



LET'S MAKE OUR RIVER
SWIMMABLE AGAIN BY
2025

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NSW Department of Planning, Industry and Environment
Carter Street Masterplan Team

Monday, 28 September 2020

RE: Submission on Carter Street Masterplan

Dear DPIE

The Parramatta River Catchment Group (PRCG) is an alliance of councils, government agencies and community representatives. Together we are working to revitalise the Parramatta River and make it a safe and enjoyable place to recreate and swim. In October 2018, we launched [DUBA, BUDU, BARRA: Ten Steps to a Living River - The Parramatta River Masterplan](#). This Masterplan details the steps required to make the Parramatta River swimmable again by 2025.

The PRCG thank you for the opportunity to provide comment on the *Carter Street Masterplan*. The State Government recognises the importance of healthier waterways through its vision for Sydney, 'Our Sydney 2056' and the Central District Plan, the draft Coastal Management Program scoping study for Sydney Harbour, and the Marine Estate Management Strategy. All of these outline the vision for a central river city with healthy clean waterways. The PRCG strongly advocate for a future environmentally sensitive, greener urban form and water sensitive open space and parklands.

We welcome collaboration and sharing of the detailed work that the Parramatta River Catchment Group have done to date on the implementation of the Parramatta River Masterplan, and in particular the work on planning and policy reform for improvement in the urban environment and the benefits of blue-green infrastructure.

Yours sincerely,



Nell Graham

PRCG Coordinator

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Submission on Carter Street Masterplan

Introduction

The Parramatta River Catchment Group (PRCG) welcomes the opportunity to provide a submission for the Carter Street Masterplan. The Masterplan outlines a development vision for a critical area of the Parramatta River catchment as it is adjacent to the tributary of Haslam Creek, which leads to an area of high environmental value. It also shows a demonstratable test case of the state of play of waterways and stormwater controls at a strategic level within the Parramatta River catchment.

The State Government recognises the importance of healthier waterways through its vision for Sydney, ‘Our Sydney 2056’ and the Central District Plan, the draft Coastal Management Program scoping study for Sydney Harbour, and the Marine Estate Management Strategy. All of these outline the vision for a central river city with healthy clean waterways. It further recognises the importance of an *integrated* blue-green vision for the future of our urban form, through its ‘draft Greener Places Design Guide’, the Premiers Priorities for a Greener Urban form, and the blue-green grid outlined by the Government Architects Office.

As identified in the Parramatta River Masterplans Water Quality Modelling report, stormwater runoff is one of the most significant contributors to the degradation of waterways in general, through primarily an increased hardstand area contributing to the increase of volume of stormwater which then carries increased pollutants to waterways over time.

The PRCG has taken this analysis and queried how to mould the existing planning system to promote Water Sensitive Urban Design (WSUD) as part of an Integrated Water Cycle Management (IWCM) outcome through its 'draft Recommendations Paper – Standardising the Standards. The appendix attached outlines these best practice provisions at the LEP and DCP level, which this masterplan engages with.

This document an attempt to formulate standardised planning controls across the catchment to mitigate the impact of stormwater as best as possible. It shows how to utilise the levers available to government through urban planning to create a Parramatta River that is swimmable, clean and healthy in the face of significant intensification of development within the Rivers catchment.

The below diagrams set out our method of Water Sensitive Urban Design for the urban form, and the significant amounts of benefit that occur for the overall urban form when adopting a strong approach to WSUD:



We reason through our 'recommendations paper' that the best possible practice of stormwater management in urban planning policy through the promotion of a fully integrated blue-green WSUD approach becomes critical to fulfilling the vision of a greener urban form as well as utilising our most precious resource, water, in the most effective manner possible into the future. If managed correctly, stormwater provides the foundation of a lush, vibrant, green urban form supported by the

sustainable usage of water into the long-term future. This reasoning can be said to be supported by State Government in its current policy perspective for a Greener Sydney that has healthy waterways.

With this in mind, it is commended that the draft structure plan is complemented by a detailed and well-reasoned development framework, and that the Department has integrated significant amounts of community feedback into their vision to date. Particularly, the draft development frameworks for trees indicating significant vegetation; the strong network of active transport and the dedication of foreshore land to be public are supported and will contribute to the health of a greener, more water sensitive city. The detailed stormwater controls present in the draft development framework are also welcomed. All of these will contribute to a greener urban form and healthier, activated waterways for the future.

Upon detailed analysis of the documents presented in light of this renewed importance for effective stormwater management and treatment, we have some recommendations that would hopefully assist in contributing to a more concrete committal to the principles of Water Sensitive Urban Design as part of an Integrated Water Cycle Management solution for the precinct.

This is of pivotal importance to this precinct as:

- The 6200 new dwellings and 12000 sqm of retail floorspace will provide additional stress on the quality and quantity of stormwater through significantly increased population adding to gross pollutants, both passively through increased traffic and actively through increased rubbish and littering, and increased hardstand area contributing to the volume of runoff.
- The proximity to Haslams Creek makes the precinct of strategic priority when it comes to stormwater management from an environmental health perspective.

The key themes that arise out of this analysis are:

- **Water Sensitive Urban Design must be a foundational part of a complete design solution that contributes positively to the entire urban form, with benefits of increased urban canopy coverage, open space and water health/sustainability.**
- **Stormwater runoff must be an opportunity as the fundamental foundation of a greener, high amenity precinct, rather than a straightforward element whose impacts must be minimised only.**
- **WSUD must be considered from an integrated perspective, with all elements of active transport, public open space and private development contributing to the solution effectively for the impact of stormwater to be truly minimised.**
- **These elements reflect a call to ensure WSUD is taken seriously by designers, through either strengthening in language for provisions, providing minimums for investment for WSUD infrastructure, or raising the primacy of WSUD.**
- **As one example of this translated into a current policy mandate, the current management of stormwater through public open space, in our view, therefore does not manage the potential stormwater impacts on environmental conservation areas under SEPP (State Significant Precincts) 2005 due to WSUD as part of managing stormwater impact being aspirational or indicative in nature currently, particularly in the public domain.**

Explanation of Intended Effect

Below is an analysis of the explanation of intended effect, from a WSUD perspective.

