Guidelines for Erosion & Sediment Control on Building Sites

Bricks & Water

Keep the Soil on the Site

MANLY ENVIRONMENT CENTRE

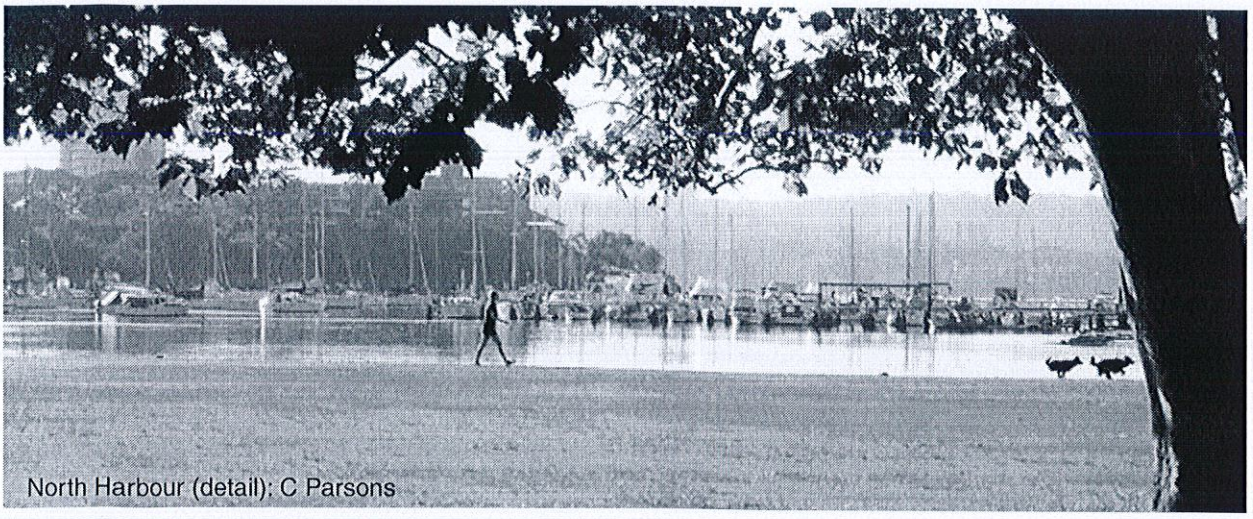
MANLY COUNCIL

WARNING!

$1500 on-the-spot fine

It is illegal to allow anything other than water (soil, cement slurry or other building materials) to enter the stormwater system.

Protect Our Waterways



North Harbour (detail): C Parsons

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This publication has been developed for Bricks & Water by Manly Council and the Manly Environment Centre.

All material is based on 'Managing Urban Stormwater - Soil and Construction' (3rd Edition 1998) also known as the 'Blue Book'.

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This booklet has been prepared to provide information relevant at the time of publishing. It is not a regulatory document. If you need more information regarding legal obligations consult a lawyer, the legislation, the Department of Environment & Conservation (formerly the Environment Protection Authority) or your local Council.

Introduction

This handbook provides a practical guide to best practice to reduce stormwater pollution from building sites. These guidelines will help you to comply with your statutory environmental obligations. This document does not override advice issued to you by council.

Construction disturbs soil and creates dust and debris. Run-off from a building site travels down the gutters and drains to creeks and canals and eventually ends up in a river, lake or the sea.

Polluting stormwater is an offence that can result in on-the-spot fines or legal proceedings.

Although a single block of land may seem insignificant, if you consider all the building sites in the region, erosion has a huge effect on water quality. Studies by the EPA show that one building site can lose up to four truckloads of soil in a single storm.

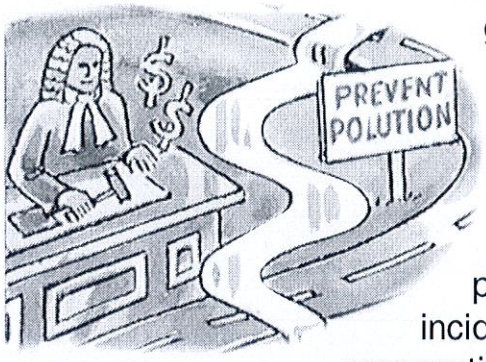
It is important to keep the soil on the site.

Everyone on site is responsible. Preventing site erosion saves money for you and your client and protects you from prosecution.

Be sure that all your employees and contractors understand what they need to do.

Burnt Bridge Creek: **Ed McPeake**

The Law and You



There are many laws, regulations, policies and guidelines to help protect the environment in NSW. These laws give guidance to business and industry. In some cases, if you break these laws it is an offence that can carry serious penalties and in most instances the prosecutor does not need to prove that you intended to cause the incident. Even accidents can result in prosecution. You and others in your business should be aware of these laws and penalties and take all reasonable care not to harm the environment.

The **Protection of the Environment Operations Act 1997 (POEO)** came into effect on 1/7/1999 and has replaced the following earlier Acts:

- Clean Waters Act 1970
- Clean Air Act 1961
- Noise Control Act 1975
- Pollution Control Act 1970
- Environmental Offences and Penalties Act 1989
- Regulatory sections of Waste Minimisation and Management Act 1995.

All owners, managers and operators should ensure that they know about environmental laws and their responsibilities.

The POEO Act focuses on environmental management. Since July 1 1999 local councils hold increased powers in relation to environmental management in their local area.

These changes mean that owner-builders, builders and other trades are directly responsible for preventing sediment and construction wastewater leaving a building site. While the EPA monitored builders actions in the past, now councils have the power and responsibility to monitor the industry and issue penalty infringement notices.

The Law and You

Under the POEO Act, **on-the-spot fines of $1,500 (corporations) and $750 (individuals) may be imposed on builders, owner/occupiers or other trades** where pollution has the potential to, or has entered gutters, drains and waterways. On top of this fine you may also be charged a $320 administration fee.

Supervisors need to take reasonable and practical steps to ensure that workers under their control on the site (e.g. sub-contractors) do not breach environmental laws.

The law does not recognise:

- Whether or not the site is difficult
- Problems that might be encountered in implementing the plan
- Whether or not you are familiar with good soil and water standards.

Note that workers who become aware of significant environmental harm in association with their work, e.g. a major loss of sediment from their site, have a legal duty under the POEO Act to notify their employer.

