

Soil Management

1. Topsoil

Controls:

- Topsoil will be sourced from areas which are cleared for mining, construction and spoil dumps, conserved and used judiciously in the rehabilitation of disturbed land;
- The Contractor is required to strip topsoil together with grass from all areas where structures are located, construction related activities occur, and access roads are to be constructed. Topsoil must be stockpiled for later use;
- Topsoil stripping will be scheduled for the dry season, as far as possible;
- Topsoil is to be handled twice only – once to strip and stockpile, and secondly to replace, level shape and scarify;
- Topsoil must not be compacted in any way, nor should any object be placed or stockpiled upon it. No vehicles may be allowed access onto the stockpiles after they have been placed;
- Topsoil is to be replaced along the contour;
- Topsoil stripped from different sites must be stockpiled separately and clearly identified as such;
- Land to which topsoil has been applied will be vegetated as soon as possible after application; and
- The disposal of unused topsoil (i.e. topsoil leftover after site rehabilitation and landscaping is complete) must be undertaken in consultation with the surrounding landowners and relevant authorities.

Maintenance:

- Stored topsoil will be free of deleterious matter such as large roots, stones, refuse, stiff or heavy clay and noxious weeds which would adversely affect its suitability for planting; and
- Topsoil stockpiles are not to exceed 2 (two) meter in height. Topsoil, which is to be stockpiled for periods exceeding 28 days, must be treated with mulch, roughened and seeded with and approved grass mixture or ground cover specified by the ECO. The mulch cover must be kept free of alien vegetation/seeds.

2. Spoil Material

Controls:

- The location of spoil stockpile sites will be agreed by the ECO prior to the onset of any operations that will generate spoil materials. No spoil material will be dumped outside the defined site. The Contractor will ensure that the material does not blow or wash away. If the spoil material is in danger of being washed or blown away, the contractor will cover it with suitable material such as Hessian or plastic;
- All cut material will be tested against quality requirements for other works;
- If material meets quality requirements for other works it must be taken to the relevant area on instruction of the Project Manager;

- If material does not meet the quality requirements for other works, the material must be disposed of at a relevant waste disposal site;
- Spoil dumps will be located at least 10 (ten) meter away from natural drainage lines;
- Spoil dumps will be placed wherever practical in topographical sheltered locations to obtain maximum protection from wind exposure;
- All spoil dumps assessed as being unstable will be encircled with silt fences or drainage systems that will collect and dispose of contaminated water;
- Spoil dumps will have slopes not greater than 1:2 (vertical to horizontal). Less steep slopes will be applied in conditions where erosion risks are indicated to be high; and
- Spoil dumps will be smoothed and contoured and compacted to prevent ponding.

3. Excavation, Backfilling and Trenching

Controls:

- Excavations should not be undertaken until such time that all required materials/services etc. are available on-site, to facilitate immediate laying of such services or the construction of subsurface infrastructure;
- Any such excavations must be undertaken within the confines of an established construction site – i.e. a site that is either protected with a peripheral fence, or a site that has a regular/continual human presence. Failing this, regular daily inspections are essential. All excavations, regardless of depth, must be provided with escape ramps, suitably constructed with a stable gravel or similar material at a minimum gradient of 1:2;
- Consider using any excess rock and boulders that were excavated from the construction site for any erosion protection work which is required on site;
- Excess material as a result of excavation activities is not to be dumped along the roadsides, but must, together with construction rubble be removed once constructions are completed, and appropriately disposed of.
- Suitable excavated material is to be stockpiled next to the excavations for use as backfill and all unsuitable or excess material must be loaded onto trucks and hauled to designated spoil areas;
- Backfill material must be from excavated material or imported from a suitable source if the excavated material does not conform to the required specifications; and
- Areas to be backfilled must be cleared of all unsuitable material and debris

4. Erosion Control

Controls:

- Areas susceptible to erosion must be protected by installing the necessary temporary and/or permanent drainage works as soon as possible and by taking other measures necessary to prevent surface water from being concentrated in streams and from scouring slopes, banks or other areas;
- Any tunnels or erosion channels developed during the construction period or during the vegetation establishment period shall be backfilled and compacted, and the areas restored to a proper condition;

- Anti-erosion compounds shall consist of an organic or inorganic material to bind soil particles together and shall be a proven product able to suppress dust and erosion. The application rate shall conform to the manufacturer's recommendations. The material used shall be of such quality that grass seeds may germinate and not prohibit growth;
 - The following erosion control methods can be considered where required:
 - Brushcut packing;
 - Mulch or chip cover;
 - Straw Stabilisation;
 - Watering;
 - Planting/sodding;
 - Hand seeding/sowing;
 - Hydro seeding;
 - Retaining walls;
 - Soil binders and anti-erosion compounds; or
 - Log/pole fencing.
 - These erosion control measures, including storm water drainage systems, will be installed before mining and construction commences;
 - Installed erosion control measures will be appropriate to site conditions to handle a one-in-two-year storm event for temporary structures, and a one-in-fifty year storm event for permanent structures which provide ongoing sediment control after a site has been rehabilitated;
 - Contingency plans will be in place for extreme storm events;
 - Blocking of storm water drainage systems must be prevented and storm water must be managed to prevent soil erosion;
 - Natural storm water run-off, which is not polluted by the site operations, must be diverted around spoil dumps and soil stockpiles
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- Where storm water has accumulated in the working area and needs to be pumped out, it must be disposed of into the nearest stream or river in such a way that erosion does not occur along the course of its passage;
 - Maintain soil erosion structures such as stone pitching, gabions, etc to enable effectiveness;
 - Site activities will take overall recognition of the importance of measures to avoid and reduce erosion by phasing the work programme to minimise land disturbance in the planning and design stage, by keeping the areas of land cleared to a minimum, and by ensuring that the period of time for which areas remain cleared are kept to a minimum;
 - All cleared areas will be proactively rehabilitated and in accordance with specific instructions from the Project Manager;
 - Soil must be exposed for the minimum time possible once cleared of invasive vegetation. The timing of clearing and grubbing must be co-ordinated as much as possible to avoid prolonged exposure of soils to wind and water erosion;
 - Stockpiled topsoil must be either vegetated with indigenous grasses or covered with a suitable fabric to prevent erosion and invasion by weeds; and
 - Only light equipment may be used for transport and delivery of construction material in areas of unstable soils. (Martin, 2007)