

**Annex XII**

**Operation and Maintenance Manual  
for  
Moon Plains Sanitary Landfill Site at  
Nuwara Eliya**

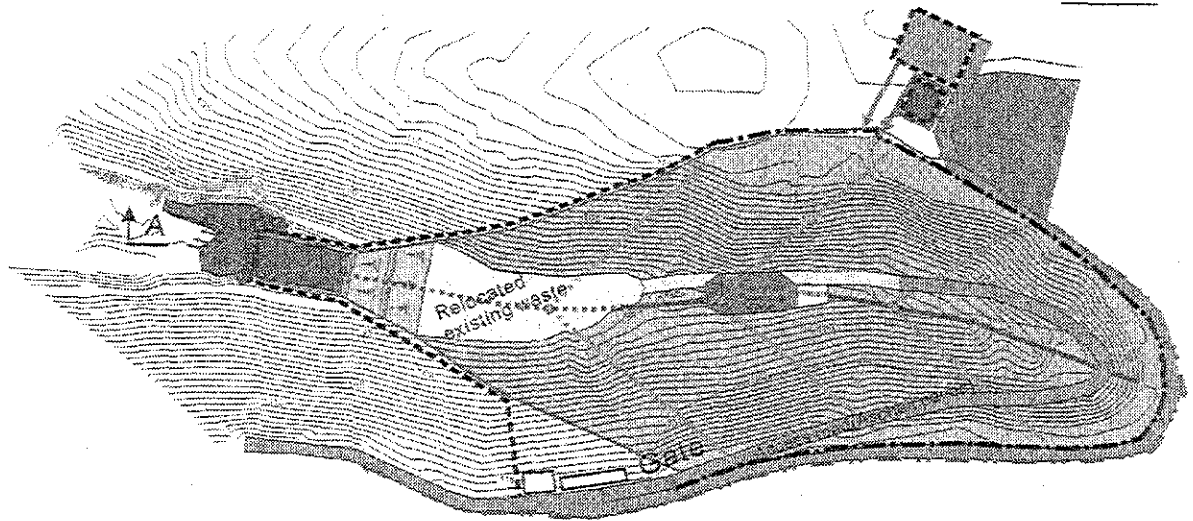
# 1 Waste discharging and covering soil

The waste shall be discharged to the landfill site from the platform. The waste discharging procedure is as follows.

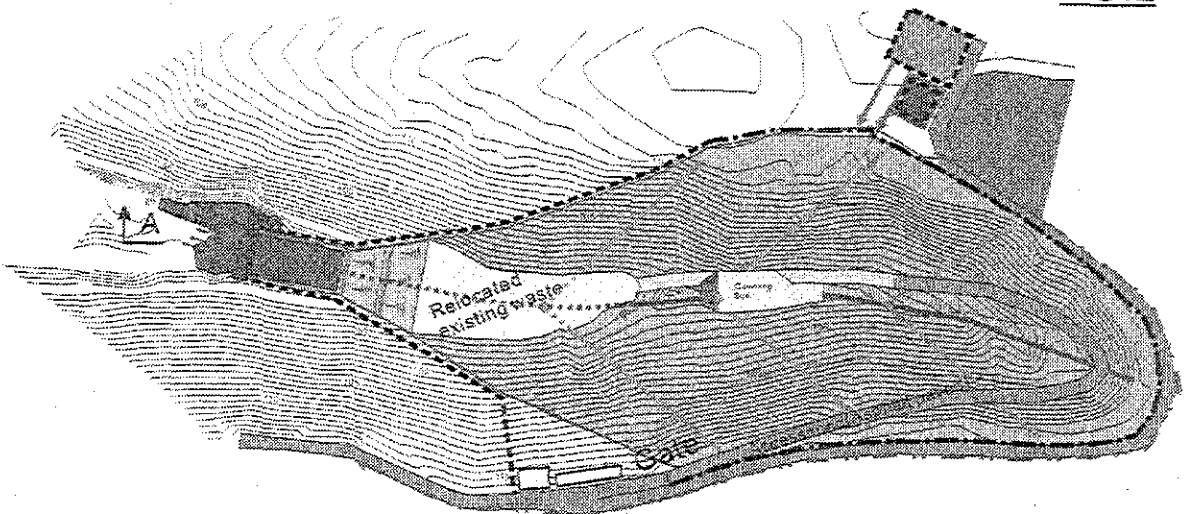
- 1) At the beginning of operation, the waste shall be discharged to the down at the landfill site from platform.
- 2) Bulldozer shall move and compact the discharged waste. The waste must not be scattered and it must be minimize as less as possible in order to decrease the amount of covering soil.
- 3) Covering soil shall be done every day.
- 4) The thickness of covering soil is approximately twenty (20) cm and it shall be done every day. Top soil can be utilized as covering soil
- 5) Covering soil could be excavated within the landfill site without damaging to other facility.
- 6) The area where is covered soil on the waste will become temporary access road for collection vehicle, therefore it must be compacted well by Bulldozer.
- 7) The steel plates can be utilised for the travelling of collection vehicle, when it is rain.
- 8) Waste shall be discharged only from the platform or active filling area from bottom of access road not from the top on the road.

The following figures show the operation procedure of discharging waste and covering soil.

