3.0 Desired outcomes and processes

The ultimate aim of this guideline is to minimise the use of potable water on designed landscapes. Natural bushland is an environment that does not rely on potable water and plants are sustained over long periods and through seasonal and drought cycles. The hydrological characteristics of natural bushland therefore suggest an ‘ideal state’ for the hydrological performance of designed landscapes (Figure 5). Table 2 highlights the ‘assumed’ natural bushland percentages for evapotranspiration, runoff, shallow infiltration and deep infiltration.

<table>
<thead>
<tr>
<th>Hydrological criteria</th>
<th>Adopted benchmark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evapotranspiration</td>
<td>40% of total rainfall</td>
</tr>
<tr>
<td>Runoff</td>
<td>10% of total rainfall</td>
</tr>
<tr>
<td>Shallow infiltration to topsoils</td>
<td>25% of total rainfall</td>
</tr>
<tr>
<td>Deep infiltration to subsoils</td>
<td>25% of total rainfall</td>
</tr>
</tbody>
</table>

Source: Catchments and Creeks Pty Ltd

The ‘ideal state’ can act as a model for achieving best practice in water sensitive landscape design. The principles inherent in the ‘ideal state’ indicate that landscaping on development sites should:

1. integrate with civil works and building design to minimise runoff from the site
2. provide soil of adequate depth and structure to maximise stormwater infiltration and soil storage capacity
Additionally, it will also be desirable that designed landscapes:

3. incorporate plants that are suitable to the site’s microclimates, soils and hydrology
4. use sensitive building siting, garden walls and other elements to moderate exposed sites with harsh microclimates
5. integrate with civil works and building design to maximise stormwater harvest from roofs
6. integrate with the building design so that grey water irrigation technologies can be used (provided that compliance is met with any relevant legislation)
7. be regularly maintained so water conservation outcomes are met over the life of the development.

3.1 DESIGN STANDARDS

Four design standards are proposed (infiltration, planting design, irrigation and maintenance). These standards must be met for applicants to comply with the guideline. Table 3 lists the standards and desired outcomes.

Table 3: Design standards and desired outcomes

<table>
<thead>
<tr>
<th>Hydrological criteria</th>
<th>Adopted benchmark</th>
</tr>
</thead>
</table>
| Soil infiltration     | • Specify, conserve and manage soil depths and structure to maintain optimal moisture content for healthy plant growth.  
                        | • Provide the required soil moisture levels (close to field capacity) predominantly through direct rainfall on garden beds and tank water  
                        | • Where appropriate, reshape existing landforms to capture rainfall and allow direct percolation into the soil sub-grade.  
                        | • Design pavements to direct water to turf and garden areas |
| Planting design       | • Protect suitable existing trees and vegetation.  
                        | • Choose plant species adapted to the site’s hydro-zones.  
                        | • Modify areas with harsh microclimates through building siting, walls and other elements to support plants/ turf. |
| Irrigation            | • Only use irrigation systems when plant water needs cannot be fully met by rainfall.  
                        | • If necessary, harvest stormwater from roofs and store on-site for irrigation use throughout dry periods of the year.  
                        | • Apply irrigation water to plants efficiently using innovative technologies such as rain sensors and moisture probes.  
                        | • Use potable water for irrigation only when all other options have been exhausted. |
| Maintenance           | • Ensure optimal soil infiltration, plant health and selection, and irrigation performance and adjustment are met over time. |

Through sensitive design processes that respond to the site and the landscape’s intended use, it may be possible that the landscaping will not require an irrigation system. Therefore, these guidelines encourage designers to achieve the necessary soil infiltration and planting design outcomes first and then decide if on-site water storage and an irrigation system is required.
The soil infiltration design standard (Section 4.1) provides details to ensure that soil depth and structure, mulching depths and types, and landforms, optimise stormwater infiltration to soils and direct runoff from paved areas to turf and gardens.

The planting design standard (Section 4.2) includes conserving suitable existing vegetation, guidance on selecting plants according to the site’s hydro-zones, and estimating the percentage of plants’ water needs that are met by rainfall.

The irrigation design standard (Section 4.3) includes estimating the percentage of plant watering needs that could be provided by rainfall, tank installation and requirements for irrigation design.

The characteristics of soils and plants change over time. The maintenance design standard (Section 4.4) ensures that a maintenance plan is prepared so that optimal soil infiltration is maintained and plants (including turf) are kept in a healthy state. Irrigation systems, if required, are to be maintained for peak performance and adjusted to respond to the changing water needs of the landscape as plants grow, die out and are replaced, and as user needs change.

### 3.2 DESIGN PROCESSES AND BENCHMARKS

#### 3.2.1 CONCEPT DESIGN

This guideline requires that the landscape conceptual design is prepared at the same time as the civil engineering and building design plans, allowing water sensitive design to be integrated throughout the project. For example, buildings can be sited to moderate more extreme hydro-zones and civil works plans can incorporate water sensitive landforms such as swales and terraces. At the conceptual design stage, the requirements for turf and garden areas, garden walls, wind breaks and shade trees, paths, water features and other elements should be determined.

It is recommended that all of the design team – i.e. engineer, architect, landscape architect and horticulturist – collaborate at the beginning of the design process to achieve cost effective water conservation outcomes. The resulting design should inform the initial Development Application to Council prior to the commencement of any detailed design.

#### 3.2.2 DETAILED DESIGN

All of the design standards in this guideline are intended for use during the detailed design stage and following Council approval of the initial Development Application. Figure 6 shows a conceptual flow chart of a suggested landscape design process for water conservation. It shows the design standards (detailed in Section 4.0) that must be adopted to comply with this guideline. Table 4 (at the end of Section 4.0) is a copy of the checklist that needs to be submitted to Council for operational works assessment to demonstrate compliance. Appendices 1–5 provide further guidance.

This guideline introduces two benchmarks that must be met for compliance. Direct rainfall infiltration to soils must supply 50% or more of the plants’ annual water needs. If this requirement cannot be met, the landscape design must be revised. If rainfall infiltration provides between 50% and 100% of the plants’ water needs, the landscape design is deemed to comply and the designer can prepare an irrigation system incorporating rainwater harvesting. If 100% of the plants’ water needs can be met by rainfall, an irrigation system will not be required. Refer to the planting design standard (Section 4.2) for further details.
It is important to note that design approaches vary between designers and may not necessarily follow the simplified sequential pathway indicated. The flow chart should be read to provide suggestions on when certain tasks could be undertaken to aid in achieving better outcomes for water conservation.
If an irrigation system is required, stormwater harvesting from roofs must supply at least 50% of the remaining water required by plants. Refer to the irrigation design standard (Section 4.3) for further details.

For landscaping located on podiums, the proportion of water supplied directly can be disregarded provided a minimum of 75% of the plant’s water needs are sourced other than from potable water.