MULTIPLE USE PUBLIC OPEN SPACE

THE CASE FOR A NEW APPROACH
CONSULTATION REPORT

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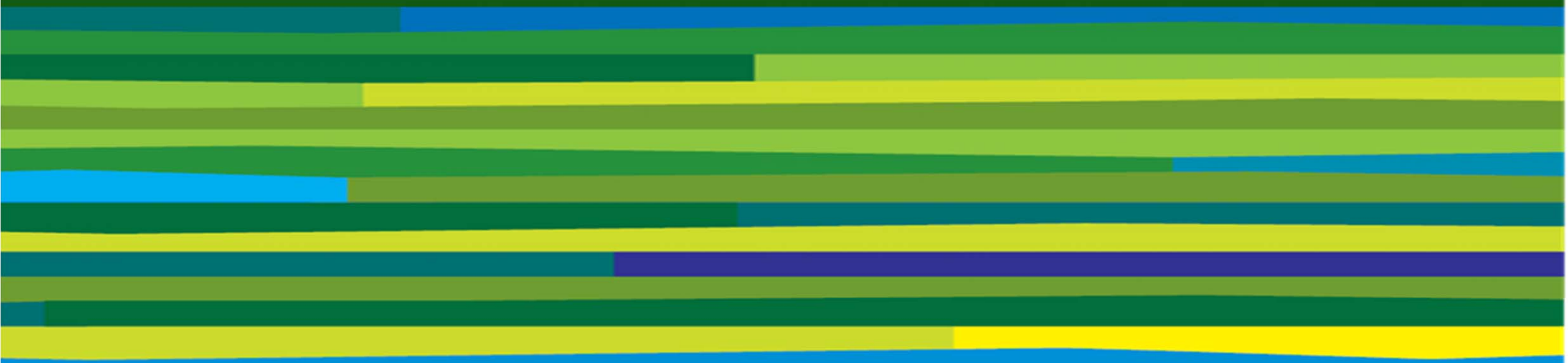
For: Department of Infrastructure, Local Government and Planning
September 2015



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1 INTRODUCTION

In 2013-14 the Queensland Government undertook a review of the State's infrastructure planning and charging framework. The aim of the review was to enhance certainty and equity, to support the financial sustainability of local governments and to protect development feasibility.

In the context of that review, financial sustainability meant that local governments should have adequate revenue to fund trunk infrastructure at a reasonable standard of service, whilst development feasibility should not be adversely impacted by the level of infrastructure charges. The review resulted in a number of legislative changes but concluded that capped infrastructure charges be kept at their existing level.

Where the cost of providing trunk infrastructure to development exceeds the revenue received from capped infrastructure charges, the resultant gap must be funded from other revenue sources such as rates. Accepting that limited scope exists to increase revenue from infrastructure charges or rates, local and state governments have begun to focus on opportunities to reduce the cost of providing development infrastructure.

Following the Queensland Government's review of the State's infrastructure planning and charging framework, a scoping assessment of development infrastructure standards was commissioned by the former Department of State Development, Infrastructure and Planning (DSDIP). This assessment found that significant opportunity existed to reduce infrastructure costs through the multiple use of land for park and stormwater infrastructure. These reduced costs would benefit both the development industry and local government.

It was further stated that the multiple use of land for park and stormwater infrastructure could create more engaging open space areas that meet the community's desire for active recreation, reflection, contemplation and sense of place, whilst reducing net open space maintenance costs.

The aim of this report is to explore whether better and more cost effective infrastructure provision can be achieved through multiple use of land for parks and stormwater. The report:

- Outlines the current local government parkland framework in Queensland
- Considers the barriers to the multiple use of land for parks and stormwater infrastructure
- Benchmarks the current parkland desired standards of service
- Proposes preliminary parkland desired standards of service (DSS) to allow for multiple use parklands
- Presents parkland case studies that illustrate how multiple use DSS can be applied as well as defining land and financial outcomes.

Parkland delivered in accordance with multiple use parkland design principles (collocated, multiple use, integrated, safe and low maintenance)

2 WHAT IS THE PROBLEM?

Historically parklands have been located next to waterways and have included 'water' as an important aesthetic element. Many iconic parklands and pathways in Queensland are next to creeks or rivers and contain water in one form or another. The interaction between users to the park and 'water' means these elements are highly valued and desired by the community.

Over the last two decades, local governments and the State Government have recognised the impact that urban development is having on receiving waterways and created new policy to ensure better stormwater management. Stormwater was no longer considered just drainage infrastructure, it also included stormwater management systems (sediment ponds, wetlands, bio-retention systems, swales etc.) to be integrated into new development. Given the historical connection to water within parklands, it made sense that stormwater management infrastructure would be integrated with parklands. There are a number of excellent parklands in Queensland which have been delivered in the last 15 years where stormwater management forms an important part of the parkland. Refer to *Multiple Use of Open Space Discussion Paper* (Water by Design, 2010).

Notwithstanding these successful examples, the approach to providing parkland and stormwater infrastructure within development has more often become segregated. This has been driven by a belief that stormwater infrastructure is incompatible with the recreational objectives of parklands. Local government parkland policy has been adjusted to effectively exclude stormwater management functions and waterways from parklands. **This approach is resulting in higher costs to local government and is also leading to perverse parkland, waterway and stormwater outcomes**. This is explained below.

Cost

The cost of providing infrastructure is a significant component of the cost of developing land. Under the *Sustainable Planning Act 2009*, local governments are responsible for funding shared (trunk) infrastructure whilst developers are responsible for funding non-trunk infrastructure. Parks are typically considered to be trunk infrastructure and are therefore funded by local government

It is generally acknowledged that infrastructure charges levied on development do not always fund the full cost of trunk infrastructure. With infrastructure charges being capped to maintain development feasibility and limited opportunity available to increase rates, local governments are finding it increasingly difficult to fund the cost of trunk infrastructure required to service development.

The segregated approach for providing parkland and stormwater infrastructure is a significant part of the funding problem. Given current local government parkland policy separates parkland from stormwater infrastructure, the land and capital costs associated with council-owned park and stormwater infrastructure is higher. This higher cost is funded by both local government (i.e. higher cost of trunk infrastructure) and the developer (i.e. higher cost of non-trunk infrastructure). Furthermore the ongoing maintenance cost to local government is higher given the overall maintenance area is larger.

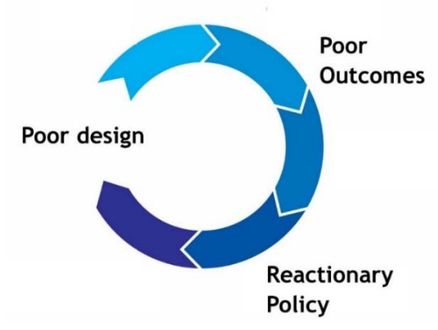
Ill-considered development layout following by poor design by engineers. The result is problematic stormwater management infrastructure which are considered toxic assets by park planners and asset managers

The segregated design approach is also resulting in poor stormwater design outcomes as developers seek to minimise the cost associated with providing non-trunk stormwater infrastructure. This is referred to as stormwater squeeze.

Stormwater squeeze

With most local governments either discouraging or preventing the integration of parks and stormwater infrastructure, the stormwater squeeze phenomenon occurs when stormwater management systems are squeezed into the smallest space possible within a development site without any consideration of the landscape and aesthetic outcomes. This is driven by the following:

- **Cost of stormwater infrastructure** – In most instances, stormwater infrastructure is non-trunk infrastructure and is not offset against infrastructure charges. With no ability to integrate stormwater infrastructure with parkland, developers attempt to minimise their cost of providing this infrastructure by minimising its footprint. This also has the benefit to the developer of maximising development yield.
- **Poor design** - The design of stormwater management infrastructure is most often the responsibility of civil and stormwater engineers and is undertaken after the urban planning process is complete. Landscape architects are generally not involved in the design of this infrastructure until after the civil design is complete. This engineering driven design process often leads to poor integration of stormwater measures into the urban form and public realm (refer photos). Even where spatial integration may appear be resolved in two dimensions, translation of this into three dimensions can result in the unravelling of this integration due to engineering constraints not having been fully appreciated at the planning stage. Due to the lack of space in the development layout for proper interfaces and batters from the stormwater systems to the surrounding landscape, walls or very steep batters are used. This results in little or no landscape amenity and poor outcomes in terms of public safety and accessibility. This also results in a perception that stormwater management systems detract from open space values, increase public risk, are dirty and require intensive and expensive maintenance.
- **Reactionary parkland policy** – Poor design outcomes have led to local governments excluding stormwater drainage and management from parklands as stormwater is perceived to be incompatible with open space values. Local governments have adopted stringent flood immunity requirements (e.g. 50 year ARI) or explicitly excluded stormwater management systems from parks to enforce this. This approach separates parkland from waterways, where parks have until recent times been logically located. It also compounds the problem of stormwater squeeze by limiting alternative options for locating stormwater infrastructure. Consequently, developers continue to squeeze stormwater infrastructure into the smallest space possible.



The industry appears to be in a cycle of poor design leading to poor outcomes resulting in reactionary policy. It is important that parkland policy be revisited to break this cycle and identify a way forward which minimises cost but preserves parkland function. However, there are a number of reasons why local governments are reluctant to change parkland policy (refer Section 3).

Examples of 'Stormwater Squeeze'

3 BARRIERS TO CHANGE

Despite its potential benefits, the multiple use of land for parks and stormwater infrastructure has not received wide acceptance in Queensland, with relatively few modern examples in urban subdivisions. Clearly, there are one or more barriers at play, discouraging or preventing its use as part of new development. If the use of land for both parks and stormwater infrastructure is to be more widely accepted, it is necessary to understand and overcome these barriers. To gain this understanding, consultation was undertaken with three Queensland local governments. Two of these local governments were within South East Queensland whilst the third was regional.

Consultation with each local government was undertaken via a two hour meeting with representatives of the parks and stormwater departments. Local government attendees included town planners, engineers and parks planners.

From these meetings, four main barriers to multiple use of parks were discerned and are discussed in the following sections. Meeting notes are provided in Appendix B.

3.1 LACK OF FINANCIAL INCENTIVE

The cost of using land for both parks and stormwater infrastructure must be less for the party funding the infrastructure than if the infrastructure was provided separately. Without this incentive, there is little to encourage the multiple use of land for parks and stormwater infrastructure given the additional planning and design effort that is often involved.

In considering this issue, a distinction needs to be made between the party funding infrastructure and the party which provides it. For example, a developer may provide a trunk park as part of a subdivision, however the cost of the park is refunded to the developer by the local government (as an offset against the developer's infrastructure charges). Because local government usually plan recreational and sporting parks as part of their LGIP, most parkland that is provided by developers is funded by local government (i.e. as trunk infrastructure which is eligible to be offset against infrastructure charges).

Most local governments condition developers at the time of subdivision approvals to mitigate their impact on stormwater through the provision of on-site infrastructure. This on-site infrastructure is usually considered to be non-trunk infrastructure and its cost is not refunded by the local government. It is therefore provided and funded by the developer.

As a consequence, adopting multiple use of land for parks and stormwater will usually involve a combination of local government and developer funded infrastructure. If stormwater detention or retention infrastructure could be partly or fully accommodated within the area nominated for park the land that a developer needs provide for stormwater infrastructure can be reduced, potentially improving yield and profits.

From a local government perspective, a better financial outcome would be achieved by lowering its purchase costs for parkland. This would be possible if:

- part of the local government cost of purchasing park land could be shared with the developer proposing to locate stormwater infrastructure within the area of the park; and
- trunk parkland could be partially located on otherwise undevelopable land such as flood-prone land along a natural drainage path. Land having these characteristics is significantly less expensive to purchase than developable land.

It has also been identified that *Statutory Guideline 03/14 – Local government infrastructure plans* requires local government at the time of a development approval to base any offset or refund on the establishment cost of the trunk infrastructure identified in the LGIP. Consequently, the ability for the local government to share in the reduced capital cost is limited, thus diminishing the financial incentive for a local government to agree to an alternative, more cost effective, multiple use parkland solution. The department intends to review the relevant provision within *Statutory Guideline 03/14 – Local government infrastructure plans* with a view to allowing local governments to adjust the cost of identified infrastructure if more cost effectives solutions are agreed with developers.

Further, local governments have ongoing responsibility to maintain trunk parks. Where the multiple use of land for parks and stormwater infrastructure is poorly executed, there is potential for higher maintenance costs. Unless it can be demonstrated that maintenance costs of multiple use parkland is reduced through appropriate design standards, the potential for higher maintenance costs will remain a financial disincentive.

3.2 REGULATORY/TECHNICAL REQUIREMENTS

Multiple uses of land for parks and stormwater infrastructure can only be achieved where the regulatory and technical requirements that are applied by local government permit this outcome. The major regulatory / technical barriers are as follows:

- Local government desired standards of service for parkland do not anticipate shared use with stormwater infrastructure. Standards of service which can be particularly restrictive include high levels of flood immunity, width to length ratios that only permit 'handkerchief' shaped parks, and long road frontage requirements. These standards make it difficult to incorporate stormwater infrastructure into parkland and also discourage linear parkland being provided along natural drainage channels.
- Planning schemes contain few if any design standards for multiple use of land for parks and stormwater infrastructure. Coupled with a lack of experience in the implementation of multiple use solutions, developers and local government staff have little guidance on how to achieve good outcomes. Design standards would need to maximise the useability and appearance of the space, whilst minimising maintenance and potential for conflict with neighbours.
- Consistent with the point made in 3.1, it is important that where multiple use of land for parks and non-trunk stormwater infrastructure is undertaken, the financial benefits of the approach are shared by both local government and the developer.

- Fast track development approval systems tend to rely on a 'cookie-cutter' style of development application. The additional planning and design associated with multiple use infrastructure requires a collaborative approach between developers and local governments, which may be difficult to reconcile with fast track approaches to development assessment.

3.3 MAINTENANCE PROBLEMS

Multiple use of land for parks and stormwater infrastructure raises a number of practical maintenance problems in the opinion of staff at the three local governments interviewed, that need to be overcome. The following key issues were raised:

- Dog off-leash areas must be well drained otherwise turf becomes very muddy. Fences and equipment associated with dog off leash areas should be above the 20 year ARI flood level.
- Paths can be covered in silt following a flooding event and can become a safety risk for persons using the park. Cleaning paths of silt can be costly.
- Water flowing into a park can bring litter and pollutants which remain after the water has subsided.
- Regular summer rainfall can prevent a park from drying out following a flood event. This can prevent the mowing of these areas.
- Hard infrastructure such as paths, shelters, barbecues and playgrounds should be kept out of the area that floods in order to minimise water damage.

3.4 CULTURAL ATTITUDES

For the last ~15 years, the objectives of parks and stormwater planning have been seen as mutually exclusive. Parks have been designed by parks planners to achieve high levels of recreational amenity whilst stormwater infrastructure has been designed by engineers to protect people, property and infrastructure. Stormwater has not been considered as compatible with recreation.

This approach to infrastructure planning is reflected in the desired standards of service and planning scheme provisions of most local governments that discourage or prevent the multiple use of land for parks and stormwater infrastructure. These standards and provisions are typically implemented by local government officers responsible for administering planning schemes and infrastructure plans.

Successful implementation of multiple use spaces that provide park and stormwater functions will require a change of attitude at many levels.

4 PROVIDING PARKLAND IN QUEENSLAND

4.1 FRAMEWORK

As illustrated in Figure 1, public parklands (referred to as parklands herein) are provided by local governments and developers in Queensland. The design and delivery of these parklands is primarily controlled through the local government's planning scheme which includes a Local Government Infrastructure Plan (LGIP). Specific parkland requirements are also outlined in the Parkland Desired Standards of Service and Parkland Policy or Design Guideline which are usually to be found in either the planning scheme or LGIP. These typically outline:

- Park types (refer Section 4.2)
- Potential locations
- Provision rates
- Minimum areas
- Dimensions
- Slopes
- Landscape planting
- Flood immunity
- Exclusions

Parkland standards within the DSS and Parkland Policy/Guideline are adopted by local governments to reflect the outcomes sought by their local community.

State Government instruments that are relevant to parkland and stormwater planning include:

- *Statutory guideline 03/14 – Local government infrastructure plans*
- *State Planning Policy July 2014*
- *State Planning Policy – state interest guideline - Liveable communities July 2014*

Local government infrastructure plans

If a local government plans to provide a trunk park network, it is required by the *Sustainable Planning Act 2009* (SPA) to identify those trunk parks in its local government infrastructure plan (LGIP). Planning for trunk parks is undertaken by all local governments in Queensland that have major urban centres.

Statutory guideline 03/14 – Local government infrastructure plans provides examples of trunk parks that may be included in an LGIP but provides no specific design requirements for these parks.

Whilst trunk parks are planned by local governments in response to the needs of both existing and future residents, they are often provided by developers as part of the subdivision of land (Refer Section 4.2).

An important characteristic of trunk parks is that where a trunk park is provided by a developer in a manner consistent with the LGIP, the cost of the park must be offset against the infrastructure charges levied on the development.

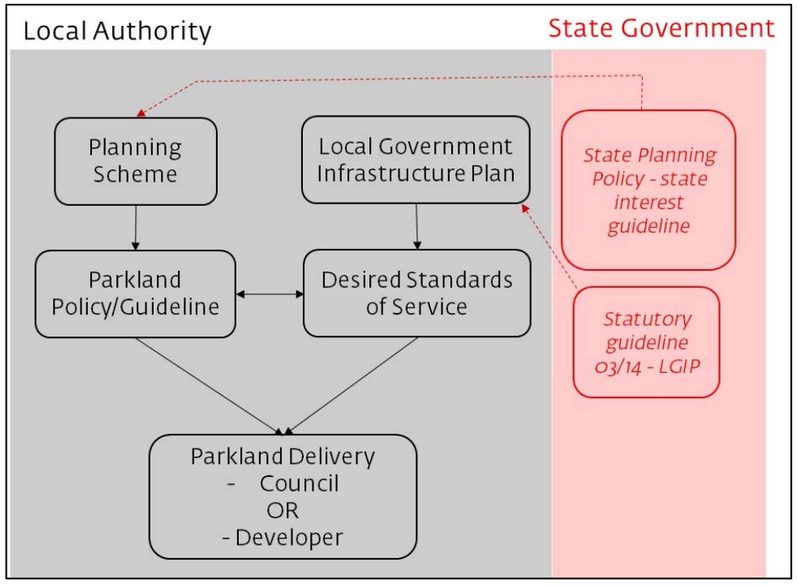


Figure 1: Parkland planning and delivery framework in Queensland

State Planning Policy & State Planning Policy - state interest guideline – Liveable communities

The *State Planning Policy* (SPP) defines the State Government's policies about matters of state interest in land use planning and development. These policies apply when making or amending a local planning scheme and designating land for community infrastructure.

The policy most relevant to park planning is State interest – liveable communities. This state interest requires, inter alia, that the planning scheme provide attractive and accessible natural environments and public open space by planning for public open space that:

- is functional, accessible and connected, and
- supports a range of formal and informal sporting, recreational and community activities.

This requirement is not supported by any technical standards for parks planning in the SPP.

State Planning Policy- state interest guideline - Liveable communities supports the implementation of the SPP but is not a statutory component of the SPP. Use of the guidance material is therefore optional. The guideline provides advice concerning the integration of the state interest into planning schemes, and includes a chapter providing general advice on the planning of public open space.

To achieve cost effectiveness of public open space, the state interest guideline provides the following advice:

- Encourage the multiple use of public open space and shared use of facilities, where the proposed uses are safe and compatible, as a means of reducing initial development costs and the ongoing costs of the parks network to the community.
- Integrate flood and stormwater management elements, utility corridors and active transport links into parkland.

4.2 PARKLAND FUNCTION AND TYPE

Table 1 defines the typical parkland types and functions adopted by Queensland local governments. Parklands are typically designed and delivered in accordance with the local governments DSS or parkland design guidelines.

This review focusses on parklands delivered as part of development. These are typically local recreation park, linear park and district recreation park. Waterway buffer open space has also been included in the review to illustrate the benefits of multiple use waterway buffers.

Active Recreation – Active recreation provides a setting for formal structured sporting activities. Occurs on sport parklands and ovals.

Passive Recreation – Passive recreation provides a setting for informal play and physical activity, relaxation and social interaction. This includes:

- Playgrounds or other activity areas
- Shelter and picnic areas
- Kickabout space
- Vegetation both existing and created garden beds
- Other functions (dog off-leash, waterway and stormwater management)

Table 1: Parkland types

Parkland Type	Description*	Typical Area
Local Park	A small to moderate sized park which provides visual amenity and passive recreation opportunities for the local community. Intended to be an extension of private open space residents walk to local parks, use the parks in small numbers and for short periods of time. The parks will contain limited infrastructure such as seating, shelter and play equipment for young children plus a small grassed area for kickabout, trees and garden beds. Pathways through the park should connect to the surrounding residents and to regional recreation linkages and pathways.	0.5 – 1.0 ha
Linear Park	A long, relatively narrow park that provides informal recreation opportunities, particularly paths for walking and cycling. Linear parks are used as a linking element in the overall parks network either within or between neighbourhoods or between neighbourhoods and destinations such as a school commercial centre or sporting oval. Ideally located adjacent to vegetated and environmental areas such as a buffer to a waterway. Recreation surveys across Queensland have highlighted the communities' desire for more linear recreation parks that provide pedestrian and bicycle connections across large areas. (i.e. along waterways).	-
District Park	A large park that caters for the varied recreational needs and community activities of a group of neighbourhoods. District recreation parks should provide a variety of settings, spaces and facilities to cater for large numbers of people, including large groups of people at significant community events, and for all age groups and levels of ability in the community.	2.0 – 5.0 ha
Regional (City-Wide)	A very large park with extensive facilities and settings to cater for the varied recreation demands of a large population catchment. Regional parks provide a significant range of recreation opportunities to cater for the whole community, and should be capable of supporting a large community event and multiple activities undertaken simultaneously by large groups of people. Regional parks are well known in the community and people travel long distanced to spent long periods of time (4+ hours) in the park.	> 5.0ha
Civic Park	A small park within a higher density residential or commercial major centre. They provide landscape and amenity values and passive recreation opportunities for residents, workers and visitors to the centre. Civic parks provide spaces and facilities for social interaction and community events. A civic park is typically urban in nature, with hard surfaces and treatments in recognition of its setting and high activity levels.	< 1.0ha
District	A large park that provides spaces and facilities for practising and playing structured or organised sports. District sports parks normally accommodate several sporting organisations that share the sports facilities, and also provide some informal recreation activities and spaces for the immediate area and visitors to the park.	>3ha
Regional (City-Wide)	A very large park that provides spaces and facilities for practising and playing structured or organised sports, including spectator seating and parking for major sports events. Major sports parks cater to a large catchment and normally accommodate several sporting organisations that share the sports facilities. Major sports parks also provide a range of informal recreation activities and spaces for the immediate area and visitors to the park.	>6ha

* Descriptions based on those provided in *ULDA Guideline No. 12 Park Planning and Design* (ULDA, 2011)

4.3 DESIRED STANDARDS OF SERVICE BENCHMARKING

Benchmarking of the parkland desired standards or service was undertaken as part of the *Multiple Use of Open Space Discussion Paper* (Water by Design, 2010). This work focussed on the engineering and stormwater management aspects of parkland design (e.g. flood inundation standards, surface profiles for rapid drying etc.). The subsequent *Framework for the Integration of Flood and Stormwater Management into Open Space* (Water by Design, 2011) presents the findings of this work in a design framework which provides an excellent tool for resolving many of the technical aspects of integrating stormwater functions into parkland design. Since the release of this framework there has been very little uptake by local governments. The Economic Development Queensland *Guideline No. 12 Park Planning and Design* appears to be the only park guide which references the Water by Design framework, although it is acknowledged that this operates under the *Economic Development Act 2012*.

