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# ARMIDALE CREEKLANDS MASTERPLAN

Armidale Regional Council

Project Client: Armidale Regional Council  
Project Name: Armidale Creeklands Masterplan  
Project Number: 0656SYD

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# Introduction

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*The Dumaresq Creek Masterplan will offer a narrative vision guiding the development of a restorative and connective spatial network linking social, environmental and operational ecologies into Armidale's civic fabric...*

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The Dumaresq Creeklands are a focal point for the city of Armidale. This complex network of spaces and features is highly valued by the community, partly due to the generous spaces, but also because of the range of landscapes, facilities, recreational opportunities and experiences available. Active community members have also put their own time and effort into improving the Creeklands' biodiversity and riparian vegetation, and suggesting new opportunities to make the Creeklands a more central part of the City.

The Dumaresq Creeklands masterplan will integrate the cultural, social, recreational, environmental and tourism potential of the entire precinct, while addressing the key issues of environmental and hydrologic impact, public safety, flooding, social infrastructure and maintenance. The project is an opportunity to deliver a wide range of public benefits to enhance liveability through integration of water and urban design. The masterplan can also deliver value to the region across a broad range of economic, social, and environmental areas using sustainable water management as the driver.

The Creeklands masterplan can unlock these benefits through optimisation of infrastructure investment across water, public space, recreation and active transport planning while providing sustainable water management strategies. These initiatives can also contribute to the health of human and ecological communities by linking parks, cycleways and other community infrastructure to water features such as wetlands, habitats and riparian areas. Sustainable water management outcomes can include pollution control, ecological restoration, increasing drought resilience of green space and mitigating local urban heat islands.

By collaborating with local government, state agencies and communities through governance co-ordination, this project can deliver wide ranging aspirational benefits for Dumaresq Creek. Establishing pathways to the procurement of infrastructure providing enhanced flood control and reduced impact on public and private property is also an ambition of the project. These initiatives can also unlock substantial opportunities for funding, support and collaboration, with regional, state and national agencies encouraging regional development across the country.

Through these myriad collaborative dialogues, with community, stakeholders, authorities and agencies, the masterplan will deliver a vision for the Creeklands that is both aspirational and achievable.

# Project Background

The Dumaresq Creeklands have been the subject of much community and Council interest and input throughout Armidale's history. Evolving community action has recently led to a formal request by the Armidale Creeklands Committee for the initiation of a masterplanning process, while additional consideration was necessitated after a coronial inquest into a drowning in Curtis Park. In March 2018, Armidale Regional Council engaged McGregor Coxall to undertake research and public consultation in the eventual development of this Masterplan for the Dumaresq Creeklands.

Council is now developing their Greenprint for a Sustainable Future, linked to the UN's Sustainable Development Goals. Specifically, the BioDiversity arc and Water arc from the UN criteria are highly relevant to the Creeklands and have been closely considered throughout the development of the masterplan. Concurrently, Council is also working on a series of city revitalisation plans, investigating initiatives in urban design, park hydrology, municipal ecology, creek flooding and wildlife corridors. These plans and concepts have been integrated into the contextual analysis and strategic framing of the Creeklands Masterplan.

A central objective of the project is to ensure that the needs and desires of the Armidale community are reflected and integrated within the masterplan and its myriad components and recommendations. This will guarantee that the Creeklands serve the current and future needs of the entire community, while providing a vibrant civic space for community events and activities, celebrating the history, culture and future of the city and bringing its neighbourhoods and people together.

# Study Area

The area of this masterplan study is a series of conjoined open spaces traversed by Dumaresq Creek in the city centre of Armidale. The area is loosely bounded to the north and south by Kirkwood and Dumaresq Streets, and Markham and Marsh Streets to the west and east. An additional area to the west below Dumaresq Street, bounded by Markham and Beady Streets, and containing the Monckton Aquatic Centre is also included. To the east, the Rologas and Wicklow sports fields and creek area bordered by Marsh, Donnelly and Douglas Streets are also part of the overall study area. Dumaresq Creek runs through or alongside all the areas noted in the study.

Most of the parcels of land along this section of Dumaresq Creek are Crown Lands managed by Armidale Regional Council. The Council has a management lease over each of these parcels of land under a title of Public Recreation. The area within the creek banks, including the water in the creek, is owned by the Crown.

Some of the land adjacent to Dumaresq Creek is privately owned. Typically, landholders owning property adjacent to a waterway own to the top of the bank of that waterway, unless the title of the land states otherwise. All land within the banks is classified as Crown land unless the titles of the adjoining parcels of the land state otherwise. The owners of land adjacent to waterways often take on responsibility for the management of that waterway (the areas within the banks), even though the land remains Crown Land.

Groups undertaking revegetation activities along the urban reaches of Dumaresq Creek must consult with land owners and receive their written permission to undertake revegetation works on their land. Additionally, the NSW Department of Lands must be consulted prior to any works being undertaken on Crown land.

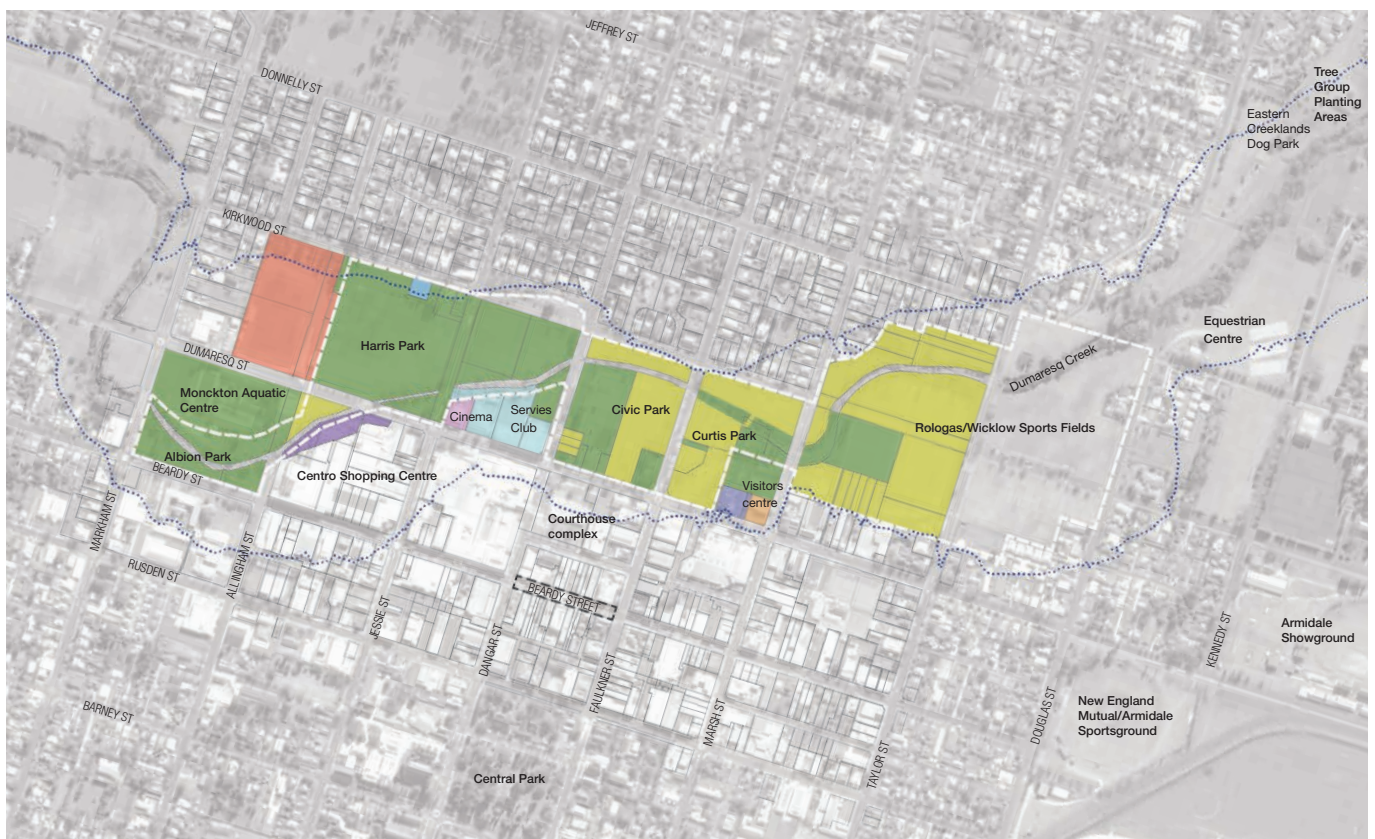


Figure 1.0 - Property Ownership and Flood Planning Levels

## Legend

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| <span style="display: inline-block; width: 15px; height: 10px; background-color: #4CAF50; border: 1px solid black; margin-right: 5px;"></span> Armidale Dumaresq Council                         | <span style="display: inline-block; width: 15px; height: 10px; background-color: #2196F3; border: 1px solid black; margin-right: 5px;"></span> Mr William John Ferguson & Ms Esther St |
| <span style="display: inline-block; width: 15px; height: 10px; background-color: #4DD0E1; border: 1px solid black; margin-right: 5px;"></span> Armidale Ex-Services Memorial Club Ltd            | <span style="display: inline-block; width: 15px; height: 10px; background-color: #FF9800; border: 1px solid black; margin-right: 5px;"></span> Ocwen Energy Pty Ltd                    |
| <span style="display: inline-block; width: 15px; height: 10px; background-color: #E91E63; border: 1px solid black; margin-right: 5px;"></span> Armidale Ex-Services Memorial Club Ltd and Cinema | <span style="display: inline-block; width: 15px; height: 10px; background-color: #C8E6C9; border: 1px solid black; margin-right: 5px;"></span> The State of NSW                        |
| <span style="display: inline-block; width: 15px; height: 10px; background-color: #FF5722; border: 1px solid black; margin-right: 5px;"></span> Armidale Rugby League (Seniors)                   | <span style="display: inline-block; width: 15px; height: 10px; background-color: #9575CD; border: 1px solid black; margin-right: 5px;"></span> Vicinity Manager Pty Ltd                |
| <span style="display: inline-block; width: 15px; height: 10px; background-color: #3F51B5; border: 1px solid black; margin-right: 5px;"></span> Filmer Property Pty Ltd and Nowmake Pty Ltd       | <span style="display: inline-block; width: 15px; border-bottom: 1px dotted black; margin-right: 5px;"></span> Flood Planning Level   |



# Project Methodology

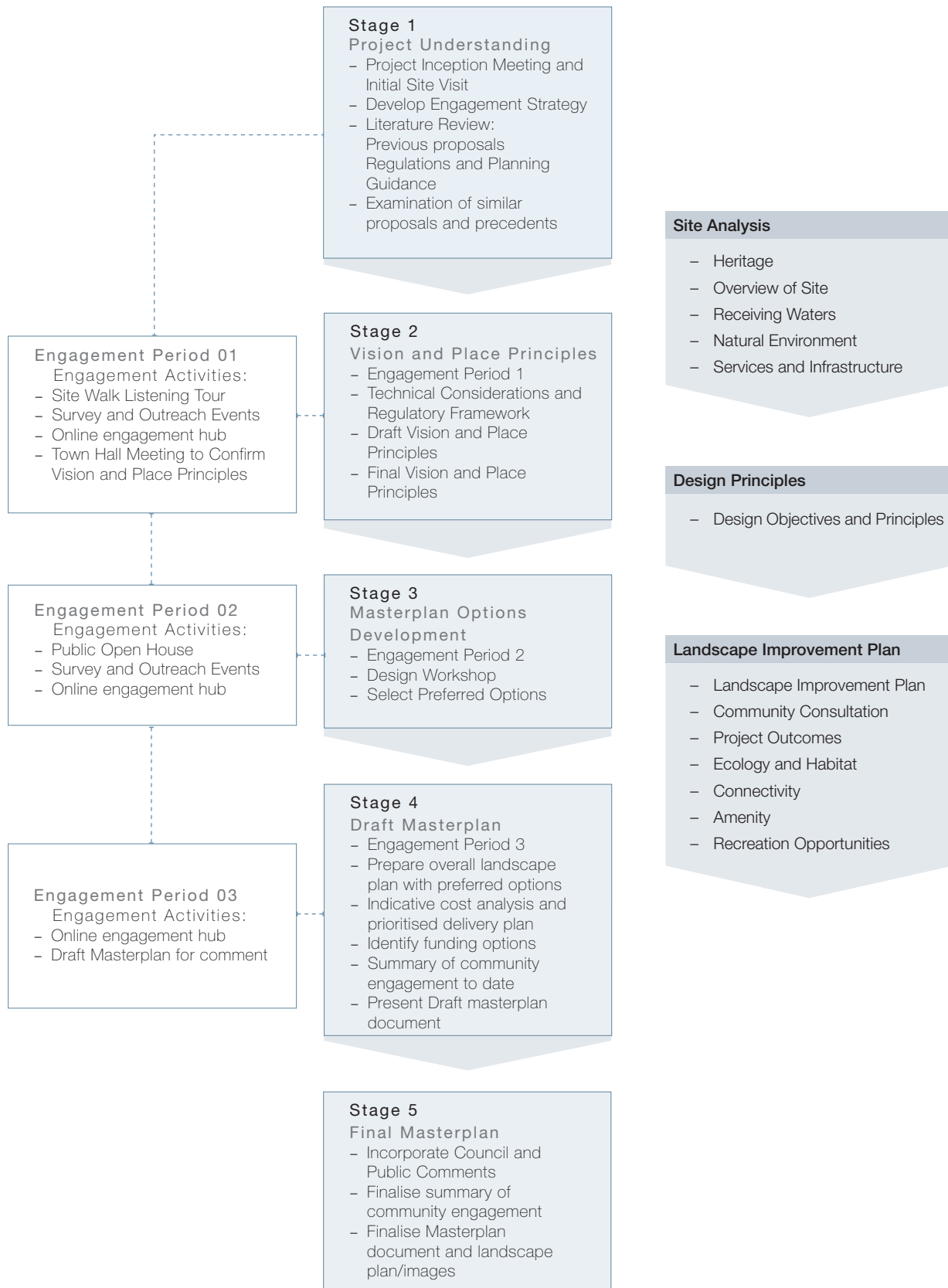


Figure 2.0 - Report Structure and Project Methodology

# Local Context

## Armidale

Prior to settling by British colonists, the Armidale region was home to the indigenous Anaiwan people.

The region was settled by Europeans in the early 1830s, having been identified as a prime region for grazing. The town of Armidale was gazetted in 1849, to provide a market and administrative centre for the regional farms. A gold rush in 1850 changed the dynamics of the region and brought many new people into town.

The current population of the city is just over 23,000 (2016 census), with a median age of 36.

Armidale is home to the University of New England, a research university with ten multi-disciplinary schools. The university is the City's largest employer and is linked to the town centre by Dumaresq Creek and the Creekside cycle path. The creek serves as both a backdrop and an active research laboratory for the University.

Dumaresq Creek has long been a subject of community interest and debate for the community of Armidale. From 1919 through to the 1970's, flooding and drainage issues were addressed with engineering solutions including channelisation, removal of sandbanks and the filling in of local depression areas that were prone to quagmire conditions. Despite these efforts, flooding remained an issue, as it still does.

Council first became responsible for management of the Creeklands as a public park in 1913, when the Minister for Lands approved a small reserve set aside for public recreation. Through donations, fundraising, and state subsidies, by 1972 the City became responsible for most of the remaining flood-prone land along the creek, creating the Creeklands as they are now known: a 4km continuous reserve.

The Creeklands effectively bisects the city, running from west to east, with residential neighbourhoods located immediately to the north and the city centre immediately to the south. The Creeklands are somewhat disconnected from the CBD, with very few businesses facing into the park. The City is currently in dialogue with the community about revitalisation of the Beardy Street Mall and recognises the opportunity to improve connectivity between the Creeklands and local enterprises and activities.

The Creeklands are better connected to the residential area to the north, with many homes fronting the parkside streets and enjoying views over the park.

The Creeklands are a key site for community festivals as well as the seasonal Farmers Market.

## Prior Community Proposals

The Creeklands are the subject of much attention from the community, as evidenced by the following activities and proposals.

- Over 1,400 volunteers with the Armidale Urban Rivercare Group have planted 75,000 plants at designated revegetation areas since 2009.
- Formation of the Armidale Creeklands Committee, with several options for developing the Creeklands as a focal point for the city, capitalising on the creek as a water feature with both passive and active recreation potential.
- Installation of fitness equipment along the cycle path.
- Creek re-naturalisation for improved ecology and biodiversity and flood mitigation.
- Road crossing improvements to improve flood control.
- An offline treatment wetland to improve water quality and provide a community amenity.
- Construction of a semi-permanent labyrinth for walking meditation and gentle recreation.

# Regional Context

The City of Armidale is situated in the Northern Tablelands of New South Wales, at the intersection of “Waterfall Way” (Highway B78) and the New England Highway (A15). Waterfall Way is a scenic drive through national parks and countryside, connecting the tablelands to the Pacific coast. There are four significant national parks within a one-hour drive.

Dumaresq Dam is another regional attraction, offering camping and water recreation activities. The dam is currently undergoing upgrades to increase amenity and attract more visitors.

The region is also home to the New England Regional Art Museum, the largest art gallery collection in regional NSW.

The local economy depends on regional agri-business, tourism and education. The *Armidale Region Economic Development Strategy* defines four themes of economic development:

01. A region of choice for smart and sustainable agri-business
02. A globally connected knowledge region
03. A skilled workforce and dynamic regional business sector
04. A premium regional visitor destination for tourism and events

The region advertises its tourism opportunities through New England High Country branding.

The headwaters of Dumaresq Creek are approximately 16km upstream of town. Before it merges with Tillbuster Creek, Dumaresq Creek is joined by several tributaries, including three through the urban area. Dumaresq Creek is part of the Commissioners Waters water source and forms part of the Water Sharing Plan for the Macleay Unregulated and Alluvial Water Sources 2016. Dumaresq Creek thus contributes to the Macleay catchment’s overall aquatic health. Commissioners Waters has been graded “very poor” in terms of water quality.



Figure 3.0 - Regional Context Map





# Engagement Process

## Aims

A key objective of the Masterplan is to ensure that the voice of the Armidale community is reflected and integrated in the plan to ensure the Creeklands serve the current and future needs of the community.

The approach to community engagement was to conduct both targeted and general outreach activities to be as inclusive as possible, with many forums for engagement. Targeted outreach involved engagement of key stakeholders - groups and individuals with an expressed interest in being involved with the Masterplan process, or who have a vested, demonstrated interest in development of the Creeklands. General outreach involved engagement of the broader public who have not necessarily actively engaged with the Creeklands in the past. Councillors were also invited to participate throughout the engagement period, in both general and targeted outreach activities.

## Engagement Opportunities

The following engagement opportunities were undertaken in March, April, and May of 2018:

### Project Advisory Group

An Advisory Group made up of key stakeholder representatives was established to work with consultants to share their perspectives and deep local knowledge of the Creeklands. The Advisory Group participated in a site walk tour at the outset of the project, and were invited to define the project's Vision and Place Principles at a workshop held at the end of the end of the public engagement process to synthesise the information that had been gathered.

Members of the Advisory Group included staff from the University of New England, members of local bushcare groups including Landcare, the Armidale Urban Rivercare Group and Armidale Tree Group, representatives of the Armidale Creeklands Committee, the Armidale Business Chamber, Council Staff, and NSW Police.

### Yoursay Website and Facebook

Council's Yoursay website was used as the primary on-line forum for engagement throughout the process. Events were advertised here and on Council's Facebook page.

### Autumn Festival and Farmers Markets

Council staff and consultants co-hosted a booth at the Autumn Festival in the first general outreach event. The Mapping Exercise and Ideas Generator were presented for feedback and to fuel discussion. Staff and consultants were available throughout the day to talk about the project and guide people through the activities.

The Survey was available to take away or do on the spot.

Council staff hosted a pop-up booth at two Farmers Markets. The mapping exercise was used each time.

### Ideas Generator

Voting exercise in which people were offered intentionally broad descriptions of various features that could be included in the Creeklands. The descriptions were categorised to loosely correspond to the place vitality.



### Mapping Exercise

Location-specific labelling exercise to provide information about how people currently use the Creeklands, what they do and don't like, what they'd like to see change, and what they'd like to see remain the same.



### Survey

An open-ended survey was used to elicit candid feedback in people's own words about how they currently use different areas of the Creeklands, what their favourite things were about a specific area and why those things were their favourite, how they would like to see the area improved, and what they would like to do in that area that they cannot do currently.

The survey was available through the YourSay website and in hardcopy format available at Council's Community Engagement Centre on the Mall and at the Customer Service Centre on Rusden Street.

### Community Engagement Centre

Council's Community Engagement Centre on the Mall was open throughout the engagement period. The mapping exercise introduced at the Autumn Festival was available to locate specific ideas and feedback. Paper copies of the survey were also available. The Centre was also used as the forum for the Design Options Open House.

### Site Walk Listening Tours

Site walk listening tours were conducted for the general community as well as the Project Advisory Group on the 16 March 2018. The opportunity to participate was advertised through media releases, at the Farmers Market booths, and on the YourSay website. Councillors were also invited to join the general community site walk listening tour.