There is strong support of increased public open space and riparian buffer using an RE1 zoning. The indicative design framework of the public open space is also well considered. Both will contribute significantly to environmental, water quality and amenity outcomes.

Overall considerations

The draft structure plan does not make mention of any precinct scale water recycling, or any areas of dedicated infrastructure for the treatment of gross pollutants entering a waterway of high environmental value. A stronger dedication to such elements would complement Sydney Olympic Park Authority's development controls and stormwater management ethos, and would also contribute to positive water outcomes for the precinct and would signal a dedication for investment through the VPA for positive water quality outcomes for the precinct as a whole.

It is recommended that there be some consideration of water recycling and stormwater treatment be reflected in the final structure plan, to ensure that the impact from stormwater is minimised and water sustainability is maximised in the public space as well as the private domain. This could be achieved through the current provision of public open space, beyond the detention shown in the development framework.

Principal controls

There are no local clauses that ensure that Water Sensitive Urban Design will be included in design considerations beyond the development framework, and even then, controls are generally aspirational when looked at from a total WSUD perspective (only adherence being to a WSUD report for private development of a certain size). What this tends to deliver is a minimum adherence to a water quality standard table for runoff (reflected in the development framework) with a minimal cost outcome. A more total response would be to raise the profile of WSUD through an additional local provision for the whole precinct, given its overall importance in promoting a positive 'blue-green' outcome for the urban form.

It is recommended a provision be included that ensures a Water Sensitive Urban Design outcome through a simple objective for the precinct under a head of consideration for environmental health. This would ensure private development outcomes and public investment in infrastructure for WSUD purposes are looked at initially as a point of priority.

Recreational Public Open Space

RE1 zoning objectives, on the face of it, are to proceed as intended under the present LEP, with no additional consideration for Water Sensitive Urban Design. This could be resolved through an RE1 zoning with a stronger consideration for Water Sensitive Urban Design, as reflected in our draft recommendations objectives (see appendix). For example, there is no mention of specified objectives on how to deal with the RE1 zone adjoining the waterway, and no engagement in the development framework through say promotion of a naturalised foreshore, GPT's or anything of that manner.

Without a primary control or additional local provision promoting WSUD it will fall off in importance and green infrastructure will not be resilient due to a lack of capitalising on the opportunity for stormwater being used as a resource to nourish green space. Whilst there is some WSUD touted for the public open space through the development framework through on site detention, a clear objective would ensure all public space available has WSUD as an overall priority, not just minimisation of impact through overland flows. This would also provide primacy to the control C 11 under s8.2 of the development framework, which calls upon public space considering the impact on

conservation areas in Olympic Park. Stormwater impact is in likelihood going to be the key contributor, due to its nature as an area of High Environmental value within a waterway ecology.

It is recommended that specified WSUD objectives be placed in RE1 zones for the precinct, and that a further objective empower an adequate on-site treatment of stormwater entering the public domain from these RE1 land uses.

Private domain principal controls

There is currently a missed opportunity when looking at landscaped area within the private development domain. This could be bought into primary controls reflective of place making and greener places, with consideration of the Apartment Design Guide for mixed use/ high density residential. Examples of this working in practice can be seen in Strathfield's LEP (2015).

It is recommended that there be some consideration to bring landscaped area into primary development controls to provide additional strengthening of the minimums for deep soil proposed under the Apartment Design Guide and to effectively cover all land use types under the draft master plan. This would promote green 'through paths', green roofs and open public courtyards for commercial leaning development and provide additional liveability for private development. The minimums would not be too onerous given the density proposed but would go some way in promoting positive WSUD and green placemaking outcomes for the precinct.

Development framework

Public street designs

Under Section 5 street network there is some indication of a WSUD response through the extensive planting proposed, but little in the way of permeability for paving, secondary responses such as treatment of stormwater runoff on these streetscapes.

It is recommended a specified design criteria be added to this section that promotes the use of semi permeable pavers or requires a minimum level of permeability for the streetscape, biofiltration etc for streetscapes and adequate stormwater treatment for the public streetscape for stormwater collected in this section.

Public Street canopy coverage

The indicative street designs seem well considered but there is no stringent criteria ensuring they are fulfilled, either in this or in environment section. A minimum criterion would contribute significantly to the green grid, and by correlation water sensitivity for the streetscape.

It is recommended that street tree planting minimums are added in this section, through say 'X tree every 10 metres' for each of the street designs shown. Indicative solutions for this context can be freely challenged and exposes a risk that investment will go elsewhere.

WSUD for public open space generally

The design ethos for public streets could be mirrored by providing a Water Sensitive guidance on the public recreation land generally, and particularly that adjoining the waterway. As the contact point to the waterway, strong provision for mitigating the impact of stormwater through improving its quality through a designation for Gross Pollutant traps and other treatment devices should be seriously considered. There is some consideration for how this could be approached in section 8, which mentions integrating on site detention for overland flow paths using the public open space network. Any exploration of this would be assisted greatly by bringing an objective for this land use for WSUD into principal development controls.

It is recommended that indicative landscaping designs be provided for the public open space and that they demonstrate a high level of water sensitivity, similar to the ethos presented in the indicative streetscapes. If this can not be achieved, a control measure for public open space must promote WSUD, which is currently missing under C6. A simple measure that states that 'design must be in accordance with the principles of best practice WSUD for stormwater management under this development framework, with a focus on reduction of quantity of stormwater entering the waterway'.... 'solutions to minimise the impact of stormwater such as gross pollutant traps, passive biofiltration, foreshore naturalisation and other measures are to be considered as part of a total WSUD solution in the precinct.'

Through site links and urban greening

Through site links in section 7.3 do not make mention of urban greening or tree planting. This is a missed opportunity for a more permeable green grid in the precinct.

It is recommended that any site that is highlighted for through site links have a design criteria established for these links that promotes 'green' through links, through increased tree planting for the links, landscaping, and semi permeable surfaces to support such green infrastructure.

Pedestrian and Active Transport links

Pedestrian and active transport links call for a diverse design response, yet make no mention of the beneficial outcome, both from an amenity, environmental health and personal health of these being designed in accordance with urban greening and WSUD principles. Without this, there is a risk that competing objectives in the indicative streetscape coupled with the need for designated active transport linkage could detract from a water sensitive, green streetscape.

