

MUCK DISPOSAL PLAN

1. Generated Muck Volume

Since proposed road traverses through undulated section in Plain & Rolling Terrain as well as in Mountainous & Steep Terrain in Open Country due to which road side cutting involves which requires removal of excavation of material i.e. soil, boulders etc.

The estimated volumes of muck to be generated from the road side cutting are given in table 1 below.

About 100% of the generated muck is to be reused in road construction for filling, construction of retaining/RS walls and in approaches of VUP as necessary. The total quantity of generated muck, reusable quantity, and quantity to be disposed are provided in Table 2 below.

Table: 1 Volume of Muck to be generated

| S.No. | Description | Quantity | Unit |
|-------|---------------------------------------------------|------------|------|
| 1 | Material received from hill side cutting | 654337.277 | Cum |
| 2 | Total (1) | 654337.277 | Cum |
| 3 | Disposal and use of cutting material in road work | | |
| 1 | Embankment filling from roadway cutting (80%) | 131129.442 | Cum |
| 4 | Total | 131129.442 | Cum |
| 5 | Material required to be disposed by cartage(2-4) | 523207.835 | Cum |
| 6 | Swell Factor 40% | 209283.134 | Cum |
| 7 | Total Material Required to be Disposed(5+6) | 732490.969 | Cum |

Table 2 Summary of debris disposal

| S.No. | Reused material for road construction | Total debris including 40% swell factor | Total disposal in dumping zone |
|-------|---------------------------------------|-----------------------------------------|--------------------------------|
| 1 | 131129.442 | 732490.969 | 732490.969 |

Note: - Muck disposal 732490.969 cum. Shall be catered to muck dumping location (I) km 175+500 to km 175+950 Nearby village Matha Neval having Capacity 425250 cum. and muck dumping location (II) km 177+975 to km 178+580 having Capacity 1197900 Cum. Nearby village Bijni Total Capacity 1623150 Cum. section for NH-154.

2-Lane of Pkg-VA Pathankot to Mandi section NH-154 (KM-180.00 to Km 202.815)

2. Proposed Muck Disposal Sites

Two (02) muck disposal sites measuring a total area of 6.0750 ha have been selected as designated site for muck disposal as detailed in Table 3 below.

Table 3: Muck Disposal Sites-Present Status

| Village | Dumping Sides | Survey No | Existing Land | | To be acquired Land | | Total Land (Ha.) | |
|-------------|---------------|-----------|-------------------|-----------------------|---------------------|-----------------------|------------------|--------|
| | | | Forest Land (Ha.) | Non Forest Land (Ha.) | Forest Land (Ha.) | Non Forest Land (Ha.) | | |
| Matha Niyul | MDS1 | 230/1 | | | 0.0765 | | 0.0765 | |
| | | 514/225/1 | | | 1.0790 | | 1.0790 | |
| | | 514/225/2 | | | 0.2515 | | 0.2515 | |
| | | 204/2 | | | 0.0016 | | 0.0016 | |
| | | 204/3 | | | 0.0032 | | 0.0032 | |
| | | 208 | | | 0.0103 | | 0.0103 | |
| | | 206/1 | | | 0.0340 | | 0.0340 | |
| | | 485/225/1 | | | | 0.0101 | 0.0101 | |
| | | 215/1 | | | | 0.0123 | 0.0123 | |
| | | 216 | | | | 0.0625 | 0.0625 | |
| | | 217 | | | | 0.0111 | 0.0111 | |
| | | 218/1 | | | | 0.0377 | 0.0377 | |
| | | 205/1 | | | | 0.0559 | 0.0559 | |
| | | 207 | | | | 0.0086 | 0.0086 | |
| | | 209/2 | | | | 0.0017 | 0.0017 | |
| | | Tandu | 212/1 | | | 0.0765 | | 0.0765 |
| | | | 214/1 | | | 0.0012 | | 0.0012 |
| | | | 222/1 | | | 0.0067 | | 0.0067 |
| | | | 452/360/1 | | | 0.0079 | | 0.0079 |
| | | | 213 | | | | 0.0275 | 0.0275 |
| 216/1 | | | | | 0.1371 | 0.1371 | | |