### Design Options Open House

Design options for the Creeklands, developed after the community engagement events, were presented for viewing and comment at the Community Engagement Centre on 8 May 2018. It is estimated that over 50 people visited the open house, providing valuable feedback and additional ideas for incorporation into the Masterplan.

# Engagement Outcomes

The following sections summarise combined comments from the site walk tours, online engagement and written submissions to Council. Comments are grouped into general comments and those relating to the five precincts identified in this Masterplan.

Note that where a comment is followed by one or more asterisks, these represent the number of times the same comment came up.

## General

Respondents made several general comments about their preferences for the creeklands as a whole. Common themes were to “keep it natural”, “keep it simple”, and to leave the area relatively unchanged.

In terms of the elements that respondents wanted to change, the creek attracted the most comments. Respondents called for a more natural creek with improved habitat value, less reeds, less rubbish and cleaner water. There were some respondents who called for more native vegetation around the creek and some for water bodies within the creek. Several people mentioned safety around the creek.

Other general comments related to:

- More trees, particularly for shade, and diverse native vegetation
- Improved cycleways and walking paths, including better surfaces and improved connectivity
- Improved lighting was mentioned throughout the creeklands
- Improved passive recreation facilities including park benches, picnic facilities, shade trees and river access
- More basic facilities such as toilets, rubbish bins, wayfinding signage
- Better facilities for dog walking and off-leash exercise, including dog bag dispensers
- Improved playground and skate park facilities
- Night time safety and vibrancy
- Interpreting local history and culture

## Area 1

Responses on Area 1 included the following ideas on elements to include in the masterplan:

- Creek clean up: control aquatic weeds, remove rubbish, improve water flow and water quality\*\*\*\*\*
- Planting of more native trees and shrubs\*\*\*\*\*
- Removal of weeds including exotic trees\*\*\*\*\*
- Improved connectivity, including between TAFE, Pottery Building, bridge, pool, across creek and across streets\*\*\*\*\*
- More shade, particularly at skate park\*\*\*\*\*
- Retain and restore items of heritage value including bridge, pool entrance\*\*\*\*
- More seating areas\*\*\*\*\*
- Open access to creek edge\*\*\*\*
- BBQ and/or picnic facilities\*\*\*\*
- Path lighting\*\*\*
- Small safe playground for young children\*\*\*
- Passive surveillance and CPTED, particularly at skate park\*\*
- Pathway improvements including smoother bike track\*\*
- Outdoor exercise stations\*\*
- Café\*\*
- Lunchtime recreational area for TAFE\*
- Convert area to a lake
- Large playground
- Filtered water
- Toilets
- More bins





## Area 2

Responses on Area 2 included the following ideas on elements to include in the masterplan:

- Creek improvements including rubbish and weed removal, revegetation, habitat improvement\*\*\*\*\*
- Improved footpaths and cycleway\*\*\*\*\*
- More trees, particularly for shade\*\*\*\*\*
- More diverse planting, including natives\*\*\*\*\*
- Improved lighting, particularly of paths\*\*\*\*\*
- More seating and picnic tables\*\*\*\*\*
- Sports field improvements including spectator seating and lighting for night use\*\*\*
- Outdoor exercise stations\*\*\*
- Creek crossings\*\*
- Upgraded toilets\*\*
- Boardwalks\*
- Outdoor cinema/stage\*
- Café\*
- Ponds/lakes\*
- Small playground for young children\*
- Artwork\*
- Rain gardens
- Retail to address park
- Clear access from Dumaresq Street
- Educational/interpretive signage
- More bins
- Dog waste bag dispensers
- Off leash area

## Area 3

Responses on Area 3 included the following ideas on elements to include in the masterplan:

- Creek improvements including naturalisation, reed removal, clean water, riparian zone restoration, edge safety\*\*\*\*\*
- Diverse plantings including particularly natives and bird habitat\*\*\*\*\*
- Shade trees\*\*\*\*\*
- Heritage interpretation and sculpture/other art\*\*\*\*\*
- Improve existing pond or add new ponds/wetlands, particularly for water quality improvement\*\*\*\*\*
- Picnic facilities and quiet picnic spots\*\*\*\*\*
- Improved lighting of cycleway and park, including solar lighting\*\*\*\*\*
- Outdoor performance space/stage/pavilion\*\*\*\*\*
- Playground\*\*\*\*\*
- More seating\*\*\*\*\*
- Toilets\*\*\*\*
- Large water body\*\*\*
- Stepping stones/boardwalks/footbridges\*\*\*
- BBQ areas\*\*\*
- Improved, more permanent labyrinth\*\*
- Outdoor exercise stations\*\*
- Connection with town centre and Central Park\*\*
- Improved paths including links\*\*
- Space for community events\*
- Improved cycleway including improved road crossing\*
- Maintain sightlines\*
- Children's bike track\*\*
- Community gardens
- Café\*
- PLUS Kayaking, Water stations, Rubbish bins, Mobile food carts, Air pollution indicator, Fill in pond, Giraffe sanctuary



## Area 4

Responses on Area 4 included the following ideas on elements to include in the masterplan:

- Creek improvements including bank safety, rubbish and weed removal, naturalisation, riparian zone restoration, "chain of ponds"\*\*\*\*\*
- Improved playgrounds, including potential for super-playground/adventure play\*\*\*\*\*
- Footbridge connection between playgrounds\*\*\*\*\*
- Improved cycleway and walking tracks\*\*\*\*\*
- Fencing between playgrounds and creek\*\*\*\*\*
- More picnic facilities\*\*\*\*\*
- More shade trees\*\*\*\*\*
- Improved toilets\*\*\*\*\*
- Additional BBQs\*\*\*
- Café\*\*\*
- Improved events space\*\*\*
- Natural play spaces\*\*
- Outdoor exercise stations\*\*
- Lighting\*\*
- Children's bike track\*
- Large pond/lake\*
- Improved passive surveillance and public safety\*
- Security cameras, particularly at underpass\*
- More dense native shrub plantings
- Improved lighting
- Boardwalks
- Retain existing playgrounds, no adventure play
- Weather and air quality display
- Art
- More seating
- Permanent stage
- Water refill stations
- Rubbish bins



## Area 5

Responses on Area 5 included the following ideas on elements to include in the masterplan:

- Creek improvements including clean up, rubbish and weed removal, ponds, wetlands, native planting, bank restoration, riparian restoration, reduce nuisance flooding\*\*\*\*\*
- More seating\*\*\*\*\*
- More lighting, including cycleway\*\*\*\*\*
- More trees\*\*\*\*\*
- More diverse vegetation including native habitat\*\*\*\*
- Improved paths and cycleway\*\*\*\*
- Regional level playing fields including better lighting, more seating and cover for spectators\*\*\*
- Picnic facilities\*\*\*
- Improved toilets\*\*
- Better access to the creek\*
- Alternative path during flooding
- Filtered water stations
- Interpret local history
- Dog off-leash area
- Create a pond/dam
- Climbing wall
- More paths
- Encourage commercial properties to address creeklands
- Planting to screen commercial properties and clubhouse
- Air pollution indicator
- Wayfinding
- Outdoor games, e.g. chess board and ping pong tables
- Play equipment
- More covered areas
- Rubbish bins
- Dog waste bag dispensers

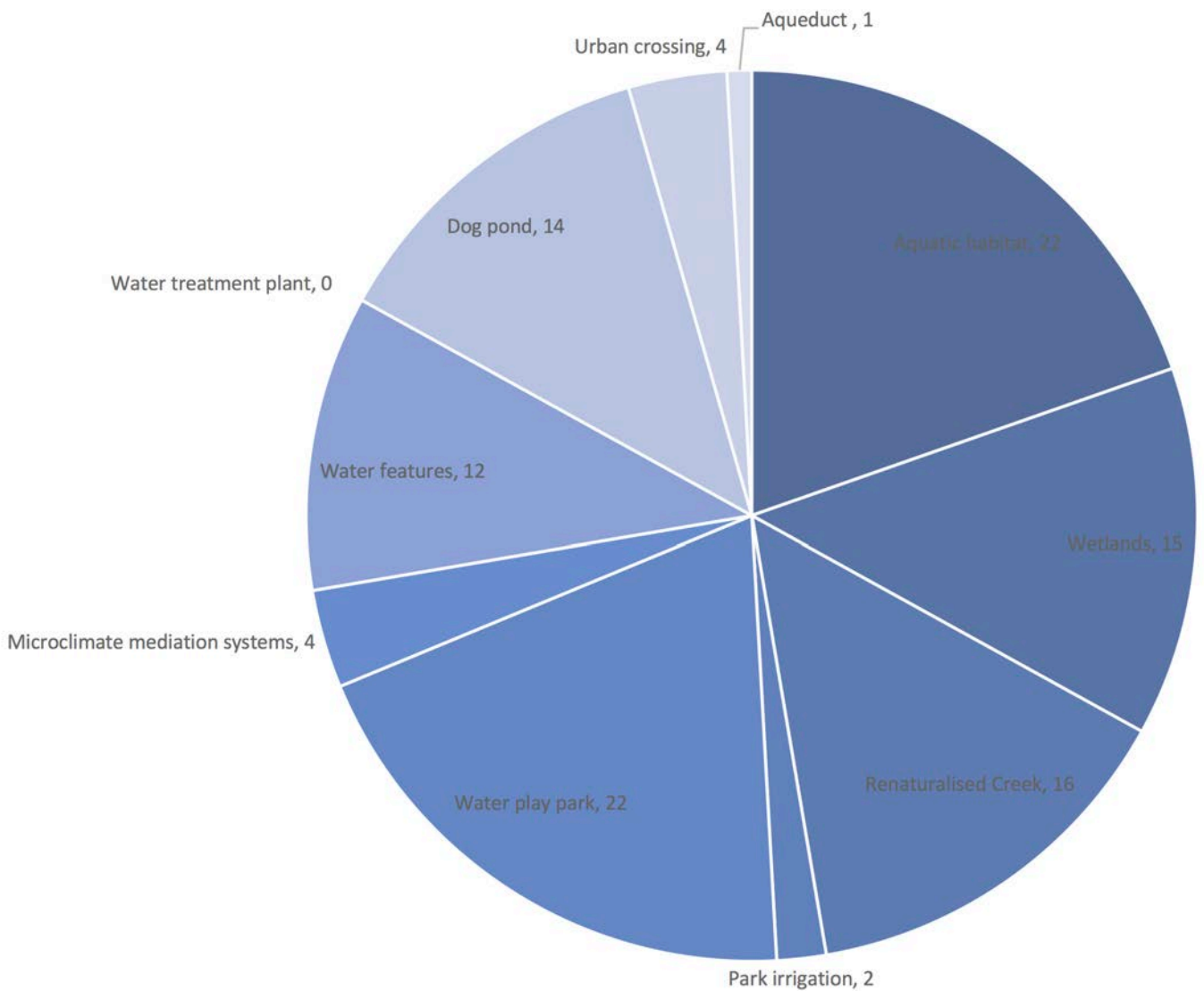


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## Ideas Generator: Poll Results

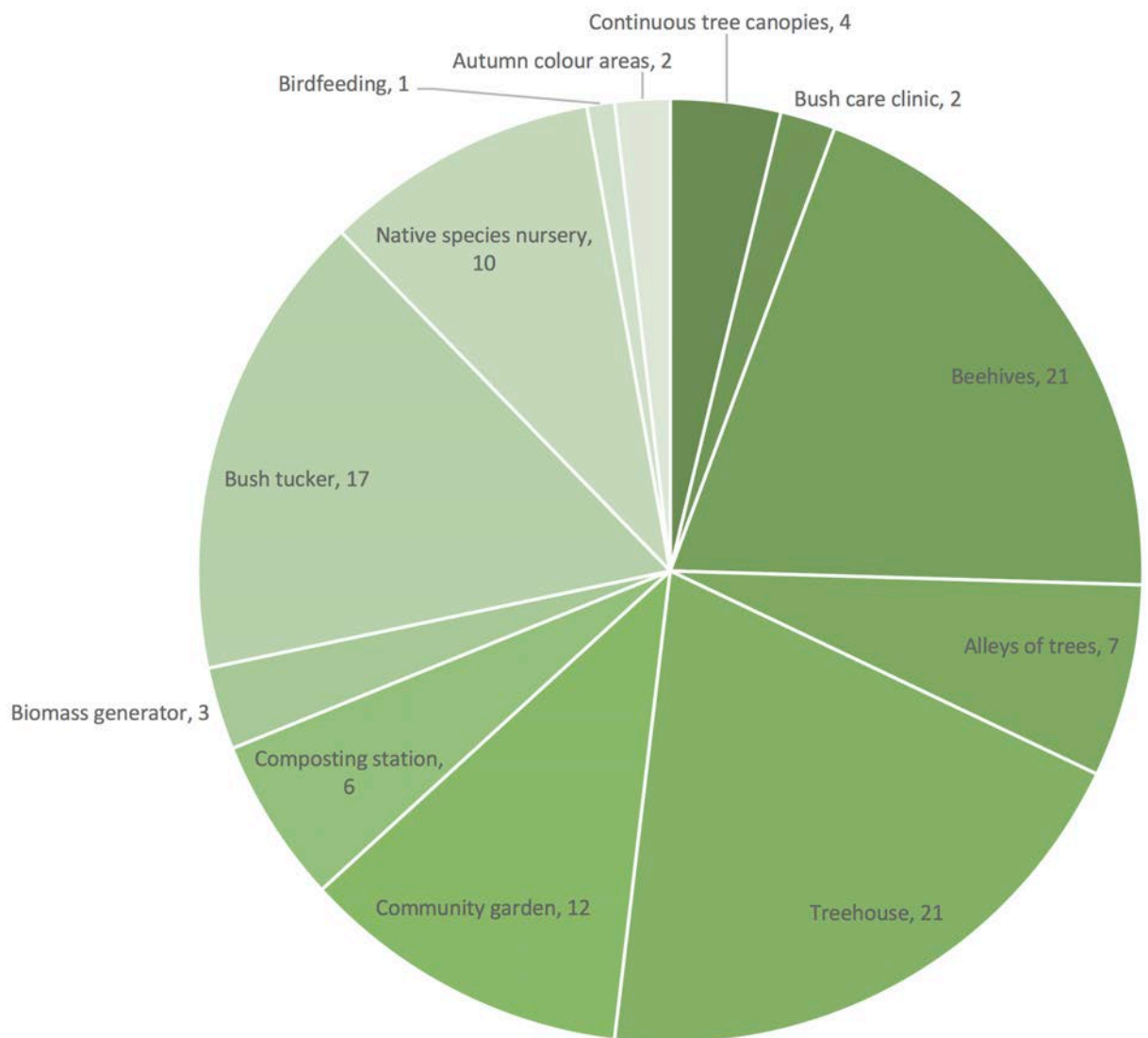
### Ideas Generator: Blue Grid

The Blue Grid encompasses all of the hydrological issues relating to the Creeklands, from engineering hydrology through to recreational uses. As water was central to the founding and formation of Armidale, so it remains as a focus of community interests and initiatives.



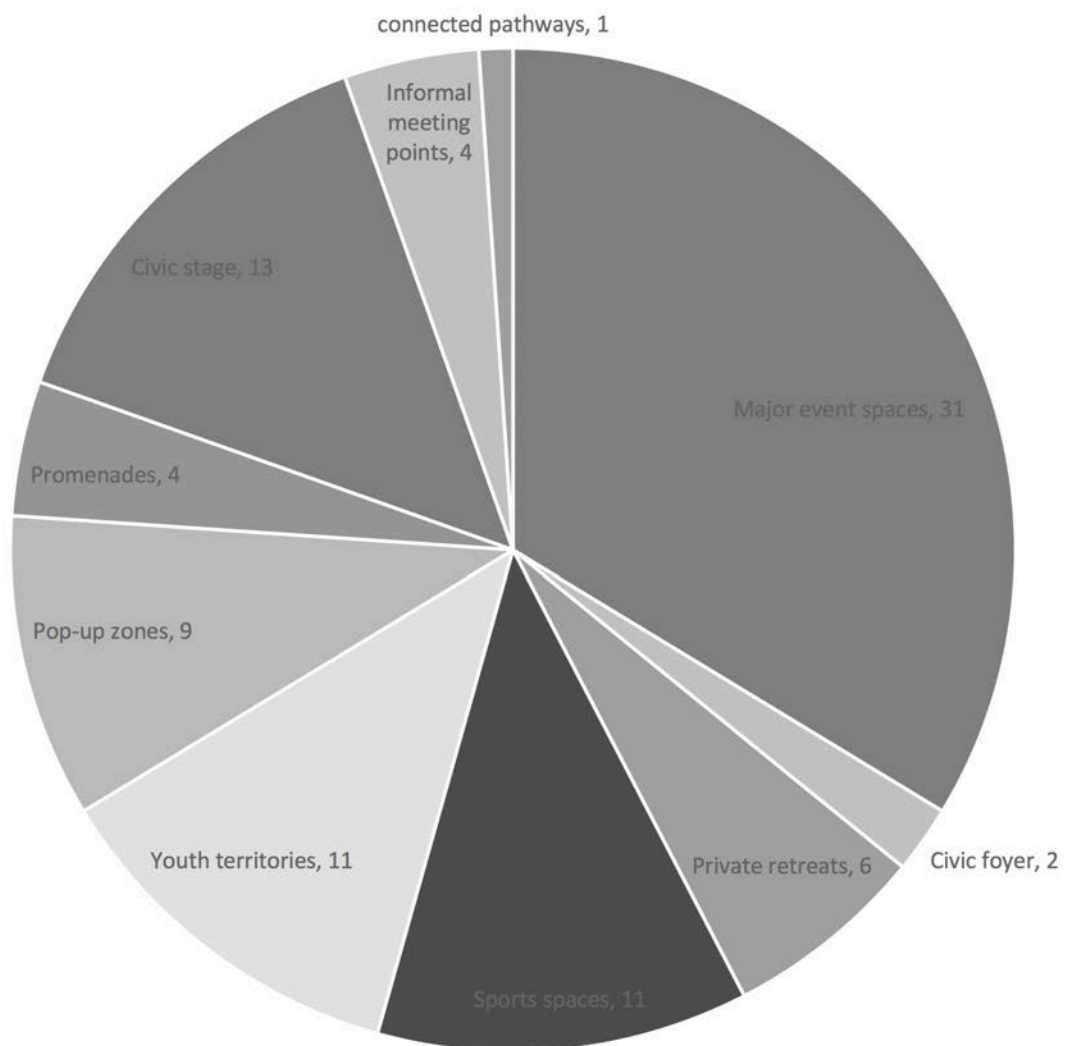
### Ideas Generator: Green Grid

Symbiotic with the aquatic vitality of the Creeklands is its environmental health and amenity, including open spaces, the diverse variety of native and exotic planting, and the myriad local species that make use of this rich habitat.



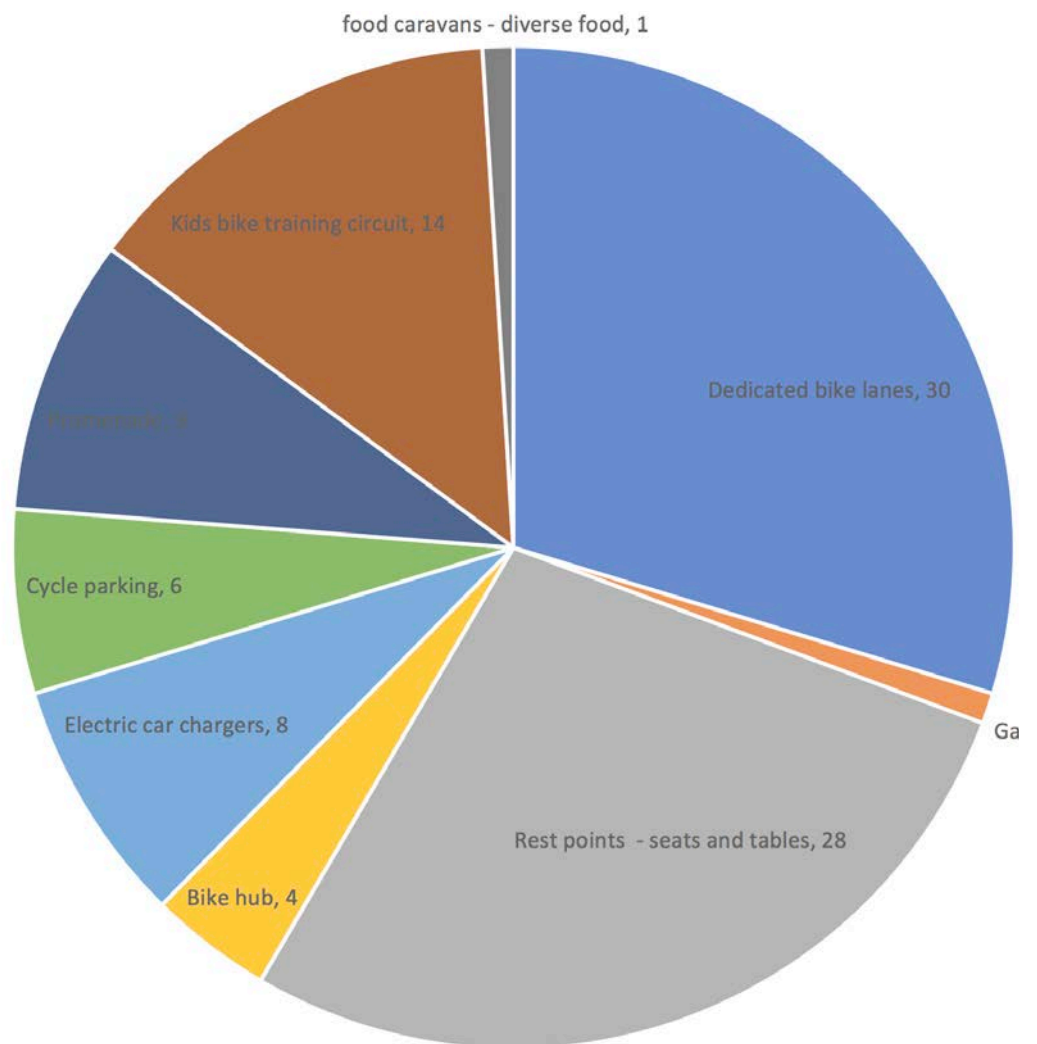
### Ideas Generator: Connectivity

The Creeklands are a series of spaces, but also a critical network of links joining various areas of open space together, as well as linking City and Creeklands, and providing greater local and regional connectivity across the wider City area.