There is some example of integration of the controls relating to fulfilling both the roadway design ethos integrating with any active transport outcome, with regard to Hill Road in control C3 of section 7.2 due to the complexity of a shared path, yet this integration between 2 sections is not well captured in this section otherwise.

As this is only a guidance document with 'consideration' for this framework to be had under the principal development controls currently, this strengthening will add significance to any green space outcome for public streets.

It is recommended that a general objective be added here that promotes WSUD outcomes, urban greening outcomes through promotion of the green grid and a permeated greenspace throughout the precincts active transport network through semi permeable design, minimisation of hardstand area, and well considered high absorption design methodology., and that specificity be added that any pedestrian or active transport development be conducted in accordance with those set out in section 5 generally.

Green roofs for high density development

There is an encouragement of communal roof top open space but this is not mandated under control C2 of 10.9.2 The Chatswood CBD Masterplan provides an excellent test case of a successful implementation of mandatory green roofs within a masterplan context through development controls. In practice light touch controls such as this usually do not lead to beneficial outcomes as they are freely challengeable. The diagrams visualise open space at the rooftop level but this is not reflected in a concrete control anywhere in the framework.

It is recommended that there be a strengthening provision to mandate green roofs of a certain percentage of the size of the development floor plate for high density residential or mixed use

development, as these will be able to afford the overhead generated by such a control; and the buildings here will have the highest carbon footprint and largest floorplates. This will assist in mitigating the overall urban heat island and contribute positively to stormwater outcomes through innovative on-site detention from stormwater absorption on these green roofs.

Private development stormwater harvesting

There is also opportunity for stormwater that is collected through these roofs to be harvested or treated before it reaches the wider stormwater network, or for it to be used on site.

It is recommended that this be reflected in an expanded suite of stormwater solutions present in the general stormwater management and Water Sensitive Urban Design section.

Greenstar

Furthermore, the Chatswood CBD Masterplan recognises the overall importance of environmental health outcomes, so mandates a minimum 5 star greenstar performance for developments within its Masterplan. It is recommended that Carter Street explore a similar method to guarantee some level of minimum best practice when it comes to environmental performance of the built form.

It is recommended some consideration for greenstar be reflected in the development framework, to promote beneficial overall environmental outcomes for high intensity development proposed for the precinct.

WSUD controls generally in the framework

Currently, in this section, all roads point toward a WSUD outcome that only requires adherence to the table currently found in all DCP's under table 6, which in reality lets developers off the hook if they are working towards a target (mass usage of cartridge filters and OSD only). It does not speak to reducing the **volume** of runoff, rather meeting a minimum threshold for quality only. Furthermore, of note, although most developments will require a WSUD strategy in this section, some do not, which may be problematic in the future.

There are several secondary elements which could be considered, which although mentioned as aspirations under this section, could be given additional weight in the private domain. If touted effectively through this provision, it could go a long way in contributing positively to an integrated 'blue-green' response. Strengthening provisions are listed above in detail, but for clarity, the following could be considered:

It is recommended for consideration, in this or other sections:

- **Controls for green roofs**
- **Controls for specified deep soil amounts and landscaped area**
- **Controls for green through paths**
- **Offsetting schemes for WSUD contributions to the public domain for restricted sites (i.e. trees, payment of street vegetation etc**
- **Increased rainwater tank targets beyond BASIX**
- **Greenstar to promote overall environmental health outcomes for the urban form**
- **Stronger adherence to WSUD for the public domain generally**

It is also recommended that in any call for a WSUD strategy report that involves a modelling analysis have primacy for passive, landscape focussed responses first, with a focus on the reduction of volume for a site first and foremost. The quantity as well as the quality of runoff is a fundamental consideration that is missing from these requirements.

Furthermore, the 'long-term' phase should be given a timeframe under C15 of a minimum of 20 years (typical development life cycle). This will work towards ensuring maintenance for a longer term for sites that are high density and not likely to change.

Rainwater Tanks

Rainwater tank controls are currently not complete in the development framework (C13 VIII). There is also not a mention of water recycling within the WSUD objectives generally.

It is recommended that the rainwater tank provisions have increased strength within the framework that seek a 'beyond BASIX' solution, and in the alternate on site or off-set water recycling be explored that satisfies these beyond BASIX criteria. Such examples are SOPA's development framework controls, which seek a 90% on site retention of stormwater runoff from roofscapes.

It is also recommended that the rainwater tank provision itself be filled in, as it currently seems blank.

Importance of these considerations through funding in the VPA

All these considerations will be critical in how the funding captured through the VPA is to be spent in actuality. It is a general pool of funds, so without concerted direction through principal development controls, complemented by WSUD appearing in a more complete manner in the development framework, it will drop off due to the primacy of building roads and other core infrastructure. This is a serious issue when considering how to fund a responsive central river city that contributes positively to the overall environmental health of the area and water quality of the catchment. The current structure plan and associated development framework read as 'nice to haves' contrary to the overriding public policy objective of healthier waterways and greener places.

This means that key opportunities such as payment for semipermeable paving, street level treatment of stormwater, novel waterway riparian health solutions etc will in likelihood not be considered as the precinct develops. We consider this however, an opportunity to enable Carter Street to be one of the leading Water Sensitive Urban Design Precincts in NSW, due to the high level of engagement with the principle already present in the document and its critical importance due to its proximity to a creek with high environmental values.

APPENDIX A – Draft Best Practice LEP and DCP clauses in Parramatta River Catchment Groups ‘Draft Recommendations Paper’ for planning controls in the catchment.

LEP clauses

Zoning provisions

Table 12 reviews the provisions in the LEP Standard Instrument for zones W1, W2, E1, E2, E3, RE1, RE2 – these zones cover many of the waterways in the Parramatta River catchment. The final column makes recommendations on additional objectives that should be considered for each of these zones.

