5 Prioritising active transport

Walking and cycling
Public transport
Parking

Arden will provide direct and efficient connections in and around the precinct through safe and attractive public areas. This will include active and public transport networks that will complement the new Arden Station.

– Arden Vision, 2018.

The new Arden Station will be the heart of the precinct, making Arden easy to access from anywhere in Melbourne via the new Metro Tunnel.

The *Arden Vision* includes targets for all trips to Arden to be 60 per cent public transport, 30 per cent walking and cycling and 10 per cent private vehicles.

Transport planning for the precinct is focussed on delivering great streets for walking and cycling (also known as active transport). To reinforce walkability, it is important that the public realm is prioritised for pedestrians, with limited opportunities for private vehicle circulation.

Arden's ambition is to deliver world class transport-oriented development that maximises public and active transport use by providing a connected local transport network that promotes sustainable transport choices and moves away from onsite carparking, making it easier for people to choose not to own a car

A vehicle circulation and precinct parking plan will manage the location and volume of car parking (at a maximum cap of 3,000 spaces) and set out a local transport network that limits vehicle circulation to reduce conflicts between pedestrians, cyclists, public transport services and private vehicle movements.

The planned density and diversity of land use within Arden provides an excellent opportunity for most local trips to be made by walking, cycling and public transport, and allows for the uptake of recent trends towards small electric transport options such as e-bikes and e-scooters. Retail, services and education will all be locally available, and accessible by a twenty-minute walk.

Arden's fully integrated transport network is designed to enable its net-zero carbon objectives.

OBJECTIVE 15

Provide space for high capacity public transport capable options connecting Arden into the expanding central city.

Dedicated public transport lanes will allow for frequent, fast and reliable public transport services to and from Arden.

While at this stage it is too early to commit to a particular mode, dedicated road-space is set aside in the draft plan to facilitate its delivery. The high capacity public transport capable corridors outlined in this plan are aligned with Victorian Government's longer-term tram and bus planning and transport corridors proposed in the West Melbourne Structure Plan.

The extension of the high-capacity public transport capable corridor north of Arden Street along Fogarty Street, Henderson Street and Boundary Road will connect Arden to the suburbs of Macaulay, Travancore and Moonee Ponds. Laurens Street will become a key public and active transport route, connecting North Melbourne and Arden stations. Ireland Street will form a connection between Arden and West Melbourne.

STRATEGY 15.1

Provide space to allow for the potential future delivery of high capacity public transport capable corridors along Laurens Street, Fogarty Street, Henderson Street and Boundary Road (south of Macaulay Road).

STRATEGY 15.2

Implement improvements to local bus services to improve connections between Arden and surrounding suburbs in the short term.

STRATEGY 15.3

Explore opportunities to reopen the northern entrance to North Melbourne Station for a more convenient and direct link to Arden.

OBJECTIVE 16

Provide safe, direct and connected protected cycling routes through and to the precinct.

The Capital City Trail along Moonee Ponds Creek provides regional cycle access to the suburbs of Moonee Valley and Moreland (via Royal Park and the Upfield bike path) and on to Docklands, Footscray and Fishermans Bend. New cycling infrastructure constructed as part of the West Gate Tunnel project will provide a shared path from CityLink over the Moonee Ponds Creek and the rail corridor to Dryburgh Street.

Within the precinct, there will be four Strategic Cycling Corridors. These corridors are designed to improve cycling to and around major activity centres and are routes that cater for the highest cycling volumes while offering protection from other vehicles so that cyclists of all ages and abilities can confidently use them.

Improved cycling infrastructure on local streets will address deficiencies such as bike lane gaps at intersections and will be designed to be safe for all users.

STRATEGY 16.1

Deliver Strategic Cycling Corridors along Arden Street, Queensberry Street, Langford Street and Laurens Street.

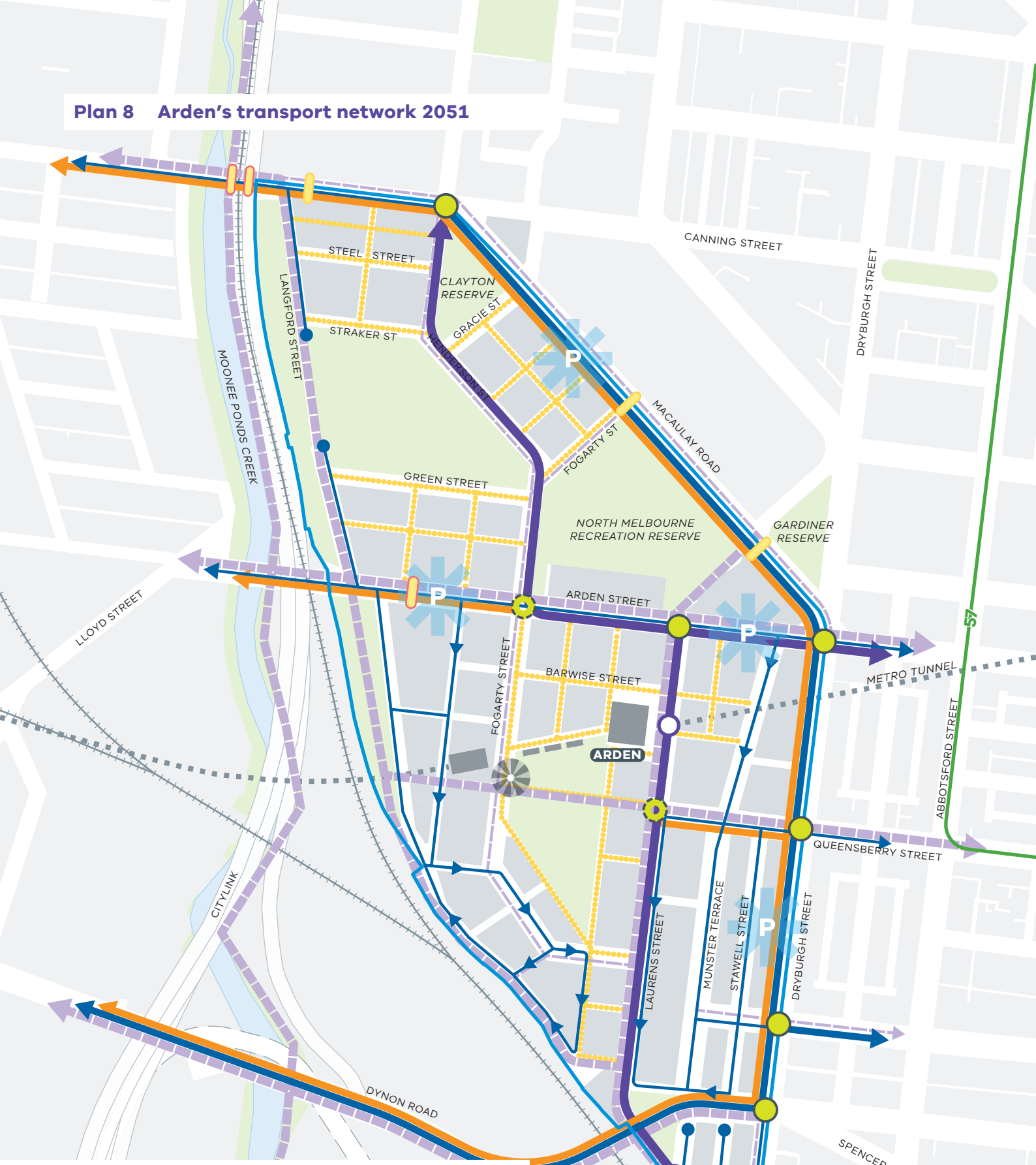
STRATEGY 16.2

Deliver a dense network of local feeder bike lanes to complement the Strategic Cycling Corridors and provide access for bicycles to destinations within the precinct, including the proposed government primary school, community hubs and innovation hub.

STRATEGY 16.3

Deliver safer intersections for bike riding by adopting designs which continue bicycle lanes up to and through intersections and provide physical separation for cyclists.

Plan 8 Arden's transport network 2051



OBJECTIVE 17

New and existing streets will be pedestrian-friendly and provide comfortable, green links between open spaces and public transport routes and enhance the quality of the public realm.

Residents, workers and visitors will be able to walk and cycle around Arden with ease, making active transport part of everyday life for the Arden community. Streets will provide quick and convenient walking and cycling connections between key spaces including Macaulay, Arden North Melbourne train stations, and the open spaces both within Arden and beyond. In addition streets, laneways and other in-between spaces play a legitimate role in providing space for recreation and other functions that have conventionally been the domain of public open space.

To encourage people to walk, ride bikes and spend time in the streets they need to be safe, interesting and comfortable.

Arden's streets and laneways surrounding the new station and open spaces will prioritise pedestrians, sharing the road with slow moving cyclists and occasional emergency and service vehicles. Green links will provide additional shading and opportunities for water sensitive urban design and biodiversity.

Fogarty Street will be a key north–south connector that enables movement throughout the precinct and connects Arden into West Melbourne in the south and Macaulay in the north. Queensberry Street will provide a direct connection to nearby Parkville and the North Melbourne Arts Precincts. As it reaches the train station. Queensberry Street will transform into a wide, shared pathway for pedestrians and cyclists to allow people to move throughout and enjoy the central open space safely.

STRATEGY 17.1

Create walkable streets in Arden with many routes, crossings and through-block links that improve permeability and draw people into new spaces, consistent with block sizes outlined in the *Central Melbourne Design Guide*.

STRATEGY 17.2

Create activated pedestrian-priority zones that provide shared space for pedestrians and slow-moving cyclists and service and emergency vehicles.

STRATEGY 17.3

Deliver streetscape improvements to Queensberry Street and Fogarty Street to support their role as urban boulevards

STRATEGY 17.4

Deliver public realm and urban greening improvements along the western edge of the Arden precinct to connect North Melbourne Station and Macaulay Station via a new green link.

STRATEGY 17.5

Explore opportunities to integrate water sensitive urban design into streets and green links.

STRATEGY 17.6

Explore opportunities to deliver centralised freight distribution and waste collection hubs to reduce the number of service vehicles entering the precinct.

STRATEGY 17.7

Maximise personal safety and security through activation of ground floors around open spaces and key pedestrian routes and the use of Crime Prevention Through Environmental Design (CPTED) principles.

Figure 39 Examples of safe, direct and efficient on- and off-road cycle connections.

Figure 40 Slovenska Boulevard in Slovenia is an example of a high-quality shared street where people visit, meet and pass through. (Source: Landezine, 2016)

OBJECTIVE 18

Minimise the impact of car parking and associated vehicular movements through Arden.

To achieve the ambitious active transport targets for Arden, private vehicle use will be managed in the precinct. Parking management on a precinct level will assist in protecting Arden from excessive traffic and associated negative impacts.

The *Arden Transport Network Plan 2051* identifies potential locations to deliver consolidated precinct parking. Consolidated precinct parking facilities will provide car parking for occupants of the precinct (should they wish to acquire it) in a designated location rather than within individual buildings. This has several benefits, including reducing the cost of constructing parking in individual buildings, preventing ground floor carparks from detracting from the vibrancy of street life, increasing the pedestrianisation of parts of the precinct, and minimising the use footpaths for vehicle cross overs or parking by scooters and motorbikes.

Over time, these facilities discourage the ownership of private vehicles and private vehicle trips by decoupling car parking from home ownership so that car parking is seen as an incremental cost to housing rather than an inclusion. It provides greater control over the number of cars that will be able to be housed in the precinct and ensures only those that need a car have to pay for parking, improving how car parking is shared.

These parking facilities will be located on the periphery of the precinct, outside of the main activity centres and denser living areas, making sustainable transport choices like public transport, cycling and walking more convenient than private vehicle trips and minimising the impact of vehicular traffic on the higher amenity areas of the precinct.

These facilities should also provide electric vehicle charging stations and share-car facilities for those that choose not to own a car.

This approach forms part of an integrated and more sustainable approach to transport access, supported by significant investment in transport choices, comprehensive planning to make cycling and walking convenient and safe and limited provision of car parking in individual buildings through maximum parking planning controls.

STRATEGY 18.1

Prepare a *Vehicle Circulation and Precinct Parking Plan* which caps the supply of parking and directs parking into dedicated off-street parking hubs. This will be based on the principles outlined overleaf.

STRATEGY 18.2

Ensure that appropriate parking is provided for disabled access at key destinations throughout the precinct.

STRATEGY 18.3

Provide appropriate bicycle, motorbike and scooter parking within private developments to enable footpaths to be free from impediments.

STRATEGY 18.4

Support shared transport schemes such as shared vehicles, e-bikes and e-scooters through private development and within the public realm in locations where it is readily accessible.

STRATEGY 18.5

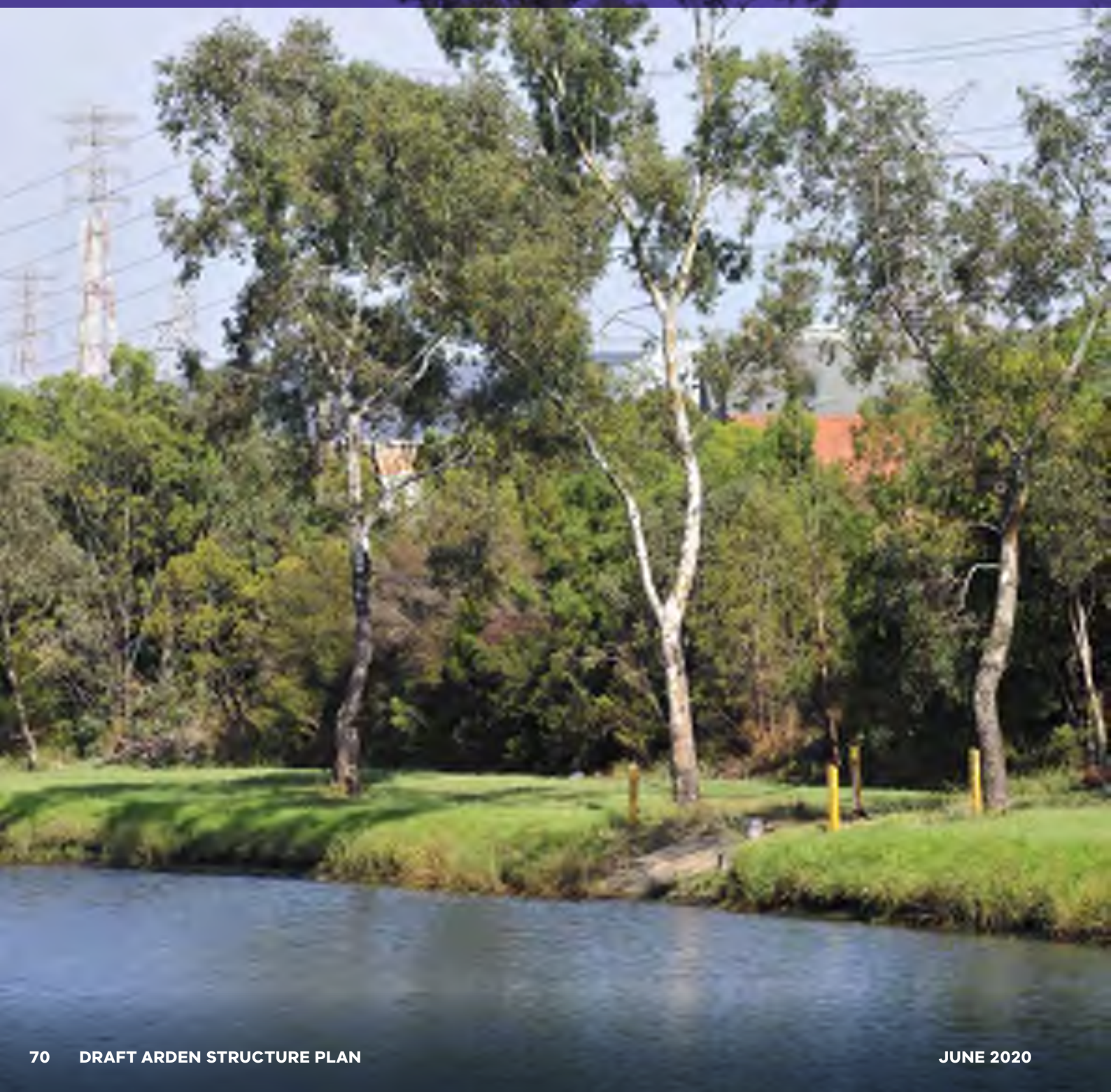
Support the flexible use of parking spaces within buildings and on the street.

Arden's precinct-wide car parking plan – key principles

- Off-street car parking to be designed, located and managed to ensure flexible and efficient use, and to minimise the need for vehicular movements through the high amenity core of the precinct.
- Off-street car park developments to provide electric vehicle charging stations from the outset and demonstrate the capacity to progressively lift rates to meet future demand.
- New retail, commercial and community buildings without onsite parking must incorporate (and preferably exceed) minimum bicycle parking provision based upon anticipated peak occupancy/visitor rates.
- Ownership of off-street car parking space provision to be decoupled from single dwellings/ tenancies, to ensure flexible and efficient use.
- Electric vehicle charging should be located in consolidated off-street car parking facilities.
- On-street parking, where provided, will also be limited, instead prioritising kerbside access for deliveries and drop-offs, car-share schemes and disability parking.
- Parking controls (fees and time limits) will be used to ensure efficient use of on-street parking, consistent with the plan objectives. Parking permits for residents and commercial/other occupiers will not be provided.
- Appropriate management of parking controls in streets surrounding Arden to prevent parking overspill.

6 Celebrating water

Managing flooding
Urban water cycle



Arden will incorporate water as a feature of the landscape through innovative and creative flood mitigation solutions. The Moonee Ponds Creek corridor will be valued as an environmental, recreational and active transport asset, and an integrated water management approach will ensure that water is shared and reused across the precinct.

– Arden Vision, 2018.

Water is a fact of life in Arden and demands a comprehensive and multi-faceted approach to ensure the precinct is safe and feasible to develop.

Much of the land in Arden is impacted by flooding in a major rain event and during frequent nuisance flooding events. Flows from across Melbourne's inner north-west impact the precinct and converge on the lowest lying areas behind the existing levee banks near the Arden Street bridge and along the edges of Moonee Ponds Creek corridor. The current drainage system is not designed to manage this stormwater, resulting in unsafe flood depths in some of the lowest lying areas of the precinct.

Conveyance of water along streets, strategic flooding, and the use of natural-based water strategies to hold and filter water will play an important role in managing water and providing opportunities for urban cooling, water quality improvements and restoring biodiversity.

Flood risk in Arden

Arden is affected by flooding from several different sources as shown in Plan 9.

Arden is low lying and subject to flooding both from stormwater runoff from surrounding higher areas, and flooding from the Moonee Ponds Creek. Existing levees along the creek provide some flood protection however, they are often breached during heavy rain events. Stormwater runoff converges at the levees but is unable to discharge into Moonee Ponds Creek once it is full.

Flood modelling indicates that in extreme storm events, the majority of the precinct would be affected by flooding.

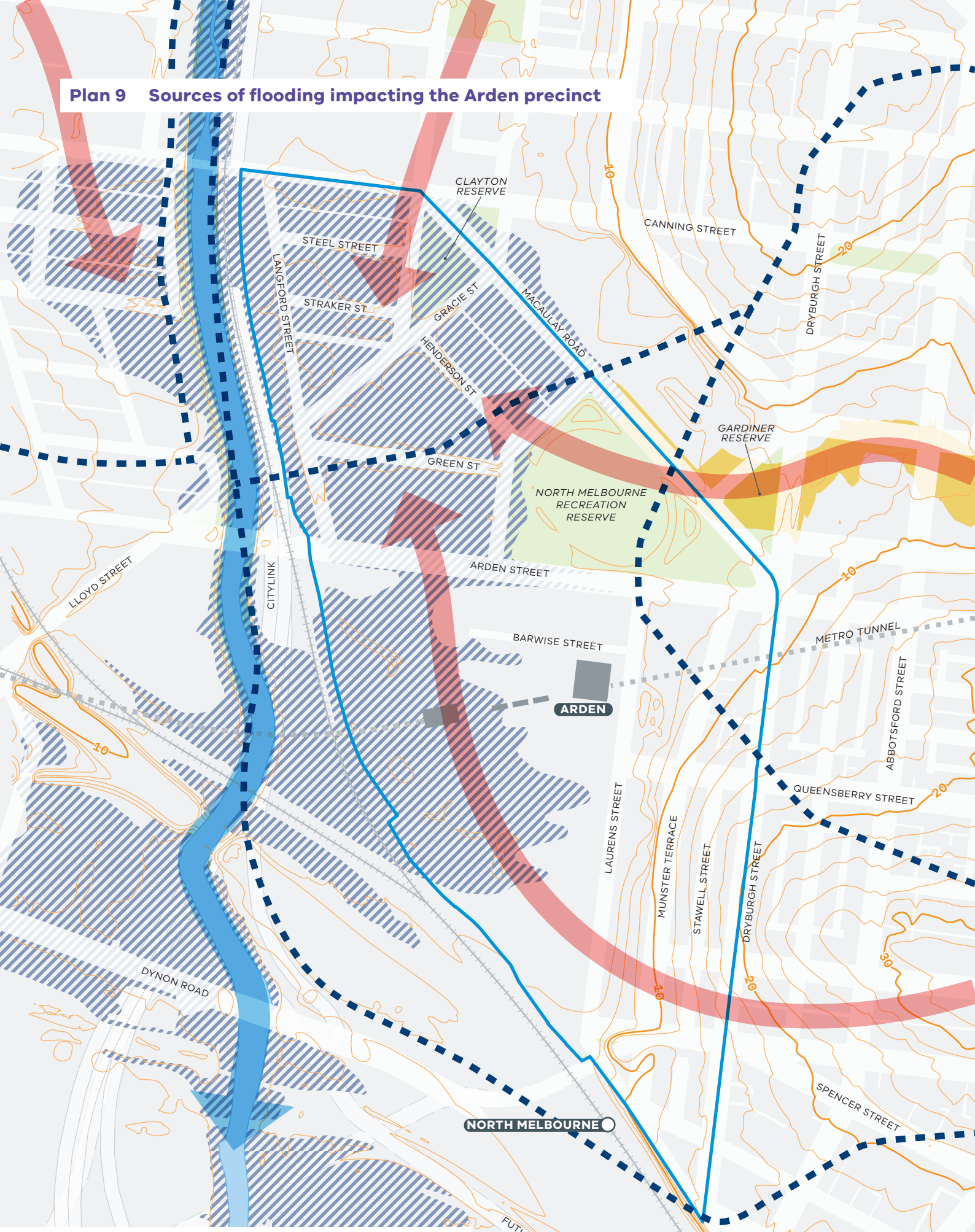
Various authorities have responsibility for planning for the management of flood risks in Arden.

The Land Subject to Inundation Overlay (shown in Plan 9) identifies where planning applications may be affected by flooding and should be referred to Melbourne Water for consideration. These overlays are currently being updated by the City of Melbourne and will be released in late 2020.

DELWP's *Guidelines for Development in Flood Affected Areas* (February 2019) specifies the protection of human life and health and to provide safety from flood hazard as the main objectives for flood management. Melbourne Water is the relevant flood plain management authority related to Moonee Ponds Creek while council is the relevant authority for local drainage and flooding.

Figure 41 Flooding of the Moonee Ponds Creek at the Macaulay Road Bridge.

Plan 9 Sources of flooding impacting the Arden precinct



OBJECTIVE 19

Safely manage the risk of flooding to future development of Arden through innovative and creative flood management solutions in the natural landscape and built environment.

Water will be a positive, visible and ephemeral contribution to the public realm and open space, including along Arden Street, Queensberry Street and Fogarty Street. Celebrating water in the landscape will have multiple benefits by slowing and storing stormwater and providing ecological regeneration and enhanced biodiversity.

A central feature of Arden North will be a new integrated stormwater management open space which will be designed to flood during heavy rain events. This space will also provide a range of recreation, biodiversity, community and cultural uses.

Water storage areas to the west of Langford Street in Arden North and along the Upfield railway corridor in Arden Central will provide further opportunities for passive recreation and urban greening and cooling.

Detailed design work will be undertaken to finalise the design of open spaces, including the integrated stormwater management open spaces. Engagement with the community and traditional custodians will form part of this process to ensure that the spaces reflect the cultural values and aspirations for the area.

STRATEGY 19.1

Implement the precinct-wide flood management strategy for Arden (shown in Plan 10).

STRATEGY 19.2

Manage flooding risk where residual flooding exceeds safe levels through planning controls and guidance to deliver development safe from flooding, achieves good quality urban design outcomes and is equitably accessible.

STRATEGY 19.3

Investigate opportunities for the integration of water sensitive urban design in streets and open spaces to provide for passive irrigation of street trees and provide urban greening.

STRATEGY 19.4

Provide for universal access to the whole of the public realm and positively respond to any necessary level changes that are required for drainage purposes between development and the public realm.

Figure 42 Example of potential water sensitive urban design. Chulalongkorn University Centenary Park stores water during rain events to help manage urban flooding in Bangkok. (Source: Landezine, 2016)

Figure 43 Darling Harbour, Sydney is an example of a shared path and civic space that combines water management open spaces with green space in the public realm. (Source: Landezine 2018)

Arden flood management strategy

A drainage strategy to manage the impacts of flooding is being prepared by Melbourne Water and will ensure that local stormwater runoff and riverine flooding from Moonee Ponds Creek can be managed as safely as possible at a precinct-wide level and allow for the development of other land in the precinct.

The Arden flood management strategy (described in Plan 10) will include natural and built infrastructure works to manage the risk of flooding and unlock development in the precinct. This combination of works is required to ensure flooding is managed safely in Arden while also delivering opportunities for urban greening, open space, recreation and biodiversity. The works in the Arden flood management strategy include:

- Raising and extending the levees for the Moonee Ponds Creek
- Defining flow paths along key streets and in the landscape, including Fogarty Street and Queensberry Street. There is the opportunity to integrate flow paths with water sensitive urban design to capture, store, treat and convey water.
- Creating Integrated stormwater management open spaces which will double as open space
- Installing below-ground flood storage in an existing recreation area
- Upgrading pump stations and pipes
- Improvements to the public realm including raising identified streets
- Raising floor levels of buildings in some locations to manage residual flooding risk.

A range of mechanisms will be explored to collect financial contributions to fund the flood management works, including a Development Services Scheme. Melbourne Water will consult on its proposed scheme alongside consultation on the final Arden Structure Plan and associated planning scheme amendment.

Planning will seek to deliver Arden's Flood Management Strategy in coordination with the aspirations of the Moonee Ponds Creek Strategic Opportunities Plan.

Landowners to be affected by this strategy will be contacted separately by Melbourne Water who will provide further information.

Permitting new development

Melbourne Water is the relevant authority relating to flooding within the Moonee Ponds Creek Floodplain, and the City of Melbourne is the relevant drainage authority outside of these areas. To ensure public safety and the appropriate development within floodplains, Melbourne Water requires:

Access

All flood-affected properties will need to ensure access if possible where depth of flooding is less than 0.4 metres deep for the 1 per cent AEP event.

Where access depth is more than 0.4 metres deep but less than 0.8 metres deep, this may be acceptable if the duration that the flood depth exceeds 0.4 metres is less than two hours.

Setting floor levels

It is likely that building floor levels for some future development within the Arden–Macaulay precinct will need to be raised above the footpath level to prevent buildings being flooded.

Under the *Victorian Building Regulations 2005*, floor level heights for buildings should be set a minimum 300mm freeboard above the applicable flood level, or as otherwise determined by the floodplain management authority. Requirements differ depending on whether the development is in a floodplain or an overland flow path.

Appropriate freeboard* would be:

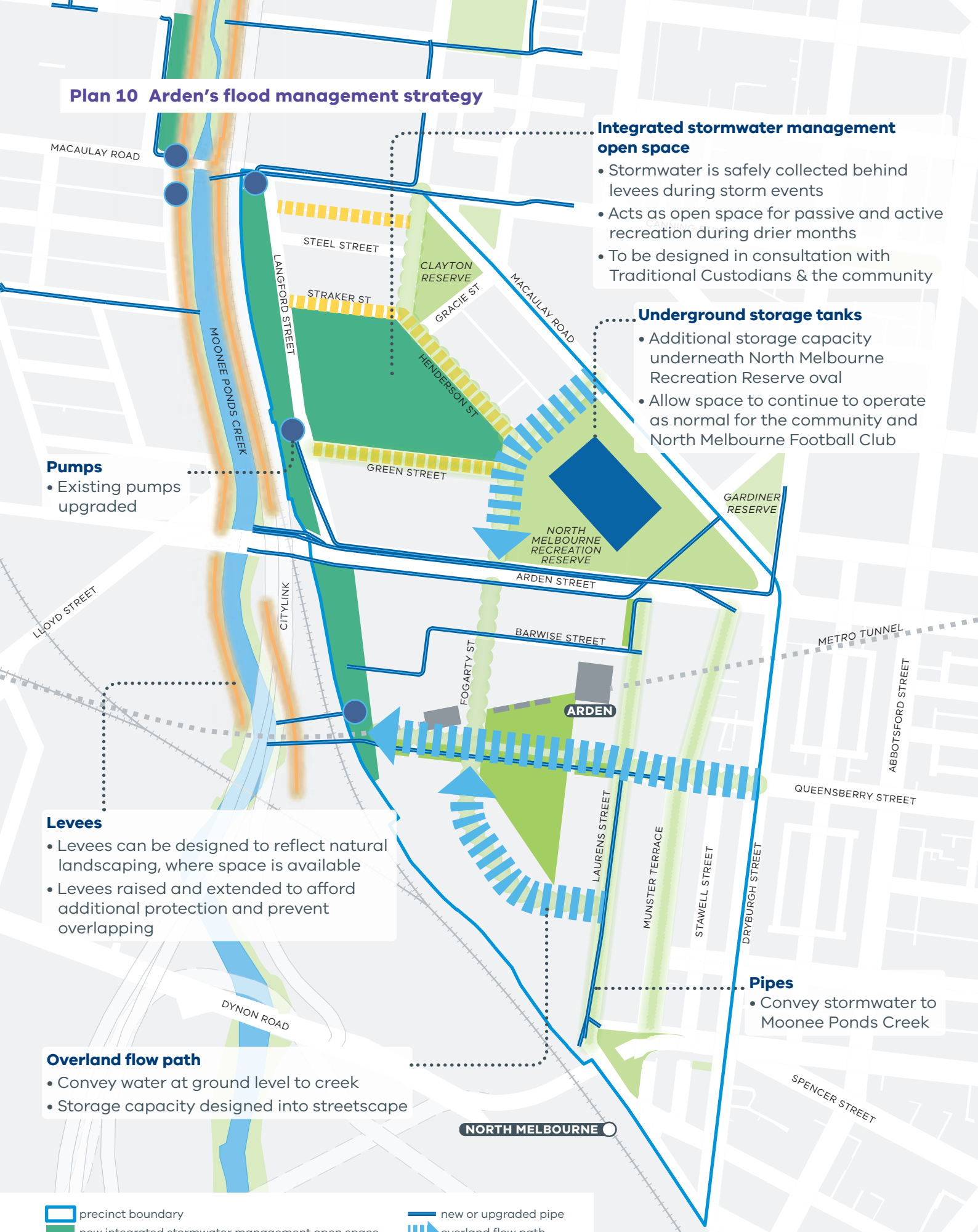
- 0.6 metres above 1 per cent AEP flood level when pumps fail where properties are impacted by ponded stormwater (such as behind the Moonee Ponds Creek levees)
- 0.3 metres above 1 per cent AEP flood level when pumps fail where properties are impacted by overland flow paths.

As the precinct is impacted by sea level rise, the minimum floor levels will be 3 metres Australian height datum (AHD) for sensitive uses. Where the ground floor use is a non-sensitive use, the 0.6 metre freeboard may not be required.

Higher floor levels will be required where the local 1 per cent AEP flood level, when the pumps fail, exceeds 3.0 metres AHD.

* Freeboard: A factor of safety above design flood levels, typically used in relation to the setting of floor levels, and levee crest heights. It is usually expressed as a height above the design flood level. Freeboard tends to compensate for flood prediction uncertainties and for factors which increase flood levels, such as a wave action, localised hydraulic effects, settlement of levees. It should not be relied upon to provide protection for events larger than the design flood. (Flood Victoria, 2020)

Plan 10 Arden's flood management strategy



Integrated stormwater management open space

- Stormwater is safely collected behind levees during storm events
- Acts as open space for passive and active recreation during drier months
- To be designed in consultation with Traditional Custodians & the community

Underground storage tanks

- Additional storage capacity underneath North Melbourne Recreation Reserve oval
- Allow space to continue to operate as normal for the community and North Melbourne Football Club

Pumps

- Existing pumps upgraded

Levees

- Levees can be designed to reflect natural landscaping, where space is available
- Levees raised and extended to afford additional protection and prevent overlapping

Pipes

- Convey stormwater to Moonee Ponds Creek

Overland flow path

- Convey water at ground level to creek
- Storage capacity designed into streetscape

precinct boundary
new integrated stormwater management open space
new open space
existing open space
new or upgraded levee
investigation area for the raising of streets
new or upgraded pipe
overland flow path
pump station
urban boulevard
green link

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Designing in flood-prone areas

In order to fully mitigate the risk of flood to life and property in Arden, ground floor levels of some buildings will need to be raised above the forecast flood level. The height to which the ground floor level needs to be raised will depend on the proposed use and flood depth, with residential uses needing to be raised higher than other uses.

