POLICY:	GREYWATER REUSE (RESIDENTIAL HOUSEHOLDS)
DATE ADOPTED:	Director Environmental, Planning & Building Serices Report #2 Policy 4 April 2007 Council 18 April 2007 Minute Book No. 10111
ORIGINAL ADOPTION:	
FILE REFERENCE:	14.00394
OBJECTIVE:	To establish guidelines for the greywater reuse for residential households

Everyday activities in a domestic household generate wastewater, which is diverted to a centralised sewerage system or onsite sewage management system (eg. septic system) for treatment and disposal. Wastewater is categorised as either greywater or black water.

Greywater is defined as the wastewater from the bath, shower, laundry and hand basins, whereas black water is defined as the wastewater from the toilet, urinals, bidets and kitchen sinks. It is important to note that the two wastewater streams are quite distinct in their chemical, biological and physical properties. Black water is grossly contaminated with faeces and a range of chemicals which are toxic to human health and the environment if released untreated. Once greywater and black water have been combined (as happens in the normal plumbing arrangement in domestic premises) the entire volume is considered black water.

Further, it is important to note the difference between greywater reuse and treated effluent reuse (or effluent reclamation/effluent recycling/recycled water as it is also known). Greywater reuse refers to the generation and reuse within a single residential property. Treated effluent reuse utilises effluent from a Wastewater Treatment Plant (WWTP). The effluent is highly treated through a sophisticated, centralised system and its end use is dependent on the level of treatment. This may include a reticulated system (such as the Rouse Hill dual reticulation system), an irrigation system (as used by many golf courses) or even for drinking water (of which there are many international examples). The treated effluent would otherwise be disposed of in a waterway, such as the Macquarie River in the case of Bathurst. This policy in no way deals with treated effluent reuse.

Greywater reuse represents one of the many opportunities that an individual or household can take to reduce their “Ecological Footprint”. In combination with a reduction in energy use, waste produced, etc a household may move towards a more sustainable lifestyle and lessen the impact of their daily activities on the local (and global) environment.

AIM

The principal aim of this policy is to ensure the protection of public health and the environment.

Further, this policy aims to promote the conservation of drinking water by facilitating the installation and operation of greywater reuse systems.

BENEFITS

Greywater reuse has a number of benefits for both the individual household and the environment. Greywater diversion has the potential to considerably reduce the volume of drinking water consumed by an individual household. Most Australian households use more than 30% of their total water consumption on maintaining their garden and lawns. Greywater reuse can provide a sustainable alternative to using drinking water for this purpose. Treated greywater also has uses inside the home, for toilet flushing and/or clothes washing. This may save between 10 and 20% of the total drinking water use within the household.

Greywater reuse has the potential to reduce the load on the sewerage system, as a large portion of the greywater produced by a household has the potential for reuse.

RISKS

There are a wide range of factors to be considered when installing a greywater reuse system. It is very important to determine the average volume of greywater that will be generated by the household, and the average volume that can be utilised.

Greywater must be reused in an appropriate way to ensure public health and environmental risks are managed to prevent illness and environmental degradation. It is the responsibility of the individual who undertakes these activities to obtain appropriate approvals where necessary and to ensure that their system is maintained and operated in a safe and sustainable way.

The contaminants in greywater are derived from household cleaning and personal hygiene activities. Nine hazards have been identified with the reuse of greywater (by the National Water Quality Management Strategy “Australian Guidelines for Water Recycling: Managing Health and Environmental Risks [Phase 1]”) on residential properties – boron, cadmium, chlorine disinfection residuals, hydraulic loading, nitrogen, phosphorus, salinity, chloride and sodium.

However, the hazards can be minimised by carefully adhering to the *“Do’s and Don’ts”* of Greywater reuse which are detailed in the “General Management Issues”

LAND TO WHICH THIS POLICY APPLIES

This policy shall apply to all residential properties in the Bathurst Regional Council Local Government Area. This policy does not apply to Commercial or Industrial properties.

PERMISSIBLE TYPES OF GREYWATER REUSE SYSTEMS

Council can only approve greywater reuse systems which comply with the requirements of NSW Health and the Department of Energy, Utilities and Sustainability (DEUS). Further, this policy takes into consideration the guidelines developed by the National Water Quality Management Strategy "Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 1)".

DEUS has developed a policy known as "NSW Guideline for Sewered Residential Premises (Single households) Grey water Reuse". Essentially the guidelines categorise permissible grey water reuse into three different areas:

- Manual bucketing
- Grey water diversion
- Grey water treatment

The approval conditions for each type of reuse are detailed in the next section.

APPROVAL CONDITIONS

Each of the three systems (manual bucketing, greywater diversion, greywater treatment) is subject to different requirements for approval and installation.