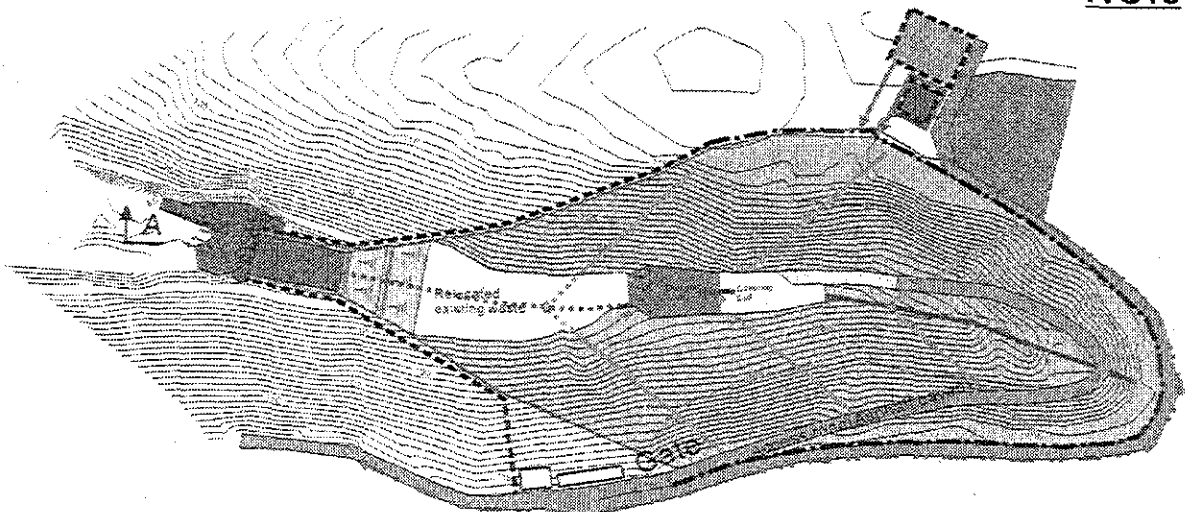
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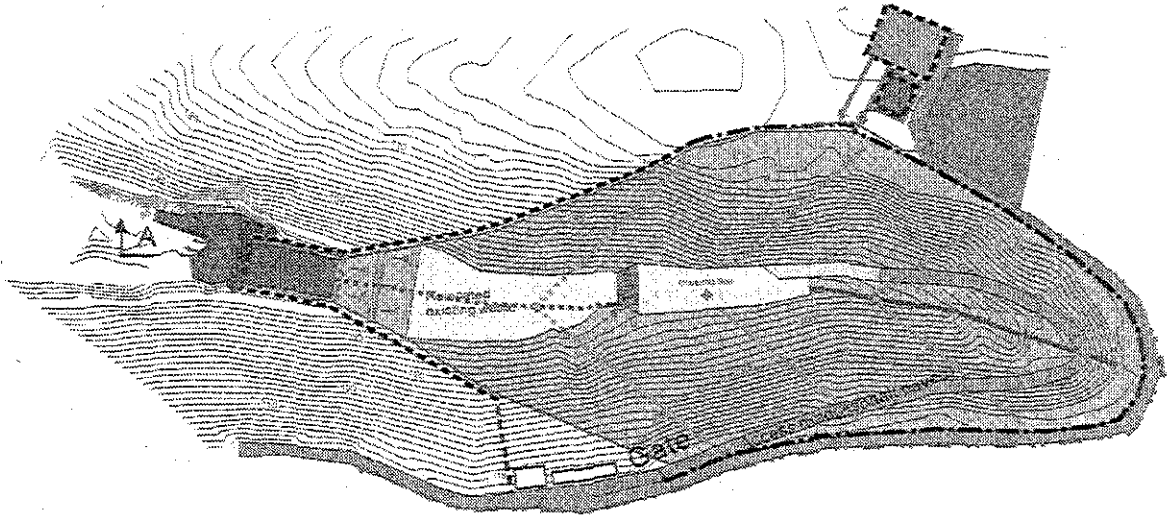
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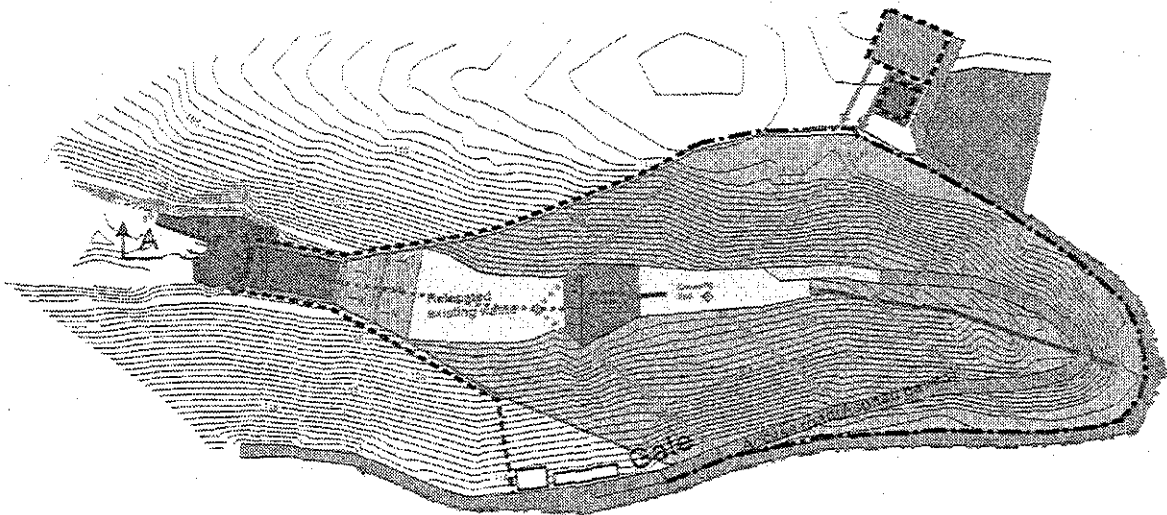
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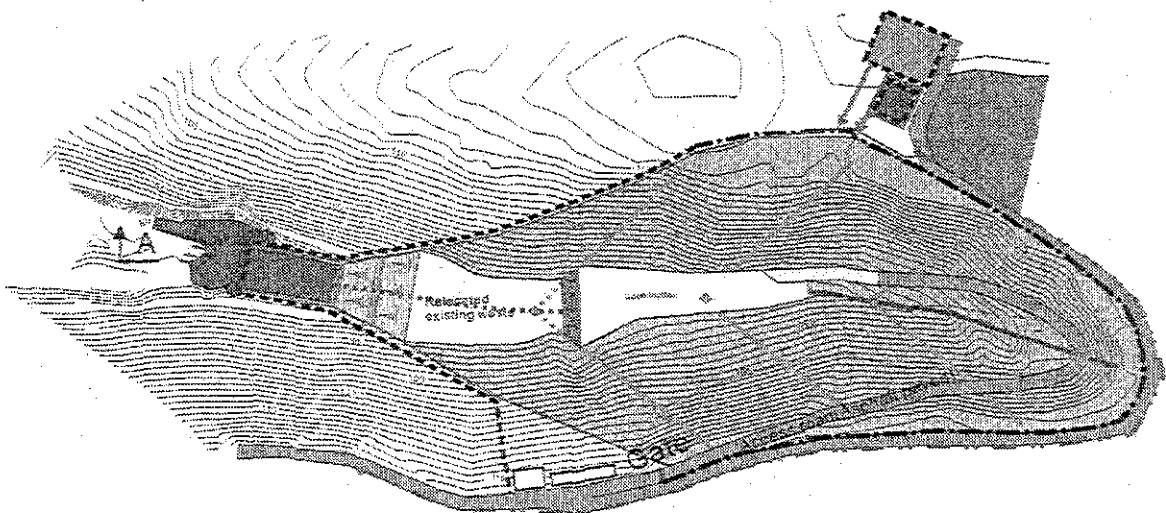
