THE ISSUE OF BORROW PITS BEING USED IN THE AGGREGATE AND SAND INDUSTRY

INTRODUCTION

Established Quarries in South Africa have over the last years had to compete with borrow pits and crushing operations which have not always been seen in the same light as an established quarry.

Some misconceptions have been bandied around that when a mobile crusher is used then it is not mining and the legislation does not apply.

The issue of borrow pits has been a sore point n the eyes of established operations as the rules have differed substantially.

The borrow pit industry has grown in SA and operators have slowly starting gaining experience in this field and therefore the rules have been followed by those responsible operators.

THE PAST

Historically, rehabilitation was typically limited to the removal of equipment following the cessation of activities. This practice was not only lax, but was unacceptable from a community safety and environmental sustainability perspective. In terms of the Mineral and Petroleum Resources Development Act, **the holder of mining right/permit remains liable for any pollution or ecological degradation, and the management thereof, until a closure certificate has been issued for the subject site**.

Closure should ensure that:

- Operations are ended efficiently and cost effectively;
- The site is rehabilitated and returned to a safe and stable state;
- The final land use conforms with the concept of sustainable development; and

THE IMPACTS OF THE ENVIRONMENT

Mining is an inherently destructive process, and there are a number of **environmental impacts that remain after a site has been mined,** e.g. erosion, siltation or watercourses/water bodies and permanent visual/aesthetic intrusion (otherwise known as "scarring"). Although land can rarely be returned to its former capacity/state, every effort should be made address potential residual impacts during the closure process, and where possible **ensure that these are eliminated or at least curtailed.**

ONCE BORROW PIT IS CLOSED

During the course of borrow pit excavations, operations should be planned in such a way that the amount of work that will be necessary for the finishing off of the borrow pit is reduced as far as possible. Indiscriminate excavation without due regard for the desired final shape of the borrow pit should not be permitted and should be rectified immediately.

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PLANNING FOR THE BORROW PIT

Ideally **Closure Objectives should have been set as part of the Mining Plan**. These objectives would guide environmental management during the cessation of mining operations and subsequent closure and determine the "*legacy of what gets left behind"* pursuant to the abandonment of the site.

At the point where closure is eminent, the **Closure Objective should be revisited and reviewed, and the measures that need to be implemented to achieve these objectives should be confirmed as part of a closure/rehabilitation process.** It may be appropriate at this stage to revisit any potential residual impacts and ensure that the identified measures are adequate to address these.

WHAT ABOUT NO MINING PLANS?

Yes, there are often circumstances were a Mining Plan may not have been developed for a particular borrow pit, e.g. where the pit is a historic site, which has been abandoned, or where the development and operation of the pit preceded the legal and good practice requirements were not followed. In these circumstances, a Closure Plan would need to be developed to identify the key Closure Objectives and highlight the remedial/rehabilitation measures required to achieve these.

The first step in formulating a Closure Plan would be to undertake a risk assessment. During the development of this Closure Plan **the key questions are "*What mitigation measures are required to leave the borrow pit in an acceptable state?*** And ***"What are the potential residual risks and how should these be mitigated".***

WHEN IS REHABILITATION NECESSARY?

The timing of rehabilitation is important, and rehabilitation of disturbed areas should ideally be programmed to occur as soon as practically possible following the cessation of the work in a specific area. The period between cessation of activities associated the mining of materials and the onset of rehabilitation for that area should ideally not exceed 1 month.

Rehabilitation operations should ideally be conducted in parallel with extraction. Accordingly, progressive rehabilitation, in which depleted sections of a borrow pit are reclaimed while extraction is ongoing in other sections of the same pit is encouraged. This approach is particularly well suited to large borrow pits and to long-term operations, and is especially effective when the intended end-use is "nature area", as it enhances the establishment of plant communities. In addition to this approach:

- **Reduces the visual impact** of the borrow pit or quarry;
- Facilitates adequate conservation and utilisation of topsoil;
- Simplifies the **management of runoff** and attendant erosion;
- Reduces health and safety risks; and
- Minimises the effect of operations on nearby **communities and plant/animal populations.**

LEFT OPEN BORROW PITS

In SA there are many borrow pits that have been left with no rehabilitation on measures taken to secure the areas. The public safety has not been seen as an important issue in the past and many animals and children have drowned in abandoned borrow pits.

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OPERATORS SHOULD TAKE CERTAIN MEASURES TO ENSURE THAT THESE AREAS ARE SECURED: Some Ideas:

- Where the borrow pit is likely to pose a significant risk after rehabilitation, e.g. dangerous slopes (steeper than 1:2 or unstable), not free draining, developed as a farm dam, not visible etc., then the perimeter of the borrow pit, as defined by the expropriation or landowner agreement, should be secured with permanent fencing prior.
- Stock-proof fencing, in concert with appropriate signage, should be utilised as a minimum and should be maintained in a satisfactory condition.
- A gate should be provided to permit access to the site for the ongoing monitoring and management of the site rehabilitation.
- Care should be taken not to damage existing fences and gates.