2-Lane of Pkg-VA Pathankot to Mandi section NH-154 (KM-180.00 to Km 202.815)

| | | | | | | |
|-------------|-------|--------------|--|--------|---------|--------|
| | | 216/2 | | | 0.0283 | 0.0283 |
| | | 217 | | | 0.0206 | 0.0206 |
| | | 218 | | | 0.0016 | 0.0016 |
| | | 219/1 | | | 0.0213 | 0.0213 |
| | | 220/1 | | | 0.004 | 0.0040 |
| | | 224/1 | | | 0.02429 | 0.0243 |
| | | 224/1/1 | | | 0.0121 | 0.0121 |
| Total | | | | 1.5484 | 0.47669 | 2.0250 |
| Bijan | MDSII | 1091/8/1 | | 2.6518 | | 2.6518 |
| | | 9 | | | 1.0611 | 1.0611 |
| | | 10 | | | 0.0101 | 0.0101 |
| | | 24 | | | 0.00405 | 0.0041 |
| | | 1456/1163/60 | | | 0.1815 | 0.1815 |
| | | 1161/60 | | | 0.0434 | 0.0434 |
| | | 1162/60 | | | 0.041 | 0.0410 |
| Total | | | | 2.6518 | 1.3412 | 3.9930 |
| Grand Total | | | | 4.2002 | 1.8178 | 6.0180 |

The muck disposal lands proposed are generally in non-forest area but due to under-capacity some forest land has also been acquired within the PROW to fulfil the muck dumping as no other alternative non-forest land is available along the project area. Out of the total 6.0180 ha, 4.2002 ha. Forest land has already been diverted in 2021 through Proposal No FP/HP/ROAD/154466/2022 dated 05/07/2022 for muck disposal.

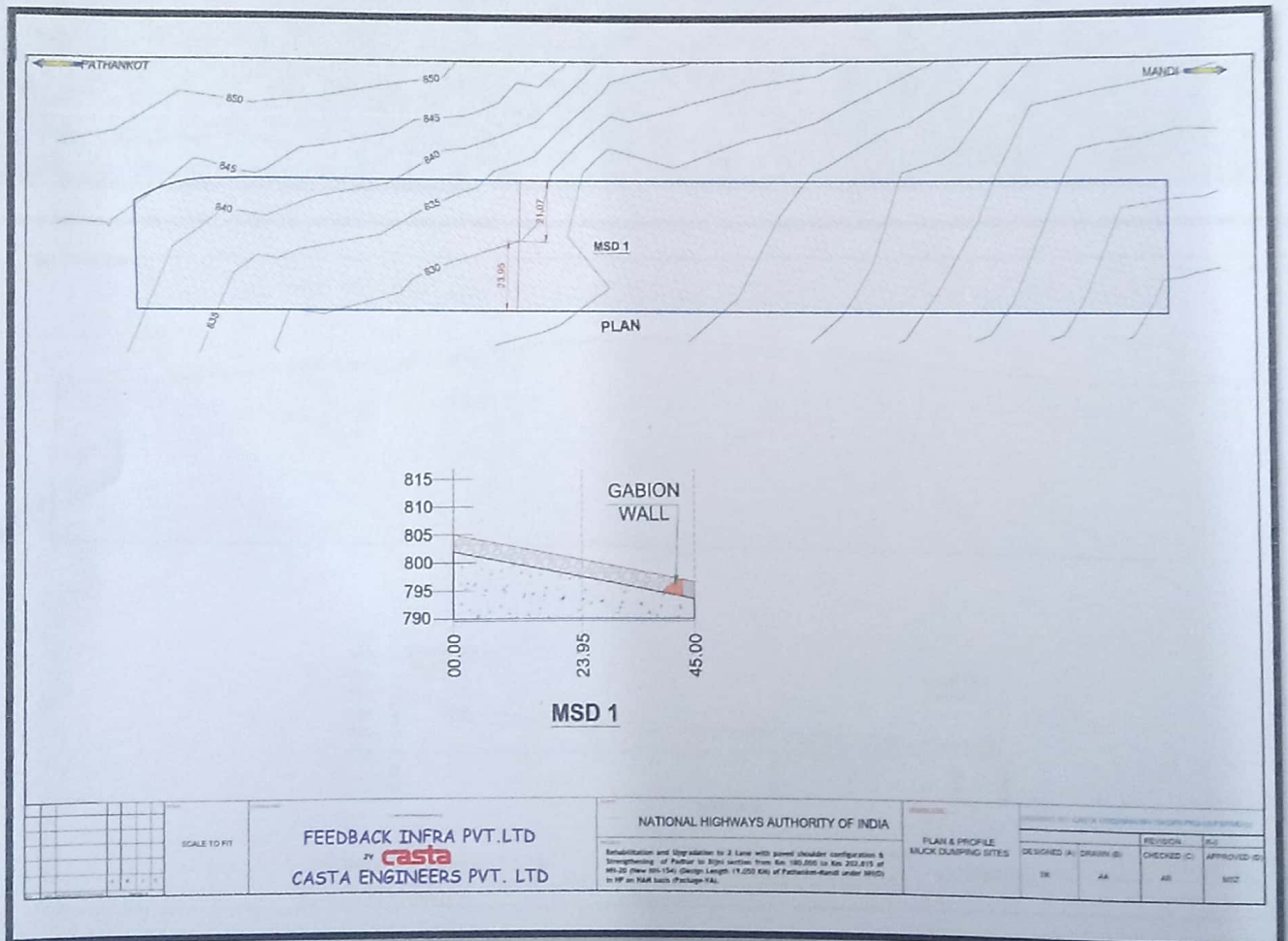
Moreover, Digital elevation models, as presented in **Figure 1&2 below** of the Two (02) selected muck disposal sites, were prepared for all muck dumping sites to ascertain the topography and determining the location and length of the gabion wall for slope protection so as to prevent the muck from reaching into natural streams.