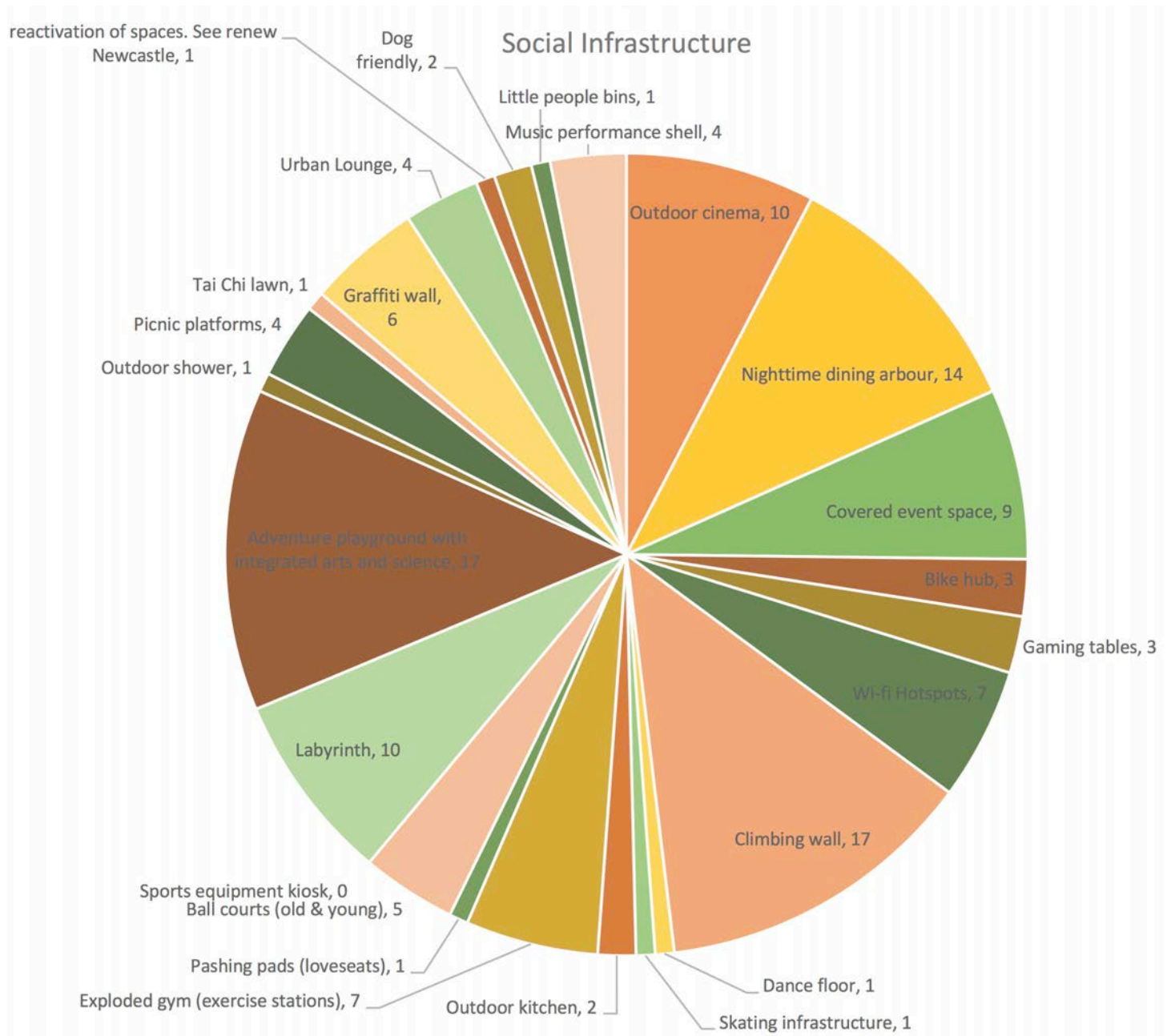
### Ideas Generator: Economics and Activity

A great range of activities already take place across the Creeklands, and within its many spaces and environments – the masterplan will seek out opportunities to enhance this vitality by increasing connections between City and park.



## Ideas Generator: Social Infrastructure

A overlay of tools for activation and inhabitation.





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# Project Objectives

*The Dumaresq Creeklands are the heart of Armidale, providing a vibrant civic space for community events and festivals. The creek and embankment vegetation, restored to a more balanced natural condition, provide ecological integrity for urban fauna as well as opportunities for people to safely engage with and enjoy the water – a naturalised oasis in an urban environment. Minor flood events are less of a nuisance, and bank erosion is minimised.*

*The creeklands are a chosen destination for locals and visitors of all ages. Art and sculpture installations reflect both the history and contemporary nature of the City. Aboriginal and European influences are respected and represented. A mixture of open and intimate spaces are available for passive and active recreation. Pedestrians and cyclists have clear, well-maintained routes linked to destinations in and outside of the Creeklands. Everyone who uses the creeklands feels safe, at all times of day and in all seasons.*

*The creeklands play a vital role in a thriving local economy rich with atmosphere. Store frontages near the creeklands are in high demand due to the large number of people who use its parks on a daily basis. Pedestrians are able to move safely between the existing business district and the Creeklands in a complementary feedback loop that optimises the potential of each.*

*The Dumaresq Creeklands represents a complex network of disparate ecologies, both natural and man-made. The masterplan analysis investigates different aspects of this network, aiming to discover, enhance and develop the potentials within each area.*

To create a comprehensive assessment of the Dumaresq Creeklands and its surrounding ecological and cultural catchments, the vision, principles and strategies from the background documents, research and site analysis have been organised into McGregor Coxall's Place Principles. These conceptual filters by which to appraise the site, its conditions, and its eventual opportunities form a comprehensive framework to structure the design initiatives.



# Place Principles

## Natural Environment

Explore the ways in which the natural environments of the Creeklands and the Armidale community can develop jointly, with positive benefits for both ecosystems. Issues include:

- Flooding
- Trees/shade/vegetation
- Environmental flows
- Water quality
- Soil contamination

## Connectivity

Reveal movement networks, desire lines and points of connecting, in stitching the Creeklands together, and linking them to the City Centre. Issues include:

- Waterway link to Dumaresq Dam
- Pedestrian connectivity to Town Centre/Mall
- Open space network
- Cycle link to UNE

## Community

Create opportunities to realise a diverse collection of open public spaces across the Creeklands, servicing many uses and users. Issues include:

- Identified Community Priorities
- Integrated uses
- Accessibility for all

## Economic Vitality

Investigate how the Creeklands can contribute to the economic vitality of the town centre, while benefitting from nearby activities. Issues include:

- Improve ecotourism offerings
- Contribute to CBD vitality
- Create a regional amenity

## Built Form & Aesthetics

Assess existing form and fabric, and its attributes and opportunities, and how the material structure of the Creeklands can be integrated into Armidale's built fabric. Issues include:

- Site Character
- Existing facilities
- Proximity to Town Centre/Mall
- Topography and views

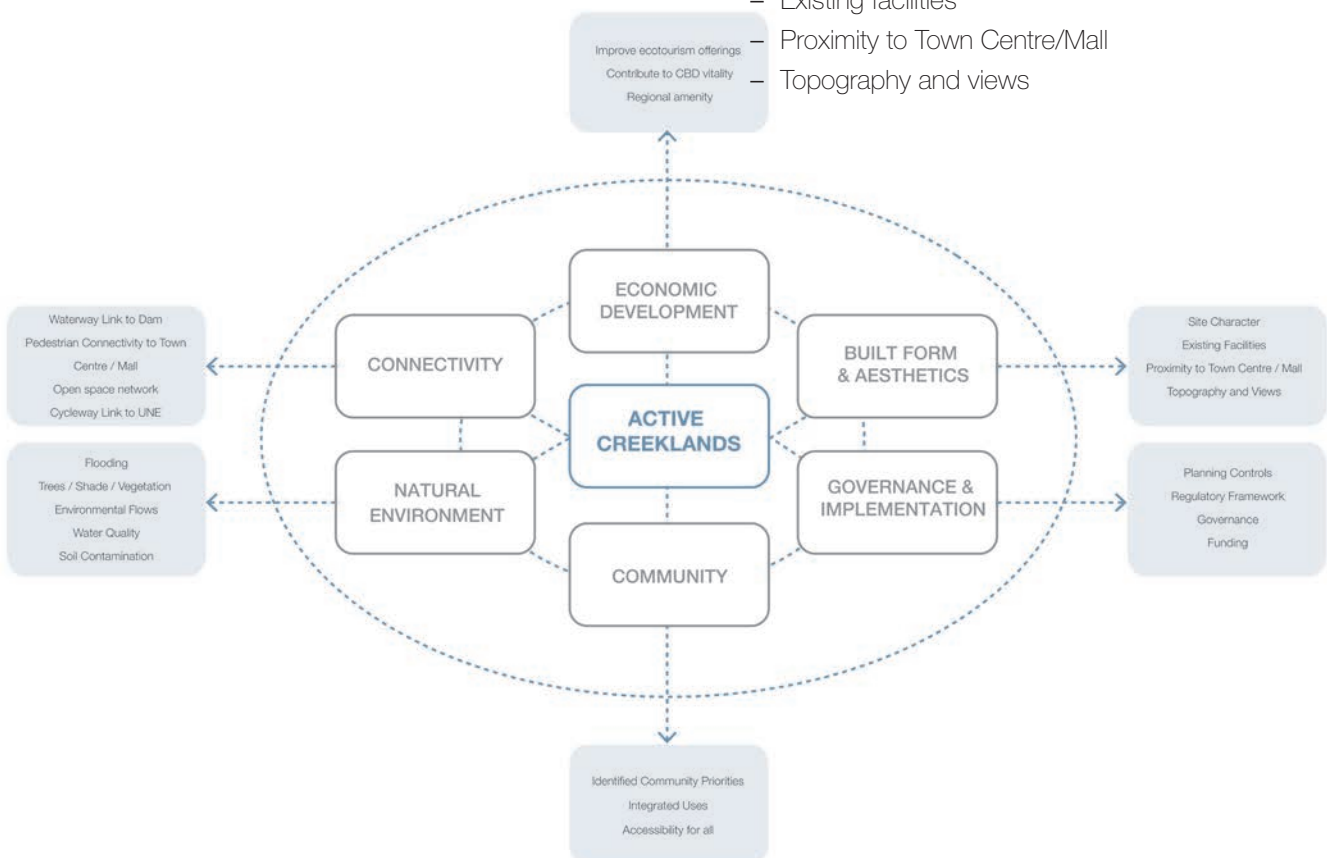


Figure 4.0 - Creeklands Place Principles





# Natural Environment

## Creek Morphology

Major works to reposition the bed and banks of Dumaresq Creek (creekline), have been undertaken at multiple locations along the creek, such as at Harris Park playing fields. Other alterations to the original line of the creek have occurred to extract materials (sand) and to develop urban infrastructure. The banks of Dumaresq Creek have been straightened and lined with basalt rock and concrete through Curtis and Civic Parks within the urban area of Armidale.

There is a weir on the creek located behind Monckton Aquatic Centre. This weir was installed to create a permanent pond of water downstream of the pedestrian footbridge. An island was created within the pond to provide habitat for native fauna. This section of the creek has been dredged multiple times in an effort to maintain the pond.

The creek channel is steeply incised between Markham and Jessie Street, with the creek bottom estimated from visual inspection to be about 2.5 metres below bank height at it's deepest point. The creek channel is about a metre deep through Curtis and Civic Parks.

## Ecological Condition

A review of literature and site inspection revealed the condition of the riparian and aquatic communities of Dumaresq Creek is poor. Past and present land use practices within the City Parklands area have resulted in significant alteration and severe degradation to the aquatic and riparian ecosystems of Dumaresq Creek.

Historical clearing of native vegetation and ornamental planting of invasive plant species such as Willows (*Salix* spp.) have resulted in a significant decrease in native

plant species, a reduction in native plant recruitment and extensive weed colonisation of the riparian zone (White 2009).

The current riparian vegetation community within the City Parklands is highly managed and is dominated by exotic groundcover, mid story and canopy species (Ryder et al 2009). As a result native bird species richness within the area is typically lower than what would be expected in a functioning riparian ecosystem (White 2009).

Historical armouring and restriction of the creek to undergo natural geomorphic processes has resulted in significant modification of the creek and adjacent floodplain. The combination of upstream flow regulation and stormwater inflows from urban areas has led to major changes in creek hydrology (Ryder et al 2009) which has contributed to erosion and bank slump of unprotected stretches of bank, bed scouring and increased downstream sedimentation (Ryder et al 2009).

On inspection, the creek bed was covered with fine silt and exotic leaf litter. Extensive beds of *Typha orientalis* were distributed throughout the creek channel, and had colonised shallow areas with fine silty sediment. Exotic Goldfish (*Carassius* spp.) were observed along several reaches of the creek.

Surface water quality in the creek is degraded and typically has low oxygen, elevated nutrients and turbidity and bacterial contamination (White 2009), results which are common to urban waterways. Contaminated soil from a historic gas works was dumped in a section of the creek bank and may contribute contaminated leachate to the creek in wet periods (White 2009).



Existing plantings and ecological condition of the Dumaresq Creeklands



## Flooding

Armidale Regional Council conducted a Flood Hazard Risk Assessment for the Armidale CBD in 2014 (BMT WBM, 2014). Results of this assessment show that nearly the entire study area is within the floodplain of the 5% AEP storm (commonly referred to as the 20-year storm). The only areas not inundated during the 20-year flood are the steep slope from Harris Park up to Kirkwood Street, most of the pedestrian path through Harris Park, and the area adjacent to Hungry Jacks in Curtis Park. The flood inundation area for the 100-year storm is slightly larger. For the 20-year and 100-year storm events, Dumaresq Creek is predicted to break out of the channel at the Dumaresq Street crossing upstream of Markham Street, with floodwaters flowing along Dumaresq Street and re-entering the channel at the causeway just east of Monckton Aquatic Centre (within the study area).

The Creeklands are also subject to frequent minor flooding events that result in inundation of Dangar and Faulkner Streets, as well as pathways and parklands adjacent to the channel between these streets and throughout the study area upstream of Marsh Street. The culverts under Dangar and Faulkner streets are understood to be undersized (being low flow culverts), creating a flow constriction that results in flood conditions. The confined narrow creek channel is also understood to contribute to the flood conditions within the parkland. The flood studies reviewed as part of this Masterplan did not include detailed analysis of either the culverts or the channel or evaluate the sensitivity of predicted flood results based to changes in size or configuration of these structures.

A Floodplain Management Study conducted in 1994 (noted in *Council Policy 204 Revegetation Guidelines for*

*the Urban Reaches of Dumaresq Creek*) did assess flood impacts related to community proposals for enhancement of the creeks and floodplains:

“Community proposals for enhancement of the creeks and floodplains have included revegetation of the creek banks to remove exotic species, planting of urban forests on the floodplain and the creation of wetlands. An assessment of the impacts such activities could have on flood levels showed that revegetation of the creek banks and the creation of wetlands would tend to lower flood levels by a small amount within the immediate vicinity.”

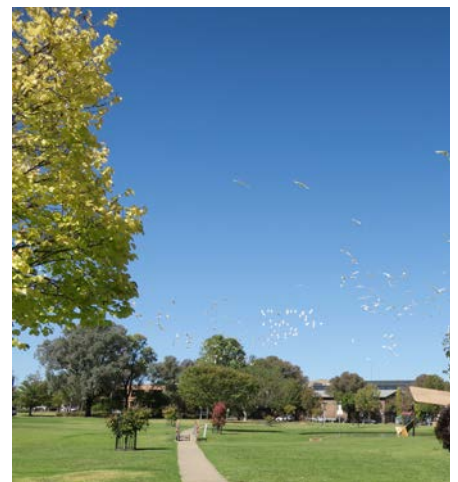
## Geology and Soils

The following information was reported in the *Revegetation Guidelines* (Armidale Dumaresq Council, 2009).

Four major geological units occur within the City of Armidale: Quaternary alluvium; late Tertiary basalts; mid Tertiary sediments (Armidale Beds); and much older Carboniferous sediments (Sandon Beds).

There are also the occasional small occurrences of secondary deposits (e.g. silcretes and ferricretes) (Bale et al, 1996). The two types of geology which occur along the urban reaches of Dumaresq Creek are Carboniferous Sediments (or Sandon Beds) and Quaternary Alluvium.

The Quaternary alluvium forms the flood plain and sometimes slightly extended areas of the major streams: Dumaresq Creek, Martins Gully; and Black Gully. The alluvium comprises deposits of gravel, sand and clay. With the exception of Dumaresq Creek, the alluvial deposits probably form only a thin mantle over the country rocks.



## Soil Contamination

Some soils within the study area are known to be contaminated with polycyclic aromatic hydrocarbons (PAHs) including Benzo[a]pyrene (BaP) resulting from coal wastes from the former Armidale Gasworks. These areas are shown in Figure 4.0.

As noted in the Revegetation Guidelines, "Anecdotal evidence obtained by EGIS Consulting Australia indicated that some gasworks' waste soil might have been deposited as fill in Harris Park and along the banks of Dumaresq Creek, (ERM, 2004). Frequent flooding events along the creek would enable sediments and soil to be carried along the Creek and floodplain, (ERM, 2004). Investigations of the Armidale Parkland areas have identified impact of surface soils with PAH and in particular BaP, (ERM, 2004). The extent of impact over these parklands has been documented in numerous reports, (ERM, 2004). However, any site located downstream of the old gas works site has potential to be contaminated."

An Environmental Management Plan (EMP) has been developed for Armidale Dumaresq Council (Council) to provide guidance for the management of surface soils of the Armidale Parklands containing elevated concentrations of polycyclic aromatic hydrocarbons (PAH) including Benzo[a]pyrene (BaP). Council is currently undertaking a study for remediation of the small, fenced-off triangle of land adjacent to the Cinema.

For the purposes of this Masterplan, soil contamination is not considered an insurmountable barrier to landscape works and use of the parklands; costs and management activities associated with the contamination are considered in development of the recommendations.

## Topography

The project area is a floodplain with typical floodplain topography, sloping gently in toward the creek from both the southern and northern boundaries. Dumaresq Creek flows eastward from Markham Street to Taylor Street; the adjacent land generally follows the slope of the creek, with significant flat areas at the sportsfield complexes. The project area is steepest on the north side of the channel, sloping up from the creek to Kirkwood Street.

## Regulatory Framework for Floodplain and Riparian Zone Works

This section provides a summary of the regulatory framework under which floodplain and riparian zone works are governed.

## NSW Department of Primary Industries Fish Habitat – Policy and Guidelines for Minimising Habitat Alteration in Urban Streams (Fisheries Management Act 1994)

Dumaresq Creek is identified as Key Fish Habitat and therefore is subject to the provisions of the *Fisheries Management Act 1994*. Rehabilitation efforts, including the removal of concrete and other artificial stream linings and restoration of stream morphology and vegetation are supported, but will need to be developed in conjunction with the DPI and in accordance with the guidelines.

## Guidelines for Riparian Corridors on waterfront Land NSW DPI (Water Management Act 2000)

Works involving removal or deposition of material (including soil and vegetation) on land, as well as works that affect the quantity or flow of water in a water source require a controlled activity approval under the *Water Management Act 2000*. Dumaresq Creek is a second order stream with a defined vegetated riparian zone (VRZ) width of 20 metres on either side of the watercourse (measured from the high bank on each side of the watercourse). Construction of cycleways and paths is allowed within the outer 50% of the VRZ, provided that the total disturbance footprint is not greater than 4 metres.