Local councils may issue the following notices:

- Clean up notices
- Prevention notices
- Penalty infringement notices
- Compliance cost notices
- Noise control notices
- Noise abatement notices

Plans

Erosion and Sediment Control Plans (ESCP) or **Soil and Water Management Plans** (SWMP) are the key to managing erosion and sediment on construction sites and subdivision. These plans are submitted to council at the Development Application (DA) stage. It is the size of works that dictates which of the two kinds of plans will be used. Both plans are principal management tools used during works.

ESCPs identify the erosion and sediment control for relatively small sites between 250 and 2,500 square metres in size.

SWMPs identify soil and erosion controls (including whether a sediment retention basin is required) for "green field" or "urban renewal or infill" developments in excess of 2,500 square metres of actual developed area.

Where circumstances change during construction, councils may require erosion and sediment control measures in addition to those measures specified in the plan.

Other contractors, such as landscapers should check any relevant SWMPs or ESCPs and make sure any DA conditions do not affect their work.

Castle Rock

Suggested **Erosion** and **Sediment** Controls for a 'Typical' **Development** Site

- Minimise area to be cleared and leave as much vegetation as possible. Install temporary fences to define 'no go' areas that are not to be disturbed.
- Install sediment fence(s) along the low side of the site before work begins.
- Divert water around the work site and stabilise channels, but ensure that you do not flood the neighbouring property.
- Establish a single stabilised entry/exit point. Clearly mark the access point and give an access map that has a delivery point indicated for all supplies.
- Leave or lay a kerb-side turf strip (for example, the nature strip) to slow the speed of water flows and to trap sediment.
- Check the erosion and sediment controls every day and keep them in good working condition.
- Stockpile topsoil within the sediment controlled zone.
- Always be aware of the weather forecast.
- Stabilise exposed earth banks (e.g. vegetation, erosion control mats).
- Fill in and compact all trenches immediately after services have been laid.
- Install site waste receptacles (mini-skip, bins, wind-proof litter receptors).
- Sweep the road and footpath every day and put soil behind the sediment controls. Hosing down roads and footpaths is unacceptable.
- Connect downpipes from the guttering to the stormwater drain as soon as the roof is installed.
- Revegetate the site as soon as possible. The erosion and sediment control devices must be kept in place until 70% of the site has been revegetated.
- Use sediment socks where appropriate.

Fact Sheet 1

Site - Planning

The overall principle is to stop both erosion occurring and sediment leaving your site. However, this requires careful planning and forethought. The way you run your building site can have a large impact on the amount of pollution in stormwater run-off.

When planning the site layout, building location and earthworks, it is possible to make sure control devices don't interfere with the building process. Your council will have guidelines for your DA submission.

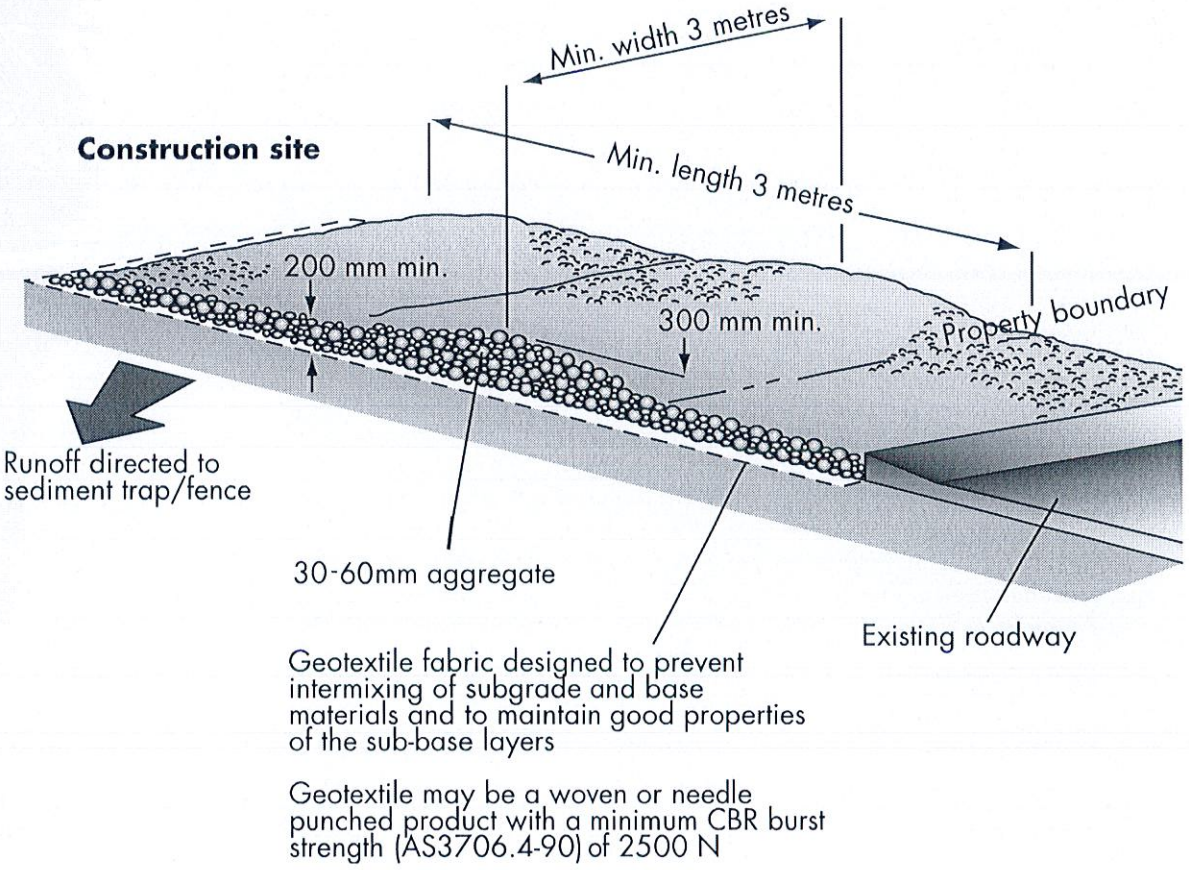
- Avoid stripping and excavating until ready to build.
- Minimise the reshaping of the land, any fill needs to be well compacted.
- Allow stormwater to flow around the building area and any disturbed areas.
- In new estates, temporary revegetation may be required.
- Allow room for a sediment barrier (e.g. sediment fence) to be located along the lower end of the disturbance.
- Ensure that stockpiles are stored within the sediment fence.
- Avoid long, steep, unstable driveways.
- Limit the amount of material on site to what is required at any one time.
- Ensure all material is immediately removed from the site at the completion of work.
- Instruct site workers on the need to prevent materials from washing or blowing into the stormwater system.
- Ensure all materials are immediately removed from site when work is completed.

