cutting including 5% over break a muck management plan, therefore, has been formulated to manage the disposal of muck and restore such areas from further degradation of the environment. During construction of the project huge quantities of cutting will be carried out from the hillside, box cutting and surface components and shall be dumped in designated areas to provide stable slopes.

**SELECTION OF DUMPING SITES**

During the selection of the dumping sites the following criteria were given preference from the environment as well as economic point of view:

- i) The dumping sites shall be located nearby the cutting or excavation sites to avoid the long distance transportation.
- ii) The sites shall be free from active landslides or creeps and should be in naturally stabilized area and care shall be taken so that the sites do not have a possibility of toe erosion related slope failure.
- iii) The base levels of the sites shall be at higher elevation than the maximum flood level and should be away from any water sources. Muck disposal sites will be located in areas that are not exposed to flooding or other geomorphologic risks. Ravines, steep slope areas and locations near waterways exposed to high water will be avoided.
- iv) There shall not be any channel of small streams flowing through the dumping sites. If it is not avoidable, adequate care shall be taken so that there would be no contact between the muck and the stream.
- v) These sites shall not be pristine habitats containing threatened species.
- vi) These sites should be away from any protected areas and eco-sensitive areas.

**Preferred locations:**

The preferred locations for the dumping sites will be-

- Environmentally degraded areas, e.g. abandoned borrow pits or zones with large depressions.
- Areas with low soil productivity, where the alteration of the original terrain morphology, and the disruption of surface water stream have been avoided.
- Zones of low visual impact, i.e. located far from potential observation points on public roads or elevated areas.

In the high part of the Project area, the filling sites have been located adjacent to natural elevations, so that the till terraces provide continuity to the area's general morphology.

**QUANTITY OF MUCK GENERATED AND ITS CONSUMPTIVE USE**

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During construction of the various components of the project, muck is generated both from soil or slide material and from rock excavation. 4612425 cum of muck is to be disposed off. Out of this 50% of muck will be utilized for side filling and raising the level of the road in fill sections. Hence the quantity of unusable muck which is to be disposed off = 50 % of 4612425 = 2306212.5cum. It is proposed to utilize some portion of the excavated material as construction material for back till and for construction of various project components. The muck shall be properly roller compacted and dumped on slopes and treated to mix and match with the surrounding environment with least change in landscape.

### MUCK DISPOSAL AREAS

In the stretch from CH 0.00 to CH 51.78 proposed dumping sites has been listed in the table Annexure-I with a total area of 1.953 ha. The total capacity of the muck disposal areas will be 23,41,899 cum (Refer Annexure I).

### MANAGEMENT OF DUMPING AREAS

Considering the elevational and horizontal distances of dumping area from highest flood level, the possibility of soil erosion and other impacts of loose soils on the river water is relatively low. Though the project stretch is on thin populated areas, the adverse impacts of dumping on ambient air quality, surrounding vegetation and human health cannot be overlooked. Considering all environmental management measures of the dumping sites are described below.

#### Precautionary measures

It is necessary to take precautionary measures to be implemented with the help of local authorities. Precautionary measures will be followed starting from cutting of till dumping of muck. All dumpers must be well maintained so that loose soil could be well protected during the transportation. All routes should be wetted prior to the dumping. Dumping would be avoided during the high speed wind, so that suspended particulate matters (SPM) level could be maintained. During the low traffic span of the day i.e. morning hours dumping will be done mostly. Care should be taken so that the loose soil could not be leached out in the nearby water body. To protect the loose soils from wind erosion, wind barriers of with suitable porosity will be established from three sides of dumping piles.

#### Engineering Measures

##### Compaction

The compaction of dumping piles compresses and reduces the volume of muck considerably. The compaction also makes it suitable for the plantation and other biological measures. The surface on the top would be leveled and graded to make the alternative use after stabilization with natural vegetation cover generation. Total budget for the compaction would be Rs. 7.5 lakhs only.

##### Construction of retaining walls

##### Dry-stone retaining wall/ Gabion wall:

Carefully packed rock to a height of 3m with sideslope of 1.5:1 is enough to withstand the stress caused by the muck; usually in muck disposal areas where the slope is steep. Gabion Wall Construction will be constructed if the area has heavy load of soil depending upon the situation.



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### Bamboo Fencing for Soil Retention:

However, most of the muck disposal areas natural ground terrain varies from gentle to semi slope where the stress caused by the muck can be protected by bamboo fencing. All total length of such retaining wall will fall around 4160 meters. Total budget for the construction of retaining wall and bamboo fence would be Rs. 45 lakh only.

SL No	Muck Disposal Area	Length in Mtr	Approved/ Not Approved	Type of retaining wall
1	MDA-1	40	To be approved	Dry Wall
2	MDA-2	300	To be approved	Dry Wall
3	MDA-3	220	To be approved	Dry Wall
4	MDA-4	650	This area already approved	Dry Wall
5	MDA-5	130	To be approved	Dry Wall
6	MDA-6	80	To be approved	Dry Wall
7	MDA-7	140	To be approved	Dry Wall
8	MDA-8	80	To be approved	Gabion Wall
9	MDA-9	140	To be approved	Dry Wall
10	MDA-10	70	To be approved	Dry Wall
11	MDA-11	90	To be approved	Dry Wall
12	MDA-12	90	To be approved	Dry Wall
13	MDA-13	100	To be approved	Dry Wall
14	MDA-14	250	To be approved	Dry Wall
15	MDA-15	240	To be approved	Dry Wall
16	MDA-16	60	To be approved	Dry Wall
17	MDA-17	40	To be approved	Dry Wall
18	MDA-18	150	To be approved	Dry Wall
19	MDA-19	20	To be approved	Gabion Wall
20	MDA-20	190	To be approved	Dry Wall
21	MDA-21	50	To be approved	Dry Wall
22	MDA-22	40	To be approved	Dry Wall
23	MDA-23	60	To be approved	Dry Wall
24	MDA-24	200	To be approved	Dry Wall
25	MDA-25	250	To be approved	Dry Wall
26	MDA-26	310	To be approved	Dry Wall
27	MDA-27	80	To be approved	Dry Wall
28	MDA-28	50	To be approved	Dry Wall
29	MDA-29	40	To be approved	Dry Wall
	<b>Total</b>	<b>4160</b>		

### Biological Measures

After the construction of the retaining wall and the concrete tunnel, dumping and compaction, a total available surface area including tops and slopes of all dumping area would be left with about .78 ha. This area will be used for the plantation so that vegetation cover could control the mechanical and hydrological effects on the slopes and would give the permanent stability to thermic. The biological measures include the following measures.

Soil Cover Generation



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To stabilize the muck and restore the disposal site, fast growing plant species are suggested. The grasses are suited to bind loose soil and shrub and trees hold soil up to deeper level. Maize and What and local jhum riceverities will be sown first to cover the soil in short span of time. Taking the climate, soil and drainage conditions of the sites into account, selection of local plant species is generally preferred. Important tree species which can be used to rehabilitate the loose soil are soil retaining species like *Alnusnepalensis*, *Dalbergiasissoo*, *Delonixregia*, *Gmelinaarborea*; grass species-*Vetiveriazizanioides*, *Themeda villosa*, *saccharumspontaneum*, Elephant grass etc. along with other locally available tree species.

Total cost for creation of bush cover/grass cover establishment will be 45 lakh.

#### Cost Estimate for Muck Disposal Management

Item		Cost in Lakh
Engineering Measures	Compaction	14.0
	Construction of retaining walls/Bamboo fencing	14.5
Biological Measures	Grass cover/bush cover establishment	16.5
	Total	45.0



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