Manual bucketing does not require Council approval. It is considered to be a low risk activity. Please refer to the next section for further guidance on manual irrigation.

Greywater diversion is considered to be a low to medium risk operation under the DEUS guidelines. Section 68 of the *Local Government Act 1993* (the Act) determines that the operation of a system of sewage management requires the approval of Council. Under the Act a system of sewage management means hold, or process or reuse or discharge sewage or by-products of sewage. Therefore, greywater diversion and greywater treatment are prescribed activities requiring Council approval under the Act.

The *Local Government (General) Regulation 2005* clause 75A determines that greywater diversion does not require Council approval if the requirements of the NSW Code of Practice: Plumbing and Drainage 3rd Edition 2006 and certain performance criteria are satisfied. Compliance with the following conditions is necessary to ensure that these requirements are satisfied.

- Wastewater is not diverted from kitchen or toilet plumbing

- An on-site sewage management facility is not in place (eg. septic system, aerated wastewater treatment system)
- Greywater is not stored in any way, or treated other than primary screening or filtration
- A washing machine standpipe, or licensed diversion device delivers the greywater to a sub-surface irrigation system
- The standpipe or diversion device has a manual switching or selection facility so that greywater can be easily diverted back to sewer
- Any diversion device connected to, or modifying the existing plumbing system is a WaterMark licensed device, and must be installed by a licensed plumber
- Any diversion other than by gravity is only via a licensed non-storage surge tank and pump system installed by a licensed plumber
- Some form of non-storage surge attenuation is installed as a part of the diversion device
- Council must be notified by the installing plumber that a greywater diversion device is in place
- Diversion devices must not be installed below the fixture trap on any plumbing fitting

If a greywater diversion device does not meet all of the criteria listed above, a "Section 68 approval" will be required. A section 68 approval is always required for a greywater treatment system. Said systems will also be subject to inspections by Council staff. There is a fee associated with the application to install, and the approval to operate a system of sewage management (which includes greywater treatment).

Greywater diversion is only permissible where a system of subsurface irrigation is installed, regardless of whether or not it meets the other exemption requirements under clause 75A. The irrigation system must be at least 100mm below the surface. The manual switching/selection facility must be clearly marked and should be diverted to the sewer as a default.

Further, greywater diversion devices are not permissible in multi-unit dwellings, as the volume of greywater generated is large and there is a considerable risk of hydraulic overloading of the soil.

The installation of a greywater treatment system requires Council approval without exception. Greywater treatment is considered to be a high risk activity. Council can only approve systems which are accredited by NSW Health. A list of accredited systems is maintained on NSW Health's website at www.health.nsw.gov.au . At the time of writing three different systems are accredited by NSW Health.

Greywater treatment systems (and the associated reuse distribution systems e.g. irrigation system, third pipe for toilet flushing) will be inspected by Council Officers. Council's Officer will undertake a risk assessment of each system and grant an "approval to operate" for a period of one, three or five years depending on the risk rating of the system and its use. The resident will be required to renew the approval to operate by arranging an inspection by Council prior to its expiry. The

risk assessment process takes into account the topography, distance to boundaries and dwellings, soil types, location of water courses and lot size among other issues. The higher the risk rating, the shorter the approval period.

Treated greywater may be used for surface irrigation, toilet flushing and clothes washing. Greywater treatment systems must be installed by a licensed plumber.

If the greywater treatment system is used for toilet flushing and/or clothes washing, separate and distinct plumbing structures (from the other household plumbing) must be installed. Greywater treatment systems must be recorded on the drainage diagram for a lot.

Council has discretion under s. 626(3) of the Act to issue a fine for carrying out an activity without prior approval of Council.

GENERAL MANAGEMENT ISSUES

Reducing the total water usage within the residence should always be the highest priority.

The first step when considering a greywater reuse option is to undertake a water balance to calculate the amount of greywater generated and the water which can be reused on the premises.

Sydney Water estimates that the average single dwelling residential premise (based on 3 persons per premises) uses 825L of water each per day. This equates to 113L of greywater generated per person per day. Of this roughly 66L is for baths/showers and 47L used in the laundry.

From the data above, it can be estimated that the average person will generate 110L of greywater per day which would be available for reuse.

The volume of greywater that can be reused must then be calculated. If irrigation is used (either surface or subsurface) DEUS recommends the following volumes per irrigation event:

Volume of Greywater Reused per Irrigation Event					
Surface area	1 m^2	5 m^2	10 m^2	25 m^2	50 m^2
Volume	20L	100L	200L	500L	1000L

DEUS also recommends a maximum irrigation frequency dependent on the season:

- Summer – every 4 days
- Autumn – every 10 days
- Winter – every 14 days
- Spring – every 6 days

These recommendations take into account not only the volume of water required but also the nutrient loads present in the greywater. If rainfall has occurred then the time between irrigation events will need to be extended.