WHAT HAPPENS AFTER THE CONTRACTOR OPERATOR LEAVES THE AREA?

It is essential that sites are cleaned up and returned to an acceptable state when an operation is closed down.

Some measures to assist with this are:

- Infrastructure that has been erected at the site should be demolished and removed.
- All equipment, plant, concrete footings, fencing, etc. Should be removed from site;
- All services should be dismantled and removed from site.
- All foreign materials should be removed from site.
- Domestic or other waste should not be disposed of in the borrow pit, but should be removed from site and disposed off at an approved landfill and
- Soil contaminated with oil, grease, fuel or other hydrocarbon should not be disposed of in the excavation.

WHAT ABOUT THE ROADS AND VEGETATION ON THE SITE?

Access roads should be:

- Made specifically for the mining activities, and which are not required by the landowner, should be rehabilitated.
- Be rehabilitated by ripping the surface crust to ensure the regrowth of vegetation. In some cases it may be necessary to plough the area and revegetation to ensure that a sustainable and desirable land use is achieved.
- The requisite permanent drainage works and erosion protection measures should be set in place.

TOPSOILING REQUIREMENTS

- Approximately 50 to 100mm of previously stripped and stockpiled overburden material should be applied to the newly shaped and scarified/ripped borrow pit.
- Before placing topsoil, all visible weeds should be removed from the placement area and from the topsoil. The previously stripped and stockpiled topsoil should generally be spread evenly over the prepared surface to a depth of 75 to 150mm on slopes of 1:3 or steeper.
- Toipsoil placement shall occur in a phased manner, concurrent with the phased operation of the borrow pit. Topsoil should be placed in the same area from which it was stripped.
- Where amounts are inadequate to cover the entire area, slopes should receive priority treatment.

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WHAT ABOUT THE LOOKS OF THE AREA?

Areas not properly rehabilitated are a sore eye and therefore screening is necessary to ensure acceptable and sustainable environmental areas are left behind.

Some requirements:

- The most effective way to mitigate the visual impacts associated with a borrow pit is via the effective implementation of the rehabilitation process, and the attainment of stable slopes and acceptable revegetation.
- For some sights rehabilitation may not be adequate to address the impacts on the visual aesthetics. Hence, consideration should be given to the visual screening of sites that are unsightly, are highly visible or are located in visually sensitive areas.

Visual screening could include:

- Erecting earth bunds of at least 1 m high on the boundary/periphery of the borrow pit; or
- Planting vegetation, viz trees, shrubs or tall grasses. In some areas it may be appropriate to use alien plant species, such as pines, to facilitate visual screening e.g. within or adjacent to forestry plantations.

WHAT HAPPENS TO THE LAND ONCE THE CONTRACTORS HAVE LEFT AND THE AREA HAS BEEN REHABILITATED?

It is often found that other operators or opportunists visit areas that have been mined to continue with the removal of material. These situations are often then not controlled or regulated and deteriorate into gaping holes.

- Revegetation should not occur in any areas until all operations within those areas has been completed.
- Once revegetated, areas should be protected to prevent trampling and erosion.
- No construction equipment, vehicles or unauthorised personnel should be allowed onto areas that have been vegetated.
- Only persons or equipment required for the preparation of areas, application of fertiliser and spreading of topsoil should be allowed to operate on these areas.
- Where rehabilitation sites are located within actively grazed areas, they should be fenced.
- Fencing should be removed once a sound vegetative cover has been achieved.
- Any runnels, erosion channels or wash aways developing after revegetation should be backfilled and consolidated and the areas restored to a proper stable condition. The erosion should not be allowed to develop on a large scale before effecting repairs and all erosion damage should be repaired as soon as possible.

WHO IS REPONSIBLE FOR THE AREA ONCE OPERATIONS HAVE BEEN COMPLETED?

The licence/permit holder stay liable until a Closure Certificate has been issued for the site by the DMR.

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WHAT ARE THE FINANCIAL IMPLICATIONS?

In terms of the requirements of the Mineral and Petroleum Resources Development Act, financial provision must be made for the closure or sudden cessation of work and for any rehabilitation/revegetation work.

The issue of financial provisions and applicability to road maintenance activities being undertaken by Provinces has specifically been raised with DMR and the following has been agreed:

- Where the road maintenance is undertaken by an independent Contractor, since the Contractor will sign a formal Contract with Province, financial provision for closure or sudden cessation of work be provided for via the Contract Agreement. The financial guarantees provided by the Contractor would also be available for any remedial work. Given the scale of the mining activities associated with borrow pits, it is anticipated that this would be more than adequate to meet the remedial requirements.

IN CONCLUSION

Legislation affecting the environment has developed to such an extent that more than one Regulating Department can interfere in operations.

www.aspasa.co.za
P O Box 61809
Marshalltown
2107

email: npienaar@bullion.org.za
Tel: 011 498 6275
Fax: 011 498 7269

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