Discussions with local governments indicate that the Water by Design Framework has not been adopted for a numbers of reasons (refer Section 3) and very little change in park policy has occurred in the time since it was released. Importantly the framework does not deal with the fundamental issue which face parkland planners:

- How much parkland is actually required?
- How much of this parkland area is required to play and to kickabout (i.e. useable area)?
- What are the characteristics of these play and kickabout areas (i.e. slope, shape)?

A benchmarking exercise was undertaken to answer these questions, the findings of which are presented in the following sections. The benchmarking focusses on recreational parkland, not sporting parkland.

4.3.1 Queensland Local governments

The following pages provide a summary of current open space DSS for the defined local governments, with park size, provision rates, shape, slope and flood immunity examined.

Park Area - The table below provides the minimum park sizes specified by local governments, as well as the prescribed provision standards (expressed in ha/1,000 persons). The table indicates the following:

- While there is a variance in park sizes across local government areas, there is a general consistency across parkland types.
- Local Park size is typically a minimum of 0.5ha with a provision rate of 1ha/1000p.
- District Park size is typically a minimum of 2ha, with the larger populated local government areas adopting 4-5ha minimum. Provision rates vary significantly with the typical range being 0.4-1.4ha/1000p.
- Citywide/regional recreation parks are consistent at 10+ha in area with a provision rate of 0.5ha/1000p.
- Total recreation park provision rates vary between local governments but the typical range is 2.0-2.3ha/1000p.

Table 2: Recreation park size and provision rates (ha/1,000p) by local government

Local Government	Minimum park sizes (ha)			Provision standards (ha/1,000p)			Total (ha/1,000p)
	Local	District	City/Region	Local	District	City/Region	
Banana Shire Local government	n/	1.4	n/a	n/a	1.4/1,000	n/a	1.4ha/1,000
Brisbane City Local government	0.5	5	n/a	0.8/1,000	0.8/1,000	0.4/1,000	2ha/1,000
Bundaberg Regional Local	0.5	2	n/a	1.2/1,000	0.5/1,000	n/a	1.7ha/1,000
Cairns Regional Local	1	2-5	2-5	1/1,000	1.3/1,000	0.2/1,000	2.5ha/1,000
Carpenteria Shire Local	0.5	1	n/a	n/a	n/a	n/a	n/a
Central Highlands Regional Local government	0.5	2	n/a	0.5/1,000	0.4/1,000	0.6/1,000	1.5ha/1,000
Cook Shire Local government	0.5	n/a	n/a	3/1,000			3ha/1,000
Fraser Coast Shire Local	1-2	2-6	6	1/1,000	1.3/1,000	0.2/1,000	2.5ha/1,000
Gold Coast City Local	1	5	15	1.5/1,000	1/1,000	0.5/1,000	3ha/1,000
Gympie Regional Local	0.5	2	2	0.4/1,000	1.4/1,000	0.5/1,000	2.3ha/1,000
Ipswich City Local government	1	4	10	0.5/1,000	0.4/1,000	n/a	0.9ha/1,000
Lockyer Valley Regional Local	0.5	1	n/a	0.6/1,000	0.4/1,000	0.4/1,000	1.4ha/1,000
Logan City Local government	1	5	10	0.8/1,000	1.2/1,000	1/1,000	3ha/1,000
Mackay Regional Local	n/	3	10	n/a	2/1,000	0.6/1,000	2.6ha/1,000
Moreton Bay Regional Local	1	4	10	1/1,000	0.6/1,000	0.5/1,000	2.1ha/1,000
Mount Isa City Local	0.5	1	n/a	0.8/1,000	0.8/1,000	0.4/1,000	2ha/1,000
North Burnett Regional Local	0.5	n/a	n/a	1/1,000	n/a	n/a	1ha/1,000
Redland City Local government	0.2-	2-10	5-20	n/a	n/a	n/a	n/a
Rockhampton Regional Local	0.5	2*	6*	1.2/1,000	0.8/1,000	0.5/1,000	2.5ha/1,000
Somerset Regional Local	0.5	1-2	n/a	2.5/1,000			2.5ha/1,000
Southern Downs Regional Local	0.5	1.5	2	0.8/1,000	2/1,000	2/1,000	4.8ha/1,000
Sunshine Coast Regional Local	0.5	3-5	10-20	1/1,000	1.3/1,000	0.7/1,000	3ha/1,000
Toowoomba Regional Local	0.5	2	6	1/1,000	1/1,000	n/a	2ha/1,000
Townsville City Local	1	4	n/a	1/1,000	0.4/1,000	0.6/1,000	2ha/1,000
Western Downs Regional Local	0.5	2	6	1.3/1,000	0.8/1,000	n/a	2.1ha/1,000
Whitsunday Regional Local	1.5	2	5	1.5/1,000	1/1,000	0.5/1,000	3ha/1,000

Park shape - The majority of the local governments reviewed do not provide dimensions or shapes in their DSS for their recreation parks. The most common element of shape that is provided within the DSS is a minimum park width, which again is not common.

Table 3: Park shape requirements

Local Government	Specified dimensions and width by recreation park hierarchy		
	Local	District	City/Region
Banana Shire Local	-	-	-
Brisbane City Local	-	-	-
Bundaberg Regional Local government	The preferred shape for a park is square to rectangular with the sides no greater than 2:1	The preferred shape for a park is square to rectangular with the sides no greater than 2:1	-
Cairns Regional Local	-	-	-
Carpenteria Shire Local	-	-	-
Central Highlands Regional Local government	-	-	-
Cook Shire Local government	Land should be greater than 15m wide unless part of a linkage or minor entry point then 5 m minimum applies.		
Fraser Coast Shire Local	-	-	-
Gold Coast City Local	Round or square	Round or square	Round or square
Gympie Regional Local	-	-	-
Ipswich City Local government	-	-	-
Lockyer Valley Regional Local government	Square to rectangular, with the sides no greater than 2:1	The preferred shape for a park is square to rectangular with the sides no greater than 2:1	Average grade of 1:20 for main use areas, 1:50 for kick about area, and variable topography for remainder
Logan City Local government	Round or square	Round or square	Round or square
Mackay Regional Local	-	-	-
Moreton Bay Regional Local government	Square / compact. Average ratio (width-depth) at least 0.5. No less than 15m (local) to 30m (neighbourhood) in width at any point	Square or compact in shape Average ratio (width-depth) at least 0.75. No less than 30m in width at any point	No less than 30m wide at any point. Average ratio (width to depth) = 0.75
Mount Isa City Local	-	-	-
North Burnett Regional Local	-	-	-
Redland City Local	-	-	-
Rockhampton Regional Local government	Preferred shape for a park is square to rectangular with the sides no greater than	Preferred shape for a park is square to rectangular with the sides no greater	Preferred shape for a park is square to rectangular with the
Somerset Regional Local	-	-	-
Southern Downs Regional	-	-	-
Sunshine Coast Regional Local	-	-	-
Toowoomba Regional Local government	Preferred shape for a park is square to rectangular with the sides no greater than	-	-
Townsville City Local government	N/a	Preferred shape for a park is square to rectangular with the sides no greater	Preferred shape for a park is square to rectangular with the
Western Downs Regional	-	-	-
Whitsunday Regional Local	-	-	-

Park Slope - The specified slope within each local government's DSS for recreation parks varies. The two most common specifications for local recreation parks are:

- 1:20 for main use area, with 1:6 for the remainder of the site
- maximum of 1:10 for 80% of the site

Table 4: Slope requirements

Local Government	Slope by recreation park hierarchy		
	Local	District	City/Region
Banana Shire Local government	n/a	n/a	n/a
Brisbane City Local government	An applicable code and standard in a local planning instrument for the configuration, slope and acceptable level of flood immunity for the public parks network		
Bundaberg Regional Local government	Max grade of 1:10 for 80% of the area of the park (i.e. A maximum of 20% of the land may have a greater grade than 1:10)		
Cairns Regional Local	1:20 for main use area		
Carpenteria Shire Local	1:10 for 75% of park area		
Central Highlands Regional Local government	1:20 for main use area, 1:6 for	Picnic facilities = 1:20	n/a
Cook Shire Local government	1: 20 for main use area. 1: 6 for remainder	1: 20 for main use area. 1:50 for kick about area	n/a
Fraser Coast Shire Local	at least 90% of park area must have a surface gradient of less than i in 6		
Gold Coast City Local government	1:10 for 20%	1:10 for 10%	1:10 for 20%
Gympie Regional Local	max grade of 1:20		
Ipswich City Local government	50% at 5% gradient or less	30% at 5% gradient or less. Batters to not exceed 1:6	
Lockyer Valley Regional Local government	Maximum grade of 1:10 for 80% of the area of the park (i.e. a maximum of 20% of the land may have a greater grade than 1:10)	Average grade of 1:10 for 80% of the area of the park. To facilitate wheelchair access to parks, areas with a grade of 1:14 will also be provided, where possible	n/a
Logan City Local government	50% greater than 5%	30% greater than 5%	25% greater than 5%
Mackay Regional Local	Not to exceed 1:10		
Moreton Bay Regional Local	Currently being revised		
Mount Isa City Local government	1:10 (for 20%)	1:10 (for 10%)	n/a
North Burnett Regional Local government	Minimum 75 per cent of the area with a gradient less than 10 per cent. All area must be above 50 per cent AEP minimum and 50 per cent above 5 per cent AEP. All buildings and car parks are to be above the 1 per cent AEP		
Redland City Local government	<20%		n/a
Rockhampton Regional Local	Max grade of 1:14 for 80%		
Somerset Regional Local government	1:20 for main use area, 1:6 for	1:20 for main area, 1:50 for kick about area	n/a
Southern Downs Regional Local	1:10 (for 80% of site)		n/a
Sunshine Coast Regional Local	n/a	n/a	n/a
Toowoomba Regional Local government	Max of 1:10 for 80%	Max of 1:14 and no more than	n/a
Townsville City Local government	n/a	Average grade of 1:14 for 50%	n/a
Western Downs Regional Local government	Max of 1:10 for 80%	Average of 1:10 for 80%	Average of 1:20 for main use areas, 1:50 for kick about
Whitsunday Regional Local government	1:20 for main use area and 1:6 for remainder	1:20 for main use area	n/a

Flood Immunity – In addition to the parkland requirements presented above, flood immunity stardards were reviewed. We did this because many of the local authority DSS's have been updated since the release *Multiple Use of Open Space Discussion Paper* (Water by Design, 2010). The flood immunity standards are extremely varied across local government areas, with little commonality between local governments. Generally all of the Local government DSS's require parks to be mostly flood free with the majority of the park area to be above the 20-50 year ARI flood event. Some of the Local governments allow a portion of the park to be lower (5-50year ARI) but none allow flooding below 5 year ARI.

No local government acknowledged waterways or stormwater management systems as part of park and in fact included DSS requirements which excluded them from parkland. This is resulting in some perverse parkland and stormwater outcomes which are described in Section 2.

Table 5: Flood immunity requirements

Local Government	Minimum park sizes by recreation park hierarchy		
	Local	Distric	City/Region
Banana Shire Local government	n/a	80%>Q50	n/a
Brisbane City Local government	To be suitable for building development according to current plan provisions and should be above flood regulation levels for built development. Parks are not affected by high velocity overland flow paths (as defined in the Subdivision and Development Guidelines) that could pose a risk to personal safety. Car parking and fencing above 1 in 50 ARI; playgrounds and minor structures outside of obvious watercourses to avoid high maintenance costs		
Bundaberg Regional Local government	20%>Q5, 15%>Q100	20%>Q5, 25%>Q50, activity area > Q100	n/a
Cairns Regional Local government	Whole area free of regular flooding (i.e.: above ARI 5) with the Main Purpose Area or 10% (whichever is the greater) of total area above ARI 50. Free of hazards.		
Carpenteria Shire Local	n/a	n/a	n/a
Central Highlands Regional Local government	15%>Q100	20%>Q50,	n/a
Cook Shire Local government	Main activity area above Q10, 10%>Q50		
Fraser Coast Shire Local government	Park area must be flood free in a 1 in 2 year ARI storm event. At least 10% of the park area must be above the 1 in 100 year ARI flood level and have surface gradient of less than 1 in 6. Infrastructure to be flood resistant or located above the 1 in 100 year ARI flood level.		
Gold Coast City Local government	25% >Q5 , 75%>Q50, 0%>Q100	0%>Q5,90%>Q50, 10%>Q100	50%>Q5, 40%>Q50, 10%>Q100
Gympie Regional Local	Minimum flood immunity, 100% above Q5 and 10% above Q50		
Ipswich City Local government	Where possible drain into feature lake or creek through natural filter (e.g. wetland) or street stormwater system. Parks are to be located above the Q100 design flood level. In all circumstances, areas containing buildings or playgrounds are to be located above the Q100 design flood level.		
Lockyer Valley Regional Local	n/a	n/a	n/a
Logan City Local government	100%>Q10, 75%>Q50, 10%>Q100		
Mackay Regional Local government	For public parks, a configuration, slope, and minimum acceptable level of flood; immunity of Q5 and in accordance with Local government's adopted standards identified		
Moreton Bay Regional Local	100%>Q50	70%>Q50	50%>Q50
Mount Isa City Local government	30% >Q5, 70%>Q50	50%>Q5, 50%>Q50	Unspecified
North Burnett Regional Local	25%>Q5, 75%>Q50	n/a	n/a
Redland City Local government	n/a		
Rockhampton Regional Local government	15% of total area >Q100 and free of hazards	At least 25% of total area >Q50 with main activity area/s >Q100	At least 50% of total area >Q50 with main activity area/s >100
Somerset Regional Local	90%>Q10, Q50		
Southern Downs Regional Local	100%>Q100		
Sunshine Coast Regional Local	Land to be >Q20. Buildings are to be >Q100. Kick about and social spaces are well		
Toowoomba Regional Local government	15% >Q15, 10% >Q50,	40%>Q15, 20%>Q50,	Unspecified
Townsville City Local government	10%>Q50	20%>Q50	n/a
Western Downs Regional Local government	15% of total area >Q100 and free of hazards	25% >Q50 with main activity area/s > Q100	50% >Q50 with main activity area/s >Q100 and
Whitsunday Regional Local	25% >Q5, 75% Q50	Unspecified	Unspecified

4.3.2 Queensland Priority Development Areas

Economic Development Queensland (formerly Urban Land Development Authority) *Park Planning and Design* guideline includes the requirements provided in Table 6. This guideline integrates with the Priority Development Area development schemes and residential development guidelines.

Table 6: Queensland Priority Development Areas – Parkland Requirements

Parkland Type	Provision	Min Area	Accessibility
Local Parkland	1 .3ha/1000p	0.5ha	90% dwellings within 400m
District Parkland	0.5-1.0 ha/1000p	5.0ha	90% dwellings within 2.5km
Linear Parkland	0-0.8 ha/1000p	15m wide	

Parkland Element	Standard
Slope	1:33 with 1:10 for less than 20% of parkland
Shape	Rectangular with min width of 10m

It acknowledges the merits of multiple use parklands by:

- Including design principles which mention the need to create 'diverse' parklands and the need to consider 'waterways'.
- Referencing the *Framework for the Integration of Flood and Stormwater Management into Open Space* (Water by Design, 2011)
- Containing the following subsection in the document which allows for 30% of a parkland to be below the 5 year ARI flood event.

Flood and stormwater management

EDQ encourages the integration of flood and stormwater management practices into parks. These aspects of park design are required to achieve:

- *relevant performance criteria in the Framework for the Integration of Flood and Stormwater Management into Open Space, Water by Design, Healthy Waterways Limited. (Note: for design purposes a "minor storm event" is defined as a storm event with an Average Recurrence Interval (ARI) of 2 years), and*
- *the minimum flood immunities shown in Table 5.*

Table 5: Minimum flood immunities

Park type	*Minimum flood immunity*
Recreation parks	*Maximum 30 per cent of any park is below the 5 year ARI (average recurrence interval) flood level.* *Clubhouses, toilet and amenities blocks and other buildings (and areas designated for these facilities) are above the 100 year ARI.*
Sports parks	*All formal playing surfaces (fields and courts) are above the 20 year ARI flood level.* *Clubhouses, toilet and amenities blocks and other buildings (and areas designated for these facilities) are above the 100 year ARI.*

4.3.3 Interstate

Parkland requirements of interstate governments was rapidly reviewed as part of the benchmarking process. The findings are provided in Appendix C which have no influence on this project.

The only significant point to note is that the Western Australian Planning Commissions is prepared to accept parkland which is occupied by public utility uses such as stormwater management, provided the systems are located, designed and landscaped to ensure the public is able to use the space for safe, passive and/or active recreation and amenity is not impaired. There are a number of excellent examples of parklands in Western Australia which made the most of this by delivering parklands which provide a high level of recreation but also stormwater management function.

4.4 RAPID BENCHMARKING OF 'USEABLE' PARK AREAS

An important aspect of recreational parkland design, particularly for Local Parks, is the useable area requirement. The useable area needs to provide for play, shelter and kickabout space (i.e. informal active recreation). When a parkland is designed it is often these play/shelter nodes and kickabout spaces that are located first by the landscape designer, then the other environmental open space areas are allocated around these to create the finished parkland design. The multiple use functions should not compromise these useable areas.

No existing parkland design document specify the area requirements for play/shelter nodes and kickabout areas. Therefore a rapid benchmarking of this was undertaken based on a number of existing parklands in Queensland and Victoria and presented in Appendix A. This results of the benchmarking is summarised in has been used to establish the parkland design requirements presented in Table 7.

Toowoomba Regional Council have recently completed a similar benchmarking exercise and found very similar useable parkland areas as those listed in Table 7.

Table 7: Minimum parkland 'useable' areas

Parkland Type	Area (min)	Play/Shelter Node (min)	Kickabout space (min)
Local Parkland	0.5ha	0.1ha	0.25ha
	1.0ha	0.2ha	0.4ha
District Parkland	2.0ha	0.5ha	0.6ha

4.5 SUMMARY

Table 8 summarises the key findings from the benchmarking exercise. The requirements highlighted in red are those that the multiple use parkland framework seeks to adjust or clarify.

Table 8: Summary of recreation parkland benchmarking

Parkland Type	Provision	Min Area	Play/Shelter Node (min)	Kickabout space (min)
Local Parkland	1 ha/1000p	0.5ha 1.0ha	0.1ha 0.2ha	0.25ha 0.4ha
District Parkland	0.8 ha/1000p	2.0ha	0.5ha	0.6ha
Linear Parkland	As needs basis to offset local or district park provision. Ideally co-located with waterways and minimum 15m wide.			

Parkland Element	Standard
Slope	Generally 1 in 20 for 80% (max 1 in 6)
Shape	Circular, rectangular or square
Flooding	Flood immunity used to define flood requirements rather than flood risk (i.e. depth, velocity, inundate rates). Vulnerable parkland infrastructure should be flood free. Parkland areas generally above 20-50 year ARI but some local governments allow inundation down to 5 year ARI. EDQ Park Guideline allows 30% of parkland to be below 5 year ARI.

5 NEW APPROACH TO PROVIDING PARKLAND

This section outlines a framework that can used by local governments to revise parkland policy to encourage multiple use parks. The intention of the framework is to reward or encourage good urban and parkland design that:

- Delivers a recreational parkland which provides passive recreation including a suitable useable area for play and kickabout
- Adopts larger Local Parks instead of many smaller Local Parks
- Co-locates parkland with waterways and stormwater management systems
- Creates linear parkland linkage along waterways which connect to other parklands or destinations.
- Creates multiple use use functions within parkland (i.e. areas which provide a stormwater function while preserving the recreational opportunity of the park).
- Is well connected with surrounding parkland and urban spaces
- Is safe
- Is easily maintained

When designed to meet these outcomes, the parkland and associated multiple use functions can form part of the required parkland rate of provision (ha/1000 people).

Table 9: Multiple use Recreational Parkland Framework

Requirement	Description
Parkland rate of provision	Parkland provision requirements are set in terms of ha / 1000 people or similar. This needs to be split between Local Park, District Park, Regional/City Wide Park and Linear Park (e.g. Linear Park may form part of Local and or District Park provision). This parkland provision sets the upper limit of parkland contributions that will be funded by local government. Based on the benchmarking presented in Section 4.5 the following is considered appropriate: • Local park = 1h / 1000 people • District park = 0.8ha / 1000 people • Linear park = Forms part of local or district park contribution provided that suitable useable space (i.e. play node and kicakabout space) has been provided
Parkland minimum area	Minimum area for each park type needs to be defined by each local government to meet its community needs. Based on the benchmarking presented in Section 4.5 the following is considered appropriate: • Local park = 0.5ha or 1ha minimum (preference to encourage larger Local Parks) • District park = 2.0ha / 1000 people • Linear park = 15m wide
Accessibility	Parklands must be within easy access for residents. Local Parks and Linear Parks must be within walking distance whereas larger District Parks may be within driving distance. Generally 90% of dwellings should be within the following distances to the relevant park: • Local park = 500m • District park = 2km • Linear park = 500m
Fit for purpose areas	The allocation of **functional areas** within the parkland must be fit for purpose to create a range of recreation opportunities. The park should not be dedicated to kickabout or playground alone. The benchmarking in Section 4.4 identified the split of parkland uses at the Local Park level. Based on the benchmarking, for a 0.5ha Local Park the following could apply: • Play/Shelter node = 0.1ha minimum • Kickabout space = 0.25ha minimum • Environmental open space = 0.15ha For a 1.0ha Local Park, greater reward may be given to the developer by increasing the portion of environmental open space. Each of the parkland functional areas needs to meet a set of design requirements to achieve their function (shape, width, slope etc.). The kickabout space can provide flood detention (see below). The environmental open space area can be waterway or stormwater treatment (see below).
Co-location	Waterways and stormwater management can form part of the environmental open space area. For this to occur, the waterway/stormwater management system must be co-located with the useable areas (kickabout and play/shelter node). The design of the system must integrate with the useable zones and promote pedestrian and visual connection through a broad interface width.
Multiple Use	Kickabout space can have a lower flood immunity and provide a flood management function. However, the zone needs to be designed to be safe from 'flood risk' (as against flood immunity) and preserve the recreation function by ensuring it drains freely and be free from permanent lying water and wet areas Play/shelter nodes and associated parkland infrastructure should be flood free. Environmental open space areas can provide a range of functions including stormwater management and should maximise passive recreation opportunities through flat batters, pathways and turf zones which promote the same interaction.
Connection	Clear and legible pedestrian and visual connections must be provided between the environmental open space and useable open space and urban areas. The parkland should have at least 50% road frontage and pedestrian access should be provided to a minimum of 50% of the perimeter of the environmental open space to promote passive recreation. This pedestrian access must be connected to the active open space areas and any regional pedestrian linkages. The design of the environmental open space needs to maximise the width of the connection and adopt flat vegetated batters.

