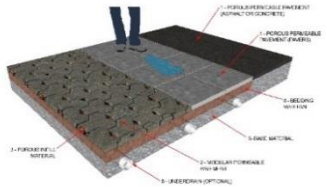
Water Sensitive Urban Design (WSUD) treatment options

The following table is a summary of the various types of Water Sensitive Urban Design (WSUD) treatment options. If you have questions about any of these requirements, please call 9240 1111 and ask to speak to an Environmentally Sustainable Design (ESD) Officer).

Infrastructure type	Description	Common applications	Key maintenance considerations
Rainwater tanks  ***Image source: www.moreland.vic.gov.au***	Rainwater tanks are ranked highest on Moreland's WSUD Hierarchy as they provide multiple environmental benefits (stormwater pollutant and volume reduction) and can save occupants money by reducing household mains water use. Roof runoff is diverted to a rainwater tank and the rainwater is used for toilet flushing and other available non-potable uses (e.g. laundry, wash down and outdoor irrigation). For further information, please refer Guidance on the use of rainwater tanks (Environmental Health Committee of the Australian Health Protection Committee, 2010). Rainwater tanks can be located above or below ground. Rainwater tanks connected to toilets require a pump system and generally include a switch system which automatically switches the supply to mains water when the water level in the rainwater tank is low. Charged stormwater pipes (i.e. store water between rainfall events) can be used to deliver stormwater from a large roof area into an above ground rainwater tank. Council recommends that charged pipes do not pass under buildings (i.e. pipe configurations should be in accordance with Victorian Building Authority Guidance). For additional information about rainwater tanks refer to: - Melbourne Water fact sheet; and - Information on DEWLP's website.	Rainwater tanks provide environmental benefits (reduction in pollutant loads and runoff volume) as well as reducing household water bills. Rainwater tanks are particularly effective where the harvesting demand is high relative to the roof area. Moreland encourages the minimum rainwater tank size to be 2,000 L. A larger tank may be needed to ensure optimal water harvesting and/or comply with Part 3.12 of Volume Two of the National Construction Code (NCC). The Tankulator Tool provides guidance on sizing tanks to ensure optimal harvesting. The NCC requires new residential buildings to have a rainwater tank or a solar hot water system. If a rainwater tank is used to comply with the NCC, it must be at least 2,000 L, receive runoff from at least 50 m^2 of roof and supply all toilets in the building.	Pumps typically require servicing every 2-5 years. Leaf filters at entrance to tank generally require cleaning once a year (can be done by householder).
Raingardens (inground and/or planter boxes)  ***Image source:***	Raingardens are specialised garden beds that treat stormwater by infiltrating the water through a vegetated soil filter. Stormwater can temporarily pond above the raingarden surface before passing through the filter media. Raingardens are also referred to as bioretention systems or biofilters. Healthy vegetation is integral to pollutant removal and long term raingarden sustainability. Council has developed a Raingarden Planting Palette to inform vegetation selection. The WSUD Response should indicate the type of vegetation to be used in the raingarden. The final vegetation design must be shown	Raingardens are suitable for treating runoff from roofs and/or hard surfaces. The outlets to raingardens are typically approximately one meter below the inlet and so the level of the site relative to the legal point of discharge needs to be considered when specifying raingardens. Raingardens included in Moreland WSUD Responses must be at least 1 m^2 wide with a minimum width of 350 mm.	Raingardens typically require maintenance every 3-6 months and are best suited to locations under a maintenance contract (e.g. body corporate managed land).Check overflow is clear of debris ~4 times a year and after heavy rain. Check surface is free draining ~4 times per year. Remove accumulated

