



THE WORLD BANK

GUIDANCE NOTE ON REHABILITATION OF SMALL SCALE BORROW PITS



RISKS OF ABANDONING BORROW PITS

Small scale rural development projects such as rural road rehabilitation, small tank cascade restoration etc require significant quantities of earth and gravel. Often, this material is borrowed from the local environment with or without a valid clearance from the necessary authorities. Once the project is completed, these borrow pits are usually abandoned without proper closure, leaving open, water-filled, unattended pits that are associated with many risks.

Notable risk factors associated with abandoned borrow pits include: (i) frequent sliding (especially in hilly areas), (ii) loss of life and ecosystem services, (iii) groundwater contamination, (iv) increase in vector populations and associated illnesses and (v) loss of arable land and flora and fauna.



Figure 1. Risk factors associated with abandoned borrow pits

It is, therefore, very important to identify potential environmental risk factors posed by abandoned borrow pits to the local environment and people from project activities. As soon as sites for borrowing are identified, the most suitable form of site restoration need to be planned on order to close the pit/s properly.

OPTIONS AND RECOMMENDATIONS FOR REHABILITATION

Many options have been identified for the rehabilitation of borrow pits around the world ranging from water retention ponds/lakes, borrow pit meadows, marshes to recreational areas. However, these require a more in-depth planning and designing of the borrow pits as well as technical interventions and after care and maintenance resulting in relatively high rehabilitation costs. These interventions are more likely in large scale development projects.



Figure 2. Images for large borrow pits that have been converted to meadows, lakes, fish ponds and ponds.

Therefore, for relatively small-scale development projects it is recommended to rehabilitate the borrow area to resemble its original state to the extent possible. Where possible, options provided above can be incorporated.

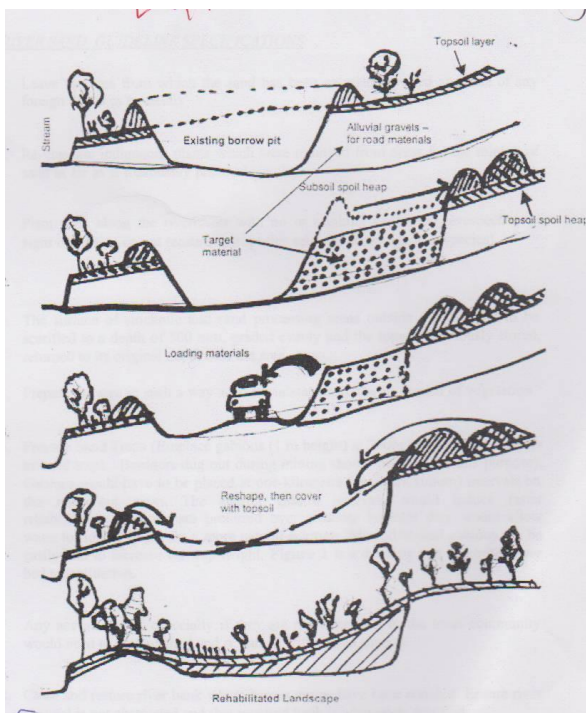


Figure 3. Illustration on burrow of rehabilitation. Sourced from EAMF, Ministry of Finance, GOSL, 2018.

Main steps to follow

1. Identify the borrow site/s for gravel and earth and obtain clearance from site engineer
2. At the start of borrowing, topsoil should be carefully removed and stored on the edges of the borrow area.
3. On completion of borrowing, the pit should be filled with spoil/soil/dredged matter followed by the reinstatement of the top soil that has been stored.
4. Filling of the pit should either achieve (a) original ground level or (b) new level as depicted in the diagram, agreed with the site engineer
5. This will be followed by compaction and in-situ and laboratory testing to achieve the original geotechnical ground condition.

Figure 3 provides a simple diagrammatic description of the steps to be followed in rehabilitating a borrow pit after use.

In addition to the topsoil that was removed from the pit surface, dredge material and other topsoil that is removed from the project site (close by) can also be used to fill the borrow pit.

Figure 5 provides a best practice diagram for progressive rehabilitation of a shallow borrow pit, that is done while the borrowing is ongoing. Once borrow material removal is completed from one area, the topsoil and any other fill material is reintroduced so that vegetation can start recolonizing. This will also reduce erosion issues and stabilizing pit embankment. If this method is adopted, it will also reduce the rehabilitation effort required at the end. Figure 4 shows rehabilitated borrow pits – some into recreational gardens and others into gently undulating landscapes.



Figure 4. Borrow pits filled and rehabilitated

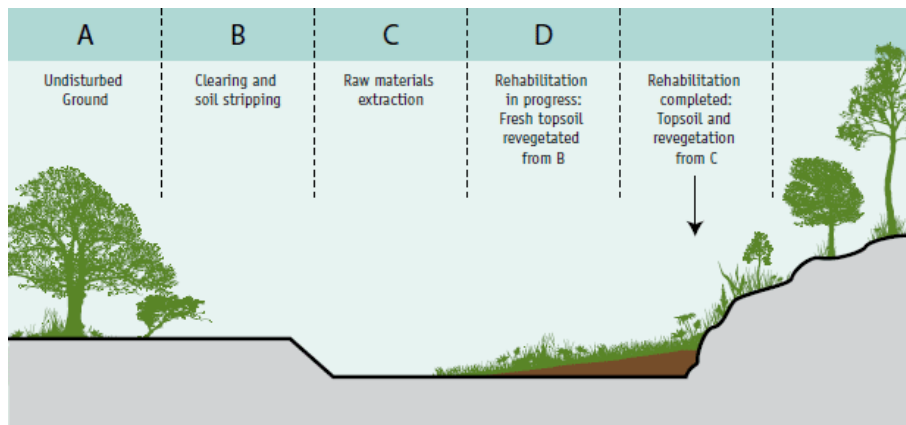


Figure 5. Progressive rehabilitation to maximize visual amenity. Sourced from Code of Practice for Small Quarries, Department of Primary Industries, Australia 2010

Attention should also be directed to the area surrounding the pit including the access paths of the machinery as the vegetation in these areas will also be disturbed. These areas should also be properly rehabilitated (by levelling and revegetating) so that it does not give rise to erosion issues and water stagnation.

IMPORTANT POINTS

- Borrow pits should be properly sited, planned and designed by professionals, with provision of appropriate safety measures. The location of the borrow pit has to be planned in consultation with the local authorities and the community.
- Operators, host community and the government agency must agree and enforce reclamation of borrow pits soon after use. Reclaiming a borrow pit should be as important as opening a borrow pit, towards sustainable engineering and environment.
- If new ponding/wetland area is created as a result of rehabilitation of the borrow site, this should be done in with technical advice from an engineering and environmental expert to ensure that this water body is in line with existing natural environment and does not lead to drainage issues, steep slopes leading to potential accidents, vector breeding sites and garbage dumping sites.