## LEP

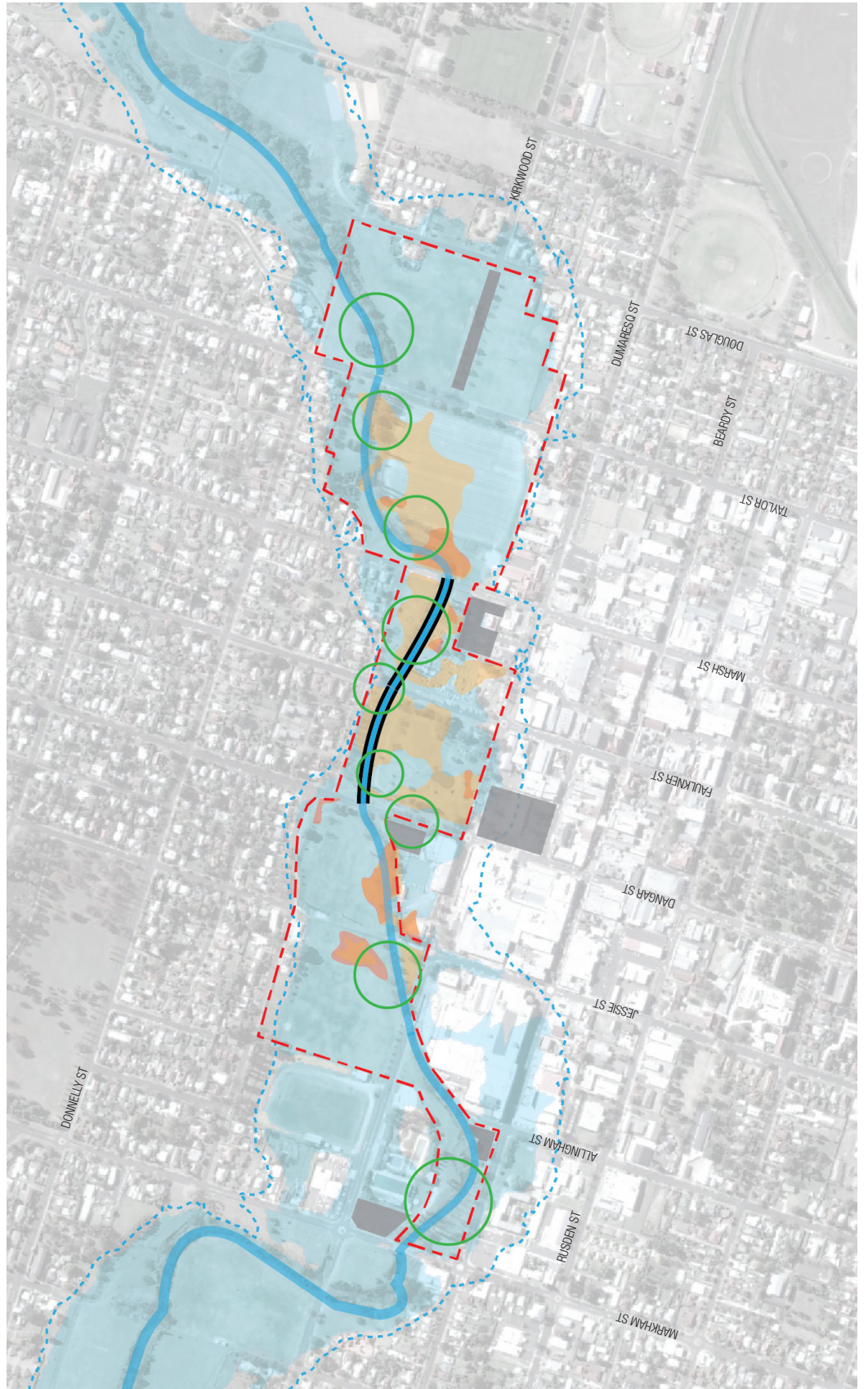
All of the land in the project area is zoned Public Recreation. Objectives for this zone include:

- To enable land to be used for public open space or recreational purposes.
- To provide a range of recreational settings and activities and compatible land uses.
- To protect and enhance the natural environment for recreational purposes.

Council consent is required for several uses that are proposed for the Creeklands including business identification signs; community facilities; environmental protection works; flood mitigation works; food and drink premises; markets; recreation areas; and recreation facilities (outdoor). Additional specific uses are specified in the DCP but not proposed for the Creeklands. Bee keeping and pubs are currently prohibited.

## DCP 2012 Chapter 2.7 Floodplain Protection and Stormwater Drainage

Generally, planning restrictions will apply to development on land below the 'flood planning level' of natural watercourses including Dumaresq Creek. The 'flood planning level' refers to the flood level established by the 1% Annual Exceedance Probability (AEP) flood (commonly referred to as the '1 in 100 year flood') plus 0.5 metres freeboard.



**Legend**

- Impervious carpark/hardscape area
- Significant exotic tree plantings
- BpA soil contamination
- PAH soil contamination
- 20 year flood extent
- Channelised section of creek
- Flood Planning Level extent
- Creekline
- Site boundary

Figure 5.0 - Armidale Creeklands Environmental Analysis

## New England Vegetation

Armidale has a long tradition of exotic plantings particularly of deciduous species, resulting in a spectacular display of coloured autumn leaves in the months of March, April and May. Over the last 15 years Dumaresq Creek has been colonised by extensive patches of willow, privet and other woody and herbaceous weeds. These weeds have in places shaded the creek, altered environmental flows through silting and created traps for litter and rubbish.

The following native vegetation types existed within the Armidale area (Keith, 2004):

### New England Grassy Woodlands

The gently undulating New England Tableland in north eastern New South Wales supports a characteristic suite of grassy woodland communities above 600m elevation, (Keith, 2004). The sedimentary and granitic rocks produce relatively fertile loamy soils and the annual precipitation (both rainfall and occasional snowfall) varies from 800mm in the east to 550mm in the west, considerably lower than on the edge of the escarpment (Keith, 2004).

These woodlands share a number of plant species with the Southern Tableland Grassy Woodlands, notably the dominant trees and some prominent grasses and herbs, (Keith, 2004).

### Tableland Clay Grassy Woodlands

The gently undulating New England Tablelands of the Great Dividing Range carry four different classes of Grassy Woodlands, but only the Tableland Clay Grassy Woodlands are commonly encountered on both the northern and southern tablelands (Keith, 2004). These occur on rich alluvial creek flats or fertile clay – loam soils derived from basalt, 700-1300m above sea level, where the annual precipitation varies from 550- 900mm (Keith, 2004).

Community concern for the environment has brought about a range of actions in the past, some benefiting the environment, others (such as planting willows) could be argued as contributing to poor water quality and environmental degradation. Prior to the 1970's it was considered acceptable to plant willows along the creeklands. Willows were planted to help improve stream bank stability, and to beautify the creeklands.



Native vegetation in the New England area



# Connectivity

Vehicular crossings through the project area include Dumaresq, Dangar, Faulkner, and Marsh Streets. Parking options for creekland users arriving by car include the car parks at Albion Park, Monckton Aquatic Centre, the Visitors Centre on Marsh Street, and the Market Square parking lot on Moore Street. Angled street parking is also available on Dangar and Faulkner streets. Kerbside parking is also available in portions of Dumaresq Street and along Markham, Marsh, and Taylor streets.

A shared use path traverses the creeklands from Dumaresq Street near Monckton Aquatic Centre through to Taylor Street, on the south side of the creek. A footpath also connects Dumaresq Street to Kirkwood Street, along the alignment of Jessie Street, bisecting Harris Park.

The pedestrian road crossings on Dangar and Faulkner Street are not striped zebra crossings, but chicanes are in place to slow traffic at the crossings. Parking is also restricted by the chicanes to improve visibility of pedestrians approaching the crossing.

The shared use path terminates on the west end of the project area at Dumaresq Street, at which point cyclists use the road and pedestrians the footpath. The next pedestrian crossing is at Monckton Aquatic Centre (not a striped crossing). The cyclepath continues to and along Markham Street, where there are two options to connect to the off-road shared path that connects to UNE. Users can access this path from Markham Street opposite the intersection with Kirkwood Street, or from Dumaresq Street about 260m west of the Markham Street roundabout.

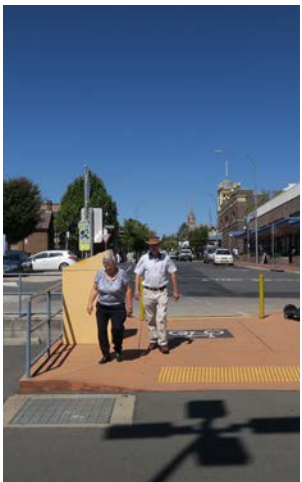
The shared use path continues on the east side of Taylor Street, outside the project area, on the north side of the creek.

The shared use path branches at the northwest corner of Civic Park, with one branch crossing the pedestrian footbridge and continuing up to Kirkwood Street; the main branch continues eastward to cross Faulkner Street. At this point a dedicated footpath crosses Civic Park diagonally to the Judith Wright memorial grove at the southeast corner of the park.

There is no paved footpath along Dumaresq Street at Civic Park, though there is a strong desire line indicating that pedestrians regularly use this edge of the park as a footpath. The desire line ties into the footpath at the Judith Wright memorial. There is also no footpath along Faulkner Street in Civic Park, though there is one in Curtis Park.

In addition to the pedestrian footbridge across the creek in Civic Park, there is the suspension bridge in Albion Park, and a pedestrian bridge on the west side of Curtis Park, adjacent to Faulkner Street.

Pedestrian connectivity into the creek parklands from the CBD is limited. There are only three pedestrian road crossings of Dumaresq Street: at Hungry Jacks, at the Services Club, and at the Cinema. Road crossings with pedestrian refuges are located on each side of the roundabouts at Dangar, Faulkner, and Marsh Streets.



Existing town centre pedestrian links to the Parklands and parkland pathways

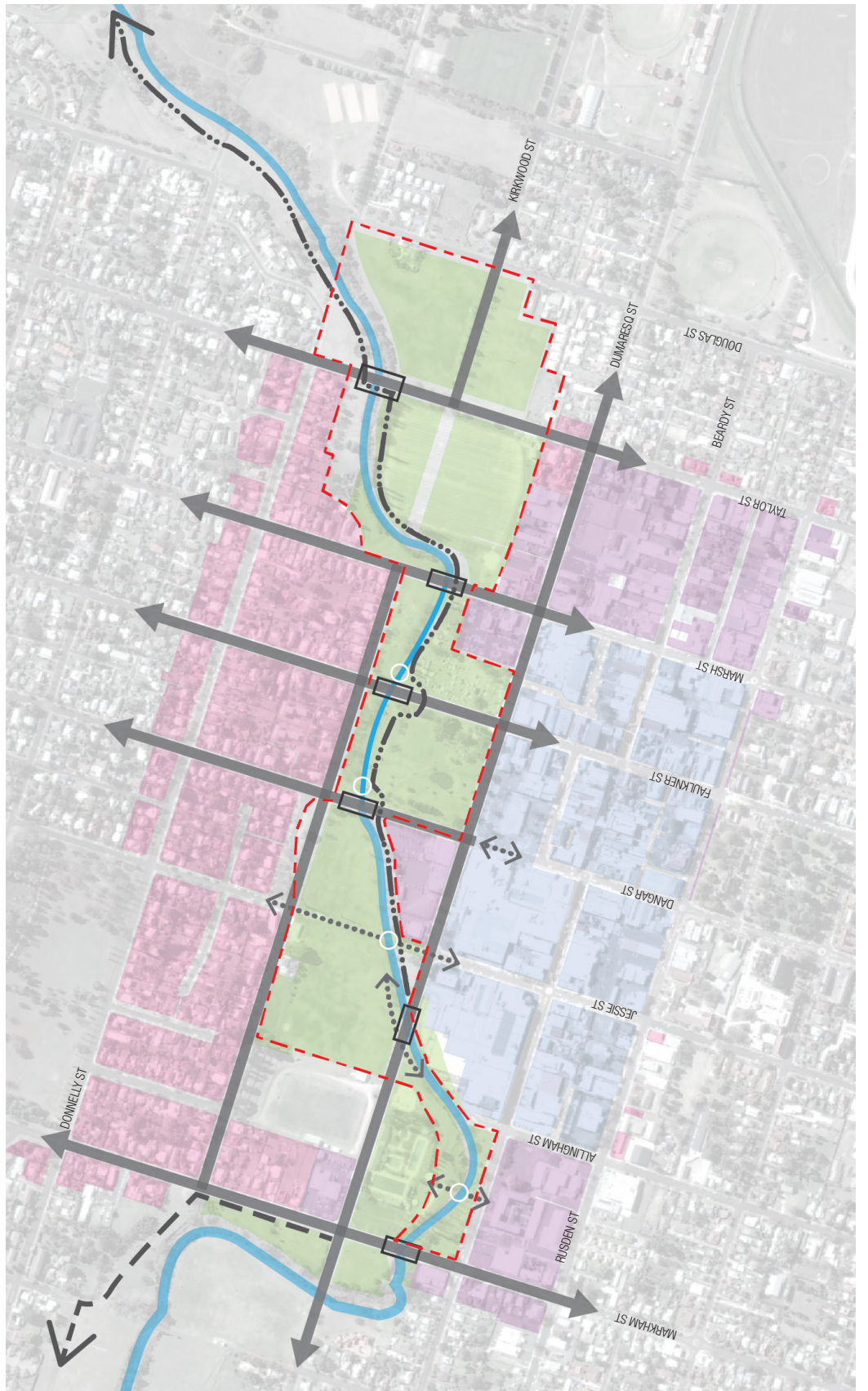


Figure 6.0 - Creeklands Connectivity Analysis

# Community

The Armidale community is just over 29,000 people strong, comprising a varied group of ethnicities including several European countries (predominately English and Irish), Aboriginal Australians, Chinese, and Indian. The community recently welcomed 200 humanitarian migrants from Iraq and Syria as part of Australia's migration program.

The University of New England is the largest employer with nearly 1,300 staff members in addition to the total student population of nearly 24,000 (including distance learning students).

Community groups are strong and active, Environmentally inclined groups with a focused interest and impact on the Creeklands include the Armidale Urban Rivercare Group, Armidale Tree Group, and the Visions for Armidale Creeklands committee. Other community groups include the Armidale Birdwatching Group, Sustainable Living Armidale, and the Armidale Dance Group.

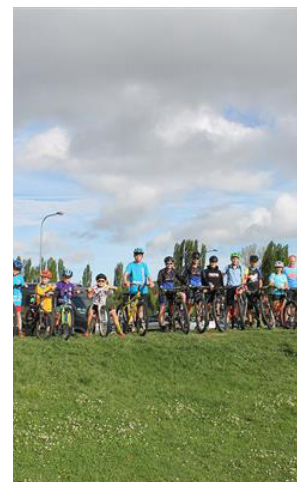
Key community events include the Autumn Festival, the Armidale Farmers Market, and the Armidale Markets in the Mall. Other community events include the St. Peters Armidale Garden Tour, and the annual Australia Day celebration. The Autumn Festival, Farmers Market, and Australia Day events are all held in the Creeklands.

Community amenities in the immediate vicinity of the Creeklands are shown on Figure 6.0.

## Prior Community Proposals

The Creeklands are the subject of much attention from the community, as evidenced by the following activities and proposals.

- Over 1,400 volunteers with the Armidale Urban Rivercare Group have planted 12,000 plants at designated revegetation areas since 2009.
- Formation of the Armidale Creeklands Committee, with several options for developing the Creeklands as a focal point for the city, capitalising on the creek as a water feature with both passive and active recreation potential.
- Installation of fitness equipment along the cycle path.
- Creek re-naturalisation for improved ecology and biodiversity and flood mitigation.
- Road crossing improvements to improve flood control.
- An offline treatment wetland to improve water quality and provide a community amenity.
- Construction of a semi-permanent labyrinth for walking meditation and gentle recreation.



Community activity and heritage in Armidale and its creeklands





Figure 7.0 - Armidale community activity

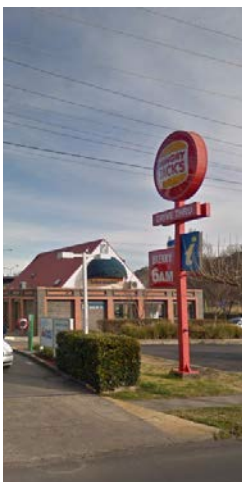
# Economic Development

The existing Creeklands are not well integrated into the economics of the city centre, either in terms of operational links or spatial connectivity. The Wicklow Hotel on Dumaresq Street overlooks part of the eastern edge of the Creeklands, and the Services Club has some outdoor spaces on the park side of the complex. These spaces are, however, still segregated from the Creeklands by parking lots and service structures. The more common condition is that of the major retail shopping centres in the city centre, which turn their backs away from the Creeklands, and away from the northerly solar aspect, presenting mostly carparks, blank walls, service entries or storage areas to Dumaresq Street.

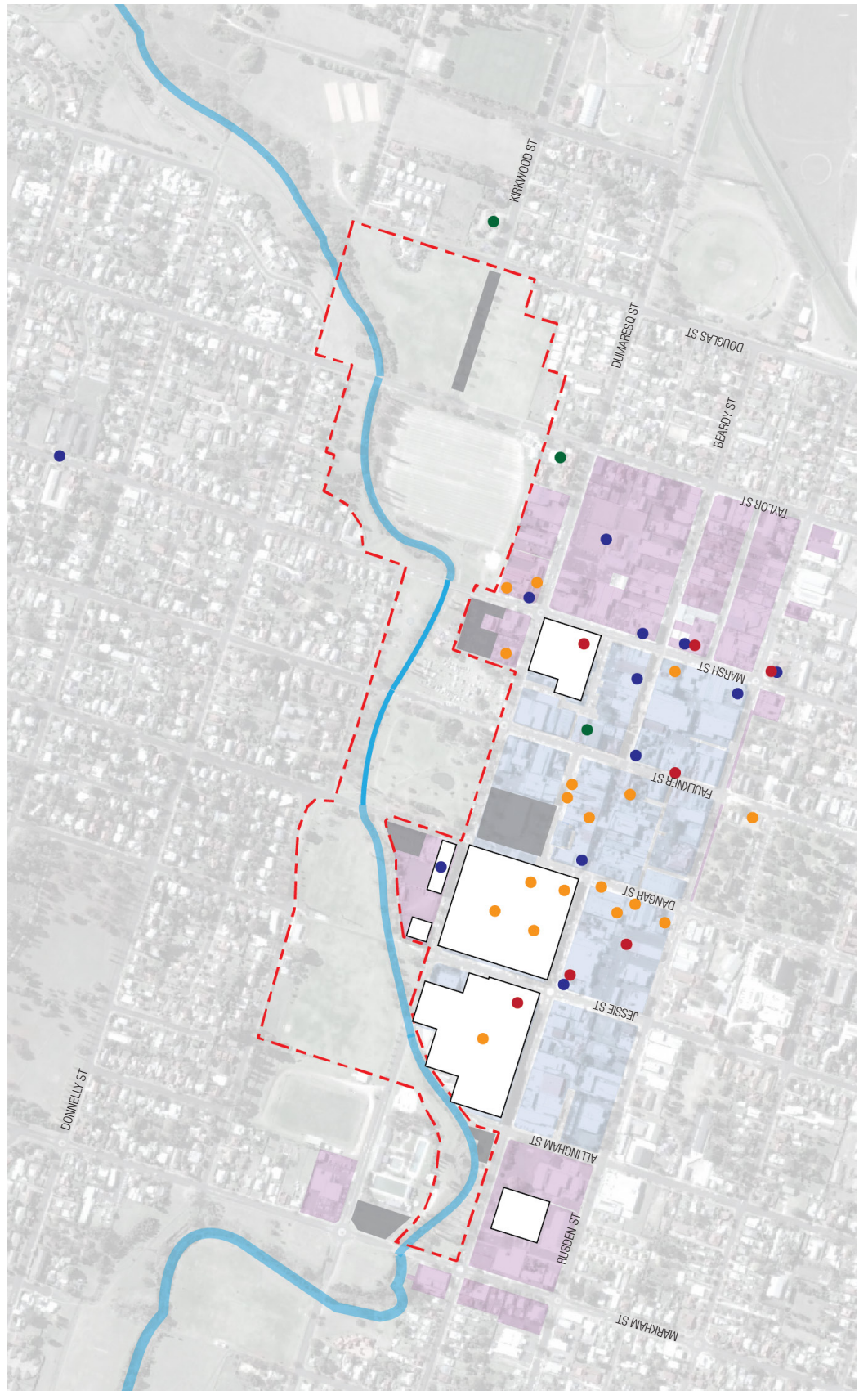
Movement-wise, there are limited designated pedestrian crossings from the city centre into the parklands, further exacerbating the separation. Pedestrian circulation leading to the Creeklands along the major north-south streets (Jessie, Dangar, Faulkner and Marsh Streets) ends in difficult to cross roundabouts dedicated solely to vehicular traffic. Similarly, the secondary movement routes through the centres of the large blocks in the city centre are not realised in crossings or entry points addressing the Creeklands.

Despite the plethora of retail and food outlets within the major shopping centres, there are no active shopfronts along Dumaresq Street facing the Creeklands. Despite the proximity to the city centre and its economic activity, these conditions noted result in the major open space amenity of the city being inadequately serviced – quick trips in and out of the park to the shops or restaurants are not possible.

