# Home site erosion management

**Experiences in the Lockyer Valley and surrounds**

## Erosion from driveways and house sites

Driveways and house sites can be a significant source of sediment deposited in waterways, particularly in the construction phase of a residence and to a lesser extent after this period.

Erosion from house sites and access roads is due to the exposure of bare soil and from the increased and concentrated runoff from hard surfaces like roofs and driveways. Large areas of very low mown grass can also increase runoff rates.

It is predicted that the Lockyer Valley area will continue to be one of the major growth areas of south-east Queensland, with a 33% increase in population expected over the coming twenty years. To meet the needs of this population growth many new dwellings will be constructed.

Clogging it up: sediment deposit from new residential subdivision.

### General principles: for reducing erosion on construction sites

The objectives of sediment control on construction sites should be:

- **To divert** uncontaminated water away from the site.
- **To minimise** erosion by minimising site disturbance, promptly stabilising disturbed areas and securing material stockpiles.
- **To prevent** sediment contaminated water leaving the site.

1. **Design** to avoid excessive cut and fill, unnecessary clearing of vegetation and to preserve existing site drainage patterns.
2. **Preserve** grassed areas and vegetation where possible. This helps filter sediment from stormwater run off.
3. **Delay** removing vegetation or commencing earthworks until just before building activities start. Avoid building activities that involve soil disturbance during periods of expected heavy or lengthy rainfall.
4. **Install** sediment control measures before commencing any excavation or earth moving. Regularly maintain them until construction is complete and the site is stabilised.
5. **Protect** subsoils and topsoils. Topsoil should be stored on site for later use during site rehabilitation and revegetation.
6. **Stabilise** the site as soon as possible after construction. Turf lawns are commonly used to stabilise soil but rely heavily on water. An alternative is to use native ground cover plants with lower water requirements.
7. **Mulch** (straw or other material) can be used on open garden beds to protect soil and support plant growth. (effective for minimizing soil moisture loss and weed control when spread to a depth of 75-100mm). Mulch may be less suitable on steep sites and in high wind areas.
8. **Temporary, quick germinating grasses** such as rye and oats can be used to stabilise soil until slower growing plants can be established. This method is only effective once the grass seeds have germinated and established a root structure.
9. **Semi permeable paving** can be used to stabilise areas. Avoid excessive use of hard surfaces which prevent the infiltration of stormwater.
10. **Biodegradable erosion control mats** are useful when revegetating steep slopes.
11. **Integrate landscaping strategy** in conjunction with sediment control. For example, diversion channels and trenches that filter sediment can be used with rubble in the base to create a deep root planting opportunity.

Source: www.greenhouse.gov.au/yourhome/technical/fs52.htm

Australian Government
Department of the Environment, Water, Heritage and the Arts

HEALTHY WATERWAYS
Because we're all in the same boat

Case study

# Go with the flow

| Property Owner: | Location: | Property Size: | Landuse: |
|---|---|---|---|
| Dave and Pam Grubb | Laidley | 0.8ha | Residential |

Dam good idea: At the bottom of the Grubb property water is collected in a small dam which provides an excellent habitat for plants and animals.

Laidley residents Dave and Pam Grubb own a small 0.8 hectare property. A management feature of this sloping site is how they have controlled and even harvested stormwater run off which traverses the block. This runoff has the potential to cause extensive erosion but, through effective management and planning, the Grubbs have been able to turn this flow into an asset.

The property is located on the north facing slope of a spur that extends westwards from the Little Liverpool Range. The soils in this area are derived from sandstone sediments that are highly erodible, particularly the sodic subsoil. The main vegetation community is spotted gum (Corymbia citriodora) and ironbarks, which are indicative of soils with low fertility and low moisture holding capacity.

The area is typical of many of the residential and rural residential development sites in the Lockyer catchment. The Grubbs have employed the guiding principles outlined on the previous page to construct their home and manage their block in an environmentally responsible manner. Some of the key points from their experiences include:

## 1. Fit the house to the landscape

House construction and the installation of services have the potential to impact negatively on the surrounding environment. The location and design of the Grubbs' house focuses on reducing many of these impacts.