6 POTENTIAL NEW DESIRED STANDARDS OF SERVICE

The following sections propose new open space desired standards of service (DSS) which local governments may use to support the creation of multiple use parklands. The DSS aim to create fit-for-purpose recreation parklands but promote the colocation and integration with waterways, flood detention and stormwater treatment systems. **The DSS are preliminary only and provided for the following purposes**:

- Provide a draft framework for multiple use parklands
- Provide a starting point for further discussion with local governments regarding DSS's
- Allow the creation of case studies (Section 7) to illustrate the benefits of the multiple use open space framework

The DSS are based on those provided in Water by Design (2011) *Framework for the Integration of Flooding and Stormwater Management into Open Space* and Leinster et al (2010) *Can we move beyond the credit crunch: WSUD in open space* but expanded to consider the following:

- Findings of the benchmarking presented in Section 4.5
- Incentives to encourage colocation of parkland with waterways, stormwater management infrastructure and retained vegetation
- Park provision requirements (ha/1000 people)
- Parkland minimum areas (ha)
- Spatial requirements for recreation nodes and kickabout space (ha)
- Parkland shape
- Road frontage requirements
- Integration of stormwater management within waterway buffers

The DSS have been broadly discussed with Toowoomba, Brisbane and Logan Councils and generally reflect the outcomes of those discussions. Further consideration and discussion is required to refine these DSS before possible implementation by local governments.

Multiple use parkland showing kickabout space (background) and constructed wetland (foreground)

6.1 LOCAL PARK

The proposed multiple use DSS for Local Parkland is provided in Table 10. Figure 2 illustrate the spatial requirements of the DSS for Local Parkland. The DSS preserves the function of the Local Park, passive recreation (i.e play) and informal active (i.e. kickabout), while providing multiple use opportunities within the environmental open space and in the kickabout space.

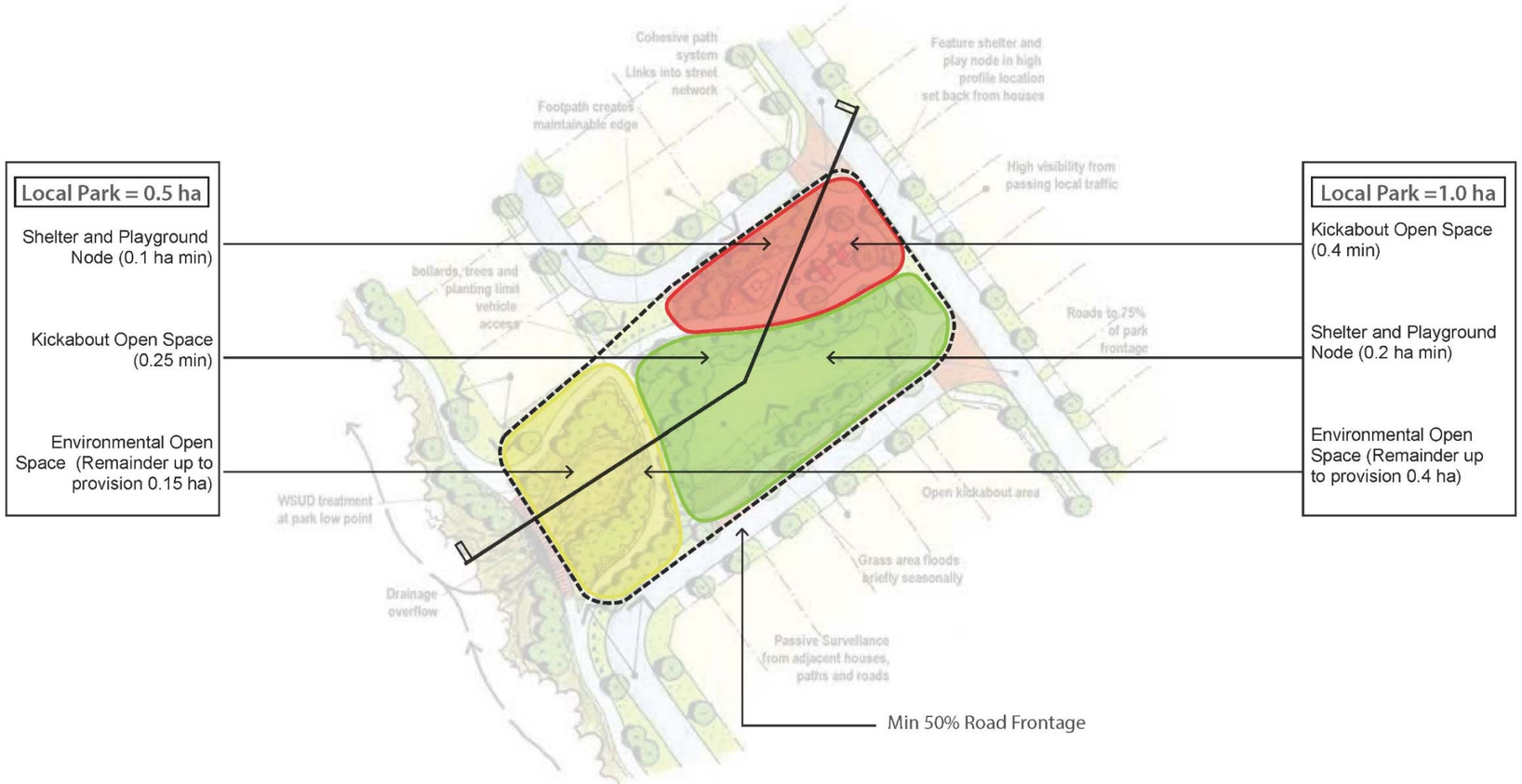


Figure 2: Local Park Multiple use DSS – Plan

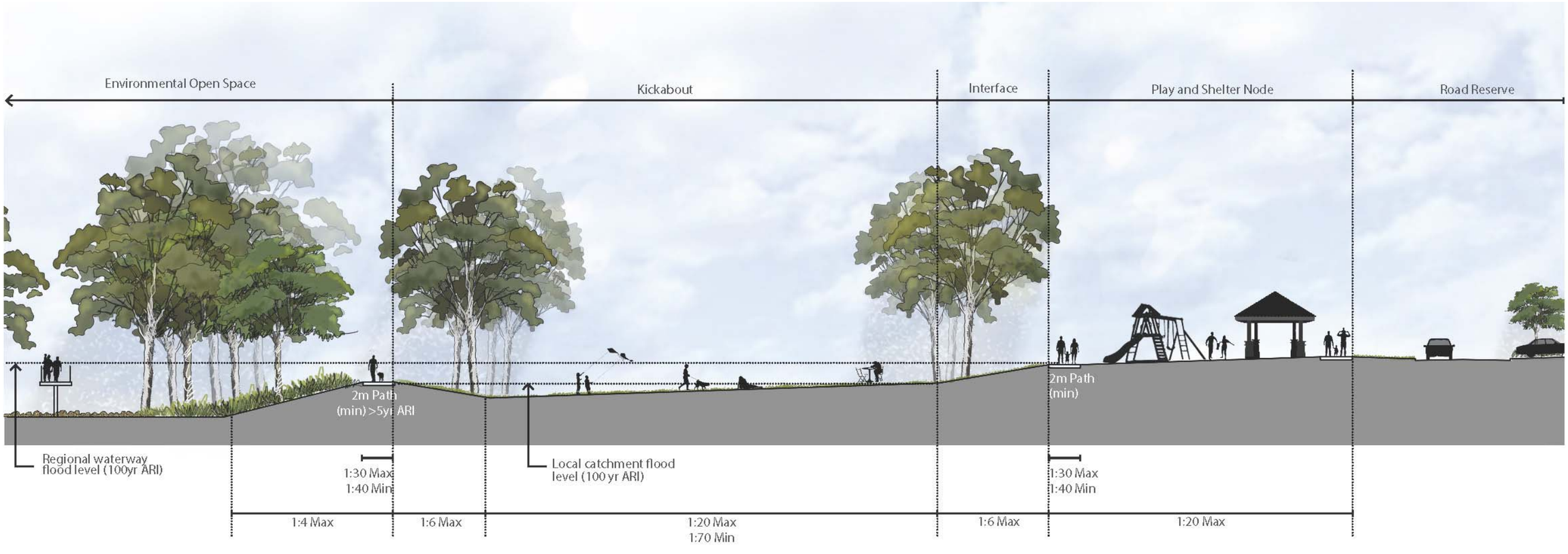


Figure 3: Local Park Multiple use DSS – Section

Table 10: Local Park Multiple use DSS

Park Element	Parameter	Standard				Comment
Land	Park Provision	1 ha per 1000 people				Based on benchmarking typical local park provision is 1.0ha per 1000 people. Local governments to define.
	Park Area	Total Park (minimum)	Play/Shelter Node (minimum)	Kickabout space (minimum)	Environmental Open Space	Based on benchmarking minimum local park area is 0.5ha. Local governments prefer larger parks to achieve the local park provision of 1ha per 1000 people rather than numerous small local parks. Developers prefer to deliver numerous smaller (0.5ha) parks to resolve problems in the development layout, to create green landscape along traffic routes and to increase lots which front onto park (higher price points). If a Local Park area of 0.5ha is adopted there is less room for integration of multiple use space and associated batters. Where a larger 1.0ha Local Park is adopted there is more room for integration multiple use spaces. If a developer adopts a larger parkland then the developer is rewarded by having more environmental open space included in the parkland contribution.
		0.5ha	0.1ha	0.25ha	0.15ha maximum (up to the Park Provision area of 1ha per 1000 people)	
		1.0ha	0.2ha	0.4ha	0.4ha maximum (up to the Park Provision area of 1ha per 1000 people)	
	Accessibility	500m distance to 90% of residents				400m – 500m is the industry standard.
	Shape	Broadly square, round or rectangular No greater than 2(length) : 1 (width)				
	Road frontage	50% minimum				
Play node + Shelter node	Area (minimum)	**0.1ha** for 0.5ha Local Park **0.2ha** for 1ha Local Park*				Allowance for play elements, shelter and associated pathways and buffers to residents * Where a 1ha local park is adopted then it should include additional 'node' space for play or other functions (e.g. dog off-leash).
	Slope	1:20				Suitable flat zone for play and shelter. May not be required in the DSS. Having some slope in the play area creates interest.
	Flood immunity	100 year ARI				Park infrastructure is above major events
	Width	>15m				
	Paths	Concrete pathway minimum 1.5m wide connecting from road or pathway network to node Cross-fall of the path is minimum 1:40, max 1:30				
	Embellishment for play and shelter	Refer Local government Standards				Each Local government has different embellishment requirements including play elements, seating, shelter and fencing. Play elements should cater for a range of ages.
Kickabout space	Area (minimum)	**0.2ha** for 0.5ha Local Park **0.4ha** for 1ha Local Park				Allowance for informal active recreation pursuits
	Shape	Broadly, square, round or rectangular No greater than 2(length) : 1 (width) Single area (not split) >20m wide excluding batters				
	Slope	1:20				
	Level difference	Level difference between kickabout zone surface to urban zone (roads) or play node/shelter node maximum of 2.0m.				The flood storage (or land subject to flooding) and adjacent parkland have a strong visual connection and be integrated with the broader terrestrial landscape while ensuring public safety. This may not be a significant issue and the 2m too stringent.

Park Element	Parameter	Standard	Comment
	Fences	No fences	
	Walls	No walls	
	Flooded zone Turf flood immunity Paths flood immunity Slope Water depth Flow velocity Depth X Velocity product under all events Time from rain onset to water ponding in open space Time taken from water ponding in open space to maximum depth reached Time taken following inundation for POS to be useable	 1 year ARI 5 year ARI, cross-fall of the path is minimum 1:40, max 1:30 1:100 above 20yr ARI, 1:70 below 20yr ARI < 0.8m during 20yr ARI, <1.2m during 100yr ARI < 1m/s under any event < 0.4 m2/s > 15 minutes > 30 minutes < 24 hours (see Useability)	Flood risk approach to parkland design rather than flood immunity
	Stormwater infrastructure	No inlet or outlet pipes should discharge to the land in question. Stormwater should outlet into land below the 1 yr ARI flood level (i.e. stormwater treatment system or waterway) or into a drainage system which conveys flows up to 1 yr ARI. Any hydraulic structures such as inlet and outlet pipes, grates, pits, and headwalls must provide adequate provisions for safety and in some cases the risk assessment provided in QUDM should be completed. The location and form of the hydraulic structures must account for kickabout space activities.	This ensures flood waters enter the land in question via 'surcharge' or backwatering rather than direct flow. This method is much safer and avoids the park getting wet every rainfall event.
Environmental open space	Area	Remainder of local park area (up to the Park Provision area of 1ha per 1000 people)	Includes retained vegetation, waterway edge, flood or stormwater management, batters and other landscape features. The environmental open space could provide one or a combination of these functions. This area is included in the parkland contribution subject to the following conditions: - Area of environmental open space considered to be 'parkland' in terms of contribution is the capped by the parkland provision minus the playground node, shelter node and kickabout space (i.e. Environmental open space component of parkland contribution = Parkland Provision – Playground Shelter Node – Kickabout space). - The remainder of the environmental area still needs to be colocated with the parkland but will not form part of the parkland contribution. - The value of the land associated with the environmental open space is lower due to the land being encumbered (i.e. flooded). For example to achieve the 1ha per 1000 people the following may be adopted: - 2 x 0.5ha parks including the following areas: o Play/Shelter Node = 2 x 0.1ha = 0.2ha o Kick about space = 2 x 0.25ha = 0.5ha o Environmental open space = 2 x 0.15ha = 0.3ha - 1 x 1ha park including the following areas:

Park Element	Parameter	Standard	Comment
			o Play/Shelter Node = 0.2ha o Kick about space = 0.4ha o Environmental open space = 0.4ha (benefit of creating a single large local park)
	Waterway Colocation Interface and connection Slope Safety	Must be colocated and integrated with adjoining parkland zone. Waterway must form part of the regional recreation linkage. The parkland must integrate with at least 50m of the waterway. 1 in 4 batters or flatter. No fences. No walls. Preference for no walls (Note: Local government may consider small walls provided the walls are small, safe and integrated with broader landscape) Water depth under operating conditions (extended detention depth) < 0.5m above surface level or normal water level Water depth (m) during 20 yr ARI storm event < 1.2m above surface level or normal water level Flow velocity under any event < 1m/s Depth by velocity product under all events < 0.4 m2/s	
	Stormwater Treatment Colocation Interface Batters/Slope Safety	Stormwater treatment system must be colocated and integrated with adjoining parkland zone. Pedestrian access via pathways or turf zones should be provided to a minimum of 50% of perimeter of the stormwater treatment system to promote passive recreation. Paths to be above 5yr ARI. Level difference between adjacent kickabout space <1.5m and road or playground node <2.5m 1 in 4 batters or flatter. Dense vegetation on batters (sedges, grasses, shrubs and trees) integrated with broader landscape with appropriate sight lines for viewing No fences. No walls. Preference for no walls (Note: Local government may consider small walls provided the walls are small, safe and integrated within broader landscape) Water depth under operating conditions (extended detention depth) < 0.5m above surface level or normal water level Water depth (m) during 20 yr ARI storm event < 1.2m above surface level or normal water level Flow velocity under any event < 1m/s Depth by velocity product under all events < 0.4 m2/s	

6.2 DISTRICT (RECREATION) PARK

District recreation parks provide a destination point for the community through playground node(s), shelter node(s) and large areas of kickabout. They also provide large environmental open space which can be used for multiple use functions. The proposed multiple use DSS for district recreation parkland is provided in Table 11. Figure 4 illustrate the spatial requirements of the DSS for district recreation parkland.

Figure 4: District Recreation Park Multiple use DSS

Table 11: District Park Multiple use DSS

Park Element	Parameter	Standard	Comment
Land	Park Provision	0.8 ha per 1000 people	Based on benchmarking typical district park provision is 1.0ha. Local governments to set this but 1.0ha seems appropriate.
	Park Area (minimum)	2 ha	Based on benchmarking minimum district park area for passive recreation is 2.0ha. Can certainly be larger minimum area set.
	Shape	Broadly square, round or rectangular No greater than 3(length) : 1 (width)	District parks have a range of shapes and forms.
	Road frontage	50% minimum	
Play node + Shelter node	Area (minimum)	0.6ha (as one area or multiple areas)	Allowance for playground, shelter, dog off leash and associated pathways and buffers to residents. This could include kick about space as well.
	Slope	1:20	Suitable flat zone for play and shelter
	Flood immunity	100 year ARI	Park infrastructure is above major events
	Width	15m minimum	
	Paths	Concrete pathway mins 2.0m wide connecting from road or pathway network to node Cross-fall of the path is minimum 1:40, max 1:30	
	Embellishment for play and shelter	Refer Local government Standards	Each Local government has different embellishment requirements including play elements, seating, shelter and fencing.
Kick about space (minimum)	Area (minimum)	0.6ha (preference for at least two kickabout spaces)	
	Shape	Broadly, square, round or rectangular No greater than 2(length) : 1 (width) Single area (not split) >20m wide excluding batters	
	Slope	1:20	Consider using 1:40 where possible
	Level difference	Level difference between kick about zone surface to urban zone (roads) or play node/shelter node maximum of 2.0m.	The flood storage (or land subject to flooding) and adjacent parkland have a strong visual connection and be integrated with the broader terrestrial landscape while ensuring public safety. These interface requirements may not be an issue and could be too stringent.
	Fences	No fences	
	Walls	No walls	
	Flooded zone Turf flood immunity Paths flood immunity Slope Water depth Flow velocity Depth X Velocity product under all events	 1 year ARI 5 year ARI, Cross-fall of the path is minimum 1:40, max 1:30 1:100 above 20yr ARI, 1:70 below 20yr ARI < 0.8m during 20yr ARI, <1.2m during 100yr ARI < 1m/s under any event < 0.4 m2/s	Flood risk approach to parkland design rather than flood immunity

Park Element	Parameter	Standard	Comment
	Time from rain onset to water ponding in open space Time taken from water ponding in open space to maximum depth reached Time taken following inundation for POS to be useable	> 15 minutes > 30 minutes < 24 hours (see Useability)	
	Stormwater infrastructure	No inlet or outlet pipes should discharge to the land in question. Stormwater should outlet into land below the 1 yr ARI flood level (i.e. stormwater treatment system or waterway) or into a drainage system which conveys flows up to 1 yr ARI. Any hydraulic structures such as inlet and outlet pipes, grates, pits, and headwalls must provide adequate provisions for safety and in some cases the risk assessment provided in QUDM should be completed.	This ensures flood waters enter the land in question via 'surcharge' or backwatering rather than direct flow. This method is much safer and avoids the park getting wet every rainfall event.
Environmental open space	Area	Remainder of local park area (up to the Park Provision area of 2ha per 1000 people)	Includes retained vegetation, waterway edge, flood or stormwater management, batters and other landscape features. The environmental open space could be provide one or a combination of these functions. This area is included in the parkland contribution subject to the following conditions: - Area of environmental open space considered to be 'parkland' in terms of contribution is capped by the parkland provision minus the playground node, shelter node and kick-about space (i.e. Environmental open space component of parkland contribution = Parkland Provision – Playground Shelter Node – Kick-About space). - The remainder of the environmental area still needs to be co-located with the parkland but will not form part of the parkland contribution. - The value of the land associated with the environmental open space is lower due to the land being encumbered (i.e. flooded).
	Waterway Colocation Interface and connection Slope Safety	 Must be colocated and integrated with an adjoining parkland zones Waterway must form part of the regional recreation linkage. The parkland must integrate with at least 50m of the waterway. 1 in 4 batters or flatter. No fences. No walls. Preference for no walls (Note: Local government may consider small walls provided the walls are small, safe and integrated broader landscape) Water depth under operating conditions (extended detention depth) < 0.5m above surface level or normal water level Water depth (m) during 20 yr ARI storm event < 1.2m above surface level or normal water level Flow velocity under any event < 1m/s Depth by velocity product under all events < 0.4 m2/s	
	Stormwater Treatment Colocation	 Stormwater treatment system must be colocated and integrated with an adjoining parkland	

Park Element	Parameter	Standard	Comment
		zones	
	Interface	Pedestrian access via pathways or turf zones should be provided to a minimum of 50% of perimeter of the stormwater treatment system to promote passive recreation. Paths to be above 5yr ARI	
		Level difference between adjacent kick-about space <1m and road or playground node <2.5m	
	Batters/Slope	1 in 4 batters or flatter. Dense vegetation on batters (sedges, grasses, shrubs and trees) integrated with broader landscape with appropriate sight lines for viewing	
		No fences.	
		No walls. Preference for no walls (Note: Local government may consider small walls provided the walls are small, safe and integrated broader landscape)	
	Safety	Water depth under operating conditions (extended detention depth) < 0.5m above surface level or normal water level	
		Water depth (m) during 20 yr ARI storm event < 1.2m above surface level or normal water level	
		Flow velocity under any event < 1m/s	
		Depth by velocity product under all events < 0.4 m2/s	

6.3 LINEAR PARKLAND

The intention of the Linear Park DSS, is to encourage the creation of linear parks along waterways. This is achieved by delivering a 10m wide pedestrian zone (pathway, turf, shade trees) need to the waterways. In this case a full 15m (10m pedestrian zone plus 5m waterway zone) is acknowledged as parkland and may be considered as contribution towards Local Park or District Park provision. The park must be part of a regional recreation pathway network and connect to other parklands or destinations.