Fact Sheet 2

Stabilised Entry/Exit Point

Where possible, the entry/exit point of the site should be managed so sediment is not tracked off the site and it should be restricted to one stabilised location. Note that an appropriate location for the construction entrance may not be the location of the permanent driveway.

The recommended construction method for stabilising the access point is 200 mm of aggregate at 30-60 mm in size (note: crushed sandstone is **not** suitable, crushed concrete is preferable to help reduce landfill). The access should be a minimum 3 metres wide and 3 metres long, or to the building alignment for all residential or sub-division sites. Where possible, the entry/exit area should extend from the kerb to the building footprint. Remember that a large truck must be able to gain access to this site without leaving the stabilised access.



Where the entry/exit area slopes toward the road, a diversion hump should be installed across the stabilised area to direct stormwater run-off to the side where it can be filtered by a sediment fence.

Stabilised access points only require periodic maintenance with the topping up of the rock. Street sweeping on adjacent roads may still be required.

Advantages. The advantages to builders of stabilising the access point is that restricting vehicular movement allows the entire site to be more stable and durable during wet weather. After wet weather, work can begin on the site more quickly due to the area being stable. This prevents the most heavily travelled routes from becoming a source of sediment and reduces the likelihood of vehicles bogging on site.

Remember that extra crushed rock or recycled concrete needs to be added to maintain its effectiveness.

Construction Notes

1. Strip at least 150 mm of topsoil, level area and stockpile on site if space available.
2. Compact sub-grade.
3. Cover area with needle-punched geotextile.
4. Construct a 200 mm thick pad over geotextile using aggregate at least 30 mm in size. Minimum length 3 metres or to building alignment. Minimum width 3 metres.
5. Construct diversion hump immediately within boundary to divert water to a sediment fence or other sediment trap.

Fact Sheet 3

Sediment Fencing

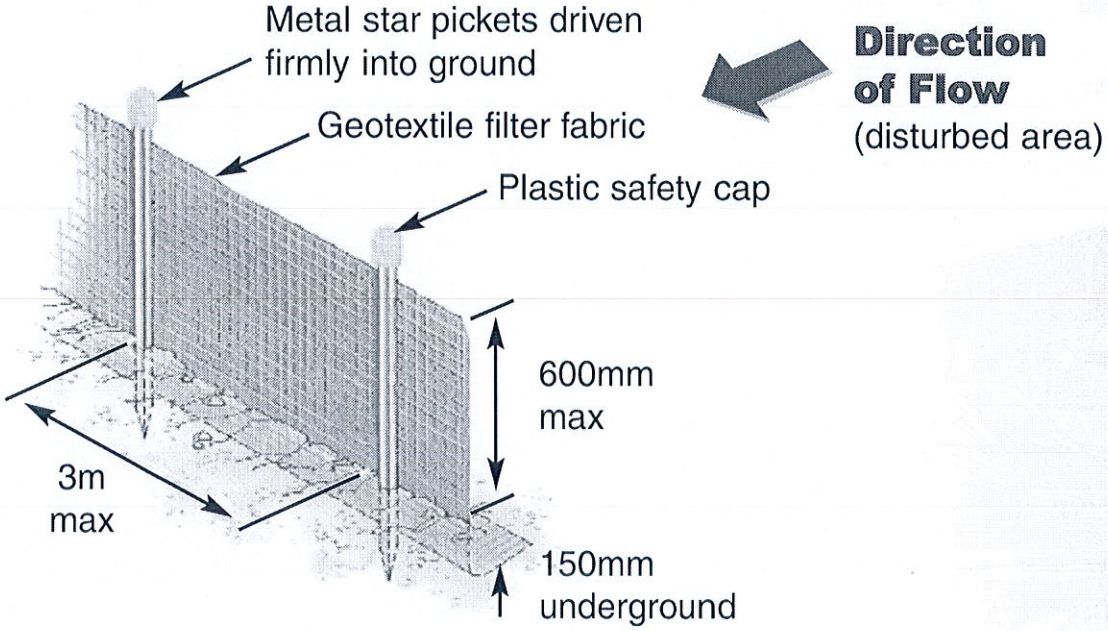
The most efficient and widely accepted sediment barrier for construction sites is a specially manufactured geotextile sediment fence. Sediment fences act like dams - trapping the sediment while allowing water to leave the site. They are effective in retaining suspended solids coarser than 0.02 mm. They are simple to construct, relatively inexpensive and easily moved as development proceeds.

When using a sediment fence, keep in mind that it will be effective within the following parameters:

- It is generally not designed to filter concentrated flows and therefore needs to be placed following the contours whenever possible.
- It should last for up to six months but requires regular maintenance and weekly checks are needed. The performance of a sediment fence diminishes considerably when crushed by delivery of building materials. It must remain vertical and keyed into the soil.
- Where the sediment fence is not installed correctly water will inevitably flow through the point of least resistance. Damaged fences must be repaired promptly.
- Sediment fences need to be trenched in at least 150 mm and buried so the water flows through and not underneath.
- Soil on both sides of the fence must be compacted to avoid seepage under the barrier.

On a typical residential building block (approx. 700sq.m), a sediment fence should work well providing it is situated on the low side of the block. If there needs to be a break in the fence for any reason (say, an access point) a contour bank/diversion bank or bund needs to be constructed to direct water back to the fence. The sediment fence must have uphill returns at either end to prevent sediment flowing around it.

Advantages. It is a simple strategy that is easily installed, shifted or removed. Sediment fences work well and, if maintained, will last for the duration of the construction stage.



Construction Notes

1. Construct sediment fences as close as possible to follow the contours of the site.
2. Drive 1.5 metre long posts into ground, maximum 3 metres apart.
3. Staple to 40 mm square hardwood posts or wire tied to steel posts.
4. Dig a 150 mm deep trench along the up-slope line of the fence for the bottom of the fabric to be entrenched.
5. Backfill trench over base of fabric and compact on both sides.