Muck Dumping Site-I

2-Lane of Pkg-VA Pathankot to Mandi section NH-154 (KM-180.00 to Km 202.815)



Figure: 1 MDS-1 Villages Matha Niyul & Tandu



2-Lane of Pkg-VA Pathankot to Mandi section NH-154 (KM-180.00 to Km 202.815)

Muck Dumping Site-II

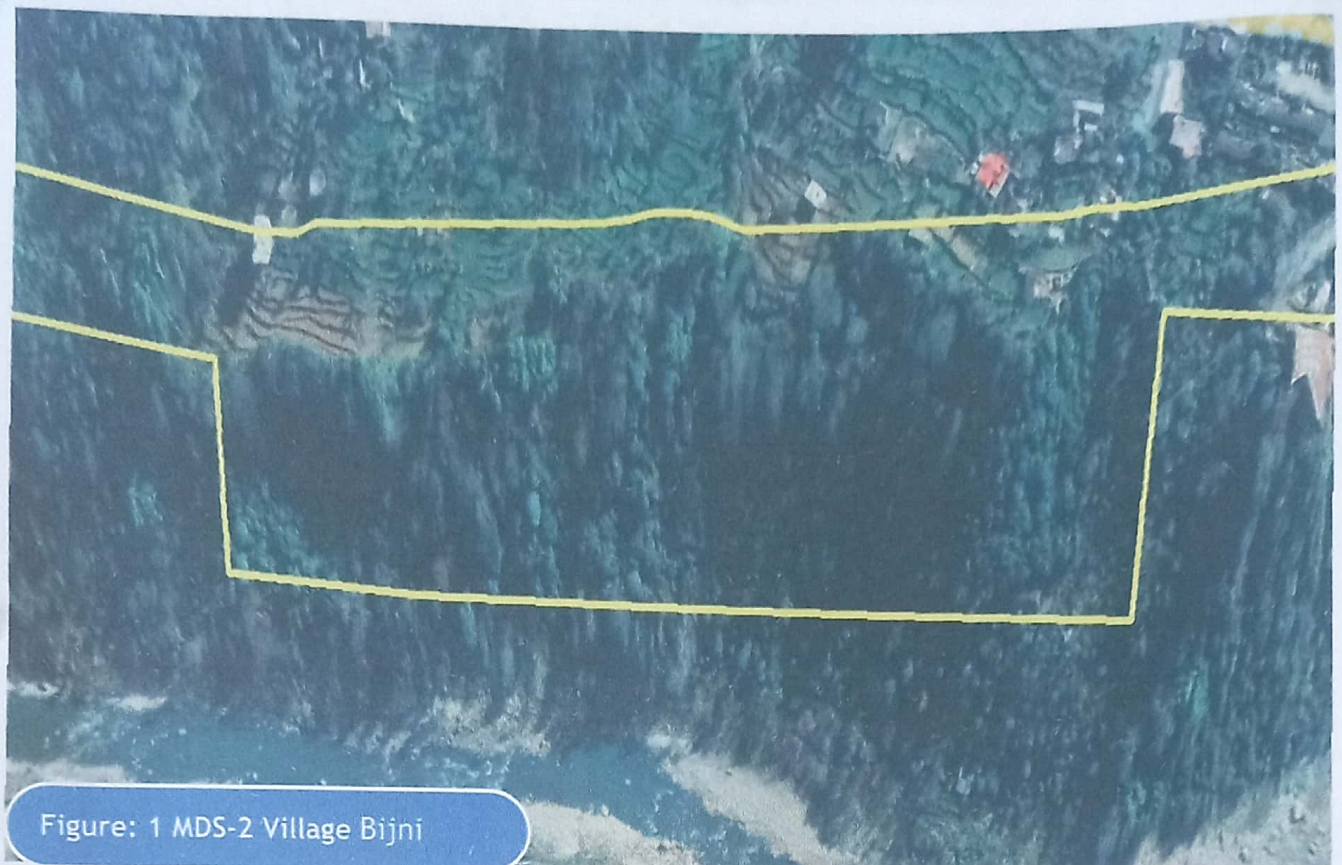
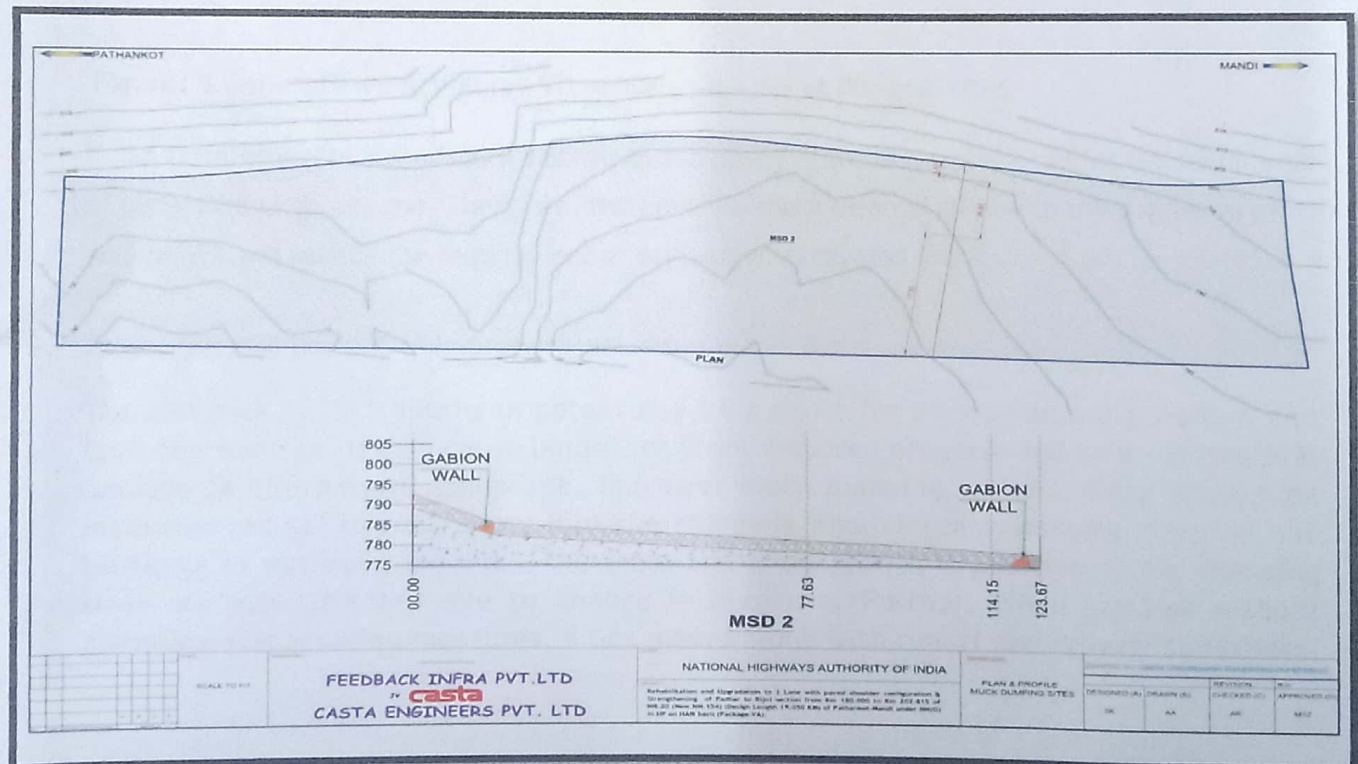