Figure 5: Linear Parkland Multiple use DSS - Plan

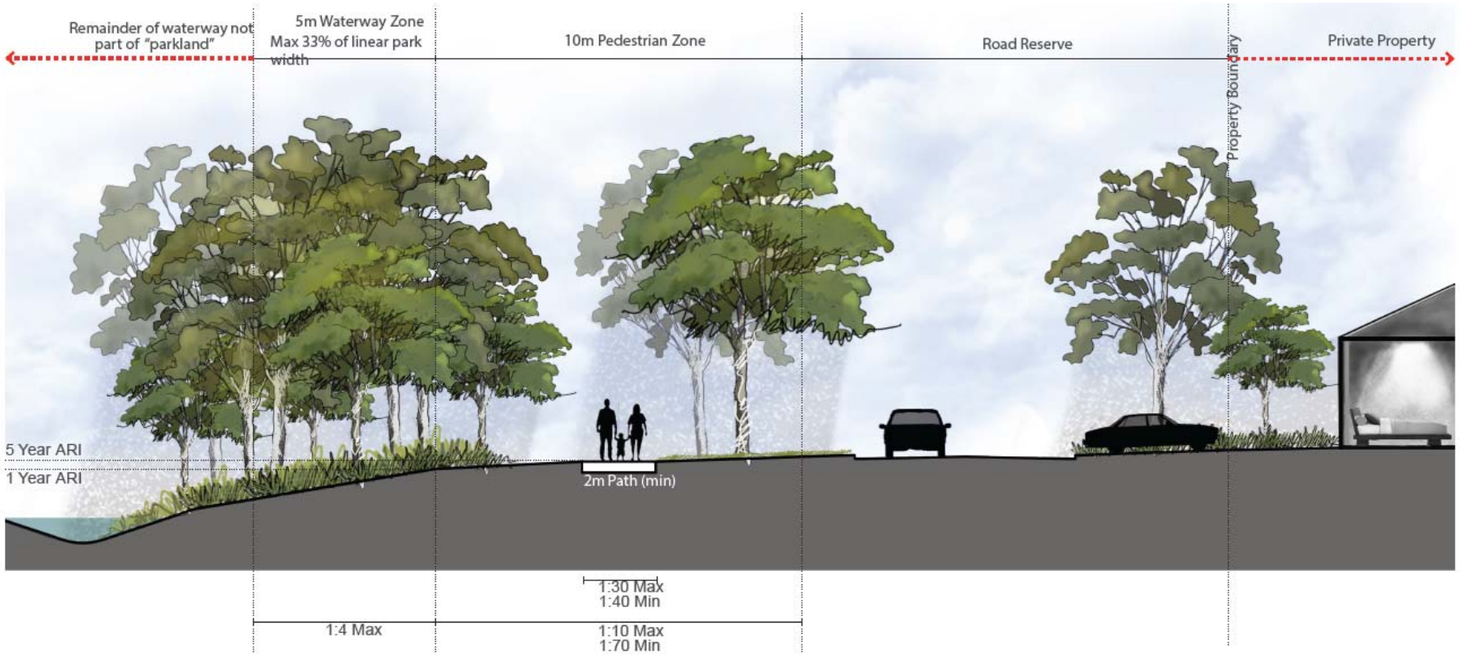


Figure 6: Linear Parkland Multiple use DSS – Section A

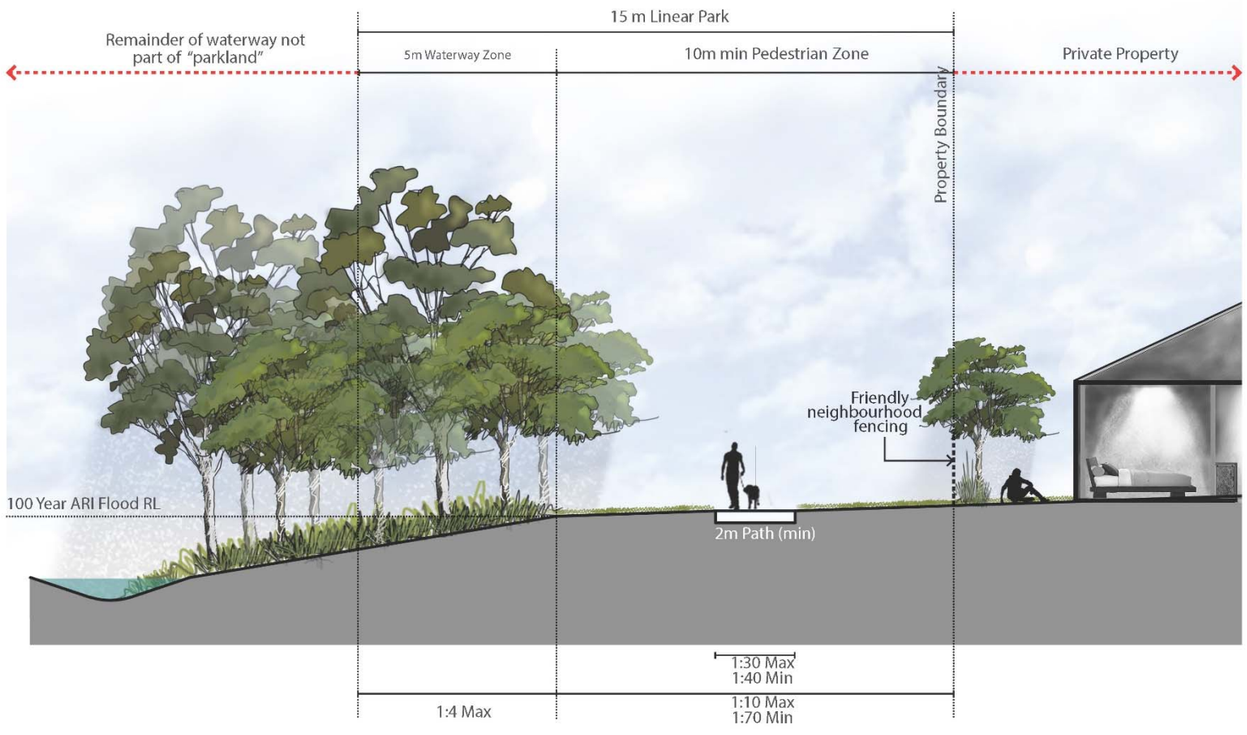


Figure 7: Linear Parkland Multiple use DSS – Section B

Table 12: Linear Park DSS

Park Element	Parameter	Standard	Comment
Land	Park Provision	May form part of either: - Local Park provision (1 ha per 1000 people) - District Park provision (0.8ha per 1000 people) Shelter and Kickabout area requirements of the Local or District Park must still be provided and not replaced by Linear Park.	Based on benchmarking typical district park provision is 1.0ha. Local governments to set this but 1.0ha seems appropriate.
	Colocation	Must be colocated and integrated with an adjoining waterway along the length of the linear park (linear park and waterway collocated along entire length). Must connect to a regional linkage or pedestrian path. Where this is achieved then part of the waterway will form part of the parkland contribution. The park is split into the Pedestrian Zone and Waterways Zone.	
	Width	15m minimum	
	Road frontage	80% minimum	
	Maximum distance without road (behind private allotments)	80m with clear visual surveillance for the full length	
Pedestrian Zone	Width	Minimum 67% of the total width 10m minimum	Two thirds of the Linear Park must be created for pedestrian use including path, turf, shade trees and flat batters.
	Slope	1:10 maximum, 1 in 70 minimum	Suitable flat zone for play and shelter
	Paths	Concrete pathway min 2.0m wide connecting from road or pathway network to node Cross-fall of the path is minimum 1:40, maximum 1:30	
	Flooding when located next to road frontage Turf flood immunity Paths flood immunity Water depth Flow velocity Depth X Velocity product under all events Time from rain onset to water ponding in open space Time taken from water ponding in open space to maximum depth reached Time taken following inundation for POS to be useable	 1 year ARI 5 year ARI < 0.8m during 20yr ARI, <1.2m during 100yr ARI < 1m/s under any event < 0.4 m2/s > 15 minutes > 30 minutes < 24 hours	
	Flooding when located behind private allotments Turf flood immunity Paths flood immunity Water depth	 20 year ARI 100 year ARI < 0.8m during 20yr ARI, <1.2m during 100yr ARI	

Park Element	Parameter	Standard	Comment
	Flow velocity Depth X Velocity product under all events Time from rain onset to water ponding in open space Time taken from water ponding in open space to maximum depth reached Time taken following inundation for POS to be useable	< 1m/s under any event < 0.4 m2/s > 15 minutes > 30 minutes < 24 hours (see Useability)	
	Fencing	Good neighbour fencing (permeable) to be used between linear park has no road frontage and adjoins private property. 50% transparent fencing.	
	Stormwater infrastructure	No outlet pipes should discharge pedestrian zone. Stormwater should outlet into waterway or land below pedestrian zones. Any hydraulic structures such as inlet and outlet pipes, grates, pits, and headwalls must provide adequate provisions for safety and in some cases the risk assessment provided in QUDM should be completed.	
Waterway zone	Area (minimum)	Maximum 33% of the total width 5m minimum	Credit given for collocating Linear Park next to waterway. Waterway then becomes part of the parkland contribution.
	Slope	1:4	
	Vegetation	Turf, retained trees or restored riparian vegetation	
	Fences	No fences	
	Walls	No walls	
	Stormwater infrastructure	No inlet or outlet pipes should discharge to the land in question. Stormwater should outlet into land below the 1 yr ARI flood level (i.e. stormwater treatment system or waterway) or into a drainage system which conveys flows up to 1 yr ARI. Any hydraulic structures such as inlet and outlet pipes, grates, pits, and headwalls must provide adequate provisions for safety and in some cases the risk assessment provided in QUDM should be completed.	

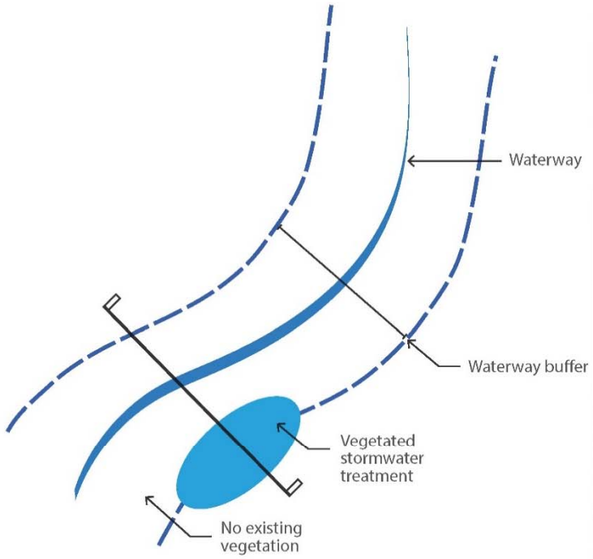
6.4 WATERWAY & WETLAND BUFFERS

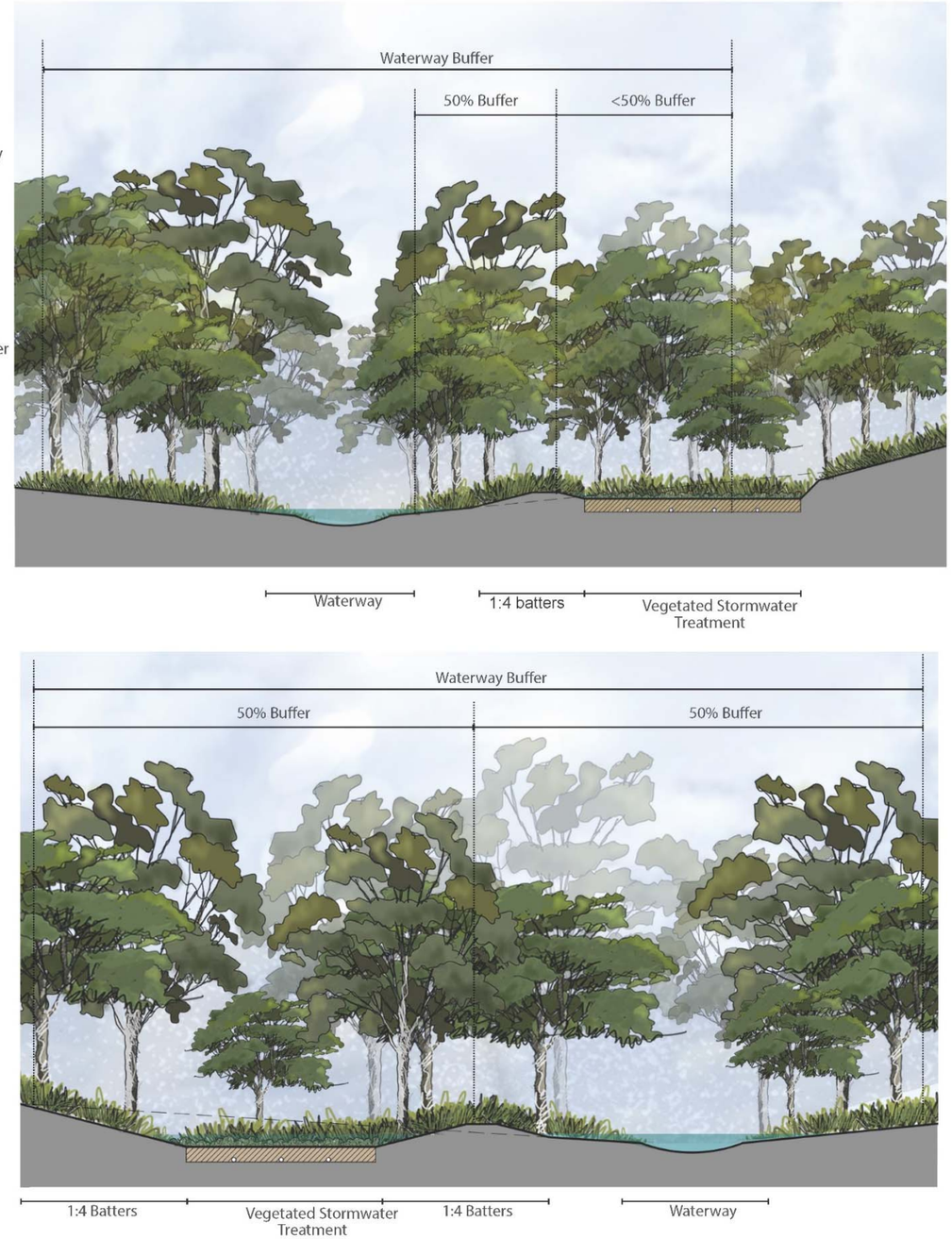
Buffers to natural wetland and waterways are defined as 'the transition zone between the wetland or riverine ecosystems and the surrounding land use. They help protect and support the functions and values of wetlands and waterways' (Environmental Protection Agency 2006). Buffers are mandated by the State Government and Local governments to:

- Maintain the ecological value of the waterway or wetland
- Protect the ecology of the waterway or wetland from external impacts (primarily to provide water quality treatment or flows entering the wetland or waterway and to protect against weed ingress)

The State Government and some Local governments have allowed the placement of stormwater management systems within waterway and wetland buffers provided the function of the buffer is preserved. The results of this kind of integration has benefits to the waterway, Local government and the developer.

The table below present a preliminary DSS for allows stormwater treatment systems to be placed within waterway and wetland buffers. The figures below illustrate how the DSS may be applied. This style of DSS has been used successfully on a number of projects throughout Queensland.





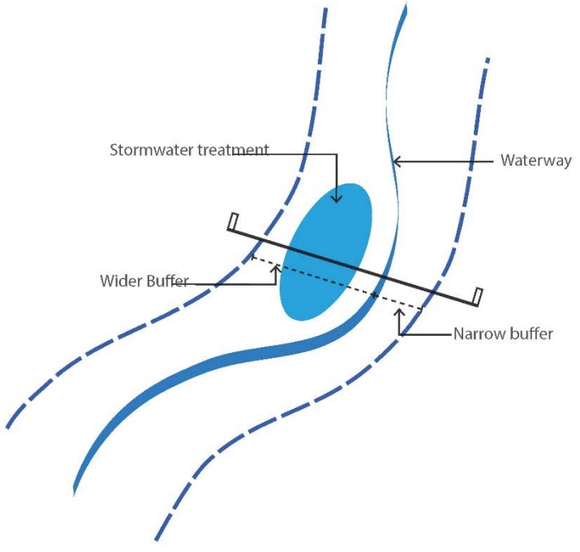


Figure 8: Waterway Buffer Multiple use DSS

Table 13: Stormwater management in waterway and wetland buffers DSS

Parameter	Standard	Comment
Type of stormwater management	Stormwater management systems used within waterway buffers must be vegetated stormwater management systems (earth and vegetation) which provide stormwater management and ecological function	These rules have been used successfully across a number of locations in Queensland to deliver stormwater management devices within waterway buffers. However, there have been isolated situations where stormwater management systems have failed or been washed into waterways due to stream instability and erosion. Either the stream has moved taking the stormwater management system with it or the outer batter of the stormwater management system has been exposed to high velocity erosive flows resulting in scour of the embankment batter. The general rule is where the stream is flat, stable and flood velocities are low (say <1.5ms) then placement of stormwater management within the waterway buffer is fine. Where the stormwater Further interrogation of this issue is required to firm up the Standards listed in this table. This will require working with a geomorphologist to establish quantitative criteria for when it is and is not suitable for placing stormwater treatment systems in waterway buffers to avoid instability.
Existing vegetation	Stormwater management systems must be placed in areas clear of significant vegetation. No existing significant vegetation is removed	
Planted vegetation	Vegetation must complement the riparian vegetation of the waterway and provide fauna friendly movement (if required). E.g. 70% projective foliage cover.	
Area/width	Only half the overall waterway buffer width can be utilised for stormwater treatment including batters and hydraulic structures Toe of batters must be set back at least 10m from top of bank (refer stream stability for erosion issues)	
Slope and batters	1 in 4 or flatter and planted with appropriate local species to complement the buffer	
Walls	No walls or significant above ground structures should be built within buffer	
Maintenance	Any areas requiring scheduled maintenance such as sediment fore-bays should remain at the outer edge of the buffer	
Stream stability	Detailed geomorphic assessment of the waterway is required where the waterway has: - Instability, erosion or steep banks exist - Instability, erosion or waterway movement has occurred previous or may occur in the future - Risk of hydrologic change in the waterway as a result of changes in the catchment which may increase stream instability - Placement of the stormwater management system will increase risk of stream instability or risk of the stormwater treatment system being eroded. The geomorphic assessment need to: - Assess the geomorphology of the waterway and floodplain. - Identify existing and future instability and erosion risk - Confirm the instability and erosion risk as a result of future development in the catchment and the placement of the stormwater management system within the waterway buffer - Define the design requirements for protecting - Define design requirements for stabilising waterway and stormwater management systems waterway (i.e. moving or adjusting form of the stormwater treatment, stabilising waterway)	

Acceptance of multiple use parkland design will require stakeholders being convinced of the benefits of the new approach. To help demonstrate these benefits, case studies have been undertaken for a variety of parkland scenarios and are presented in this section. Each case study considers:

- An example of existing parkland which has been delivered in accordance with current DSS's and design guidelines
- An alternative multiple use parkland design which illustrates the parkland outcomes that could be delivered through the adoption of multiple use DSS's and design guidelines

For each scenario the following was defined:

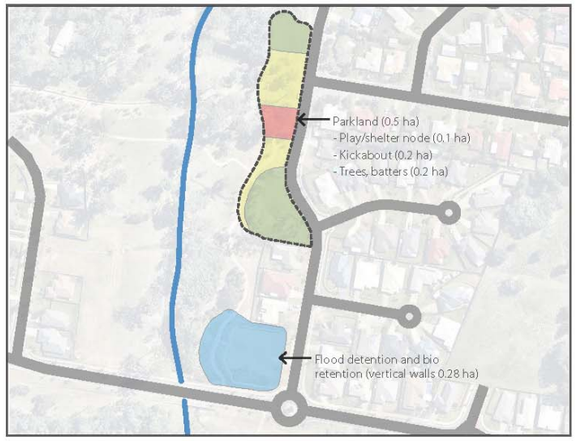
- Land audit (overall green space, parkland areas including play node and kickabout node, stormwater management areas and additional development land)
- Capital cost
- Infrastructure charges
- Maintenance cost

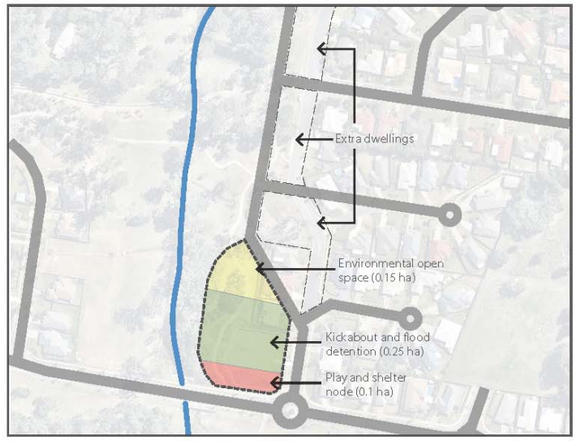
The following sections present the individual case studies and summaries the findings. The costs have been derived using recent project costs combined with advice provided by local authorities. The details of the cost calculations are provided in Appendix D.

Photo of the Local Park Micro Scale Case Study – Existing stormwater management system not collocated with Local Park and poorly integrated with surroundings resulting in walls and fences. Expensive capital cost and difficult to maintain.

7.1 LOCAL PARK

7.1.1 Local Park Micro Scale





Description

Local park and stormwater management infrastructure created in separate location. This case study looks at the land and costs assoicated with existing situation and then redesigns the parkland and stormwater management based on the proposed new multiple-use DSS. The land and cost audit of the multiple-use parkland outcome are presented in terms of outcomes to the community, developer and Council.

Parkland

Type	Local	
Area	0.5	ha
Park catchment	16.5	ha
	200	homes
	500	people
Provision	1.0	per 1000 people

Stormwater Management

Stormwater Treatment	Bioretention	
	280	m^2
Flood Detention	1600	m^3
	1600	m^2
Batters	920	m^2

Existing

Land

Parkland	0.5	ha
Play/shelter node	0.1	ha
Kickabout	0.2	ha
Linear	-	ha
Other (batters/trees)	0.2	ha
Stormwater	0.28	ha
Treatment	0.028	ha
Flood detention	0.16	ha
Other (batters/trees)	0.092	ha
TOTAL	0.78	ha

Capital Cost

Park - works	$	312,303
Park - land	$	300,000
Stormwater works	$	275,610
Stormwater land	$	28,000
TOTAL	$	915,913

Maintenance Cost

Parkland	$	6,825	/yr
Stormwater	$	6,080	/yr
TOTAL	$	12,905	/yr

Infrastructure cost to be offset against charge

Park - land	$	300,000
Park - works	$	312,303
TOTAL	$	612,303

Multiple-Use

Land

Parkland	0.5	ha
Play/shelter node	0.1	ha
Kickabout	0.25	ha
Linear	-	ha
Environmental Open Space	0.15	ha
Stormwater	0.1	ha
Treatment	Within env OS	
Flood detention	Within kickabout	
Other (batters/trees)	0.1	ha
TOTAL	0.6	ha

Capital Cost

Park - works	$	332,263
Park - land	$	80,000
Stormwater - works	$	219,750
Stormwater - land	$	10,000
TOTAL	$	642,013

Maintenance Cost

Parkland	$	8,309	/yr
Stormwater	$	1,560	/yr
TOTAL	$	9,869	/yr

Maintenance if mowing of flooded area by SW budget

Parkland	$	4,309	/yr
Stormwater	$	5,560	/yr
TOTAL	$	9,869	/yr

Infrastructure cost to be offset against charge

Park - land	$	80,000
Park - works	$	332,263
TOTAL	$	412,263

Outcomes

Land

Parkland		No change	
Play/shelter node		No change	
Kickabout		No change	
Stormwater		-0.18	ha

Community

Parkland Function		Preserved	
Stormwater		Better integration	

Developer

Development yield		0.18	ha
Dwellings		3	
Sales	$	540,000	
Profit	$	231,000	
Capital cost saving*	$	273,900	

Council

Added Developer charges	$	84,000	
Saved infrastructure credit*	$	200,040	
Maintenance cost saving	$	3,036	/yr

* If Local Park is Trunk then most capital cost savings passed to Council as saved infrastructure credit.

7.1.2 Local Park Macro Scale

Legend
- Waterway or Drainage
- Stormwater Management
- Public Open Space
- Local Park
- Linear Park
- 400m Radius

Description

Large scale greenfield development. Numerous small scale local parks with no strategic co-ordination with waterways.

This case study illustrate the benefit of colocating local parks with waterways and and linear parks. Requires careful consideration of the parkland locations as part of urban design.

Development

Area including parkland	118	
Parkland	8.67	ha
Net development area	109.33	ha
	1312	homes
	3280	people
Provision	2.6	ha per 1000 people

Stormwater Management

All locationed within and along waterways and drainage reserves.

Existing

Land

Local Parks*		
Number	9	
Area	5	ha
Kickabout		
Number	7	
Area	1.05	ha
Play/Shelter Nodes		
Number	7	
Area	0.6	ha
Other Parkland Area (trees,	3.35	ha
Linear Park	3.67	ha
TOTAL	8.67	ha

Capital Cost

Park - works	$	4,887,489
Park - land	$	4,486,725
TOTAL	$	9,374,214

Maintenance Cost

Parkland	$	110,709	/yr

Infrastructure cost to be offset against charge

Park - land	$	4,486,725
Park - works	$	4,887,489
TOTAL	$	9,374,214

* Local parks include kickabout, play/shelter nodes and other

Multiple-Use

Land

Local Parks		
Number	5	
Area	4.6	ha
Kickabout		
Number	7	
Area	1.75	ha
Play/Shelter Nodes		
Number	7	
Area	0.75	ha
Environmental Open Space	2.1	ha
Linear Park	4.35	ha
Pedestrian zone	2.9	ha
Waterway zone	1.45	ha
TOTAL	8.9	ha

Capital Cost

Park - works	$	4,084,373
Park - land#	$	2,706,000
TOTAL	$	6,790,373

Maintenance Cost

Parkland	$	89,007	/yr

Infrastructure cost to be offset against charge

Park - land#	$	2,706,000
Park - works	$	4,084,373
TOTAL	$	6,790,373

Value of land is lower as Kickabout and environmental open space is flooded and not developable.