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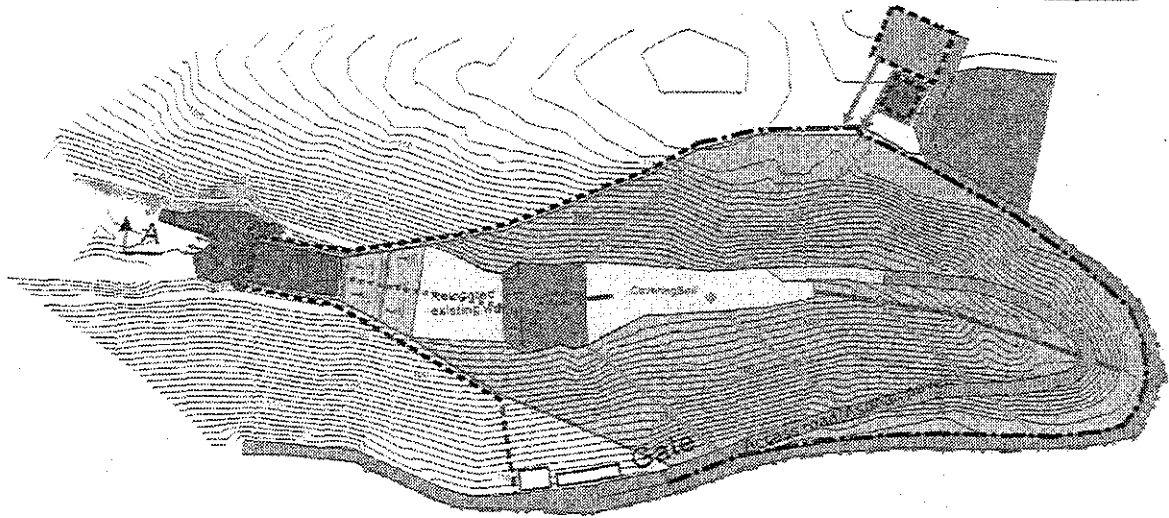
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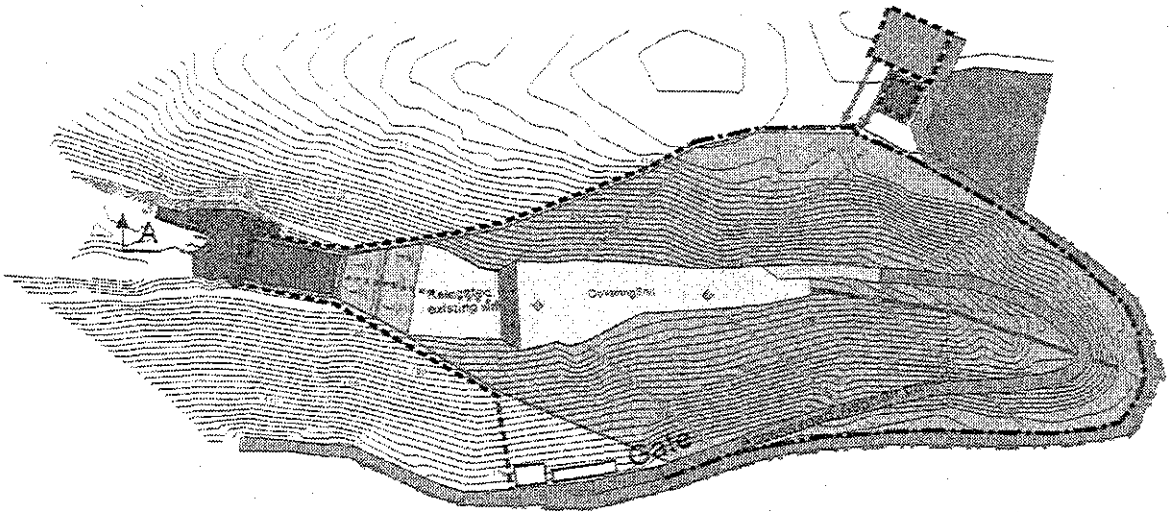
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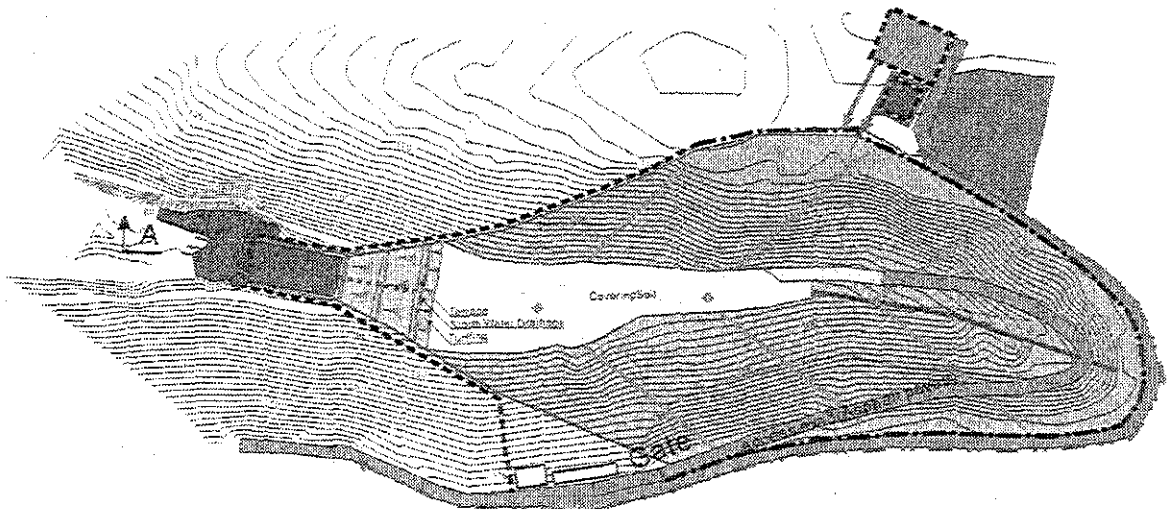
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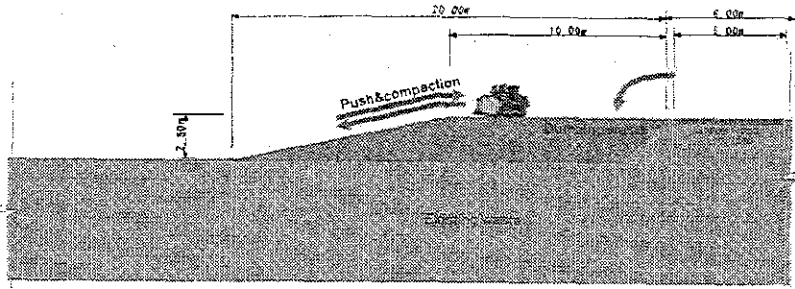