Fact Sheet 4

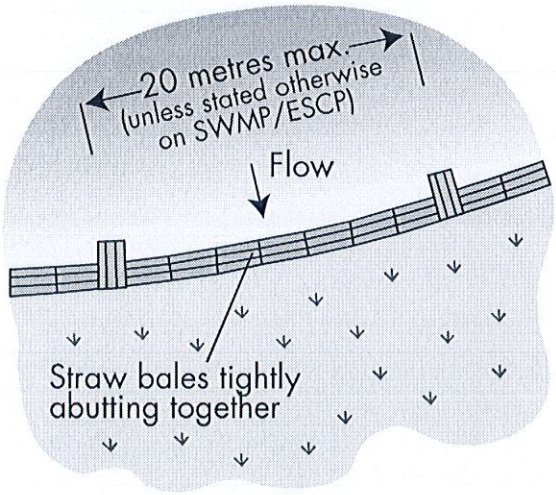
Straw Bale Filter

Straw bales are suitable for low flows of water. It is only recommended that these are used in limited applications such as reducing the flow velocity. **Straw bales should not be used on hard surfaces, such as in the gutter, as they will allow sediment laden waters to pass underneath.**

The return of straw bales every 20 metres is recommended to ensure some stability for this style of barrier. Please note that they need to be embedded in the ground and held firmly in place with star pickets. Straw bales should be wrapped in geotextile fabric to reduce decomposition and seed dispersal.

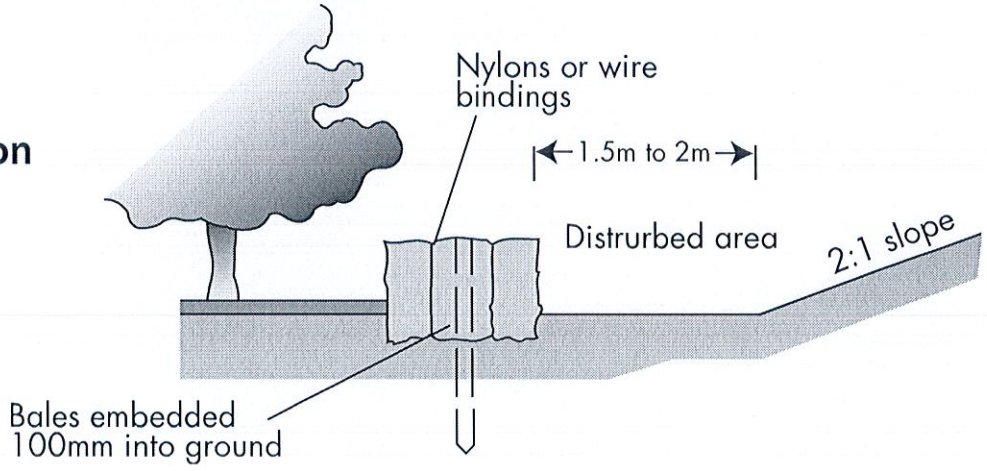
The minimum number of bales to be used is four. If only two bales are used during a storm event, the water will simply hit the bales and flow around, increasing erosion. The bales must dam the run off and allow the sediment to settle behind the bales.

Plan



Please note straw bales do not filter sediment-laden waters. They will only hold back water if installed correctly.

Section

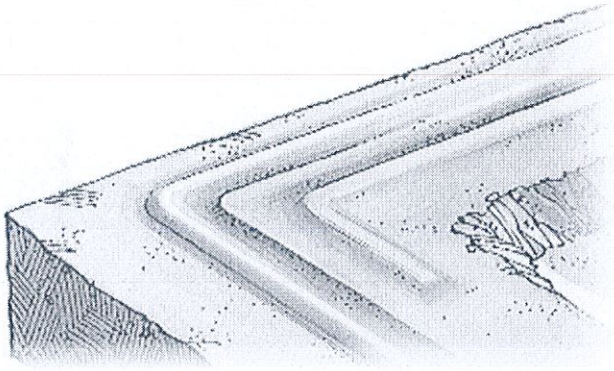


Fact Sheet 5

Diversion of Up-Slope Water

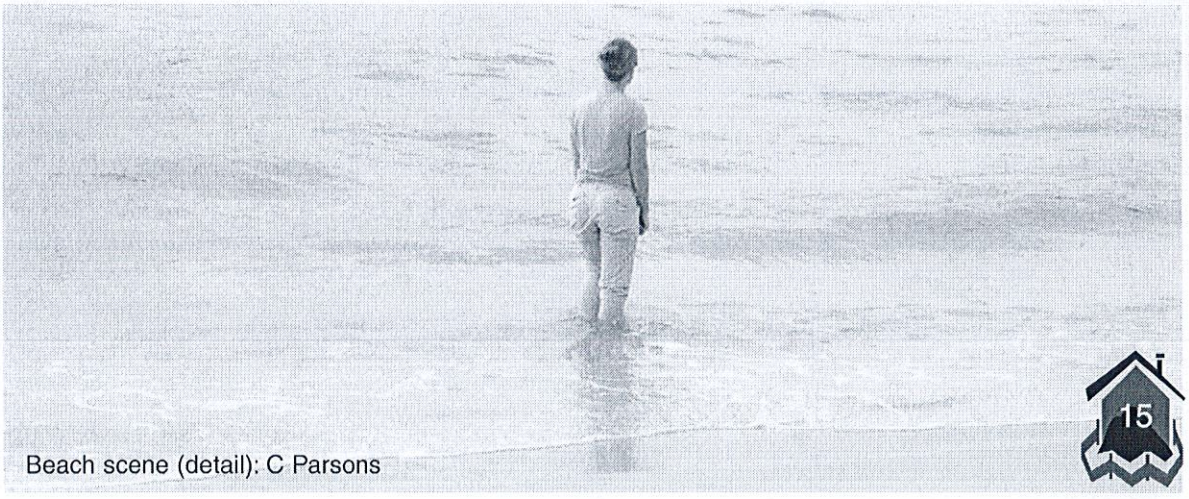
Where practical, or where stormwater run-off is more than 0.5 hectare, up-slope water should be diverted around the site. Stormwater can be diverted with the use of small turf or geotextile lined catch drains, or with the use of diversion banks.

Diverted stormwater should be discharged onto stable or vegetated/ grassed areas and should not be diverted into neighbouring properties unless written permission is obtained from the land owner(s). Avoid directing stormwater towards the site's entry/exit point.



Advantages. There is a reduction in the amount of water that must be treated. The site is kept drier during wet periods.