Figure: 1 MDS-2 Village Bijni



2-Lane of Pkg-VA Pathankot to Mandi section NH-154 (KM-180.00 to Km 202.815)

The muck holding capacity of the all muck disposal sites (including the already diverted/acquired plot) are detailed in Table 4 below and comparison of muck volume to be generated vis-à-vis capacity of the disposal sites are presented in info graphics in Figure 3 below.

Table: 4 Muck Holding Capacity of Disposal sites

| S.No | Villages | Design Chainage (km) | | Length | Width | Height | Area (Sqm) | Volume (Cu.m) |
|-------|---------------------|----------------------|---------|--------|-------|--------|------------|---------------|
| | | From | To | | | | | |
| 1 | Matha Niyul & Tandu | 175.500 | 175.950 | 450 | 45 | 21 | 20250 | 425250 |
| 2 | Bijan | 177.975 | 178.580 | 605 | 66 | 30 | 39930 | 1197900 |
| Total | | | | | | | 60180 | 1623150 |

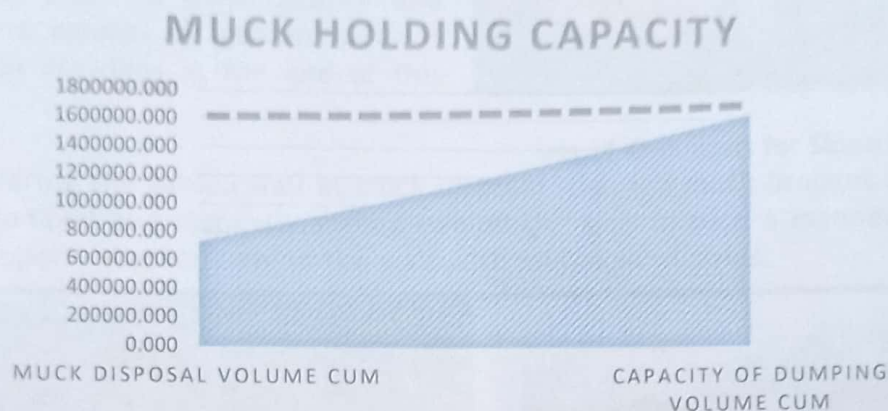


Figure: 3 Generate Muck Volume Vis -a-Vis's capacity of Disposal sites

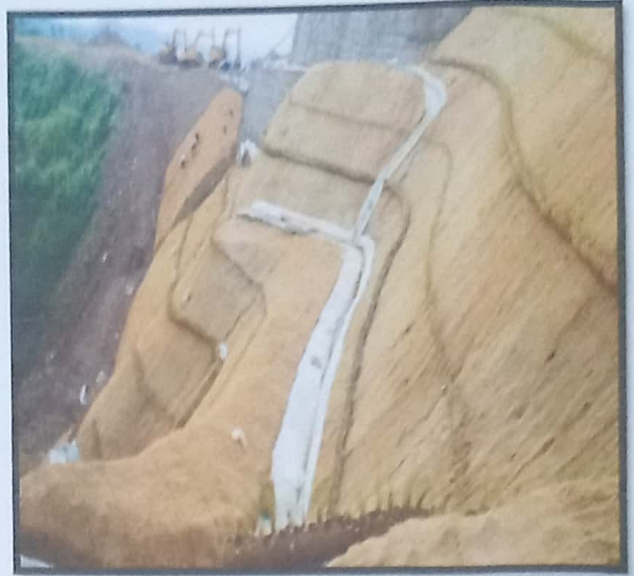
It can be inferred from the Figure 3 above that capacity of the disposal sites fulfils the requirement of generated muck volume. Therefore, the proposed muck disposal sites with the suggested gabion wall height will suffice the requirement of dumping of excavated muck.