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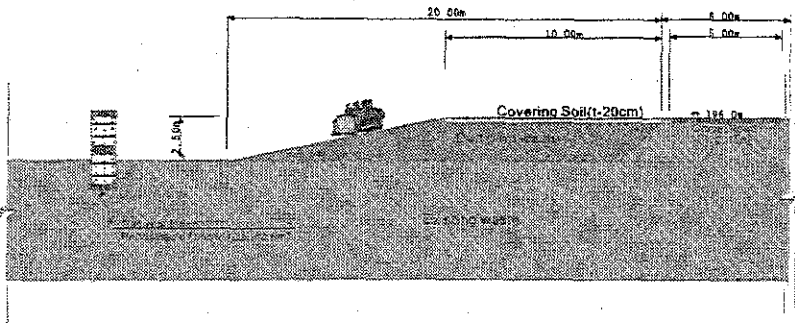
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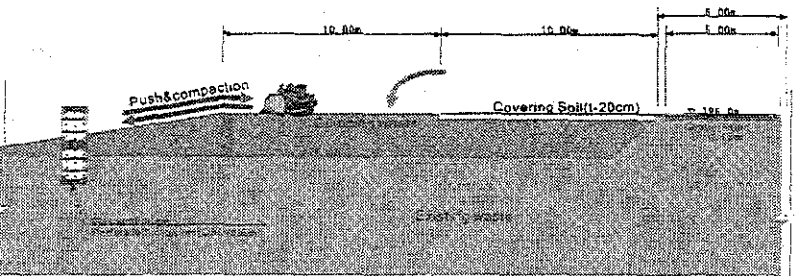
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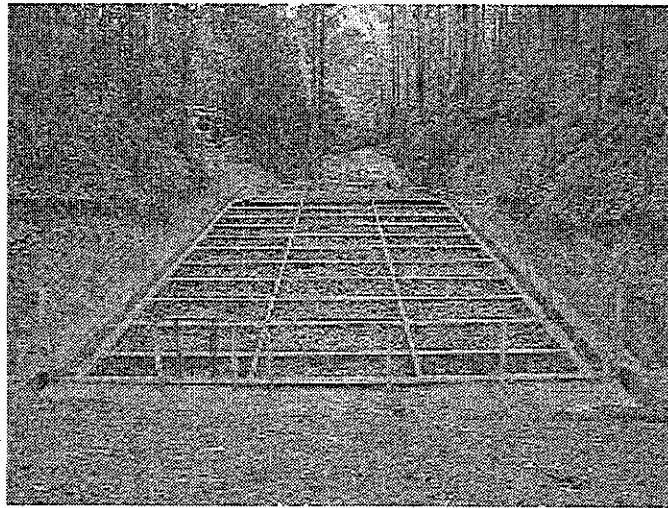