In addition to day-to-day commerce is the opportunity for events and tourism initiatives. The Creeklands are already used for markets and annual festivals such as the Autumn Festival and New Years.



Existing institutions and centres located nearby Dumaresq Creeklands

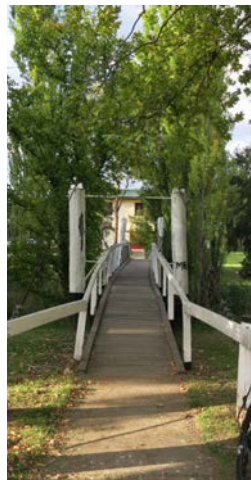


- Legend**
- Site boundary
  - Creekline
  - Significant buildings
  - Carpark/hardscape areas
  - Commercial core
  - Mixed use adjacent to site
  - Bottle shop
  - Cafe
  - Pub
  - Daycare centre

Figure 8.0 - Economic Analysis

# Built Form and Structure

The buildings and other structures throughout the Creeklands are a diverse mix of types, styles and materials, most having been constructed for individual and isolated purposes, with little consideration given to either an overall sensibility of the fabric or any unifying orders (whether form, material, arrangement, composition or deployment). Within this collection of built elements, there are a number of heritage items throughout the study area. Locations of these heritage items within the project area are indicated in Figure 8.0 along with a selection of the variety of built structures.



Built form and connections within and adjacent Dumaresq Creeklands



**Legend**

Spaces, built form and parklands of heritage significance

Figure 9.0 - Items of Heritage significance

## Potential for large water bodies

The potential to create permanent water bodies has been assessed within the Masterplan area. There are two general options which have been considered for constructing artificial water bodies – online or offline. Online water bodies intercept the flow of a waterway, while offline water bodies are built away from the main water course, where they may be fed either by a smaller tributary catchment (e.g. a local stormwater catchment) or by diverting some flows from the main water course.

Online water bodies are often larger ponds or small lakes. However, within the Masterplan area along Dumaresq Creek, large online water bodies pose significant design and management challenges:

- Online water bodies are typically constructed by placing a weir/embankment across a waterway. However weirs/embankments would raise flood levels. In this section of Dumaresq Creek, increased flooding is unlikely to be acceptable, as it would increase property damage.
- A water body could also be constructed by excavating an area below the normal water level in the creek. However, this would be an expensive option. Within the Masterplan area, soil contamination could further increase the costs associated with excavation and disposal of spoil.
- Online water bodies require approvals under the *Water Management Act 2000*. The NSW Department of Primary Industries – Office of Water is the approving authority. Their *Guidelines for instream works on waterfront land* seek designs which “maintain or mimic existing or natural hydraulic, hydrologic, geomorphic and ecological functions of the watercourse”. However online water bodies alter hydraulics, intercept sediment and woody debris, alter habitat and restrict fauna movement.
- While large online water bodies have been constructed in many urban areas, they have often proved difficult to manage in the long term. Online water bodies are typically characterised by a large catchment area in relation to the water body volume. A large upstream catchment delivers high flows and pollutant loads, and as pollutants accumulate, water bodies can often develop problems such as eutrophication, algal blooms and blackwater events. Canberra’s Lake Burley Griffin is an example, where water quality has become problematic in recent years (Lawrence 2012). Many of Canberra’s other large online lakes and ponds have also presented water quality management challenges (e.g. Lake Tuggeranong, Yerrabi Pond, Giralang Pond, Isabella Pond).
- Large water bodies would compete with other uses of the creeklands.

Smaller, offline water bodies are recommended as a more appropriate option for this section of Dumaresq Creek. Note that smaller urban water bodies can also experience serious water quality problems such as recurrent algal blooms (e.g. refer to SEQ HWP 2007), however a cooler climate is more forgiving in this regard. The ACT has several examples of successful offline ponds (e.g. David Street pond, pictured below). An offline water body can be designed with controlled inflows, pre-treatment to improve water quality, and design features to facilitate maintenance.



David Street Pond, O’Connor ACT

There are several stormwater drainage systems which pass through the creeklands and could be intercepted to feed a water body. An offline water body could be designed to improve runoff quality before discharge to Dumaresq Creek. Three potential locations for offline water bodies are shown on page 48-49. The following design considerations apply:

- Estimated runoff quality and quantity from each of the upstream stormwater catchments
- Levels, topography and potential cut/fill options to create water bodies
- Soil contamination
- Other physical constraints such as underground services
- Compatibility with other proposed uses such as sports fields
- Public safety
- Maintenance access and requirements

The Masterplan on page 52-53 proposes three locations for water bodies, identified by Program number 19. In addition to these three locations, the Masterplan also proposes several other potential locations for smaller stormwater treatment systems, which could be designed as wetlands or ponds.

## References

- Lawrence, I (2012) "Investigation into the state of Lake Burley Griffin and Catchment - Water Quality Assessment" prepared for the ACT Office of the Commissioner for Sustainability and the Environment.
- NSW Department of Primary Industries – Office of Water "Guidelines for instream works on waterfront land"
- South East Queensland Healthy Waterways Partnership (2007) "Constructed Waterbodies in Urban Areas of South East Queensland: Maintenance Issues and Costs to Local Government" Version 1.0, 27 August 2007.

## Existing Infrastructure

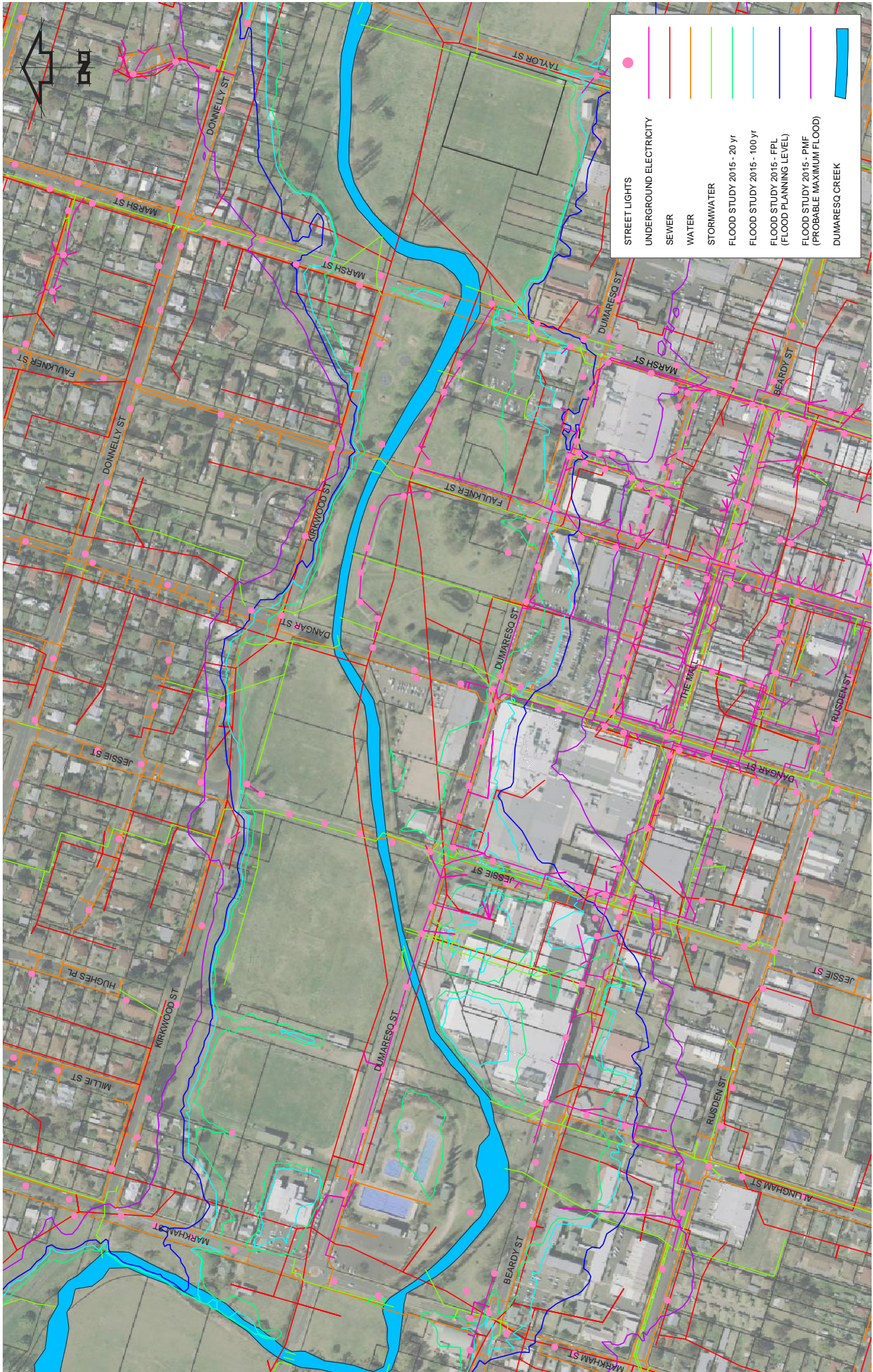
Stormwater drainage is conducted to Dumaresq Creek through 41 stormwater drainage outlets which include both piped and open grassed channels. Gross pollutant traps (GPT) are located within a block from the creek on Marsh, Dangar and Faulkner Streets. Major gross pollutant traps, typically located within city centres on waterways, are used to trap pollutants and sediment on a large scale. Minor gross pollutant traps intercept sediment and trash from small urban catchments. They are typically small, enclosed and located within the stormwater drainage system on the shores of water bodies or where stormwater pipes discharge laterally into floodways.

The Marsh Street GPT is a minor GPT discharging into Dumaresq Creek. Constructed by Council in 1992, it consists of a concrete-lined wet basin, a trash rack and provision for maintenance. A second GPT is located on Dangar Street in the south-western corner of the park, south of the Creek. These minor GPT's intercept sediment, trash and debris from stormwater runoff.

There are 17 structures which cross Dumaresq Creek, within the study area. These include road bridges, culvert crossings, pipeline crossings, causeways pedestrian footbridges and weirs. Council has a range of significant infrastructure located within the Creeklands corridor including electrical infrastructure, cycleway lighting, sewer trunk mains, five major water distribution mains crossing the creek, storm water pipes and associated gross pollutant traps.

Figure 10.0 (facing)- Location of Underground Services and Flood Study





DUMARESQ CREEK MASTER PLAN SHEET 1 - LOCATION OF UNDERGROUND SERVICES AND FLOOD STUDY







In consultation with the Project Advisory Group on the 24 April 2018, the following visions have been developed for each Place Principle. Each of these criteria have driven a series of assessments applied across the Creeklands and its constituent precincts and have framed the strategic and operative recommendations for the Masterplan.

## **BUILT FORM & AESTHETICS**

A beautiful and amenable series of spaces supported by cohesive and integrated architectural elements considerate of environment, local character, and materials.

## **ECONOMIC DEVELOPMENT**

The creeklands are the focus of a vibrant sustainably evolving regional urban economy supporting local enterprises, diverse uses and activities.

## **NATURAL ENVIRONMENT**

An intersection of a unique, living, evolving ecosystem and a growing community, linked through experience, exploration, operations and care.

## **CONNECTIVITY**

An accessible network of links and spaces providing efficient, experiential, and emotional connections between the city and the creeklands.

## **COMMUNITY**

A network of beautiful and diverse spaces that offer a range of social, civic, cultural, and recreational opportunities for the entire community.







**HARRIS PARK SPORTING PRECINCT**

Creek interaction, education and play areas  
Outdoor options for existing businesses  
Field Sports

**ACTIVE FAMILY PRECINCT**

Creek-based education and play  
Sports viewing

**CIVIC AND CURTIS PARKS**

The heart of the  
Creeklands



## ROLOGAS/WICKLOW SPORTS FIELDS

Creek interaction areas  
Outdoor options for existing businesses



### Program

01. Centre for Earth and Water
02. Habitat island
03. Creekside seating areas
04. Shaded skate park and exercise station
05. Shared pathway
06. Grove planting
07. Creek Interpretation and interaction deck
08. Sports spectator seating
09. Reshaped Creekbed with rocks and planting
10. Nature-themed adventure playground
11. Existing Judith Wright Memorial grove
12. Village Green with bandstand and natural amphitheatre
13. Reflective listening and ceremonial space
14. Labryinth
15. Farmers market square
16. Vegetated stormwater treatment system (raingarden/wetland/pond)
17. Row Plantings
18. Exercise station
19. Potential open water body locations

# Active Family Precinct

This area is defined by Beardy Street on the south side, Markham Street to the west, and Monckton Aquatic Centre and Dumaresq Street on the north side. The east side of this area is defined by the Armidale Central shopping mall and the retaining wall that constrains the creek. An historic suspension bridge provides pedestrian access across the creek.

The site character is somewhat different on either side of the creek. The south side area comprises Albion Park, and is characterised by open grassy areas shaded by large deciduous trees. This side is furnished with two covered and one un-covered picnic tables, and a single bench facing the TAFE. Rubbish bins are located throughout the park.

Riparian vegetation on this side consists primarily of non-native vegetation including a row of several tall trees planted right along the creek bank to the west of the bridge.

On the north side immediately opposite Albion Park, the landscape is dominated by the historic Spanish mission-style building and associated arched wall extending from the building to the east. The building was once the formal entrance to the town pool but has been used as the studio of the Armidale Pottery Club since 1972.

The lawn area behind the Aquatic Centre slopes toward the creek, and there is a small stand of casuarinas and a large bush adjacent to the end of the bridge. Visibility of the creek is obscured due to the large amount of cumbungi and other dense non-native vegetation along the creek banks. A weir crosses the creek immediately downstream of the large stormwater drain on the south side. This creates a ponded area of deeper water with an island in the middle.

The Armidale skate park is located adjacent to the Aquatic Centre on Dumaresq Street. The skate park is currently enclosed by a metal railing fence that separates the park from the adjacent lawn. There is a single covered picnic table and rubbish bin located on the south side of the skate park.

Albion Park is used primarily by TAFE students and staff for lunch breaks and passive recreation. The north side is used as an informal thoroughfare for walkers and cyclists to cross between Beardy and Dumaresq Street. The skate park is heavily used especially during school holidays.

The masterplan vision for this area is to create a family-oriented precinct with opportunities for passive and active recreation. Given the existing weir, this is an ideal location to create an open-water feature for passive interaction with water, a desire expressed strongly by several members of the community.



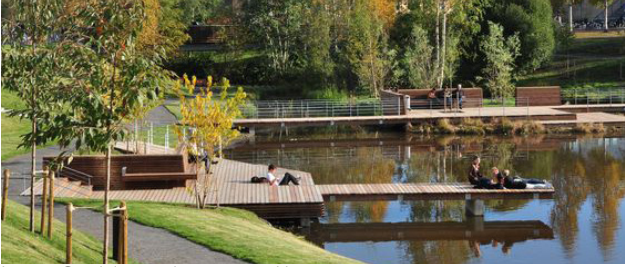


Image: Creek interaction opportunities



Image: Creek-oriented seating areas



Image: Youth hub centred on skate park



Image: Vegetated shade structure over skate park



Image: Potential for safe creek and creekside play areas



### Specific improvements for this area

01. A shared-use path through the area connecting Markham Street to Dumaresq Street, shaded intermittently with native trees. The path should be designed to facilitate safe road crossings and create an alternate route for cyclists connecting to the existing bike path on the west side of Markham Street, north of Dumaresq Street.
02. A stormwater bioretention treatment area in Albion Park sympathetic to its English landscape garden style. In practice, this would mean no native plant revegetation outside of the treatment area, and clearing of the Lombardy poplars in the vicinity to retain an open grassy sloping bank to the creek edge.
03. Creation of a passive water interaction area immediately behind the Aquatic Centre achieved by clearing the dense riparian vegetation to create an approachable open-water area. Seating is provided underneath native shade trees. The island is cleared of invasive vegetation and becomes a location for an art installation, accessible by new footbridge.
04. Restoration and refurbishment of the historic Monckton Aquatic Centre entrance building and associated arched wall, including lighting for night time illumination.
05. Restored and repurposed heritage building into a 'Centre for Earth and Water', building a community around everything from pottery, potting up plants, to pottering around – operating as a ceramics studio, landcare volunteer shelter and classroom for watercolour painting.
06. A vegetated shade structure and additional lighting for the skate park.
07. An exercise station
08. Rehabilitation and native-species restoration of the riparian vegetation along the creekline.
09. Native shade trees intermittently throughout the lawn area.
10. A formalised pedestrian crossing of Dumaresq Street flanked by speed bumps on either side to promote traffic slowing. Alternatively, a refuge or High Pedestrian Activity Zone (HPAZ), in consultation with Traffic Study.
11. Wayfinding signage, lighting, and rubbish and recycling bins placed to facilitate movement, safety, and sanitation. Note that all installations in the flood zone will need to be designed and installed to withstand flood velocities.

### Key considerations for suggested improvements in this area

- Revegetation plans should be undertaken in accordance with the *Revegetation Guidelines for Urban Reaches of Dumaresq Creek (March 2009)*, and incorporate the concept of the open water area with opportunities for clear lines of vision to the creekbed. Staged implementation of revegetation activities should be designed to provide stepping stone habitat for the birds and other animals known to inhabit the area. A commitment to ongoing maintenance is required to prevent recolonisation of the rehabilitated area with non-native species.
- Investigation for modifications to the existing weir to improve water quality should be undertaken.
- Soil-disturbing works must be carried out according to current best-practices and work health and safety guidelines for contaminated soil.
- Exact placement of the path end-points on Markham and Dumaresq Street should be determined through a bicycle network and active transportation study to address community concerns about safety and connectivity and develop a city-wide strategy for non-vehicular movement.

↙ View location overleaf





# Harris Park Sporting Precinct

This area is defined by Dumaresq Street on the south side, Kirkwood Street on the north, the Armidale Rams field on the west, and Dangar Street on the east. A shared use asphalt path runs along the creek on the south side. The area is bisected by a footpath that crosses the creek behind the cinema, crossing the shared use path and connecting to the footpath on Dumaresq Street. Belgrave Cinema and the Armidale Ex-Services Memorial Club both back on to the creek.

This area is a much-used sporting precinct dominated by Council playing fields. The area is also used for passive recreation such as relaxing in the shade. The riparian vegetation in this area is dominated by non-native species, as it is throughout most of the urban reaches of the creek. This area also includes an area of land currently fenced off due to soil contamination.

The masterplan vision for this area is to improve the amenity of the sports field complex, make minor modifications to the creek channel to improve habitat and provide access to and exploration of the creek, and provide areas for passive enjoyment of the creek. A key objective of this vision is to increase usership of the area to encourage the existing businesses to interact with and take advantage of their proximity to the creeklands.