Remember on steep sites, depending on duration of works and expected water flows, it maybe necessary to line the earth drain with turf or a geotextile fabric to avoid unnecessary soil erosion.



Beach scene (detail): C Parsons

Fact Sheet 6

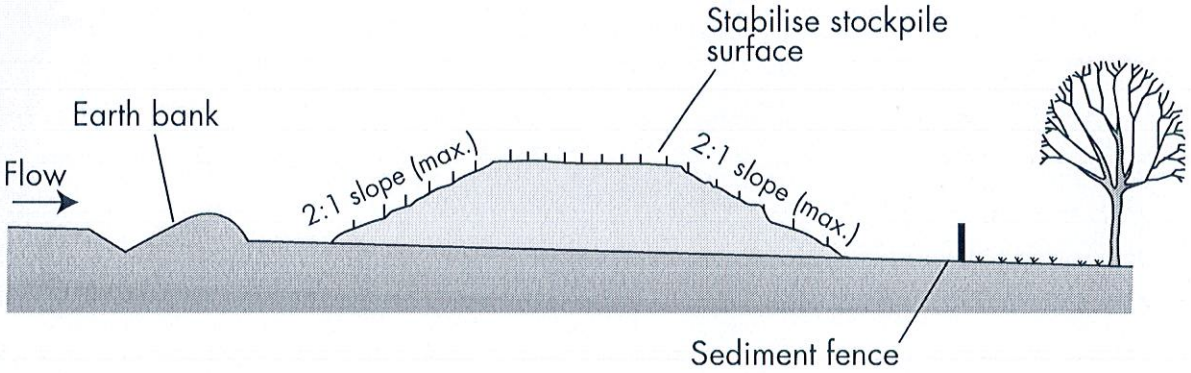
Stockpiles and Storage of Materials

Stockpiles and building materials are not to be stored on the footpath or within the road reserve. Stockpile losses and stormwater pollution will be minimised with the use of covers (e.g tarpaulins).

All stockpiles and building materials should be located behind the sediment controls. Stockpiles should be protected from run-on water by placing diversion banks up-slope and with sediment control structures (e.g sedimet fence) placed immediately down-slope.

The location of all stockpiles on-site should be at least 2 metres (preferably 5 metres) from hazard areas, especially likely areas of concentrated or high velocity flows such as waterways, kerb inlet pits, paved areas and driveways. The height of the stockpile should be less than 2 metres. The incorrect storage of stockpiles is a major source of stormwater pollution.

All site workers, subcontractors and delivery drivers need to be advised of their responsibilities to minimise soil erosion and pollution. The delivery driver must be given a designated location to deliver materials on site. This practice will also keep stockpiles away from site access and consequently keep sediment from being discharged to the stormwater system.



Fact Sheet 7

Grass Filter Strips

Strips of vegetation left or planted down-slope from earthworks provide a simple method of trapping coarse sediment.

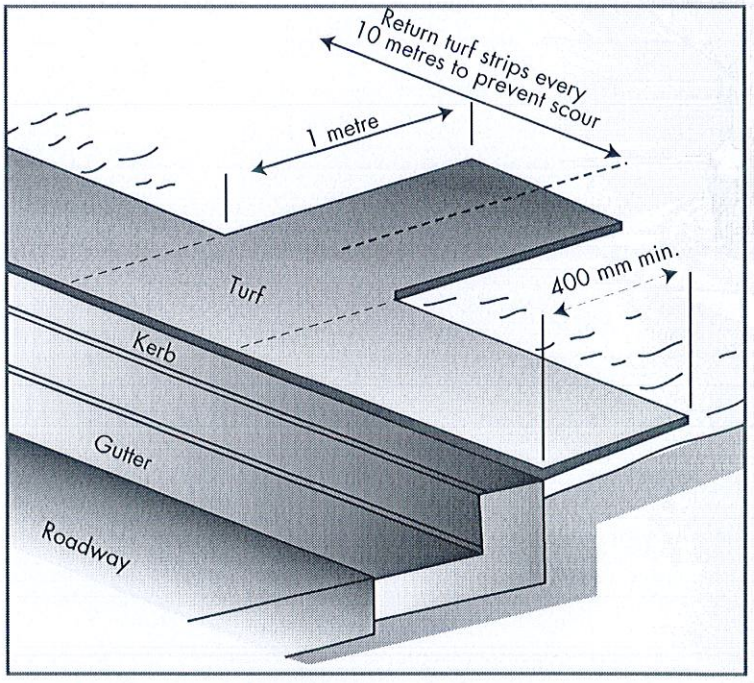
The flatter and wider the filter strips are, the more effective they become. Grass filter strips have little effect in a storm, but form an important part of a sediment control program.

A 400 mm wide grass strip can be installed next to a kerb to stabilise the area between the kerb and footpath. It is also valuable for trapping sediment in very small storm events.

For best results it is advised that the whole footpath is planted.

Grass strips will stabilise a disturbed site quickly and easily and act as an excellent erosion & sediment control device.

Advantages. Grass filter strips can be very effective in removing coarse sediment upstream from detention basins or infiltration structures. They prevent sediment travelling from bare soil areas towards the formal drainage system.



Remember that grass filter strips are only suitable on low grades.

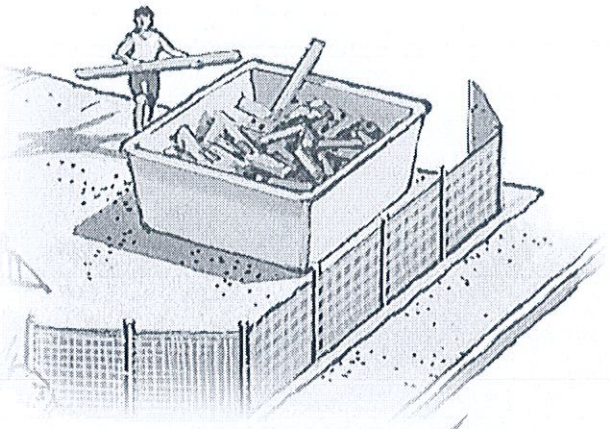
Construction Notes

1. Install minimum 400 mm wide roll of turf on the footpath adjacent to the kerb and at the same level as the top of the kerb.
2. Lay 1.5 metre long turf strips (at 90 degrees) every 10 metres.
3. Rehabilitate disturbed soil behind the turf strip in accordance with the ESCP/SWMP.