## 2 Leachate Treatment

### 2.1 Leachate treatment facility

The operation and maintenance of leachate treatment facility is as follows

- Leachate treatment facility shall be checked every morning whether somebody or animals fell or not.
- Leachate treatment facility shall be checked every morning whether there is leaking of leachate or not. If leaking is found, inform to Municipal engineer and CPHI immediately.
- Surrounding fence shall be maintained well in order to avoid animals or somebody falling to the leachate treatment facility.
- The soil at the pit for effluent of treated leachate shall be removed regularly.
- The coconuts fibre shall be replaced every five years.
- The charcoal filter shall be replaced regularly.
- The plantation as buffer zone between leachate treatment facility and existing road shall be maintained well.
- When leachate outflow is little, effluent of treated gully suck could be discharged to leachate treatment facility



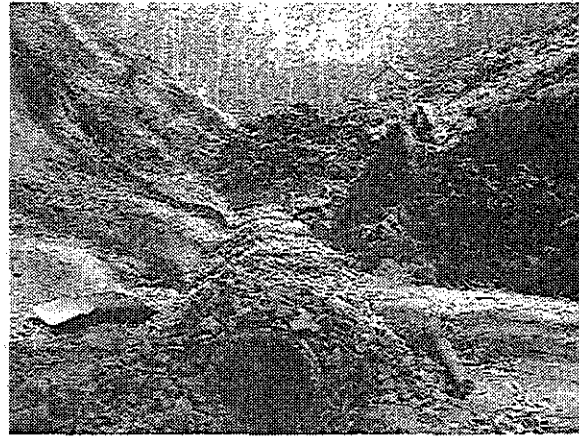
The leachate treatment facility



## 2.2 Leachate collection facility

The maintenance of leachate collection pipe is as follows.

- Bulldozer is strictly prohibited to pass on the leachate collection facility uncovered by waste. The leachate collection facility is easily damaged by heavy equipments.
- Leachate collection facility shall be covered by waste and not to be covered by soil.
- The rubble or gravel stone around leachate collection facility should not be misplaced or removed

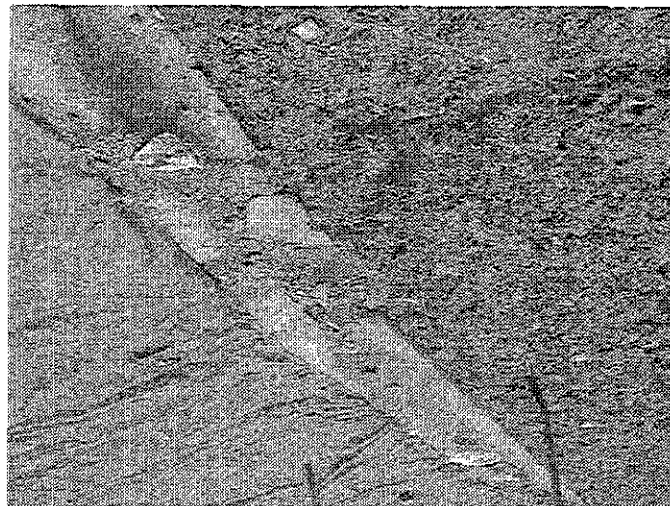


*The leachate collection facility*

## 2.3 Leachate collection pipe on the terrace

The maintenance of leachate collection pipe is as follows

- When the seeping out of leachate is found on the terrace, the leachate collection pipe might be cloggy. The obstacles shall be removed in order to discharge the leachate properly.



Removing of the obstacles of cloggy leachate collection pipe



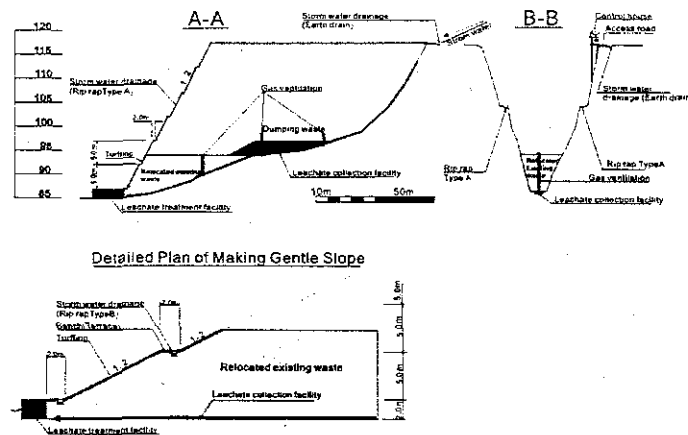
### 3 Finished slope

#### 3.1 Making slope and terrace

The slope and terrace shall be made by discharged waste during operation. Specification of slope and terrace is as follows,

- 1:2 slope degree
- Every 5 meters in height.
- 2 meters in terrace width.

The role of storm water drainage on the slope is not only diversion of storm water drainage but also mark for making slope. The waste shall be discharged in accordance with the location of storm water drainage on the slope.