3. Environmental Impacts of Improper Muck disposal

The dumping of rock spoil can potentially be a cause for environmental problems and land degradation. It may cause landslides if not disposed properly and be an aesthetical damage to the natural landscape. Improper muck dumping without slope protection measures results in wash away into the channels/Khad/Streams causing siltation and blockage of natural channels. The trees and undergrowth vegetation of the dumping sites are also affected due to change in land use. Further, when stacked without adequate stabilisation measures, muck moves along with runoff and creates landslides.

4. Environmental Safeguard Measures for Muck Disposal Sites

- Multiple gabion walls at different elevation levels are proposed to retain muck within the boundary of muck disposal sites. Gabion wall of height of 5 m including 0.75 m of buffer along with standard wire gauge galvanised wire (SWG GI) having 10 cm x 10 cm mesh and dimension 1.15 m x 1.15 m x 1.15 m in multi tiers with 0.5 m wide offset to be laid concurrently with the dumping of muck for side protection. Muck dumping plan of all two (02) proposed disposal sites along with elevation profile and desired Placement of gabion wall is provided in drawings at the end of this report.



Use of Geo- mats for Slope Stabilization

- After preparing the gabion wall at muck disposal site, the muck brought in dumpers shall be dumped and manually spread behind the wall in such a manner that rock mass is properly stacked behind the wall with minimum of voids.



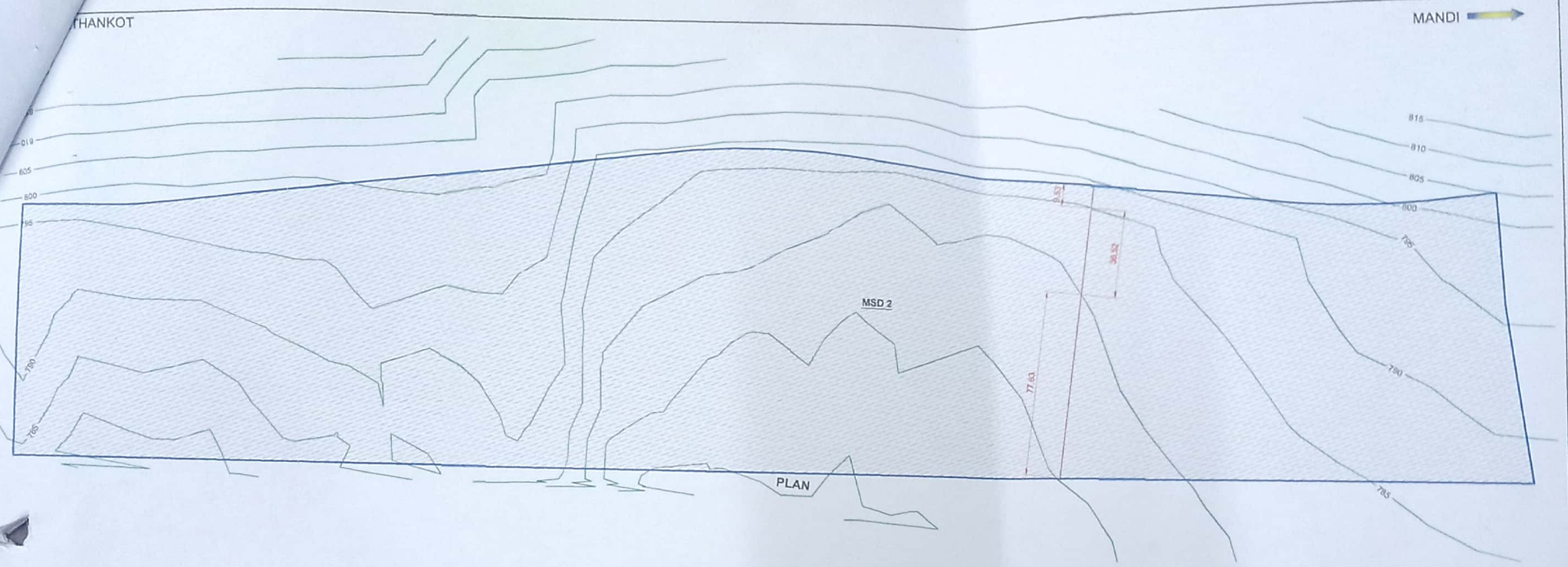
Rehabilitation of slopes using bio-engineering techniques