It is especially important that the interfaces of raised floor buildings respond positively to the public realm. Poor design results in complicated, unattractive and inequitable combinations of stairs and ramps to overcome the height difference from the street to the ground floor and that undermine the experience at the street-level (see poor examples on this page).

For example, raising ground floor levels in activity centres where retail uses are proposed can be difficult as many businesses rely on easy, at-grade access for pedestrians from the street.

Urban design issues that result from required finished floor levels can be overcome through careful design considerations, design detail and landscaping.

The City of Melbourne will work with Melbourne Water and other Victorian Government departments and agencies to prepare further guidance on urban design in flood-prone areas, to be released in late-2020.

Figure 44 This page: Examples of poor flood-responsive urban design that do not provide an active street frontage.

Where possible, activity centres will be located away from the most flood-prone parts of Arden. Where active interfaces are proposed in flood-prone areas, considerations may be given to the design of level changes that provide required flood protection but also ensure active, safe and attractive edges to streets.

Level management can be layered to provide a softened landscape presentation, best practice management of privacy and activation, and limit the height of any vertical barrier to the street edge.

Both land use and urban design need to be considered when delivering the required flood protection in Arden.

Figure 45 This page: Examples of good flood-responsive urban design that provides an active street frontage.

OBJECTIVE 20

Establish an alternative water system across Arden that provides access to high-quality alternative water to be used in buildings and to irrigate open spaces.

Securing water supply is a significant challenge for Victoria. Projected population growth and changes to climate will increase pressure on our current potable water sources and reduce the amount of water available for use.

To help meet this challenge, the Victorian Government has prepared *Water for Victoria* (2016), a strategic plan that guides the management of water to support a healthy environment, prosperous economy and thriving communities now and for the future. The plan identifies urban areas as a significant opportunity to help embed resilience in local communities, encourage better use of water and improve the environment.

The renewal of Arden is a unique opportunity to rethink the way water is managed in urban environments.

City West Water, in collaboration with the Victorian Government, and members of the Maribyrnong Integrated Water Management Forum, is investigating the opportunity to secure an alternative water supply for indoor and outdoor non-potable uses in Arden. Alternative water sources under investigation include local stormwater harvesting and sewer mining.

Any alternative water plant will be located appropriately to best integrate with the existing infrastructure in the precinct and be designed to meet anticipated water demand. Uses for alternative water in Arden could include:

- Irrigation of sports fields, open spaces and streetscape landscaping throughout Arden
- Toilet flushing, laundry and watering of private green spaces within Arden Central.

The supply of alternative water for internal uses is proposed for Arden Central as this area presents the greatest opportunity in the precinct to establish an alternative water system due to the proposed density and level of certainty of new development.

New developments in Arden will be responsible for providing on-site water retention infrastructure to ensure there is no net-increase to the impervious surface area per development and to manage the stormwater runoff from the site to meet pollution reduction requirements. This will be delivered in line with local best practice environmental management targets and could include green roofs, rain gardens and rainwater tanks.

STRATEGY 20.1

Support the delivery of an alternative water treatment plant and associated third-pipe infrastructure to provide recycled water as a substitute for potable water for toilet flushing, laundry and irrigation across all public and private development in Arden Central.

STRATEGY 20.2

Identify an appropriate location for an alternative water treatment plant (approximately 2,000 square metres) and storage tank (approximately 2,500 square metres) for the Arden precinct through master planning of Arden Central.

STRATEGY 20.3

Design buildings to capture rainwater to minimise flooding, improve stormwater quality and create an alternative water resource.

The urban water cycle & integrated water management

The natural water cycle is impacted by urbanisation. Buildings, concrete and other sealed surfaces prevent water from soaking into the ground. As a result, natural water flows are altered, and surface stormwater is created contributing to surface pollutants, flooding and decreased soil moisture.

Stormwater is rain that has collected on roofs, roads, footpaths and other sealed surfaces. It flows directly into our waterways via the stormwater drainage network. When water meets surfaces such as roofs, roads and footpaths, it becomes contaminated with oils, metals, litter and other pollutants. Stormwater drains do not usually have any treatment systems, so pollutants are carried directly into our waterways, bays and oceans.

In Arden, impermeable surfaces and a lack of existing planting have already significantly altered the local water system, preventing stormwater from soaking into the ground and reducing evapotranspiration. As a result surface stormwater flowing into the Moonee Ponds Creek is heightened and worsens urban waterway pollution.

Although excess amounts of stormwater can cause problems in urban areas, it is also a very valuable resource for enhancing the liveability of our city. Significant local stormwater in Arden could be captured and treated to provide an alternative water source for the precinct. This will be achieved through the adoption of an integrated water management (IWM) approach described in Chapter 4 and Chapter 6. Some of the elements of an IWM are described in Figure 43.

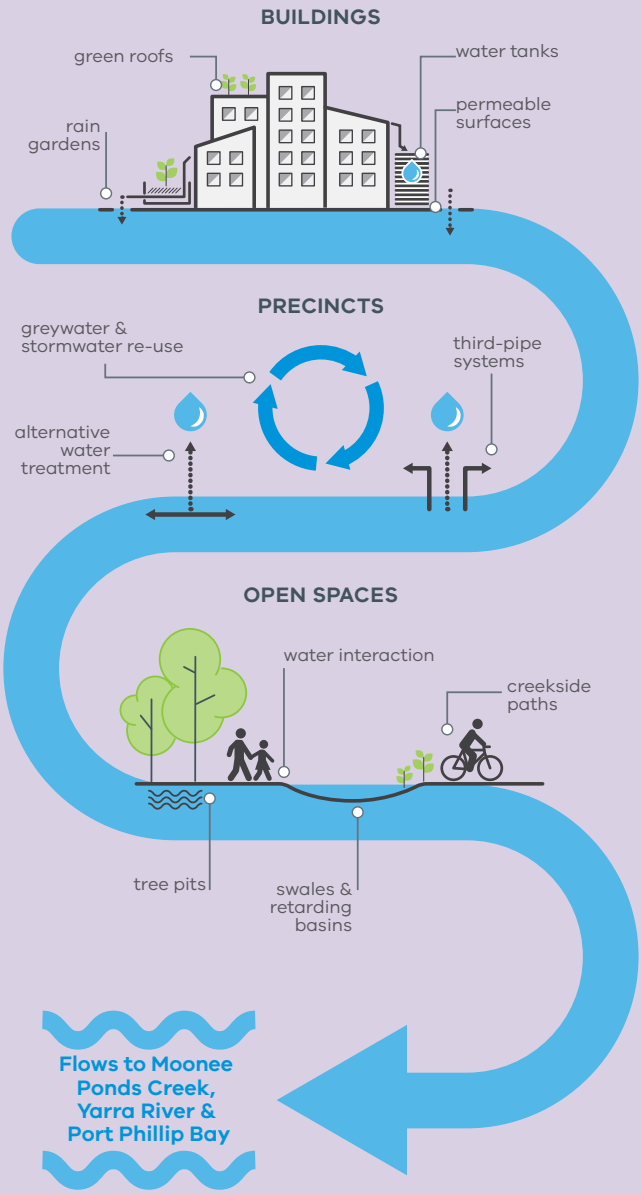


Figure 46 Elements of integrated water management. Source: *Arden Vision*, 2018.

7 Creating diverse open spaces

Open space network

Open space design

Arden will be a cooler and greener version of the central city, with a generous and well-connected open space network, providing multi-functional spaces for recreation, socialising, active transport and biodiversity.

– Arden Vision, 2018.

Arden's open space and public realm network will be designed to support the health of the community and the environment; celebrate cultural values and heritage and create opportunities for collaboration and innovation.

A cleverly designed, generous and integrated network of open spaces will celebrate water in the landscape and be a core part of the precinct's identity. The detailed planning of open spaces will draw on the rich Aboriginal and natural history of the area and local knowledge of the community to inform the design of the public realm and restore connections with the Moonee Ponds Creek and Arden's ecology.

Much loved parks such as the Clayton Reserve dog park, the North Melbourne Recreation Reserve and the green streets that connect them will be retained and enhanced.

The network of existing green streets will be transformed through extensive tree planting and sustainable transport goals will be reinforced through connected, cool and safe streets.

Figure 47 Pancras Square in Kings Cross Central, London is an example of the type and function of the future open space in Arden Central.

OBJECTIVE 21

Provide generous, well-designed and accessible open spaces that are diverse and flexible to meet the needs of Arden's evolving community and visitors to the precinct.

Arden will have a network of high quality and connected open spaces including parks, civic plazas and active and passive recreation spaces. These spaces will be robust and capable of adapting to changing conditions and community demographics to ensure they can serve the needs of the many different groups and individuals of Arden's community over a long period of time.

Planning for Arden has looked to international best practice, such as Battery Park in New York City and Kings Cross Central in London, to provide direction on carrying forward the industrial heritage and character into the public realm and integrating water into the spaces of everyday life.

The defining feature of Arden's open space network will be a new 1.6 hectare space adjacent to Arden Station that will be delivered early in the project. This space will provide a range of functions from managing the activity and vibrancy of a major metro train station to hosting festivals and events. Directly to the south, a neighbourhood open space will serve a range of passive recreation, play and informal activities.

In Arden North an integrated water management open space will connect the existing North Melbourne Recreation Reserve to the Moonee Ponds Creek corridor. In significant rainfall events this park will temporarily collect and manage stormwater. Clever design will ensure the space safely and effectively serves its flooding function, be a great asset to the community and improve local biodiversity.

STRATEGY 21.1

Deliver a new 1.6 hectare open space in Arden Central comprising a Capital City open space and a neighbourhood open space to align with the City of Melbourne's *Open Space Strategy*. This will be delivered early to complement the opening of Arden Station.

STRATEGY 21.2

Deliver 5.9 hectares of new integrated stormwater management open space for informal recreation in Arden North that is able to safely serve a stormwater function in extreme rainfall events.

STRATEGY 21.3

Deliver a linear park along Munster Terrace and a shared path along the western edge to create green links and walking tracks.

STRATEGY 21.4

Preserve opportunities for connecting spaces with the Moonee Ponds Creek by providing additional integrated stormwater management open space along the precinct western edge.

STRATEGY 21.5

Coordinate open space contributions to deliver open spaces throughout the precinct to ensure residents, workers and visitors have access to these spaces within an easy 300m walk.

STRATEGY 21.6

Explore opportunities to enhance existing open space assets.

STRATEGY 21.7

Collaborate across Victorian Government, local government and water authorities to realise the open space and recreational aspirations of the *Moonee Ponds Creek Strategic Opportunities Plan* for Arden.

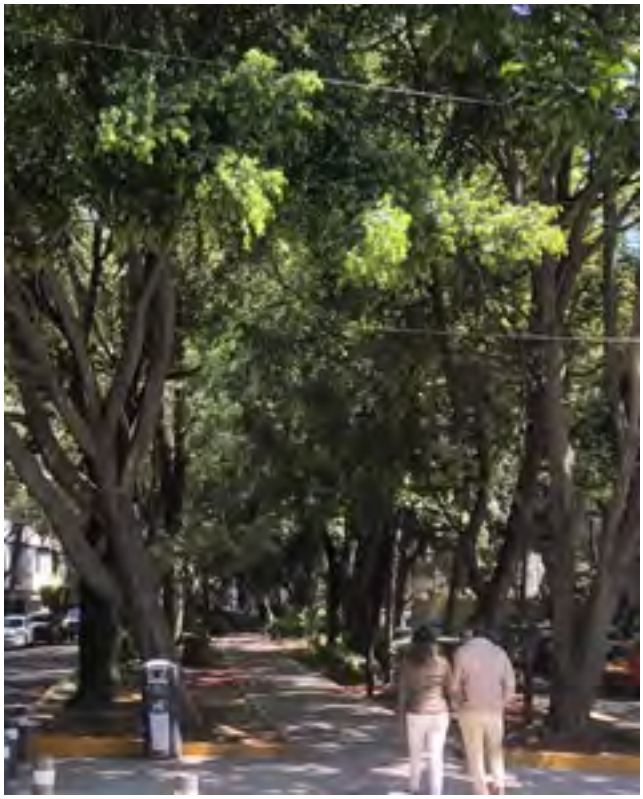


Figure 48 Increased tree canopy cover will improve urban cooling and greening in Arden.

Figure 49 Opportunities to enhance existing open space assets such as Clayton Reserve.

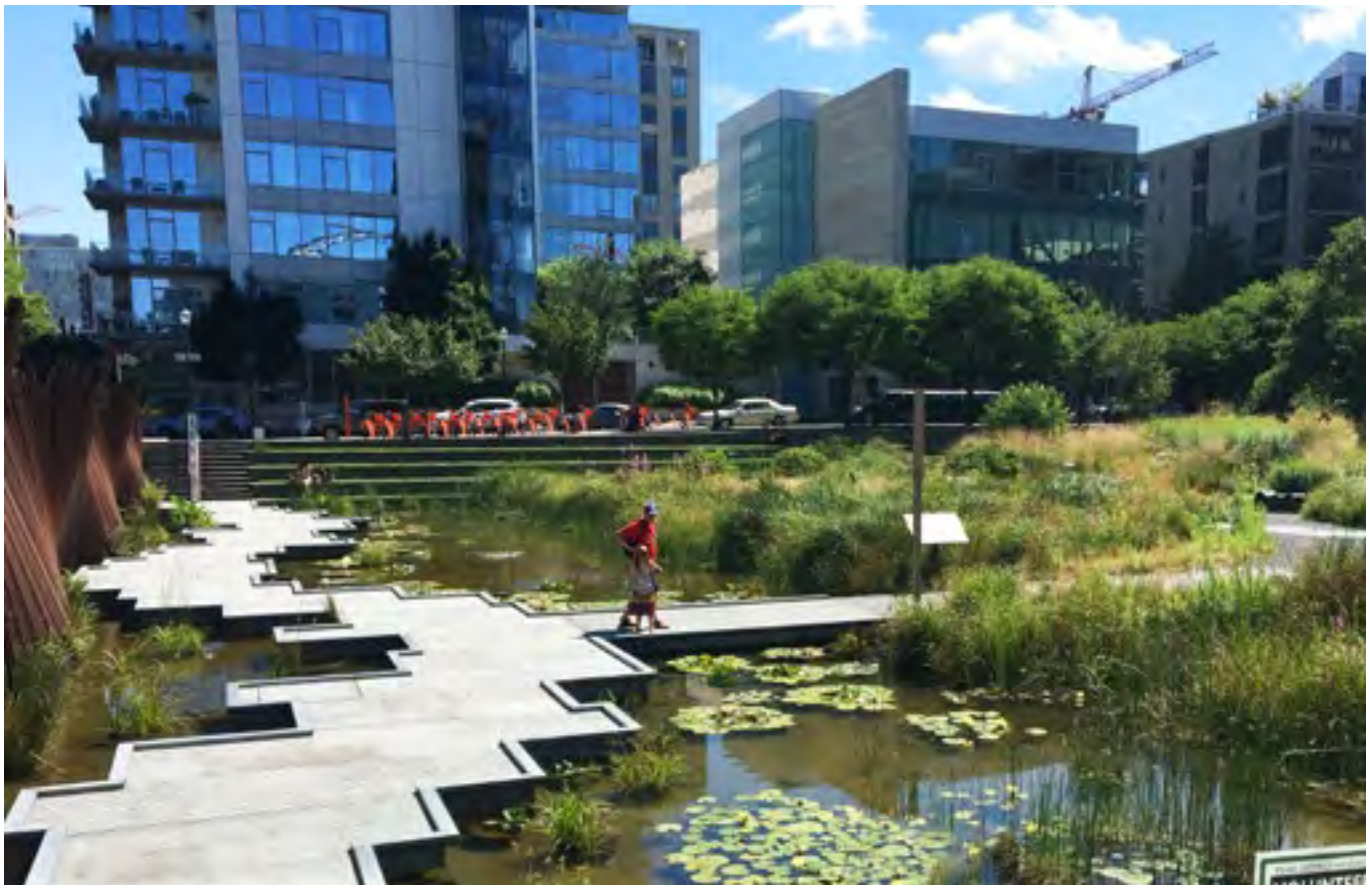


Figure 50 Example of an open space in Portland, Oregon which also manages stormwater during flood events

Arden's proposed open space and public realm network

Type	Catchment	Size	Character
Existing			
North Melbourne Recreation Reserve	Municipal 2km	4.5 hectares	• Restricted sporting • Recreation
Clayton Reserve	Local 300m	0.7 hectare	• Informal use • Seating/viewing
Macaulay Road & Canning Street Reserve	Small local 300m	0.2 hectare	• Informal use • Seating/viewing
Railway Place & Miller Street Park	Small local 300m	0.1 hectare	• Informal use • Seating/viewing
Total existing unencumbered, unrestricted open space		**1.0 hectares**	
Total existing open space		**5.5 hectares**	
Proposed new space			
Arden Central Capital City open space	Capital city N/A, regional function	0.6 hectare	• Civic • Events • Square or urban plaza • Water feature
Arden Central neighbourhood open space	Neighbourhood 500m	1.0 hectare	• Recreation • Informal use • Play
Arden North and Arden Central integrated stormwater management open space	Municipal 2km	6.0 hectares	• Informal use • Heritage • Nature conservation • Water feature
Munster Terrace linear park	Small local 300m	TBC	• Linear • Informal use • Seating/viewing
Western edge green link	Small local link N/A	N/A	• Linear • Seating/viewing
Total proposed unencumbered, unrestricted open space		**1.0 hectare**	
Total proposed open space		**7.6 hectares**	

What is open space?

Open space is the public land set aside primarily for recreation, nature conservation, passive outdoor enjoyment and public gatherings.

Encumbered open space is open space that is constrained in function to an extent, such as due to service use requirements or below-standard access to sunlight.

Restricted open space refers to space that is only available on a fee-paying or club membership basis some or all of the time, such as space used by professional sporting clubs.

Plan 11 Arden's future public realm and open space network

OBJECTIVE 22

Establish design excellence and design objectives for streets, open spaces and development interfaces to ensure the public realm works as a seamless, integrated and continuous space for people.

Arden's public realm and open space network will be designed to meet economic, social and environmental outcomes. Adopting a generic approach to open space would not produce the outcome and the place aspired to in the *Arden Vision*. Beyond simply looking at the amount of space provided, the structure plan aims to build on the existing features and characteristics of Arden, integrate principles from the surrounding area and look to international best practice to deliver a public realm and open space network that exemplifies a world leading urban renewal precinct.

Pedestrian-friendly streets and privately owned public spaces have an opportunity to extend and connect open spaces. The design of these spaces, such as forecourts, roof gardens and other in-between spaces, is key to ensuring they genuinely contribute to the public realm and open space network.

A design charter will be established to inform the overall design of the network, it will lead the co-design and programming of key spaces with the community and Traditional Custodians, and will guide developers in delivering projects that contribute to and enhance the public realm and open space network. Design excellence will ensure that spaces and places can serve multiple different roles and functions for different people, be flexible across the day, week and year, and evolve over time as people's needs change.

STRATEGY 22.1

Develop a design charter to guide the detailed design of public spaces and development interfaces.

STRATEGY 22.2

Encourage new spaces to build Arden's identity by integrating and enhancing existing assets of Arden's character and public realm including industrial character and existing mature planting.

STRATEGY 22.3

Limit carriageways and on-street car parking next to open spaces in order to increase their usability, connectivity and safety.

STRATEGY 22.4

Expand the urban forest through streetscape designs that provide ample space for street trees and people movement. A target of 40 per cent canopy coverage should be achieved in the public realm over time.

Figure 51 Increased tree canopy cover will improve urban cooling and greening in Arden.

Figure 52 Examples of the diversity of activities within a Capital City open space. Source: *Arden Public Realm and Open Space Strategy*, AECOM 2020.

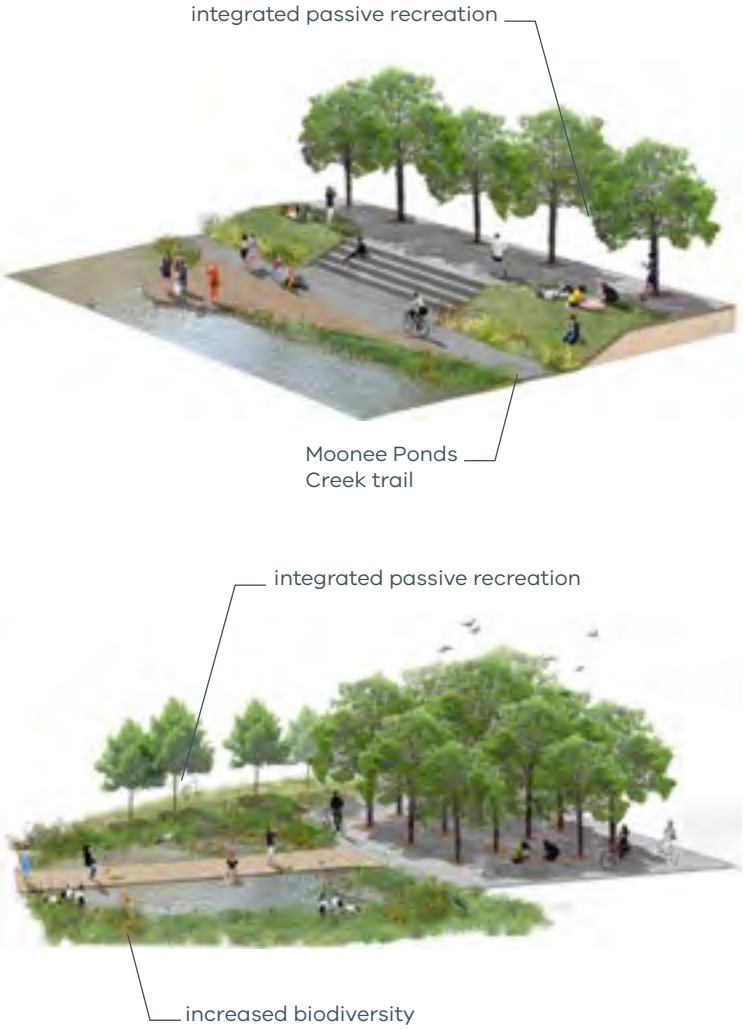


Figure 53 Examples of open spaces that also manage flooding. Source: *Arden Public Realm and Open Space Strategy*, AECOM 2020.

Figure 54 Examples of diverse activities within a neighbourhood open space. Source: *Arden Public Realm and Open Space Strategy*, AECOM 2020.

Planning for the Moonee Ponds Creek

The Moonee Ponds Creek has a significant role as a major natural connector between several communities located along the creek. By providing better connectivity to Arden and the surrounding communities, the creek can become a recreational asset integral to the precinct's identity.

Planning for Arden will seek to align with the *Moonee Pond Creek Strategic Opportunities Plan* (City of Melbourne, 2019), the *Moonee Ponds Creek Implementation Plan* (Victorian Planning Authority), as well as the Victorian Government's *Waterways of the West* project which provides for a community-led approach to protecting waterways for generations to come.

The plan identifies future upgrades to pedestrian and cycle connections across the creek at Arden Street and Macaulay Road, as well as two new pedestrian connections from Arden North to the western bank. This structure plan will allow for potential future connections to the Moonee Ponds Creek corridor in the design of the open space network in Arden North, including the design of integrated stormwater management open spaces near Langford Street.

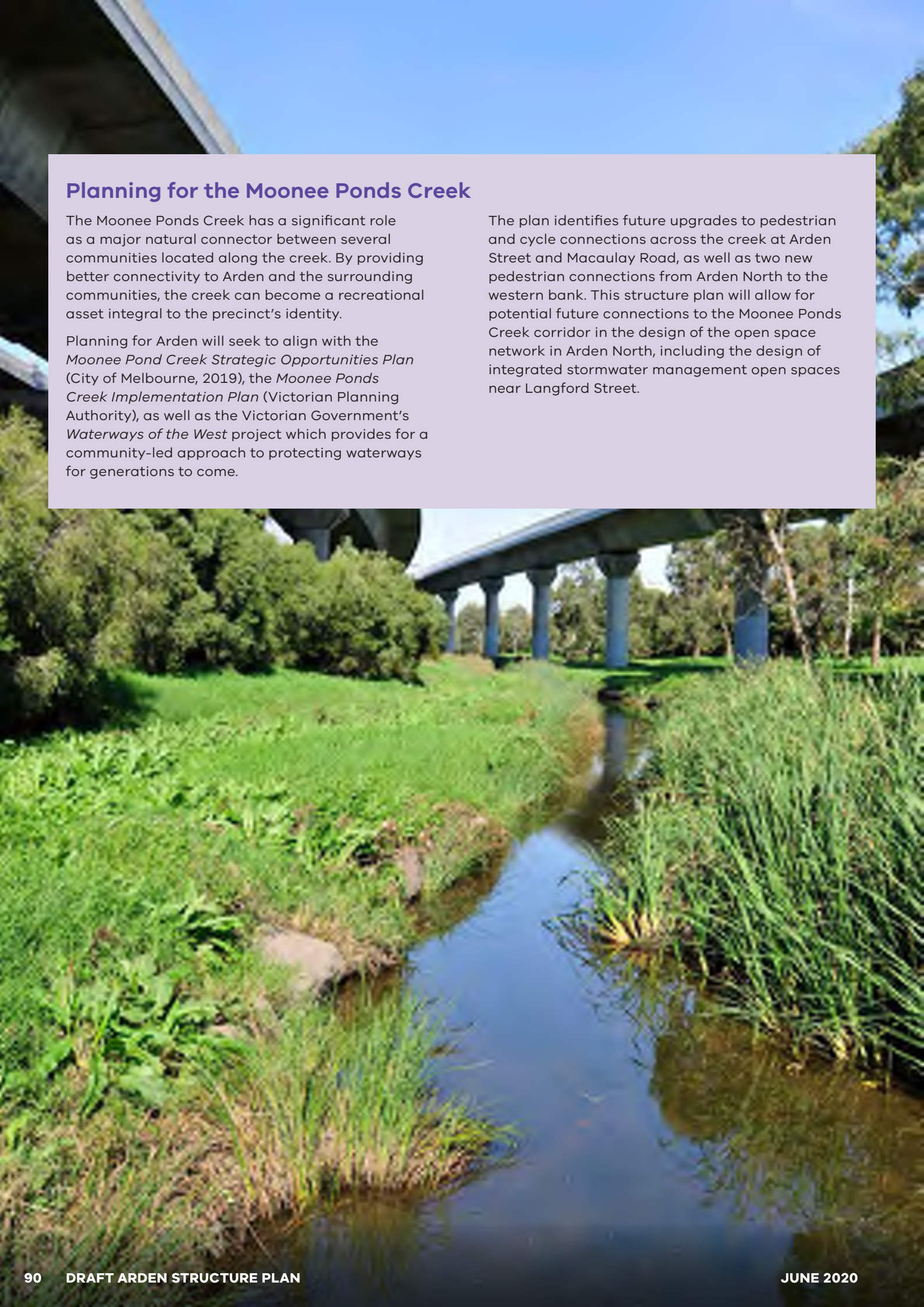
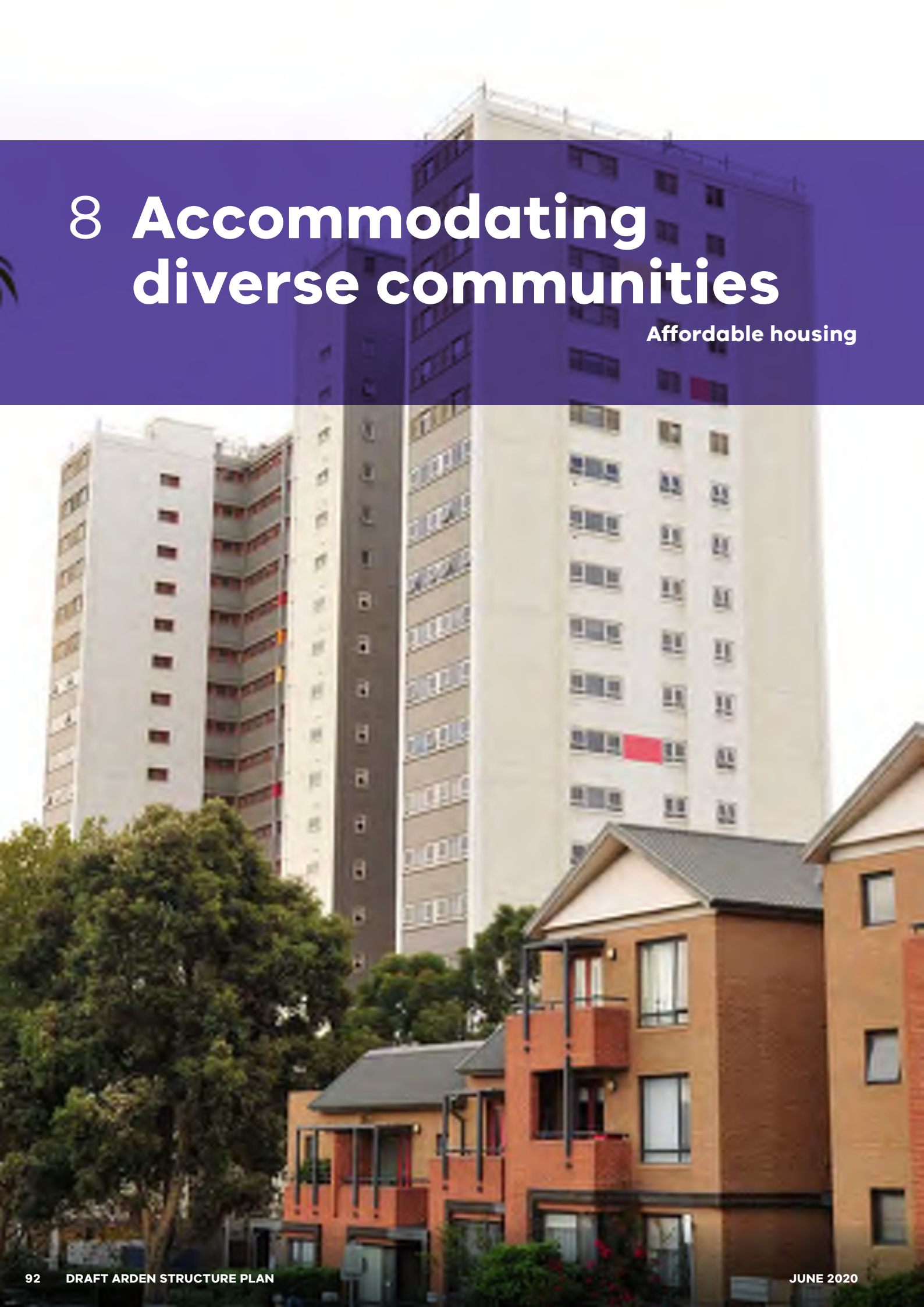


Figure 55 Top & above: Artist's impression of a re-imagined Moonee Ponds Creek from the *Moonee Ponds Creek Strategic Opportunities Plan*, 2019. Indicative only.

8 Accommodating diverse communities

Affordable housing



Arden will cater to a diversity of households across a range of ages and incomes, and address different needs with affordable housing. New homes will be well-designed, accessible and sustainable.

– Arden Vision, 2018.

Within the City of Melbourne there is a shortfall of 5,500 affordable rental dwellings. With no change this is expected to increase to over 23,200 dwellings by 2036.

Without appropriate provision of affordable housing, households experiencing housing stress face increased risk of homelessness and people experiencing homelessness have greater difficulty finding safe and appropriate accommodation.

Housing also plays a critical role in unlocking Arden's potential as an innovation precinct. Affordable housing will ensure Arden is an inclusive and affordable neighbourhood, providing housing for people like health workers, teachers, creatives and entrepreneurs.

In order to meet the future housing needs of the municipality, approximately one in four new dwellings will need to be affordable rental housing as defined by the P*lanning and Environment Act 1987* and industry standards.

The Victorian Government and the City of Melbourne recognise the importance of the Arden Precinct as setting the standard for urban renewal in Melbourne.

An Affordable Housing Strategy is being prepared for the final Arden Structure Plan to guide the development of planning controls that will ensure affordable housing is delivered. The strategy will identify the most appropriate types of affordable housing that should be delivered through the development of Arden. This should enable flexibility to respond to changing needs over time.

OBJECTIVE 23

Facilitate inclusive, well-designed, sustainable and accessible housing, with at least six per cent of all new housing in the precinct being affordable for very low to moderate income households and delivered as social and affordable housing or shared equity.