The block has a steep upper slope of approximately 8% and the pole-frame house was designed to work with the contours minimising site disturbance. The house was constructed to fit the existing landscape and to minimise earthworks. By assessing the contours and using retaining walls the depth of cut was minimised.

The disturbed topsoil was retained on site and reused during stabilisation and revegetation of the site. Topsoil contains many microorganisms which are essential for successful plant growth.

The design of the house attempted to:

- minimise the footprint of the house block,
- conserve existing vegetation (the owners negotiated with the builders regarding site access points and material storage areas),
- coordinate the location of water and electrical services to maximise potential future requirements,
- take into account stormwater drainage implications of the site.

Spoon drain: A well grassed spoon drain on the Laidley property of Pam and Dave Grubb safely transfers water across the property.

## 2. Design for storm water run-off

A steep increase in residential development over the last fifteen years has contributed to reduced natural water infiltration and increased stormwater runoff due to the increase in impermeable surfaces. Additionally, roadside table-drains tend to concentrate and speed up water flows creating high energy water movement.

This sloping block has presented many challenges for managing stormwater flows on the property. These have been overcome by working with the natural contours of the block in order to slow down the flow of the water, minimise erosion and increase infiltration rates.

High energy water flows concentrated through culverts.

The stormwater culverts uphill from the Grubbs' property had the potential to be damaging by concentrating the flow and increasing the energy of the water. However, this potentially damaging stormwater has become a resource for the block, being guided and harvested using a system of grassed, contoured spoon drains, storm-water detention basins, small dams and ponds and rock-lined flowlines.

On steep slopes dry stone retaining walls were installed to reduce any accumulated soil/water pressure.

The flow of storm water from culverts across the block is now directed down a protected flowline of basalt rocks on a blanket cover of geo-fabric to reduce the chance of erosion and the creation of a new gully. No concrete has been used on the property for storm-water management as the soil will often scour out adjacent to such concrete and cause more problems than if there were no concrete at all.

Use of hay bales and rocks makes a sediment trap for runoff from a spotted gum ridge.

A series of detention ponds has been used to hold storm water, allowing any particles to settle out of the water.

## 3. Optimise ground cover and vegetation type

Even with the ability to water harvest, the garden plantings have been tested by the current drought. Many of the locally occurring dry rainforest species such as local acacias, wilga (*Geijera parviflora*), and orangebark (*Maytenus spp.*) are thriving in these testing times.

The best approach in choosing plant species is to apply the principle of environmental preference planting i.e. putting the right plant in the right place. Hence locally native species (endemic) are preferred en masse as a key element of the planting scheme. Herbaceous understorey plants have been used extensively which provide habitats for the many butterfly species found on the property.

As a planting policy the Grubbs apply three basic rules:

1. Plant only what you can maintain in a season,
2. Plant in dense groups of similar species, and
3. Blanket mulch, and hand water only until the plants are established.

Soil Protected: Mulch created in situ protects the soil on this residential development block. The mulch is retained whilst awaiting house construction to commence.

## 4. Maintaining or increasing biodiversity and wildlife habitats

Over the twelve years since the Grubbs first started designing the garden they have become acutely aware of the problems facing the local native wildlife as a result of habitat loss. Some of the strategies used to combat this habitat loss are:

- integrating water harvesting and plantings to improve the habitat values
- working with neighbours to extend the plantings beyond the property border
- avoiding the physical obstructions of fences to facilitate the development of a vegetation corridor

## 5. Managing road verges and hard surfaces

Unconsolidated road verges and driveways are a major source of sediment and runoff. On a 100 metre long by 5 metre wide road, every millimetre of soil lost represents half a tonne of soil removed.

The Grubbs' were conscious of the need to minimise surface runoff, so they opted for Besser "Grass Grid" set on gravel with gravel infill. The result is that runoff during storm events is limited and the subsurface drainage is unchanged. Grass grid has also been used for the steeper path sections.

Storm water run-off from the road has been directed to ephemeral ponds on the property, which provide water to the plantings downslope. All hard surfaces have been constructed to direct rainfall to where it can best be used. Careful engineering of the edge of roads and tracks is also important in order to prevent edges from collapsing or erosion occurring.

No erosion: The western drain on Dave and Pam Grubb's Laidley property during heavy rains in February 2001.

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