Table 12: Potential additions to standard zone provisions for waterway and environmental zones

Zone	Current application in the catchment	Current Standard Instrument	Recommendations: additional objectives	
W1	Several of the Parramatta River's major tributaries including Subiaco Creek, Vineyard Creek, Toongabbie Creek, Duck River and Lake Parramatta.	<p>1 Objectives of zone</p> <ul style="list-style-type: none"> To protect the ecological and scenic values of natural waterways. To prevent development that would have an adverse effect on the natural values of waterways in this zone. To provide for sustainable fishing industries and recreational fishing. 	<p>2 Permitted without consent</p> <p>3 Permitted with consent</p> <p>Aquaculture</p> <p>4 Prohibited</p> <p>Business premises; Hotel or motel accommodation; Industries; Multi dwelling housing; Recreation facilities (major); Residential flat buildings; Restricted premises; Retail premises; Seniors housing; Service stations; Warehouse or distribution centres; Any other development not specified in item 2 or 3</p> <p>Additional direction:</p> <p>The following must be included as either "Permitted without consent" or "Permitted with consent" for this zone:</p> <p>Environmental facilities</p> <p>Environmental protection works</p>	<p>Objectives should extend from just 'protect' to 'protect and enhance' (as per alignment with the text in the aims of the plan).</p> <p>Additional objectives could also better reflect the values of waterways under this zone in the Parramatta River catchment:</p> <ul style="list-style-type: none"> To improve/enhance waterway health To protect cultural and scientific values To provide opportunities for nature-based recreation and connection with nature
W2	A reach of Parramatta River between the Parramatta CBD and Melrose Park	<p>1 Objectives of zone</p> <ul style="list-style-type: none"> To protect the ecological, scenic and recreation values of recreational waterways. To allow for water-based recreation and related uses. To provide for sustainable fishing industries and recreational fishing. 	<p>2 Permitted without consent</p> <p>3 Permitted with consent</p> <p>Aquaculture; Kiosks; Marinas</p> <p>4 Prohibited</p> <p>Industries; Multi dwelling housing; Residential flat buildings; Seniors housing; Warehouse or distribution centres; Any other development not specified in item 2 or 3</p> <p>Additional direction:</p>	<p>As above, objectives should extend from just 'protect' to 'protect and enhance' (as per alignment with the text in the aims of the plan).</p> <p>Additional objectives could also better reflect the values of waterways under this zone in the Parramatta River catchment:</p> <ul style="list-style-type: none"> To improve/enhance waterway health To protect cultural and scientific values

Zone	Current application in the catchment	Current Standard Instrument		Recommendations: additional objectives
			<p>The following must be included as either "Permitted without consent" or "Permitted with consent" for this zone:</p> <ul style="list-style-type: none"> • Boat sheds • Environmental facilities • Environmental protection works • Water recreation structures 	
E1	Specific areas within Sydney Olympic Park and within Parramatta River Regional Park	<p>1 Objectives of zone</p> <ul style="list-style-type: none"> • To enable the management and appropriate use of land that is reserved under the National Parks and Wildlife Act 1974 or that is acquired under Part 11 of that Act. • To enable uses authorised under the National Parks and Wildlife Act 1974. • To identify land that is to be reserved under the National Parks and Wildlife Act 1974 and to protect the environmental significance of that land. 	<p>2 Permitted without consent Uses authorised under the National Parks and Wildlife Act 1974</p> <p>3 Permitted with consent Nil</p> <p>4 Prohibited Any development not specified in item 2 or 3</p>	<p>No changes.</p> <p>The objectives are straightforward and as the zone prohibits essentially all development, there is no need for more specific objectives.</p>
E2	Many bushland areas within the catchment are zoned E2, including at Sydney Olympic Park, around Lake Parramatta, upper reaches of Darling Mills Creek, along parts of Toongabbie Cree and in smaller patches along other creeks	<p>1 Objectives of zone</p> <ul style="list-style-type: none"> • To protect, manage and restore areas of high ecological, scientific, cultural or aesthetic values. • To prevent development that could destroy, damage or otherwise have an adverse effect on those values. 	<p>2 Permitted without consent</p> <p>3 Permitted with consent Oyster aquaculture</p> <p>4 Prohibited Business premises; Hotel or motel accommodation; Industries; Multi dwelling housing; Pond-based aquaculture; Recreation facilities (major); Residential flat buildings; Restricted premises; Retail premises; Seniors housing; Service stations; Tank-based aquaculture; Warehouse or distribution centres; Any other development not specified in item 2 or 3</p> <p>Additional direction: The following must be included as either "Permitted without consent" or "Permitted with consent" for this zone:</p> <ul style="list-style-type: none"> • Environmental protection works 	<p>No changes.</p> <p>The objectives are straightforward and as the zone prohibits essentially all development, there is no need for more specific objectives.</p>
E3	Some areas at Sydney Olympic Park	<p>1 Objectives of zone</p>	<p>2 Permitted without consent Home occupations</p>	<p>This zone permits more development than other waterway or environmental zones, and therefore there may be a case</p>

Zone	Current application in the catchment	Current Standard Instrument		Recommendations: additional objectives
		<ul style="list-style-type: none"> To protect, manage and restore areas with special ecological, scientific, cultural or aesthetic values. To provide for a limited range of development that does not have an adverse effect on those values. 	<p>3 Permitted with consent Dwelling houses; Oyster aquaculture; Pond-based aquaculture; Tank-based aquaculture</p> <p>4 Prohibited Industries; Multi dwelling housing; Residential flat buildings; Retail premises; Seniors housing; Service stations; Warehouse or distribution centres; Any other development not specified in item 2 or 3</p> <p>Additional direction: The following must be included as either "Permitted without consent" or "Permitted with consent" for this zone: Environmental protection works Roads Home industries, kiosks, cellar door premises, neighbourhood shops and roadside stalls may (but need not) be included as permitted with consent.</p>	<p>for strengthening the objectives. A water quality objective could be included:</p> <ul style="list-style-type: none"> To minimise impacts on the water cycle, including runoff quantity and quality
RE1	Most of the parks are zoned RE1, including many riverside and foreshore parks	<p>1 Objectives of zone</p> <ul style="list-style-type: none"> 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. 	<p>2 Permitted without consent</p> <p>3 Permitted with consent Aquaculture; Kiosks; Recreation areas</p> <p>4 Prohibited Any development not specified in item 2 or 3</p>	<p>As this zone includes many waterways, consider adding an objective focused on protection and restoration of waterways and riparian lands:</p> <ul style="list-style-type: none"> To protect and restore waterways and riparian lands and ensure recreational use minimises impacts on the natural environment
RE2	Many golf courses are zoned RE2	<p>1 Objectives of zone</p> <ul style="list-style-type: none"> To enable land to be used for private 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. 	<p>2 Permitted without consent</p> <p>3 Permitted with consent Aquaculture; Community facilities; Kiosks; Recreation areas; Recreation facilities (indoor); Recreation facilities (outdoor)</p> <p>4 Prohibited</p>	<p>This zone allows a greater range of development with potential impacts on the water cycle. Consider additional objectives focused on waterways and stormwater pollution:</p> <ul style="list-style-type: none"> To protect and restore waterways and riparian lands and ensure recreational use minimises impacts on the natural environment To minimise impacts on the water cycle, including runoff quantity and quality