Arden's renewal is an invaluable opportunity to achieve global best practice in affordable housing to respond to the significant and growing shortfall in affordable housing across Melbourne. Affordable housing, as defined by the *Planning and Environment Act 1987*, is "housing, including social housing, that is appropriate for the housing needs of very low-income households, low income households and/or moderate income households." Industry standard defines housing as being 'affordable' where housing costs represent less than 30 per cent of household income for these household types.

Access to diverse, high quality and affordable housing is a priority for the ongoing productivity, liveability and social equality of Melbourne and Victoria. The households requiring this housing could work in the hospitals, cafés, schools and other services that underpin Melbourne's global reputation for liveability and prosperity. To retain these qualities, we must invest in affordable housing that is located close to jobs, amenity and services.

Across a range of policies and ministerial actions, both the City of Melbourne and the Victorian Government have recognised the importance of providing a greater supply of appropriate social and affordable housing in well located areas that have access to transport, employment and services.

STRATEGY 23.1

Establish affordable housing guidelines for Arden that provide clarity and certainty regarding the amount of housing required and the means of calculating it, the type and design quality of housing to be provided, and the process for how it will be provided.

STRATEGY 23.2

Require at least six per cent of new residential development be delivered through mechanisms such as community housing or shared equity.

STRATEGY 23.3

Require that up to 25 per cent of new housing be made available as affordable housing where City of Melbourne-owned land is redeveloped.

STRATEGY 23.4

Incentivise additional affordable and social housing provision on all types of land to achieve goals.

STRATEGY 23.5

Require that at least 10 per cent of all properties in government-led developments be prioritised for first home buyers through the Victorian Government's *Homes for Victorians* (2017) initiative.

STRATEGY 23.6

Require that at least five per cent of all private housing be universally accessible, to encourage assisted living and help residents age in place.

STRATEGY 23.7

Ensure that planning controls deliver a diversity of sizes of residential accommodation for all types of households.

Figure 56 Lampton Road is a new neighbourhood in London that will create over 900 new homes with 50 per cent being affordable housing. Source: Notting Hill Genesis.

Figure 57 Boyd Village is being delivered as part of the sale of City of Melbourne land and includes new community facilities and just under 15 per cent affordable housing. Source: PDG.

9 Investing in community infrastructure

Community hubs

Schools

Arden will support the existing and new community by providing infrastructure that is integrated with the existing area. The design of community facilities such as schools, will reflect best practice and community input.

– Arden Vision, 2018.

To support the health and wellbeing of residents, workers and students in Arden, new facilities such as the proposed government schools, recreation facilities, youth centres, libraries, arts facilities and community centres will be required. The provision of high-quality community infrastructure, delivered by both public and private providers, is integral to cultivating a culturally and socially cohesive community. Community spaces will bring the new and existing communities together and can become civic landmarks.

Community infrastructure will be integrated with Arden's innovation story by designing and delivering facilities and services, creating a lifestyle and community that attracts talented individuals and involving the community in the innovation occurring in the precinct.

Beyond serving the immediate community, Arden's central location in the north-west region of inner-Melbourne and high level of transport access means there are opportunities for some facilities to serve the region more broadly. Similarly, this high level of connectivity enables Arden to tap into and grow existing nearby communities, such as in the North Melbourne Arts Precinct.

OBJECTIVE 24

Ensure timely delivery of high-quality, accessible and integrated community infrastructure to meet the needs of existing and future residents, workers and visitors.

Providing equal and fair access to education, arts and cultural activities is key to ensuring that the growing community feels a sense of belonging and to promote social cohesion. Spaces that support the development, production and presentation of creative work will contribute to the new identity of the precinct as a thriving innovation precinct.

Innovation-focussed infrastructure in the heart of Arden Central will provide a variety of robust studios and workspaces that can support local enterprise and encourage multi-disciplinary collaboration between creative and innovation industries. Additional facilities integrated into mixed-use developments throughout the precinct will also support this collaborative practice.

Community hubs create the opportunity to blend spaces and facilities together, enabling partnerships between local government, state government and the private and not-for-profit sector. This will allow for the co-location of services such as maternal and child health services with a proposed government primary school and privately owned/operated child-care, and provide opportunities for workers, residents and students to share spaces like conference centres and libraries. The Dock library in Docklands was successfully delivered using the hub model. Community hubs in Arden North and Arden Central will be located to maximise access to open space, complementary services and facilities, and new and existing neighbourhoods.

STRATEGY 24.1

Deliver an innovation hub in Arden Central to serve the needs of the Arden innovation and creative community and surrounding areas.

STRATEGY 24.2

Deliver a family and community hub in Arden Central to serve the needs of the Arden community.

STRATEGY 24.3

Deliver an arts, cultural and community hub in Arden North to serve the needs of the Arden community.

STRATEGY 24.4

Explore opportunities to upgrade and expand the North Melbourne Recreation Reserve to serve the needs of the Arden community and surrounding areas.

STRATEGY 24.5

Co-locate proposed community facilities, proposed government schools and sports facilities described in Plan 12 to maximise access and deliver opportunities through sharing complementary infrastructure.

STRATEGY 24.6

Provide community facilities that are diverse and adaptable to serve the changing needs of people over time, and beneficial, supportive and appropriate for people with special needs, including families, the ageing and elderly population, people with disabilities and those with different cultural and social needs.

STRATEGY 24.7

Support and facilitate the delivery of creative space by private providers including live/work artist studios, gallery spaces, rehearsal and performance spaces, and creative workshops, in addition to services provided within public community hubs.

STRATEGY 24.8

Support and facilitate the delivery of aged care and long day childcare facilities by private providers, in addition to the aged and childcare services provided within public community hubs.

Plan 12 Arden's proposed community facilities

Arden North arts, cultural & community hub

- Library services and creative technologies
- Multi-purpose bookable rooms
- Aboriginal cultural interpretation space
- Ancillary lettable space for health services and Aboriginal businesses

Innovation hub

- Innovation and technology labs
- Artists and makers spaces
- Co-working spaces
- Presentation spaces

Proposed government primary school

- Primary school
- Kindergarten
- Maternal and child health services
- Playgroup space

Arden Central family & community hub

- Older persons and disability services
- Multi-purpose bookable meeting space

precinct boundary
Arden Central community hub
arts, cultural & community hub
innovation hub
proposed government primary school
proposed government secondary school investigation site
potential institutional use
existing community facilities
active recreation opportunity
new open space
existing open space
new integrated stormwater management open space

Note: The location of proposed government schools is subject to further investigation and agreement.

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Case study: Community hubs

Cultural Centre Rozet
Arnhem, Netherlands

The Cultural Centre Rozet is a mixed arts and culture facility located in a dense and developing neighbourhood. Incorporating two libraries, a heritage centre, art centre and community college, the 12,000 square metre project is close to a train station and was a catalyst for further urban development in the area. The project boasts exemplary and interactive sustainability credentials, complete with a public green roof that showcases water management, biodiversity and renewable energy.

Figure 58 Above & right: External and internal views of Cultural Centre Rozet.

Artscape Daniels Launchpad
Toronto, Canada

Artscape Daniels Launchpad is a first-of-its-kind creative entrepreneurship hub designed to help emerging and established artists, designers and creators succeed like never before.

Launchpad offers members access to co-working spaces, state-of-the-art and multidisciplinary creative and technical studios, meeting and event facilities, and specialised creative entrepreneurship programs to support and inspire creative experimentation, learning and collaboration across many disciplines.

Figure 59 Collaborative spaces at work in Artscape Daniels Launchpad.

OBJECTIVE 25

Deliver educational facilities to meet the anticipated demographic demand.

Arden is expected to generate approximately 450 government primary school enrolments and 380 government secondary school enrolments, as well as approximately 200 non-government primary school and 300 non-government secondary school enrolments. There are no primary or secondary schools currently located within Arden, however several government and Catholic schools are within walking distance of the precinct. A proposed government primary school, North Melbourne Hill (interim name) is located nearby in Abbotsford Street, North Melbourne.

Based on the expected student demand, it is anticipated that there will be one additional government primary and one additional government secondary school required to meet the needs of the new community in Arden and the surrounding community. Providing flexibility to accommodate private education providers is also considered in the planning for Arden. There are opportunities to co-locate educational facilities with community facilities including multi-purpose rooms, kindergartens, early learning centres and indoor/outdoor sports courts to support a healthy and engaged community.

STRATEGY 25.1

Support the development of the proposed government primary school within Arden Central to serve the needs of the current and future Arden community and surrounding areas.

STRATEGY 25.2

Support development of the proposed government secondary school in the North Melbourne/Macaulay area to serve the needs of the current and future Arden community and surrounding areas.

STRATEGY 25.3

Ensure schools in Arden are innovatively planned and delivered to be located in proximity to or co-located with complementary services and spaces, including recreational spaces, activity centres, public transport services, kindergartens and early learning centres.

Figure 60 The façade and a playspace of South Melbourne Primary School.

Case study: Schools in urban renewal areas

South Melbourne Primary School

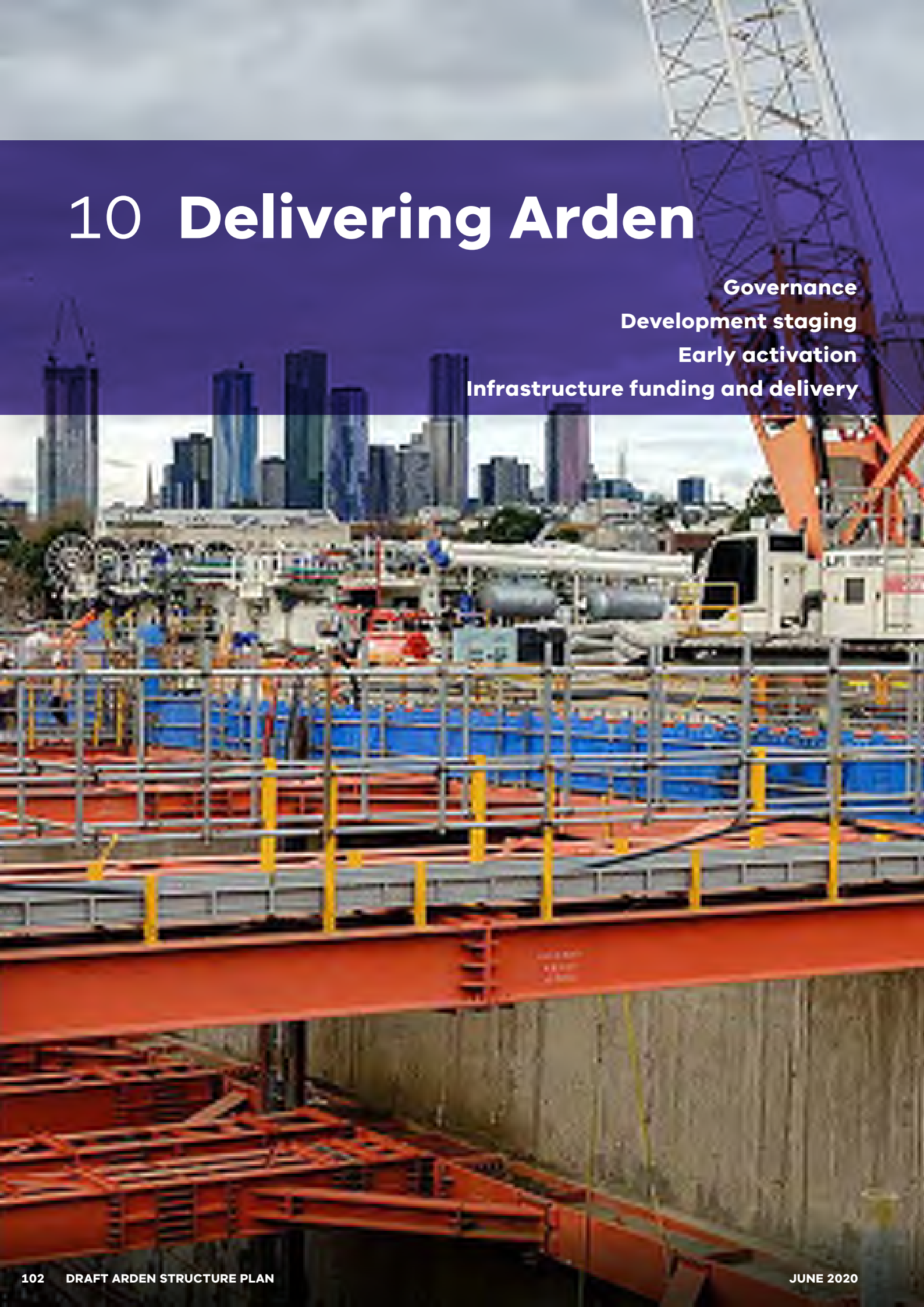
South Melbourne Primary School delivered in Fishermans Bend urban renewal area opened in 2018 and is Victoria's first vertical school. The internationally-awarded project joined the growing number of school designs responding to the challenge of providing educational facilities in dense environments.

The six-storey school maximises space by providing community facilities on the lower floors including an early learning centre, maternal and child health centre, multi-purpose community rooms and indoors and outdoors sports courts. It is an integrated and multi-functional part of the community available to be used when the school is out of session.

The safe integration of the school with the surrounding neighbourhood is supported by public realm and streetscape upgrades to maximise the school's ability to use nearby open space.

10 Delivering Arden

Governance
Development staging
Early activation
Infrastructure funding and delivery



The delivery of Arden as an innovation precinct that aspires to accommodate approximately 34,000 jobs and around 15,000 residents will be achieved over a period of more than 25 years. The complexity of delivering the strategies outlined within this structure plan and realising a world-class urban renewal site requires a whole of government approach and integrated and innovative approaches to governance, finance, delivery, ownership and management of infrastructure and development. This includes putting in place the servicing and utilities infrastructure required to meet future needs while responding to updates in technology, coordinating funding between all levels of government, private developers and other stakeholders to deliver a high-quality public realm, and applying the right planning controls to facilitate delivery.

Developing an agreed governance model amongst stakeholders will be an important early activity in Arden; to ensure clarity around ongoing decision-making and accountability amongst delivery partners. With a robust governance structure in place, Arden will be well placed to provide a sound precinct management and stewardship strategy, and to meet the ongoing and evolving needs of the precinct.

The overall delivery model for Arden is subject to ongoing and detailed testing to inform a delivery strategy that is effective in delivering infrastructure and development outcomes when they are needed and are equitable in sharing costs. As such the delivery model is subject to change.

OBJECTIVE 26

Ensure coordinated and collaborative staging of development on government owned land around the new Arden Station to effectively respond to existing conditions and ongoing business requirements and create a safe and vibrant place upon opening of the station.

A coordinated and collaborative development strategy will be required to ensure the success of the project. Consideration needs to be given to current and future landholders, residents and employers, the delivery of major infrastructure projects – in particular the Arden station due to open in 2025 – the curation of government landholdings and attracting tenants that will set the precinct's economic direction. The development strategy will also consider works required to make Arden 'development-ready', including flood management, contamination remediation, and noise and air pollution attenuation. The coordination of these elements is critical to place creation, investment attraction and community development.

The Victorian Government is committed to the development and curation of Arden to ensure that the objectives of a high quality place to live, and innovative place to work, are achieved. Early place shaping activities are essential to building identity and community connectedness and support Arden's innovation aspirations.

In addition to this, more detailed master-planning and delivery strategy process will follow this structure plan that will provide detail on how the precinct will be delivered and begin to work with key stakeholders, including the community and traditional custodians, to develop concept and detailed designs of key sites, places and streets in Arden.

STRATEGY 26.1

Develop an agreed precinct governance model with stakeholders to provide a sound framework for ongoing decision-making.

STRATEGY 26.2

Establish a delivery strategy that outlines precinct development coordination, staging and timing. This will include a strategy for government landholdings, an approach to working with the private development sector, and set out a coordinated approach to the delivery of key infrastructure items.

STRATEGY 26.3

Establish an application referrals and assessment process to ensure development outcomes are consistent with the objectives of the *Arden Vision* and Structure Plan.

STRATEGY 26.4

Collaborate with the Metro Tunnel Project and project partners to deliver construction phase and legacy phase projects as outlined in the Metro Tunnel Creative Strategy.

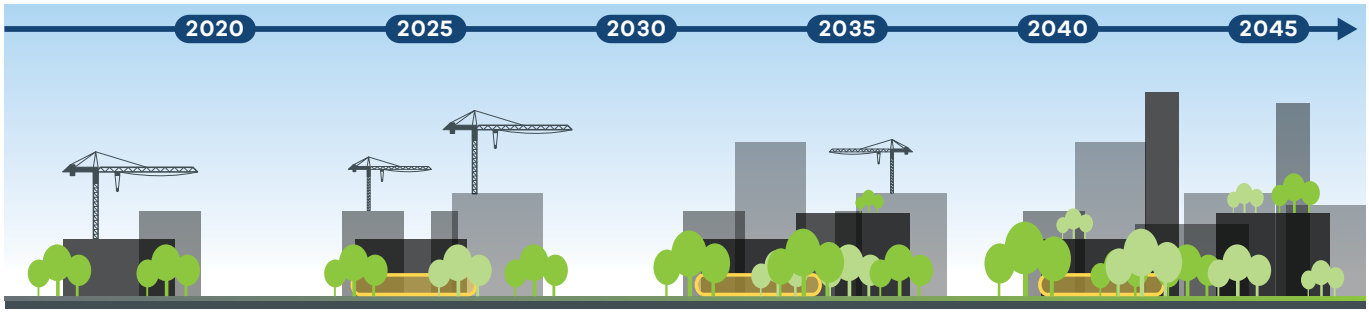


Figure 61 Timeline of Arden's anticipated transition to a mature precinct by 2050.

OBJECTIVE 27

Ensure that early activation and place shaping activities are delivered alongside early precinct development and in readiness for the Arden station opening, to create a distinct sense of place and a vibrant and interesting early precinct experience and ensure the long term success of the precinct.

Successful neighbourhoods have a strong quality of place; they offer quality urban amenity and quality experiences that attract strong visitation, accelerate outcomes, and increase interactions. Ensuring a focus on place shaping activities and early activation in the precinct will ensure positive early experiences and create a place identity for Arden, setting the precinct up for success in the longer term and supporting critical early investment in the precinct. This should include identifying key community groups to work with in developing and implementing the plan.

STRATEGY 27.1

Develop an Arden Place Plan that identifies, coordinates and communicates opportunities for early place creation and place-making activities that foster a strong sense of place and community identity.

OBJECTIVE 28

Ensure that new development responds to surrounding conditions including the transmission pressure gas pipelines and is not unduly impacted by noise, vibration and electromagnetic interference from the adjacent railway corridor, elevated roadway and Metro Tunnel Project.

While the adverse effects of the existing industrial land uses will transition over time, noise and vibration generated from the adjacent rail corridor, elevated roadway and Metro Tunnel Project will likely prevail into the future. For Arden to be a truly desirable place to live and work, new development must ensure that the place is protected from undesirable levels of noise.

The design of the Metro Tunnel includes mitigation measures which seek to achieve guideline targets for noise, vibration and electromagnetic interference (EMI) during operation. There is an onus on future developments to ensure that they are not unduly impacted by noise, vibration and electromagnetic interference from the Metro Tunnel infrastructure.

STRATEGY 28.1

Require noise-sensitive uses (such as apartments) to include noise and vibration attenuation measures when in proximity to the railway corridor and elevated freeway and address EMI in the case of the Metro Tunnel Project.

STRATEGY 28.2

Design buildings to ensure that new sensitive land uses located near noise, vibration and, in the case of the Metro Tunnel Project, EMI-emitting uses demonstrate that development is designed and constructed to achieve recommended amenity targets.

STRATEGY 28.3

Protect key public spaces in the precinct by shielding them from significant noise, vibration and, in the case of the Metro Tunnel Project, EMI sources through planned placement of vegetation, buildings and other mitigation strategies.

STRATEGY 28.4

Ensure permit applications within the measurement length of transmission pressure gas pipelines appropriately respond to manage the potential risk.

STRATEGY 28.5

Establish a referral process with relevant gas authorities to assess the permit applications.

OBJECTIVE 29

Make Arden adaptable to change while managing the impacts of existing uses that need to transition from the precinct.

Arden's long and rich industrial history dating back to the early 19th century will form an important part of the future character and identity of the precinct. However, land reclamation and filling in the late 19th century has led to widespread contamination across the precinct. The precinct's renewal to a mixed-use precinct will pose challenges including the remediation of potentially contaminated land and staging of adverse land uses and new development.

Several industrial activities in the area have been identified as incompatible with the planned mixed-use renewal of the precinct. As some industries will gradually transition from the area, the City of Melbourne and the Victorian Government will actively assist key landowners to facilitate positive outcomes. Existing industrial operations need to meet air quality control and noise standards, however the onus is on new sensitive land uses to ensure that they are not unduly impacted by emissions from existing industries. Collaboration with key landholders and businesses will be essential to ensuring new development is staged and located appropriately as the adverse land uses within the precinct transition out.

STRATEGY 29.1

Plan for the transition of incompatible existing industries by working with business owners to understand the potential impacts to business and to future use and development in Arden.

STRATEGY 29.2

Facilitate, where practical, a staged environmental assessment process to evaluate the suitability of sites for proposed development.

STRATEGY 29.3

Require that the Environmental Audit Overlay be applied as part of the Planning Scheme Amendment over sites that are potentially contaminated to ensure that appropriate site remediation occurs prior to development.

STRATEGY 29.4

Require new development in areas identified as being potentially contaminated to undertake further environmental assessment to determine whether potential sources of contamination are present and site remediation is required.

STRATEGY 29.5

Require new development of sensitive land uses to demonstrate building design and construction practices that manage the potential adverse amenity impacts from industrial uses.

OBJECTIVE 30

Provide critical infrastructure and utility services in a coordinated manner to support the planned development.

Critical to supporting the intensification of Arden will be the timely delivery of key enabling infrastructure, utilities and community services.

Projects will be identified for transport, integrated water management, social infrastructure, open space and public realm projects. Effective staging and coordination across infrastructure types will be required to enable delivery efficiencies.

Development around the new station will focus on ensuring a vibrant precinct heart; central open spaces, major tenants and industry-focussed facilities will be delivered to activate Arden Central and establish a foundation for Arden's economic productivity and innovation. As the precinct grows, community services, proposed government schools and additional open spaces will also be delivered to foster a sense of place and support the growing community and workers in the precinct.

Key streets and shared paths will be delivered to encourage walking and cycling throughout the precinct and create a connected network with the surrounding neighbourhoods. Public realm and street upgrades will be delivered accordingly to connect residents, workers and the surrounding community to new spaces and facilities as they are delivered. As Arden grows, residents, workers and visitors will have access to a multitude of active and public transport options.

A precinct infrastructure plan will be included in the *Arden Structure Plan* amendment package, providing a complete list of infrastructure items, including:

- new station at Arden
- new streets
- public realm upgrades to streets for cycling, public transport, pedestrian crossings
- alterations to North Melbourne Station (to be investigated)
- centralised car parking
- open space comprising a mix of green links, small local spaces, local parks, neighbourhood parks and the Capital City Open Space
- drainage and integrated water management comprising a mix of levees, pipes, pumps, public realm water sensitive urban design features, and flood storage measures
- utilities and sustainability including centralised waste management, water supply, sewer and telecommunications
- community infrastructure including libraries, business and innovation facilities, community hubs, arts and culture facilities, sport and recreation upgrades, and provision of education facilities.

STRATEGY 30.1

Prepare a precinct infrastructure plan to support public and private investment decision making and to achieve the development outcomes sought by this structure plan.

STRATEGY 30.2

Collaborate across government agencies to maximise delivery efficiencies and community benefit and enable timely urban renewal by pursuing the coordinated programming, funding and delivery of infrastructure identified in the precinct infrastructure plan.

OBJECTIVE 31

Provide for the timely and coordinated funding and delivery of public open space, transport upgrades and community and social infrastructure to meet the needs of the new community.

A range of funding and delivery mechanisms will be required to enable the delivery of the infrastructure required to support precinct development. These include:

- works funded and delivered by state government departments and agencies;
- capital works projects delivered by or on behalf of the City of Melbourne;
- utility service provider requirements (for example, Melbourne Water's Drainage Services Scheme);
- development contributions;
- open space contributions; and
- developer works – infrastructure and works which have a direct nexus to development and required to be fully funded by the developer as part of development of the land.

In addition to investment by the Victorian Government and the City of Melbourne, developers will be required to make contributions. These may be in the form of direct delivery for works directly supporting their site, or cash or works-in-kind for infrastructure identified under a contributions scheme.

To support the funding and delivery of key infrastructure items, a development contributions plan will be prepared. The development contributions plan will ensure that the cost of providing new infrastructure to meet the demands of the new population, is shared equitably between developers and the wider community.

STRATEGY 31.1

Prepare a state infrastructure investment plan outlining the role of government in investing in and facilitating the delivery of key infrastructure and the infrastructure that will be delivered through this plan.

STRATEGY 31.2

Prepare a development contributions plan (or equivalent) to contribute funds towards the costs of new infrastructure required as a result of new development in Arden.

STRATEGY 31.3

Prepare a Development Services Scheme with Melbourne Water for the Arden and Macaulay urban renewal areas and consult with affected landowners and development industry alongside consultation on the Final Arden Structure Plan and associated planning scheme amendment.

Planning scheme amendment

Following review of the feedback received on this draft structure plan, the VPA and City of Melbourne will prepare the final structure plan. A final *Arden Structure Plan* will be made available to the community and stakeholders in late 2020.

A planning scheme amendment is the process undertaken to make changes to the planning scheme. Following the finalisation of structure plan, the VPA and the City of Melbourne will commence preparation of planning controls to implement the proposed land use and built form outcomes outlined in the structure plan. Since the existing controls in the planning scheme will not be suitable for the anticipated growth and development, an amendment is required to update these controls. The final structure plan will be exhibited alongside a planning scheme amendment to implement the proposed planning controls.

To provide certainty for the community, the correct planning zones and overlays must be applied to set the preferred direction of growth in Arden. Together with the structure plan, the planning scheme controls will guide the major changes to land use, built form and public spaces that together can achieve economic, social and environmental objectives for Arden.

The planning scheme amendment process will run from late-2020 to mid-2021 and will include an opportunity for the public to provide formal submissions to the planning scheme amendment and associated proposed zoning controls and development contributions plan.

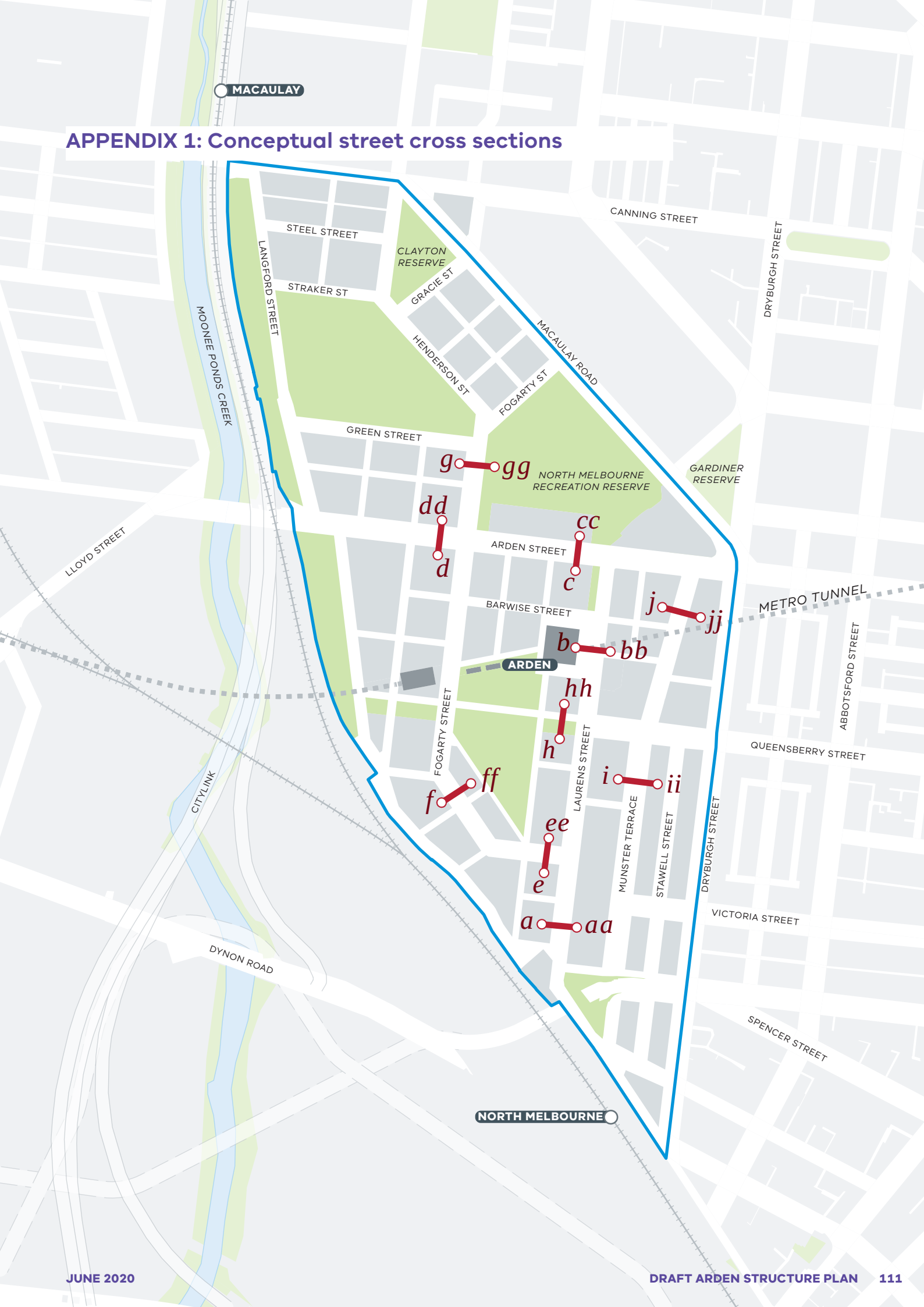
11 Appendices

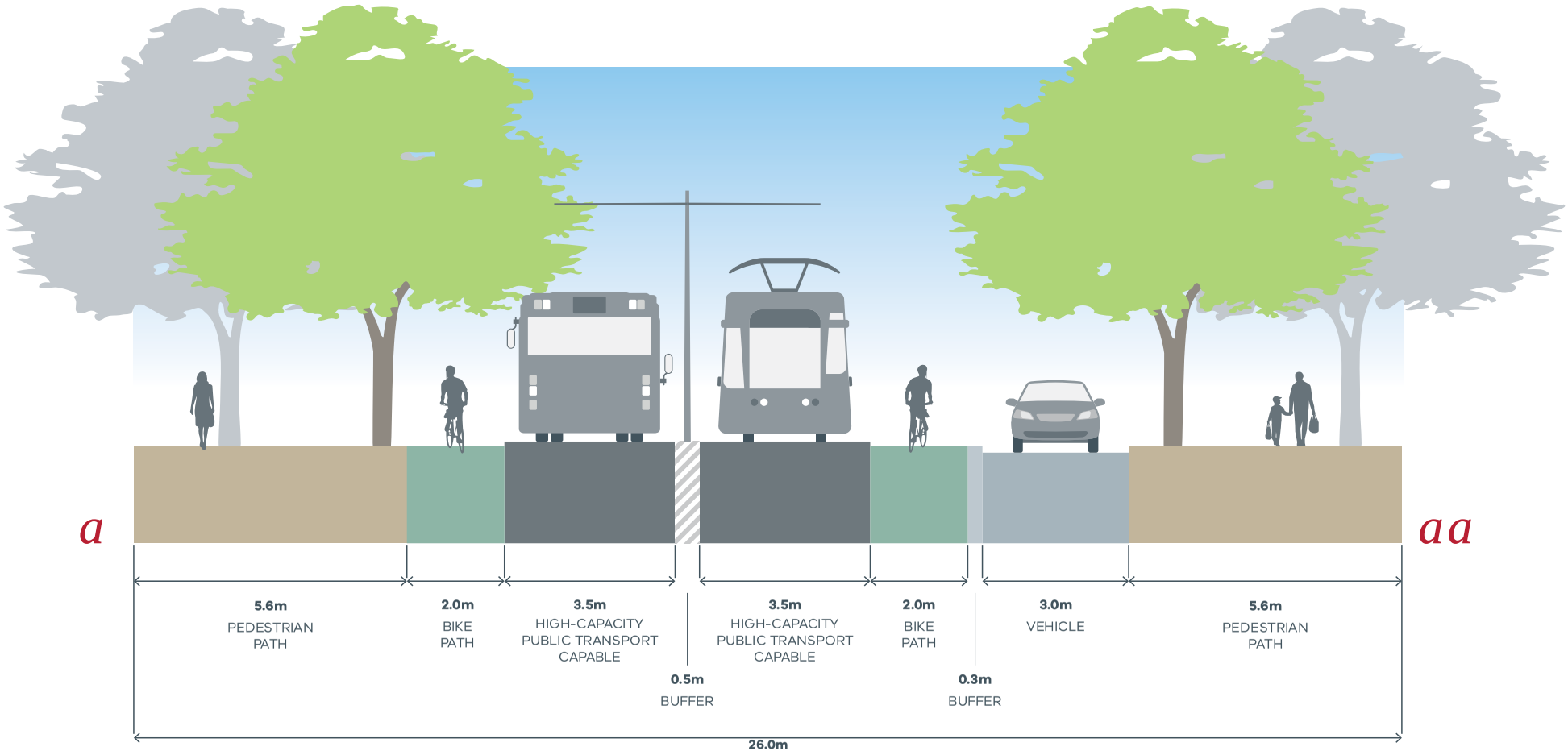
Appendix 1: Conceptual street cross sections