Image: Potential for safe creek and creekside play areas



Image: Play elements and shelters integrated into existing vegetation



Image: Benched creekbanks allow for planting and increased creek interaction



Image: Character of planting and linear pathway next to creek

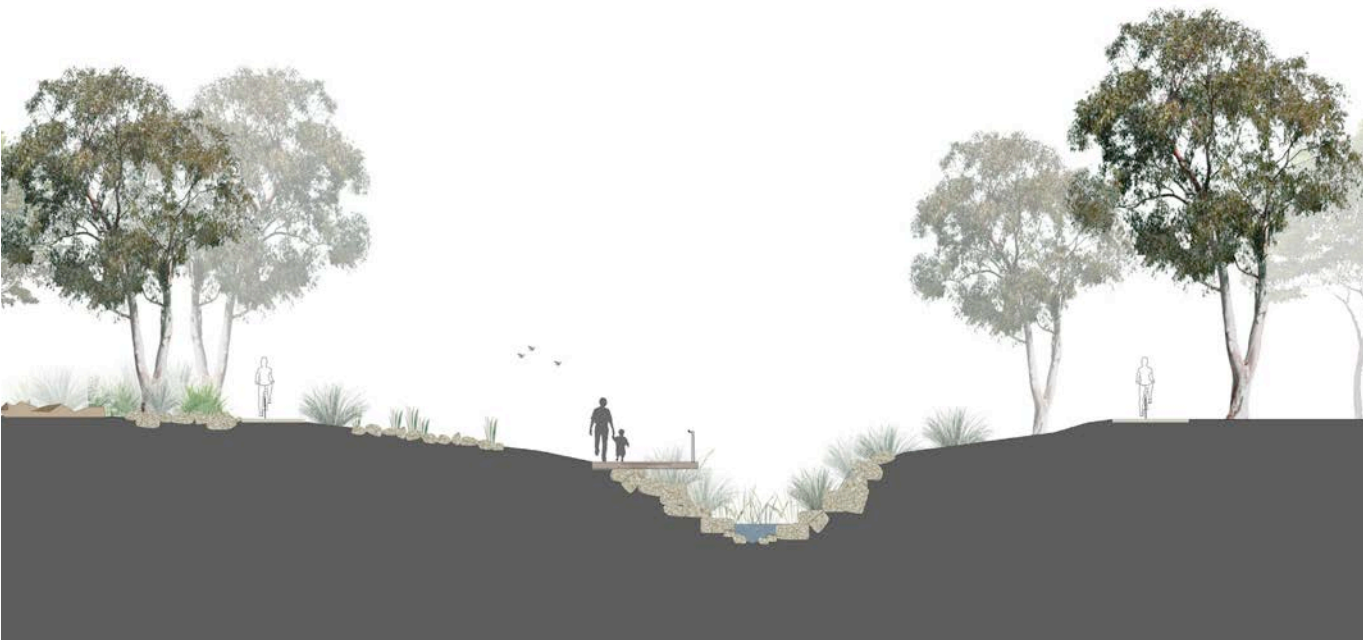


Figure 14.0 - Typical Creek Section showing benched creek bank and viewing platform in the Harris Park Sporting Precinct



### Specific improvements for this area

01. A shared-use path through the area, connecting to the Area 1 path on the north side of Dumaresq Street. This path will provide an alternate route for cyclists who may wish to avoid the more heavily used areas of Curtis and Civic Parks, by routing them through this area up to Kirkwood Street.
02. Replace the existing Council clubhouse on Kirkwood Street with a new building (including public toilets) to match the other buildings proposed for the Creeklands. This recommendation can be implemented at some point in the future when the existing clubhouse is at the end of its useful life, or when adequate funding becomes available.
03. Nature play elements, can be incorporated into the redesign of clubhouse of item 02 above.
04. Stormwater bioretention treatment systems near the intersection of Dangar Street and Kirkwood Street.
05. Two exercise stations.
06. Rehabilitation and native-species restoration of the riparian vegetation along the creekline coupled with localised terracing/benching of the creek banks to promote access to the water and showcasing of such planting.
07. Three viewing decks with seating allowing users to look over the creek or north towards the sports fields, located on the north side of the creek. They will also feature interpretative signage explaining the revegetated native riparian communities.
08. Maintenance and repair of the existing path on the south side of the creek.
09. A new pedestrian bridge connecting the existing businesses with the other side of the creek, to promote economic interaction.
10. Grass terraces on the slope north of the western playing field (sloping down from Kirkwood Street), to provide spectator seating with a view over the sports field and across the creek into town.
11. Replace the existing pedestrian bridge with new bridge to match design aesthetic.
12. Native shade trees intermittently throughout the lawn area.
13. Removal of the existing willow trees on the north side of the creek.
14. A shady grove seating area with views over the creek in the currently fenced off area. Include interpretative signage to tell the history of the site and the soil contamination, and Council's efforts to remediate and make the area safe for public use.
15. Wayfinding signage, lighting, and rubbish and recycling bins placed to facilitate movement, safety, and sanitation. Note that all installations in the flood zone will need to be designed and installed to withstand flood velocities.

### Key considerations for suggested improvements in this area include:

- Revegetation plans should be undertaken in accordance with the *Revegetation Guidelines for Urban Reaches of Dumaresq Creek (March 2009)*. Staged implementation of revegetation activities should be designed to provide stepping stone habitat for the birds and other animals known to inhabit the area. A commitment to ongoing maintenance is required to prevent recolonisation of the rehabilitated area with non-native species.
- Soil-disturbing works must be carried out according to current best-practices and work health and safety guidelines for contaminated soil.

# Civic and Curtis Parks - The Heart of the Creeklands

Civic and Curtis parks are the heart of the creeklands, providing public gathering space for festivals and markets, playground space for children, a labyrinth for meditative contemplation, and open spaces for strolling, picnicking and informal sport. This area is also home to the Judith Wright memorial grove at the corner of Faulkner and Dumaresq Streets.

A constructed duckpond and outlet channel (with a bridge over the channel) dominate the landscape on the western side of Civic Park. Picnic tables, benches, and rubbish bins are scattered throughout the park. There are three sculptural features in this area (one in the middle of the duckpond, one at the corner of Dangar and Dumaresq Streets, and one at the corner of Faulkner and Dumaresq Streets).

The creek through this area is a rock-lined straight channel that conveys stormwater rapidly through the area. The narrow straight-sided channel restricts flow from what was once a more meandering, gently banked creek bed. Channel modifications and undersized culverts at the road crossings result in frequent minor flooding experienced in the area.

The depth of the channel and steep drop-off from the bank are a public safety hazard, particularly for small children. Sediment build up in the channel has resulted in a dense stand of cumbungi between Faulkner and Marsh streets. The creek is crossed by two pedestrian footbridges above the high-water line. All of the bridges in the area are of distinctly different architectural styles, contributing to an overall sense of discoordination and randomness.

The masterplan vision for this area is to create a dynamic public precinct that provides opportunities for the broad demographic of the city.





Image: Civic-focussed performance spaces taking advantage of creek location



Image: Re-naturalised creek provides greater space for play and flood



Image: Flexible use of a large village green space



Image: Nature-themed adventure playground rivaling that of Tamworth



Image: Planting and rock ground treatment of modified creek channel



Figure 16.0 - Typical Creek Section of proposed modified creek channel in Curtis and Civic Park Precinct



## Specific improvements for this area

01. A village green area with a permanent structure for performances, community fitness classes, and movies in the park. Minor re-levelling of the existing surface, including filling the existing duckpond and channel, creates a subtle amphitheatre while remaining level enough for informal ball play or tossing a frisbee around.
02. Create a defined entrance to the village green area using a “tunnel of trees” living arbour to connect the creeklands to the CBD. The entrance terminates in a forecourt to the village green, flanked with a toilet block and kiosk on either side of the entrance walkway. Stones from the creek channel could be used to define the forecourt space.
03. Pedestrian connectivity is encouraged with a new pedestrian crossing of Dumaresq Street, at the middle of Civic Park across from the building that currently houses the City Band.
04. Reshape the creek channel to create a gentle approach to the waters edge and eliminate the steep drop-off into the channel. Reshaping the channel creates a larger cross-section for floodwaters to fill, and is expected to reduce the impacts and extent of the frequent minor floods. Preliminary hydraulic calculations indicate that the proposed reshaping will increase channel capacity from about 15 m<sup>3</sup>/s to 85 m<sup>3</sup>/s. The modified creek bed will feature native plants, a rocky base, and large woody debris for habitat creation, visual interest, and exploration during periods of low flow.
05. An at-grade rocky crossing of the creek in Civic Park at Faulkner Street
06. New pedestrian footpaths around the perimeter of the park, with landscaping that may include groups of trees, arbour, etc.
07. Replacement of the existing pedestrian footbridges to create a cohesive design aesthetic throughout the creeklands. This recommendation can be implemented at some point in the future when the existing bridges are at the end of their useful life, or when adequate funding becomes available.
08. Two stormwater bioretention systems.
09. A meditative precinct in the southeast region of Civic Park by establishing a permanent labyrinth and an Aboriginal ceremonial space, adjacent to the existing Judith Wright memorial garden. The landscape design reflects Aboriginal land stewardship with small copses of native peppermint trees connected with open grassy areas. The stones removed from the creek channel can possibly be used to form the labyrinth, set so that they are flush with the grass (hexagonal side up), to minimise maintenance considerations.
10. A large playground and associated works in the southwest of Curtis Park, adjacent to the existing Hungry Jack's, per Council's Curtis Park Development Playground Concept plan dated 16 April 2018 (produced by inSite EMLA). The pathworks shown in Council's concept plan should be integrated with the pathworks recommended as part of this masterplan, and designed to fit seamlessly together. The planting palette included in this masterplan provides for species more appropriate for Armidale's climatic conditions.
11. Relocate the existing gorge-walker sculpture to the area between the creek and the visitor centre, and elicit further sculpture to tell the story of the gorges and build the region's recreation and tourism opportunities.
12. Repurpose the existing playground area for an exercise station. Relocate the existing playground equipment to another location in the city.
13. Wayfinding signage, lighting, and rubbish bins placed to facilitate movement, safety, and sanitation. Note that all installations in the flood zone will need to be designed and installed to withstand flood velocities.
14. Remove existing children's playground on north side of creek.
15. Retain automatic toilet facility (upgrade to match design aesthetic at end of useful life).
16. Invigorate the under-bridge area as a location for public artwork. The walls of the bridge support can be used as mural canvases on a rotating basis to highlight various community groups or artists. Install lighting and surveillance to discourage undesirable

### Key considerations for suggested improvements in this area include:

- Creek bank works need to be undertaken with consideration of the regulatory context presented in a previous section of this report.
- Flood impacts of the proposed creek modification works are expected to be positive, but have not been studied in detail. A flood impact assessment study should be undertaken as part of future concept development.
- Soil-disturbing works must be carried out according to current best-practices and work health and safety guidelines for contaminated soil.
- Risks and mitigation measures associated with works in this area are provided in a subsequent section of this report.

↙ View location overleaf

↙ View location p80-1







# Rologas/Wicklow Sports Fields

The character of this area is dominated by the well-kept Council sports fields. The shared use path continues from Curtis Park, passing under Steven's Bridge (Marsh St) on the south side of the creek. The creek is currently significantly overgrown with Morning glory weeds immediately of the bridge. Further downstream, AURG has installed dense native plantings on the north side of the creek, creating a solid visual screen to the creeklands on the other side. North of the creek, behind the dense native plants, there is an underutilised grassy area that is sometimes used by cyclists as an alternate route between Taylor and Marsh Streets.

The masterplan vision for this area is to enhance the existing use by providing shade, seating and amenities.





Image: Safe, modern and open amenities blocks that blend into the landscape



Image: Cycleways connecting to key destinations and constructed for their level of use



Image: Cycleways peripheral to the town centre allowing for commuting and recreational purposes



Image: Cafes and businesses taking advantage of parkside setting





### Specific improvements for this area

01. Avenue plantings along southern edge of the playing fields to expand on those existing. Expansion of avenue plantings to adjacent streets can provide shade for commuters, while expansion of group plantings on fields can provide shade for sports spectators.
02. A formalised pathway from the existing path up to the Wicklow Hotel.
03. A dedicated paved cycleway on the north side of the creek.
04. Sports spectator seating.
05. An exercise station.
06. Four stormwater bioretention facilities.
07. Bike hire hub

# Secondary Placemaking Techniques

## Wayfinding & Interpretation

Several constituent themes within the Creeklands have emerged from the masterplanning process that could be the subject of an educational and interpretative experience:

- Aboriginal legacy
- European settlement
- Environment and remediation
- Creek ecologies and riparian habitat
- Indigenous and introduced flora

Interpretive signage will be deployed throughout the masterplan area, developed using a consistent graphic style across all themes, with specific elements and locations highlighted within the overall framework. These elements, along with wayfinding signage, will be incorporated within other built elements distributed throughout the Creeklands, minimising physical clutter, and creating a network of information-rich points of contact across the open spaces.

## Lighting

Lighting will be deployed throughout the Creeklands in two specific ways.

Illuminating paths, movement areas and open spaces to creates visible and highly surveilled areas, enhancing safety and security. Along the movement paths, a staggered arrangement of lighting poles will be installed, illuminating the paths and surrounding areas. The heights of the lights and their relationship to the paths will vary, creating a visual modulation of both physical element and spatial sequence when viewed externally or as experienced along the paths.

The second type of lighting deployment will be to locate and highlight specific elements within the Creeklands, using low-level and colour-enhanced lighting at the edges or undersides of built elements. These coloured “low-lights” will create a range of glowing elements throughout the Creeklands – a constellation of illuminated amenity and social infrastructure.



Image: interpretive information integrated into path edge



Image: lighting at varied heights and formations



Image: interpretive information integrated into path



Image: creative use and integration of lighting in the build environment

### Interactive Technology

At strategic locations or hubs throughout the Creeklands (such as at Curtis Park), a series of “console tables” will be deployed, which can be designed and implemented as multi-purpose elements evolving over time with changes in technology and use. Initially, the tables are simply robust steel and timber gaming tables, incised with playing board setouts on their tops. Each table will contain a Wi-Fi distribution point, with each hotspot individually identified and named, to create a series of virtual outposts across the Creeklands. RFID and geo-location technology would potentially be incorporated over time, as well as interactive features (lighting, sound, projection) allowing the hotspots to be incorporated into wayfinding, interpretation, temporary public art events and/or future interactive gaming initiatives.

### Public Art

Dumaresq Creeklands stakeholders, including the community have called for more public art, including sculpture, throughout the spaces and along the movement systems of the Creeklands. Rather than simply deploy isolated objects in space, the main strategy within the Creeklands masterplan is to identify locations for public art imbedded within and integrated into the physical fabric of the environment. These elements might be structural parts of infrastructure transformed into communication and interpretation elements: the structural pylon for shade mesh over the skate park, the blank end wall of a toilet kiosk, the frame around the bandstand, the underside of a bridge. While the masterplan suggests specific locations for public art related to new and enhanced elements of social infrastructure, the locations and the nature of deployment of artwork are flexible, dependent on the artist, nature of artwork and its temporality. The locations selected could define and celebrate different places along the Creeklands, highlight natural or built features and contribute to the narratives of the Creeklands and of Armidale.



Image: interactive technology application possibilities



Image: the use of art to highlight and celebrate the local environment

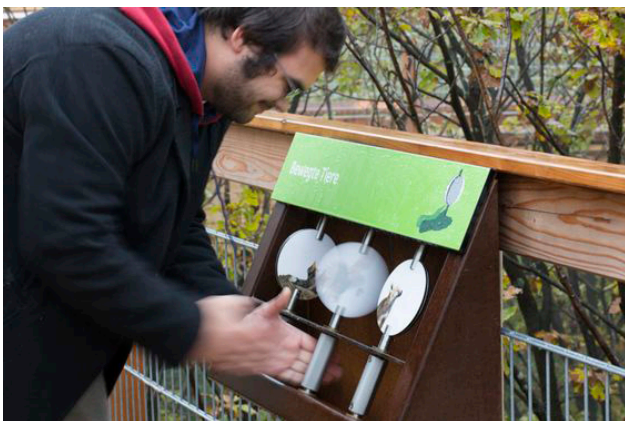


Image: integration of interactive technology with education and interpretation



Image: structural parts of infrastructure doubling as communicative, interpretative and artistic elements

# Risk Assessment

Inherent in the process of landscape design is the need to assess risk in the resultant built and natural environment. A risk assessment for various proposals in the masterplan was conducted to identify hazards and associated risks, and provide suggested mitigation measures.

Design element	Hazard	Risk	Mitigation Measure
<b>Shared Use Path</b>	Mix of fast and slow-moving users	Risk of Collision	<ul style="list-style-type: none"> <li>– Path is wide enough for adequate passing room.</li> <li>– Signage to alert all users to share path etiquette (including cyclist's use of bells and yielding to pedestrians)</li> </ul>
<b>Road crossings</b>	Proximity to vehicles	Risk of Collision	<ul style="list-style-type: none"> <li>– Speed bumps on either side of crossings</li> <li>– Pedestrian crossings marked with zebra stripes</li> <li>– Kerb blisters</li> </ul>
<b>Activation of Creekland areas</b>	Use of a greater range of areas of the Creeklands at a greater range of times of day and night, including transit corridors away from populated areas	Darkness and visibility-related threats  Predatory attack	<ul style="list-style-type: none"> <li>– Adequate illumination</li> <li>– Environmental design to prevent blind corners, concealment opportunities and areas of unlit seclusion</li> <li>– Work with police during design and operation phases</li> <li>– Proposed planting to avoid dense shrubs which block sightlines, instead opting for a canopy and groundcover</li> <li>– CCTV</li> <li>– Signage to alert users</li> <li>– Increased activation of an area may increase passive surveillance</li> </ul>
<b>Playground</b>	Proximity to road	Collision	<ul style="list-style-type: none"> <li>– Fencing the roadway frontage provides a physical barrier</li> </ul>
	Proximity to creek	Drowning	<ul style="list-style-type: none"> <li>– Elimination of deep channel section reduces water depth and velocity</li> <li>– Gentle transition to waterway eliminates steep drop-offs</li> <li>– Sloped banks improve surveillance from multiple vantage points</li> </ul>
<b>Creekbed works (Curtis and Civic Parks)</b>	Access to waterway	Drowning	<ul style="list-style-type: none"> <li>– Elimination of deep channel section reduces water depth and velocity</li> <li>– Gentle transition to waterway eliminates steep drop-offs</li> <li>– Sloped banks improve surveillance from multiple vantage points</li> </ul>
<b>At-grade creek crossings</b>	Proximity to creek	Erosion, flooding	<ul style="list-style-type: none"> <li>– Design with reference to technical guidelines such as the Statewide Mutual Best Practice Manual</li> </ul>
<b>General</b>	Poor design increasing opportunities for criminal activity	Crime	<ul style="list-style-type: none"> <li>– Crime Prevention through Environmental Design (CPTED) outlined in next section</li> </ul>



## Crime Prevention Through Environmental Design (CPTED)

Crime Prevention through Environmental Design (CPTED) is a crime prevention strategy that focuses on the planning, design and structure of cities and neighbourhoods to reduce the likelihood of crime opportunities. It is reflected in the planning and development process through Crime Prevention Legislative Guidelines in section 79C of the *Environmental Planning and Assessment Act*, requiring consent authorities to ensure that development provides safety and security to users and the community.

This is achieved through :

- Safer By Design Evaluation, a formal crime risk assessment done by Council in conjunction with police.
- CPTED principles that can be considered by Council during the proposal stage:
  - Territorial Re-enforcement, including a sense of community ownership and custodianship creating a sense of responsibility for a place;
  - Surveillance, achieved by strategic layout, orientation and placement of landscape and lighting design, allowing users to be seen and to see others, which deters criminal activity. Additionally, security guards or electronic measures could be implemented.
  - Access control – by restricting, channelling or encouraging movement at certain areas using physical features such as landscape, waterway, built or even symbolic features, criminal activity can be deterred.

More information can be found at: [http://www.police.nsw.gov.au/safety\\_and\\_prevention/policing\\_in\\_the\\_community/safer\\_by\\_design](http://www.police.nsw.gov.au/safety_and_prevention/policing_in_the_community/safer_by_design)

# Place Principle Assessment

The following table demonstrates the alignment of Place Principles, introduced at the outset as the project's objectives, with the most common themes raised during stakeholder and community consultation, and how these are specifically implemented in the proposed Masterplan.

It shows how they align with each other and work together towards Armidale's wider aspirations for the cultural, social, recreational, environmental and tourism potential of the Dumaresq Creeklands.

Place Principle	Stakeholders Input	Masterplan Outcomes
<b>Natural Environment</b>	<ul style="list-style-type: none"> <li>- Keep it natural</li> <li>- Improved habitat value</li> <li>- Less reeds</li> <li>- Less rubbish</li> <li>- Cleaner Water</li> <li>- More trees, and diverse native vegetation</li> </ul>	<ul style="list-style-type: none"> <li>- Habitat island</li> <li>- Grove planting, Row Plantings</li> <li>- Creek Interpretation and interaction deck</li> <li>- Reshaped Creekbed with rocks and planting</li> <li>- Vegetated stormwater treatment system (raingarden/wetland/pond)</li> <li>- Planting Palette</li> </ul>
<b>Connectivity</b>	<ul style="list-style-type: none"> <li>- Improved cycleways and walking paths, including better surfaces and improved connectivity</li> <li>- More wayfinding signage</li> <li>- Improved lighting</li> <li>- More basic facilities such as toilets, rubbish bins, wayfinding signage</li> <li>- Better facilities for dog walking and off-leash exercise, including dog bag dispensers</li> </ul>	<ul style="list-style-type: none"> <li>- Shared pathway</li> <li>- Planted alley of trees in Civic Park</li> <li>- Wayfinding and interpreting strategy</li> </ul>
<b>Community</b>	<ul style="list-style-type: none"> <li>- Safety around the creek</li> <li>- Improved lighting, nighttime safety and vibrancy</li> <li>- Improved passive recreation facilities</li> <li>- More basic facilities such as toilets, rubbish bins, wayfinding signage</li> <li>- Interpreting local history and culture</li> <li>- Better facilities for dog walking and off-leash exercise, including dog bag dispensers</li> <li>- Improved playground and skate park facilities</li> </ul>	<ul style="list-style-type: none"> <li>- Centre for Earth and Water</li> <li>- Creekside seating areas</li> <li>- Shaded skate park and exercise station</li> <li>- Sports spectator seating</li> <li>- Nature-themed adventure playground</li> <li>- Existing Judith Wright Memorial grove</li> <li>- Village Green with bandstand and natural amphitheatre</li> <li>- Exercise station</li> <li>- Public art strategy</li> </ul>
<b>Economic Vitality</b>	<ul style="list-style-type: none"> <li>- Night time safety and vibrancy</li> </ul>	<ul style="list-style-type: none"> <li>- Centre for Earth and Water</li> <li>- Farmers market square</li> <li>- Village Green with bandstand</li> </ul>
<b>Built Form &amp; Aesthetics</b>	<ul style="list-style-type: none"> <li>- Keep it simple</li> <li>- Improved lighting</li> <li>- More wayfinding signage</li> <li>- Improved playground and skate park facilities</li> </ul>	<ul style="list-style-type: none"> <li>- Reflective listening and ceremonial space</li> <li>- Labryinth</li> <li>- Lighting strategy</li> <li>- Village Green with bandstand</li> </ul>

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## Next Steps and Implementation

01. Masterplan. Council endorsement of masterplan and publication of findings to community, stakeholders and invested institutions and organisations, to engender support for future pathways to implementation.
02. Working group. Establish an expanded working group of stakeholders (including external or transient organisations or users) to regularly meet to continue project momentum.
03. Catalogue of events. Create a calendar of staged pop-up events, interventions and pilot projects to test feasibility of and interest in various initiatives for the Creeklands.
04. Active transport network plan. Investigation, analysis and strategic recommendations for precinct, local and regional links and connections for enhanced pedestrian connections and cycleways.
05. Creek bed modifications feasibility study. Analysis, evaluation and engineering proposals for hydrology, civil and environmental works to the creekline.
06. Dumaresq wayfinding strategy. Development of a comprehensive approach for design and deployment of all visual collateral throughout the Creeklands, incorporating public art, sculpture trail, signage, interpretation and lighting.
07. Flood impact study. Examination of flood plain hydrology for eventual creek bank modifications.
08. Planning. Incorporate an identified planning approach to CBD interaction with the creeklands for future development in the Local Environmental Plan and in business reactivation planning.
09. Armidale 2038 vision. Design workshop and strategic investigation report to establish a 20-year vision for the city incorporating the implementation and evolution of major projects in the city area.