Local provisions

The following sections include model clauses for the following local provisions:

- Landscaped areas
- Stormwater Management and Water Sensitive Urban Design
- Waterways and riparian land
- Foreshore area development

Landscaped areas

This model provision is based on the Sutherland Council (2015) LEP:

- (1) The objectives of this clause are as follows—
 - (a) to ensure adequate opportunities exist for the retention or provision of vegetation that contributes to biodiversity and, in the case of trees, enhances the tree canopy
 - (b) to minimise urban run-off by maximising permeable areas on the sites of development,
 - (c) to ensure that the visual impact of development is minimised by appropriate landscaping and that the landscaping is maintained,
 - (d) to ensure that landscaping carried out in connection with development is sufficient to complement the scale of buildings, provide shade, screen parking areas and enhance workforce amenities.
- (2) This clause applies to land in the following zones—
 - (a) Zone R1 General Residential,
 - (b) Zone R2 Low Density Residential,
 - (c) Zone R3 Medium Density Residential,
 - (d) Zone R4 High Density Residential,
 - (e) Zone B1 Neighbourhood Centre,
 - (f) Zone B2 Local Centre,
 - (g) Zone B3 Commercial Core
 - (h) Zone B4 Mixed Use,
 - (i) Zone B5 Business Development,
 - (j) Zone B6 Enterprise Corridor,
 - (k) Zone B7 Business Park,
 - (l) Zone B8 Metropolitan Centre,
 - (m) Zone IN1 General Industrial,

- (n) Zone IN2 Light Industrial,
- (o) Zone IN3 Heavy Industrial,
- (p) Zone E3 Environmental Management

- (3) The minimum percentage of the site area on land to which this clause applies that is to consist of landscaped areas is the percentage shown on the Landscape Area Map in relation to that land.
- (4) The minimum landscaped area for any lot of land to which this clause applies created by the subdivision of a lot containing a dual occupancy is the percentage shown on the Landscape Area Map in relation to the land.
- (5) Subclause (4) does not apply to a subdivision of land under the Community Land Development Act 1989 or the Strata Schemes (Freehold Development) Act 1973.
- (6) The following are taken to be excluded from the site area for the purposes of this clause—
 - (a) land on which the development is prohibited under this Plan
 - (b) in the case of an internal lot—
 - (i) any access corridor to or from the lot, and
 - (ii) any right of way that traverses another lot.

Stormwater Management and Water Sensitive Urban Design

This model provision is drawn on existing precedents, but the wording has been substantially modified for consistency with the Parramatta River Masterplan and the objectives defined in Section 2 of this recommendations paper:

- (1) The objectives of this clause are as follows:
 - (a) to minimise the adverse impacts of stormwater runoff and diffuse stormwater pollution downstream of new development
 - (b) to improve the health of the Parramatta River [and any others relevant to the specific LGA]
 - (c) to protect and enhance the values of all waterways in the Parramatta River catchment [and any others relevant to the specific LGA]
- (2) This clause applies to all land in residential, business, industrial, special uses, recreation and environmental protection zones.
- (3) Development consent must not be granted to development on any land unless the consent authority is satisfied that the development:

- (a) is designed to maximise pervious surfaces and vegetation coverage
- (b) is designed to reduce the quantity (volume) of stormwater discharged from the land, including:
 - (i) maximising the harvesting and use of rainwater and/or stormwater for appropriate non-potable end uses, reducing the quantity of runoff
 - (ii) maximising infiltration and evapo-transpiration, having regard to the soil characteristics affecting on-site infiltration of water
 - (iii) meeting any Stormwater Runoff Reduction Targets adopted by Council
- (c) is designed to avoid, mitigate or offset stormwater quality impacts, including meeting any Stormwater Quality Targets adopted by Council
- (d) will avoid, mitigate or offset any adverse impacts of stormwater runoff on adjoining properties, native bushland, waterways and groundwater systems
- (e) is designed in keeping with the principles of water sensitive urban design

(3) For the purposes of subclause (3)(e), the water sensitive urban design principles are—

- (a) minimising demand on Sydney’s centralised water supply system
- (b) minimising wastewater discharge
- (c) minimising stormwater runoff
- (d) improving the quality of remaining stormwater runoff to a standard suitable to meet downstream water quality objectives
- (e) minimising harmful impacts of urban development on surface and groundwater flow regimes
- (f) protecting and enhancing natural waterways
- (g) integration of stormwater management systems into the landscape in a manner that provides multiple benefits, including water quality protection, stormwater retention and detention, enhancement of ecological processes, habitat and biodiversity, urban heat mitigation, recreational value and visual amenity

Waterways and Riparian Land

(1) The objectives of this clause are as follows—

- (a) to protect or improve—
 - (i) water quality within waterways, and
 - (ii) the stability of the bed and banks of waterways, and
 - (iii) aquatic and riparian species, communities, populations and habitats, and

- (iv) ecological processes within waterways and riparian lands, and
- (v) scenic, recreational and cultural heritage values of waterways and riparian lands,
- (b) where practicable, to provide for the rehabilitation of existing piped or channelised waterways to a more natural state,
- (c) where practicable, to provide for improved habitat connectivity along riparian corridors.
- (d) Where practicable, to provide for improved green grid (active transport and recreation) links along riparian corridors.