Appendix 2: Relevant policies & projects

Appendix 3: Glossary

APPENDIX 1: Conceptual street cross sections

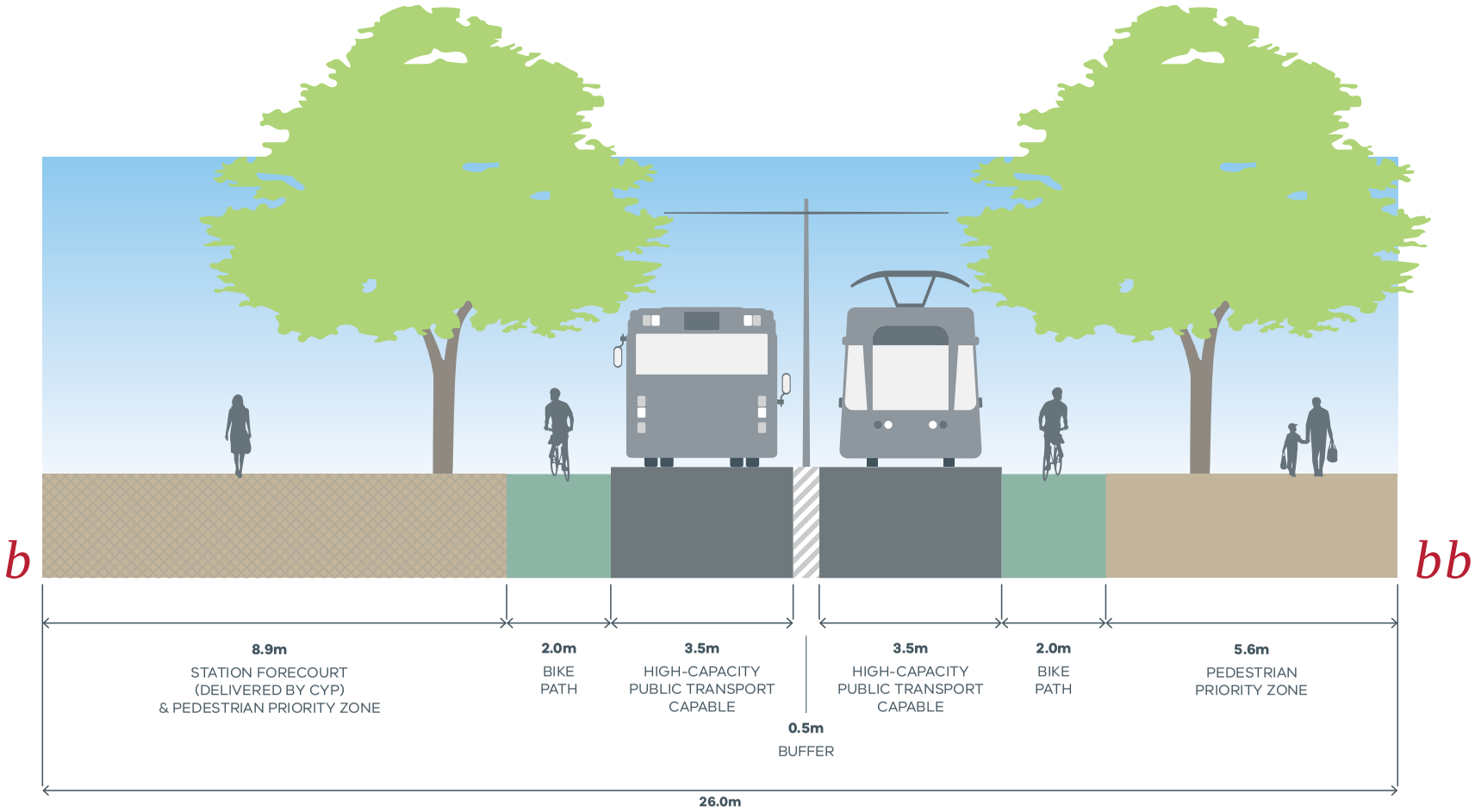




Notes:

- Future modal interchanges to be delivered as accessible, cycle-/drive-over stops subject to detail design.
- Bike path widths may be reduced at future modal interchanges to manage speed if required by detail design.
- Bike paths to be designed at grade of foot paths and be clearly delineated using material and surface textural finishes.
- Vehicle and public transport lane to be designed with traffic calming devices including raised pedestrian crossings and the use of textural surface changes (such as the use of granitic paving stones, etc) to achieve a target speed of 30km/h.

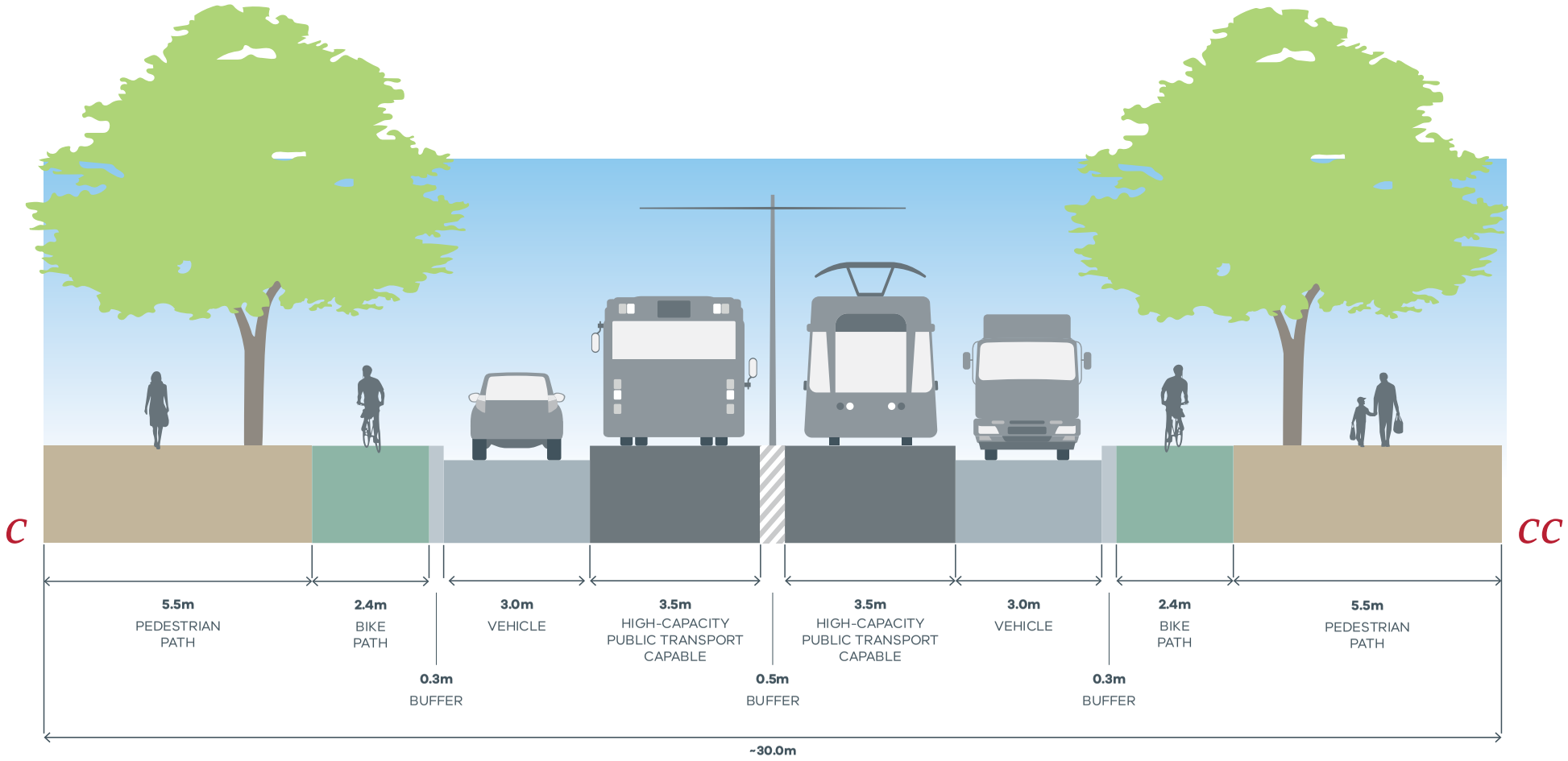
Laurens Street



Notes:

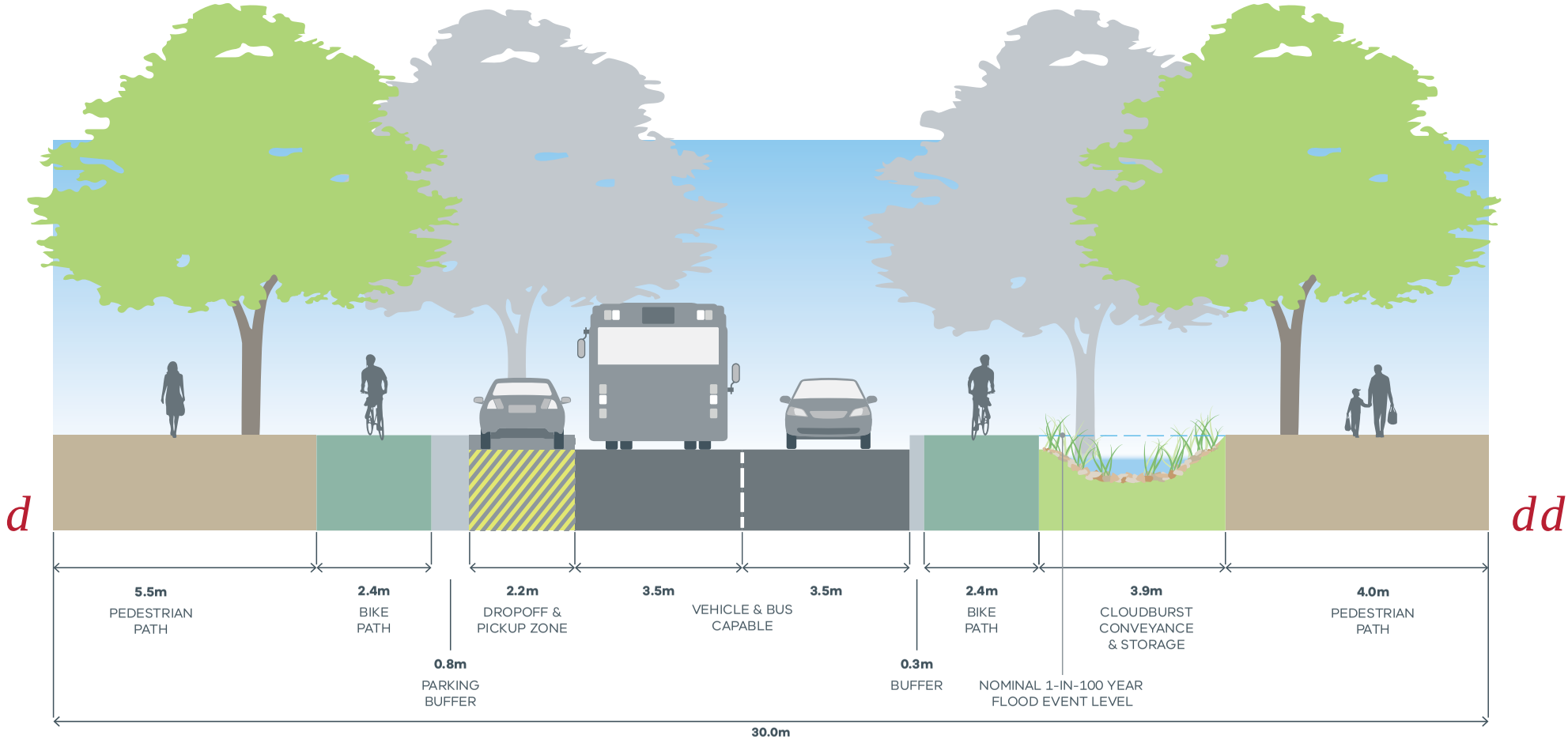
- Future modal interchanges to be delivered as accessible, cycle-over stops.
- Bike path widths may be reduced at future modal interchanges to manage speed if required by detail design.
- Bike paths to be designed at grade of foot paths and be clearly delineated using material and surface textural finishes.
- Pedestrian path on eastern side of street to integrate with future station forecourt delivered by Cross Yarra Partnership.
- Pedestrian priority zones designed to accommodate service vehicle access
- A 10 km/hr speed limit should apply through this section and apply to bicycles, service vehicles and public transport to prioritise pedestrians and it should be designed accordingly (to achieve an outcome similar to the Bourke Street mall)

Laurens Street



Notes:

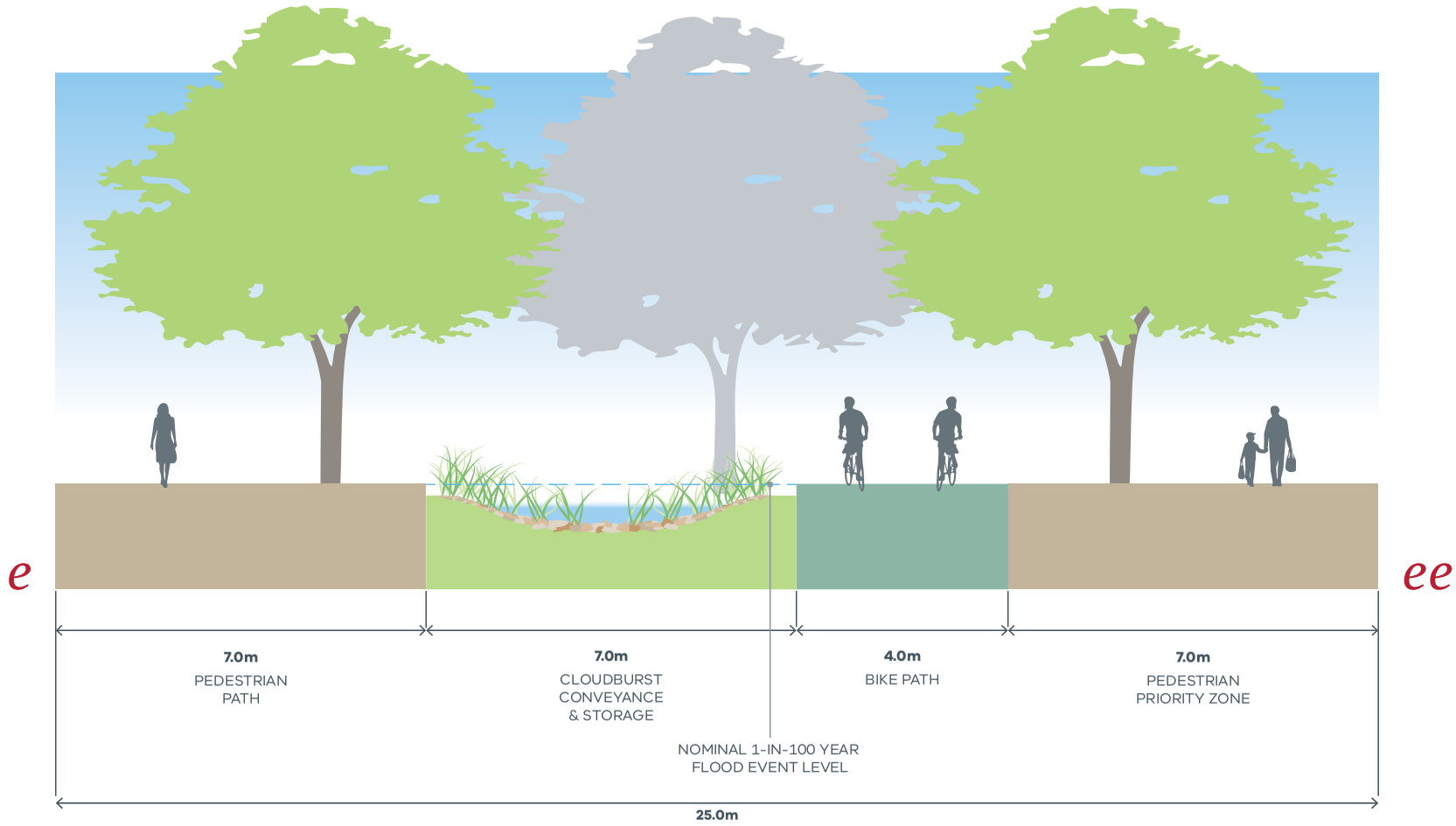
- Future modal interchanges to be delivered as accessible, cycle-/drive-over stops subject to detail design.
- Bike path widths may be reduced at future modal interchanges to manage speed if required by detail design.
- Bike paths to be designed at grade of foot paths and be clearly delineated using material and surface textural finishes.
- High Capacity Public Transport Capable Corridor to be grade separated from adjacent vehicle lanes.
- Vehicle and public transport lane to be designed with traffic calming devices including raised pedestrian crossings and the use of textural surface changes (such as the use of granitic paving stones, etc) to achieve a target speed of 50km/h generally and 10 km/hr at modal interchanges.



Notes:

- Bike paths to be designed at grade of foot paths and be clearly delineated using material and surface textural finishes. Bike paths may be designed at grade of vehicle lane where abutting cloudburst elements required for flood management.
- DDA compliant pedestrian paths to be designed to cross over cloudburst conveyance at appropriate intervals that align with other laneways or pedestrian connections.
- Vehicle / public transport lane to be designed with traffic calming devices including raised pedestrian crossings, traffic & pedestrian signals and the use of textural surface changes (such as the use of granitic paving stones, etc) to achieve a target speed of 50km/hr generally and 10 km/hr at modal interchanges.
- Bike path widths may be reduced at future modal interchanges to manage speed if required by detail design.
- Detailed design of street sections and plans will explore opportunities to integrate water sensitive urban design within road reserve and cloudburst elements, in particular to provide for urban forest irrigation and stormwater treatment.

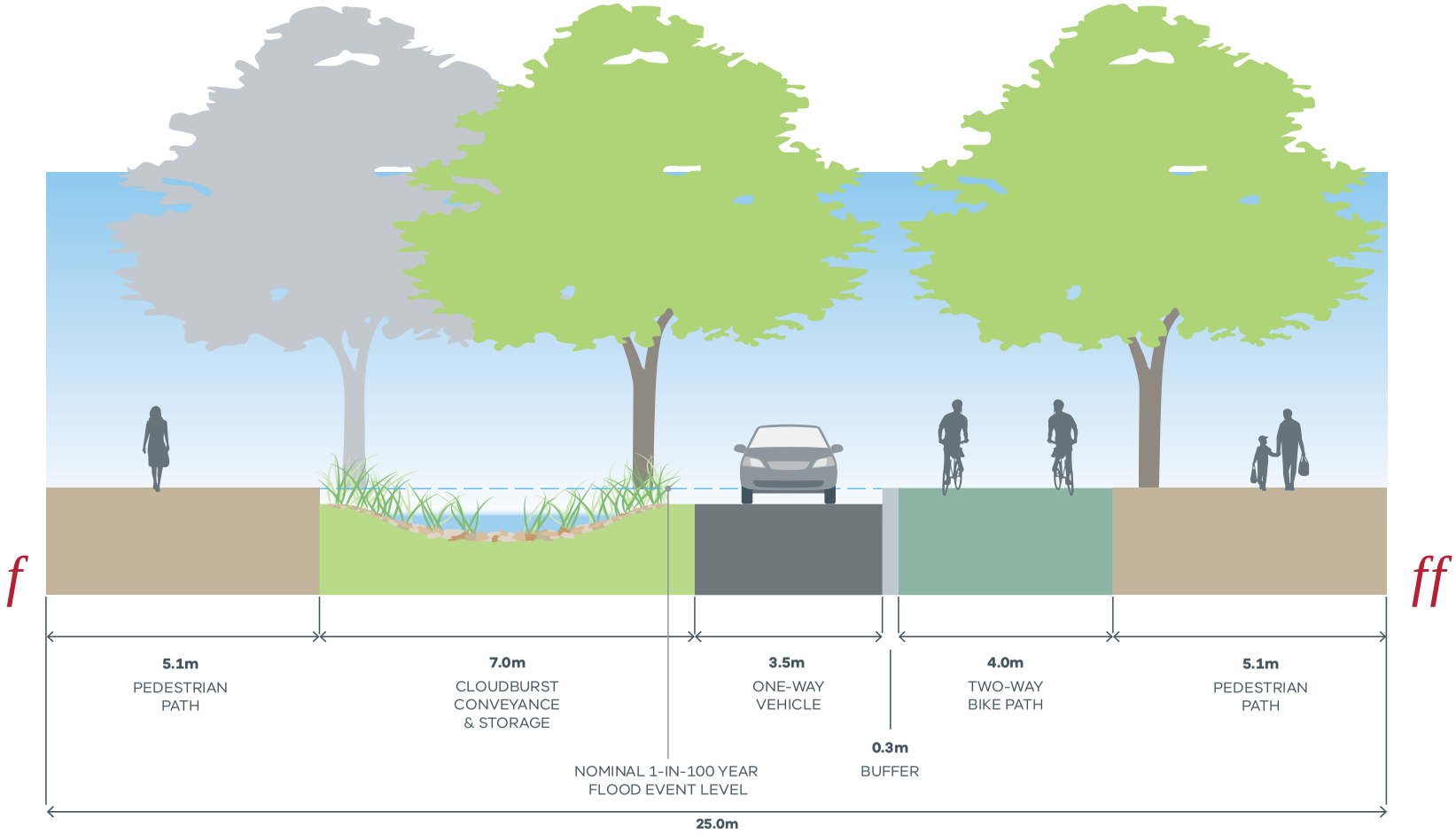
Arden Street



Notes:

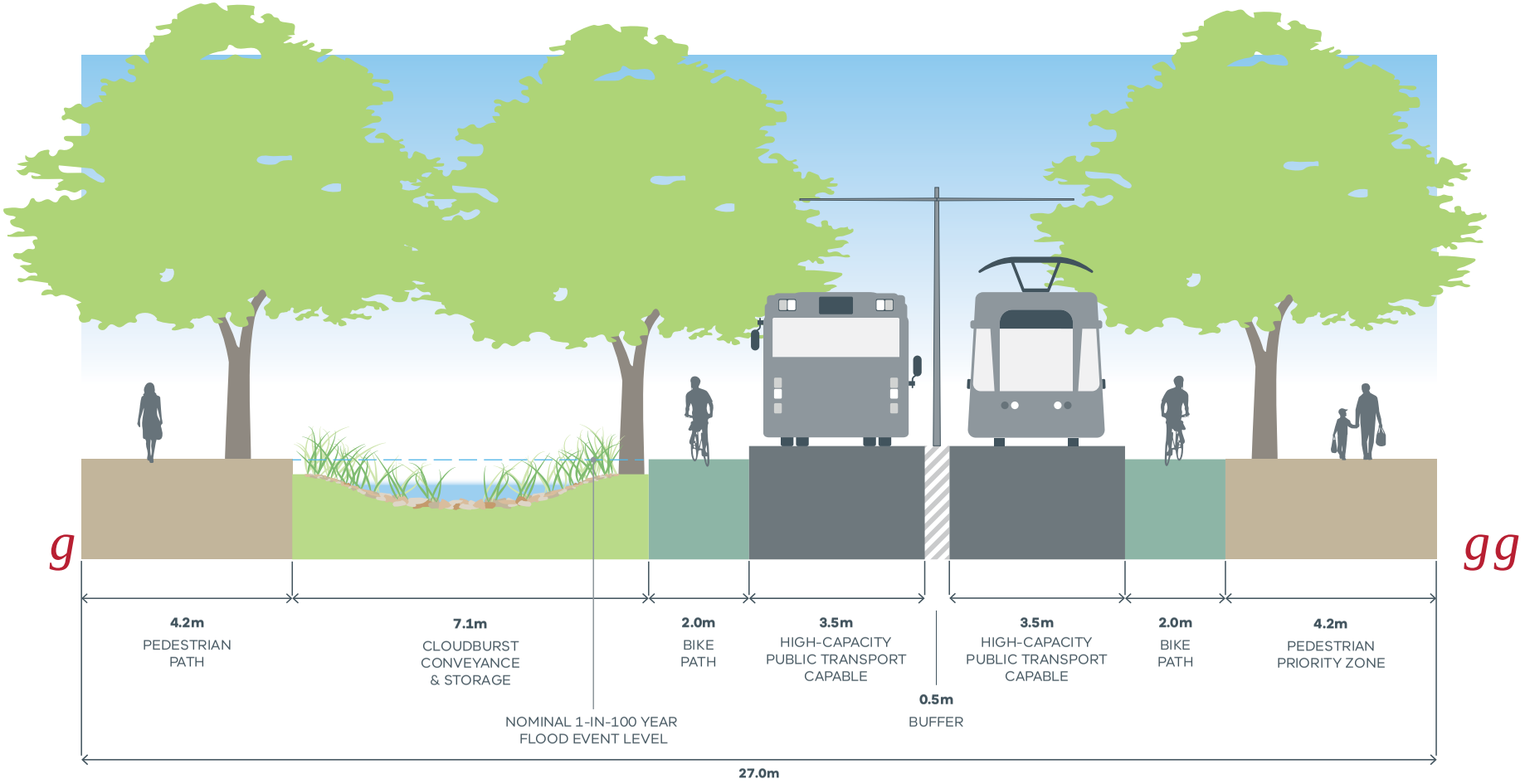
- Bike paths to be designed at grade of foot paths and be clearly delineated using material and surface textural finishes.
- DDA compliant pedestrian paths to be designed to cross over cloudburst conveyance at appropriate intervals that align with other laneways or pedestrian connections.
- Pedestrian priority zones designed to accommodate service vehicle access.
- A 10 km/hr speed limit should apply to the Pedestrian Priority Zone and it should be designed accordingly (to achieve an outcome similar to the Bourke Street Mall).
- The cloudburst conveyance could be designed to one side of the street allowing a wider area for foot/bike service vehicle access, subject to detail design and the access and servicing needs of abutting development.
- Detailed design of street sections and plans will explore opportunities to integrate water sensitive urban design within road reserve and cloudburst elements, in particular to provide for urban forest irrigation and stormwater treatment.

Fogarty Street extension



Notes:

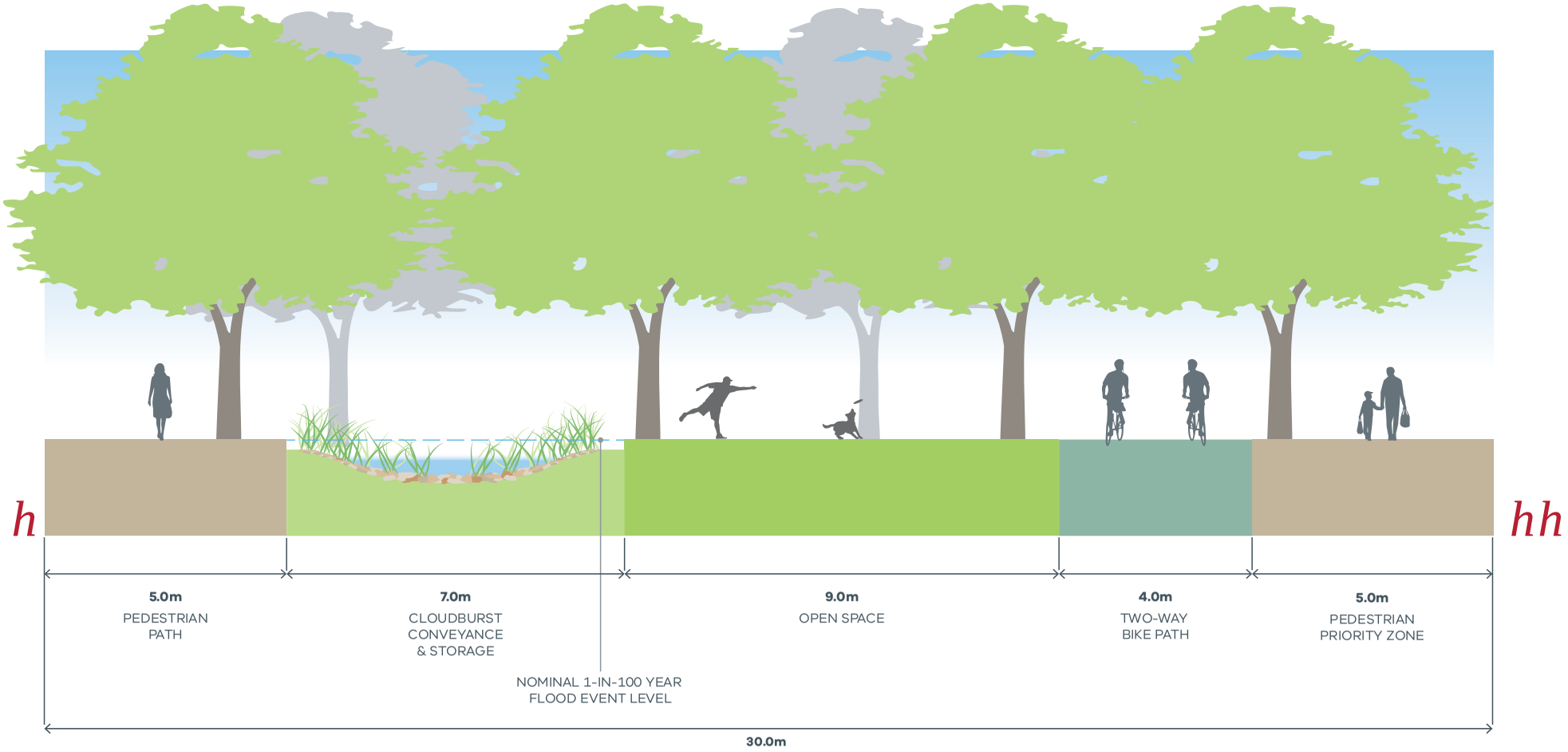
- Bike paths to be designed at grade of foot paths and be clearly delineated using material and surface textural finishes.
- DDA compliant pedestrian paths to be designed to cross over cloudburst conveyance at appropriate intervals that align with other laneways or pedestrian connections.
- Vehicle lane to be designed with traffic calming devices including the use of textural surface changes (such as the use of granitic paving stones, etc) to achieve a target speed of 30km/h.
- Detailed design of street sections and plans will explore opportunities to integrate water sensitive urban design within road reserve and cloudburst elements, in particular to provide for urban forest irrigation and stormwater treatment.



Notes:

- Bike paths to be designed at grade of foot paths and be clearly delineated using material and surface textural finishes.
- Bike path widths may be reduced at future modal interchanges to manage speed if required by detail design.
- DDA compliant pedestrian paths to be designed to cross over cloudburst conveyance at appropriate intervals that align with other laneways or pedestrian connections.
- High capacity public transport capable corridor to be grade separated from adjacent bike paths and designed to achieve a target speed of 30km/hr and 10 km/hr at modal interchanges.
- Pedestrian priority zones designed to accommodate service vehicle access and slower moving cyclists.
- Detailed design of street sections and plans will explore opportunities to integrate water sensitive urban design within road reserve and cloudburst elements, in particular to provide for urban forest irrigation and stormwater treatment.