Fact Sheet 8

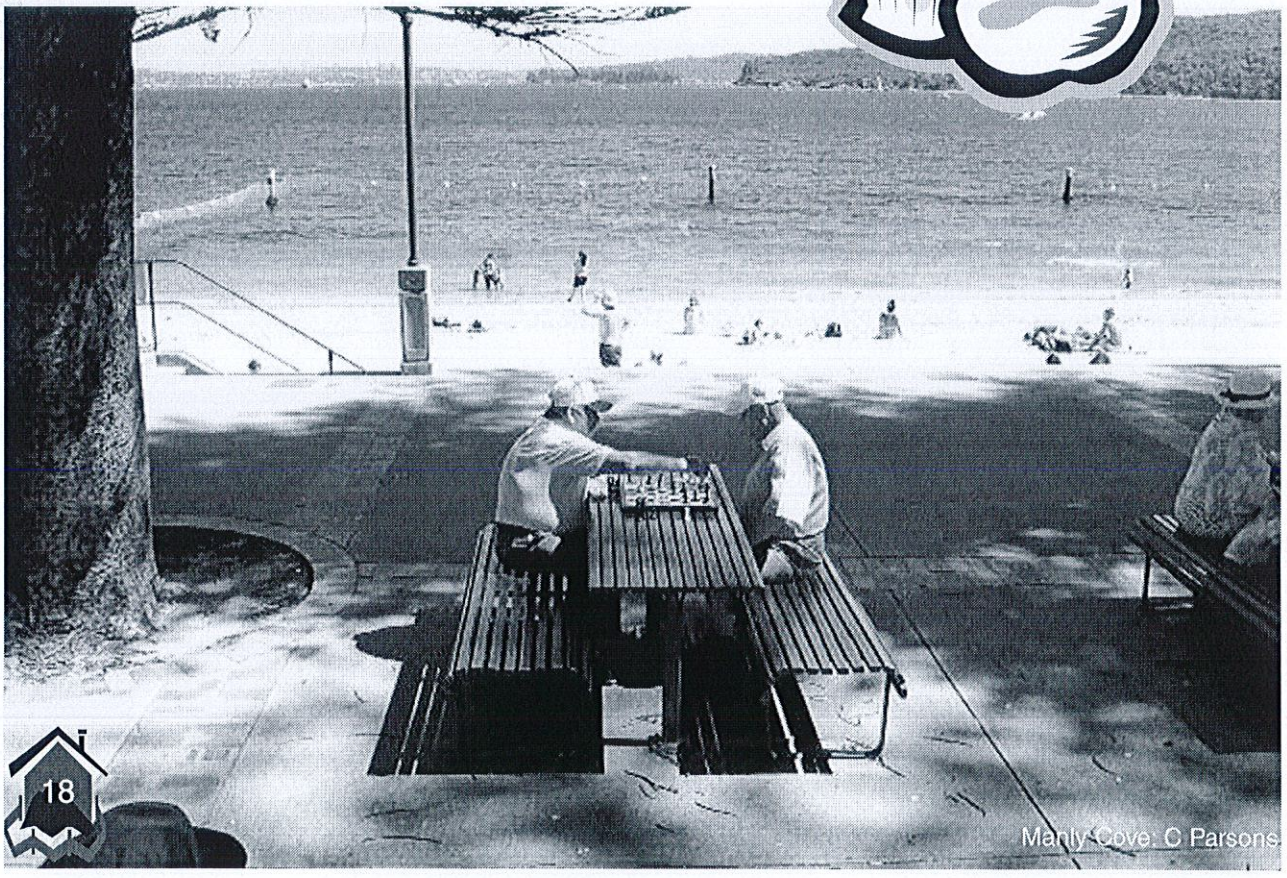
Litter and Building Waste

All hard waste should be stored on-site in a way that prevents material loss caused by wind or water.



Smaller materials such as litter should be contained in covered bins or litter traps formed on three sides by geotextile as a windbreak.

Tipping fees can be reduced by separating building waste products into separate litter traps, so this material can be recycled.



Manly Cove. C Parsons.

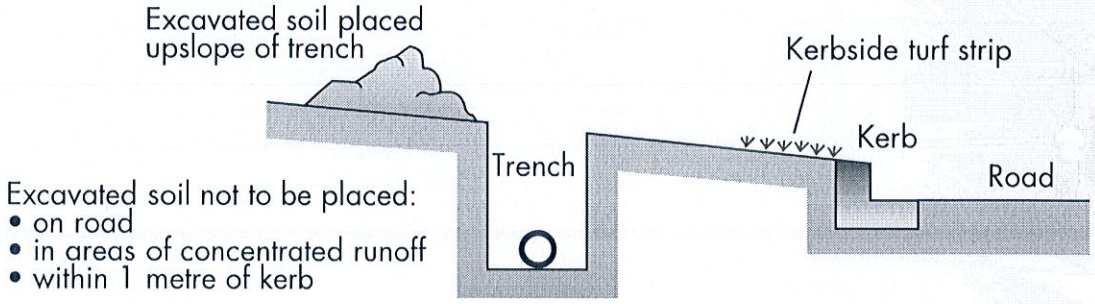
Fact Sheet 9

Service Trenches

Where possible, coordinate the various service connections so that a single trench can be used. Avoid trenching in areas where water flow is likely to concentrate. Alternatively, try to schedule work to periods when rainfall is low.

Try to limit the time trenches are open to fewer than three days and avoid opening them whenever the risk of storms is high. Remove and store vegetated topsoil (sod) so that it can be used to provide immediate erosion protection after backfilling.

Place the soil on the uphill side of trenches to divert water flow away from the trench line. Alternatively, use temporary bunds for similar effect. Backfill subsoil and compact to 95 per cent Standard Proctor. Then replace topsoil and any sod to match surrounding ground levels.



Construction Notes

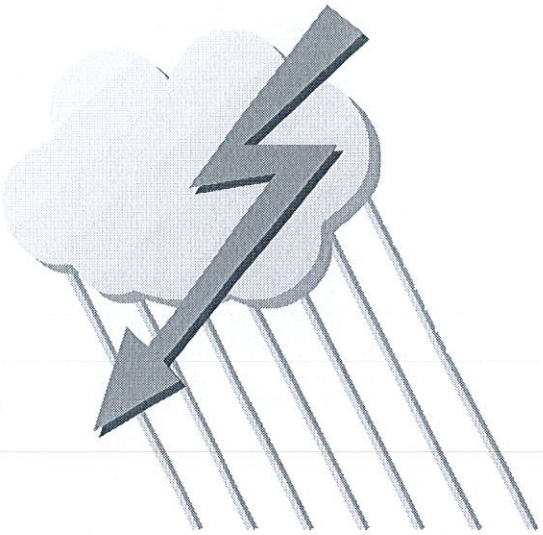
1. Do not open any trenches unless it is likely to be closed in three days.
2. Place excavated material upslope of trench.
3. Divert runoff from the trenchline with diversions.
4. Revegetate.