(2) This clause applies to riparian land. Riparian land is identified by the presence of a waterway, where the presence of a waterway is either—

- (a) Identified in the NSW Government Hydroline dataset
- (b) Identified via physical features that are consistent with the definition of a “river” within the *Water Management Act NSW 2000*
- (c) [if/when available, waterways and riparian land could also be identified via a mapping layer prepared by the local council as part of the LEP]

“Riparian Land” is defined according to the Strahler stream order, and measured from the top of bank on either side of the waterway. The width of the riparian corridor, on either side of the waterway, is as follows:

Stream order	Riparian land width (either side of the waterway, measured from top of bank)
1 st	10m
2 nd	20m
3 rd	30m
4 th	40m

Note. Some development types within 40 metres of a waterway will still require referral to the NSW Office of Water as integrated development.

(3) In deciding whether to grant development consent for development on land to which this clause applies, the consent authority must consider—

- (a) whether the development is likely to have an adverse impact on the following—
 - (i) the water quality in any waterway,
 - (ii) the natural flow regime, including groundwater flows to any waterway,
 - (iii) aquatic and riparian species, populations, communities, habitats and ecosystems,
 - (iv) the stability of the bed, shore and banks of any waterway,
 - (v) the free passage of native aquatic and terrestrial organisms within or along any waterway and riparian land,
 - (vi) public access to, and use of, any public waterway and its foreshores,
 - (b) any opportunities for rehabilitation or re-creation of any waterway and its riparian areas,
 - (c) any appropriate measures proposed to avoid, minimise or mitigate the impacts of the development.
- (4) Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that the development—
- (a) is consistent with the objectives of this clause, and
 - (b) integrates riparian, stormwater and flooding measures, and
 - (c) is designed, sited and will be managed to avoid any potential adverse environmental impacts, and
 - (d) if a potential adverse environmental impact cannot be avoided by adopting feasible alternatives—the development minimises or mitigates any such impact to a satisfactory extent.

Foreshore area development

This model clause is based on Canada Bay's current LEP (2013):

- (1) The objective of this clause is to ensure that development in the foreshore area will not impact on natural foreshore processes or affect the significance and amenity of the area.
- (2) Development consent must not be granted for development on land in the foreshore area except for the following purposes—
- (a) the extension, alteration or rebuilding of an existing building wholly or partly in the foreshore area,
 - (b) the erection of a building in the foreshore area, if the levels, depth or other exceptional features of the site make it appropriate to do so,

- (c) boat sheds, sea retaining walls, wharves, slipways, jetties, waterway access stairs, swimming pools, fences, cycleways, walking trails, picnic facilities or other recreation facilities (outdoors).
- (3) Development consent must not be granted under subclause (2) unless the consent authority is satisfied that—
- (a) the development will contribute to achieving the objectives for the zone in which the land is located, and
 - (b) the appearance of any proposed structure, from both the waterway and adjacent foreshore areas, will be compatible with the surrounding area, and
 - (c) the development will not cause environmental harm such as—
 - (i) pollution or siltation of the waterway, or
 - (ii) an adverse effect on surrounding uses, marine habitat, wetland areas, fauna and flora habitats, or
 - (iii) an adverse effect on drainage patterns, and
 - (d) the development will not cause congestion or generate conflict between people using open space areas or the waterway, and
 - (e) opportunities to provide continuous public access along the foreshore and to the waterway will not be compromised, and
 - (f) any historic, scientific, cultural, social, archaeological, architectural, natural or aesthetic significance of the land on which the development is to be carried out and of surrounding land will be maintained, and
 - (g) in the case of development for the alteration or rebuilding of an existing building wholly or partly in the foreshore area, the alteration or rebuilding will not have an adverse impact on the amenity or aesthetic appearance of the foreshore, and
 - (h) sea level rise or change of flooding patterns as a result of climate change has been considered.
- (4) In deciding whether to grant consent for development in the foreshore area, the consent authority must consider whether and to what extent the development would encourage the following—
- (a) continuous public access to and along the foreshore through or adjacent to the proposed development,
 - (b) public access to link with existing or proposed open space,
 - (c) public access to be secured by appropriate covenants, agreements or other instruments registered on the title to land,
 - (d) public access to be located above mean high water mark,

- (e) the reinforcing of the foreshore character and respect for existing environmental conditions.

(5) In this clause—

foreshore area means the land between the foreshore building line and the mean high water mark of the nearest natural waterbody shown on the Foreshore Building Line Map.

foreshore building line means—

- (a) the line that is landward of, and at the distance specified on the Foreshore Building Line Map from, the mean high water mark of the nearest natural waterbody shown on that map, or
- (b) if no distance is specified, the line shown as the foreshore building line on that map.

DCP clauses

The following sections include a basic set of clauses that can be used as a starting point to develop DCP provisions that are consistent with the goals of the Parramatta River Masterplan and the objectives in Section 2 of this recommendations paper. Note that text placed in [square brackets] represents an optional element, or a detail that needs to be considered in each DCP.

Landscape

Landscape provisions in DCPs are multi-objective, and therefore this section does not provide a complete model landscape clause, but the important elements to include from a water management perspective have been written up as model clauses that could be integrated into the landscape section of the DCP, along with other clauses.

Minimum landscaped area

Landscaped area means a part of a site used for growing plants, grasses and trees, but does not include any building, structure or hard paved area.

The following minimum landscaped areas are to be provided in new development:

- [List development types and minimum percentages – these will need to be locally appropriate]

[OPTIONAL] The following specific parts of the site must include landscaped areas that meet particular requirements:

- [list any specific parts of the site where particular landscape requirements apply – e.g. the front setback, back yards, streetscapes. Include minimum percentages and/or dimensions]

The following areas can be counted towards the landscaped area:

- Existing vegetation to be retained, except for any vegetation that is protected under legislation (e.g. vegetation within EECs and/or riparian lands)
- Trees, shrubs, grasses, groundcovers
- Garden beds with annual plantings
- Turfed areas
- Green roofs

Pervious paving can be counted towards the landscaped area provided that:

- It is designed with a permeable soil layer below, so that water can effectively infiltrate
- It is situated within or adjacent to a planted area, so that any excess runoff drains into the pervious area
- A maximum of 5% of the total landscape area requirement can be contributed by pervious paving (i.e. if the total landscaped area is 20%, then the limit is 5% of 20% = 1% of the total site)

[OPTIONAL] A minimum of [X%] of the total landscape area requirement must be vegetated with locally native species, and needs to include canopy, mid and understorey plantings. Refer to list of appropriate locally native species.

