

# Ballarat Botanical Gardens - The North Gardens Wetlands

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Constructed in 2001 the North Gardens Wetlands has been designed to reduce stormwater pollutants from discharging into Lake Wendouree. The Wetlands receives stormwater from an urban catchment area that consists of both residential and commercial developments covering approximately 100Ha. Pollutants originate from a variety of sources including construction activities, erosion, motor vehicles, spillages and the atmosphere. Types of pollutants range from 'gross pollutants' (eg. Litter/plastic bags etc) to trace metals and nutrients associated with fine sediment, to dissolved pollutants.

In very basic terms wetlands act as a giant sieve by slowing the flow of water so the larger particles being carried drop to the floor of the wetlands and the smaller particles are filtered out through the actions of aquatic plants.

The wetlands consist of three parts:

1. The Gross Pollutant Trap (GPT) is located near Gregory Street. It removes artificial (eg. Plastic bags) and natural litter (eg. Twigs and Leaves) and coarse particles (eg. Gravel/Sand). During storms, large amounts of urban debris are flushed from catchment areas into the stormwater drainage system. This debris is often referred to as gross pollutants. The GPT installed is designed to remove 95% of solids of solids larger than 5mm. This results in over 90% of all stormwater being treated for the removal of gross pollutants.
2. The Inlet Zone takes the form of a pond. This zone serves two very important functions in ensuring the effective operation of the wetlands. Firstly, it traps the sand and silt sized particles and secondly it slows the inflow and therefore controls the rate of discharge into the next wetland zone. This second function is important for maintaining the integrity of the vegetation and other biological structure necessary for the effective treatment of the stormwater in the next zone. A flood bypass is also provided here to allow large floods to bypass. High intensity storm flows would flush sediments from the wetlands into the lake, so once the wetland reaches its full depth water cascades over a bypass channel which is heavily vegetated with reeds and grasses to prevent scouring.
3. The Macrophyte zone is designed to remove fine particles and contaminants from the stormwater. The zone relies on vegetation to promote the range of physical and chemical processes necessary to remove the fine particles. The "control" of the water level in this zone is fundamental in the design of a wetland system.
4. This zone consists of a combination of ephemeral, deep marsh, marsh and shallow marsh areas. The ephemeral areas are normally set above the normal water level and will only be inundated periodically. There is usually some degree of permanent water level in the marshes which helps maintain the biofilm growth on the stems and leaves of the wetland vegetation. These biofilms contribute to the removal of both fine particles and soluble pollutants. The macrophyte zone is divided into three cells separated by a porous rock embankment at one location and earthen embankment at another. This allows for a range of hydrological operation conditions within the wetland to promote a more diverse botanical structure. Water levels in each section are regulated



by means of a series of siphons and a riser (a vertical pipe with a series of holes along it) located at the southern end of this zone. The porous embankment is also used to dissipate flow energy and to ensure uniform flow.

The Wetlands also provide:

- Extended habitat for native fauna
- A site for conservation and interpretation of indigenous plants
- A "wild" contrast to the flat, predictable, largely exotic landscape of the balance of the Botanical Gardens.

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