www.whittlesea.vic.gov.au	on the landscape plan that is submitted to Council as a condition of the planning permit. Unlined raingardens are configured to allow treated stormwater to soak into the surrounding soil, thus reducing the volume of stormwater runoff and increasing soil water available to vegetation. Unlined raingardens should be used where possible. Raingardens that are within 5 m of a building or building foundations should be lined with an impermeable barrier such as a HDP liner to avoid impacting the adjacent structure. Raingardens can be positioned in the ground to collect runoff from adjacent surfaces or above ground (planter box). Raised planter boxes and used to treat runoff from roofs and balconies whereas the levels of inground raingardens can be set to treat runoff from all hard surfaces. For further information on raingardens please refer to information on Melbourne Water's website.		sediment as required. Properly constructed raingardens can last without major maintenance (i.e. new layers underneath the surface) for 10 + / 15 + years, if maintained correctly.
Buffer strip  ***Image source: storm.melbournewater.com.au***	A buffer strip is a line of vegetation along the downslope edge of a hard surface and is designed to trap pollutants as water flows slowly through the vegetation. Buffer strips are typically planted with grass although other vegetation can be used.	Buffer strip and swales are commonly used along the edge of driveways or paths. Buffer strips included in Moreland WSUD Responses can receive runoff from an impervious area not wider than 3 m.	Check vegetation and any accumulated sediment is not blocking flow paths~4 times a year and after heavy rain.
Sand filters  ***Image source: www.estuarypartnership.org***	Sand filters are similar to raingardens systems but have a coarser filter media that drains too quickly to support vegetation. Sand filters can be effective at removing sediment and phosphorous but have limited ability to remove nitrogen.	Sand filters can be located at the surface or underground (e.g. within stormwater pits). Sand filters are only recommended whether site conditions, such as levels, limit the use of raingardens.	Sediment that accumulates on the surface of the sand filter requires regular removal to ensure the filter does not clog.
Permeable paving	Permeable paving can be used in public and private spaces to increase the amount of water that soaks into the underlying soil and therefore decrease the volume of stormwater runoff. Permeable paving can consist of: - porous pavers that allow water to pass through	Permeable paving is suitable for driveways, carparks and footpaths where water can infiltrate into the underlying soil. Note: Areas to be covered with permeable paving are assumed to be pervious and can be excluded	Permeable paving need to be periodically swept (e.g. manually with a broom for small areas or with a street sweeper for larger areas)

 ***Image source: DesignFlow***	the paving surface into the subsurface layers; or - modular interlocking pavers with gaps in between the pavers which allow water to infiltrate into the subsurface layer. It is important to consider the loading on the paving (e.g. pedestrian versus vehicle) when selecting the most suitable permeable paving product. Where permeable paving is used above poorly drained soil, e.g. heavy clays, an underdrain can be used to limit the proportion of runoff that soaks into the soil. For further information on permeable paving please refer to Melbourne Water's website or Instruction Sheet.	from STORM calculations. Areas to be covered with permeable paving must be clearly indicated on town planning drawings.	or pressure hosed to prevent clogging and therefore a reduction in the infiltration capacity.
Gross pollutant traps 	Gross pollutant traps (GPTs) are structures that use physical processes to trap solid waste such as litter. They are commonly used upstream of other treatment systems which remove finer particles.	GPTs are ideal for catchments containing commercial land use. GPTs come in a range of sizes and can be installed in local pits near shopping centres through to large traps at the entrance to a regional constructed wetland.	Typically sized to require emptying every three to six months. Empty as per manufacturer's instructions.
Proprietary stormwater treatment products (other than GPTs)	A number of 'off the shelf' proprietary products are available for onsite treatment of stormwater runoff quality. Proprietary products generally comprise of prefabricated filtration systems, often with replaceable filter cartridges. Alternative products with drop in planter boxes are also available. Proprietary products are often used in constrained situations where conventional stormwater treatment measures may not be suitable; for example, large paved areas. In many cases, the installation of proprietary products will be accompanied by a fixed maintenance contract with the supplier, whereby the unit will be serviced/replaced on a regular basis.	Proprietary treatment systems are generally more expensive than other options and so are used when space/level constraints make other treatment types unsuitable. Proprietary products do not reduce stormwater runoff volumes or provide landscape benefits.	As per manufacturers' instructions.