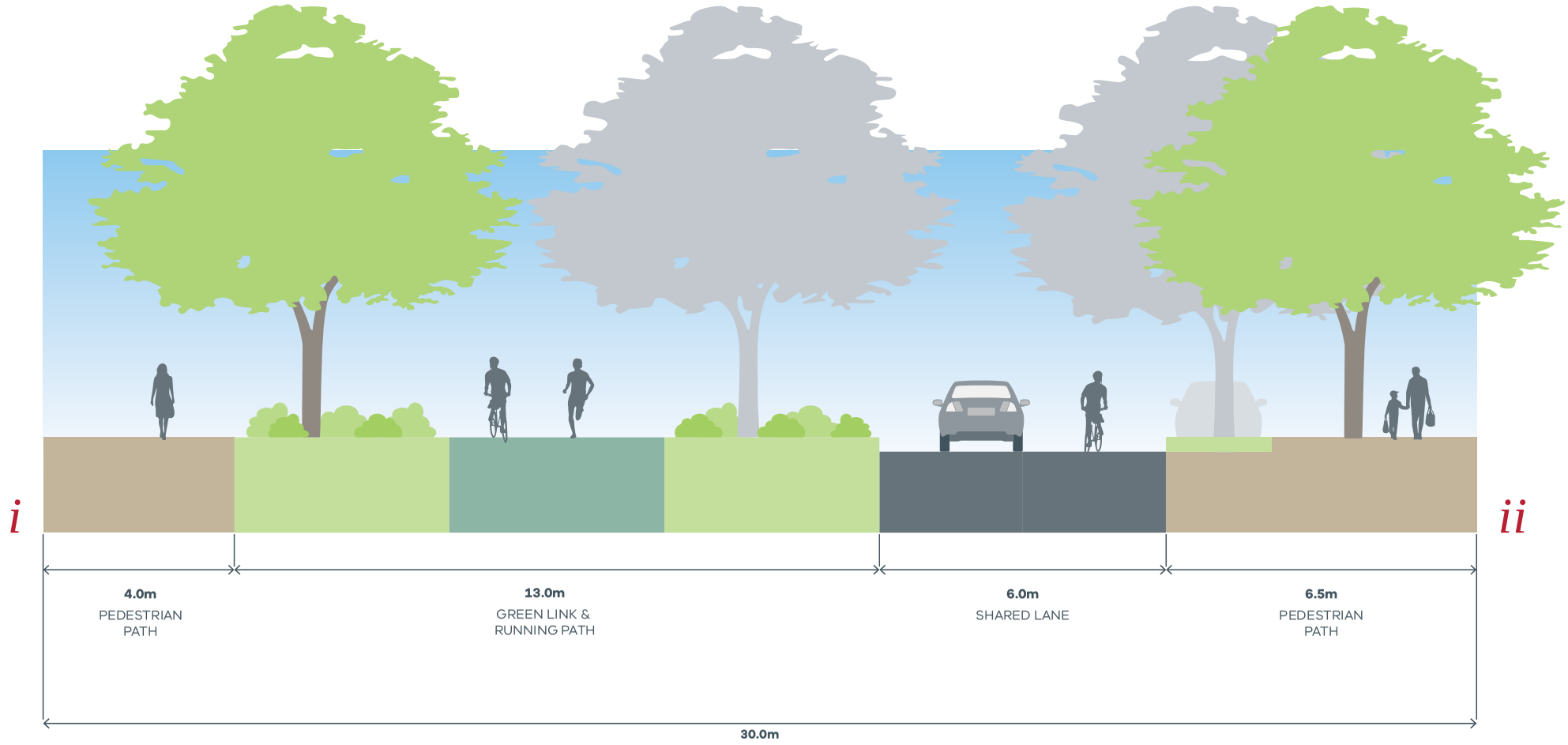
Fogarty Street extension



Notes:

- Bike paths to be designed at grade of foot paths and be clearly delineated using material and surface textural finishes.
- DDA compliant pedestrian paths to be designed to cross over cloudburst conveyance at appropriate intervals that align with other laneways or pedestrian connections.
- Pedestrian priority zones designed to accommodate service vehicle access and slower moving cyclists.
- Detailed design of street sections and plans will explore opportunities to integrate water sensitive urban design within road reserve and cloudburst elements, in particular to provide for urban forest irrigation and stormwater treatment.

Queensberry Street extension



Notes:

- DDA compliant pedestrian paths to be designed to cross over green link at appropriate intervals that align with other laneways or pedestrian connections.
- Vehicle lane to be designed with traffic calming devices including raised pedestrian crossings, traffic & pedestrian signals and the use of textural surface changes (such as the use of granitic paving stones, etc) to achieve a target speed of 30km/h generally.
- Detailed design to manage vehicle cross overs over green link to ensure pedestrian and cyclist safety on running path.
- Detailed design to appropriately manage parking / loading requirements within eastern tree line.
- Detailed design to facilitate safe cycling while allowing for local vehicle access.
- Detailed design to appropriately incorporate street level changes within green link.

Munster Terrace between Victoria and Queensberry Streets

Notes:

- DDA compliant pedestrian paths to be designed to cross over cloudburst conveyance at appropriate intervals that align with other laneways or pedestrian connections.
- Vehicle lane to be designed with traffic calming devices including raised pedestrian crossings, traffic & pedestrian signals and the use of textural surface changes (such as the use of granitic paving stones, etc) to achieve a target speed of 30km/h generally.
- Detailed design to manage vehicle cross overs over green link to ensure pedestrian and cyclist safety on running path.
- Detailed design to appropriately manage parking / loading requirements within eastern tree line.
- Detailed design to facilitate safe cycling while allowing for local vehicle access.
- Detailed design to appropriately incorporate street level changes within green link.

Munster Terrace between Arden and Queensberry Streets

APPENDIX 2: Relevant policies & projects

Relevant state policies

Plan Melbourne 2017–2050

Plan Melbourne 2017–2050 (Plan Melbourne) is the Victorian government's long-term plan for greater Melbourne to 2050. Plan Melbourne seeks to build on Melbourne's global legacy of distinctiveness, liveability and sustainability and respond to key challenges such as climate change and community connectedness.

Plan Melbourne identifies Arden as a major urban renewal precinct. The purpose of major urban renewal precincts is to take advantage of underutilised land close to jobs, services and public transport infrastructure, to provide new housing, jobs and services. Major urban renewal precincts will play an important role in accommodating future housing and employment growth and making better use of existing infrastructure.

Melbourne Industrial and Commercial Land Use Plan (2020)

Published in 2020, the *Melbourne Industrial and Commercial Land Use Plan* (MICLUP) provides a policy direction for the future of industrial and commercial land across the city.

The plan identifies existing industrial and commercial land as being of state, regional or local significance.

Within the Arden precinct there are two main areas of industrial land and an area of commercial land, which are all identified as areas of local significance under the plan.

The plan gives direction that in areas of local significance, councils are best placed to determine how these areas are planned for, which can include retention for employment or transitioning into other uses.

Homes for Victorians (2017)

Released by the Victorian Government in March 2017, *Homes for Victorians* will increase and renew public housing and address homelessness. *Homes for Victorians* aims to deliver 6,000 new social housing homes, renew 2,500 existing public housing residences and provide support and services to 19,000 people who are homeless or at risk of being homeless.

Victoria's Climate Change Framework (2016)

Victoria's Climate Change Framework articulates the Government's long-term vision and approach to climate change. Government has committed to reducing Victoria's greenhouse gas emissions by 15–20 per cent below 2005 levels by 2020 and to reducing emissions from government operations by 30 per cent below 2015 levels by 2020. The target for the 2020–2030 period is due to be set by 31 March 2020.

The priority sectors include high value and high growth industries of medical technologies and pharmaceuticals, new energy technologies, food and fibre, defence technologies, construction technologies, transport technologies, international education, and professional services.

Relevant local policies

Municipal Strategic Statement

City of Melbourne's Municipal Strategic Statement identifies Arden as an area that will undergo significant growth and change from its current role, and notes the land use conflicts that are evident in the area that will need to be addressed through strategic planning and planning controls. It notes that the Metro Tunnel will lead to major change to the east of the Moonee Ponds Creek Corridor.

The Municipal Strategic Statement also includes the vision for the broader City of Melbourne to be a "bold, inspirational and sustainable city". Underpinning this vision is the need to:

- accommodate forecast growth within the municipality while respecting the neighbourhood character and heritage value of established residential areas
- continue to protect ecological systems and biodiversity
- achieve a diversity of housing choices, housing affordability and a good standard of building design and amenity
- maintain a strong and diverse local economy, and
- maximise the use of sustainable transport.

Open Space Strategy (2012)

The *Open Space Strategy* provides the overarching framework and strategic direction for delivering public open space planning in the City of Melbourne to 2027. The strategy provides direction for providing open space to meet the needs of forecast population growth, for responding to climate change and for the basis of an open space contributions policy. The strategy identifies the need to provide additional open space in transitioning urban renewal areas including Arden.

Transport Strategy 2030 (2019)

City of Melbourne's draft *Transport Strategy 2030* prepares for the significant population growth and changes expected over the coming decades, and establishes a long-term vision for transport policy for the next 10 years. The draft *Transport Strategy 2030* sets out the approach to make sure there is space for the growing population to move around the city safely, efficiently and sustainably. This includes improving safety for people walking and riding bikes and prioritising efficient modes of transport with consideration to space and time.

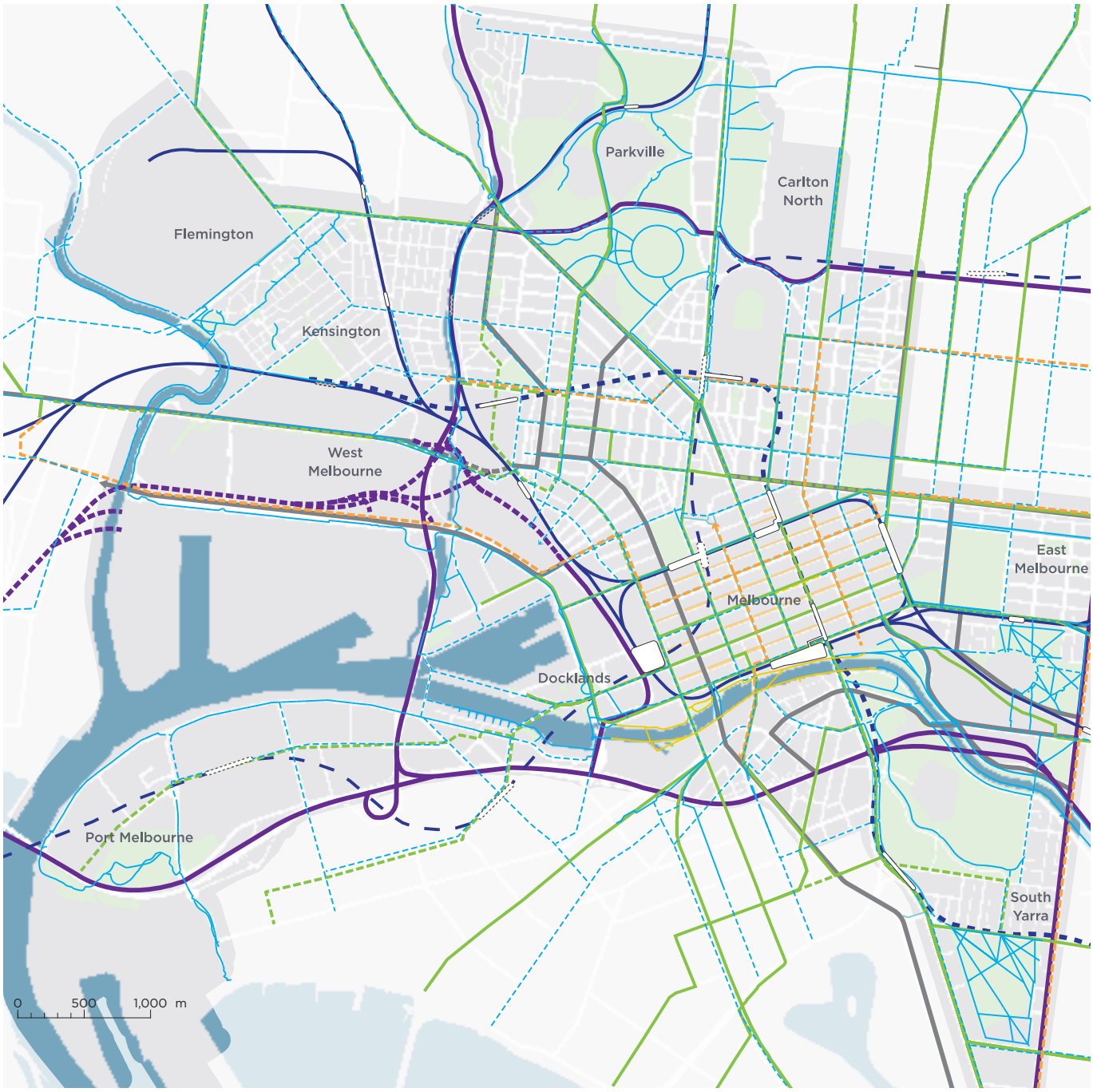


Figure 62 Proposed transport network including Arden. (Source: Melbourne City Council)

Integrated Water Management Plan (2017)

The City of Melbourne's *Integrated Water Management Plan* sets out the strategy for the holistic management of water, integrating water consumption, rainwater, stormwater, wastewater and groundwater management to secure the health of the water catchment and the city.

Arden–Macaulay and the Moonee Ponds Creek corridor are identified as a priority area requiring a place-based approach based on the following elements:

- Mitigating current and projected 2100 flooding without compromising urban design.
- Increasing access to and minimising connectivity barriers across Moonee Ponds Creek.
- Integrating water management with open space without overly encumbering the open space.
- Developing place-based targets for permeability and level of service for flood management.
- Meeting best practice stormwater quality discharge.
- Providing alternative, non-potable water supply to the precinct and beyond.

Climate Change Mitigation Strategy to 2050 (2018)

The *Climate Change Mitigation Strategy to 2050* sets out the City of Melbourne's approach to reducing greenhouse gas emissions. The strategy recommends a 29 per cent reduction of 2015 levels by 2030 in order to achieve net zero emissions by 2050. Key actions to achieve this include:

- Partnering with industry and Victorian and Australian Government agencies to reduce barriers and deliver zero emissions buildings and urban renewal precincts
- Facilitating the take up of the National Built Environment Rating Scheme for apartments across the municipality
- Renewing and implementing planning policies to support the development of zero emissions buildings and precincts
- Advocating and facilitating the transition from gas to electricity in buildings and precincts
- Continuing to reallocate road space to create more space for walking, cycling and green infrastructure
- Prioritising active and public transport through dedicated lanes, traffic light priorities, parking controls and road user pricing
- Advocating for energy efficiency public transport powered by renewable energy.

Climate Change Adaptation Strategy Refresh (2017)

The *Climate Change Adaptation Strategy Refresh* provides the direction for how the City of Melbourne plans, prepares for and responds to the impacts of climate change including flood, heat, drought and sea level rise. It outlines council's priorities for adapting to climate change. Five goals guide how the City of Melbourne works to deliver, partner and advocate for effective climate change adaptation:

- **Goal 1** Enhance our natural environment and green spaces
- **Goal 2** Shape our built form and urban renewal areas to withstand future climate change impacts
- **Goal 3** Strengthen the resilience of our inclusive, family friendly and culturally diverse community
- **Goal 4** Protect and enhance our diverse economy
- **Goal 5** Continue to build Melbourne's adaptation capabilities and expertise.

City of Melbourne Arts Infrastructure Framework (2016)

The City of Melbourne Arts Infrastructure Framework aims to provide strategic direction on the delivery of arts infrastructure by the City of Melbourne and its external partners.

The strategy outlines the role of arts and creative practices in the city, including placemaking and the creation of a shared cultural identity and values, drawing communities together and improving health and wellbeing through participation in the arts, and as an active agent in innovative economies as well as a major existing contributor to Victoria's economy.

The Arden urban renewal precinct is identified as a unique opportunity for the inclusion of arts infrastructure, including the provision of a new arts hub, affordable housing for creative workers, creative spaces and live–work spaces, and embedding public art in the public realm and infrastructure projects.

Relevant local plans

Arden–Macaulay Structure Plan (2012)

The *Arden–Macaulay Structure Plan* (2012) was prepared to guide the long-term development of the Arden–Macaulay area. It includes a series of strategies and actions relating to land use including the delivery of new and improved open spaces and attractive and safe streetscapes. It also contains actions relating to transport, community infrastructure and sustainable infrastructure.

While parts of the *Arden–Macaulay Structure Plan* were enacted on an interim basis through a planning scheme amendment to the Melbourne planning scheme which introduced new planning controls for Macaulay (Amendment C190), it was decided that additional planning work should be undertaken for the Arden precinct due to the announcements of the Metro Tunnel and the new Arden Station. That work is now underway as part of the *Macaulay Structure Plan Refresh*.

Macaulay Structure Plan Refresh (underway)

Interim controls relating to the Macaulay area of the *Arden–Macaulay Structure Plan* (2012) were introduced to the Melbourne Planning Scheme under Amendment C190. These interim controls included a Design and Development Overlay governing built form, and a development contributions plan to capture value uplift from the project to fund key infrastructure and public realm upgrades.

Since adopting the structure plan there have been changes to the planning context affecting the Macaulay area including pursuing separate planning processes for Arden and Macaulay, and progressing further work on flooding to develop new approaches to integrated water management in the area.

In response to these changes, the City of Melbourne is developing a refreshed structure plan for Macaulay that will deliver improved planning outcomes by reinforcing the strategic intent for Macaulay established by the 2012 structure plan.

West Melbourne Structure Plan (2018)

City of Melbourne has developed a new *West Melbourne Structure Plan* to guide future growth in West Melbourne. The plan includes tailored planning controls to protect character and heritage buildings, the creation of a new high street at Spencer Street and the unlocking of 10,000 square metres of new open space.

Melbourne Planning Scheme Amendment C309 proposes to implement the *West Melbourne Structure Plan* by introducing new tailored planning controls in the Planning Scheme. This will guide the use and development of land and celebrate the character of West Melbourne as outlined in the structure plan.

APPENDIX 3: Glossary

Active perimeter / edge / frontage
Street frontages or edges where there is an active visual engagement between those in the street and those on the ground and upper floors of buildings.

Active recreation
Leisure time physical activity undertaken outside of structured, competition sport. Activities within the wider range of physical activity options including walking, running, cycling and other sports.

Active uses
Uses that generate many visits, in particular pedestrian visits, over an extended period of the day.

Activity area
An area that provides a focus for enterprises, services, shopping, employment, housing, transport and social interaction. They range in size, intensity and composition

Adaptive reuse
The capacity of a building or space to respond to changing community needs and to accommodate new land uses and users.

Affordable housing
Housing, including social housing, that is appropriate for the housing needs of any of the following – very low-income households, low income households and moderate income households, as defined in the *Planning and Environment Act 1987*. See the Act for further details and definitions.

Amendment C309
Implements the West Melbourne Structure Plan's land use and development recommendations by making changes to the planning scheme.

Amendment C190
Implements the *Arden–Macaulay Structure Plan's* Stage 1 land use and development recommendations by making changes to the planning scheme.

Amenity
The features of an area, street or building, that provide facilities and services that contribute to physical or material comfort and benefit and are valued by users. An amenity can be tangible, such as open space, seating, a swimming pool or gym; or intangible, such as pleasant views, air quality, or proximity to a local school or supermarket.

Anchor enterprises / institutes
Entities with a large stake and economic role in a city or place, usually through a combination of important economic and spatial impacts due to their physical size, sector impacts, employment generating and spending role.

Australian Height Datum (AHD)
The adopted national height datum that generally relates to height above mean sea level. Elevation is in metres.

Blue-green space
Spaces that are designed to integrate natural systems that provide the ecological and amenity value associated with urban greening and also provide stormwater management functions.

Built form
The function, shape and configuration of buildings and their relationship to streets and open spaces.

Capital City Open Space
Open spaces that are iconic and synonymous with the character and identity of Melbourne and often used to stage activities and events of international, national, state and metropolitan importance. Examples include Federation Square (Capital City), Domain Parklands (Capital City) and Royal Park (State). The size varies to suit the identified purpose and urban context in which they are located

Capital works
Building and engineering works that create an asset in the public realm such as park upgrades, street upgrades or pipe upgrades.

Cloudburst streets
Used to channel and direct the large amounts of water that can be dumped during a cloudburst. By using a v-shaped profile and raised kerbs, water will flow to the middle of the street and away from buildings.

Community benefit
While there is no explicit definition of community benefit in the relevant legislation or planning policy context in Victoria, it typically refers to items such as open space, roads and drainage, affordable housing, community infrastructure and strategic land uses.

Community housing
Secure, affordable, long term rental housing managed by not-for-profit organisations for people on low incomes or with special needs.

Community infrastructure
Public places and spaces that accommodate community facilities and services and support individuals, families and groups to meet their social needs, maximise their potential and enhance community wellbeing.

Density
The number of measured units in an urban area divided by the area of the land that they occupy, for example dwelling density would comprise the number of dwellings that occupy a land area expressed as dwellings per hectare.

Development application
A formal application for development of a site. The application is usually made to local council and consists of an application form, supporting reports and plans of the proposed building or works.

Development contributions
Document that sets out the contributions expected from each individual landowner to fund infrastructure and services. Refer to Part 3B of the *Planning and Environment Act 1987*.

Dwelling
A place of residence, such as house or apartment.

Fine grain design
An urban environment with small-scale spaces, street blocks and a mix of uses to foster diverse activities and walkability.

Floor area ratio (FAR)
The ratio of allowable total floor area to the site area.

Floorplates
The shape and amount of leasable area on an individual floor of a building.

Green street
A public thoroughfare that integrates garden beds, tree planting and water sensitive urban design (WSUD).

Gross floor area (GFA)
The total floor area contained within the building.

Housing stress
When housing costs rise too high relative to household incomes. Households are typically considered to be in housing stress when the household has an income level in the bottom 40 per cent of the nation's income distribution and is paying more than 30 per cent of its income in housing costs.

Interface
The space between buildings and the urban space demarcated by that building.

Knowledge economy
Production and services based on knowledge-intensive activities that contribute to an accelerated pace of technical and scientific advancement.

Land use
The primary purpose for which the land is used or may be developed.

Local open space
Open spaces that complement the larger reserves and provide smaller, more intimate spaces within safe and easy walking distance of the local community. Examples include Golden Elm Reserve in South Yarra and Chapman Street Reserve in North Melbourne.

Levee
An embankment built to prevent the overflow of a water body.

Liveability
A measure of city users' quality of life used to benchmark cities around the world. It includes socioeconomic, environmental, transport and recreational measures.

Mixed use
The composition of land use mix. The arrangement – quantity and distribution – and type of uses within a geographic area or development site.

Neighbourhood open space
Open spaces that provide a diversity of character and facilities that appeal to the local community at a neighbourhood level. Examples include Argyle Square and North Melbourne Community Centre.

Open space
Publicly-owned land set aside for recreation, nature conservation, passive outdoor enjoyment and public gatherings. This includes public parks, gardens, reserves, waterways, forecourts and squares.

Overland flow path
Overland flow occurs in heavy rainfall when water runs off neighbouring properties and driveways, following natural paths and into stormwater drains or local creeks.

Overlay
The planning scheme maps zoning and overlays of land. Overlays only apply where there is a special feature of the land.

Passive recreation
Casual use of open space such as sitting, walking, reading a book, meeting people enjoying the ambience and relaxing.

Permeability
The extent to which the urban form permits or restricts the movement of people and vehicles in different directions.

Place creation
A multi-faceted approach to the planning, design and management of spaces that collaborates with a community with the intention of co-creating a place that promote people's health, happiness, and well-being.

Planning controls
The zones, overlays, and particular provisions contained within the planning scheme.

Planning scheme
The rules for the use and development of land, set out by the Victorian Government and local councils.

Planning Scheme Amendment
Changes to the planning scheme are called amendments.

Potable water
Water that is safe to drink or to use for food preparation

Public housing
Long-term rental social housing for people on low incomes that are most in need. Public housing is owned and managed by the Victorian Government.

Public realm
External urban spaces that are publicly accessible and belong to everyone. This includes streets, squares, parks, green spaces and other outdoor spaces.

Resilience
The capacity of individuals, institutions, businesses and systems within a city to adapt, survive and thrive no matter what kind of chronic stresses and acute shocks they experience.

Scale
The size of a building in relation to its surroundings, or the size of parts or details of the building, particularly in relation to the scale of a person.

Sensitive use
A land use, such as residential uses, that is sensitive to emissions from industry and infrastructure.

Setback
The distance of a building wall from any lot boundary. A building front setback can add to the perceived width of the street, provide additional public or private space, and allow space for landscaping.

Shared equity
A housing model in which the home buyer shares the capital cost of purchasing a home with an equity partner, allowing lower income home buyers to buy sooner as they need a lower initial deposit and have lower ongoing housing costs.

Sleeving
The process of surrounding infrastructure or services with other uses on the outside of the building to produce a better interface with streets, for example sleeving car parking with active uses such as retail.

Social housing
Short and long-term rental housing that is owned and run by the Victorian Government or not-for-profit agencies.

Topography
The arrangement of the natural and artificial physical features of an area.

Typology
The classification of (usually physical) characteristics commonly found in buildings and urban places, according to their association with different categories, such as intensity of development, land use or architectural style.

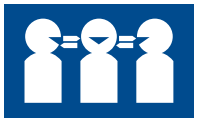
Urban heat island effect
A worldwide phenomenon where cities become warmer than nearby suburban and regional areas, particularly at night due to a range of factors include higher thermal mass and lower urban greening.

Urban renewal
The redevelopment of land in established parts of the city from industrial or low-intensity precincts to precincts with more employment, commercial or residential opportunities.

Urbanisation
The process of making an area more urban.

Figures

Plans



Phone interpreters in all languages: 9651 0716

*اتصلوا بنا للتحدث إلى مترجم شفهي **عربي** عن مخططنا لمستقبل مركز أردن الإجتماعي.*

*致電我們要求一位**廣東話**翻譯員來協助您了解我們對 Arden 鄰里所作出的未來規劃。*

*给我们打电话，通过**普通话翻译**了解我们对 Arden 邻里街坊的未来规划。*

*Na soo wac si aad ula hadasho mutarjum **Soomaali** ah si uu kaaga caawimo wixii ku saabsan qorshaynta mustaqbilka agagaarka Arden Neighbourhood.*

*Gọi cho chúng tôi để nói chuyện với thông dịch viên **tiếng Việt** về việc hoạch định tương lai cho khu vực lân cận Arden.*

DRAFT Arden STRUCTURE PLAN

JUNE 2020

Victorian Planning Authority

CITY OF MELBOURNE

VICTORIA State Government

Arden and Macaulay Precinct – IWM Strategy

City of Melbourne – September 2020

Engineering + Creativity = Better Water Outcomes

Project Name	Arden and Macaulay Precinct – IWM Strategy
Client	City of Melbourne
Rain ID	81_01
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Version Number	Status	Authors	Reviewer
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//cover image// Flooding on Moonee Ponds Creek – December 2018

//carbon offsetting// Rain Consulting deeply recognise our responsibility to address the environmental impacts of our businesses and those we are associated with. Human induced climate change has increased average and extreme temperatures, changed rainfall patterns and created more severe and less predictable storms. That's why we're are striving for net negative carbon. 0.151 tonnes of CO_2 have been emitted in the creation of this project. We have offset this emission with South Pole Australia (https://www.southpole.com/sp-australia). South Pole Australia is an Australian Government Carbon Neutral Certified Organisation. See Appendix A for calculations further information.

Rain respectfully acknowledges the Traditional Owners of the lands on which we work, live and play. We also pay our respects to their Elders, past and present, and Aboriginal Elders of other communities.

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Figures

1 Executive Summary

1.1 Overview and key findings

The Arden and Macaulay IWM Plan reviewed existing information, plans and strategies to find opportunities in which IWM could work to enhance future projects and better address flooding, improve waterway health and provide a resilient water supply for green spaces. Various City of Melbourne departments, Melbourne Water, City West Water and the Victorian Planning Authority were consulted and a list of IWM projects and opportunities developed which may be delivered via the DSS or DCP or through council's capital works program.

A high-level GIS layer of IWM opportunities has been delivered as part of this plan, with opportunities taken directly from the reviewed document list. This can be used internally at the City of Melbourne to identify further potential opportunities and objectives whenever any work is proposed in the precincts. Shapefile areas in the layer are indicative only and should not be used for functional or detailed design or planning purposes.

The Arden and Macaulay Precincts were split into five discrete zones and one "other" zone which covers a number of sites:

- Arden North: Both Arden and Macaulay Precincts
- Chelmsford and Bent: Macaulay Precinct
- North Melbourne Social Housing: Macaulay Precinct
- Government Land: Arden Precinct
- Stubbs Street: Macaulay Precinct

Other:

- Parsons Street: Macaulay Precinct
- Fink and Bruce Streets: Macaulay Precinct
- Mark Street to Macaulay Road: Macaulay Precinct
- Alfred Street to South of Sutton Street: Macaulay Precinct

Within each of the zones, IWM opportunities were identified and listed, and the full list of options per zone has been provided as a separate Microsoft Excel Workbook (Arden and Macaulay IWM Opportunites_v1.xlsx) and is too large to summarise here.

Opportunities for Blue Streets (primarily for flood storage) and Blue-Green Streets (primarily for flood conveyance) were identified by review of the available flood modelling for the precinct from the local catchment as well as the local drainage network. Whilst blue streets and blue-green streets do provide flood conveyance and flood storage roles, additional analysis was completed to identify streets which play a flood conveyance or flood storage role. These are shown in the below table. Many of these streets have already been identified as good candidates for blue or blue-green streets in the IWM opportunities. Where they have not, a further opportunity exists to retrofit these streets. The identified streets are not part of the flood strategy for the area. In a large flood event, each type of street represents the current main mechanism of flooding.

Flooding from Moonee Ponds Creek is not necessarily considered, and no modelling has been completed specifically for this strategy. In a Moonee Ponds Creek flood event, the levee walls are expected to overtop, and any drainage of the local catchment is controlled by the pump stations. In such an event, the main mechanism of flooding within the precinct is storage-based as water waits to be pumped out or until levels in Moonee Ponds Creek subside. The DSS recommends levee upgrades to prevent the overtopping. Once completed, just the

runoff from the local catchment (no overflow from Moonee Ponds Creek) will be controlled by the pump stations.

As the overall water strategy continues to develop, flood models should be updated to ensure Melbourne Water's proposed level of service from the DSS is maintained.

Each street identified is shown below:

Street	Precinct	Type
Stubbs Street	Macaulay	Flood Storage Street
Bent Street	Macaulay	Flood Storage Street
Langford Street	Arden	Flood Storage Street
Hardiman Street	Macaulay	Flood Storage Street
Parsons Street	Macaulay	Flood Conveyance Street
Robertson Street	Macaulay	Flood Conveyance Street
Chelmsford Street	Macaulay	Flood Conveyance Street
Lloyd Street	Macaulay	Flood Conveyance Street
Arden Street	Arden	Flood Conveyance Street
Canning Street	Arden/Macaulay	Flood Conveyance Street
Green Street	Arden	Flood Conveyance Street
Fogarty Street	Arden	Flood Conveyance Street
Macaulay Road	Arden/Macaulay	Flood Conveyance Street
Mark Street	Macaulay	Flood Conveyance Street
Boundary Road	Macaulay	Flood Conveyance Street
Alfred Street	Macaulay	Flood Conveyance Street
Bruce Street	Macaulay	Flood Conveyance Street
Queensbury Street	Arden	Flood Conveyance Street

Preliminary and conceptual staging advice has been provided based on the proposed timing of DSS works. Melbourne Water have indicated that there is flexibility in staging of the proposed works. The timelines provided by Melbourne Water are assumed to reflect proposed construction and delivery dates, and it should hence be noted that design works are likely to commence prior to this. All opportunities and projects need to be confirmed via flood modelling to further refine the staging and prioritisation.

1.2 Recommendations

The following further recommendations are noted for the study in general, many of which are direct feedback from the stakeholder workshop:

1. It was noted in the stakeholder workshop that land acquisition has not been considered in costing. It is recommended that further work be undertaken in this regard before any finalised plans for asset delivery (be it DSS, DCP, etc) to understand these additional costs. Melbourne Water and CoM's Open Space Planning Team to resolve land acquisition for flood storage, mitigation or treatment with regard to Open Space requirements and use.
2. It is recommended that cross-sections for Blue and Blue-Green Streets of various widths are developed in the feasibility stage
3. Detailed design of spaces should seek to engage with Traditional Owner groups early to obtain input about needs and ongoing engagement. Initial consultation with groups via Structure Plan process for Arden and Macaulay has identified water management as a key opportunity for integrating Aboriginal cultural values and heritage.
4. All works fronting onto IWM spaces should consider urban design treatment. Wherever possible, IWM and Urban Design should be considered together for opportunities to incorporate water into the landscape with a practical function.
5. It is recommended that immediate discussions are held between CoM, MW and VPA to discuss the overlap of works and staging in the precinct.