The maintenance of finished slope is as follows.

- To repair the damaged slope in accordance with 1:2 slope degree
- To check seeping of leachate on the slope. If it is found, the seeping place shall be replaced to some gravel.



Making slope (1:2)

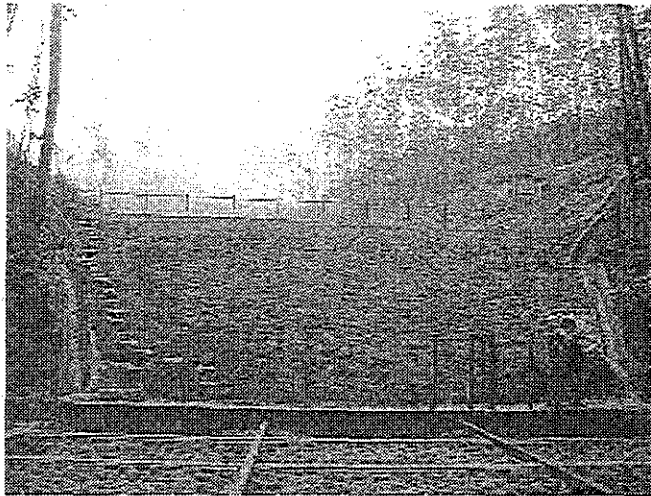
## 3.2 Turffing

The outside of slope of the waste filling was turffed for the following purposes.

- Protection of the slope from erosion by runoff water.
- Maintenance of the good view.

The maintenance of turffing is as follows,

- The slope made by discharged waste is turffed immediately after covering soil
- To water the turff at least every three days in order to protect the slope.



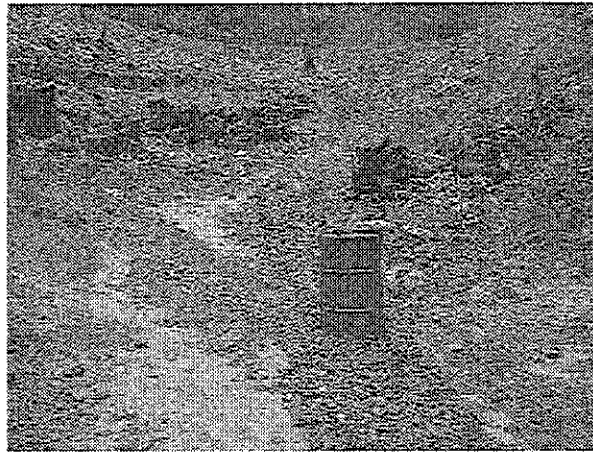
To water the turff in order to protect the slope

## 4 The other facilities

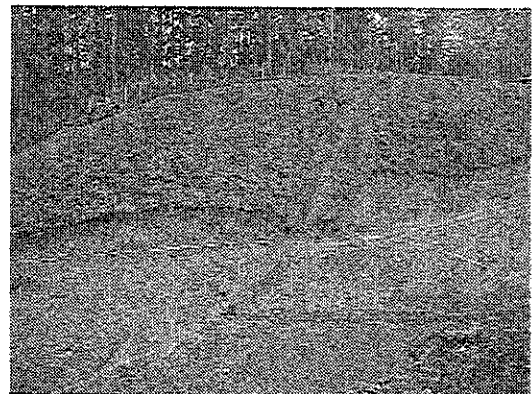
### 4.1 Extension of Gas Ventilation Facility

The role of gas ventilation facility is emission of methane gas which is generated through decomposing of discharged waste.

- The waste shall be discharged to surrounding of gas ventilation facility carefully.
- The vertical gas ventilation facility shall be extended in accordance with the progress of the layer of discharged waste
- Top soil as covering soil surrounding gas ventilation facility on the slope shall be taken carefully not to damage gas ventilation facility.



Gas Ventilation Facility (Vertical)

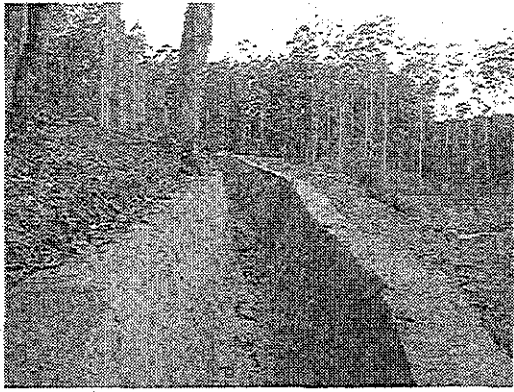


Gas Ventilation Facility (On the slope)

## 4.2 Storm water drainage

The role of storm water drainage is to divert the storm water from landfill site to outside.

- Storm water drainage shall be cleaned twice a month
- The soil at the pit for storm water drainage shall be removed regularly



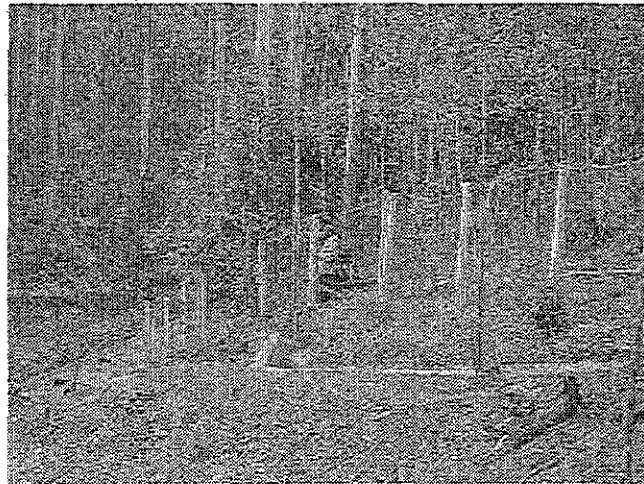
Storm water drainage (Rip rap)