Outcomes

Land

Parkland	Increased
Play/shelter node	Preserved
Kickabout	Increased
Linear Park	Increased

Community

Parkland Function	Improved - more kicakabout - more linear
Waterway	Better integration

Developer

Development yield		3.3 ha
Dwellings		39
Sales	$	7,063,200
Profit	$	3,021,480
Capital cost saving*	$	2,583,841

Council

Added Developer charges	$	1,098,720
Saved infrastructure credit*	$	2,583,841
Maintenance cost saving	$	21,702 /yr

* If Local Park is Trunk then most capital cost savings passed to Council as saved infrastructure credit.

7.2 LINEAR PARK

Legend

- Local Park
- Waterway or Drainage
- Stormwater Management
- Kickabout
- Play and Shelter Node
- Linear Park

Description

This case study involves an existing site with oversized and underutilised local parkand redesigns the development layout to reduce the size of the park and create a significant linear park which links the residential and park to the local shopping centre.

Parkland

Type	Local	
Area	0.95	ha
Park catchment	30	ha
	360	homes
	900	people
Provision	1.1	per 1000 people

Existing

Land			
Local Parkland		0.95	ha
Play/shelter node		0.15	ha
Kickabout		0.25	ha
Other (batters/interfac		0.55	ha
Linear Park			
Pedestrian zone			ha
Waterway zone			ha
TOTAL		0.95	ha
Capital Cost			
Park - works	$	464,978	
Park - land	$	570,000	
TOTAL	$	1,034,978	
Maintenance Cost			
Parkland	$	13,834	/yr
Infrastructure cost to be offset against charge			
Park - land	$	570,000	
Park - works	$	464,978	
TOTAL	$	1,034,978	

Multiple-Use

Land			
Local Parkland		0.35	ha
Play/shelter node		0.1	ha
Kickabout		0.25	ha
Other (batters/interface)			ha
Linear Park		0.6	ha
Pedestrian zone		0.4	ha
Waterway zone		0.2	ha
TOTAL		0.95	ha
Capital Cost			
Park - works	$	466,978	
Park - land	$	322,500	
TOTAL	$	789,478	
Maintenance Cost			
Parkland	$	11,475	/yr
Infrastructure cost to be offset against charge			
Park - land	$	322,500	
Park - works	$	466,978	
TOTAL	$	789,478	

Outcomes

Land			
Parkland		No change	
Play/shelter node		Minor reduction	
Kickabout		No change	
Community			
Parkland Function	Preserved		
Waterway	Better integration		
Developer			
Development yield		0.2	ha
Dwellings		4	
Sales	$	720,000	
Profit	$	308,000	
Capital cost saving*	$	245,500	
Council			
Added Developer charges	$	112,000	
Saved infrastructure credit*	$	245,500	
Maintenance cost saving	$	2,359	/yr

* If Local Park is Trunk then most capital cost savings passed to Council as saved infrastructure credit.

7.3 DISTRICT PARK

Description

This case study assesses an existing district park which provides a play and shelter nodes within a 2ha parkland which have been located and design in isolation to the stormwater management systems and waterway.
The multiple-use DSS is applied to this park to relocated the park next to the waterway and colocate the stormwater management systems to integrate with the parkland. Significant benefits to Council and developer accrue through this redesign.

Parkland

Type	Disctrict	
Area	2	ha
Park catchment	80	ha
	960	homes
	2400	people
Provision	0.8	per 1000 people

Stormwater Management

Stormwater Treatment	Bioretention	
	1000	m^2
Flood Detention	6000	m^3
	6000	m^2
Batters	1000	m^2

Existing

Land

Parkland	2.0	ha
Play/shelter node	0.15	ha
Kickabout	0.6	ha
Linear	-	ha
Other (batters/trees)	1.3	ha
Stormwater	0.7	ha
Treatment	0.1	ha
Flood detention	0.6	ha
Other (batters/trees)	-	ha
Waterway	1.0	ha
TOTAL	3.7	ha

Capital Cost

Park - works	$	928,453
Park - land	$	1,200,000
Stormwater works	$	859,000
Stormwater land	$	35,000
TOTAL	$	3,022,453

Maintenance Cost

Parkland	$	26,700	/yr
Stormwater	$	16,100	/yr
TOTAL	$	42,800	/yr

Infrastructure cost to be offset against charge

Park - land	$	1,200,000
Park - works	$	928,453
TOTAL	$	2,128,453

Multiple-Use

Land

Parkland	2	ha
Play/shelter node	0.2	ha
Kickabout (Flood free)	0.6	ha
Kickabout (Floodable)	0.7	ha
Environmental Open Space	0.5	ha
Stormwater		ha
Treatment	Within Env OS	
Flood detention	Within kickabout	
Other (batters/trees)	Within Env OS	ha
Waterway (outside Env OS)	0.8	ha
TOTAL	2.8	ha

Capital Cost

Park - works	$	1,058,853
Park - land	$	540,000
Stormwater - works	$	432,500
Stormwater - land	$	-
TOTAL	$	2,031,353

Maintenance Cost

Parkland	$	27,786	/yr
Stormwater	$	2,500	/yr
TOTAL	$	30,286	/yr

Maintenance if mowing of flooded area by SW budget

Parkland	$	15,434	/yr
Stormwater	$	14,852	/yr
TOTAL	$	30,286	/yr

Infrastructure cost to be offset against charge

Park - land	$	540,000
Park - works	$	1,058,853
TOTAL	$	1,598,853

Outcomes

Land

Parkland	No change
Play/shelter node	Increased
Kickabout	Increased

Community

Parkland Function	Preserved
Stormwater	Better integration

Developer

Development yield		0.9	ha
Dwellings		13	
Sales	$	2,349,000	
Profit	$	1,004,850	
Capital cost saving*	$	991,100	

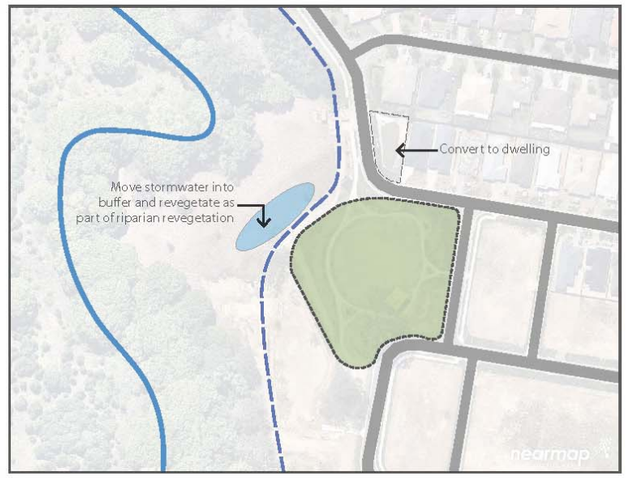
Council

Added Developer charges	$	365,400	
Saved infrastructure credit*	$	529,600	
Maintenance cost saving	$	12,514	/yr

* If Local Park is Trunk then most capital cost savings passed to Council as saved infrastructure credit.

7.4 WATERWAY BUFFERS

7.4.1 Waterway buffer Micro Scale



Legend

- Local Park
- Stormwater Management
- Waterway
- Waterway Buffer

Description

This case study looks at a situation where stormwater management was not allowed within the waterway buffer even though the buffer was to be cleared of weed and revegetated. The resulting placement of the stormwater management system was poorly considered by the developer resulting in significant cost.
The alternative solution of placing the stormwater management system in the buffer in accordance with the multiple-use DSS is presented.

Stormwater management

Stormwater Treatment	Bioretention	
	280	m^2
Batters	70	m^2

Existing

Land			
Stormwater	350	m^2	
Treatment	280	m^2	
Batters	70	m^2	
Walls	50	m^2	
Capital Cost			
Stormwater works	$	132,000	
Stormwater land	$	21,000	
TOTAL	$	153,000	
Maintenance Cost			
Stormwater	$	1,060	/yr

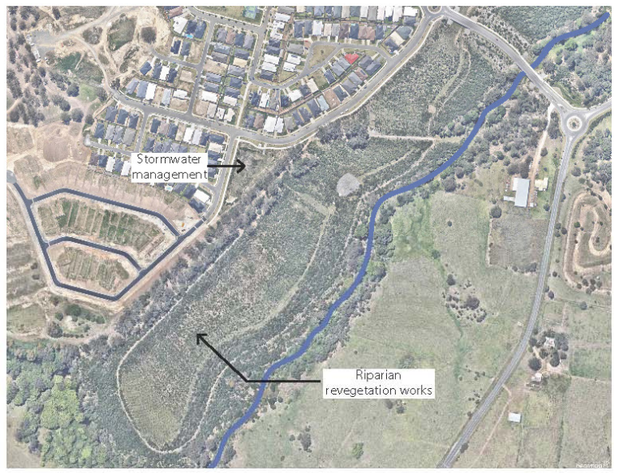
Multiple-Use

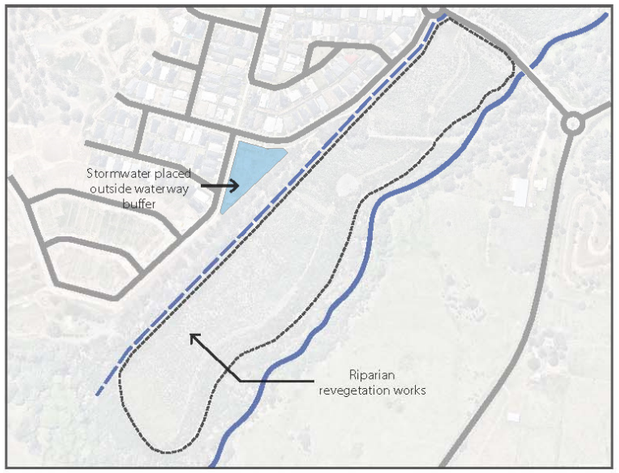
Land			
Stormwater in buffer	350	m^2	
Treatment	280	m^2	
Batters	70	m^2	
Stormwater outside buffer	0	m^2	
Capital Cost			
Stormwater works	$	112,000	
Stormwater land	$	-	
TOTAL	$	112,000	
Maintenance Cost			
Stormwater	$	420	/yr

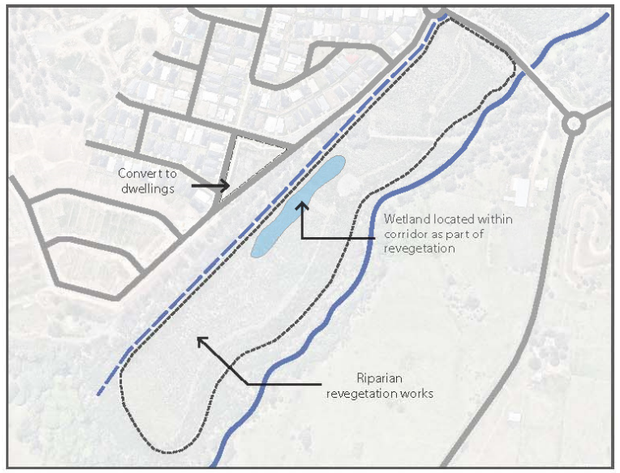
Outcomes

Land			
Stormwater management		No change	
Community			
Stormwater		Better integration	
Developer			
Development yield		350	m^2
Dwellings		1	
Sales	$	180,000	
Profit	$	77,000	
Capital cost saving	$	41,000	
Council			
Added Developer charges	$	28,000	
Saved infrastructure credit*	$	-	
Maintenance cost saving	$	640	/yr

7.4.2 Waterway Buffer Macro Scale







Description

This case study looks at a situation where stormwater management was not allowed within the waterway buffer even though the buffer was to be cleared of weed and revegetated. The resulting placement of the stormwater management system was poorly considered by the developer resulting in significant cost.
The alternative solution of placing the stormwater management system in the buffer in accordance with the multiple-use DSS is presented.

Stormwater management

Stormwater Treatment	Bioretention	
	2400	m^2
Batters	1800	m^2

Existing

Land

Stormwater	4200	m^2
Treatment	2400	m^2
Batters	1800	m^2
Walls	0	m^2

Capital Cost

Stormwater works	$	960,000
Stormwater land	$	252,000
TOTAL	$	1,212,000

Maintenance Cost

Stormwater	$	5,300	/yr

Multiple-Use

Land

Stormwater in buffer	4200	m^2
Treatment	2400	m^2
Batters	1800	m^2
Stormwater outside buffer	0	m^2

Capital Cost

Stormwater works	$	960,000
Stormwater land	$	-
TOTAL	$	960,000

Maintenance Cost

Stormwater	$	3,600	/yr

Outcomes

Land

Stormwater management		No change

Community

Stormwater		Better integration

Developer

Development yield		4200	m^2
Dwellings		6	
Sales	$	1,134,000	
Profit	$	485,100	
Capital cost saving	$	252,000	

Council

Added Developer charges	$	176,400	
Saved infrastructure credit*	$	-	
Maintenance cost saving	$	1,700	/yr

7.5 SUMMARY

The findings of the case study assessments are summarised in the tables below:

- Table 14 presents the findings of the land audit for each case study.
- Table 15 presents the capital and maintenance cost comparisons
- Table 16 summarises the outcomes for the developer
- Table 17 summarises the outcome for the local government

Table 14: Case Study Findings – Land Outcomes

Case Study	Existing Scenario				Alternative Multiple use Scenario				Additional development land* (ha)
	Local Park Parkland (ha)	District Park (ha)	Linear Park (ha)	Total Parkland (ha)	Local Park Parkland (ha)	District Park (ha)	Linear Park (ha)	Total Parkland (ha)	
Local Park Micro	0.5	-	-	0.5	0.5	-	-	0.5	3.3
Local Park Macro	5.0	-	3.67	8.67	4.6	-	4.35	8.9	
District Park	-	2.0	-	2.0	-	2.0	-	2.0	0.9
Linear Park	0.95	-	-	0.95	0.35	-	0.60	0.95	0.2
Waterway Buffer Micro	-	-	-	-	-	-	-	-	0.035
Waterway Buffer Macro	-	-	-	-	-	-	-	-	0.42

* Additional development land is associated with reduction in stormwater management or waterway area. The parkland area remains the same but has been created as multiple use to provide stormwater function as well.

Table 15: Case Study Findings – Cost Outcomes

Case Study	Existing Scenario						Alternative Multiple use Scenario						Reduced Capital Cost ($)	Reduced Maintenance Cost ($/yr)
	Park Capital Cost ($)	Park Maintenance Cost ($/yr)	Stormwater Capital Cost ($)	Stormwater Maintenance Cost ($)	Total Capital Cost ($)	Total Maintenance Cost ($)	Park Capital Cost ($)	Park Maintenance Cost ($)	Stormwater Capital Cost ($)	Stormwater Maintenance Cost ($)	Total Capital Cost ($)	Total Maintenance Cost ($)		
Local Park Micro	$612,303	$6825	$303,610	$6,080	$915,913	$12,905	$412,263	$8,309	$229,750	$1,560	$642,013	$9,869	$273,900	$3,036
Local Park Macro	$9.375M	$110,709	-	-	$9.375M	$110,709	$6.79M	$89,007	-	-	$6.970M	$89,007	$2,584M	$21,702
District Park	$2.128M	$26,700	$894,000	$16,100	$3.022M	$42,800	$1.599M	$27,786	$432,500	$2,500	$2.031M	$30,286	$991,100	$12,514
Linear Park	$1.035M	$13,834	-	-	$1.035M	$13,834	$789,478	$11,475	-	-	$789,478	$11,475	$245,500	$2,359
Waterway Buffer Micro	-	-	$153,000	$1,060	$153,000	$1,060	-	-	$112,000	$420	$112,000	$420	$41,000	$640
Waterway Buffer Macro	-	-	$1.212M	$5,300	$1.212M	$5,300	-	-	$960,000	$3,600	$960,000	$3,600	$252,000	$1,700

Table 16: Case Study Findings – Developer Outcomes

Case Study	Increase Development Profit			Reduced capital cost*		
	Total $	$ / ha of development	$ / dwelling	Total $	$/ ha of development	$ / dwelling
Local Park Micro	$231,000	$14,000	$1,155	$273,900	$16,600	$1,370
Local Park Macro	$3.02M	$25,606	$2,303	$2.584M	$21,896	$1,969
District Park	$1.0M	$12,560	$1,047	$991,100	$12,388	$1,032
Linear Park	$308,000	$10,267	$856	$245,500	$8,183	$682
Waterway Buffer Micro	$77,000	$24,200	$2017	$41,000	$12,886	$1,074
Waterway Buffer Macro	$485,100	$22,234	$1,853	$252,000	$11,550	$963

* Where a parkland is identified as trunk in the LGIP it will be funded by the local government. Therefore, a large proportion of this cost saving is passed to the local government. The majority of the capital cost saving is associated with reduced land value (i.e. stormwater management function within parkland meaning the parkland land value is significantly reduced). There may be an element of 'double dipping' between the land value associated with the reduced capital cost and increased development profit (i.e. the unencumbered land which was part of the park has been be reduced from the capital cost but added to the development yield and profit). We have attempted to exclude this double dipping from the case studies.

Table 17: Case Study Findings – Local government Outcomes

Case Study	Increased infrastructure charges*			Saved infrastructure refund**			Reduced Maintenance Cost		
	Total $	$/ ha of development	$ / dwelling	Total $	$/ ha of development	$ / dwelling	Total $	$/ ha of development /yr	$ / dwelling/yr
Local Park Micro	$840,000	$5,090	$420	$200.040	$12,124	$1,000	$3,036	$184	$15
Local Park Macro	$1.099M	$9,311	$837	$2.584M	$21,896	$1,969	$21,702	$184	$17
District Park	$365,400	$4,567	$381	$526,600	$6,620	$552	$12,514	$156	$13
Linear Park	$112,000	$3,733	$311	$245,500	$8,183	$682	$2,369	$79	$6.50
Waterway Buffer Micro	$28,000	$8,800	$733	-	-	-	$640	$201	$17
Waterway Buffer Macro	$176,400	$8,045	$1,700	-	-	-	$1,700	$78	$6.50

* It is recognised that increased infrastructure charges also represents the cost of servicing the additional lots

** Where a parkland is identified as trunk in the LGIP it will be funded by the local government. Therefore, a reduction in capital cost is passed on to the local government as a reduced infrastructure refund. If the parkland is non-trunk then it will be funded by the developer and no refund would be given. The saving is therefore retained by the developer.

8 CONCLUSIONS

The aim of this project is to explore whether better and more cost effective infrastructure provision can be achieved through the multiple use of land for parks and stormwater infrastructure.

Until recently, there has been limited interest by local governments in the multiple use of land for park and stormwater infrastructure which in many cases is resulting in poor landscape and urban design outcomes (refer Stormwater Squeeze in Section 2) and higher costs to local governments and developers. There is an opportunity to revisit local government parkland policy to improve urban design outcomes, preserve parkland function and minimise cost.

Consultation with local government officers revealed four key barriers that need to be addressed if the multiple use of land for parks and stormwater infrastructure is to be broadly accepted. These barriers are a lack of financial incentive, regulatory / technical requirements which prevent or discourage multiple use parkland, maintenance problems and cultural attitudes.

This report seeks to address the first three of these barriers by proposing a new parkland DSS that support the creation of multiple use parklands. The proposed DSS promotes parkland design which avoids common maintenance problems, and associated costs, and enables the capital cost of park and stormwater infrastructure to be reduced. This is achieved by reducing the overall amount of land required to fulfil parkland and stormwater functions and by allowing the partial location of parkland on otherwise undevelopable land (such as flood-prone land along a natural drainage path). For developers, the primary benefit of this approach is additional development yields. For local government, the primary benefit is reduced costs of acquiring parklands.

It is recognised that implementing the proposed approach must occur within the regulatory framework provided by SPA and *Statutory Guideline 03/14 - Local government infrastructure plans.* Ensuring there is adequate financial incentive for both local government and developers will be integral to the success of the proposed approach as well as removal of barriers which prevent this outcome. Amending *Statutory Guideline 03/14 - Local government infrastructure plans* to clarify that local government is allowed to recalculate the value of trunk infrastructure if it does not align with the value identified in the LGIP, is one element for consideration in achieving this outcome.

Changing existing cultural attitudes to multiple use parkland also remains a broader challenge and it is hoped that raising awareness of the benefits of multiple use parklands through reports such as this will help to overcome this barrier in time. It is anticipated that consultation with local government and industry stakeholders, and other capacity building initiatives will assist this.

To help raise awareness of the benefits of multiple use parklands, this report provides a number of case studies showing how the land, function and cost outcomes for existing parks could be improved if they were redesigned in accordance with the multiple use parkland DSS. Although the case study assessments are high level and may not consider all of the specific design and development application requirements of each site, the findings illustrate there is a significant net benefit to all stakeholders when applying multiple use parkland design approaches.

Key findings from the case studies are:

- Parkland areas are retained thus preserving the parkland provision
- Useable parkland functions are preserved (i.e. play node and kickabout)
- Stormwater management area is reduced because part of this function is integrated within the park
- Maintenance areas are reduced
- Additional land is available for development
- Capital cost of land required for parks and stormwater is reduced
- Where a parkland is trunk, the capital cost saving is passed onto the local government, usually through reduced infrastructure offsets or refunds
- Where a parkland is non-trunk, the cost saving is retained by the developer
- Additional developer charges are collected by the local government due to increased development yield (i.e. more allotments)
- Overall maintenance costs to local government are reduced.

Finally, successful implementation of multiple use parkland will require a collaborative approach between developers and local government. It will be essential that town planners are able to lead these discussions to ensure that developers, local government and the community realise the desired benefits of using parks for multiple purposes.

Multiple use parkland, play nodes within areas that provide flood detention. Photo taken 2 days after the large 1 May 2015 rainfall event.