6. The use of underground tanks (or large culverts) should be considered where feasible in cross section design to provide additional flood storage.
7. Generally, open spaces within the precinct will be providing a flood mitigation role also. Many open spaces in this area will provide some level of flood storage, for example, some spaces may only play a role in the less frequent events, designed for water to clear in a short period of time returning them to their primary use function. We recommend considering the Open Space Strategy Primary use when designing the flood mitigation components of these assets. This also requires further internal discussion at CoM. It is recommended that CoM develop a criteria for designing open spaces that play a flood function role which can be used for both CoM and MW projects. These discussions should focus on sites where IWM use could impact on primary Open Space use.
8. It is recommended further work is completed to integrate/discuss implications for the North Melbourne Community Centre.
9. It is recommended that immediate discussions are held between MW and CoM to further discuss the inclusion of WSUD into the DSS. Discussions should involve VPA and DJPR. The DSS currently allows for flooding and drainage to meet the level of service associated with the change in land use. An equivalent justification would be required for surface water quality.
10. Any green, Blue-Green and Blue streetscape planning and design needs to incorporate existing precinct plans identified in the Urban Forest Precinct Plans, consider open space links and biodiversity opportunities in the City of Melbourne's Nature in the City.
11. Where new Blue or Blue Green Streets are proposed, particularly where interacting with DSS works, new flood modelling should be completed to confirm sizing and interplay between the works and optimise design.
12. Live planning approvals should be considered throughout the design stages.
13. Where new roads are proposed, Blue-Green Streets are recommended. It will be more cost effective to construct a new road as a Blue-Green Street rather than retrofit for the sole purpose of IWM. It would be beneficial to consider dual-staging of new road constructions and IWM works to minimise costs, disruptions and rework.
14. There are many IWM objectives relating to the MPC corridor. This includes biodiversity links, open spaces, connections, active transport links, cultural considerations, as well as flood management and stormwater harvesting and reuse. Further work is required around IWM in the MPC corridor which seeks to also link in with the IWM projects in this strategy. For example, where the levees, flood storages, blue-green streets and WSUD opportunities connect with the MPC.
15. Key transport (pedestrian, cycling, car, public transport) corridors, current or proposed, will potentially provide opportunities for collaboration. It is recommended that this is considered when undertaken further design of IWM opportunities.
16. It is recommended that further work consider Urban Cooling (Heat Island) and refer to the City of Melbourne Urban Forest Strategy. The VPA has indicated that it might be possible to include some items into a DCP such as larger trees for canopy shade/protection with a nexus to more people being housed post development.

17. Whenever new works are being proposed, City of Melbourne's Infrastructure and Assets Group's Capital Plan should be reviewed/considered to look for other opportunities or overlaps.
18. Continue discussions with VPA and MW about the link of levees with other identified opportunities per the Structure Plan and Strategic Opportunities Plan.
19. Further design needs to consider services etc (for example, potential risk mitigation works required associated with the high-pressure gas pipeline along Green St & Fogarty St).
20. The use of IWM Targets specific to the area covered in this document could be considered in future if required.
21. VPA has indicated that they will not own or manage assets. It is recommended that asset ownership be resolved between CoM and MW in consultation with DJPR and VicTrack (due to significant government land holdings).
22. VPA has indicated that land required for flood management and future transport uses (adjacent to Upfield Rail Corridor on Arden's western boundary) must 'not preclude' future transport infrastructure, such as level crossing removals. It is therefore recommended that this is considered for any further design.
23. It is recommended that further discussions are held between Melbourne Water and CoM to further discuss the Living Levee concepts.
24. It is recommended that further discussions are held between Melbourne Water and CoM regarding the potential open drainage swale through the North Melbourne Social Housing site. MW have indicated that this could be funded through the DSS (as indicated), however ongoing ownership would be Council. With regards to DSS funding, it will need to consider difference in costs between daylighting and undergrounding. If daylighting more expensive capital costs, then further co-funding may be required.
25. It is recommended that further discussions are held between Melbourne Water and CoM on the idea of Above Ground Storage with Open Space (Item 8) in the North Melbourne Social Housing opportunity area.
26. It is recommended that the reliability and ongoing Opex of underground tanks be determined and discussed with Melbourne Water.
27. As the overall water strategy continues to develop, flood models should be updated to ensure Melbourne Water's proposed level of service from the DSS is maintained.

2 Introduction

In both the Arden and Macaulay draft Structure Plans, Integrated Water Management (IWM) has been identified as a key approach to address flooding, improve waterway health and provide a resilient water supply for green spaces.

The Arden and Macaulay IWM Plan set out to review the existing information, plans and strategies to find opportunities in which IWM could work to enhance future projects.

Working with various City of Melbourne groups, Melbourne Water, City West Water and the Victorian Planning Authority, the strategy is designed to inform the final Arden and Macaulay Structure Plans and the associated Developer Contributions Plan (DCP). It will also be used to influence and create opportunities in the proposed Developer Services Scheme (DSS) (Melbourne Water) and City West Water's strategy to deliver an alternative water supply to Arden and to work within Council's capital works programming. The result is a list of IWM projects and opportunities. These projects may be delivered via the DSS or DCP, with others to inform council's capital works program, subject to the standard prioritisation process.

2.1 DSS and DCP Criteria

DSS infrastructure aims to prevent inundation of private land in a 1% Annual Exceedance Probability (AEP) event, and streets in a 5% AEP event. The DSS infrastructure are designed to be cost-efficient. That is, they are optimised to achieve these objectives for the least cost possible. The justification for flood infrastructure for the Arden Mac DCP is that since the change in land use (industrial to mixed use) will lead to a much higher population at risk. To meet modern standards for flood risk requires an engineering solution. If the infrastructure were not built, then it would be very difficult to achieve the vision of the precincts (e.g. poor urban design outcomes, some land becoming undevelopable due to flood depths). There could be scope to include stormwater quality outcomes in the DSS but it will require a similar clear justification. Other IWM projects such as blue-green street infrastructure and public realm improvements may be suitable for full or partial cost recovery through DCPs being prepared for Arden and Macaulay, subject to meeting the DCP tests of need and nexus, equity and accountability.

2.2 Study Area

The Arden and Macaulay urban renewal areas are located approximately two-kilometres north-west of the CBD. The area has an industrial heritage and is bisected by Moonee Ponds Creek running from the north through to its southern confluence with the Yarra River. Moonee Ponds Creek is mostly hidden from view throughout due to the levee walls that protect the precincts from flooding in large events. Despite the levees, flooding often occurs due to either the levees overtopping or local rainfall unable to be discharged from behind the levee walls into Moonee Ponds Creek quickly enough.

2.3 Arden and Macaulay IWM Visions

Integrated Water Management is set-out and defined in both the Arden Vision (2018) and the Macaulay Discussion Paper (2019).

- Arden will be protected by innovative solutions to manage flooding, make better use of water and expand space for recreation and biodiversity – Arden Vision, 2018
- Urban renewal provides opportunities to improve flood mitigation and ensure it is integrated with open spaces and the design of the public realm – Macaulay Discussion Paper, 2019

2.4 IWM Objectives

One tool used to assist in the prioritisation of IWM projects is the use of Strategic Direction Statement (SDS) objectives. A well-known set of SDS objectives were used in this strategy. These objectives have been developed for various State led IWM projects. The SDS goals applied are listed below, and this strategy focussed specifically on the highlighted objectives:

- Safe, secure and affordable water supplies in an uncertain future.
- Effective and affordable wastewater systems.
- Opportunities are optimised to manage existing and future flood risks and impacts.
- Healthy and valued waterways and marine environments.
- Healthy and valued landscapes.
- Community and Traditional Owner values are reflected in place-based planning.
- Jobs, economic benefit and innovation.

3 Documents Reviewed

Several technical studies and strategic pieces of work have been undertaken to date but not all have incorporated IWM or made links to where there are opportunities when stakeholders work can together. The strategies and reports reviewed for this project are listed in Table 3-1.

Table 3-1 Documents Reviewed

Strategy/Report	Lead Organisation/s
Melbourne Water Developer Services Scheme and costs.	Melbourne Water
Arden Vision	VPA, City of Melbourne
Municipal Integrated Water Management Plan	City of Melbourne
CWW Alternative Water Plan Presentation	City West Water
Moonee Ponds Creek Strategic Opportunities Plan	City of Melbourne
Moonee Ponds Creek Background Report	City of Melbourne
Healthy Waterways Strategy	Victorian State Government, Melbourne Water
Urban Design Guide for Flood Prone Areas Arden, Macaulay, and Fishermans Bend (draft 2020)	City of Melbourne
Relevant design guidelines	City of Melbourne
Clause 22.23 Stormwater Management (WSUD)	DELWP
Clause 56.07 Integrated Water Management	DELWP
Clause 19.03 Integrated Water Management	DELWP
Arden Structure Plan (Draft version 2.2)	City of Melbourne
Macaulay Structure Plan (Draft v3)	City of Melbourne
Integrated Water Management Framework for Victoria	DELWP
A cost allocation framework for IWM projects	DELWP
Langford St Flood Storage Investigation	Melbourne Water
Arden Flood Modelling Report - Arden Macaulay Cloudburst management plan	Melbourne Water
Finalising Flood Mitigation Options	Melbourne Water
MW Arden Mac Drainage strategy document 1	Melbourne Water
MW Arden Mac Drainage strategy document 2	Melbourne Water
City of Melbourne Capital Program	City of Melbourne

Documents were reviewed with key IWM opportunities within each documented listed. Across the documents, over 200 opportunities were found. For each opportunity, the following was recorded into a central database:

- An individual ID
- A project category (advocacy, civil works or strategy)
- Document name
- Document link
- Lead organisation
- Detail of the opportunity
- Location
- Page references
- Categorisation as a “direction”, “objective”, “target” or “other”
- Potential delivery, operational and maintenance responsibilities
- Potential funding sources
- Level of commitment

Each opportunity in the database was compared against each of the SDS objectives. Finally, each opportunity was digitised into a GIS map to view the opportunities spatially – an important first step in understanding overlapping opportunities. The shapefiles in the database are indicative areas only and should not be used for functional or detailed design purposes, but more to help identify further ideas and initiatives.

4 Consultation

4.1 Initial Consultation

The agreed approach used in this IWM Strategy was to review existing documentation and strategies to identify IWM opportunities (that had already been identified previously, and it is understood that varying levels of consultation had been undertaken across those studies). Initially, a short meeting was held with each of the four key stakeholder organisations (City of Melbourne Assets and Infrastructure, Melbourne Water, City West Water and the VPA) to further discuss the status of identified opportunities, potential funding opportunities and issues and any further IWM works. Specifics from these discussions were brought into the assessment of IWM projects.

4.2 Workshop

Following the identification and high-level assessment of potential IWM projects, a workshop was also held to bring together internal City of Melbourne stakeholders (from several departments including Climate Change Adaptation, Precinct Planning, Open Space Planning, Assets and Infrastructure and City Strategy), with the key external stakeholders mentioned above. The objectives of the workshop were to present several of the identified IWM projects for Arden and Macaulay and to:

- Identify any red flags
- Further discuss funding sources
- Identify any other opportunities prior to prioritisation.

The virtual workshop (held under COVID19 social distancing measures) used a "JamBoard" to capture participant's comments and ideas for further consideration. An example of this is shown in Figure 4-1. The comments were collated following the workshop and sorted into inputs and ideas for this study, and items and recommendations for future follow up.

Considerations for Arden North

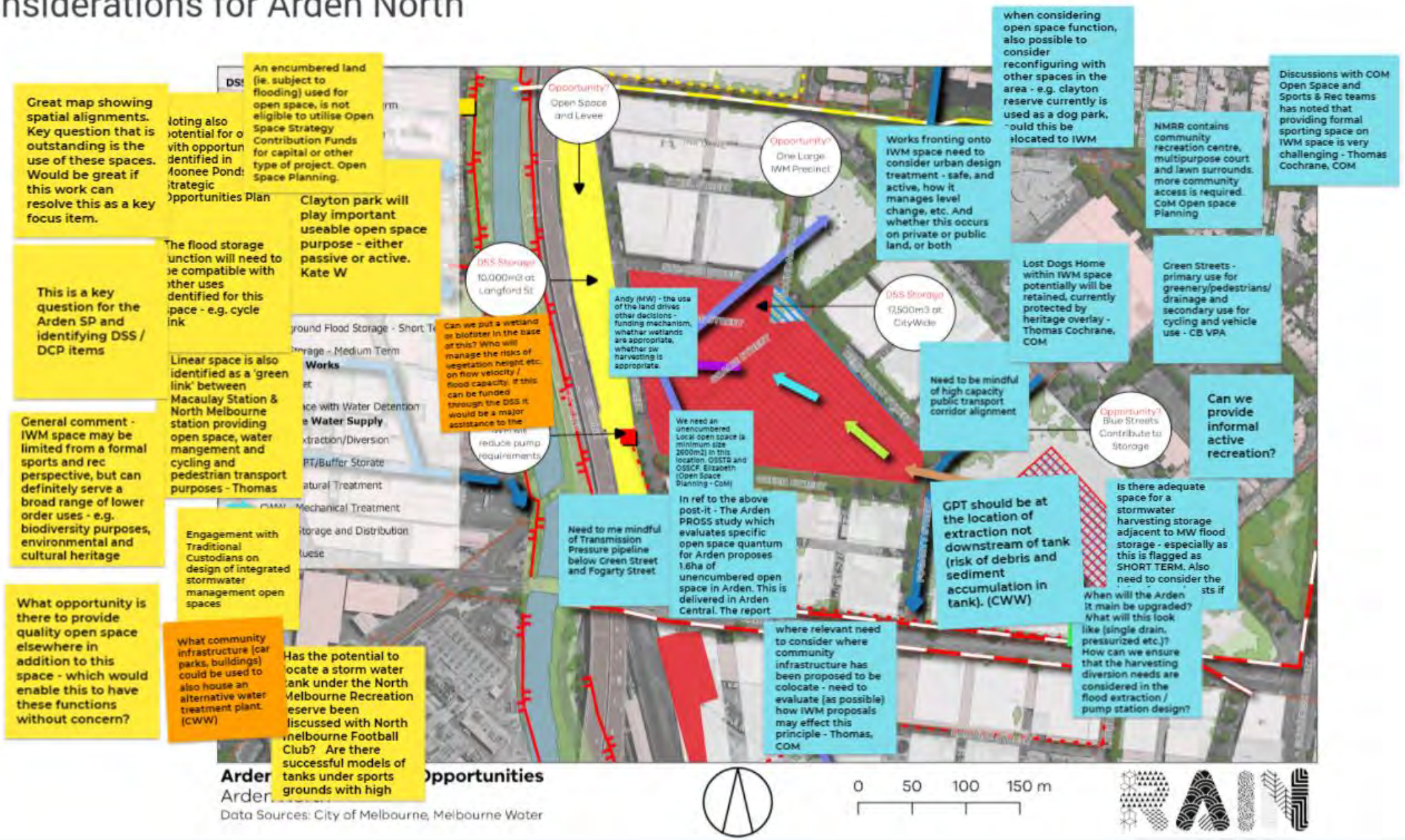
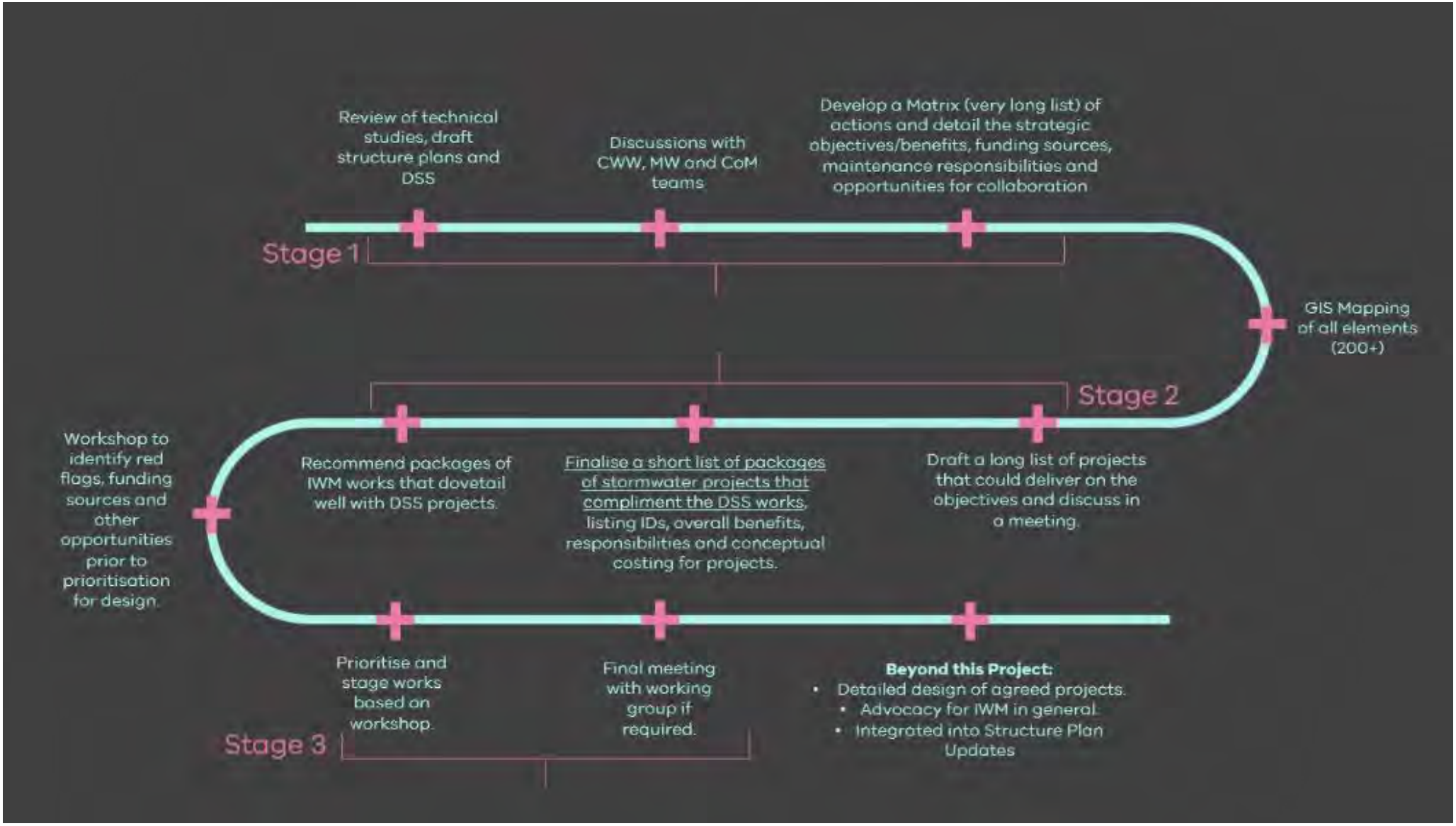


Figure 4-1 Stakeholder workshop JamBoard record for the Arden North IWM opportunities area

5 Process

The IWM Strategy for Arden and Macaulay was completed across three stages as shown in the image below.



6 IWM Opportunities

6.1 Initial Long List

Stage 1 of the project involved extracting individual IWM opportunities from each of the documents and noting key attributes for each as listed in Section 3.

Over 200 opportunities were found through this process, with several opportunities being listed in multiple documents. Where this was the case, the opportunity was listed multiple times to demonstrate the overlap.

The spatial distribution of the projects was also important to understand. Each of the opportunities were given a spatial reference which allowed for quick analysis of select areas. In some cases, where the opportunity applied to the entire study area, this was noted. The shapefiles in the database are indicative areas only and should not be used for functional or detailed design purposes, but more to help identify further ideas and initiatives.

While the review of opportunities to create the long list was detailed, it is important to note that not every opportunity may be listed. Often the spatial reference location for an opportunity was inferred from limited information within the document, and hence the locations of each project should be confirmed prior to use in other work.

6.2 Recommended IWM Projects

Given the number and spread of IWM projects, the Arden and Macaulay Precincts were split into five discrete zones and one "other" zone which covers a number of sites:

- Arden North: Both Arden and Macaulay Precincts
- Chelmsford and Bent: Macaulay Precinct
- North Melbourne Social Housing: Macaulay Precinct
- Government Land: Arden Precinct
- Stubbs Street: Macaulay Precinct
- Other:
    - Parsons Street: Macaulay Precinct
    - Fink and Bruce Streets: Macaulay Precinct
    - Mark Street to Macaulay Road: Macaulay Precinct
    - Alfred Street to South of Sutton Street: Macaulay Precinct

The zones are shown in Figure 6-1. The zones were selected based on the alignment of DSS works. The DSS works include pumps and pressurised pipes, therefore do not always follow the natural contours of the catchment. IWM opportunities may span multiple zones where they do not follow the DSS works but do follow the natural flow path.

Within each of the zones, IWM opportunities were identified and listed, and the full list of options per zone has been provided as a separate Microsoft Excel Workbook (Arden and Macaulay IWM Opportunites_v1.xlsx) – this is referred to in the following Sections as "the supplied spreadsheet". An overview of each zone and a map is provided in this section.

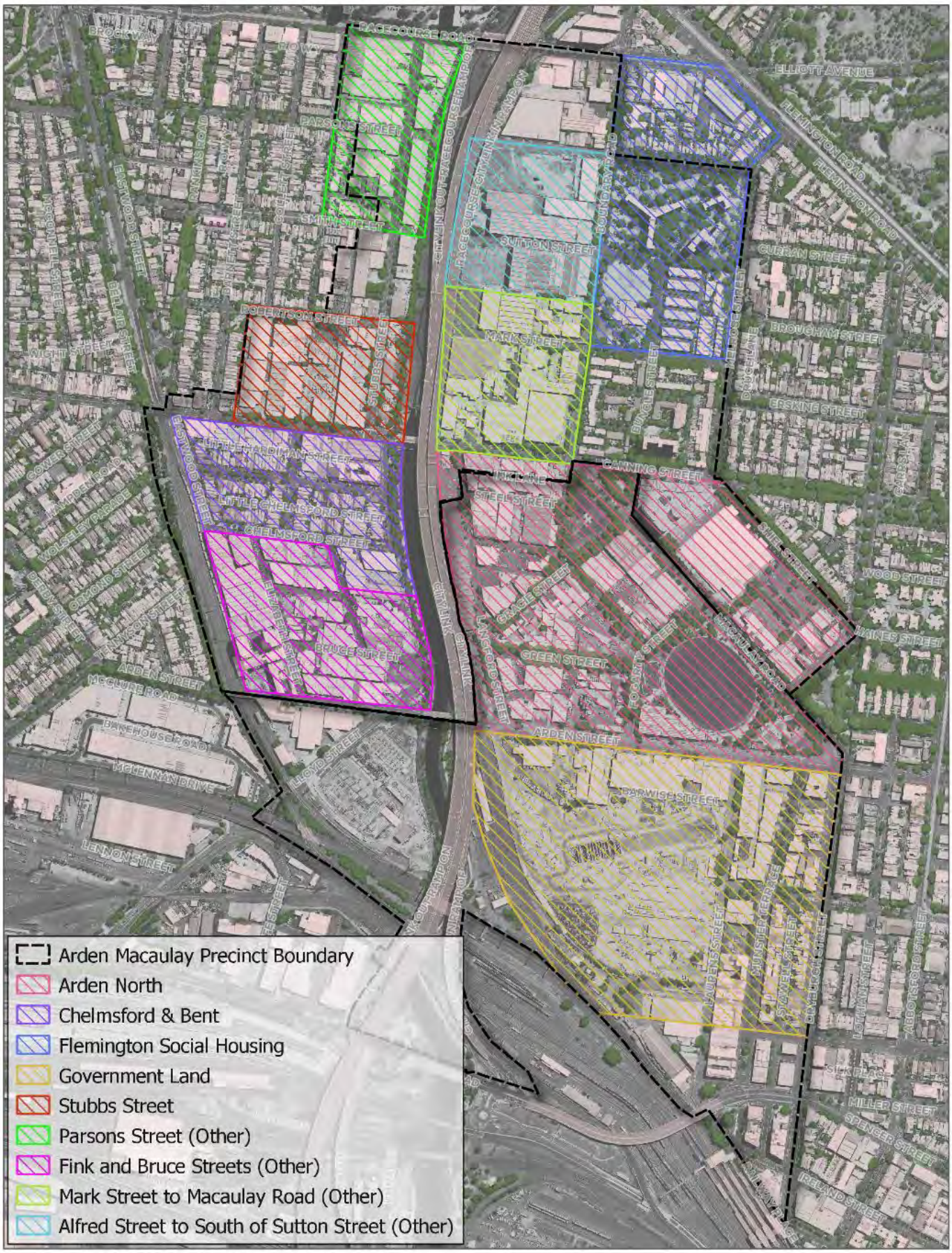


Figure 6-1 IWM Opportunity Zones

6.2.1 *Arden North IWM Zone*

The Arden North IWM site provides the most options for IWM with significant DSS works planned for the area, including three flood storages and a City West Water alternate water system planned. Many options exist for the incorporation of IWM works. All works are within the Arden Precinct except for the northern pump station (ID9) and approximately 18% of the Langford Street Storage (ID7) which are in the Macaulay Precinct. Opportunities are listed on Figure 6-2 with the matrix of options shown in the supplied.

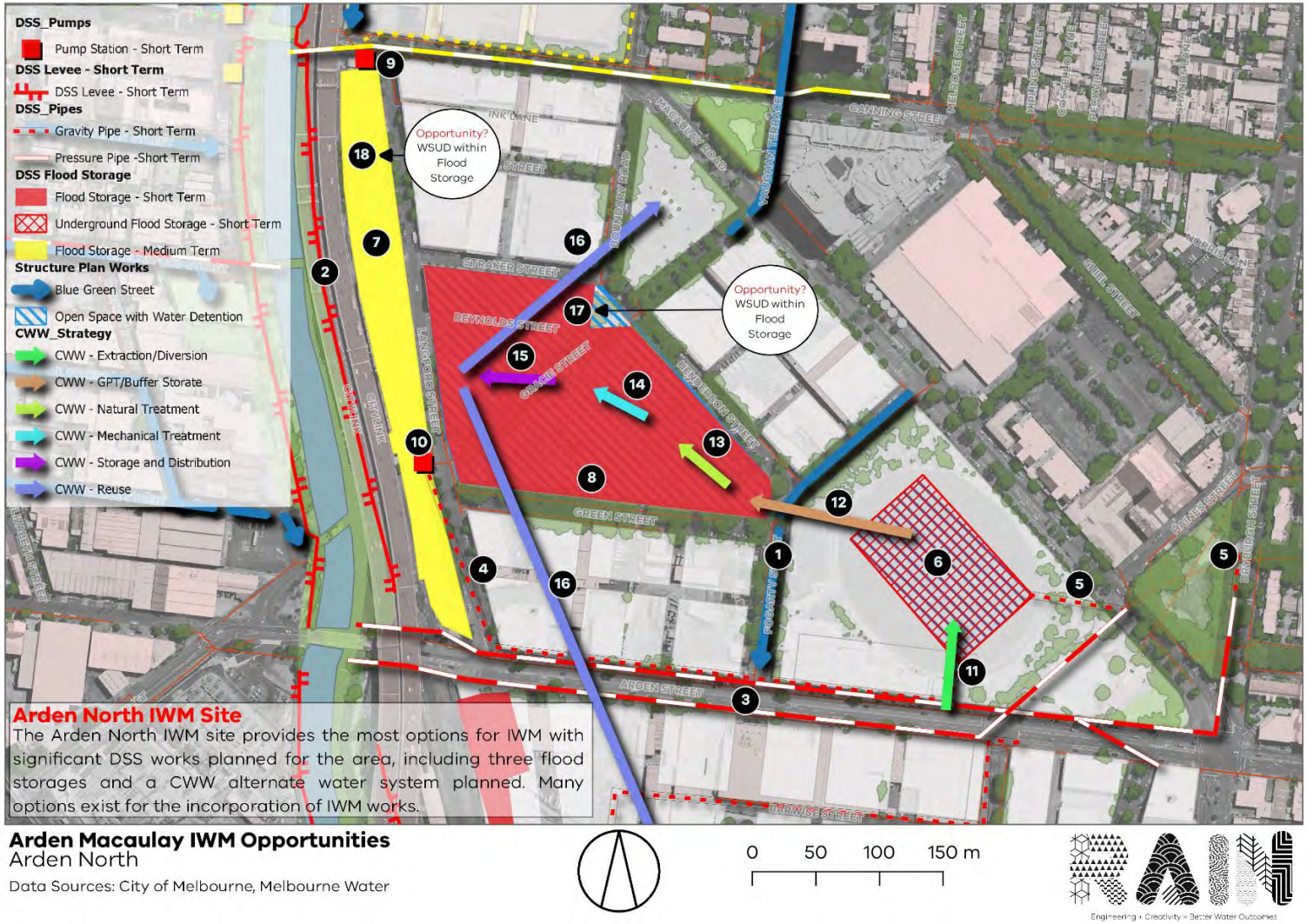


Figure 6-2 Arden North IWM Opportunities

6.2.2 Chelmsford and Bent IWM Zone

The Chelmsford and Bent Street areas face a significant flood management challenge, with very deep depths in large events. Opportunities exist to combine the proposed DSS works with Blue-Green Streets proposed in the Macaulay Draft Structure Plan. All works are within the Macaulay Precinct. Opportunities are listed on Figure 6-3 with the matrix of options shown in the supplied spreadsheet.

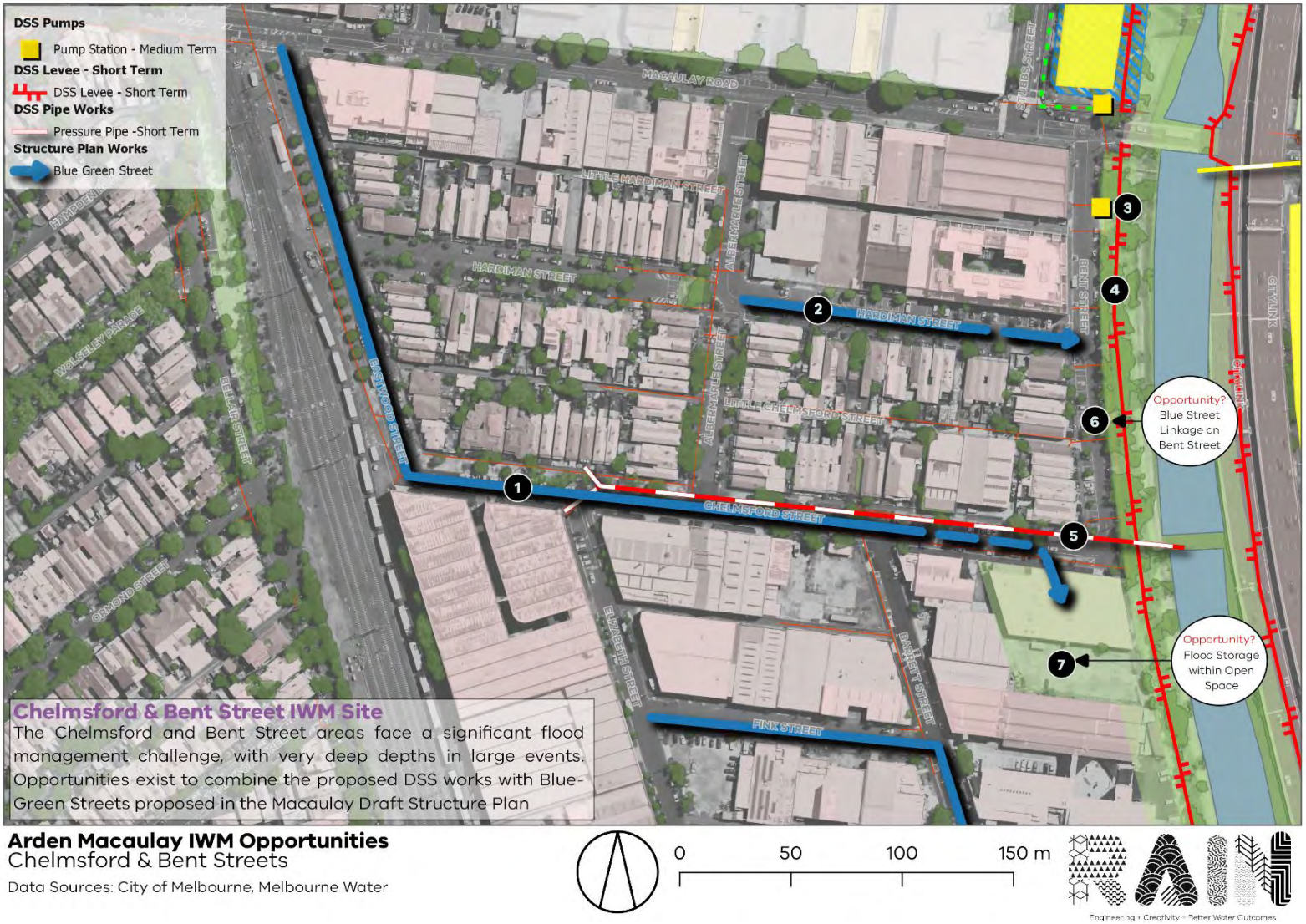


Figure 6-3 Chelmsford and Bent Streets IWM Opportunities

6.2.3 North Melbourne Social Housing IWM Zone

The North Melbourne Social Housing IWM Site has both Structure Plan and DSS works directing water in a south westerly direction, focusing on conveyance. There are opportunities to provide IWM benefits through daylighting pipes and the use of open space for flood storage or WSUD. All works are within the Macaulay Precinct. Opportunities are listed on Figure 6-4 with the matrix of options shown in the supplied spreadsheet.