Storm water drainage (Earth drain)

## 4.3 Fence (Fixed type)

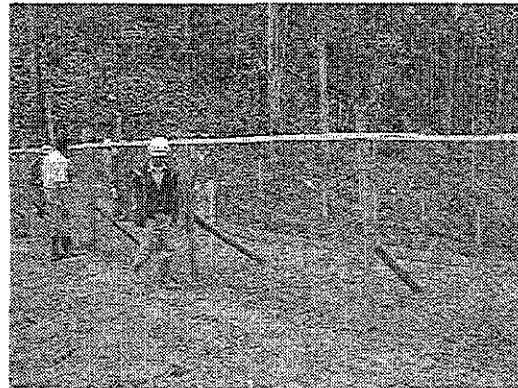
The role of fixed type fence is to avoid the scattering waste and animals or somebody entering. The fence shall be repaired when it is damaged by animals and so on.



Repairing of damaged fence

#### 4.4 Fence (Movable type)

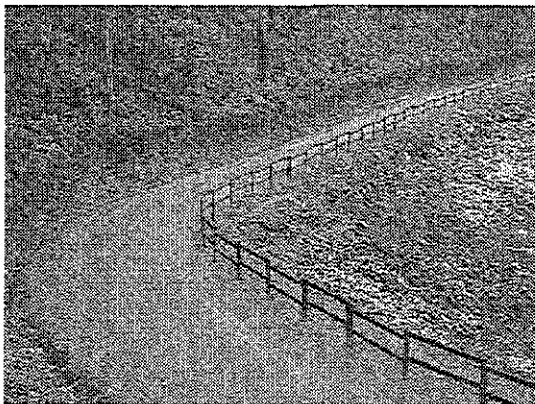
The role of fence (Movable type) is to avoid the scattering waste and to mitigate the ugly view. The fence shall be shifted in accordance with the layer of discharging waste.



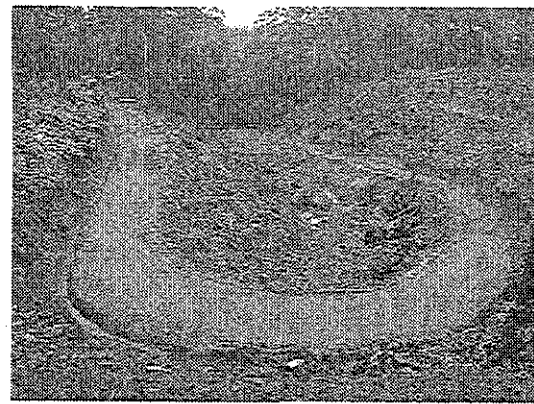
Fence (movable)

#### 4.5 Access road

The role of access road is to approach the place where the collection vehicles discharge waste, gully suck treatment facility and health care waste discharge pit. The access road shall be repaired immediately when it is damaged.



Along the landfill site



In the landfill site

#### 4.6 Discharge pit for Health care waste

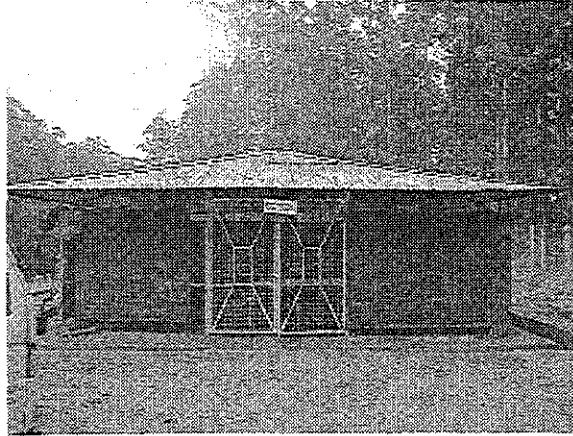
The disposal pit for healthcare waste receives the following wastes which require special care for handling.

- ✓ Syringes
- ✓ Medical tools and goods which contacted blood

The maintenance of discharge pit for health care waste is as follows,

- Surrounding storm water drainage shall be cleaned and repaired well in order to avoid storm water entering the pit.

- Receiving of body parts and infectious waste is strictly prohibited
- Bamboo Blind shall be closed continuously.
- Discharged health care waste shall be covered by lime.

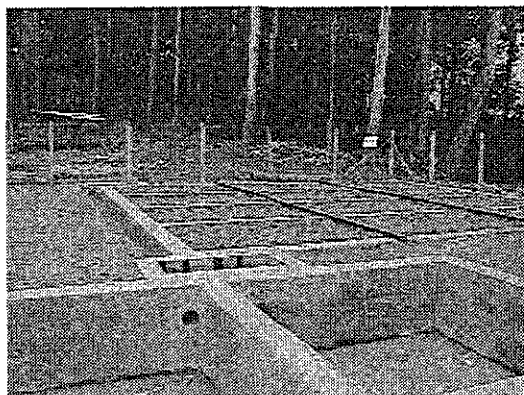


Discharge pit for health care waste

## 4.7 Gully Suck Treatment facility

The operation and maintenance of Gully suck treatment facility is as follows

- Gully suck treatment facility shall be checked every morning whether somebody or animals fell or not.
- Gully suck treatment facility shall be checked every morning whether there is leaking of leachate or not. If leaking is found, inform to Municipal engineer and CPHI immediately.
- Surrounding fence shall be maintained well in order to avoid animals or somebody falling to the leachate treatment facility.
- When the gully suck is leaking from treatment facility, it must be repaired immediately.
- The sludge at the sedimentation tanks shall be removed regularly. Removed sludge can be discharged to the landfill site.
- The soil at the pit for effluent of treated gully suck shall be removed regularly.
- The coconuts fibre shall be replaced every five years.
- Effluent of gully suck shall be divert to leachate treatment facility during dry season