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# Cost Estimate

	Unit Cost	Unit	Quantity	Base Cost Estimate
<b>Area 1: Active Family Precinct</b>				
Shared use path including lighting (3.5 m wide by 375 m long)	\$ 1,000	m	375	\$ 375,000
Stormwater bioretention area (750 m2)	\$ 250	m2	750	\$ 187,500
Riparian restoration and revegetation works	\$ 500	m	800	\$ 400,000
Allowance for restoration and refurbishment of existing building and wall, including public toilet and lighting	\$ 360,000	ea	1	\$ 360,000
Skate park shade structure	\$ 150,000	ea	1	\$ 150,000
Exercise station (4-6 pieces of equipment in a group with soft fall)	\$ 40,000	ea	1	\$ 40,000
Raised pedestrian crossing	\$ 100,000	ea	1	\$ 100,000
Allowance for seating areas	\$ 150,000	total	1	\$ 150,000
Allowance for shade trees	\$ 150	ea	30	\$ 4,500
Allowance for wayfinding signage	\$ 2,000	ea	3	\$ 6,000
Allowance for interpretive signage (one at each entrance to area and each path intersection)	\$ 3,500	ea	1	\$ 3,500
<b>Area Total</b>				<b>\$ 1,776,500</b>

<b>Area 2: Harris Park Sporting Precinct</b>				
Shared use path including lighting (3.5 m wide by 375 m long)	\$ 1,000	m	400	\$ 400,000
New clubhouse with public toilets	\$ 600,000	ea	1	\$ 600,000
Nature play area	\$ 40,000	ea	1	\$ 40,000
Stormwater bioretention area	\$ 250	m2	625	\$ 156,250
Exercise station (4-6 pieces of equipment in a group with soft fall)	\$ 40,000	ea	2	\$ 80,000
Riparian restoration and revegetation works	\$ 500	m	3280	\$ 1,640,000
Viewing deck with seating (x3)	\$ 50,000	ea	3	\$ 150,000
Existing path refurbishment	\$ 30	m2	280	\$ 8,400
Pedestrian bridge (x2)	\$ 50,000	ea	2	\$ 100,000
Grass terrace seating (approximately 2000 m2)	\$ 265,000	ea	1	\$ 265,000
Allowance for shade trees	\$ 150	ea	40	\$ 6,000
Gaming console	\$ 15,000	ea	2	\$ 30,000
Allowance for interpretive signage	\$ 3,500	ea	2	\$ 7,000
Allowance for wayfinding signage	\$ 2,000	ea	4	\$ 8,000
<b>Area Total</b>				<b>\$ 3,490,650</b>

<b>Areas 3 and 4: Curtis and Civic Parks</b>				
Village Green area earthworks including filling of the duck pond	\$ 50	m2	5500	\$ 275,000
Shared use path including lighting (3.5 m wide by 375 m long)	\$ 1,000	m	195	\$ 195,000
Pedestrian crossing with speed bumps	\$ 50,000	ea	1	\$ 50,000
Entrance path and forecourt	\$ 100,000	ea	1	\$ 100,000
Toilet block	\$ 180,000	ea	1	\$ 180,000
Kiosk	\$ 180,000	ea	1	\$ 180,000
Creek bed and banks reshaping and revegetation works, including soil disposal	\$ 14,100	m	360	\$ 5,076,000
Bioretention treatment areas	\$ 250	m2	900	\$ 225,000
Meditative precinct including upgrades to existing memorial, new permanent laybrinth and Aboriginal ceremony	\$ 250,000	ea	1	\$ 250,000
Village Green bandstand pavilion	\$ 250,000	ea	1	\$ 250,000
Playground	\$ 1,000,000	ea	1	\$ 1,000,000
New pedestrian footpath including lighting to complete perimeter of park (1.5 m by 780 m)	\$ 500	m	780	\$ 390,000
At-grade rocky crossing	\$ 10,000	ea	1	\$ 10,000
Allowance for gorge-walker sculpture relocation and new sculpture	\$ 50,000	ea	1	\$ 50,000
Exercise station (4-6 pieces of equipment in a group with soft fall)	\$ 40,000	ea	1	\$ 40,000
Gaming console	\$ 15,000	ea	3	\$ 45,000
Allowance for interpretive signage	\$ 3,500	ea	3	\$ 10,500
Allowance for wayfinding	\$ 2,000	ea	5	\$ 10,000
Allowance for shade trees	\$ 150	ea	40	\$ 6,000
<b>Area Total</b>				<b>\$ 8,342,500</b>

Curtis and Civic Park Creek works (bed and bank reshaping and revegetation, including soil disposal)				
Excavation cross sectional area	30.00	m2		
Length of creek	360.00	m		
Volume of excavation	10,800.00	m3		
Density of excavated material	1.60	tonnes/m3		
Weight of excavated material	17,280.00	tonnes		
	Unit Cost	Unit	Quantity	Base Cost Estimate
Total cost for disposal	\$ 200	tonne	17,280.00	3456000
Total cost for excavation	\$ 50	per m3	10,800.00	540000
Total for TEV (topsoil, erosion, vegetation)	\$ 100	per m3	10,800.00	1080000
<b>TOTAL</b>				<b>\$ 5,076,000</b>
Cost per metre length of creek	\$ 14,100	m	360	

Area 5: Rologas/Wicklow Sports Fields				
Allowance for shade trees	\$	150	ea	40 \$ 6,000
New pathway from existing to Wicklow Hotel	\$	500	m2	54 \$ 27,000
Dedicated Cycleway (450 m)	\$	800	m2	450 \$ 360,000
Sports spectator seating (6m-long 4-bench bleachers installed on concrete pad)	\$	7,000	ea	3 \$ 21,000
Exercise station	\$	40,000		1 \$ 40,000
Stormwater bioretention areas (x3)	\$	250	m2	1700 \$ 425,000
Allowance for E-bike/Sharebike hire facility	\$	25,000	ea	1 \$ 25,000
<b>Area Total</b>				<b>\$ 904,000</b>
<b>Grand Total</b>				<b>\$ 14,513,650</b>





# Planting Strategy

The planting strategy recognises that both native and non-native plants have a role in the character and beauty of Armidale. In general, the premise of the strategy is to remove deciduous trees and non-native vegetation from the riparian corridor and use deciduous trees to line the road corridors that connect Curtis and Civic Parks with the CBD area. Use of deciduous trees in this manner complements the European architecture and heritage of the area, expanding the attraction of the autumn colours. Use of native trees and plants within the creeklands honours the Aboriginal heritage and connection to country and improves water quality and habitat.

## Indigenous plants for interpretive sites

Plantings representing plant communities that are endemic to lower slopes and riparian zones on the Northern Tablelands. These plantings are suitable for interpretive sites and provide examples of various assemblages from the eastern, central and western portions of the tablelands. Species selection would represent naturally occurring assemblages that are becoming less common. Interpretative signage may highlight conservation issues and indigenous cultural significance.

Locations: Active Family Precinct, Harris Park Sporting Precinct and Rologas/Wicklow Sports Fields

## New England Peppermint Grassy Woodland Critically Endangered Ecological Community

### Trees

- *Eucalyptus nova-anglica*,
- *E. dalrympleana* subsp. *heptantha*

### Shrub layer

- *Pimelia curviflora*,
- *Leucopogon fraseri*
- *Pultenaea microphylla*

### Groundcover

- *Poa sieberiana*
- *Themeda australis*
- *Carex inversa*
- *Lespedeza juncea*

## Ribbon gum/ Mountain white gum/ Snow gum Grassy Woodland Endangered Ecological Community

### Trees

- *Eucalyptus viminalis*
- *E. pauciflora*
- *E. stellulata*
- *Acacia dealbata*

### Shrub layer

- *Pimelia curviflora*
- *Leucopogon fraseri*
- *Pultenaea microphylla*

### Groundcover

- *Lomandra longifolia*
- *Poa sieberiana*
- *Themeda australis*
- *Poa sieberiana* var. *labillardierei*
- *Bulbine bulbosa*
- *Ranunculus lappaceus*
- *Viola betonicifolia*
- *Ammobium alatum*



Name	SPRING			SUMMER			AUTUMN			WINTER			Fauna/ feature
	early	mid	late	early	mid	late	early	mid	late	early	mid	late	
<b>Tree</b>													
<b>Eucalyptus dalrympleana</b> Mountain Gum, White Gum													
Height over 30m Spread 3.5 - 6m	Rough Flaky Bark												
<b>Shrub</b>													
<b>Lespedeza juncea</b> Chinese Lezpedeza													
Height 0.90 - 1.50m Spread	Small/Medium												
<b>Leucopogon fraseri</b> Patotara													
Height 0.0 - 0.30m Spread 0.3 - 0.6m	Medium												
<b>Pimelea cuviliflora</b> Slender curved rice flower													
Height 0.90 - 1.50m Spread 0.3 - 0.6m	Small/Medium												
<b>Pultenaea microphylla</b> Spreading Bush-pea													
Height 0.30 - 0.45m Spread 0.6 - 0.9m	Small/Medium												
<b>Ground Cover</b>													
<b>Carex inversa</b> Knob Sedge													
Height 0.3 - 0.45m Spread 0.3 - 0.6m	Native Repeater												
<b>Tree</b>													
<b>Eucalyptus stellulata</b> Black Sallee													
Height 5 - 10m Spread 3.5 - 6m	Rough Flaky Bark												
<b>Eucalyptus viminalis</b> Ribbon Gum, Manna Gum													
Height over 30m Spread 3.5 - 6m	Slick Fall Bark												
<b>Shrub</b>													
<b>Acacia dealbata</b> Silver Wattle													
Height 5 - 10m Spread 3.5 - 6m	Tall												
<b>Herb</b>													
<b>Viola betonicifolia</b> Mountain Violet													
Height 0.0 - 0.30m Spread 0.0 - 0.3m	Erad												
<b>Ground Cover</b>													
<b>Ranunculus lappaceus</b> Native Buttercup													
Height 0.30 - 0.45m Spread 0.0 - 0.3m	Erad												

## Eastern tablelands riparian stream communities

### Trees

- *Casuarina cunninghamiana*
- *Banksia integrifolia*
- *Acacia melanoxylon*

### Shrub layer

- *Callistemon sieberiana*
- *Leptospermum polygalifolium*
- *Acacia floribunda*
- *Bertya rosmarinifolia*
- *Bursaria spinosa*
- *Dodonea viscosa*

### Groundcover

- *Lomandra longifolia*
- *Lythrum salicari*
- *Phragmites australis*
- *Schoenoplectus validus*
- *Elocharis sphacelata*
- *Juncus usitatus*
- *Ranunculus lappaceus*
- *Hydrocotyl tripartita*
- *Stellaria angustifolia*




































Name	SPRING			SUMMER			AUTUMN			WINTER			Fauna/ feature	
	early	mid	late	early	mid	late	early	mid	late	early	mid	late		
<b>Tree</b>														
Casuarina cunninghamiana River She-oak	 Height 15 - 20m Spread 6 - 10m													
Acacia melanoxylon Blackwood	 Height 25 - 30m Spread 3.5 - 6m													
Banksia integrifolia Coastal Banksia	 Height 5 - 10m Spread 3.5 - 6m													
<b>Shrub</b>														
Acacia floribunda White Sallow Wattle, Sally, Marrai-Uo, Gossamer	 Height 5 - 10m Spread 3.5 - 6m													
Bursaria spinosa Blackthorn, Boxthorn, Sweet Bursaria	 Height 3 - 5m Spread 0.3 - 0.6m													
Callistemon sieberi tonghi bottlebrush, river bottlebrush, Alpine bottlebrush	 Height 1.50 - 3m Spread 1.2 - 2.0m													
Dodonaea viscosa Native Hop Bush, Green Hop Bush	 Height 3 - 5m Spread 2.0 - 3.5m													
<b>Herb</b>														
Lythrum salicaria Purple Loosestripe	 Height 0.90 - 1.50m Spread 0.9 - 1.2m													
<b>Ground Cover</b>														
Hydrocotyle tripartita Pennywort	 Height 0.0 - 0.3m Spread 0.6 - 0.9m													
<b>Aquatic</b>														
Eleocharis sphacelata Tall Spike-rush	 Height 1.5 - 3m Spread 0.3 - 0.6m													
Phragmites australis Common Reed, Native Reed, Thatch Reed	 Height 1.50 - 3m Spread 0.0 - 0.3m													
Schoenoplectus validus River Club-rush	 Height 1.5 - 3m Spread 0.3 - 0.6m													

## General park planting

Local specimen trees to improve wildlife habitat in open areas and that may complement interpretive riparian plantings. These trees may serve as stepping stones and provide insect and nectar resources for woodland birds throughout the creeklands. 'Safer by Design Principles' must be taken into consideration to ensure shrub plantings do not provide areas of concealment and that sight lines are maintained to safety of landscaped areas. Where shrubs are utilised they should be placed strategically to block hardscapes or used sparingly. Set height hedging of shrubs may be considered.

Locations: All precincts

- *Casaurina cunninghamia*
- *Eucalyptus pauciflora*
- *Eucalyptus blakelyi*, Blakely's red gum
- *Eucalyptus melliodora*, yellow box
- *E. michaeliana*
- *E. camphora*
- *E. magnificata*
- *Banksia integrifolia*
- *Exocarpus cupressiformis*
- *Acacia melanoxylon*

Name	SPRING			SUMMER			AUTUMN			WINTER			Fauna/ feature
	early	mid	late	early	mid	late	early	mid	late	early	mid	late	
<b>Tree</b>													
<b>Eucalyptus blakelyi</b> Blakely's Red Gum  Height 15 - 20m Spread 6 - 10m  Scaly Bark													
<b>Eucalyptus melliodora</b> Yellow Box, Honey Box  Height 20 - 25m Spread 10 - 15m  Broad Domed													
<b>Eucalyptus pauciflora</b> Snow Gum  Height 10 - 15m Spread 3.5 - 6m  Rough Bark													
<b>Exocarpos cupressiformis</b> Cherry Ballart, Native Cherry  Height 3 - 5m Spread 3.5 - 6m  Conical													
<b>Acacia melanoxylon</b> Blackwood  Height 25 - 30m Spread 3.5 - 6m  Narrow Domed													
<b>Banksia integrifolia</b> Coastal Banksia  Height 5 - 10m Spread 3.5 - 6m  Branches, Vase Shaped													

## Riparian vegetation

The following is a selection of riparian vegetation suited to wet areas such as the proposed vegetated stormwater treatment systems and three offline ponds. They also suit the naturalised sections of Dumaresq Creek in Curtis and Civic Parks where the channel has been widened and the benched creekbed interaction areas in the Harris Park Sporting Precinct.

Locations: Civic and Curtis Parks – Heart of the Creeklands precinct, off stream ponds and storm water retention basins

### Trees

- *Casuarina cunninghamia*, river she-oak
- *Eucalyptus camphora*

### Ground layer

Mass plantings of selected species or groupings of selected species such as:

- *Dianella longifolia*, flax lily
- *Baumea articulata*, jointed twigrush
- *Carex appressa*, tussock sedge
- *Cyperus difformis*, dirty dora
- *Eleocharis acuta*, common spikerush
- *Juncus usitasis*, tussock rush
- *Lomandra longifolia*, long-leaf matrush
- *Imperata cylindrica*, blady grass
- *Poa labillardierei*
- *Pennisetum alopecuroides*, swamp foxtail
- *Bulbine bulbosa*
- *Ranunculus lappaceus*
- *Schoenoplectus validus*
- *Stellaria angustifolia*

### Physical barrier plantings to prevent access:

- *Carex appressa* - rough to touch
- *Lomandra longifolia* - dense
- *Gahnia sieberana*, sawsedge

The University of New England has compiled two lists of species suitable to plant in the wetlands and streams of the Northern Tablelands split into “What should I plant in my stream?” (Mika, Bell and Ryder 2008a) for moving water and “What should I plant in my wetland?” (Mika, Bell and Ryder 2008b) for still bodies of water.

Name	SPRING			SUMMER			AUTUMN			WINTER			Fauna/ feature
	early	mid	late	early	mid	late	early	mid	late	early	mid	late	
<b>Tree</b>													
<i>Casuarina cunninghamiana</i> River She-oak	 Height 15 - 20m Spread 6 - 10m												
	 Rough Flaxy Bark												
<b>Shrub</b>													
<i>Leptospermum polygalifolium</i> Tantoon, Lemon-Scented Tea Tree	 Height 1.50 - 3m Spread 3.5 - 6m												
	 Tall												
<b>Other</b>													
<i>Poa labillardieri</i> Tussock Grass, River Tussock	 Height 0.75 - 0.90m Spread 0.6 - 0.9m												
	 Tussock												
<b>Herb</b>													
<i>Cyperus difformis</i> Smallflower Umbrella Sedge	 Height Spread												
	 Narrow Riparian												
<b>Ground Cover</b>													
<i>Carex appressa</i> Tall Sedge	 Height 0.60 - 0.75m Spread 0.3 - 0.6m												
	 Tussock												
<i>Dianella longifolia</i> Blueberry Lily, Blue Flax Lily	 Height 0.75 - 0.9m Spread 0.0 - 0.3m												
	 Erect												
<i>Eleocharis acuta</i> Common Spike Rush	 Height 0.45 - 0.60m Spread 0.3 - 0.6m												
	 Freshwater Rush												
<i>Gahnia sieberiana</i> Red-fruit Saw Sedge	 Height 0.9 - 1.5m Spread 1.2 - 2.0m												
	 Tall Native												
<i>Imperata cylindrica</i> Blady Grass	 Height 0.9 - 1.5m Spread 0.3 - 0.6m												
	 Tussock												
<i>Lomandra longifolia</i> Spiny-headed Mat-Rush	 Height 0.60 - 0.75m Spread 0.9 - 1.2m												
	 Tufted												
<i>Pennisetum alopecuroides</i> Fountain Grass	 Height 0.90 - 1.50m Spread 0.6 - 0.9m												
	 Tussock												
<b>Aquatic</b>													
<i>Baumea articulata</i> Jointed Twig-rush	 Height 0.9 - 1.5m Spread 0.9 - 1.2m												
	 Freshwater Rush												
<i>Juncus usitatus</i> Common Rush	 Height 0.90 - 1.50m Spread 0.6 - 0.9m												
	 Freshwater Rush												

## Grassland areas

Expanses of native meadow grasses can create a soft effect in the Creeklands, providing a soft barrier and deterring access while maintaining sightlines and requiring less maintenance. They also provide shelter and a food source for certain local bird species.