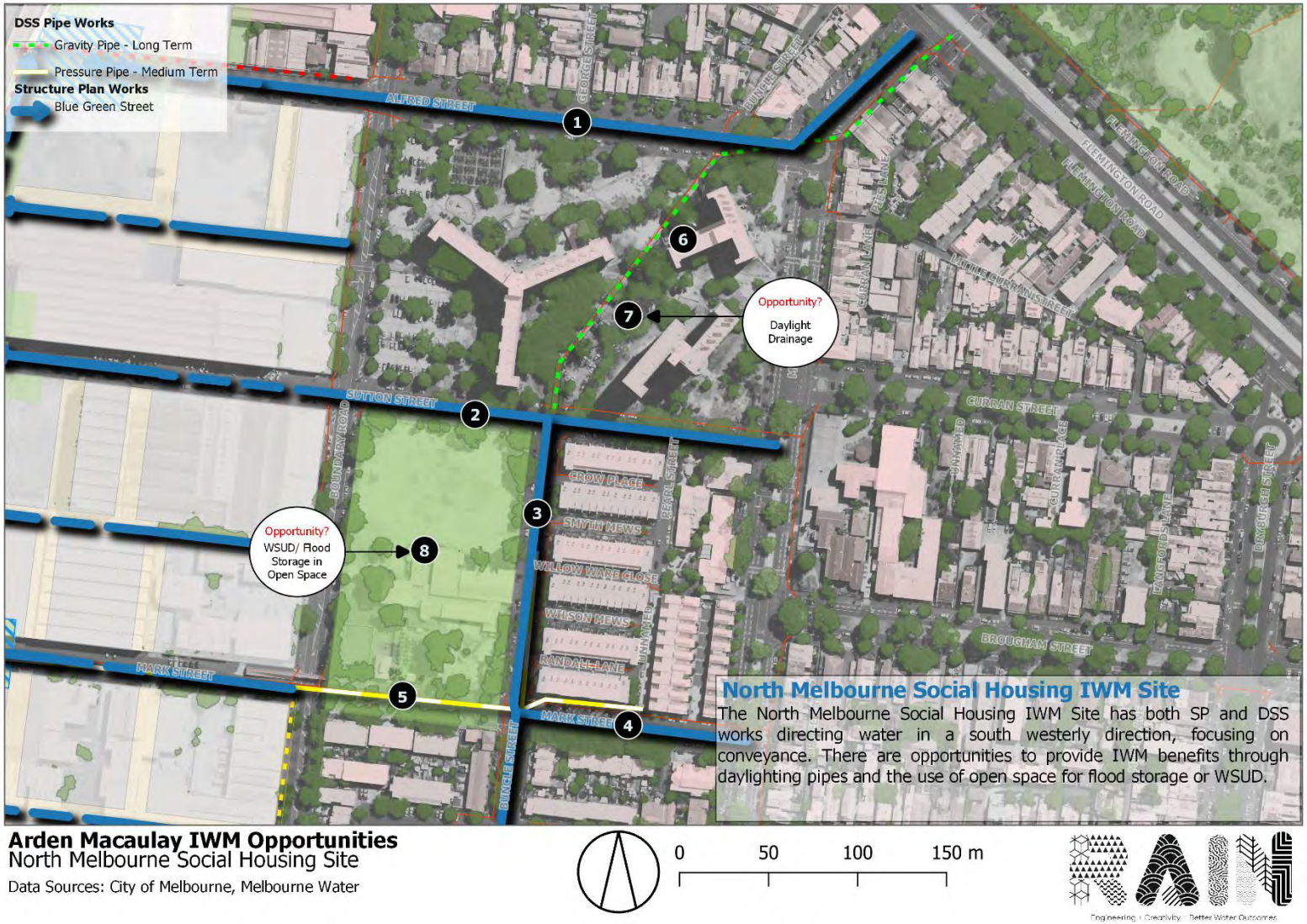


Figure 6-4 North Melbourne Social Housing Site IWM Opportunities

6.2.4 Government Land IWM Zone

The Government Land Site provides many unique opportunities to provide IWM outcomes. Wherever possible, IWM objectives should be considered in new road alignments. The site features a large flood retention basin, pump station and levee walls fed by several DSS works. City West Water have a reuse strategy for the area also. Many options exist for the incorporation of IWM works. All works are within the Arden Precinct. Opportunities are listed on Figure 6-5 with the matrix of options shown in the supplied spreadsheet.

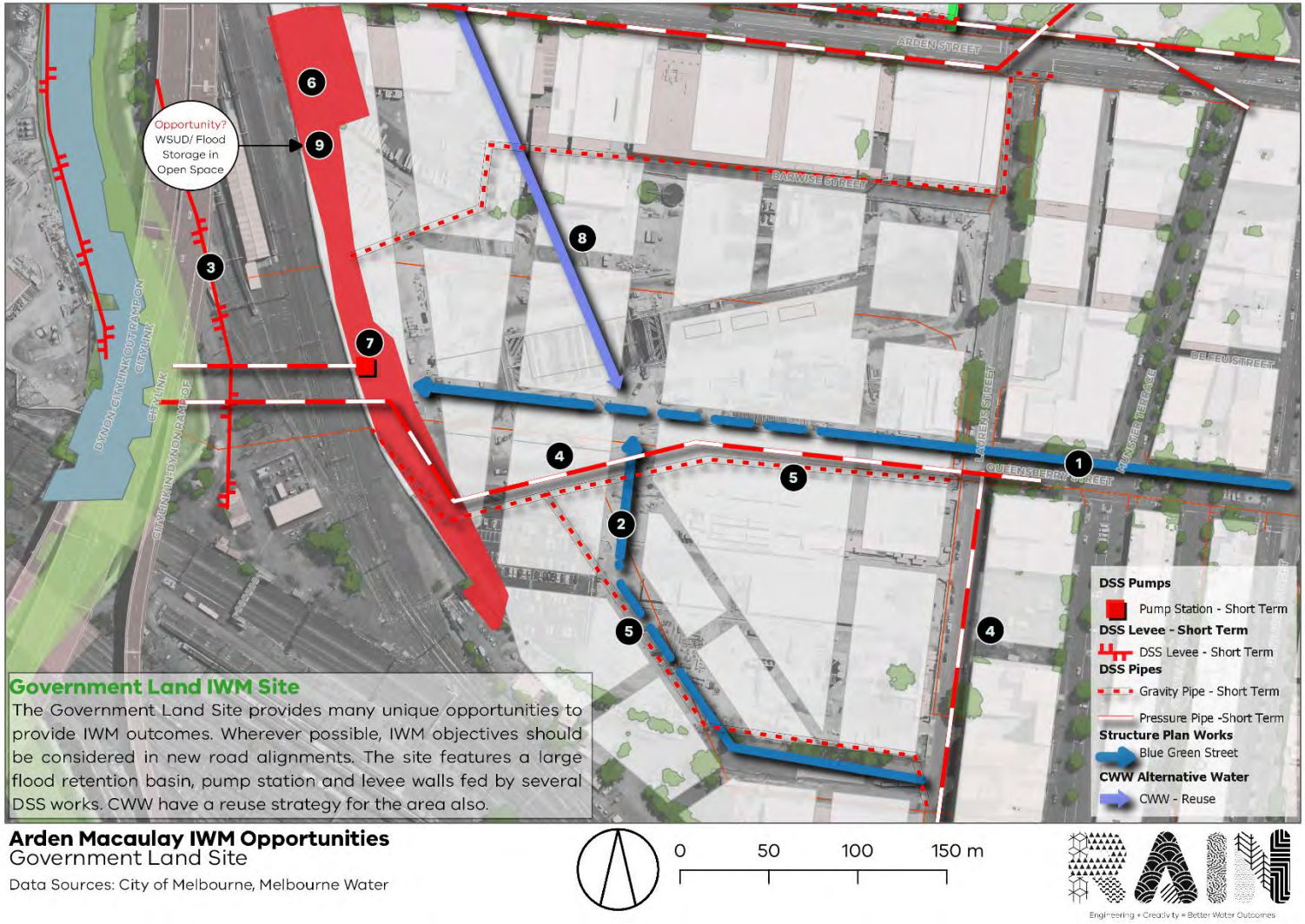


Figure 6-5 Government Land IWM Opportunities

6.2.5 *Stubbs Street IWM Zone*

The Stubbs Street IWM Site provides great IWM opportunities. The new road alignments between Robertson and Macaulay Roads will provide important linkages to new open space. Overlaps between the DSS works and IWM options are significant and present. All works are within the Macaulay Precinct. Opportunities are listed on Figure 6-6 with the matrix of options shown in the supplied spreadsheet. MW have indicated that they are anticipating that all drainage assets within this area to become Council owned and operated (as per 60 ha rule).

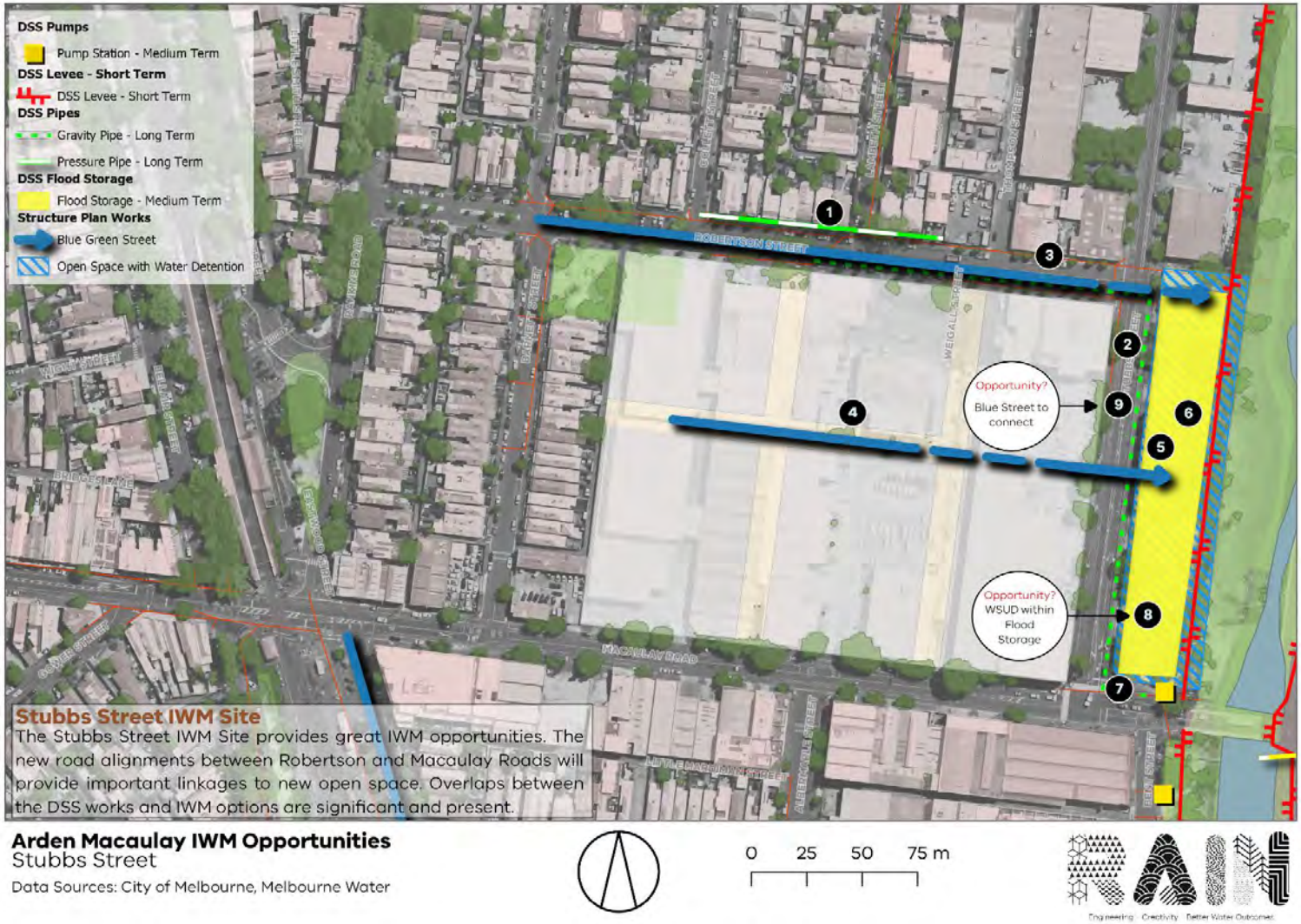


Figure 6-6 Stubbs Street IWM Opportunities

6.2.6 *Other IWM Zone*

The "Other" IWM zone is made up of four sites (Parsons Street, Fink and Bruce Streets, Mark Street to Macaulay Road and Alfred Street to South of Sutton Street). Other than "Mark Street to Macaulay Road" and "Alfred Street to South of Sutton Street" sites, the sites are not spatially related. All works are within the Macaulay Precinct. Opportunities are listed on Figure 6-7 with the matrix of options shown in the supplied spreadsheet.

Arden Macaulay IWM Opportunities
Other IWM Sites
Data Sources: City of Melbourne, Melbourne Water

Figure 6-7 "Other" IWM Sites IWM Opportunities

6.3 Blue Street and Blue-Green Street Opportunities

Opportunities for Blue and Blue-Green Streets were identified by review of the available flood modelling for the precinct from the local catchment as well as the local drainage network. Flooding from Moonee Ponds Creek is not necessarily considered. No modelling has been completed.

Where a street is identified as a "Flood Storage Street", this means that stormwater would be expected to pond in these areas in large flood events. These streets are suitable to be converted to a Blue Street.

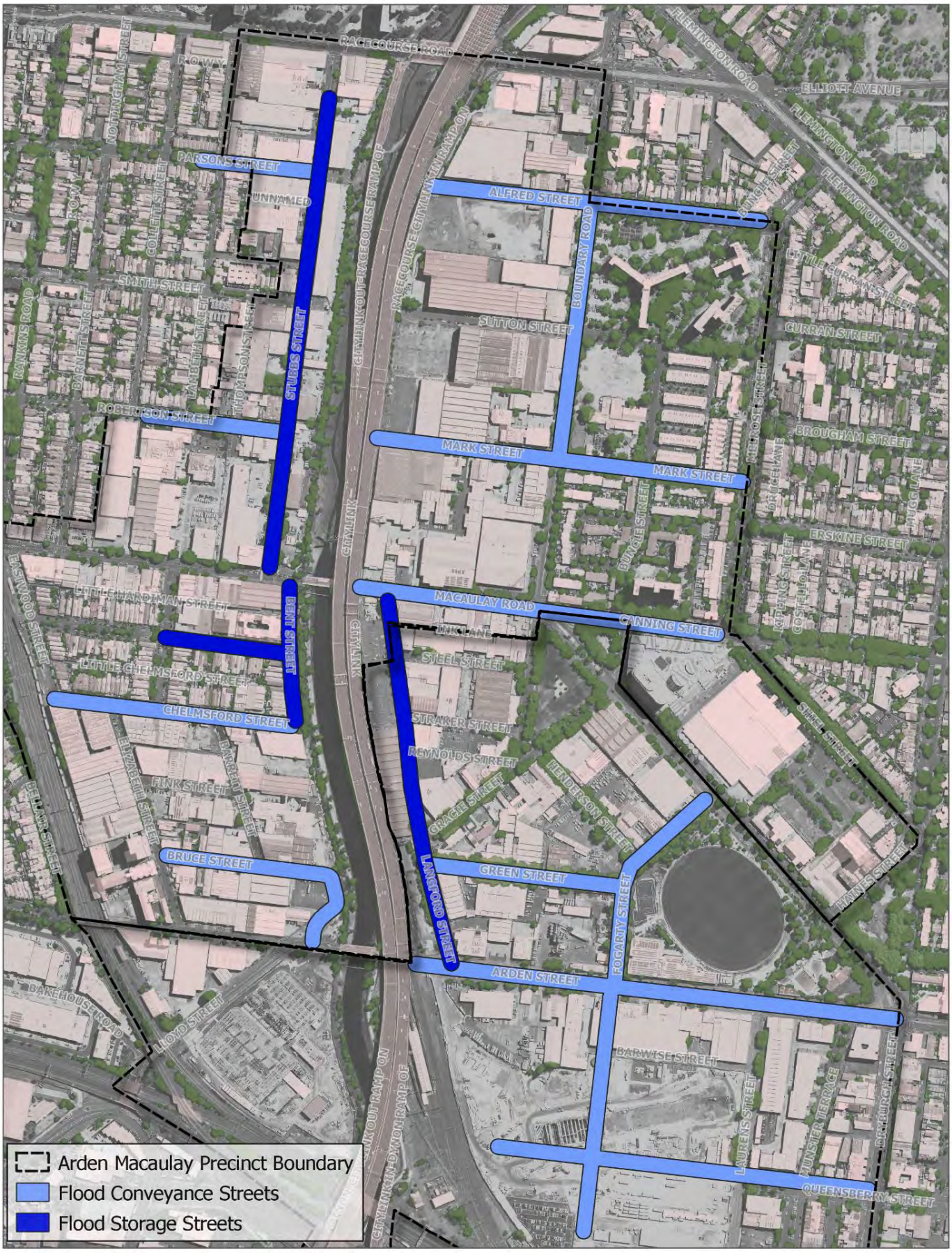
Assessment criteria for suitability of land area for public open space needs to be incorporated into any proposed open space.

Where a street is identified as a "Flood Conveyance Street", this means that water would be expected to travel overland through these streets. These streets are suitable to be converted to a Blue-Green Street.

Each street identified is shown in Table 6-1 and Figure 6-8.

Table 6-1 Flood Storage and Flood Conveyance Streets

Street	Precinct	Type
Stubbs Street	Macaulay	Flood Storage Street
Bent Street	Macaulay	Flood Storage Street
Langford Street	Arden	Flood Storage Street
Hardiman Street	Macaulay	Flood Storage Street
Parsons Street	Macaulay	Flood Conveyance Street
Robertson Street	Macaulay	Flood Conveyance Street
Chelmsford Street	Macaulay	Flood Conveyance Street
Lloyd Street	Macaulay	Flood Conveyance Street
Arden Street	Arden	Flood Conveyance Street
Canning Street	Arden/Macaulay	Flood Conveyance Street
Green Street	Arden	Flood Conveyance Street
Fogarty Street	Arden	Flood Conveyance Street
Macaulay Road	Arden/Macaulay	Flood Conveyance Street
Mark Street	Macaulay	Flood Conveyance Street
Boundary Road	Macaulay	Flood Conveyance Street
Alfred Street	Macaulay	Flood Conveyance Street
Bruce Street	Macaulay	Flood Conveyance Street
Queensbury Street	Arden	Flood Conveyance Street



Arden and Macaulay IWM Strategy

Flood Storage and Conveyance Streets

Data Sources: City of Melbourne

0 100 200 300 m

Engineering + Creativity = Better Water Outcomes

Figure 6-8 Flood Storage and Flood Conveyance Streets

6.4 Staging

Preliminary and conceptual staging advice is provided based on the proposed timing of DSS works. Projects and opportunities which overlap with the DSS works have been identified and suggested timings of each are shown.

Through liaison on this project, Melbourne Water have indicated that there is flexibility in staging of the proposed works. The timelines provided by Melbourne Water are assumed to reflect proposed construction and delivery dates, and it should hence be noted that design works are likely to commence prior to this. However, while Melbourne Water have noted flexibility in staging, a number of projects in Arden are currently scheduled ahead of projects in Macaulay where there are existing residents and existing planning controls that allow for densification, particularly for projects within the Stubbs St and Bent St areas.

All opportunities and projects need to be confirmed via flood modelling to further refine the staging and prioritisation. A detailed staging and prioritisation study (including flood and financial modelling and design) is recommended as a priority.

6.4.1 Arden North IWM Zone

Opportunities related to DSS Works

- Langford Street Linear Flood Storage (Opportunity 7) – 22/23
    - WSUD within the Flood Storage (Opportunity 18) should be investigated prior.
- Langford Street Pump Station 1 (Opportunity 9) – 22/23
- Arden Street Main Gravity Pipes (Opportunity 4) – 23/24
    - The extraction/diversion device (Opportunity 11) should be provisioned for, noting that the storage tank (Opportunity 6) is not due for construction until 25/26
- Langford Street Pump Station 2 (Opportunity 10) – 23/24
- Arden Street New Local Gravity Drainage (Opportunity 5) – 23/24
- North Melbourne Recreation Reserve Underground Storage Tank (Opportunity 6) – 25/26
    - The extraction/diversion (Opportunity 11) and the GPT and buffer storage (Opportunity 12) should be completed at the same time
- CityWide/LDH Storage (Opportunity 8) – 27/28
    - The natural treatment (Opportunity 13), mechanical treatment (Opportunity 14) and storage and distribution (Opportunity 15) and reuse diversion (Opportunity 16) should be completed/provisioned for at the same time
    - The WSUD within the flood storage (Opportunity 17) should be completed at the same time
- Arden Street Pressure Pipes (Opportunity 3) – 30/31
- No timing was available for the levee works (Opportunity 2), but the Open Space Strategy and interface with the levee walls should be determined as a priority before design begins.

Other Works

- The Fogarty Street Blue-Green Street can be completed at the time of future upgrades or the extension into the Government Land.

6.4.2 Chelmsford and Bent Street IWM Zone

Opportunities related to DSS Works

- The levee wall (Opportunity 4) - 23/24, noting that design will take place sooner.
    - The Open Space Strategy and interface with the levee walls should be determined as a priority before desig

begins. This links with Opportunity 7 which is the creation of flood storage with open space at the corner of Bent and Chelmsford Streets.

- Chelmsford Street pressure pipe (Opportunity 5) - 24/25.
  - An IWM opportunity exists to supplement or replace these works with a Blue-Green Street (Opportunity 1). Detailed investigations (design and flood modelling) will be required prior.
- The pump station upgrade (Opportunity 3) - 25/26.
  - City of Melbourne have indicated that there is interest to potentially deliver this sooner. Discussions around timing are required ASAP. No other IWM opportunities are linked with the pump station upgrade.

Other works

- The Hardiman Street Blue-Green Street (Opportunity 2) can be constructed at any stage but may be best delivered with Chelmsford Street Blue-Green Street (Opportunity 1).
- The Bent Street Blue Street (Opportunity 6) should be constructed with or prior to the Hardiman Street Blue Green Street (Opportunity 2) but after the flood storage (Opportunity 7).

6.4.3 North Melbourne Social Housing IWM Zone

Opportunities related to DSS Works

- Mark Street Pressure Pipe (Opportunity 5) – 27/28
  - The Mark Street Blue Green Street (Opportunity 4) could be constructed at the same time
  - The Buncle Street Blue Green Street (Opportunity 3) could be constructed at the same time
    - Consider the daylighting of the drainage (Opportunity 7) or the Gravity Pipe (Opportunity 6) prior to design
- Flemington Road to Sutton Street Gravity Pipe (Opportunity 6) – 29/30
  - The Alfred Street Blue Green Street (Opportunity 1) could be constructed at the same time
  - The daylighting of the drainage (Opportunity 7) should be considered prior to the design of (Opportunity 6)
  - The WSUD and flood storage in the open space (Opportunity 8) needs to be considered prior

Other works

- The Sutton Street Blue Green Street (Opportunity 2) and portions of the other Blue Green Streets (Opportunities 1,3 & 4) should be completed when upgrade works to the roads are required.

6.4.4 Government Land IWM Zone

Opportunities related to DSS Works

- Arden Government Land Pressure Pipe (Opportunity 4) – 24/25
- Arden Government Land Gravity Pipe (Opportunity 5) - 24/25
  - The Blue-Green Street (Opportunity 2) could be completed at the same time
- Arden Government Land Pump Station (Opportunity 7) – 24/25
- Arden Government Land Flood Storage (Opportunity 6) – 25/26
  - The WSUD within the flood storage (Opportunity 9) could be completed at the same time

- The Queensberry Street Blue Green Street (Opportunity 1) should be completed with or after the construction of the flood storage (Opportunity 6)

- Levee wall (Opportunity 3) – 26/27
  - The Open Space Strategy and interface with the levee walls should be determined as a priority before design begins.

Other works

- The reuse of alternate water strategy (Opportunity 8) can occur at any stage, although is likely to be required prior to development commencing in the area.

6.4.5 Stubbs IWM Zone

Opportunities related to DSS Works

- Levee Wall - 23/24
  - The Open Space Strategy and interface with the levee walls should be determined as a priority before design begins.
  - Consideration and design could be required for many of the IWM opportunities required as part of the flood storage (Opportunity 5)
- Stubbs Street Flood Storage (Opportunity 5) – 26/27
  - Linkages to many IWM opportunities will need to be understood (Opportunities 3,4,6,8)
- Stubbs Street Pump Station #2 (Opportunity 7) – 31/32
  - An understanding of whether the gravity pipe (Opportunity 2) will be required given the IWM opportunities will be required prior to design.
  - City of Melbourne have indicated that there is interest to potentially deliver this sooner. Discussions around timing are required ASAP.
- Robertson Street and Stubbs Street Gravity Pipe (Opportunity 2) – 30/31
  - The Robertson Street Blue Green Street (Opportunity 3) could be constructed at the same time and may supplement the need for the pipe.
  - The proposed Blue Street (Opportunity 9) could be delivered at any stage but must consider the impact of the gravity pipe
- Robertson Street Pressure Pipe (Opportunity 1) – 33/34

Other Works

- The proposed Blue-Green Street (Opportunity 4) should be constructed as this area develops.

7 Assumptions

Some key assumptions are as follows:

- Where streets have been recommended for flood conveyance or flood storage, this is based on the available flood modelling for the precinct from the local catchment as well as the local drainage network. Flooding from Moonee Ponds Creek is not necessarily considered.
- All costing provided in this spreadsheet is high level and is either provided by Melbourne Water (via the DSS costing), City West Water or from City of Melbourne estimates. Further detailed costing is required. Unless specified, costs do not include land acquisition. Maintenance costs are estimated by City of Melbourne and City West Water.

8 Recommendations

The following key recommendations are noted for the study in general, many of which are direct feedback from the stakeholder workshop:

1. It was noted in the stakeholder workshop that land acquisition has not been considered in costing. It is recommended that further work be undertaken in this regard before any finalised plans for asset delivery (be it DSS, DCP, etc) to understand these additional costs. Melbourne Water and CoM's Open Space Planning Team to resolve land acquisition for flood storage, mitigation or treatment with regard to Open Space requirements and use.
2. It is recommended that cross-sections for Blue and Blue-Green Streets of various widths are developed in the feasibility stage
3. Detailed design of spaces should seek to engage with Traditional Owner groups early to obtain input about needs and ongoing engagement. Initial consultation with groups via Structure Plan process for Arden and Macaulay has identified water management as a key opportunity for integrating Aboriginal cultural values and heritage.
4. All works fronting onto IWM spaces should consider urban design treatment. Wherever possible, IWM and Urban Design should be considered together for opportunities to incorporate water into the landscape with a practical function.
5. It is recommended that immediate discussions are held between CoM, MW and VPA to discuss the overlap of works and staging in the precinct.
6. The use of underground tanks (or large culverts) should be considered where feasible in cross section design to provide additional flood storage.
7. Generally, open spaces within the precinct will be providing a flood mitigation role also. Many open spaces in this area will provide some level of flood storage, for example, some spaces may only play a role in the less frequent events, designed for water to clear in a short period of time returning them to their primary use function. We recommend considering the Open Space Strategy Primary use when designing the flood mitigation components of these assets. This also requires further internal discussion at CoM. It is recommended that CoM develop a criteria for designing open spaces that play a flood function role which can be used for both CoM and MW

projects. These discussions should focus on sites where IWM use could impact on primary Open Space use.

8. It is recommended further work is completed to integrate/discuss implications for the North Melbourne Community Centre.
9. It is recommended that immediate discussions are held between MW and CoM to further discuss the inclusion of WSUD into the DSS. Discussions should involve VPA and DJPR. The DSS currently allows for flooding and drainage to meet the level of service associated with the change in land use. An equivalent justification would be required for surface water quality.
10. Any green, Blue-Green and Blue streetscape planning and design needs to incorporate existing precinct plans identified in the Urban Forest Precinct Plans, consider open space links and biodiversity opportunities in the City of Melbourne's Nature in the City.
11. Where new Blue or Blue Green Streets are proposed, particularly where interacting with DSS works, new flood modelling should be completed to confirm sizing and interplay between the works and optimise design.
12. Live planning approvals should be considered throughout the design stages.
13. Where new roads are proposed, Blue-Green Streets are recommended. It will be more cost effective to construct a new road as a Blue-Green Street rather than retrofit for the sole purpose of IWM. It would be beneficial to consider dual-staging of new road constructions and IWM works to minimise costs, disruptions and rework.
14. There are many IWM objectives relating to the MPC corridor. This includes biodiversity links, open spaces, connections, active transport links, cultural considerations, as well as flood management and stormwater harvesting and reuse. Further work is required around IWM in the MPC corridor which seeks to also link in with the IWM projects in this strategy. For example, where the levees, flood storages, blue-green streets and WSUD opportunities connect with the MPC.
15. Key transport (pedestrian, cycling, car, public transport) corridors, current or proposed, will potentially provide opportunities for collaboration. It is recommended that this is considered when undertaken further design of IWM opportunities.
16. It is recommended that further work consider Urban Cooling (Heat Island) and refer to the City of Melbourne Urban Forest Strategy. The VPA has indicated that it might be possible to include some items into a DCP such as larger trees for canopy shade/protection with a nexus to more people being housed post development.
17. Whenever new works are being proposed, City of Melbourne's Infrastructure and Assets Group's Capital Plan should be reviewed/considered to look for other opportunities or overlaps.
18. Continue discussions with VPA and MW about the link of levees with other identified opportunities per the Structure Plan and Strategic Opportunities Plan.
19. Further design needs to consider services etc (for example, potential risk mitigation works required associated with the high-pressure gas pipeline along Green St & Fogarty St).
20. The use of IWM Targets specific to the area covered in this document could be considered in future if required.
21. VPA has indicated that they will not own or manage assets. It is recommended that asset ownership be resolved between CoM and MW in consultation with DJPR and VicTrack (due to significant government land holdings).

22. VPA has indicated that land required for flood management and future transport uses (adjacent to Upfield Rail Corridor on Arden's western boundary) must 'not preclude' future transport infrastructure, such as level crossing removals. It is therefore recommended that this is considered for any further design.
23. It is recommended that further discussions are held between Melbourne Water and CoM to further discuss the Living Levee concepts.
24. It is recommended that further discussions are held between Melbourne Water and CoM regarding the potential open drainage swale through the North Melbourne Social Housing site. MW have indicated that this could be funded through the DSS (as indicated), however ongoing ownership would be Council. With regards to DSS funding, it will need to consider difference in costs between daylighting and undergrounding. If daylighting more expensive capital costs, then further co-funding may be required.
25. It is recommended that further discussions are held between Melbourne Water and CoM on the idea of Above Ground Storage with Open Space (Item 8) in the North Melbourne Social Housing opportunity area.
26. It is recommended that the reliability and ongoing Opex of underground tanks be determined and discussed with Melbourne Water.
27. As the overall water strategy continues to develop, flood models should be updated to ensure Melbourne Water's proposed level of service from the DSS is maintained.

Appendix A - Greenhouse Gas Offsets

Through the development of this report, Rain Consulting has emitted 0.151 Tonnes of CO2. Committing to the 2C pathway, our emissions are multiplied by 2.5, and hence the offset amount is 0.38 Tonnes. We have chosen to offset this via South Pole Australia, whilst committing to the 2C Pathway. For this project, we have offset against a fantastic project called "EcoAustralia".

The Story

The Mount Sandy Project is located in part of South Australia's Limestone Coast, this region features some of the country's most breathtaking landscapes. However, land surrounding these national treasures has been largely cleared for agriculture. The traditional lands of the Ngarrindjeri people, Traditional Custodians of the Coorong, Mount Sandy is a rare pocket of intact native vegetation in the region. In Yingxin, implementing measure for core industries to minimise their environmental impact has become key for maintaining the long-term viability of the local economy.

The Solution

EcoAustralia is a stapled product that blends carbon credits with biodiversity protection. Each EcoAustralia credit consists of one Australian Biodiversity Unit, equal to 1.5m2 of government-accredited, permanently protected Australian vegetation, and 1 tCO2e of avoided emissions from a Gold Standard certified project. The Australia Biodiversity Unit supports Mount Sandy Conservation, a unique project bringing together indigenous and non-indigenous communities of Australia by promoting traditional land management for biodiversity conservation. This project protects a rare pocket of wetlands and woodlands between the Coorong National Park and Lake Albert. As one of the last remaining areas of native vegetation in the region, the land forms a strategic wildlife corridor and is of great significance to the Ngarrindjeri people, the local indigenous nation. The Gold Standard certified Yingxin Glassworks project is avoiding emissions by is installing state-of-the-art technology to increase energy efficiency. The project supports a system to capture waste heat and convert is back into electricity to power more glass production – significantly reducing their need for fossil-fuel derived power in their operations.

The Impact

The Mount Sandy project ensures permanent protection for a regionally and culturally important pocket of biodiversity-rich land in partnership with its Traditional Owners. Local birds, animals and plants flourish undisturbed, while native plants for revegetation will be supplied by the local nursery at Raukkan Aboriginal Community, a self-governed Indigenous community 50 kilometres northwest of the project site. Raukkan community members are also employed for onsite works including vegetation monitoring and mapping, fencing, and pest and weed control. At the Yingxin plant, electricity generated by this project meets over half needed in the glass production. In addition to the environmental benefits, the project owner has provided scholarships to children and is supporting schools, as well as elderly people and the local infrastructure. Local people are also permitted to borrow machinery and tools at no cost. By supporting EcoAustralia, unique Australia heritage and vegetation is protected for generations to come; while certified emission reductions are helping to mitigate the effects of climate change.