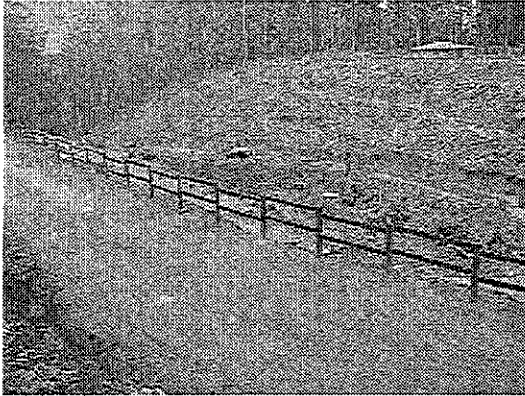


Gully suck treatment facility

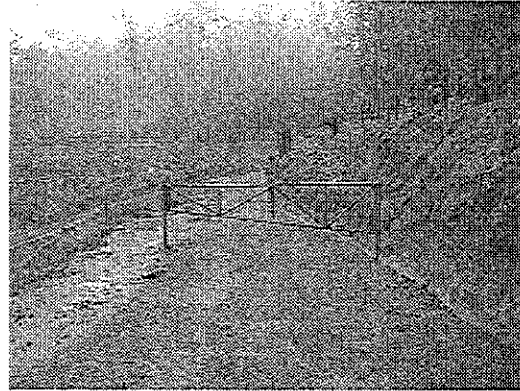
## 4.8 Gate and handrail

The purpose of gate and handrail are for security and safety.

- Gate shall be closed in the night time.
- Damaged handrail shall be repaired immediately.
- No body is allowed to sit or climb on handrail



Handrail along the access road

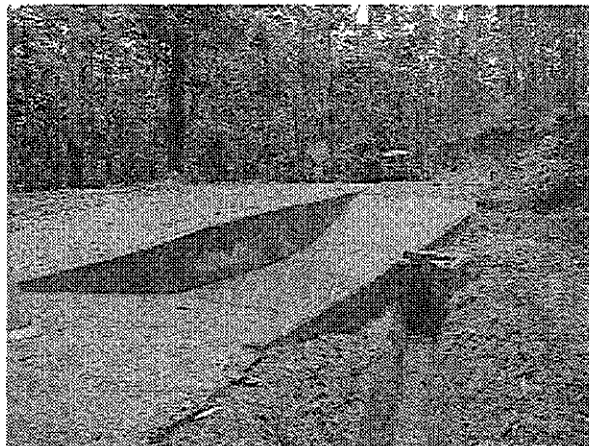


Gate

## 4.9 Wheel wash pit

The role of wheel wash pit is to prevent litter the waste or mud, attached to the collection vehicle.

- All collection vehicles shall pass the wheel wash pit.
- Soil at the wheel wash pit shall be removed regularly.
- Water shall be added at least twice a week.



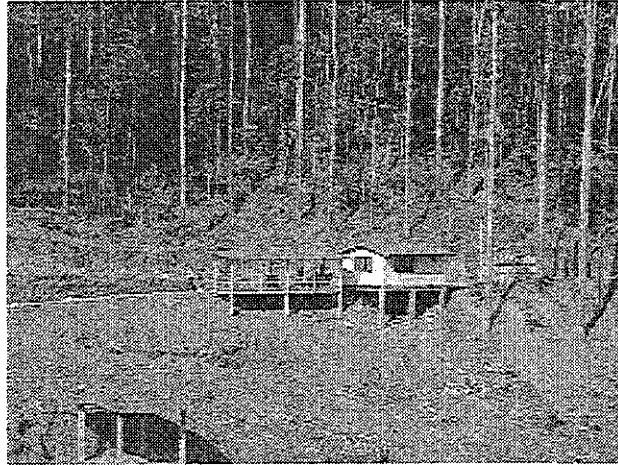
Wheel wash pit



#### **4.10 Control house, Garage for Bulldozer and Education facility**

The role of control house, garage for bulldozer and education facility is as follows.

- To keep the tools, materials, safety goods, etc at the control house.
- To secure and to protect a bulldozer at the garage.
- To teach the sanitary landfill method to visitors at the education facility



Control house, Garage for Bulldozer and education facility

#### **4.11 Monitoring well**

The under ground water sample shall be taken regularly in order to analyse the water quality in accordance with the instruction of Central Environmental Authority.



Monitoring well

## **5 Prohibited activity**

The following activities are strictly prohibited.

- To discharge waste to landfill site from the access road directly.
- To discharge gully suck to the landfill site or storm water drainage except for the gully suck treatment facility
- To discharge medical waste, which consists of Syringes, medical tools and goods which contacted blood, to the landfill site.
- To sell waste which comes from slaughter house and gully suck as fertilizer
- To sell diesel of Bulldozer
- To permit entrance of livestock or animals to the landfill site
- Burning of waste of any time
- Entrance of children to the landfill site
- To use Bulldozer for any other purpose except for landfill site operation
- To use landfill site area and facilities for any other purpose except for landfill site operation

