Vegetation Management

GENERAL CONSTRUCTION PRACTICE

Best practice vegetation management involves giving appropriate consideration to the following issues. Not all the issues will be relevant on every site.

Land clearing

Vegetation clearing must to be conducted in a manner that minimises damage to any retained vegetation including protected trees, buffer zones and native vegetation corridors. Best practice site management includes appropriate consideration of the following points.

- Ensure all local and State Government approvals are obtained before any disturbance occurs to vegetation, and then disturb only the minimum necessary.
- Clearly identify any vegetation protected by legislation or Planning Schemes.

Photo 1 – Site exclusion zone clearly identified

Photo 2 – Non-disturbance areas identified during land clearing

- Land clearing should not occur unless preceded by the installation of all necessary drainage and sediment control measures. The exception being any land clearing necessary to allow installation of these control measures.
- Land clearing should be staged to minimise the extent and duration of soil exposure. Sequential clearing provides many advantages for erosion and sediment control, and can also improve the natural relocation of local wildlife. It should be noted that partially hollow trees (dead or living) often need to be saved for the habitat value these trees provide to local wildlife (Photo 3).

Photo 3 – Tree hollows can provide essential habitat

Photo 4 – Land clearing without root grubbing

- Selective clearing should aim to retain a variety of species and plants of varying ages, with an emphasis on healthy plants, plants with habitat value, and groups of trees.
- If vegetation clearing must be carried out well in advance of earthworks, then this clearing should be limited to the removal of woody vegetation only (Photo 4). Wherever reasonable and practicable, the grubbing and the removal of any ground cover (mulch or vegetation) should not occur until immediately prior to earthworks occurring within that stage of works.
  - The exception to this rule being when construction works are carried out during an extended dry period when erosive rainfall and/or winds are unlikely to occur. In any case, the **intent** should be to minimise the duration that soils are exposed to the erosive effects of wind, rain or flowing water, without causing an unnecessary financial burden to the project.
- Land clearing should not extend beyond that necessary to provide up to eight (8) weeks of site activity during those months when the expected rainfall erosivity is less than 100, six (6) if between 100 and 285, four (4) weeks if between 285 and 1500, and two (2) weeks if greater than 1500.
  - Alternatively, land clearing should not extend beyond that necessary to provide up to eight (8) weeks of site activity during those months when the actual or average rainfall is less than 45mm, six (6) if between 45 and 100mm, four (4) weeks if between 100 and 225mm, and two (2) weeks if greater than 225mm.
- Wherever reasonable and practicable, land clearing should be limited to 5m from the edge of proposed constructed works, 2m of essential construction traffic routes, and a total of 10m width for construction access. Protected vegetation must remain protected irrespective of the above recommendations.
- Disturbance to natural watercourses (including bed and banks) and their associated riparian zones must be limited to the minimum necessary to complete the approved works.
- Land clearing should ideally occur while the soil has a light moisture condition. If the soil is too dry, heavy machinery can pulverise the soil, if too wet and it may lead to clodding or hardsetting, particularly if the soil has a high silt or clay content.
- Wherever reasonable and practicable, cleared vegetation should be mulched (e.g. via tub grinding) for use on the site as an erosion control aid and to satisfy landscaping requirements. Mulch produced by tub grinding is generally more hydraulically stable than mulch produced chipping, thus allowing its use in the formation of mulch berms (Photo 5).
- The practice of selling/disposing of potential mulch early in the construction program, only to import mulch at a later date, must be avoided unless justified by sound landscaping practice.
- Avoid trunk damage—it can result in long-term vegetation problems (Photo 6).

Photo 5 – Mulch berm produced by tub-grinding cleared vegetation

Photo 6 – Undesirable tree trunk damage

Soil preparation and management

Successful site revegetation starts with appropriate soil management, including the rehabilitation of soils compacted by construction activities.

It is important to remember that topsoil contains living matter and has biological, physical and chemical properties that can be damaged if inappropriately managed. Damage to the soil's biological and chemical properties will most likely occur through inappropriate stockpiling. The soil's physical properties can be damaged through excessive compaction, over-working the soil, or working the soil at the wrong moisture content.

Best practice soil management in association with site revegetation includes following:

- Topsoil should be preserved for reuse on the site wherever possible.
- Topsoil should be stripped only while in a light moisture condition. If the soil is too dry, stripping it will pulverise the soil, if too wet and it may lead to clodding or hardsetting, particularly if the soil has a high silt or clay content.
- Ideally the top 50mm of soil should be stockpiled separately and respread as the top layer. However, if the soil contains excessive weed seed, then this top 50mm layer may need to be buried, or otherwise treated to prevent the spread of weeds.
- If it is desirable to retain the seed content of the soil, then the stockpiling should consist of long low mounds no greater than 1 to 1.5m in height, otherwise, topsoil stockpiles should not exceed 3m in height. Long-term stockpiles may need to be mulched or temporarily vegetated to prevent weed infestation.
- Stripped topsoil should be not be stockpiled for more than 12 months. Long-term stockpiling can degrade its biological and chemical qualities.
- Maintain all stockpiles in a free draining condition to avoid long-term soil saturation.
- All topsoil should be tested for fertility and adjusted (where necessary), even if the soil originated from the site.
- Before respreading the topsoil, scarify the subsoil to break up any compacted or surface sealing and to enable keying of the two soils.
- When it is desirable to re-establish the entrapped seed content of the soil, the topsoil should be re-spread in the reverse sequence to its removal so that the original upper 50mm soil layer is returned to the surface.
- Spread topsoil to a lightly compacted (i.e. firm) depth of about 40 to 60mm on lands where the slope exceeds 4:1(H:V) and 75 to 100mm on lesser slopes. Special techniques, including stair-stepping of subsoil surfaces, will be required when spreading topsoil on slopes steeper than 2:1 (Photo 7).
- After spreading topsoil, ensure the surface is left in a scarified (roughened) condition to assist moisture infiltration and inhibit soil erosion.
- Prior to planting, cultivate any compacted or crusted topsoil surfaces to a depth of 100mm, but not greater than the depth of topsoil (Photo 8).