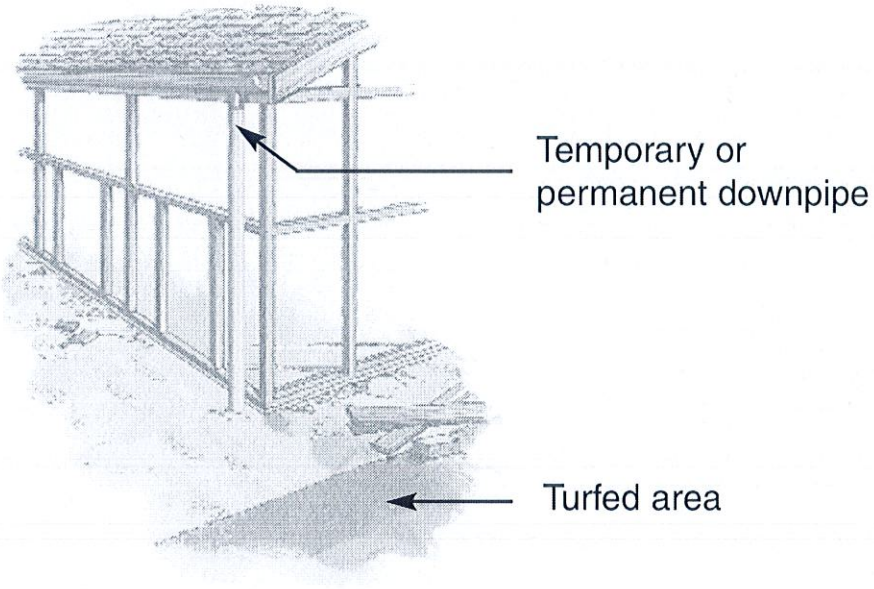
Fact Sheet 10

Early Roof Downpipe Connection

Temporary or permanent downpipes should be installed at the same time as the roof is installed. The early connection of downpipes to the stormwater system will reduce site drainage problems.

This will reduce downtime following storm events. Connecting roof downpipes is a vital process to keep the water off the site and "Keep the Soil on the Site".





Fact Sheet 11

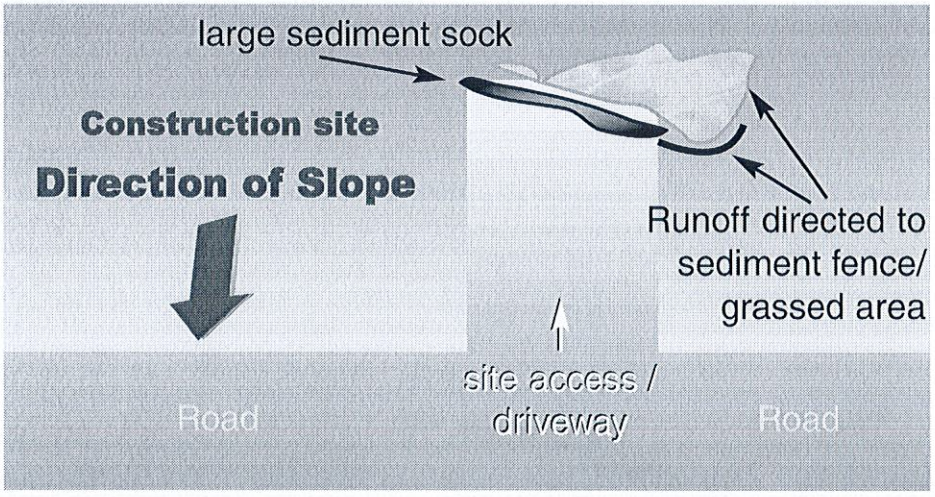
Sediment Socks

Sediment socks are very simple and a very effective way of preventing pollution. They are usually made of geotextile fabric (or similar) and are available in various lengths. Sediment socks should be filled with clean sand (blue metal can be used also if sand is not available) and should only be half filled, so they can be moulded to the shape of the ground. Care should be taken to ensure that they are securely closed at the top end, to make sure they are not adding to the pollution load. They have various applications, depending on different site characteristics, and some of these include:

To divert runoff as it travels down a slope (suitable for small areas, eg- access driveways)

Place a long sediment sock diagonally across the direction of slope, to direct flow into a sediment fence and/or onto a grassed area for filtration (see Figure 11.1). Diverted stormwater should not be discharged into neighbouring properties unless written permission is obtained from the land owner/s.

11.1



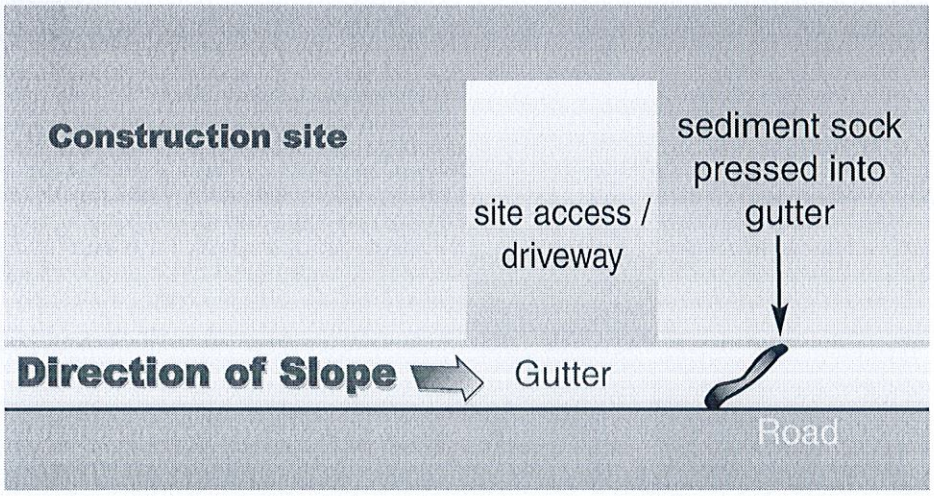
Trapping any pollution that has left the site and entered the gutter (as a last resort)

Place a small sediment sock diagonally into the gutter (see correct placement in figure 11.2), and mould firmly into place to ensure a water tight 'dam' is formed.