Deep soils

Deep soil zone means a part of the site where there is natural ground with no obstructions above or below and a relatively natural soil profile. Deep soil zones need to support healthy growth of large trees and other vegetation, protect existing mature trees and allow infiltration of rain water into the water table to reduce storm water runoff.

Deep soil zones cannot include:

- Any paved areas

- Any built structure above or below the surface
- An impermeable liner below the surface
- A clay capping layer below the surface (e.g. over a former landfill)

The deep soil zone can include imported fill or modified soils, providing that the imported or modified soil layer is underlain by natural soils and is capable of supporting healthy trees and other vegetation.

A deep soil zone can be underlain by natural bedrock, providing the bedrock is at least 1.0 m below the surface.

The following minimum deep soil areas are to be provided in new development:

- [List development types and minimum percentages – these will need to be locally appropriate]

Where possible, deep soil zones should be consolidated, contiguous and connected to other deep soil systems. The following minimum dimensions apply to deep soil zones:

- To be counted towards the site's deep soil area, any deep soil zone needs to have a minimum width of X m

[OPTIONAL] The following specific parts of the site must include deep soil zones that meet particular requirements:

- [list any specific parts of the site where particular deep soil requirements apply – e.g. the front setback, the back yard. Include minimum percentages and/or dimensions]

Trees

Trees are required in new development to reduce stormwater runoff and contribute to canopy targets. Large, medium and small trees are defined in a separate tree species list [to be developed so that it can be referenced here].

New development needs to include the following minimum number of trees:

- [list development types and minimum number of large/medium/small trees according to site area – this will need to be locally appropriate]

Trees need to be included in the following specific locations:

- [list any specific locations where trees are required, and minimum numbers – e.g. front setback, back yard, streetscape, deep soil zone]

Each tree required under this provision needs to be supported with an appropriate soil zone. These are listed in Table 13.

Table 13: Soil requirements for trees (based on City of Sydney 2016)

Mature size	Height	Canopy width	Soil volume per tree	Soil area deep soils	Soil area on structure	Min. depth
Small	6-8m	4m	9m ³	2m x 2m	3.5m x 3.5m	800mm
Medium	8-12m	8m	35m ³	4m x 4m	6m x 6m	1000mm
Large	12-18m	16m	150m ³	8m x 8m	10m x 10m	1200mm

Water management

Water management clauses in DCPs are also multi-objective, councils use their DCPs to manage multiple aspects of the water cycle and stormwater runoff, including water conservation, runoff quality and quantity, peak flows, flooding and drainage, erosion and sediment control.

The following clauses focus on stormwater quality and quantity, stormwater discharge to bushland and erosion and sediment control, as these are the aspects with most relevance to the goals of the Parramatta River Masterplan and the objectives identified in Section 2. Councils will need to consider how these should be integrated with other water-related controls in the DCP.

Rainwater harvesting and reuse

Locally-harvested rainwater must be the primary source of non-potable water for new development, to reduce stormwater runoff and minimise the impacts of stormwater quantity on sensitive receiving waters.

Rainwater tanks are to be provided when any of the following are present in the development:

- An irrigated area more than 50 m²
- Any car or other vehicle washing facilities
- Commercial laundry facilities
- Three or more toilets
- A cooling tower

Rainwater tanks or other alternative water sources need to be designed to meet the following requirements:

- At least 90% of roof area shall be connected to rainwater storage(s)
- Rainwater supply schemes may be supplemented with recycled water where connection to recycled water supply is available.
- A minimum of 0.25 kL rainwater storage is to be supplied per dwelling and an additional 1 kL of rainwater storage is to be supplied per 100 m² of non-residential net floor area.
- Connect rainwater tanks to irrigation, car washing, toilets, water features, washing machines, hot water systems and cooling towers.
- Where non-potable demand within a development site is low, alternative uses for roof water such as landscaping, roof gardens, as well as off-site re-use, should be considered so as to minimise the volume of stormwater discharged to local waterways.
- Rainwater tank storage does not contribute to on site detention volume and cannot be used to offset on site detention requirements

Stormwater quality and quantity targets

These targets apply to the following development types:

- [specify where stormwater runoff standards will apply, including minimum lot areas]

Post development mean annual pollutant loads must be reduced by the following amounts:

- Gross pollutants (90%),
- Total suspended solids (85%)
- Total phosphorus (65%)

- Total nitrogen (45%)

Post-development mean annual runoff volume must be reduced by X% [10% is suggested as a starting point, however the amount could vary depending on the development type].

To demonstrate compliance with these targets, proponents will need to submit the following [consider what approach to take – this could include different requirements for different types of development]:

- WSUD report
- MUSIC model
- S3QM certificate
- Deemed to comply checklist

Stormwater treatment systems need to be designed in accordance with: [refer to design standards that apply in the local LGA]

All stormwater treatment systems that will be transferred to Council shall be maintained for a period of no less than 3 years post practical completion. Inspections may be held during the 3-year maintenance period. An inspection will also be held on completion of the 3-year maintenance period and prior to the transfer of ownership. If the asset is not of an acceptable standard to Council at these inspections, the asset shall be rectified to the satisfaction of Council. This will include extension of the maintenance period.

Where stormwater treatment systems are located in the private domain, a Positive Covenant for ongoing operation and maintenance of stormwater treatment measures must be provided and be registered with Council.

Erosion and sediment control

All developments, where the site is disturbed, shall provide appropriate Erosion and Sedimentation Control measures to control runoff, mitigate soil erosion and trap pollutants before they can reach downslope lands and receiving watercourses.