Photo 7 – Stair stepping steep batters

Photo 8 – Scarifying the soil surface

Vegetation management

Appropriate management of site vegetation is a critical aspect of minimising the extent and duration of soil disturbance, and ensuring successful long-term site rehabilitation.

When earthworks are carried out adjacent to existing vegetation there is the potential to cause long-term damage to the vegetation even though the works may not appear to have touched the plants or caused any short-term damage. Potential long-term problems may result from:

- exposure of, or damage to, the roots;
- partial burial of the trunk causing collar rot;
- earth fill placed around established trees increasing the burial of the surface root system resulting in reduce oxygen supply to the plant;
- alterations to the sub-surface flow of water passing by the root system.

Best practice vegetation management requires giving appropriate consideration to the following:

- Ensure site revegetation is carried out by qualified contractors.
- Seek expert advice on the most appropriate means of protecting retained vegetation.
- Preparation of a *Vegetation Management Plan* (VMP) prior to commencement of works. Such a plan should clarify how all retained vegetation will be protected during the construction phase, including the identification of required *Tree Protection Zones*.
- Establish and maintain Tree Protection Zones around retained vegetation. Such zones are usually measured as a minimum of 10 times the trunk diameter of the tree measured at an elevation of 1m from the ground, or the width of the tree canopy at its widest point, whichever is the greater.
- Ensure that there is no encroachment of construction/building works within identified Tree Protection Zones unless via *trenchless digging* or *directional boring* for the installation of services. No root in excess of 25mm diameter should be disturbed within protected zones.
- Minimise changes in ground elevation adjacent to retained vegetation (Photos 9 & 10). If land reshaping must occur adjacent to retained vegetation, then it must be performed in a manner that will not cut these plants off from essential soil moisture.

Photo 9 – Recent earthworks have left this protected tree elevated well above the surrounding ground level

Photo 10 – Road works have left these native trees partially buried

- Ensure prompt implementation of the site's revegetation program.
- Utilise root barriers to allow the coexistence of trees and adjacent engineering structures.
- Ensure that where it is essential to cut the roots of protected/retained trees, that the roots are cut with a water lance, or cut while they are underwater to minimise air intrusion into the roots; and/or cut in stages over a period of days to allow tree roots time to repair and adapt.
- Ensure that planting equipment does not excessively pulverise or compact the soil.

- Ensure plants are delivered to the site in covered vehicles or sheeted trucks.
- Ensure plants are inspected upon delivery. Plants that are unhealthy, damaged, or have out-grown their pot should be rejected.
- Ensure plants are stored in appropriate conditions prior to planting.

Maintenance of revegetated areas

Revegetated areas should be maintained until the plants are self-sustaining. Best practice maintenance of site revegetation includes the following:

- Monitoring, particularly after rainfall events, and maintenance to ensure that the revegetation is controlling erosion and stabilising soil slopes as required.
- Where practicable, fill in, or level out, any rill erosion that occurs between plants. If excessive erosion occurs, then consider increasing the planting density, applying appropriate erosion control measures, or introducing alternative, non-clumping plant species.
- Periodic application of water is essential, especially in the first 7 days after establishment. Only low-pressure sprays should be used because high-pressure jets can wash away the seed and mulch cover.
- Apply additional seed and/or soil conditioning as required.
- Control excessive vegetation through mowing, slashing, or the controlled use of biodegradable herbicides—special care and advice must be taken around waterways. Grass height should be maintained at a minimum 50mm strand length within high velocity drainage reserves, or 25 to 50mm within overland flow paths.
- Control weeds—especially within a 1m radius of immature trees—for 6 to 12 months for fast growing species, and 18 to 24 months for slower growing species. Pre-emergent herbicides should be considered where high weed seed germination is expected.
- Maintain or renew (as necessary) mulches two to three times a year.
- Check and maintain protective fencing.
- Re-firm plants loosened by wind-rock, livestock or wildlife.
- Replace dead or severely retarded plants.
- Prune any plants with dead or diseased parts.
- Dispose of cleared vegetation through chipping or mulching for future revegetation works, by on-site burial, or suitable off-site disposal; cleared vegetation should not be burnt on the site or dumped near a watercourse.

Photo 11 – Root damage to car park pavement

Photo 12 – Plant watering