## Grasses

- *Dicanthium setosum*
- *Themeda australis*, kangaroo grass
- *Sorghum leiocladum*, native sorghum
- *Poa sieberana*, snow grass
- *Cymbopogon refractus*
- *Dichelachne crinita*, long hair plume grass
- *Bothriochloa macra*, redgrass
- *Sporobolus elongatus*, slender rat's tail grass
- *Eragrostis leptostachnya*, paddock lovegrass
- *Danthonia racemosa*, wallaby grass
- *Chloris truncata*, windmill grass
- *Stipa scabra*, spear grass
- *Bulbine bulbosa*, bulbine lily

















































































Image: Native grass meadow at Prince Alfred Park, Sydney NSW



Image: Native grass and wildflower meadow at Kensington Gardens, London



Name	SPRING			SUMMER			AUTUMN			WINTER			Fauna/ feature
	early	mid	late	early	mid	late	early	mid	late	early	mid	late	
<b>Shrub</b>													
Dicanthium sericeum Queensland Bluegrass													
Height													
Spread	0.9 - 1.2m												
		Erect											
<b>Other</b>													
Bothriochloa macra Red Grass, Red-leg Grass													
Height	0.3 - 0.45m												
Spread	0.3 - 0.6m												
		Tall tuft											
Bulbine bulbosa Bulbine Lily, Wild Onion, Golden lily													
Height	0.60 - 0.75m												
Spread	0.3 - 0.6m												
		Erect											
<b>Ground Cover</b>													
Chloris truncata Windmill grass													
Height	0.30 - 0.45m												
Spread	0.3 - 0.6m												
		Tussock											
Cymbopogon refractus Barbed Wire Grass													
Height	0.60 - 0.75m												
Spread	0.3 - 0.6m												
		Tufted											
Danthonia duttoniana Brown-back Wallaby Grass													
Height	0.30 - 0.45m												
Spread	0.3 - 0.6m												
		Tufted											
Dichelachne crinita Longhair Plume Grass													
Height	0.75 - 0.90m												
Spread	0.3 - 0.6m												
		Tufted											
Poa sieberiana Grey tussock Grass													
Height	0.75 - 0.90m												
Spread	0.6 - 0.9m												
		Tussock											
Sorghum leiocladum Wild Sorghum													
Height	0.90 - 1.50m												
Spread													
		Tufted											
Themeda australis/triandra Kangaroo Grass													
Height	0.45 - 0.60m												
Spread	0.3 - 0.6m												
		Tufted											
Eragrostis leptostachya Paddock Lovegrass													
Height	0.90 - 1.50m												
Spread	0.0 - 0.3m												
		Tufted											

## Formal avenue and open parkland plantings

The retention of introduced trees reflects Armidale's European heritage and complements the streetscape plantings developed over the past 60 years. Deciduous trees provide an aesthetic contrast that reflects seasonal changes that are celebrated in local events such as the popular Autumn festival. Seasonal changes in appearance can compliment architectural forms and contrast with local indigenous plantings within the park landscape. Introduced trees can appeal to a sense of the exotic and the desire to collect and establish plants that provide a horticultural interest.

Locations: Formal avenue, Civic Park, all precincts generally

Council's *Urban Streetscape Policy (POL 120)* provides a Preferred Species List and planting details.


























































Image: Central fig avenue, Hyde Park, Sydney



Image: Blossom-covered avenue planting in London parks such as Battersea Park



Image: Central Park Mall with American elm avenue planting, New York City

Name	SPRING			SUMMER			AUTUMN			WINTER			Fauna/ feature
	early	mid	late	early	mid	late	early	mid	late	early	mid	late	
<b>Tree</b>													
<b>Acer buergerianum</b> Trident Maple	 Height 5 - 10m Spread 6 - 10m		Small										
<b>Acer saccharum</b> Sugar Maple	 Height over 30m Spread 10 - 15m		Broad Domed										
<b>Alcornoque littoralis</b> Black She Oak	 Height 5 - 10m Spread 2.0 - 3.5m		Fatigue										
<b>Fraxinus excelsior</b> European Ash	 Height 10 - 15m Spread 6 - 10m		Broad Domed										
<b>Ginkgo biloba</b> (male trees only) Maidenhair Tree	 Height 15 - 20m Spread 10 - 15m		Pendulous										
<b>Koelreuteria paniculata</b> Golden Rain Tree	 Height 5 - 10m Spread 0.3 - 0.6m		Small										
<b>Lagerstroemia indica</b> Crape Myrtle	 Height 5 - 10m Spread 3.5 - 6m		Small										
<b>Melia azederach var. australasica</b> White Cedar	 Height 5 - 10m Spread 6 - 10m		Broad Domed										
<b>Olea europaea</b> Olive	 Height 10 - 15m Spread 6 - 10m		Small										
<b>Pistacia chinensis</b> (male trees only) Chinese Pistachio	 Height 5 - 10m Spread 6 - 10m		Broad Domed										
<b>Prunus cerasifera</b> Cherry Plum	 Height 5 - 10m Spread 3.5 - 6m		Small										
<b>Prunus serrulata 'Mt Fuji'</b> Japanese Flowering Cherry	 Height 5 - 10m Spread 6 - 10m		Small										
<b>Prunus x blireana</b> Blireana Plum	 Height 5 - 10m Spread 6 - 10m		Small										
<b>Pyrus calleryana 'Chanticleer'</b> Ornamental Pear	 Height 5 - 10m Spread 3.5 - 6m		Columnar										



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# Reference material Review

This non-exhaustive list identifies the work of many locals and others and in this sense represents local interest and community contributions to the creeklands over many years. We acknowledge these efforts by the community and that the masterplan was driven by the community.

	<i>Document name</i>	<i>Author/Date</i>	<i>Key points</i>
1	AINT 2017 06497 Armidale Regional Council Mall Vibrancy Plan		Four focus "areas" - more people, more support, infrastructure, more business. Includes creating "shared access" which means opening the mall up to cars/emergency vehicles and reviewing traffic access to Beardy Street/East Mall.
2	Appropriate Instream Intervention to improve the Environmental and Recreational Value of Dumaresq Ck. Will it work and who will pay? Compiled by David Anderton and Lewis Kahn (April 1999)	A forum in 1999	Looks at five scenarios: 1. constructed wetlands - downstream of Armidale CBD, 2. Constructed ponds - through Armidale CBD, 3. Constructed weirs - location uncertain, 4. Paths and bridges along Dumaresq Creek, 5. Release of water from Dumaresq Dam to manage flows in Dumaresq Creek. Forum convened by Macleay Catchment Management Committee and Dumaresq Creek Catchment Group.  Has some information about mean and median flows in Dumaresq Creek. Notes water quality concerns during low flows. More flow data in Doug Westhorpe proposal (2017)
3	Armidale Council Creeklands Fitness Project A-Space	May 2017	\$93K quote for fitness equipment; does not specify where it would be located, just "Taylor Street, Creeklands" - one block east of our project area
4	Armidale flood study Review and update Stage 3 vol 1 Main report		We have the GIS outputs of this study. The study was a review and update of 2004 work for the several tributaries.
5	Armidale flood study Review and update Stage 3 vol 2 Model Results Plots		
6	Armidale Parklands Environmental Management Plan for Armidale Dumaresq Council - December 2004		<b>Provides regulatory/technical framework info.</b> Provides guidance for management of surface soils that contain elevated PAHs (from the old gasworks). Stipulates full grass coverage to limit exposure of recreational users to surface soils, and bank maintenance/stabilisation methods in accordance with DC Management Plan.
7	Assessment and Management Guidelines for~ Resources in Dumaresq Creek Catchment - Draft for Public Comment	Dumaresq Creek Catchment Group, August 1999	Focuses on water quality and flow, vegetation management, land management, and education concerning natural resource management. Includes water quality management strategy for five different zones on the creek, including urban zone. References systematic water quality monitoring by Council. Bacteriological sampling suggests that secondary contact is OK in urban area. Notes that offline wetlands were the preferred treatment at the forum (described in another document).
8	AURG Summary 2014 - 2015		Statistics for number of volunteers and numbers of plants planted
9	Community labyrinth proposal for Civic Park	December 2013	Temporary labyrinth set up earlier in 2013; this is a proposal for a permanent installation behind the Judith Wright Memorial Garden near the corner of Dumaresq and Faulkner Streets. Proposes ground-level construction funded group members, with a request to Council for approval including a clause that it will be taken down if it is deemed a safety hazard.
10	Creeklands Fitness Stations Imagination Play	September 2017	Quote for fitness equipment with proposed locations. Includes two quotes for each of three sites - (difference is unclear one may be for the equipment installed over grass, the second one is for the rubber pads under the equipment) Only one site is within masterplan project area
11	David Carr, Stringybark Environmental Concept for Boardwalk and landscaping	David Carr, Stringybark	Hand drawn sketch for boardwalk, channel reshaping, and rerouting of cycleway in Curtis Park.
12	Dumaresq Creek Master Plan scope Final		Scope for the project - studied in detail in proposal phase



	<i>Document name</i>	<i>Author/Date</i>	<i>Key points</i>
13	DUMARESQ CREEK URBAN STORMWATER MANAGEMENT PLAN ... MAY 2000 ... PART A		
14	DUMARESQ CREEK URBAN STORMWATER MANAGEMENT PLAN ... MAY 2000 ... PART B		
15	Enhancement of Dumaresq Creek, Doug Westhorpe 2017	2017	Includes streamflow hydrographs. Proposes modifications and remodelling of creek banks, modification of existing bike and pedestrian path, and modification of road crossings at Faulkner and Dangar Streets (culvert improvements). Bike path modification includes new "high water" path to provide an alternate route and encourage more users (leaving the existing path in place).
16	Flood study hazard assessment - final	2014	Extreme hazard on Dumaresq Street from Markham Street to the crossing east of the aquatic centre. Extreme hazard on Beardy Street, adjacent to TAFE, corresponds to breakout along Beardy Street. Much of park is Extreme hazard.
17	Guidelines for Riparian Corridors on waterfront Land NSW DPI		Provides regulatory/technical framework info. Describes vegetated riparian zone widths and what can be done in the riparian zone. Need to determine what order of stream Dumaresq is (this may be in the rehabilitation works, or the reveg guidelines, and most probably in the flood studies).
18	HiCUB ME Armidale Dumaresq Creek Draft	EcoLogical Australia, December 2010	Appendix C includes works conducted by AURG from 2004 to 2010 at 7 main sites. Describes a four-council joint effort managed by Southern New England Landcare, for works to be carried out by AURG according to Armidale Regional Council's reveg guidelines.
19	History-Armidale City Council Creeklands Compiled by Graham Wilson	Compiled in 1998 by Graham Wilson to facilitate understanding of the history.	Very detailed history from 1903-1988, including amounts spent on various projects, visiting dignitaries, and a wide variety of community and professional proposals for management of the Creek and the Creeklands.
20	Joy Bowles Labyrinth request involvement in Master Planning	August 2017	Email request for involvement
21	Kate Boyd, Brief History Dumaresq Creeklands Activities	Written sometime post 2002	Brief summary of the creeklands, emphasising community desire for natural creek and open space and celebrates the volunteer work planning, clearing, and planting natives
22	Labyrinth Construction Specification		General spec for construction. Does not include plans and does not nominate size. Does reference propopsed stormwater plans and existing park irrigation system.
23	Planting assessment Guide_AS (2)		Scoring matrix by EcoLogical Australia for riparian rehabilitation works (ask Richard why he thought this one was important)

	<i>Document name</i>	<i>Author/Date</i>	<i>Key points</i>
24	POL204 Revegetation Guidelines for the urban reaches of Dumaresq Creek - March 2009	March 2009	<p>Provides revegetation plan for 5 different creekside classification areas (revegetation areas, potential reveg areas, passive recreation areas, active recreation areas, and parkland reveg areas).</p> <p>Provides guidance for community groups in relation to planning, execution, recording, and monitoring revegetation works on the creek.</p> <p>Includes history and functional analysis of the creek, as well as funding source suggestions.</p> <p>Applies to all creekslands managed by Council at the time of writing, from the RTA bypass bridge (Widder Bridge, approximately 500m west of Niagara Street) to the wooden bridge on Cooks Road.</p> <p>Land Ownership in urban area is owned by multiple parties including Crown Land, managed by NSW department of Lands delegated to Council via the Public Recreation Dumaresq Creek Lands Reserve Trust; area within the creek banks including the water is owned by the Crown.</p> <p>Some creekside land is privately owned.</p> <p>There are four reaches within our project area: I, J, K, and L. A section of Reach J is owned by and managed by Armidale Ex-Services Club.</p> <p>There are two GPTS in Reach I, one at Marsh Street on the downstream side and one at Dangar Street in the park.</p> <p>Three tributaries to Dumaresq Creek in the urban area - Black Gully, Martins Gully, and Yagoonda Gully (aka Dollis Brook)</p> <p>Bridges and other creek crossings are in Table 3. There are 7 total crossings (4 low level crossings, 3 high level crossings).</p> <p>Dumaresq Creek colonised by extensive patches of willow, privet, and other woody and herbaceous weeds. Shade the creek, alter environmental flows through silting, and created traps for litter and rubbish.</p> <p>Flooding section (page 45) - notes historic floods and the slight positive impact of riparian revegetation on the flooding regime.</p> <p>Water quality concerns include lack of available oxygen due to leaf litter from introduced tree species, faecal coliform (dog poop), erosion turbidity, industrial and petroleum products, nutrients in runoff. There are 12 years of data (as of 2009) but no formal study of the data by Council (some by UNE staff and students).</p> <p>Includes a good summary of local legislation, policy and plans.</p> <p>The Urban Stormwater Management Plan includes 8 ecological values, 8 social values, and 4 economic values for the Creek, developed from stakeholder workshops.</p>
25	PRDPR01_Armidale Canon IRC4580 PCL6_4511_001	Letter from Dr. Darren Ryder	<p>Describes the Civic Park wetland concept for water quality and public amenity. The system would be an offline treatment system treating water from DC. Based on his design for the Golf Course system described in "Using constructed wetlands to improve urban water quality". Benefits of the proposed project include:</p> <p>maintain structural role of the creek in mitigating stormwater, providing an education opportunity, providing focal point for the local community and visitors; habitat and animal biodiversity.</p>
26	Primefact_Instream_structures NSW DPI	NSW DPI 2005	<p>Description of Instream structures and other mechanisms that alter natural flows (key threatening process). Describes what they are and why they are installed (locks, weirs, dams, culverts, levees/floodgates), impacts of altering the flow regimes, and list of threatened species affected by this key threatening process. Need to know if there is a threat abatement plan for DC.</p>

	Document name	Author/Date	Key points
27	Redevelopment of Curtis and Civic parks Stringybark Ecological Dave Carr	August 2016 Email from Dave Carr, President Armidale Tree Group, based on discussion with Ian Tiley (Council Administrator).	Proposal is for works to redevelop Curtis and Civic Parks on the creeklands. Works included <ol style="list-style-type: none"> <li>1. removal of basalt channelisation of the creek and restoring natural shape</li> <li>2. landscaping the creek banks</li> <li>3. construction of a larger wetland, possibly with stormwater filtration role</li> <li>4. Retention of open grassy areas for farmers markets, festivals, circus, etc</li> <li>5. reduction in total grassed area, replacement with mixed beds of natives and exotics</li> <li>6. better connection of the park with the CBD through Dumaresq Street crossings, trees/gardens in Kmart car park</li> <li>7. Cycleway connection from existing path to CBD</li> <li>8. Public art/hard infrastructure/public facilities.</li> </ol> <p>Similar project was developed by HiCUB Community Committee but was not advanced due to perceived difficulties in negotiating council regulations.</p> <p><i>Get clear on when this was written and verify that HiCUB refers to High Country Urban Community (see 030339 Rehabilitation concept)</i></p>
28	Rehabilitation of Dumaresq Creek at the University of New England	2009	Describes rehabilitation of DC at UNE with the intent to restore pre-European conditions (as conceived of as a best educated guess). <i>Did NOT read in detail -- ask Advisory Group for key messages</i>
29	Revegetation Guidelines for the Urban Reaches of Dumaresq Creek Appendices		
30	Riparian birds in Dumaresq Creeklands: Providing Habitat for declining Woodlands Birds - Revegetation of Armidale Creeklands	Helen Webb with assistance from Dr Stephen Debus (Zoology, UNE)	Key threats, key endangered species, specific to the Armidale creeklands. Explains habitat. Provides strategies for regeneration of habitat including planting species and manner, such as providing woody debris, providing a floristically and structurally diverse range of habitat and planting types
31	Rologas Fields Soil Contamination Bioaccessibility Testing	January 2017 (email)	Finding that the soil should be used on site to avoid having to classify it; waste classification guidelines to not take bio-accessibility into account. <i>Ask Richard if the Human Health Risk Assessment was undertaken. Also need to confirm the site (report was not attached to email)</i>
32	Ryder AURG final July 2009		Assessment of two rehabilitation sites (oldest and newest) by the AURG. Includes restoration priorities for channel shape (not a trap channel), types of vegetation (deciduous and native species), changes to channel shape to facilitate diversification of vegetation and to make it non-conductive to invasive reeds/rushes. Overall praise for AURG efforts, and includes the graphics from the HiCUB Civic Park Concept
33	Summary of AURG activities 2009 to 2013		Numerical list of volunteer activities by year 2007-2013. Includes numbers of events.
34	Unleashing the Opportunities for Armidales Creek Lands	Armidale City's Creek Lands Committee 2017, presented to Council.	Armidale City's Creek Land Water Vision - four candidate areas for open water features (two in project area). Group forming a non-profit to ensure their voices are heard.
35	Using constructed wetlands to improve urban water quality	2010 UNE Authors (Sarah Mika, Warren Lawler, and Darren Ryder)	Describes a wetland system installed at a golf course.
36	Visions for Armidales Creeklands	2017 Jim Scott et al	Detailed version of Armidale City's Creek Land Water Vision (above). <i>Candidate areas added to GIS.</i>

	Document name	Author/Date	Key points
37	What should I plant in my wetland	2010 UNE Authors (Sarah Mika, Warren Lawler, and Darren Ryder).	Species list for riparian, shallow edge, floating-leaved, submerged, shallow-water emergents, deep-water emergents, and damp edge typologies.
38	AINT 2017 10119 Delivery Program 2017-2021 and Operational Plan 2017-2018		<p>Growing Tourism and Attracting Visitors:            Delivery program for new council 2017-2018. Executive message is that community must be front of mind. Introduces ideas of service levels, and emphasises listening to and engaging the community.</p> <p>Facts and Figures</p> <ul style="list-style-type: none"> <li>- Population 30,045</li> <li>- Median Age 36</li> <li>- Average Household Size 2.40</li> <li>- Aboriginal and Torres Strait Islander population 1,955 (6.9%)</li> <li>- Australian Citizens 88.5%</li> <li>- Employed Population 92.8%</li> <li>- Percentage of the population that need help in their day-to-day lives due to disability 4.6%</li> <li>- Total Registered Businesses 2,934</li> <li>- Agriculture, Forestry and Fishing Industry has the largest number of total registered businesses comprising 31.2% of all total registered businesses, compared to 7.8% in New South Wales.</li> <li>- Area 8,630 square kms</li> </ul> <p>Planning to launch a powerful marketing program to attract more visitors to the Armidale/ broad New England region.</p> <p>Surrounds include four significant national parks within one hour drive.</p> <p>Region also includes NERAM - largest art gallery and collection of art works in Regional NSW</p> <p>Rugby, mountain biking, golf, broad range of other competitive sporting events.</p> <p>Nothing in the budget for open space/recreation assets, community land. Some \$\$ for stormwater drainage, water supply network, and footpaths. Some \$\$ for "other structures"</p> <p>Environment and Infrastructure theme from Community Strategic Plan includes adoption of environmentally sustainable practices, tourism strategies and active, eco-tourism partnerships, promoting local landscape and natural attractions while considering potential impacts. Also notes climate change impacts on local agricultural sector. Also Maintain and Improve local waterways, lagoons (??) and creek lands in partnership with community groups and other agencies.</p> <p>Mentions tourism strategy and High Country destination marketing</p>
39	Economic Report - ARC Airport Industrial Precinct		<p>"Stage 1 provides 25 hectares of developable land for commercial, industrial, and air-business use, including retail, accommodation, and visitor attractions (vintage motor and aircraft museums).</p> <p>Major industries in Armidale include education and training, health care, professional services, retail, tourism, and agriculture. The area's ag heritage remains a key feature of the region, and in Guyra, sheep, lamb, fine wool, cattle, and vegetable production (with export potential) are mainstays of the region's economy."</p>

	Document name	Author/Date	Key points
40	EDS Adopted Version	Nov 2017	<p>"Three pillars of the Regional economy: Agri-business, Tourism, and Education. ""The region is on the cusp of significant growth and prosperity.""</p> <p>Theme 1: A region of choice for Smart and Sustainable Agribusiness; capitalise on the region's competitive strengths in technology-driven agribusiness in livestock and horticulture by establishing an agri-tech cluster focusing on the benefits that flow from networked businesses, institutions, and agencies sharing information, ideas, infrastructure and services.</p> <p>Theme 2: A globally connected Knowledge Region; establish the region as a location of choice for 'knowledge workers', entrepreneurs, and major innovative businesses seeking a sophisticated, family-friendly city-region lifestyle</p> <p>Theme 3: A skilled workforce and dynamic regional business sector; collaborate with industry, the education and training sector and other tiers of government to enhance the region's skills base and to support the growth of the region's innovative, productive, and prosperous micro-, small to medium, and large businesses.</p> <p>Theme 4: A premium regional visitor destination for tourism and events; Deliver a collaborative and coordinated approach to tourism promotion and development to establish the Armidale Region as a premium regional destination for tourism and events. ""New England High Country"" branding."</p>
41	UniversityFacilities-master-plan-2009-2015-	Revised March 2010	Describes creation of Dumaresq Creek linear park including cycle way link to town and hinterland. Not clear if the current cycleway was built after this MP or if they are suggesting something different - or if there were bits that needed to be filled in.
42	Armidale CBD Streetscape Design Project	July 2003	Urban design proposals for the staged physical upgrade of Armidale Mall, Beardy Street and the CBD public streetscapes.
43	030339 Rehabilitation Concept.. and 030339 Rehabilitation		Wetland and boardwalk concept for pond next to Curtis Park - Biodiversity High Country Urban Community. <i>Ask Richard about this -- are the proponents still active? Is there more to this report that would be relevant to us?</i>