Coomera Park - Coomera (QLD)

Park type	Local recreation
Total size	0.57ha
Dimensions (total park)	95m x 60m
Active open space functions	Kickabout
Passive open space functions	☐ Playground ☐ Seating
Connectivity	☐ Double road frontage ☐ Internal pathways
Road frontage	Good
Surveillance	Good
Dimensions (passive and active space areas)	Appropriate for the required functional components
Shape	Square/rectangular
Play/shelter node	0.05ha
Kickabout space	0.3ha
Other	0.22ha

Indicative apportionment of park functions

Victoria Point Park - Victoria Point (QLD)

Park type	Local recreation
Total size	0.6ha
Dimensions (total park)	65m x 92m
Active open space functions	Kickabout
Passive open space functions	☐ Playground ☐ Seating
Connectivity	☐ Double road frontage ☐ Internal pathways
Road frontage	Good
Surveillance	Good
Dimensions (passive and active space areas)	Appropriate for the required functional components
Shape	Square/rectangular
Play/shelter node	0.08ha
Kickabout space	0.26ha
Other	0.26ha

Indicative apportionment of park functions

Mt Gravatt Park - Mt Gravatt (QLD)

Park type	Local recreation
Total size	2.0ha
Dimensions (total park)	200m x 100m
Active open space functions	Kickabout Dog offleash
Passive open space functions	☐ Playground ☐ Seating
Connectivity	☐ Double road frontage ☐ Internal pathways
Road frontage	Good
Surveillance	Good
Dimensions (passive and active space areas)	Appropriate for the required functional components
Shape	Square/rectangular
Play/shelter node	0.18ha
Kickabout space	0.5ha
Other	Dog off leash 0.2ha Other 1.12 ha

Indicative apportionment of park functions

Springfiel Park - Springfield (QLD)

Park type	Local recreation
Total size	0.5ha
Dimensions (total park)	62.5m x 80m
Active open space functions	Kickabout
Passive open space functions	☐ Playground ☐ Seating
Connectivity	☐ Double road frontage ☐ Internal pathways
Road frontage	Good
Surveillance	Good
Dimensions (passive and active space areas)	Appropriate for the required functional components
Shape	Square/rectangular
Play/shelter node	0.08ha
Kickabout space	0.18ha
Other	0.24ha

Indicative apportionment of park functions

Sippy Downs Park - Sippy Downs (QLD)

Park type	Local recreation
Total size	1.0ha
Dimensions (total park)	160m x 62.5m
Active open space functions	Kickabout x 2
Passive open space functions	☐ Playground ☐ Seating
Connectivity	☐ Double road frontage ☐ Internal pathways
Road frontage	Good
Surveillance	Good
Dimensions (passive and active space areas)	Appropriate for the required functional components
Shape	Square/rectangular
Play/shelter node	0.15ha
Kickabout space	0.31ha
Other	0.54ha

Indicative apportionment of park functions

North Lakes Park - North Lakes (QLD)

Park type	Local recreation
Total size	0.57ha
Dimensions (total park)	75m x 75m
Active open space functions	Kickabout
Passive open space functions	☐ Playground ☐ Seating
Connectivity	☐ Double road frontage ☐ Internal pathways
Road frontage	Good
Surveillance	Good
Dimensions (passive and active space areas)	Appropriate for the required functional components
Shape	Square/rectangular
Play/shelter node	0.1ha
Kickabout space	0.2ha
Other	0.27ha

Indicative apportionment of park functions

Swartz Street Park - Toowoomba (QLD)

Park type	Local recreation
Total size	0.48ha
Dimensions (total park)	73m x 66m
Active open space functions	Kickabout space
Passive open space functions	☐ Playground ☐ Seating
Connectivity	☐ Double road frontage ☐ Internal pathways
Road frontage	Good
Surveillance	Good
Dimensions (passive and active space areas)	Appropriate for the required functional components (approx 50m x 66m)
Shape	Square/rectangular
Play/shelter node	0.1ha
Kickabout space	0.2ha
Other	0.18ha

Indicative apportionment of park functions

Jack Street Park - Toowoomba (QLD)

Park type	Local recreation
Total size	0.66ha
Dimensions (total park)	110m x 114m x 100m
Active open space functions	Kickabout space
Passive open space functions	☐ Playground ☐ Seating
Connectivity	☐ Double road frontage
Road frontage	Good
Surveillance	Good
Dimensions (passive and active space areas)	Appropriate for the required functional components (approx 80m x 40m)
Shape	Triangular
Play/shelter node	0.15ha
Kickabout space	0.2ha
Other	0.4ha

Indicative apportionment of park functions

The Quay Playground - Torquay (Vic)

The Quay Playground

Park type	Local recreation
Total size	0.51ha
Dimensions (total park)	80m x 90m x 40m
Active open space functions	Kickabout space
Passive open space functions	☐ Playground and adventure space ☐ Seating and shelter ☐ Barbecue
Connectivity	☐ Double road frontage ☐ Internal pathways
Road frontage	Excellent
Surveillance	Excellent
Dimensions (passive and active space areas)	Appropriate for the required functional components (approx 60m x 50m)
Shape	Rectangular
Play/shelter node	0.1ha
Kickabout space	0.25ha
Other	0.16ha

Indicative apportionment of park functions

St. Annes Reserve - Torquay (Vic)

St. Annes Reserve

Park type	Local recreation
Total size	0.49ha
Dimensions (total park)	135m x 72m x 20m
Active open space functions	☐ Kickabout space ☐ Outdoor gym equipment
Passive open space functions	☐ Playground ☐ Seating
Connectivity	☐ Double road frontage ☐ Internal pathways
Road frontage	74m and 20m
Surveillance	Average/Poor road framework
Dimensions (passive and active space areas)	Appropriate for the required functional components (approx 60m x 50m)
Shape	Triangular
Play/shelter node	0.1ha
Kickabout space	0.2ha
Other	0.19ha

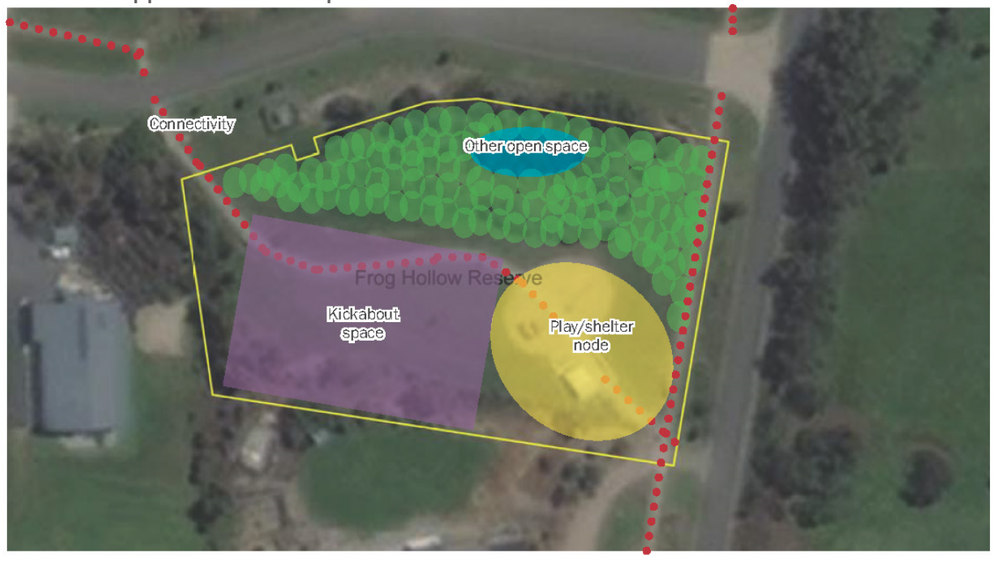
Indicative apportionment of park functions

Frog Hollow Reserve - Torquay (Vic)

Frog Hollow Reserve

Park type	Local recreation
Total size	0.56ha
Dimensions (total park)	95m x 60m
Active open space functions	Kickabout space
Passive open space functions	☐ Playground ☐ Seating
Connectivity	☐ Double road frontage ☐ Internal pathways
Road frontage	Good
Surveillance	Good
Dimensions (passive and active space areas)	Appropriate for the required functional components (approx 40m x 80m)
Shape	Rectangular
Play/shelter node	0.1ha
Kickabout space	0.23ha
Other	0.23ha

Indicative apportionment of park functions



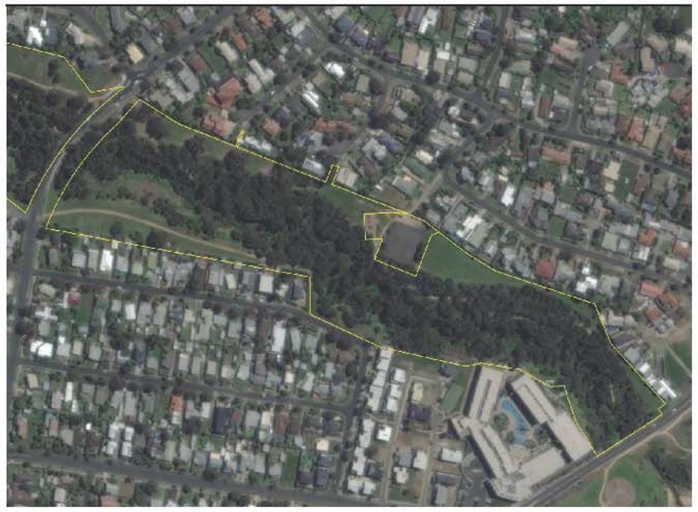
Jan Juc Creek Playground - Jan Juc (Vic)

Jan Juc Creek Playground

Park type	District
Total size	2.06ha
Dimensions (total park)	240m x 112m
Active open space functions	Kickabout space
Passive open space functions	☐ Playground ☐ Seating and shelter ☐ Barbecue
Connectivity	☐ Triple road frontage ☐ Internal pathways
Road frontage	Good
Surveillance	Good
Dimensions (passive and active space areas)	Appropriate for the required functional components (approx 80m x 40m)
Shape	Rectangular
Play/shelter node	0.15ha
Kickabout space	0.6ha
Other	1.25ha

Indicative apportionment of park functions

Deep Creek Playground - Torquay (VIC)



Park type	Local recreation
Total size	0.31ha Recreation node
Dimensions (total linear park segment)	620m x 145m
Active open space functions	☐ Kickabout space ☐ Basketball court
Passive open space functions	☐ Playground ☐ Seating
Connectivity	☐ Good connections provided through the pathway network
Road frontage	N/a
Surveillance	Limited
Dimensions (passive and active space areas)	Appropriate for the required functional components (approx 35m x 60m)
Shape	Rectangular
Play/shelter node	0.1ha
Kickabout space	0.2ha

Indicative apportionment of park functions

General Comments

The function of parks should not be compromised by their multiple use.

Local parks are local because of their accessibility and this standard should not change.

Should additional local parkland be required to accommodate stormwater infrastructure, this must not be at the cost of the local government

When considering costs, there is a need to consider full life cycle and not just initial capital cost

Local governments do not have the skill sets to ensure well designed multi-function spaces. Best practice guidance is required

Suggested minimum land area for local open space 0.3-0.4 ha (0.2ha kick-about and 0.2ha for swings/shelter). Remaining 0.1-0.2ha available for multiple use opportunities

Many older parks are located in flood prone areas and this is accepted by the community

Corridor link parks can accommodate biodiversity, active transport (10m), waterway functions and nodes for local recreation parks

Town planners are not generating solutions – have become box tickers. This approach will not work with multiple use parks

Barriers

- **Financial Incentive**

There must be a financial incentive for developers and local governments to work together to provide well designed multiple use parks.The financial benefits must be shared and be significant enough to warrant the extra planning design and construction effortMaintenance costs need to be same or cheaper

- **Maintenance Problems**

Permanent infrastructure such as BBQ's, swings etc should be kept above the level of flooding. Above Q100 was suggested.

Dog of-leash areas can block with debris during flood events. Recommend that they be kept out of flood area.

Dog off leash areas must be well drained otherwise turf becomes muddy very quickly. Fences and equipment should be above the 20 year ARI

Paths get muddy and covered in silt after flooding and can be a safety issue for people using park

Water flowing into park brings litter and pollutants which remain after the water has subsided. Need to minimise this risk.

Ability to mow grass would be hampered if the soil is flooded or wet following a flood event

Summer rainfall often prevents a park from drying out following a flood event. Suitable drainage required.

- **Regulatory / Technical**

There is a need to deal with risks associated with water velocity. Appropriate standard is required. 1.2m considered to be too high.

Existing planning scheme provisions discourage multiple use of land for parks and stormwater infrastructure

Must consider impact on neighbours bordering the park (permitter issues). If noisy activities are pushed to the perimeter, this can result in complaints

- **Cultural Attitudes**

The attitude that recreation and stormwater objectives are incompatible has become more entrenched since the 2011 floods when lives were lost in local waterways during flooding

Good outcomes are dependent on the enthusiasm and knowledge of the people involved. There is little understanding and hence enthusiasm for the additional negotiation associated with achieving multiple use parkland

Victorian Planning Provisions

The Victorian Planning Provisions provide the following guidelines in relation to public open space and integrated urban landscape objectives.

Integrated urban landscape objectives (56.05-1)

Standard C12 - Support integrated water management systems with appropriate landscape design techniques for managing urban run-off including wetlands and other water sensitive urban design features in streets and public open space.

Standard C 13 - Public open space should:

- Local parks within 400 metres safe walking distance of at least 95 percent of all dwellings. Where not designed to include active open space, local parks should be generally 1 hectare in area and suitably dimensioned and designed to provide for their intended use and to allow easy adaptation in response to changing community preferences.
- Be integrated with floodways and encumbered land that is accessible for public recreation
- Be suitable for the intended use
- Be integrated with urban water management systems, waterways and other water bodies

Other guidance

Further to the Victorian Planning Provisions, there are two other sources that provide guidance in relation to open space provision standards. The relevant components of these have been summarised in the table below.

Guideline	Active/ sporting	Passive	Total open space	Min local rec park size	Encumbered open space
Metropolitan Planning Authority	1.3ha/1,000	0.87 ha/1,000	2.17ha/1,000	Not specified	In meeting the provision standards (10% of NDA comprised of 6% active and 4% passive open space), encumbered land should be used productively for open space. The network of local and district parks should be efficiently designed to maximise the integration and sharing of space with publicly accessible encumbered land including land retained for drainage, electricity, biodiversity and cultural heritage purposes. The parkland created by such sharing and integration should be suitable for the intended open space function/s, including maintenance. In this way encumbered land will be well utilised, while the total amount of open space can be optimised without adversely impacting on the quality and functionality of the network.
Planning for Community Infrastructure in Growth Areas	1.33ha/1,000	1ha/1,000	3ha/1,000 (incl 0.67ha/1,000 for regional open space)	0.7-1ha min size	N/a

Western Australia

Western Australian Planning Commission

The Western Australian Planning Commission (WAPC) provides guidance on public open space provision in its Public Open Space in Residential Areas Policy DC 2.3.

The policy provides the following detail in regards to open space provision (recreation parks only):

Standard type	Detail
Reserve for recreation	10% of gross subdivisible area
	8% unencumbered land
	2% can be encumbered land
Public open space	3.36ha/1,000

Public utility uses

The Commission is not prepared to accept as open space land which is occupied by public utility uses such as drainage sumps. However, it may agree to such features as landscaped compensating basins being included and credited either in whole or in part as a portion of a public open space contribution. In order to be acceptable to the Commission, such compensating basins, drainage reserves and underground pumping stations, etc. shall be so located, designed and landscaped that the public is able to use the open space for safe, passive and/or active recreation and amenity is not impaired.

The Commission's general practice is that up to 100% of compensating basins may be credited towards the public open space requirement where the land is not subject to permanent inundation provided it is contoured, unfenced and fully usable for recreation purposes. Up to 50% may be credited in other circumstances subject to the advice of local government.

Liveable Neighbourhoods Policy

The WAPC in conjunction with the Department for Planning and Infrastructure have developed a Liveable Neighbourhoods operational policy - a sustainable cities initiative. The policy provides some detail on public open space provision, which largely mimics the WAPC Public Open Space in Residential Areas Policy as follows:

The policy follows the WAPC's provision of 10% of development for open space (8% active and passive and 2% allocated for urban water management measures such as swales and/or detention areas.

The policy provides the following guidance on minimum park sizes:

Open space type	Typical size
Local open space	0.4ha to 1ha
Neighbourhood open	0.3 –0.8 ha
District open space	2.5 – 7.0 ha

Department of Sport and Recreation (WA

The Department of Sport and Recreation WA provides guidance on public open space provision in its Classification Framework for Public Open Space. The framework provides the following detail:

Open space type	Typical size
Local open space	0.4ha to 1ha
Neighbourhood open space	1ha to 5ha
District open space	5ha to 15ha

The UDIA's position statement on public open space supports the principles of Liveable Neighbourhoods for Public Open Space allocation, distribution, development standards and maintenance.

New South Wales

The New South Wales Department of Planning and Environment provides high level guidance on public open space provision to be included within a local governments Local Environmental Plan, through the Department of Planning's Recreation and Open Space Planning Guidelines for Local Government.

The guideline provides the following detail in regards to open space provision standards (recreation parks only).

Open Space Type	Minimum park	Percent of developable land (non-commercial)
Local Recreation	0.5-2ha	2.6% of land
District Recreation	2-5ha	0.6% of land

Local Park –Micro Scale Costings

Existing Park Capital Cost

PARK	Local Park		5000	m2
Kickabout	Turf	100	2000	m2
Play/Shelter	Turf	70%	700	m2
	Play/Shelter		100	m2
Other Areas	Turf	50%	1000	
	Planting	50%	1000	m2
	Pathway		200	m2
Costing Areas	Total Turf		3700	m2
	Planting areas	50%	1000	m2
	Play/Shelter		100	m2
	Pathway		200	m
	TOTAL		**5000**	**m2**

Earthworks **Assumptions: 1m cut/fill to standing engineering compaction, no topsoil**		**Rate**	**Qty**	**Total**
Site clearance including removal of debris, fences, vegetation	m2	$ 1.25	5000	$ 6,250
Strip, stockpile	m2	$ 2.50	5000	$ 12,500
Bulk earthworks (cut,fill, compaction, disposal)	m2	$ 25.00	5000	$ 125,000
Sub Total				$ 143,750
Turf **Assumptions: Minimum grading, soil amelioration and 'A' grade couch**		**Rate**	**Qty**	**Total**
Walls	m2	$ 1.00	3700	$ 3,700
Ripping subgrade and additives	m2	$ 0.50	3700	$ 1,850
Ameliorate and spread site soil to 300mm depth	m2	$ 3.50	3700	$ 12,950
Supply & lay "A" grade Winter Green Couch' turf - including fertilizer as specified	m2	$ 4.00	3700	$ 14,800
Sub Total				$ 33,300
Planting Areas **Assumptions: Minimum grading, subgrade preparation, Ameliorated site soil, mulch and medium density planting.**		**Rate**	**Qty**	**Total**
Preparation and final trimming to landscape areas	m2	$ 1.00	1000	$ 1,000
Ripping subgrade and additives	m2	$ 0.50	1000	$ 500
Ameliorate and spread site soil to 300mm depth	m2	$ 7.00	1000	$ 7,000
Supply and install 140mm pots at 4/m2	m2	$ 12.00	1000	$ 12,000
Supply and install organic mulch to garden bed areas	m2	$ 7.50	1000	$ 7,500
Sub Total				$ 28,000
Play areas **Assumptions: Multiage playground with three proprietary play products in organic softfall mulch with an approximate area of 100m²**		**Rate**	**Qty**	**Total**
Softfall area excavation - excavate softfall areas as required to accommodate Softfall (approx. ± 500mm)	m2	$ 212.50	1	$ 212.50
Subsurface drainage	item	$ 500.00	1	$ 500.00
Softfall mulch 400mm to play area - including geofabric.	m2	$ 40.00	1	$ 40.00
3 x proprietary play equipment (approx 100m2 of fall zone)	item	$40,000.00	1	$ 40,000.00
Sub Total				$ 40,753
Miscellaneous		**Rate**	**Qty**	**Total**
Supply and install 1.5m wide Pedestrian pathway	lnm	$ 97.50	200	$ 19,500.00
Shade shelter and table setting	item	$ 35,000.00	1	$ 35,000.00
Bins	item	$ 3,000.00	1	$ 3,000.00
Drinking fountain	item	$ 5,000.00	1	$ 5,000.00
Seats	item	$ 2,000.00	2	$ 4,000.00
Sub Total				**$ 66,500**
			Grand Total	**$ 312,302.50**
			Civil	**$ 143,750.00**
			Landcape	**$ 168,552.50**

STORMWATER	Stormwater Area		2800	m2
	Bioretention		280	m2
	Flood detention		1600	m2
	Batters		920	m2
	Walls		105	m2
	TOTAL		**2800**	**m2**

Earthworks **Assumptions: 1m cut/fill to standing engineering compaction, no topsoil**		**Rate**	**Qty**	**Total**
Site clearance including removal of debris, fences, vegetation	m2	$ 1.25	2520	$ 3,150
Strip, stockpile	m2	$ 2.50	2520	$ 6,300
Bulk earthworks (cut,fill, compaction, disposal)	m2	$ 25.00	2520	$ 63,000
Sub Total				$ 72,450
Structures		**Rate**	**Qty**	**Total**
Hydraulic structures	Item	$ 7,500.00	1	$ 7,500
Scour protection	m2	$ 150.00	10	$ 1,500
Walls	m2	$ 400.00	105	$ 42,000
Sub Total				$ 51,000
Turf **Assumptions: Minimum grading, soil amelioration and 'A' grade couch**		**Rate**	**Qty**	**Total**
Preparation and final trimming to landscape areas	m2	$ 1.00	1600	$ 1,600
Ripping subgrade and additives	m2	$ 0.50	1600	$ 800
Ameliorate and spread site soil to 300mm depth	m2	$ 3.50	1600	$ 5,600
Supply & lay "A" grade Winter Green Couch' turf - including fertilizer as specified	m2	$ 4.00	1600	$ 6,400
Sub Total				$ 14,400
Planting Areas **Assumptions: Minimum grading, subgrade preparation, Ameliorated site soil, mulch and medium density planting.**		**Rate**	**Qty**	**Total**
Preparation and final trimming to landscape areas	m2	$ 1.00	920	$ 920
Ripping subgrade and additives	m2	$ 0.50	920	$ 460
Ameliorate and spread site soil to 300mm depth	m2	$ 7.00	920	$ 6,440
Supply and install 140mm pots at 4/m2	m2	$ 12.00	920	$ 11,040
Supply and install organic mulch to garden bed areas	m2	$ 7.50	920	$ 6,900
Sub Total				$ 25,760
Treatment system		**Rate**	**Qty**	**Total**
Bioretention construction	m2	$ 400.00	280	$ 112,000
Sub Total				$ 112,000
			Grand Total	**$ 275,610.00**
			Civil	**$ 235,450.00**
			Landcape	**$ 40,160.00**

Existing Park Maintenance Cost

PARK	Local Park		5000	m2
Kickabout	Turf	100	2000	m2
Play/Shelter	Turf	70%	700	m2
	Play/Shelter		100	m2
Other Areas	Turf	50%	1000	
	Planting	50%	1000	m2
	Pathway		200	m2
Costing Areas	Total Turf		3700	m2
	Planting areas	50%	1000	m2
	Play/Shelter		100	m2
	Pathway		200	m
	TOTAL		**5000**	**m2**

Maintenance Items		Rate	Qty	Total
Turf - Mowing 25 times per year at $0.05/m2 per mow	m2	$ 1.25	3700	$ 4,625
Planting areas - Spray weed at 6-10 times per year	m2	$ 0.50	1000	$ 500
Planting areas remulch - every 2 years to only higher profile zones of planting	m2	$ 4.00	250	$ 1,000
Play equipment clean - yearly	Item	$ 400	1	$ 400
Litter removal	Item	$ 300	1	$ 300
Sub Total				$ 6,825
Note included:				
Pathway renewal				
Playground/shelter renewal				
Turf renewal				
Planting areas renewal				
			Grand Total	$ 6,825.00

STORMWATER	Stormwater Area		2800	m2
	Bioretention		280	m2
	Flood detention		1600	m2
	Batters		920	m2
	Walls		105	m2
	TOTAL		**2800**	**m2**

Maintenance Items		Rate	Qty	Total
Bioretention maintenance	m2	$ 2.00	280	$ 560
Flood detention turf	m2	$ 1.60	1600	$ 2,560
Flood detention batters	m2	$ 0.50	920	$ 460
Removal of litter - Single big clean up per year	Item	$ 1,500.00	1	$ 1,500
Cleanout of hydraulic structures	Item	$ 500.00	1	$ 500
Wall monitoring and maintenance	Item	$ 500.00	1	$ 500
Sub Total				$ 6,080
Note included:				
Bioretention renewal				
Turf renewal				
Planting areas renewal				
			Grand Total	$ 6,080.00