As runoff reaches the sediment sock it will form a dam, and the sediment will drop out of the water column and stay trapped behind the sock. These socks will only work in a slow/medium velocity flow of water - high velocity flows will simply turn the sock into a ramp, and no sediment will be trapped.

Care must be taken to regularly clean behind the socks, as in the right circumstances they can trap large amounts of sediment - this will reduce their ability to trap further sediment.

11.2



Maintenance of Control Measures

Proper maintenance of erosion and sediment controls is vital to their success. After a storm event the effectiveness of the established controls can be assessed. The site manager should check the operation of all erosion and sediment controls each day and initiate repair or maintenance as required.

An effective maintenance program should include ongoing modification to plans as development progresses. These plans are usually based on a specific landform, but as development proceeds changes occur in slope gradients and drainage paths.

Best practice includes anticipating potential risks as well as being prepared for abnormal circumstances and emergencies. This could include storing extra sediment fence fabric and posts on-site to facilitate emergency repairs, or ensuring that the sediment control contractor's phone number is available on site.

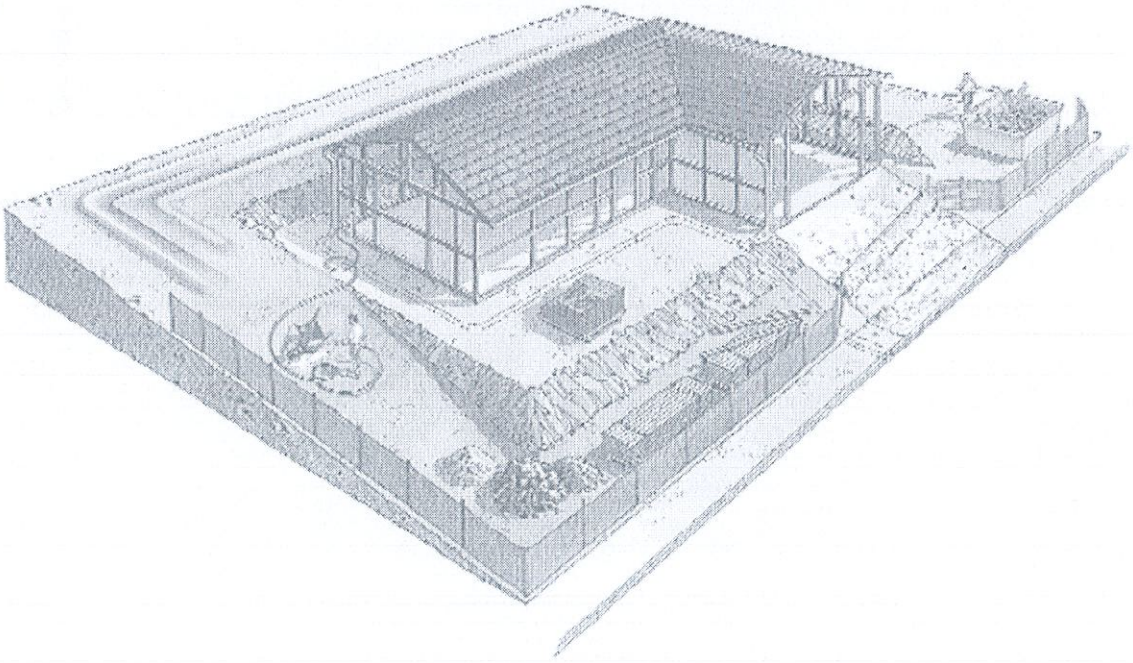
- The entry/exit pad will require reapplication of aggregate if excessive sediment build-up occurs.
- Clean any catch drains.
- Erosion in drainage channels should be repaired with rock, turf or erosion control matting.
- Sediment fences should be replaced if the fabric is ripped or otherwise damaged. Retrenching may also be needed. Sediment fences work well if they are maintained on a weekly basis and/or after every storm event.
- Sediment socks should be checked each day and cleared as necessary.
- Keep an eye on the weather.

Site **Clean-up** and **Rehabilitation**

Accidental spills of soil or other materials onto the road or gutter should be removed at the end of the day's work. Materials should be swept from the road, not washed down the gutter. Following storms, the roadway and sediment controls should be inspected and all excessive sediment residues removed.

All areas disturbed by construction should be promptly stabilised (e.g revegetated) so that they can no longer act as a source of sediment.

If the site has not been rehabilitated and is handed over to a new homeowner, they need to understand their legal obligation associated with erosion and sediment control, especially if a sub-contractor is employed to complete landscaping works. Sediment control devices must be left in place until 70% revegetation cover has been established, or other measures installed in accordance with Council's requirements.



Important **Numbers**

Manly Council	02.9976 1500
Department of Infrastructure, Planning & Natural Resources	02.9762 8044
AGL Emergency	131 909
Australian Horticulture and Landscape Council (NSW)	02.9428 2160
Tribunal for Consumer Claims & Building Disputes	02.9895 2070
Crime Stoppers Hotline	1800 333 000
Department of Fair Trading	133 220
Dial before you Dig	1100
Emergency	000
Environmental Defenders' Office	02.9262 6989
EPA Pollution Line	131 555
Housing Industry Association.	02.8878 0400
Integral Energy Emergency	131 003
International Erosion Control Association	02.9725 4450
Kimbriki Recycling and Waste Disposal Centre	9486 3512 or 9486 3542
Lifeline (24 hrs Telephone Crisis Councilling)	131 114
Master Builders' Association	02.8586 3555
Master Plumbers and Mechanical Contractors Assoc	02.9797 7055
NSW Work Cover Authority	131 050
Poisons Information Centre	131 126
Standards Australia	02.9746 4700
Stormwater Industry Assoc	02.9810 7805
Sydney Water Emergencies	132 090
Sydney Water Trade Waste	131 110 or 02.9828 8539
Translating & Interpreting	131 450
Urban Development Institute of Australia	02.9868 3677

Manly Council does not necessarily endorse these products and services.

OUR MOST FREQUENTLY CALLED NUMBERS

Name	Number
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