- Regular inspection by environmental expert of concessionaire and Independent engineer (IE) shall be made to ensure complete avoidance of spilling of muck outside the boundary, especially into channels/Khad/Streams.
- Bioengineering is the technique of utilizing vegetation in addressing geotechnical problems. Slope of muck disposal sites after completion of dumping to a particular site should be stabilized by stone pitching and turfing with geo mats (Coir Geotextile) & indigenous species of soil stabilizing legumes like Vetiver grasses. Natural geotextiles degrade quicker than man-made counterpart, but facilitate growth of vegetation quicker and better due to this inherent characteristics. Hydro-seeder sprays are to be used for restoring soil fertility of the slope walls for quicker result, as necessary.

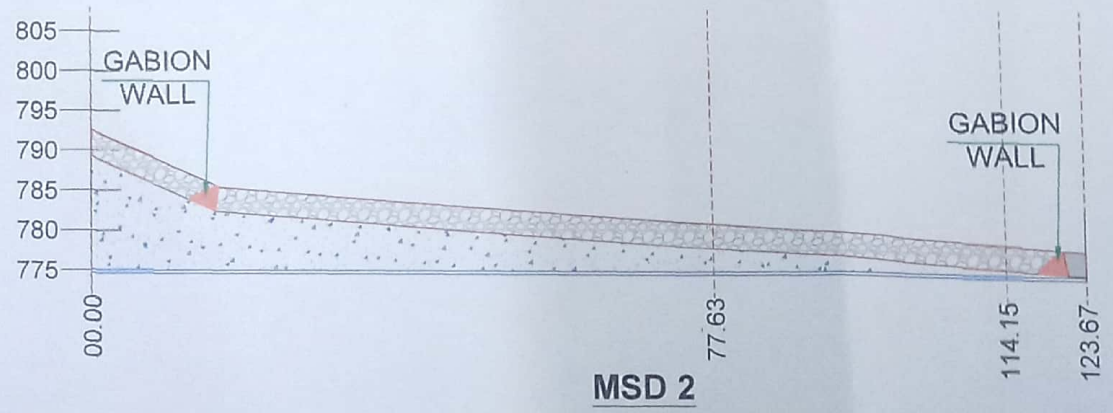
2-Lane of Pkg-VA Pathankot to Mandi section NH-154 (KM-180.00 to Km 202.815)