Multiple use Park Capital Cost

PARK	Local Park		5000	m2
Kickabout	Turf	100	2500	m2
Play/Shelter	Play/Shelter		100	m2
	Play/Shelter - Turf		700	m2
Other Areas	Other area - Turf	20%	300	m2
	Planting areas	80%	920	m2
	Pathway		200	m2
Costing Areas	Total Turf		3500	m2
	Planting areas	80%	920	m2
	Play/Shelter		100	m2
	Pathway		200	m2
	TOTAL		**4720**	**m2**

Earthworks **Assumptions: 1m cut/fill to standing engineering compaction, no topsoil**		**Rate**	**Qty**	**Total**
Site clearance including removal of debris, fences, vegetation	m2	$ 1.25	5000	$ 6,250
Strip, stockpile	m2	$ 2.50	5000	$ 12,500
Bulk earthworks (cut,fill, compaction, disposal)	m2	**$ 25.00**	5000	$ 125,000
Sub Total				$ 143,750
Turf **Assumptions: Minimum grading, soil amelioration and 'A' grade couch**		**Rate**	**Qty**	**Total**
Preparation and final trimming to landscape areas	m2	$ 1.00	3500	$ 3,500
Extra over for preparation and final trimming to kickabout due to flooding	m2	**$ 7.50**	**$ 2,500**	**$ 18,750**
Ripping subgrade and additives	m2	$ 0.50	3500	$ 1,750
Ameliorate and spread site soil to 300mm depth	m2	**$ 5.00**	**3500**	**$ 17,500**
Supply & lay "A" grade Winter Green Couch' turf - including fertilizer as specified	m2	$ 4.00	3500	$ 14,000
Sub Total				$ 55,500
Planting Areas **Assumptions: Minimum grading, subgrade preparation, Ameliorated site soil, mulch and medium density planting.**		**Rate**	**Qty**	**Total**
Preparation and final trimming to landscape areas	m2	$ 1.00	920	$ 920
Ripping subgrade and additives	m2	$ 0.50	920	$ 460
Ameliorate and spread site soil to 300mm depth	m2	$ 7.00	920	$ 6,440
Supply and install 140mm pots at 4/m2	m2	$ 12.00	920	$ 11,040
Supply and install organic mulch to garden bed areas	m2	$ 7.50	920	$ 6,900
Sub Total				$ 25,760
Play areas **Assumptions: Multiage playground with three proprietary play products in organic softfall mulch with an approximate area of 100m²**		**Rate**	**Qty**	**Total**
Softfall area excavation - excavate softfall areas as required to accommodate Softfall (approx. ± 500mm)	m2	$ 212.50	1	$ 212.50
Subsurface drainage	item	$ 500.00	1	$ 500.00
Softfall mulch 400mm to play area - including geofabric.	m2	$ 40.00	1	$ 40.00
3 x proprietary play equipment (approx 100m2 of fall zone)	item	$40,000.00	1	$ 40,000.00
Sub Total				$ 40,753
Miscellaneous		**Rate**	**Qty**	**Total**
Supply and install 1.5m wide Pedestrian pathway	lnm	$ 97.50	200	$ 19,500.00
Shade shelter and table setting	item	$ 35,000.00	1	$ 35,000.00
Bins	item	$ 3,000.00	1	$ 3,000.00
Drinking fountain	item	$ 5,000.00	1	$ 5,000.00
Seats	item	$ 2,000.00	2	$ 4,000.00
Sub Total				**$ 66,500**

Grand Total	$ 332,262.50
Civil	$ 143,750.00
Landcape	$ 188,512.50

STORMWATER	Stormwater Area		2800	m2
	Bioretention		280	m2
	Flood detention		0	m2
	Batters		1000	m2
	Walls		0	m2

Earthworks **Assumptions: 1m cut/fill to standing engineering compaction, no topsoil**		**Rate**	**Qty**	**Total**
Site clearance including removal of debris, fences, vegetation	m2	$ 1.25	1000	$ 1,250
Strip, stockpile	m2	$ 2.50	1000	$ 2,500
Bulk earthworks (cut,fill, compaction, disposal)	m2	$ 25.00	1000	$ 25,000
Sub Total				$ 28,750
Structures		**Rate**	**Qty**	**Total**
Hydraulic structures	Item	$ 7,500.00	1	$ 7,500
Scour protection	m2	$ 150.00	10	$ 1,500
Walls	m2	$ 400.00	105	$ 42,000
Sub Total				$ 51,000
Turf **Assumptions: Minimum grading, soil amelioration and 'A' grade couch**		**Rate**	**Qty**	**Total**
Preparation and final trimming to landscape areas	m2	$ 1.00	0	$ -
Ripping subgrade and additives	m2	$ 0.50	0	$ -
Ameliorate and spread site soil to 300mm depth	m2	$ 3.50	0	$ -
Supply & lay "A" grade Winter Green Couch' turf - including fertilizer as specified	m2	$ 4.00	0	$ -
Sub Total				$ -
Planting Areas **Assumptions: Minimum grading, subgrade preparation, Ameliorated site soil, mulch and medium density planting.**		**Rate**	**Qty**	**Total**
Preparation and final trimming to landscape areas	m2	$ 1.00	1000	$ 1,000
Ripping subgrade and additives	m2	$ 0.50	1000	$ 500
Ameliorate and spread site soil to 300mm depth	m2	$ 7.00	1000	$ 7,000
Supply and install 140mm pots at 4/m2	m2	$ 12.00	1000	$ 12,000
Supply and install organic mulch to garden bed areas	m2	$ 7.50	1000	$ 7,500
Sub Total				$ 28,000
Treatment system		**Rate**	**Qty**	**Total**
Bioretention construction	m2	$ 400.00	280	$ 112,000
Sub Total				$ 112,000

Grand Total	$ 219,750.00
Civil	$ 191,750.00
Landcape	$ 28,000.00

Multiple use Park Maintenance Cost

PARK	Local Park		5000	m2
Kickabout	Turf	100	2500	m2
Play/Shelter	Play/Shelter		100	m2
	Play/Shelter - Turf		700	m2
Other Areas	Other area - Turf	20%	300	m2
	Planting areas	80%	920	m2
	Pathway		200	m2
Costing Areas	Total Turf		3500	m2
	Planting areas	80%	920	m2
	Play/Shelter		100	m2
	Pathway		200	m2
	TOTAL		**4720**	**m2**

STORMWATER	Stormwater Area		2800	m2
	Bioretention		280	m2
	Flood detention		0	m2
	Batters		1000	m2
	Walls		0	m2
	TOTAL		**1280**	**m2**

Maintenance Items		Rate	Qty	Total
Turf - Mowing 25 times per year at $0.05/m2 per mow	m2	$ 1.25	1000	$ 1,250
Flooding turf - Mowing and resetting	**m2**	**$ 1.60**	**2500**	**$ 4,000**
Planting areas - Spray weed at 6-10 times per year	m2	$ 0.50	920	$ 460
Planting areas remulch - every 2 years to only higher profile zones of planting	m2	$ 4.00	175	$ 699
Play equipment clean - yearly	Item	$ 400	1	$ 400
Litter removal	Item	**$ 1,500**	1	$ 1,500
Sub Total				$ 8,309
Note included:				
Pathway renewal				
Playground/shelter renewal				
Turf renewal				
Planting areas renewal				
			Grand Total	$ 8,309.20

Maintenance Items		Rate	Qty	Total
Bioretention maintenance	m2	$ 2.00	280	$ 560
Flood detention turf	m2	$ 1.60	0	$ -
Flood detention batters	m2	$ 0.50	1000	$ 500
Removal of litter - Single big clean up per year	Item	$ 1,500.00	0	$ -
Cleanout of hydraulic structures	Item	$ 500.00	1	$ 500
Sub Total				$ 1,560
Note included:				
Bioretention renewal				
Turf renewal				
Planting areas renewal				
			Grand Total	$ 1,560.00

Local Park – Macro Scale Costings

Existing Park Capital Cost

PARK	Local Park		86700	m2
Kickabout	Turf	100%	10500	m2
Play/Shelter	Turf	70%	4200	m2
	Play/Shelter		700	m2
	Planting		1100	m2
Other Areas	Turf	50%	16750	m2
	Planting	50%	15400	m2
	Pathway		1350	m2
Linear Park	Turf	67%	24589	m2
	Planting	20%	7340	m2
	Pathway		4893	m2
Costing Areas	Total Turf		56039	m2
	Planting areas		23840	m2
	Play/Shelter		700	m2
	Pathway		6243	m
	TOTAL		**86822**	**m2**

Earthworks **Assumptions: 1m cut/fill to standing engineering compaction, no topsoil**		**Rate**	**Qty**	**Total**
Site clearance including removal of debris, fences, vegetation	m2	$ 1.25	86700	$ 108,375
Strip, stockpile	m2	$ 2.50	86700	$ 216,750
Bulk earthworks (cut,fill, compaction, disposal)	m2	$ 25.00	86700	$ 2,167,500
Sub Total				$ 2,492,625
Turf **Assumptions: Minimum grading, soil amelioration and 'A' grade couch**		**Rate**	**Qty**	**Total**
Walls	m2	$ 1.00	56039	$ 56,039
Ripping subgrade and additives	m2	$ 0.50	56039	$ 28,020
Ameliorate and spread site soil to 300mm depth	m2	$ 3.50	56039	$ 196,137
Supply & lay "A" grade Winter Green Couch' turf - including fertilizer as specified	m2	$ 4.00	56039	$ 224,156
Sub Total				$ 504,351
Planting Areas **Assumptions: Minimum grading, subgrade preparation, Ameliorated site soil, mulch and medium density planting.**		**Rate**	**Qty**	**Total**
Preparation and final trimming to landscape areas	m2	$ 1.00	23840	$ 23,840
Ripping subgrade and additives	m2	$ 0.50	23840	$ 11,920
Ameliorate and spread site soil to 300mm depth	m2	$ 7.00	23840	$ 166,880
Supply and install 140mm pots at 4/m2	m2	$ 12.00	23840	$ 286,080
Supply and install organic mulch to garden bed areas	m2	$ 7.50	23840	$ 178,800
Sub Total				$ 667,520
Play areas **Assumptions: Multiage playground with three proprietary play products in organic softfall mulch with an approximate area of 100m²**		**Rate**	**Qty**	**Total**
Softfall area excavation - excavate softfall areas as required to accommodate Softfall (approx. ± 500mm)	m2	$ 212.50	7	$ 1,487.50
Subsurface drainage	item	$ 500.00	7	$ 3,500.00
Softfall mulch 400mm to play area - including geofabric.	m2	$ 40.00	7	$ 280.00
3 x proprietary play equipment (approx 100m2 of fall zone)	item	$40,000.00	7	$ 280,000.00
Sub Total				$ 285,268
Miscellaneous		**Rate**	**Qty**	**Total**
Supply and install 1.5m wide Pedestrian pathway	lnm	$ 97.50	6243	$ 608,725.00
Shade shelter and table setting	item	$ 35,000.00	7	$ 245,000.00
Bins	item	$ 3,000.00	7	$ 21,000.00
Drinking fountain	item	$ 5,000.00	7	$ 35,000.00
Seats	item	$ 2,000.00	14	$ 28,000.00
Sub Total				**$ 937,725**
			Grand Total	**$ 4,887,488.50**
			Civil	**$ 2,492,625.00**
			Landcape	**$ 2,394,863.50**

Existing Park Maintenance Cost

PARK	Local Park		0	m2
Kickabout	Turf	100%	10500	m2
Play/Shelter	Turf	70%	4200	m2
	Play/Shelter		700	m2
	Planting		1100	m2
Other Areas	Turf	50%	16750	m2
	Planting	50%	15400	m2
	Pathway		1350	m2
Linear Park	Turf	67%	24589	m2
	Planting	20%	7340	m2
	Pathway		4893	m2
Costing Areas	Total Turf		56039	m2
	Planting areas		23840	m2
	Play/Shelter		700	m2
	Pathway		6243	m
	TOTAL		**86822**	**m2**

Maintenance Items		Rate	Qty	Total
Turf - Mowing 25 times per year at $0.05/m2 per mow	m2	$ 1.25	56039	$ 70,049
Planting areas - Spray weed at 6-10 times per year	m2	$ 0.50	23840	$ 11,920
Planting areas remulch - every 2 years to only higher profile zones of planting	m2	$ 4.00	5960	$ 23,840
Play equipment clean - yearly	Item	$ 400	7	$ 2,800
Litter removal	Item	$ 300	7	$ 2,100
Sub Total				$ 110,709

Note included:
Pathway renewal
Playground/shelter renewal
Turf renewal
Planting areas renewal

Grand Total	$ 110,708.75

Multiple use Park Capital Cost

PARK	Local Park		89100	m2
Kickabout	Turf	100%	17500	m2
Play/Shelter	Play/Shelter		700	m2
	Turf	70%	5250	m2
	Planting		1550	m2
Environmental OS	Turf	20%	4120	m2
	Planting areas	80%	15430	m2
	Pathway		1050	m2
Linear Park	Turf	70%	20300	m2
	Planting	20%	2900	m2
	Pathway		5800	m2
	Waterway planting	50%	7250	m2
	Waterway existing	50%	7250	m2
Costing Areas	Total Turf		47170	m2
	Planting areas		27130	m2
	Play/Shelter		700	m2
	Pathway		6850	m2
	Waterway existing veg		7250	m2
	TOTAL		**89100**	**m2**

Earthworks **Assumptions: 1m cut/fill to standing engineering compaction, no topsoil**		**Rate**	**Qty**	**Total**
Site clearance including removal of debris, fences, vegetation	m2	$ 1.25	66420	$ 83,025
Strip, stockpile	m2	$ 2.50	66420	$ 166,050
Bulk earthworks (cut,fill, compaction, disposal)	m2	$ 25.00	66420	$ 1,660,500
Sub Total				$ 1,909,575
Turf **Assumptions: Minimum grading, soil amelioration and 'A' grade couch**		**Rate**	**Qty**	**Total**
Preparation and final trimming to landscape areas	m2	$ 1.00	47170	$ 47,170
Ripping subgrade and additives	m2	$ 0.50	47170	$ 23,585
Ameliorate and spread site soil to 300mm depth	m2	$ 3.50	47170	$ 165,095
Supply & lay "A" grade Winter Green Couch' turf - including fertilizer as specified	m2	$ 4.00	47170	$ 188,680
Sub Total				$ 424,530
Planting Areas **Assumptions: Minimum grading, subgrade preparation, Ameliorated site soil, mulch and medium density planting.**		**Rate**	**Qty**	**Total**
Preparation and final trimming to landscape areas	m2	$ 1.00	27130	$ 27,130
Ripping subgrade and additives	m2	$ 0.50	27130	$ 13,565
Ameliorate and spread site soil to 300mm depth	m2	$ 7.00	27130	$ 189,910
Supply and install 140mm pots at 4/m2	m2	$ 12.00	27130	$ 325,560
Supply and install organic mulch to garden bed areas	m2	$ 7.50	27130	$ 203,475
Sub Total				$ 759,640
Play areas **Assumptions: Multiage playground with three proprietary play products in organic softfall mulch with an approximate area of 100m²**		**Rate**	**Qty**	**Total**
Softfall area excavation - excavate softfall areas as required to accommodate Softfall (approx. ± 500mm)	m2	$ 212.50	6	$ 212.50
Subsurface drainage	item	$ 500.00	6	$ 500.00
Softfall mulch 400mm to play area - including geofabric.	m2	$ 40.00	6	$ 40.00
3 x proprietary play equipment (approx 100m2 of fall zone)	item	$40,000.00	6	$ 40,000.00
Sub Total				$ 40,753
Miscellaneous		**Rate**	**Qty**	**Total**
Supply and install 1.5m wide Pedestrian pathway	lnm	$ 97.50	6850	$ 667,875.00
Shade shelter and table setting	item	$ 35,000.00	6	$ 210,000.00
Bins	item	$ 3,000.00	6	$ 18,000.00
Drinking fountain	item	$ 5,000.00	6	$ 30,000.00
Seats	item	$ 2,000.00	12	$ 24,000.00
Sub Total				**$ 949,875**
			Grand Total	**$ 4,084,372.50**
			Civil	**$ 1,909,575.00**
			Landcape	**$ 2,174,797.50**

Multiple use Park Maintenance Cost

PARK	Local Park		89100	m2
Kickabout	Turf	100%	17500	m2
Play/Shelter	Play/Shelter		700	m2
	Turf	70%	5250	m2
	Planting		1550	m2
Environmental OS	Turf	20%	4120	m2
	Planting areas	80%	15430	m2
	Pathway		1050	m2
Linear Park	Turf	70%	20300	m2
	Planting	20%	2900	m2
	Pathway		5800	m2
	Waterway planting	50%	7250	m2
	Waterway existing	50%	7250	m2
Costing Areas	Total Turf		47170	m2
	Planting areas		27130	m2
	Play/Shelter		700	m2
	Pathway		6850	m2
	Waterway existing veg		7250	m2
	TOTAL		**89100**	**m2**

Maintenance Items		Rate	Qty	Total
Turf - Mowing 25 times per year at $0.05/m2 per mow	m2	$ 1.25	47170	$ 58,963
Planting areas - Spray weed at 6-10 times per year*	m2	$ 0.50	19880	$ 9,940
Planting areas remulch - every 2 years to only higher profile zones of planting	m2	$ 4.00	3976	$ 15,904
Play equipment clean - yearly	Item	$ 400	6	$ 2,400
Litter removal	Item	$ 300	6	$ 1,800
Sub Total				$ 89,007
Note included:				
Pathway renewal				
Playground/shelter renewal				
Turf renewal				
Planting areas renewal				
* Exclude waterway plant management as this is part of other budget and common to both existing and new scenarios				
			Grand Total	$ 89,006.50

Linear Park – Costings

Existing Park Capital Cost

PARK	Local Park		9500	m2
Kickabout	Turf	100%	2500	m2
Play/Shelter	Turf	80%	1200	m2
	Play/Shelter		100	m2
Other Areas	Turf	90%	4950	
	Planting	10%	550	m2
	Pathway		200	m2
Costing Areas	Total Turf		8650	m2
	Planting areas	10%	550	m2
	Play/Shelter		100	m2
	Pathway		200	m
	TOTAL		**9500**	**m2**

Earthworks **Assumptions: 1m cut/fill to standing engineering compaction, no topsoil**		**Rate**	**Qty**	**Total**
Site clearance including removal of debris, fences, vegetation	m2	$ 1.25	9500	$ 11,875
Strip, stockpile	m2	$ 2.50	9500	$ 23,750
Bulk earthworks (cut,fill, compaction, disposal)	m2	$ 25.00	9500	$ 237,500
Sub Total				$ 273,125
Turf **Assumptions: Minimum grading, soil amelioration and 'A' grade couch**		**Rate**	**Qty**	**Total**
Walls	m2			$ -
Ripping subgrade and additives	m2	$ 0.50	8650	$ 4,325
Ameliorate and spread site soil to 300mm depth	m2	$ 3.50	8650	$ 30,275
Supply & lay "A" grade Winter Green Couch' turf - including fertilizer as specified	m2	$ 4.00	8650	$ 34,600
Sub Total				$ 69,200
Planting Areas **Assumptions: Minimum grading, subgrade preparation, Ameliorated site soil, mulch and medium density planting.**		**Rate**	**Qty**	**Total**
Preparation and final trimming to landscape areas	m2	$ 1.00	550	$ 550
Ripping subgrade and additives	m2	$ 0.50	550	$ 275
Ameliorate and spread site soil to 300mm depth	m2	$ 7.00	550	$ 3,850
Supply and install 140mm pots at 4/m2	m2	$ 12.00	550	$ 6,600
Supply and install organic mulch to garden bed areas	m2	$ 7.50	550	$ 4,125
Sub Total				$ 15,400
Play areas **Assumptions: Multiage playground with three proprietary play products in organic softfall mulch with an approximate area of 100m²**		**Rate**	**Qty**	**Total**
Softfall area excavation - excavate softfall areas as required to accommodate Softfall (approx. ± 500mm)	m2	$ 212.50	1	$ 212.50
Subsurface drainage	item	$ 500.00	1	$ 500.00
Softfall mulch 400mm to play area - including geofabric.	m2	$ 40.00	1	$ 40.00
3 x proprietary play equipment (approx 100m2 of fall zone)	item	$40,000.00	1	$ 40,000.00
Sub Total				$ 40,753
Miscellaneous		**Rate**	**Qty**	**Total**
Supply and install 1.5m wide Pedestrian pathway	lnm	$ 97.50	200	$ 19,500.00
Shade shelter and table setting	item	$ 35,000.00	1	$ 35,000.00
Bins	item	$ 3,000.00	1	$ 3,000.00
Drinking fountain	item	$ 5,000.00	1	$ 5,000.00
Seats	item	$ 2,000.00	2	$ 4,000.00
Sub Total				**$ 66,500**
			Grand Total	**$ 464,977.50**
			Civil	**$ 273,125.00**
			Landcape	**$ 191,852.50**

Existing Park Maintenance Cost

PARK	Parkland		9500	m2
Kickabout	Turf	100%	2500	m2
Play/Shelter	Turf	85%	1275	m2
	Play/Shelter		100	m2
Other Areas	Turf	90%	4950	
	Planting	9%	495	m2
	Pathway		200	m2
Costing Areas	Total Turf		8725	m2
	Planting areas		495	m2
	Play/Shelter		100	m2
	Pathway		200	m
	TOTAL		**9520**	**m2**

Maintenance Items		Rate	Qty	Total
Turf - Mowing 25 times per year at $0.05/m2 per mow	m2	$ 1.25	8725	$ 10,906
Planting areas - Spray weed at 6-10 times per year	m2	$ 0.50	495	$ 248
Planting areas remulch - every 2 years to only higher profile zones of planting	m2	$ 4.00	495	$ 1,980
Play equipment clean - yearly	Item	$ 400	1	$ 400
Litter removal	Item	$ 300	1	$ 300
Sub Total				$ 13,834
Note included:				
Pathway renewal				
Playground/shelter renewal				
Turf renewal				
Planting areas renewal				
			Grand Total	$ 13,833.75

Multiple use Park Capital Cost

PARK	Parkland		9500	m2
Local Park	Turf	100	2500	m2
	Play/Shelter		100	m2
	Play/Shelter - Turf		700	m2
	Play Planting		200	m2
Linear	Turf		3200	m2
	Planting areas		2000	m2
	Pathway		800	m2
Costing Areas	Total Turf		6400	m2
	Planting areas		2200	m2
	Play/Shelter		100	m2
	Pathway		800	m2
	TOTAL		**9500**	**m2**