If a greywater treatment system is installed and connected to the toilet for flushing on average ~300L per week can be reused per full flush toilet and ~100L per week can be reused per half flush toilet.

If a greywater treatment system is installed and connected to the washing machine on average ~65L per load can be reused for front loading machines and ~330L per load can be reused for top loading machines [Front loading machines use considerably less water per load which accounts for the difference].

The estimates above serve as a guideline only. However **it is expected that most households will not be able to reuse all greywater generated, regardless of the type of reuse undertaken.**

It is strongly recommended that all greywater reuse is undertaken in a manner consistent with best practise management control measures (Do's and Don'ts from DEUS guidelines) as detailed below:

DO –

- Install a greywater diversion device (GDD) that has a WaterMark Licence and is registered by NSW Health or a greywater treatment system (GTS) that has been accredited by NSW Health
- Reuse treated greywater from a GTS for irrigation, toilet flushing and washing machines only
- Reuse diverted untreated greywater from a GDD for sub-surface irrigation only
- Install a GDD that incorporates some form of non-storage surge attenuation
- Select garden friendly detergents that are biodegradable and low in phosphorus, sodium, boron, chloride and borax
- Select liquid washing detergents, as they are comparatively low in salts
- Reuse greywater in the garden on several locations rather than one single point (for manual bucketing).
- Monitor plant and soil response to greywater irrigation
- Occasionally irrigate with drinking water to flush salts from the soil
- Wash your hands after reusing greywater

DON'T –

- Leave a diversion device on all the time. Treat it like a garden tap and only reuse greywater when the garden needs watering
- Reuse toilet or kitchen wastewater
- Reuse greywater for irrigation during rain
- Reuse greywater from the washing of nappies or soiled clothing
- Apply greywater in areas that are readily accessible to children and pets
- Reuse greywater when a resident has diarrhoea or is sick

- Reuse greywater generated by cleaning in the laundry or bathroom, or when using hair dye or other chemicals
- Reuse greywater to top up rainwater tanks or swimming pools
- Store untreated greywater
- Reuse greywater so that it flows into the streets, down stormwater drains or onto neighbouring properties
- Reuse greywater on plants that will be eaten raw
- Reuse greywater to wash driveways, paths or cars

FEES

There is no fee associated with the submission of a Notice of Exempt Development.

Section 68 approvals are subject to submission fees as outlined in Council's Revenue Policy.

These fees will be determined on an annual basis by Council in association with Council's annual review of its fees and charges schedule.

IMPROVEMENT POLICY

Council seeks feed back from the public on ways to improve the policy and make it easier to understand. Please address your comments in writing to:

The General Manager
Bathurst Regional Council
Private Mail Bag 17
BATHURST NSW 2795

GLOSSARY

Domestic greywater treatment system: a system or device that collects, treats and disinfects greywater arising from an individual single domestic premises for reuse for toilet and urinal flushing or laundry use, and/or for use in surface and sub-surface irrigation in dedicated non-trafficable areas.

Greywater: domestic greywater from hand basin, kitchen*, bath, shower, and laundry, but excluding toilet and urinal wastewater
*Please note: while the NSW Health definition includes water from the kitchen, Council policy excludes the use of kitchen water from Greywater reuse systems, due to the potentially high concentrations of chemical and biological contamination. The exclusion of kitchen wastewater is consistent with DEUS guidelines.

Greywater diversion device: a device that collects and directs untreated greywater to a sub-surface irrigation area or tho the sewer. This system does not allow storage or treatment, apart from a course screen filter, which may remove lint, hair and coarse particles.

Manual bucketing: manually irrigating with greywater using a bucket, such as collecting bath water to irrigate the garden.

Nutrients: chemical elements essential for sustained plant or animal growth. The major nutrients essential for plant growth are nitrogen, phosphorus and potassium.

Operate a system of sewage management: hold or process, or re-use or discharge, sewage or by-products of sewage (whether or not the sewage is generated on the premises on which the system of sewage management is operated) [from *Local Government Act 1993*].

Risk management approach: involves identifying and managing risks in a proactive way, rather than reacting when problems occur. It involves three stages – identifying hazards, assessing the risk and implementing controls.

Stormwater: refers to the water resulting from rain draining into the stormwater system from roofs (rainwater), roads, footpaths and other ground surfaces.

Sub-surface irrigation: irrigation at a depth of at least 100mm below surface level.

Surface irrigation: water applied to the ground surface from above surface level

The domestic greywater treatment system, greywater, greywater diversion device and stormwater definitions are taken from NSW Health guidelines.