THANKOT


MANDI

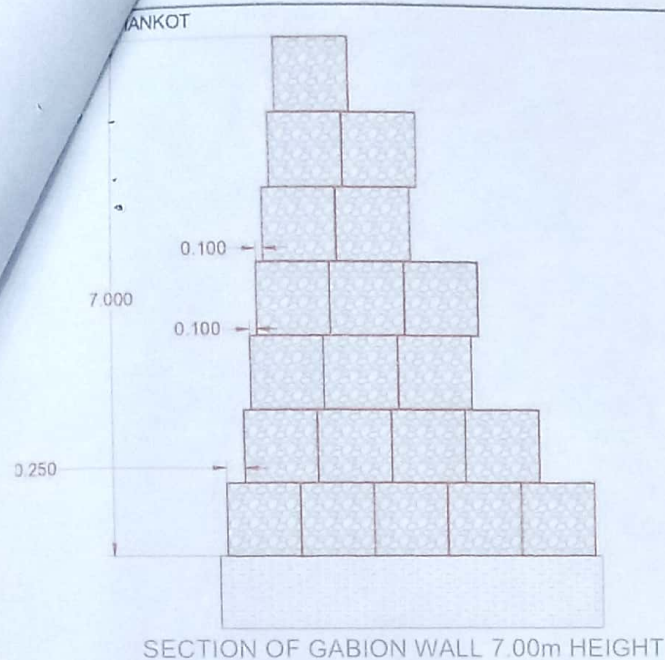


PLAN

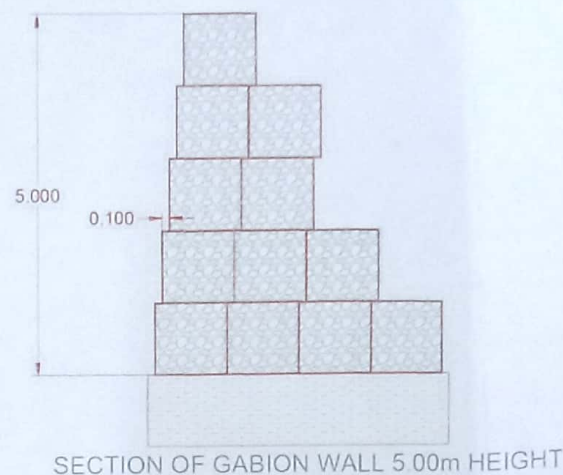


MSD 2

| | | | | | | | | | | | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------|---------------------------------------|--|------------------------------------|--|-----------------------------------------------------------------|--|--------------------------------------------------------------|--|
|  <small>SCALE TO FIT</small> | <small>CONSULTANT</small> FEEDBACK INFRA PVT.LTD <small>JV</small> casta CASTA ENGINEERS PVT. LTD | <small>CLIENT</small> NATIONAL HIGHWAYS AUTHORITY OF INDIA | <small>DRAWING TITLE</small> PLAN & PROFILE MUCK DUMPING SITES | <small>DRAWING NO. CASTA 17002/NH/154/DP/PKG-VA/SP/MD/02</small> | <small>DESIGNED (A)</small> SK | | <small>DRAWN (B)</small> AA | | <small>REVISION</small> <small>CHECKED (C)</small> AR | | <small>R.O</small> <small>APPROVED (D)</small> MBZ | |
| <small>PROJECT</small> Rehabilitation and Upgradation to 2 Lane with paved shoulder configuration & Strengthening of Padhar to Bilni section from Km 180.000 to Km 202.815 of NH-20 (New NH-154) (Design Length 19.050 KM) of Pathankot-Mandi under NH(O) In HP on HAM basis (Package-VA). | | | | | | | | | | | | |



SECTION OF GABION WALL 7.00m HEIGHT



SECTION OF GABION WALL 5.00m HEIGHT

INCLINATION OF VERTICAL FACE

95

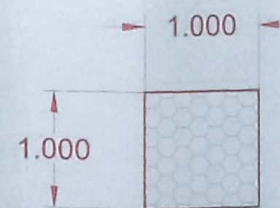


Deputy Conservator of Forests
Mandi Forest Division, Mandi (H.P.)

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
INCLINATION OF HORIZONTAL FACE



GABION BOX



ZINC COTED STEEL
WIREGABION MESH



SCALE TO FIT

FEEDBACK INFRA

FEEDBACK INFRA PVT.LTD

JV **casta**

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NATIONAL HIGHWAYS AUTHORITY OF INDIA

Rehabilitation and Upgradation to 2 Lane with paved shoulder configuration & Strengthening of Padhar to Bijni section from Km 180.000 to Km 202.813 of NH-20 (New NH-154) (Design Length 19.050 KM) of Pathankot-Mandi under NH(C) in HP on HAM basis (Package-VA).

Example 17.5

PLAN & PROFILE MUCK DUMPING SITES

BRAND NO. CASTA 1700RHAINH (SADOPRO) CAPRENO

| | | | |
|--------------|-----------|-------------|----------|
| | | REVISION | R.O |
| DESIGNED (A) | DRAWN (B) | CHECKED (C) | APPROVED |
| SK | AA | AR | MSZ |