Earthworks **Assumptions: 1m cut/fill to standing engineering compaction, no topsoil**		**Rate**	**Qty**	**Total**
Site clearance including removal of debris, fences, vegetation	m2	$ 1.25	7500	$ 9,375
Strip, stockpile	m2	$ 2.50	7500	$ 18,750
Bulk earthworks (cut,fill, compaction, disposal)	m2	$ 25.00	8700	$ 217,500
Sub Total				$ 245,625
Turf **Assumptions: Minimum grading, soil amelioration and 'A' grade couch**		**Rate**	**Qty**	**Total**
Walls	m2			$ -
Ripping subgrade and additives	m2	$ 0.50	6400	$ 3,200
Ameliorate and spread site soil to 300mm depth	m2	$ 3.50	6400	$ 22,400
Supply & lay "A" grade Winter Green Couch' turf - including fertilizer as specified	m2	$ 4.00	6400	$ 25,600
Sub Total				$ 51,200
Planting Areas **Assumptions: Minimum grading, subgrade preparation, Ameliorated site soil, mulch and medium density planting.**		**Rate**	**Qty**	**Total**
Preparation and final trimming to landscape areas	m2	$ 1.00	1300	$ 1,300
Ripping subgrade and additives	m2	$ 0.50	1300	$ 650
Ameliorate and spread site soil to 300mm depth	m2	$ 7.00	1300	$ 9,100
Supply and install 140mm pots at 4/m2	m2	$ 12.00	1300	$ 15,600
Supply and install organic mulch to garden bed areas	m2	$ 7.50	1300	$ 9,750
Sub Total				$ 36,400
Play areas **Assumptions: Multiage playground with three proprietary play products in organic softfall mulch with an approximate area of 100m²**		**Rate**	**Qty**	**Total**
Softfall area excavation - excavate softfall areas as required to accommodate Softfall (approx. ± 500mm)	m2	$ 212.50	1	$ 212.50
Subsurface drainage	item	$ 500.00	1	$ 500.00
Softfall mulch 400mm to play area - including geofabric.	m2	$ 40.00	1	$ 40.00
3 x proprietary play equipment (approx 100m2 of fall zone)	item	$40,000.00	1	$ 40,000.00
Sub Total				$ 40,753
Miscellaneous		**Rate**	**Qty**	**Total**
Supply and install 2m wide Pedestrian pathway	lnm	$ 115.00	400	$ 46,000.00
Shade shelter and table setting	item	$ 35,000.00	1	$ 35,000.00
Bins	item	$ 3,000.00	1	$ 3,000.00
Drinking fountain	item	$ 5,000.00	1	$ 5,000.00
Seats	item	$ 2,000.00	2	$ 4,000.00
Sub Total				**$ 93,000**
			Grand Total	**$ 466,977.50**
			Civil	**$ 245,625.00**
			Landcape	**$ 221,352.50**

Multiple use Park Maintenance Cost

PARK	Parkland		9500	m2
Local Park	Turf	100	2500	m2
	Play/Shelter		100	m2
	Play/Shelter - Turf		700	m2
	Play Planting		200	m2
Linear	Turf		3200	m2
	Planting areas		2000	m2
	Pathway		800	m2
Costing Areas	Total Turf		6400	m2
	Planting areas		2200	m2
	Play/Shelter		100	m2
	Pathway		800	m2
	TOTAL		**9500**	**m2**

Maintenance Items		Rate	Qty	Total
Turf - Mowing 25 times per year at $0.05/m2 per mow	m2	$ 1.25	6400	$ 8,000
Flooding turf - Mowing and resetting	m2	$ 1.60	0	$ -
Planting areas - Spray weed at 6-10 times per year	m2	$ 0.50	750	$ 375
Planting areas remulch - every 2 years to only higher profile zones of planting	m2	$ 4.00	600	$ 2,400
Play equipment clean - yearly	Item	$ 400	1	$ 400
Litter removal	Item	$ 300	1	$ 300
Sub Total				$ 11,475
Note included:				
Pathway renewal				
Playground/shelter renewal				
Turf renewal				
Planting areas renewal				
			Grand Total	$ 11,475.00

District Park – Costings

Existing Park Capital Cost

PARK	Local Park		20000	m2
Kickabout	Turf	100%	6000	m2
Play/Shelter	Turf	70%	1050	m2
	Play/Shelter		100	m2
Other Areas	Turf	50%	6250	
	Planting	50%	6250	m2
	Pathway		400	m2
Costing Areas	Total Turf		13300	m2
	Planting areas		6250	m2
	Play/Shelter		100	m2
	Pathway		400	m
	TOTAL		**20050**	**m2**

Earthworks **Assumptions: 1m cut/fill to standing engineering compaction, no topsoil**		**Rate**	**Qty**	**Total**
Site clearance including removal of debris, fences, vegetation	m2	$ 1.25	16000	$ 20,000
Strip, stockpile	m2	$ 2.50	16000	$ 40,000
Bulk earthworks (cut,fill, compaction, disposal)	m2	$ 25.00	16000	$ 400,000
Sub Total				$ 460,000
Turf **Assumptions: Minimum grading, soil amelioration and 'A' grade couch**		**Rate**	**Qty**	**Total**
Walls	m2	$ 1.00	13300	$ 13,300
Ripping subgrade and additives	m2	$ 0.50	13300	$ 6,650
Ameliorate and spread site soil to 300mm depth	m2	$ 3.50	13300	$ 46,550
Supply & lay "A" grade Winter Green Couch' turf - including fertilizer as specified	m2	$ 4.00	13300	$ 53,200
Sub Total				$ 119,700
Planting Areas **Assumptions: Minimum grading, subgrade preparation, Ameliorated site soil, mulch and medium density planting.**		**Rate**	**Qty**	**Total**
Preparation and final trimming to landscape areas	m2	$ 1.00	6250	$ 6,250
Ripping subgrade and additives	m2	$ 0.50	6250	$ 3,125
Ameliorate and spread site soil to 300mm depth	m2	$ 7.00	6250	$ 43,750
Supply and install 140mm pots at 4/m2	m2	$ 12.00	6250	$ 75,000
Supply and install organic mulch to garden bed areas	m2	$ 7.50	6250	$ 46,875
Sub Total				$ 175,000
Play areas **Assumptions: Multiage playground with three proprietary play products in organic softfall mulch with an approximate area of 100m²**		**Rate**	**Qty**	**Total**
Softfall area excavation - excavate softfall areas as required to accommodate Softfall (approx. ± 500mm)	m2	$ 212.50	2	$ 212.50
Subsurface drainage	item	$ 500.00	2	$ 500.00
Softfall mulch 400mm to play area - including geofabric.	m2	$ 40.00	2	$ 40.00
3 x proprietary play equipment (approx 100m2 of fall zone)	item	$40,000.00	2	$ 40,000.00
Sub Total				$ 40,753
Miscellaneous		**Rate**	**Qty**	**Total**
Supply and install 1.5m wide Pedestrian pathway	lnm	$ 97.50	400	$ 39,000.00
Shade shelter and table setting	item	$ 35,000.00	2	$ 70,000.00
Bins	item	$ 3,000.00	2	$ 6,000.00
Drinking fountain	item	$ 5,000.00	2	$ 10,000.00
Seats	item	$ 2,000.00	4	$ 8,000.00
Sub Total				**$ 133,000**
			Grand Total	**$ 928,452.50**
			Civil	**$ 460,000.00**
			Landcape	**$ 468,452.50**

STORMWATER	Stormwater Area		7000	m2
	Bioretention		1000	m2
	Flood detention		6000	m2
	Batters		0	m2
	Walls		500	m2
	TOTAL		**7000**	**m2**

Earthworks **Assumptions: 1m cut/fill to standing engineering compaction, no topsoil**		**Rate**	**Qty**	**Total**
Site clearance including removal of debris, fences, vegetation	m2	$ 1.25	6000	$ 7,500
Strip, stockpile	m2	$ 2.50	6000	$ 15,000
Bulk earthworks (cut,fill, compaction, disposal)	m2	$ 25.00	6000	$ 150,000
Sub Total				$ 172,500
Structures		**Rate**	**Qty**	**Total**
Hydraulic structures	Item	$ 25,000.00	1	$ 25,000
Scour protection	m2	$ 150.00	50	$ 7,500
Walls	m2	$ 400.00	500	$ 200,000
Sub Total				$ 232,500
Turf **Assumptions: Minimum grading, soil amelioration and 'A' grade couch**		**Rate**	**Qty**	**Total**
Preparation and final trimming to landscape areas	m2	$ 1.00	6000	$ 6,000
Ripping subgrade and additives	m2	$ 0.50	6000	$ 3,000
Ameliorate and spread site soil to 300mm depth	m2	$ 3.50	6000	$ 21,000
Supply & lay "A" grade Winter Green Couch' turf - including fertilizer as specified	m2	$ 4.00	6000	$ 24,000
Sub Total				$ 54,000
Planting Areas **Assumptions: Minimum grading, subgrade preparation, Ameliorated site soil, mulch and medium density planting.**		**Rate**	**Qty**	**Total**
Preparation and final trimming to landscape areas	m2	$ 1.00	0	$ -
Ripping subgrade and additives	m2	$ 0.50	0	$ -
Ameliorate and spread site soil to 300mm depth	m2	$ 7.00	0	$ -
Supply and install 140mm pots at 4/m2	m2	$ 12.00	0	$ -
Supply and install organic mulch to garden bed areas	m2	$ 7.50	0	$ -
Sub Total				$ -
Treatment system		**Rate**	**Qty**	**Total**
Bioretention construction	m2	$ 400.00	1000	$ 400,000
Sub Total				$ 400,000
			Grand Total	**$ 859,000.00**
			Civil	**$ 805,000.00**
			Landcape	**$ 54,000.00**

Existing Park Maintenance Cost

PARK	Local Park		20000	m2
Kickabout	Turf	100%	6000	m2
Play/Shelter	Turf	70%	1050	m2
	Play/Shelter		100	m2
Other Areas	Turf	50%	6250	
	Planting	50%	6250	m2
	Pathway		400	m2
Costing Areas	Total Turf		13300	m2
	Planting areas		6250	m2
	Play/Shelter		100	m2
	Pathway		400	m
	TOTAL		**20050**	**m2**

Maintenance Items		Rate	Qty	Total
Turf - Mowing 25 times per year at $0.05/m2 per mow	m2	$ 1.25	13300	$ 16,625
Planting areas - Spray weed at 6-10 times per year	m2	$ 0.50	6250	$ 3,125
Planting areas remulch - every 2 years to only higher profile zones of planting	m2	$ 4.00	1563	$ 6,250
Play equipment clean - yearly	Item	$ 400	1	$ 400
Litter removal	Item	$ 300	1	$ 300
Sub Total				$ 26,700
Note included:				
Pathway renewal				
Playground/shelter renewal				
Turf renewal				
Planting areas renewal				
		Grand Total		$ 26,700.00

STORMWATER	Stormwater Area		7000	m2
	Bioretention		1000	m2
	Flood detention		6000	m2
	Batters		0	m2
	Walls		500	m2
	TOTAL		**7000**	**m2**

Maintenance Items		Rate	Qty	Total
Bioretention maintenance	m2	$ 2.00	1000	$ 2,000
Flood detention turf	m2	$ 1.60	6000	$ 9,600
Flood detention batters	m2	$ 0.50	0	$ -
Removal of litter - Single big clean up per year	Item	$ 1,500.00	2	$ 3,000
Cleanout of hydraulic structures	Item	$ 500.00	2	$ 1,000
Wall monitoring and maintenance	Item	$ 500.00	1	$ 500
Sub Total				$ 16,100
Note included:				
Bioretention renewal				
Turf renewal				
Planting areas renewal				
		Grand Total		$ 16,100.00

Multiple use Park Capital Cost

PARK	Local Park		20000	m2
Kickabout (Flood Free)	Turf	100	6000	m2
Kickabout (Flooded)	Turf		7000	m2
Play/Shelter	Play/Shelter		200	m2
	Turf	50%	1000	m2
	Planting		800	m2
Environmental Open Space	Turf	20%	720	m2
	Planting areas	80%	2880	m2
	Pathway		400	m2
Costing Areas	Total Turf		14720	m2
	Planting areas	80%	3680	m2
	Play/Shelter		200	m2
	Pathway		400	m2
	TOTAL		**20000**	**m2**

Earthworks **Assumptions: 1m cut/fill to standing engineering compaction, no topsoil**		**Rate**	**Qty**	**Total**
Site clearance including removal of debris, fences, vegetation	m2	$ 1.25	20000	$ 25,000
Strip, stockpile	m2	$ 2.50	20000	$ 50,000
Bulk earthworks (cut,fill, compaction, disposal)	m2	$ 25.00	20000	$ 500,000
Sub Total				$ 575,000
Turf **Assumptions: Minimum grading, soil amelioration and 'A' grade couch**		**Rate**	**Qty**	**Total**
Preparation and final trimming to landscape areas	m2	$ 1.00	14720	$ 14,720
Extra over for preparation and final trimming to kickabout due to flooding	m2	$ 7.50	$ 7,000	$ 52,500
Ripping subgrade and additives	m2	$ 0.50	14720	$ 7,360
Ameliorate and spread site soil to 300mm depth	m2	$ 5.00	14720	$ 73,600
Supply & lay "A" grade Winter Green Couch' turf - including fertilizer as specified	m2	$ 4.00	14720	$ 58,880
Sub Total				$ 207,060
Planting Areas **Assumptions: Minimum grading, subgrade preparation, Ameliorated site soil, mulch and medium density planting.**		**Rate**	**Qty**	**Total**
Preparation and final trimming to landscape areas	m2	$ 1.00	3680	$ 3,680
Ripping subgrade and additives	m2	$ 0.50	3680	$ 1,840
Ameliorate and spread site soil to 300mm depth	m2	$ 7.00	3680	$ 25,760
Supply and install 140mm pots at 4/m2	m2	$ 12.00	3680	$ 44,160
Supply and install organic mulch to garden bed areas	m2	$ 7.50	3680	$ 27,600
Sub Total				$ 103,040
Play areas **Assumptions: Multiage playground with three proprietary play products in organic softfall mulch with an approximate area of 2 x 100m²**		**Rate**	**Qty**	**Total**
Softfall area excavation - excavate softfall areas as required to accommodate Softfall (approx. ± 500mm)	m2	$ 212.50	2	$ 212.50
Subsurface drainage	item	$ 500.00	2	$ 500.00
Softfall mulch 400mm to play area - including geofabric.	m2	$ 40.00	2	$ 40.00
3 x proprietary play equipment (approx 100m2 of fall zone)	item	$40,000.00	2	$ 40,000.00
Sub Total				$ 40,753
Miscellaneous		**Rate**	**Qty**	**Total**
Supply and install 1.5m wide Pedestrian pathway	lnm	$ 97.50	400	$ 39,000.00
Shade shelter and table setting	item	$ 35,000.00	2	$ 70,000.00
Bins	item	$ 3,000.00	2	$ 6,000.00
Drinking fountain	item	$ 5,000.00	2	$ 10,000.00
Seats	item	$ 2,000.00	4	$ 8,000.00
Sub Total				**$ 133,000**
			Grand Total	**$ 1,058,852.50**
			Civil	**$ 575,000.00**
			Landcape	**$ 483,852.50**

STORMWATER	Stormwater Area		7000	m2
	Bioretention		1000	m2
	Flood detention		0	m2
	Batters		0	m2
	Walls		0	m2
	TOTAL		**1000**	**m2**

Earthworks **Assumptions: 1m cut/fill to standing engineering compaction, no topsoil**		**Rate**	**Qty**	**Total**
Site clearance including removal of debris, fences, vegetation	m2	$ 1.25	0	$ -
Strip, stockpile	m2	$ 2.50	0	$ -
Bulk earthworks (cut,fill, compaction, disposal)	m2	$ 25.00	0	$ -
Sub Total				$ -
Structures		**Rate**	**Qty**	**Total**
Hydraulic structures	Item	$ 25,000.00	1	$ 25,000
Scour protection	m2	$ 150.00	50	$ 7,500
Walls	m2	$ 400.00	0	$ -
Sub Total				$ 32,500
Turf **Assumptions: Minimum grading, soil amelioration and 'A' grade couch**		**Rate**	**Qty**	**Total**
Preparation and final trimming to landscape areas	m2	$ 1.00	0	$ -
Ripping subgrade and additives	m2	$ 0.50	0	$ -
Ameliorate and spread site soil to 300mm depth	m2	$ 3.50	0	$ -
Supply & lay "A" grade Winter Green Couch' turf - including fertilizer as specified	m2	$ 4.00	0	$ -
Sub Total				$ -
Planting Areas **Assumptions: Minimum grading, subgrade preparation, Ameliorated site soil, mulch and medium density planting.**		**Rate**	**Qty**	**Total**
Preparation and final trimming to landscape areas	m2	$ 1.00	0	$ -
Ripping subgrade and additives	m2	$ 0.50	0	$ -
Ameliorate and spread site soil to 300mm depth	m2	$ 7.00	0	$ -
Supply and install 140mm pots at 4/m2	m2	$ 12.00	0	$ -
Supply and install organic mulch to garden bed areas	m2	$ 7.50	0	$ -
Sub Total				$ -
Treatment system		**Rate**	**Qty**	**Total**
Bioretention construction	m2	$ 400.00	1000	$ 400,000
Sub Total				$ 400,000
			Grand Total	**$ 432,500.00**
			Civil	**$ 432,500.00**
			Landcape	**$ -**

Multiple use Park Maintenance Cost

PARK	Local Park		20000	m2
Kickabout (Flood Free)	Turf	100	7000	m2
Kickabout (Flooded)	Turf		7000	m2
Play/Shelter	Play/Shelter		200	m2
	Turf	50%	1000	m2
	Planting		800	m2
Environmental Open Space	Turf	20%	720	m2
	Planting areas	80%	2880	m2
	Pathway		400	m2
Costing Areas	Total Turf		15720	m2
	Planting areas	80%	3680	m2
	Play/Shelter		200	m2
	Pathway		400	m2
	TOTAL		**21000**	**m2**

Maintenance Items		Rate	Qty	Total
Turf - Mowing 25 times per year at $0.05/m2 per mow	m2	$ 1.25	7000	$ 8,750
Flooding turf - Mowing and resetting	**m2**	**$ 1.60**	**7720**	**$ 12,352**
Planting areas - Spray weed at 6-10 times per year	m2	$ 0.50	3680	$ 1,840
Planting areas remulch - every 2 years to only higher profile zones of planting	m2	$ 4.00	736	$ 2,944
Play equipment clean - yearly	Item	$ 400	1	$ 400
Litter removal	Item	**$ 1,500**	1	$ 1,500
Sub Total				$ 27,786
Note included:				
Pathway renewal				
Playground/shelter renewal				
Turf renewal				
Planting areas renewal				
			Grand Total	$ 27,786.00

STORMWATER	Stormwater Area		7000	m2
	Bioretention		1000	m2
	Flood detention		0	m2
	Batters		0	m2
	Walls		0	m2
	TOTAL		**1000**	**m2**

Maintenance Items		Rate	Qty	Total
Bioretention maintenance	m2	$ 2.00	1000	$ 2,000
Flood detention turf	m2	$ 1.60	**0**	$ -
Flood detention batters	m2	$ 0.50	0	$ -
Removal of litter - Single big clean up per year	Item	$ 1,500.00	**0**	$ -
Cleanout of hydraulic structures	Item	$ 500.00	1	$ 500
Sub Total				$ 2,500
Note included:				
Bioretention renewal				
Turf renewal				
Planting areas renewal				
			Grand Total	$ 2,500.00

Waterway Buffer Micro Scale – Costings

Existing Capital Cost

STORMWATER	Stormwater Area		350	m2
	Bioretention		280	m2
	Batters		70	m2
	Walls		50	m2
	TOTAL		350	m2

Structures		Rate	Qty	Total
Walls	m2	$ 400.00	50	$ 20,000
Sub Total				$ 20,000
Treatment system		**Rate**	**Qty**	**Total**
Bioretention construction	m2	$ 400.00	280	$ 112,000
Sub Total				$ 112,000
			Grand Total	$ 132,000.00

Existing Maintenance Cost

STORMWATER	Stormwater Area		350	m2
	Bioretention		280	m2
	Batters		70	m2
	Walls		50	m2
	TOTAL		350	m2

Maintenance Items		Rate	Qty	Total
Bioretention maintenance	m2	$ 2.00	280	$ 560
Flood detention turf	m2	$ 1.60		$ -
Flood detention batters	m2			$ -
Removal of litter - Single big clean up per year	Item	$ 1,500.00		$ -
Cleanout of hydraulic structures	Item	$ 500.00		$ -
Wall monitoring and maintenance	Item	$ 500.00	1	$ 500
Sub Total				$ 1,060
Note included:				
Bioretention renewal				
Turf renewal				
Planting areas renewal				
			Grand Total	$ 1,060.00

Multiple use Capital Cost

STORMWATER	Stormwater Area		350	m2
	Bioretention		280	m2
	Batters		70	m2
	Walls		50	m2
	TOTAL		350	m2

Structures		Rate	Qty	Total
Walls	m2	$ 400.00	0	$ -
Sub Total				$ -
Treatment system		**Rate**	**Qty**	**Total**
Bioretention construction	m2	$ 400.00	280	$ 112,000
Sub Total				$ 112,000
			Grand Total	**$ 112,000.00**

Multiple use Maintenance Cost

STORMWATER	Stormwater Area		350	m2
	Bioretention		280	m2
	Batters		70	m2
	Walls		50	m2
	TOTAL		350	m2

Maintenance Items		Rate	Qty	Total
Bioretention maintenance	m2	$ 1.50	280	$ 420
Flood detention turf	m2	$ 1.60		$ -
Flood detention batters	m2			$ -
Removal of litter - Single big clean up per year	Item	$ 1,500.00		$ -
Cleanout of hydraulic structures	Item	$ 500.00		$ -
Wall monitoring and maintenance	Item	$ 500.00	0	$ -
Sub Total				$ 420
Note included:				
Bioretention renewal				
Turf renewal				
Planting areas renewal				
			Grand Total	**$ 420.00**

Waterway Buffer Macro Scale – Costings

Existing Capital Cost

STORMWATER	Stormwater Area		4200	m2
	Bioretention		2400	m2
	Batters		1800	m2
	Walls		0	m2
	TOTAL		4200	m2

Structures		Rate	Qty	Total
Walls	m2	$ 400.00	0	$ -
Sub Total				$ -
Treatment system		**Rate**	**Qty**	**Total**
Bioretention construction	m2	$ 400.00	2400	$ 960,000
Sub Total				$ 960,000
			Grand Total	$ 960,000.00

Existing Maintenance Cost

STORMWATER	Stormwater Area		4200	m2
	Bioretention		2400	m2
	Batters		1800	m2
	Walls		0	m2
	TOTAL		4200	m2

Maintenance Items		Rate	Qty	Total
Bioretention maintenance	m2	$ 2.00	2400	$ 4,800
Flood detention turf	m2	$ 1.60		$ -
Flood detention batters	m2			$ -
Removal of litter - Single big clean up per year	Item	$ 1,500.00		$ -
Cleanout of hydraulic structures	Item	$ 500.00		$ -
Wall monitoring and maintenance	Item	$ 500.00	1	$ 500
Sub Total				$ 5,300
Note included:				
Bioretention renewal				
Turf renewal				
Planting areas renewal				
			Grand Total	$ 5,300.00

Multiple use Capital Cost

STORMWATER	Stormwater Area		4200	m2
	Bioretention		2400	m2
	Batters		1800	m2
	Walls		0	m2
	TOTAL		4200	m2

Structures		Rate	Qty	Total
Walls	m2	$ 400.00	0	$ -
Sub Total				$ -
Treatment system		**Rate**	**Qty**	**Total**
Bioretention construction	m2	$ 400.00	2400	$ 960,000
Sub Total				$ 960,000
			Grand Total	$ 960,000.00

Multiple use Maintenance Cost

STORMWATER	Stormwater Area		4200	m2
	Bioretention		2400	m2
	Batters		1800	m2
	Walls		0	m2
	TOTAL		4200	m2

Maintenance Items		Rate	Qty	Total
Bioretention maintenance	m2	$ 1.50	2400	$ 3,600
Flood detention turf	m2	$ 1.60		$ -
Flood detention batters	m2			$ -
Removal of litter - Single big clean up per year	Item	$ 1,500.00		$ -
Cleanout of hydraulic structures	Item	$ 500.00		$ -
Wall monitoring and maintenance	Item	$ 500.00	0	$ -
Sub Total				$ 3,600
Note included:				
Bioretention renewal				
Turf renewal				
Planting areas renewal				
			Grand Total	$ 3,600.00