Soil erosion and sediment control measures shall be designed in accordance with the document Managing Urban Stormwater–Soils & Construction Volume 1 (2004) by Landcom (the “Blue Book”).

Development applications must include a draft construction management plan addressing the requirements set out in the Blue Book. The final Plan must be submitted with an application for a construction certificate.

Waterways and riparian land

While the LEP will define the various waterways and land to be classified as “riparian”, and the considerations for development on that land, the DCP can also include more specific requirements. While there is limited mapping of different riparian land categories, the DCP requirements need to be broad enough to accommodate a range of different situations – from riparian lands with high natural value to those that are severely degraded. Therefore several phrases include “where feasible...”, “where appropriate...” or similar. If mapping is improved, classifying riparian lands into different categories, then the DCP provisions can also be improved, making them more specific to each category of riparian land.

Riparian land

Wherever possible, all new development must provide for a development footprint outside the riparian land. Encroachments onto riparian land may be permitted, however, in determining whether an encroachment is acceptable, the following must be considered:

- i. the location of existing hardstand structures to be retained within the riparian land;
- ii. the scale of the development;
- iii. the minimisation of any encroachment through the siting and design of the development;
- iv. location above the 1% flood level;
- v. enhancements proposed as part of the development such as offset areas;
- vi. geomorphic and ecological values of the waterway.

Subdivisions (via perimeter roads) must front onto riparian land.

Minimise the following works within riparian lands:

- Impervious surfaces. Where feasible, reduce the existing building footprint and impermeable surfaces within riparian lands.
- Service infrastructure, including stormwater, sewerage and other piped services. Where necessary use non-destructive techniques such as direct

drilling, where no part of the pipe is above ground or above the bed of the waterway. In exceptional circumstances pierced crossings may be considered.

- Disturbance of soils, except where required for rehabilitation or remediation of the waterway.

No works shall be undertaken on or near a natural waterway or section of natural waterway that would cause straightening, significant relocation, widening, narrowing, piping or lining of the natural waterway.

Riparian vegetation is to be retained and enhanced. Where any existing vegetation is to be removed from riparian land, a Vegetation Management Plan prepared by a suitably qualified person, is required. Where the riparian land has been disturbed or degraded, appropriate riparian vegetation is to be revegetated or rehabilitated. Local native vegetation assemblages, capable of supporting the long-term ecological function of the riparian land, must be used. Where practicable, protection, regeneration and rehabilitation of vegetation in riparian land is to retain or achieve a density, species mix and structure of canopy, mid-storey and understorey vegetation that would occur naturally. Plantings within riparian land are to consist of 100% locally native species.

Channel and bank stability within the riparian zone is to be protected by avoiding the removal of natural stream structures, vegetation and woody debris, except where debris creates a flood hazard.

Stream bank stabilisation works are encouraged where there is risk of erosion. These works should be by use of re-vegetation methods, or if necessary, be of a ‘soft engineering’ design.

Development is to be designed to maintain or emulate a naturally functioning watercourse wherever possible. The development must be designed to ensure connectivity of vegetation, hydrological flows and fauna movement to, and within, the riparian land and waterway.

Re-instatement of piped or channelised watercourses to a more natural form is to be undertaken where feasible. Note: watercourse re-instatement is most likely to be feasible on larger developments where landscaping and drainage works are already significant and re-instatement of the watercourse can help achieve beneficial social and environmental outcomes.

Opportunities for the community or residents to connect with and explore waterways are to be provided where appropriate, however accessways must not compromise the integrity of riparian land. Any access to the waterway must be located at strategic

points where the ecological integrity of the existing riparian vegetation, stream bed and bank stability will not be compromised.

Walkways, tracks, cycleways and general access points may be established in riparian land, where:

- i. they form useful links in the green grid network of active transport and recreational pathway links
- ii. they are designed and constructed to ensure minimum impact on the riparian land; and
- iii. they contribute to the management of edge effects or ongoing riparian maintenance.

Crossings (i.e. bridges) over natural waterbodies must maintain riparian connectivity; retain natural stream bed and bank profile; prevent scour and erosion of the stream bed or banks during storm events; not restrict bankfull or floodplain flows and not inhibit natural sediment transport. This is to be achieved by:

- i. minimising the number of crossings;
- ii. minimising the width of the crossing to allow for pedestrian access. Vehicle crossings will only be considered where required;
- iii. establishing crossings at right angles to the flow rather than at an oblique angle; and
- iv. minimising disturbance to existing native riparian vegetation

Safety fences are permitted within the CRZ. Fences must be set back an appropriate distance from the top of the bank, and be of an open design to minimise barriers to flora, fauna and water.

Watercourse and riparian land management must be integrated with flooding risk. Flood management studies must consider the impacts of rehabilitation and remediation of riparian land in the assessment of risk and in any proposed mitigation strategies.

Stormwater discharge to bushland, riparian land and/or natural waterways

Urban stormwater flowing into bushland, riparian land and natural waterways can cause erosion, and is the major factor that causes weeds to become established in natural areas. In order to minimise such impacts, the following controls apply to properties that border on bushland or discharge into riparian land or natural waterways:

1. The developer must demonstrate to Council that all stormwater entering bushland will be dispersed sufficiently so as to not cause downstream erosion, scour or pollution. This may be achieved by using a raingarden, infiltration or dispersal trench system or slotted pipe to practical depth (where site conditions prevent a deeper trench structure) established at the highest practicable level within the site, parallel to the site contours.
2. For new single dwellings, the maximum post developed built-upon area draining to the dispersal trench system, infiltration trench system or raingarden must not exceed 35% of the built-upon area.
3. For alterations and additions, the post-development built-upon area draining to dispersal trench system, infiltration trench system or raingarden must not exceed the greater of
 - i. 35% of the built-upon area; or
 - ii. the pre-developed built-upon area.

Stream erosion

This should be a minor amendment to flood detention controls (if not already included), to be applied where stream erosion is a risk.

Ensure that stormwater detention provisions require detention of peak flows to match pre-development flows not only in major storm events (e.g. the 10 to 100 year ARI events) but also in frequent events (1 and 2 year ARI events). It is the frequent storm events, typically 1-2 year ARI, which cause the most erosion in natural streams.