Our offset calculations are shown below, along with our offset certificate for this proposal.

Emission Source	Tonnes of C02
Office Use	0.151
Transport (car)	0.000
Transport (train)	0.000
Transport (tram)	0.000
Other	0.000
Total Emissions	0.15
2C Pathway	0.23
Total Offset	0.38


Engineering + Creativity = Better Water Outcomes

MUNICIPAL INTEGRATED WATER MANAGEMENT PLAN

JULY 2017

CITY OF MELBOURNE

AN ECO CITY

We provide solid foundations for the sustainability of Melbourne's communities. We embrace the unfamiliar if it helps us achieve our ambitions. We continue to encourage our community to take positive actions and we lead by example locally, nationally and globally.

The City of Melbourne respectfully acknowledges the Traditional Owners of the Land. For the Woiwurrung (Wurundjeri), Boonwurrung, Taungurong, Dja Dja Wurrung and the Wathaurung groups who form the Kulin Nation, Melbourne has always been an important meeting place for events of social, educational, sporting and cultural significance. Today we are proud to say that Melbourne is a significant gathering place for all Aboriginal and Torres Strait Islander peoples.

melbourne.vic.gov.au/watermanagement

CONTENTS

July 2017

To find out how you can participate in the decision-making process for City of Melbourne's current and future initiatives, visit **melbourne.vic.gov.au/participate**

1.0 OVERVIEW

Water is fundamental to the liveability of the city and the health and wellbeing of our community. As our climate changes, intense rainfall, flooding, extreme heat events and drought are becoming more common in Melbourne and across the world. Our municipality is also experiencing stronger population growth than previously forecast. New development is increasing, with a significant proportion of this growth in low-lying urban renewal zones that are subject to flooding.

To enable this growth and manage the added challenge of climate change, we need an integrated holistic approach that will provide multiple benefits. We need open space, smart flood mitigation solutions and fit-for-purpose water, recognising the role of water and green infrastructure in responding to the effects of climate change.

The City of Melbourne practices Integrated Water Management, defined as the coordinated management of all components of the water cycle including water consumption, rainwater, stormwater, wastewater and groundwater, to secure a range of benefits for the wider catchment.

We have been at the forefront of Integrated Water Management for many years, under the direction of our Total Watermark strategy. The first Total Watermark strategy was adopted in 2004 and subsequently revised in 2009 and 2014. Our current vision of 'a healthy city in a healthy catchment' has been in place since 2009 and is supported by a series of objectives, short and medium term targets and a four-year implementation plan. With the implementation plan coming to an end, we need to consider how the many changes since 2014 will influence our work in Integrated Water Management into the future.

Focus areas

This Municipal Integrated Water Management Plan (Plan) sets the strategic direction on water management across the municipality, using a place-based and catchment approach. It guides our effort, thinking and investment for the next four years.

Place-based actions have been developed for Fishermans Bend, Arden-Macaulay and Moonee Ponds Creek, Southbank and the Yarra River. Implementation of our existing Integrated Water Cycle Management Plan for the Elizabeth Street Catchment has also been included in this Plan, as well as actions that cover the whole municipality and a range of place-based actions for the rest of the municipality.

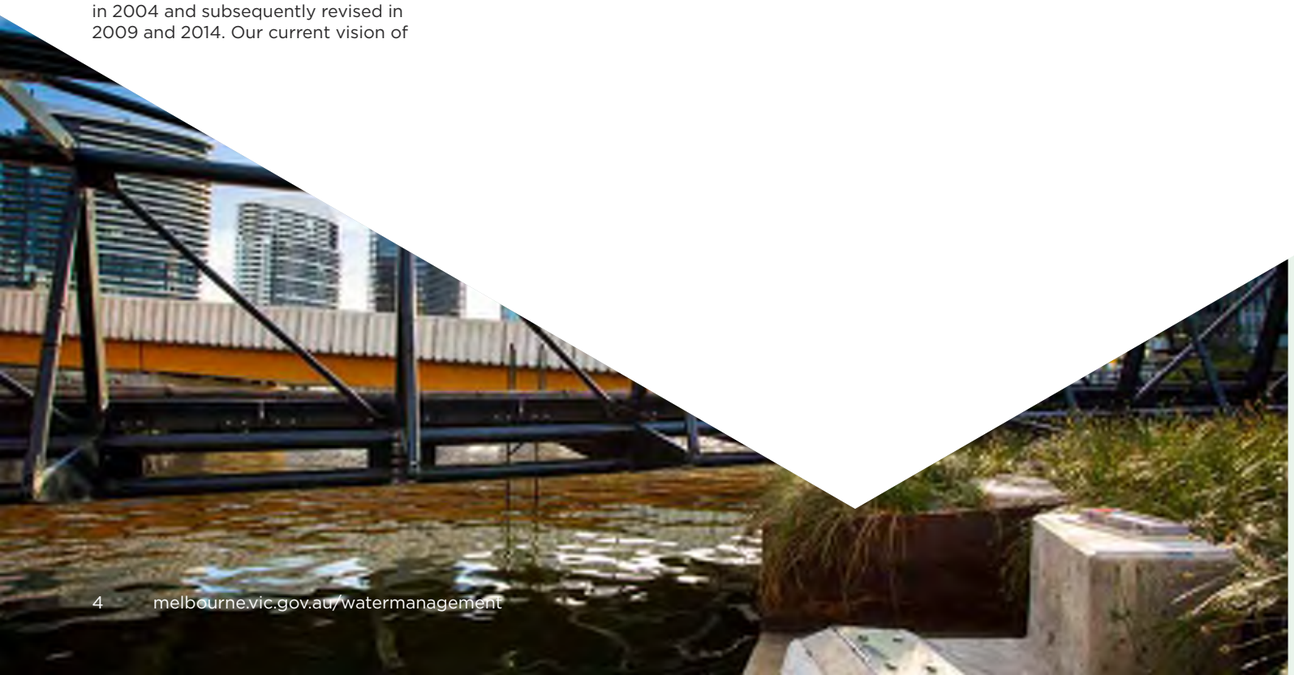
The Plan takes stock of changes and achievements since Total Watermark 2014.

Progress since Total Watermark 2014

Over the past four years we have completed many actions from Total Watermark including:

- Enhancing our open space and streetscapes to be more water sensitive
- Implementing a 10-year stormwater harvesting and flood mitigation program
- Irrigating our parks and gardens using up to 25 per cent non-potable, alternative water sources including rainwater and stormwater
- Reducing the Total Nitrogen pollution in stormwater runoff by 13 per cent.

There is still work to be done to achieve targets outlined in our Total Watermark strategy. In particular, stronger direction and action is needed to upgrade our drainage network to a 1:20 average recurrence interval (ARI) drainage standard to cope with increased intense rain events. In addition to this, we need to increase permeability in catchments to improve water quality and reduce flood impacts.



The Figure below illustrates how we implement water management and key strategies to successfully adapt to the impacts of climate change and enable population growth and density.

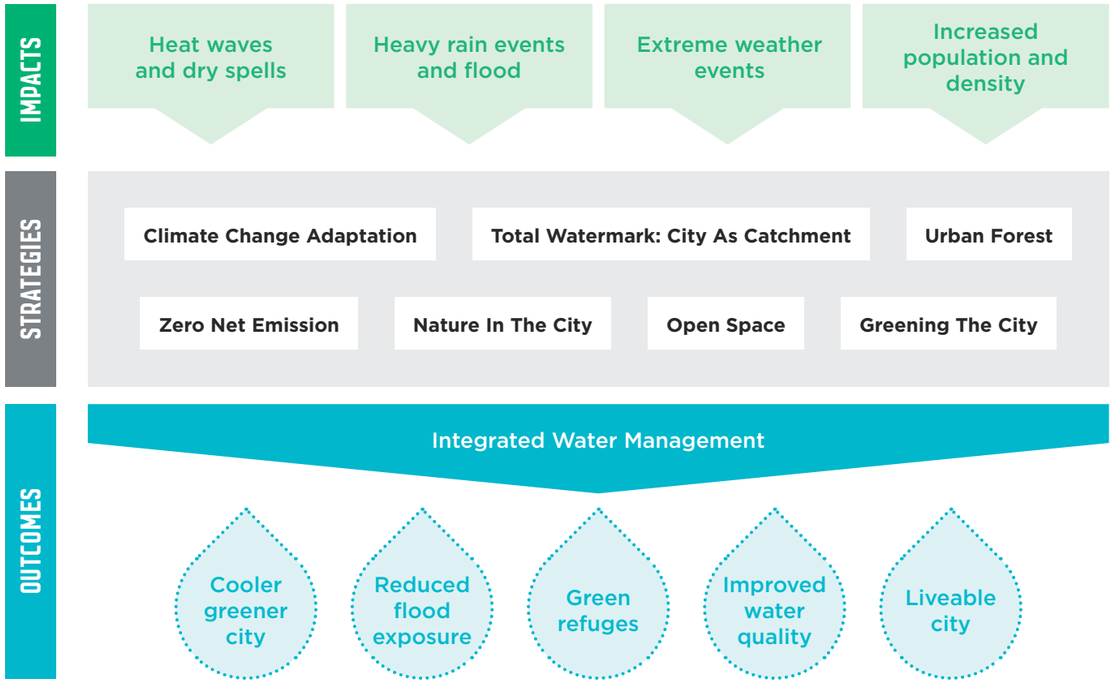


Figure 1: Outcomes of the City of Melbourne's Integrated Water Management approach

What is Integrated Water Management?

City of Melbourne practices integrated water management and defines it as *the coordinated management of all components of the water cycle including water consumption, rainwater, stormwater, wastewater and groundwater, to secure a range of benefits for the wider catchment.*

Our successful management of water within our municipality helps us maintain a high standard of liveability in the face of increasing pressures. Examples include:

- Stormwater harvesting systems that reduce our reliance on potable water, reduce pollution to waterways and decrease flooding impacts.
- Improved soil management to increase infiltration, optimising rainfall and reducing irrigation.
- Requiring stormwater management through the Melbourne Planning Scheme, mostly implemented by installing rainwater tanks.
- Passive irrigation systems supporting street trees such as the structural soil trench with smart soaker pits in Flinders Street.
- The existing sewer mine plant in Yarra Park and the proposed plant for Fishermans Bend.
- Permeable pavements installed win Collins Street and Eades Place.
- Converting pavement to green open space to achieve multiple benefits, including increased permeability and reduced stormwater runoff.
- Combining flood mitigation and stormwater harvesting at the Carlton Squares project.

2.0 CONTEXT FOR INTEGRATED WATER MANAGEMENT

2.1 Our role

The City of Melbourne relates to water in its various forms in many ways. We:

- Manage extensive public parks, gardens and vegetation to a high standard of presentation.
- Achieve this high standard of presentation and maximise vegetation health by irrigating the majority of our open spaces, which makes us one of the biggest water users in the municipality.
- Own assets that enable the implementation of water-sensitive design, in buildings, streetscapes, road and parks.
- Promote the use of green infrastructure to provide shade and cooling during summer, to intercept, retain and infiltrate rainwater, and for amenity and other ecological benefits.
- Implement, own and advocate for non-potable, alternative water supply projects.
- Can improve water management and outcomes in the private realm, as the Responsible Authority for planning applications less than 25,000 m2 of floor area.
- Influence strategic planning for whole precincts through the production of structure plans and advocacy.
- Have received a direct mandate from our communities to care for the environment and particularly capture and reuse stormwater.
- Coordinate our flood and extreme weather response with the State Emergency Service and other relevant agencies.

2.2 Community and stakeholders

The way we deliver our role is guided by a series of strategic documents developed and implemented together with our community and stakeholders. In addition to our direct influence on the way that water is managed in the municipality, we have a privileged understanding of, and access to, the community through the direct services we provide. We have also established relationships with many stakeholders that can also become drivers of Integrated Water Management.

Community

Future Melbourne 2026 sets out the community's aspirations for the future of Melbourne and was developed through extensive consultation with the community. Through Future Melbourne, 2000 people shared their ideas on a variety of topics including the environment and climate change. The community felt strongly about:

- Capturing and reusing stormwater to reduce potable demand and reduce pollution going into waterways.
- Maintaining the urban biosphere through enhancing the urban forest and green roofs and reducing the heat island effect.
- Adapting to climate change through world's best practice.

Through the development of the Climate Change Adaptation Strategy, the community also identified the urban heat island effect and more frequent flood events as key challenges. To respond to these challenges the community proposed to increase green permeable spaces and design the city to better cope with extreme weather events. Water was also a key theme that emerged through the workshops and the online forum during the Nature in the City Strategy development.

Stakeholder organisations

We work closely with many Victorian Government stakeholders and other partners to deliver Integrated Water Management.

The place-based summaries included in this Plan outline how we interact with each of the organisations in Figure 2 below.

Figure 2: The strategic context for our work in Integrated Water Management

2.3 Melbourne's habitats, blue and green spaces

The municipality of Melbourne encompasses a wide range of different habitats, blue and green spaces including waterways, marine and estuarine habitats, green infrastructure (street trees, green roofs, parks and median strips), residential gardens, formal parks (such as Fawkner Park and Fitzroy Gardens), native ecosystems with substantial remnant vegetation including Royal Park and those that have been restored such as Westgate Park. Small and fragmented patches of habitat are often considered lower value than larger or continuous patches; however their potential value as both habitat and to facilitate the movement of wildlife should not be overlooked. For example, swales instead of stormwater drains can provide habitat links for certain species.

Waterways in the municipality currently act as critical biodiversity corridors for water and land based species, particularly birds, reptiles and frogs. The municipality sits in a unique location with the convergence of three important waterways in metropolitan Melbourne – the Yarra River, the Moonee Ponds Creek and the Maribyrnong River.

Soil health is key to supporting biodiversity and ecosystem health. Challenges such as underground infrastructure, soil compaction and chemical use reduce the capacity of soil to allow the movement of water and soil biota (fungi and invertebrates) and gaseous exchange.

Integrated Water Management helps us improve habitat availability and soil and waterway health on land managed by the City of Melbourne and within the private realm.

2.4 Changes in our operational environment since 2014

There have been many significant changes in our operational environment since Total Watermark 2014. A full list is provided in Appendix 1 and a summary below. We are factoring these changes into our approach to Integrated Water Management across the city.

Population growth has exceeded forecast. It was previously forecast in 2009 that the residential population would grow to over 145,000 people in 2031 from 76,000. Based on new forecasting done in 2016, the municipality's residential forecast is now expected to grow from 136,000 in 2016 to 262,000 in 2036.

The extent of new development has also increased. The expansion of the central city is revitalising and reinventing areas along Melbourne's waterways (Southbank, Docklands, Arden-Macaulay, E-Gate, Dynon and Fishermans Bend). The contemporary growth areas for central Melbourne all are in low-lying environments that are prone to flooding, and have a rich and varied history on which we can build to enliven our urban environment and places.

Place-based guidance is needed for each of these areas to ensure that water is engaging with urban form and can become a design inspiration for our places, not just an engineering issue.

The number of urban renewal areas and other major infrastructure and asset renewal projects provide an urgent driver to set local plans of action for meeting cross-council objectives. They also offer once-in-a lifetime opportunities to influence how new buildings and surrounding public space are constructed. We need to consistently advocate within council and to Victorian Government agencies involved in approvals for the best outcomes in Integrated Water Management.

There is an increased focus on the health and management of Melbourne Rivers, including the 2017 Victorian Government's Yarra River Action Plan.

Our 2014 flood objectives do not fully reflect the legal context. We currently have gaps between what is gazetted as Land Subject to Inundation Overlay or Special Building Overlay in the Melbourne Planning Scheme and the new flood extents that we have mapped with Melbourne Water. The new flood extents have to be taken into account under the Building Regulations.

We need stronger emphasis on increasing permeability as the city grows. We can reduce runoff and flood risk while cooling the city by using green roofs, increasing the permeability of our pavements or converting them to open space. Lack of permeability correlates to reduced soil moisture and vegetation health. It also increases stormwater runoff and flood risk.

A stronger focus in the private realm will also be required to achieve the increased permeability needed to reduce runoff and flood risk.

There has been an increase in collaborative and co-creation approaches adopted by organisations to deliver strategic goals.

Water management is increasingly playing a key role in our response to the effects of climate change, as shown in Figure 4 on page 10.

Figure 3: Historic waterbodies west and south of Melbourne

2.5 Our achievements to date

The City of Melbourne is recognised as a leader in Integrated Water Management and, since 2014, has delivered many actions within the municipality to meet its targets. The 2014 implementation plan for Total Watermark included 66 actions in four areas:

- climate change adaptation and flood
- water for liveability
- water for the environment
- water use.

The majority of these actions are now completed, business as usual or ongoing activities, as detailed in Appendix 2. In particular, we have:

- Enhanced the urban planning processes by introducing planning application requirements for Water Sensitive Urban Design (WSUD) for new development applications pursuant to Clause 22.23 of the Melbourne Planning Scheme.
- Enhanced planning processes through including policies in the Melbourne Planning Scheme to encourage reduced use of potable water and the use of non-potable water.
- Enhanced open space through improved irrigation efficiencies and soil management practices that maximise infiltration.
- Progressed the reduction of flood impacts through upgrading our drainage network, increasing permeability and harvesting stormwater.
- Developed and begun to implement a 10-year stormwater harvesting plan (see Appendix 3), resulting in the use of fit-for-purpose water to irrigate and cool our parks and gardens. We currently have the capacity to provide up to 25 per cent of our irrigation demand from non-potable, alternative water sources including rainwater and stormwater harvesting.
- Begun implementing the Elizabeth Street Catchment Integrated Water Management Plan.

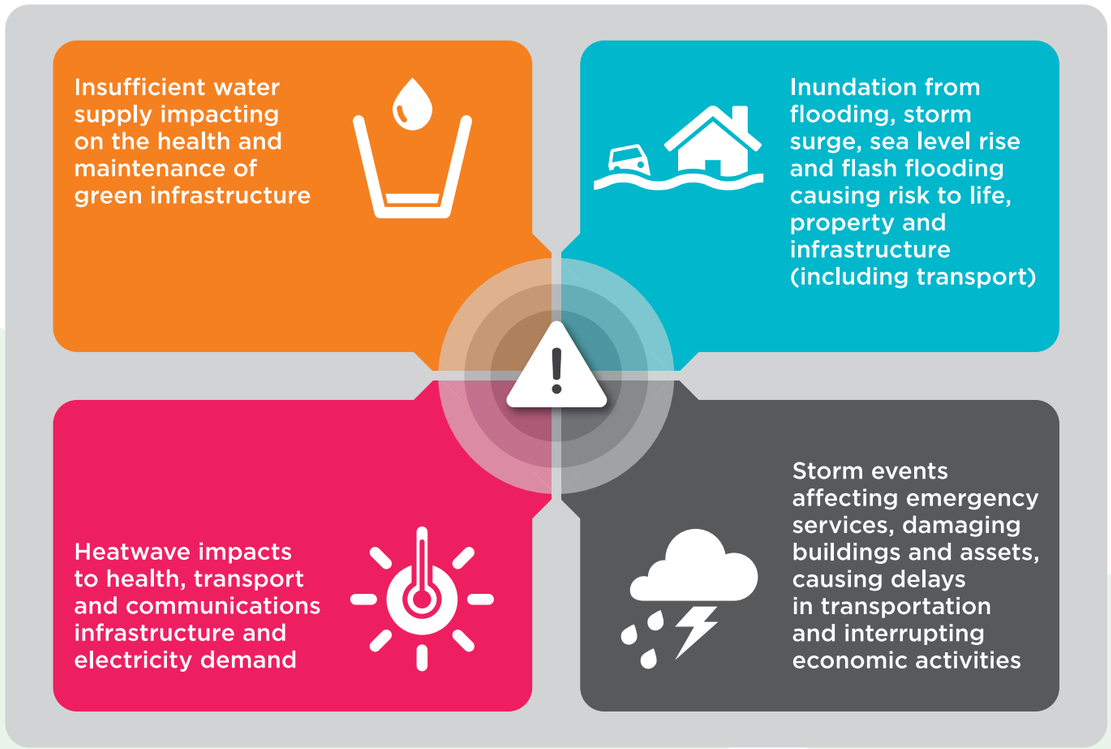


Figure 4: Climate change risk clusters

Through these actions, we have progressed towards the achievement of our targets:

- Water pollution has reduced by 20 per cent (mean kg/yr Total Suspended Solids), 13 per cent (mean kg/yr Total Nitrogen) and 18 per cent (mean kg/yr Total Phosphorus) since 2005. The Total Watermark target for 2018 is 20 per cent reduction in Total Nitrogen.
- Stormwater runoff volume has reduced by 10 per cent or 1010 ML since 2005 (mean ML/yr).
- Alternative water use for the municipality has been modelled to have increased by 5 per cent or 1164 ML since 2005 (mean ML/yr). The Total Watermark target for 2018 is 8 per cent for the municipality and 30 per cent for council. Council's actual alternative water use for 2015-16 and 2016-17 was 14 and 15 per cent respectively.

Our stocktake has identified six outstanding actions in the 2014 implementation plan for Total Watermark. The table below lists these actions and their status.

TOTAL WATERMARK ACTION	KEY STAKEHOLDERS	STATUS
Increase community education and awareness on insurance	Resilient Melbourne DELWP	We are planning to do more in this area by: • Partnering with Resilient Melbourne to deliver the Resilient Melbourne Strategy action to *support innovative approaches that make fit-for-purpose insurance affordable to more Melburnians.* • Working with DELWP to progress the action in their Climate Change Adaptation Plan to *host a forum on managing climate-related insurance risks.* These actions have been incorporated in the 2017 Climate Change Adaptation Strategy Refresh.
Undertake research on the urban heat island effect	City of Melbourne	This will action will be carried out as part of the 2017 Climate Change Adaptation Strategy Refresh. No further action required within this plan.
Undertake research on human health and access to waterways and public open spaces	RMIT	Literature review underway.
Undertake research on human health and water quality and availability	Melbourne Water	Future work included in this Plan.
Integrated Climate Adaptation Model	University of Melbourne	The model has been completed. We are now determining how best to host it on our system, keep it updated and make it useful to multiple work areas across council.
Update of the WSUD Guidelines	Melbourne Water	Last updated in 2009. Melbourne Water has recently created a web based WSUD guidelines for the western group of councils. Action 6.3.1 'Develop a business case to update the WSUD guidelines for our municipality' included in this Plan.

Table 1: Outstanding actions from the 2014 Total Watermark implementation plan

3.0 STRATEGIC DIRECTION

In reviewing the Total Watermark strategy for the development of this Plan we have determined that the strategy's vision, objectives and targets are still relevant, with two exceptions: flood risks and permeability.

3.1 Vision, objectives and targets

Our vision is a healthy city in a healthy catchment. Seeing our city as a catchment means that we recognise the important roles of the natural and man-made catchments, including roads, roofs and impermeable surfaces. We want the whole of Melbourne's community – residents, workers and businesses alike, to think about water and its role in our future, to help create a healthy city in a healthy catchment.

Based on the analysis above, we are implementing changes to continue to stay on track to achieve our vision and meet our 2030 targets. Changes include:

- Complementing the existing objectives of Total Watermark with two additional objectives:
  1. **Reduce the municipality's exposure to flood risk and impacts.**
  2. **Mimic the natural water cycle by retaining more rainwater in the upper catchment and reducing runoff.**
- Adding new targets on flood risk reduction and increase in permeability (see Figure 5 on page 13).
- Retaining Total Watermark as a strategy, but replacing the Total Watermark implementation plan with this Plan, which is place-based and reinforces the benefits of cost effective, green and multipurpose approaches to Integrated Water Management.

VISION	A healthy city in a healthy catchment.
OBJECTIVES	1. Adaptation and flood risk embedded into the strategic planning process. 2. Reduce the municipality's exposure to flood risk and impacts. 3. The Melbourne municipality has an aware and prepared community. 4. Water and liveability embedded in the strategic planning processes. 5. Access to waterways and public open spaces help support a healthy population. 6. Our major waterways are healthy and clean. 7. Soil moisture supports a healthy urban forest. 8. Optimise stormwater quality. 9. Optimise fit-for-purpose water use. 10. Water supply infrastructure is planned for current and future demand. 11. To mimic the natural water cycle by retaining more rainwater in the upper catchment and reducing runoff.

TARGETS	**2018 TARGETS**	**2030 TARGETS**
	Council: 30% of all water use sourced from alternative water sources. Municipal: 8% of all water use sourced from alternative sources.	Council: 50% of all water use sourced from alternative water sources. Municipal: 20% of all water use sourced from alternative sources.
	20% reduction in Total Nitrogen contributed to the waterways from the municipality of Melbourne's catchment (baseline year 2000).	30% reduction in Total Nitrogen contributed to the waterways from the municipality of Melbourne's catchment (baseline year 2000).
	All habitable finished floor levels within private development is free from flooding from Council drains during a 100 year ARI rainfall event while ensuring good urban design outcomes.	Minimum 20 per cent of each catchment's surface is considered permeable by 2030.
	1:20 Average Recurrence Interval (ARI) (or equivalent) flow capacity of all council drains within the central city and growth areas.	

Figure 5: Our vision and enhanced objectives and targets

New Total Watermark

Our objectives and targets are supported by a range of council and Victorian Government policies, and will help us achieve related strategic objectives, including to:

- Increase public realm canopy cover to 40 per cent or more across the city by 2040 (Urban Forest Strategy 2012).
- Increase the provision of open space in line with the Open Space Strategy and Structure Plans.
- Improve tree and vegetation health through good levels of soil moisture year round (Urban Forest Strategy).
- Create healthy green spaces for healthy people without increased potable water use (Open Space Strategy).
- Adapt to climate change-induced extreme weather events, flooding and water scarcity (Climate Change Adaptation Strategy 2017).
- Create a beneficial symbiotic relationship between Integrated Water Management, Nature in the City and the strategic action plan to green our city.
- Integrate good urban design principles with engineering solutions.

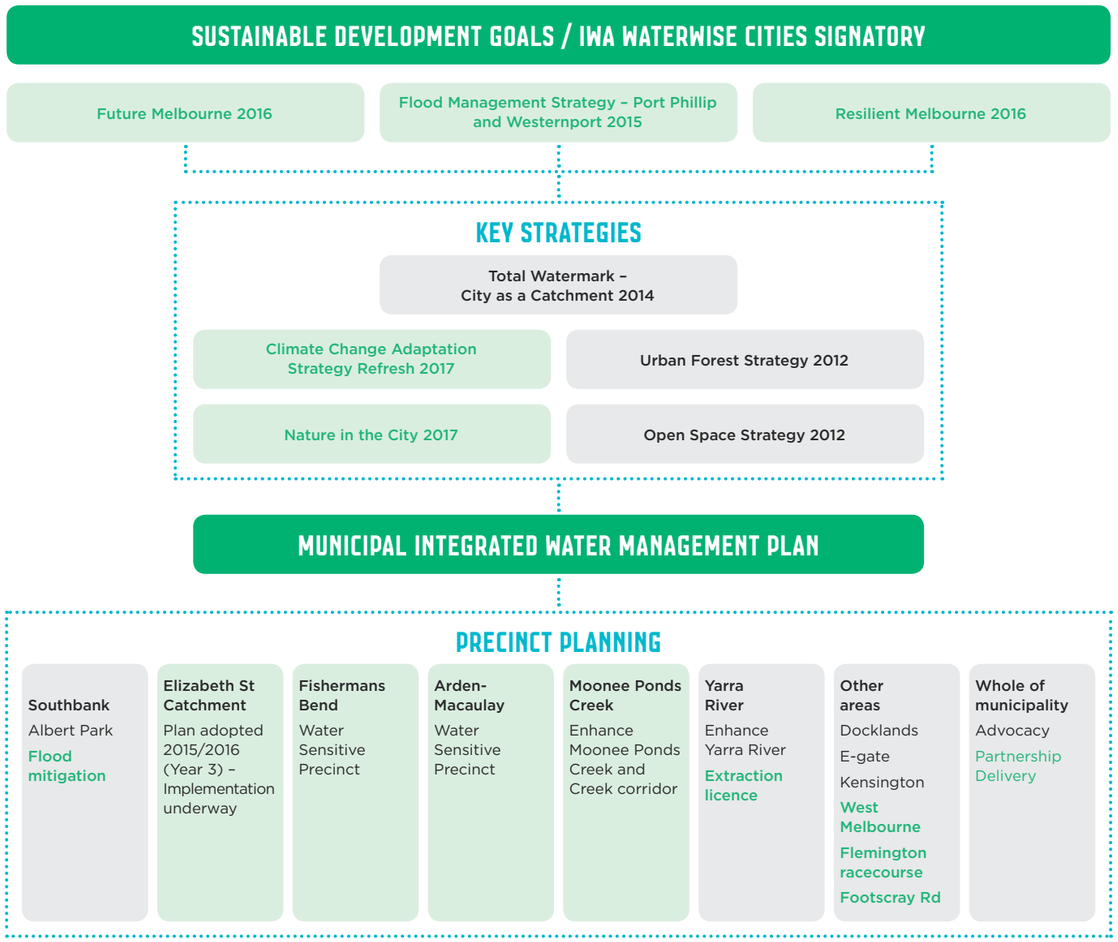


Figure 6: Role of this Plan in the context of internal and external drivers

3.2 Delivering the Plan

The tools available to the City of Melbourne to deliver its Integrated Water Management vision, objectives and targets include:

- Direct delivery via council or external grant funding for operation or capital projects.
- Partnering with external agencies for mutual benefits.
- Advocating through precinct planning or other processes for better outcomes.
- Improving renewal or maintenance processes to minimise or avoid failures.
- The Melbourne Planning Scheme: In its present form or amended via structure plans or other processes, the Scheme enables us through development applications to require the private realm to implement Water Sensitive Urban Design under the requirements of Clause 22.23 Stormwater Management (see break-out box).

The successful implementation of the Plan will result in:

- Reduced flood exposure and risk for the municipality with shared responsibility and management between public and private landowners and agencies.
- Multi-purpose, cost-effective infrastructure that provides flood mitigation, maintained or reduced water consumption and improved waterway health.
- Increased availability and use of alternative, non-potable water for the municipality.
- Increased resilience of vegetation and improved waterway health through using and absorbing rainwater within our catchment.
- Increased resilience to extreme heat for people in the municipality.
- Where flooding and sea level rise are significant issues, a consistent, whole of government approach where water is embedded as a key driver for planning and design of urban renewal areas and is part of the identify of these areas.
- Avoiding significant urban design issues from raising floor levels in areas at risk of flooding. This can be addressed by adopting regional approaches to water management that reduce flood risks and the need to raise floor levels, or by designing building foyer areas to flood in extreme conditions so that a good connection to the street is maintained.

Figure 7: Raised floor level in flood risk area

Melbourne Planning Scheme clause 22.23 Stormwater Management (Water Sensitive Urban Design)

Objectives:

- To achieve the best practice water quality performance objectives set out in the Urban Stormwater Best Practice Environmental Management Guidelines.
- To promote the use of water sensitive urban design, including stormwater reuse.
- To mitigate the detrimental effect of development on downstream waterways.
- To minimise the peak stormwater flows and stormwater pollutants.

Melbourne Planning Scheme clause 22.19 Energy, Water and Waste Efficiency

Objectives:

- To ensure buildings achieve high environmental performance standards at the design, construction and operation phases.
- To minimise the city's contribution to climate change by reducing greenhouse gas emissions.
- To improve the water efficiency of buildings and encourage the use of alternative water sources.
- To minimise the quantity of waste going to landfill and maximise the recycling and reuse of materials.
- To minimise the impacts of waste on the community.
- To encourage the connection of buildings to available or planned district energy, water and waste systems in urban renewal areas in order to achieve additional energy, water & waste efficiency arising from a precinct-wide approach to infrastructure where appropriate.

4.0 PLACE-BASED IMPLEMENTATION AND ACTION PLAN

Our review of Total Watermark and analysis of changes in our operating environment has highlighted four priority areas. These are:

- The two urban renewal areas of **Fishermans Bend** and **Arden-Macaulay and the Moonee Ponds Creek corridor** that face significant flood challenges and for which water supply and treatment, open space, drainage and flood mitigation will be redesigned in the next few years to service significant growth (80,000 new residents and 60,000 jobs by 2050 in Fishermans Bend and up to 25,000 new residents and 43,500 jobs by 2051 in Arden-Macaulay).
- **Southbank,** which is subject to significant flooding, and the iconic Yarra River corridor.
- **The Elizabeth Street Catchment**, for which we already have a place-based plan.

Integrated Water Management action will also continue in other areas of the municipality and whole of municipality actions will also be required to address challenges and opportunities that apply across all or several precincts. These are described in sections 4.5 on page 27 and 4.6 on page 29.

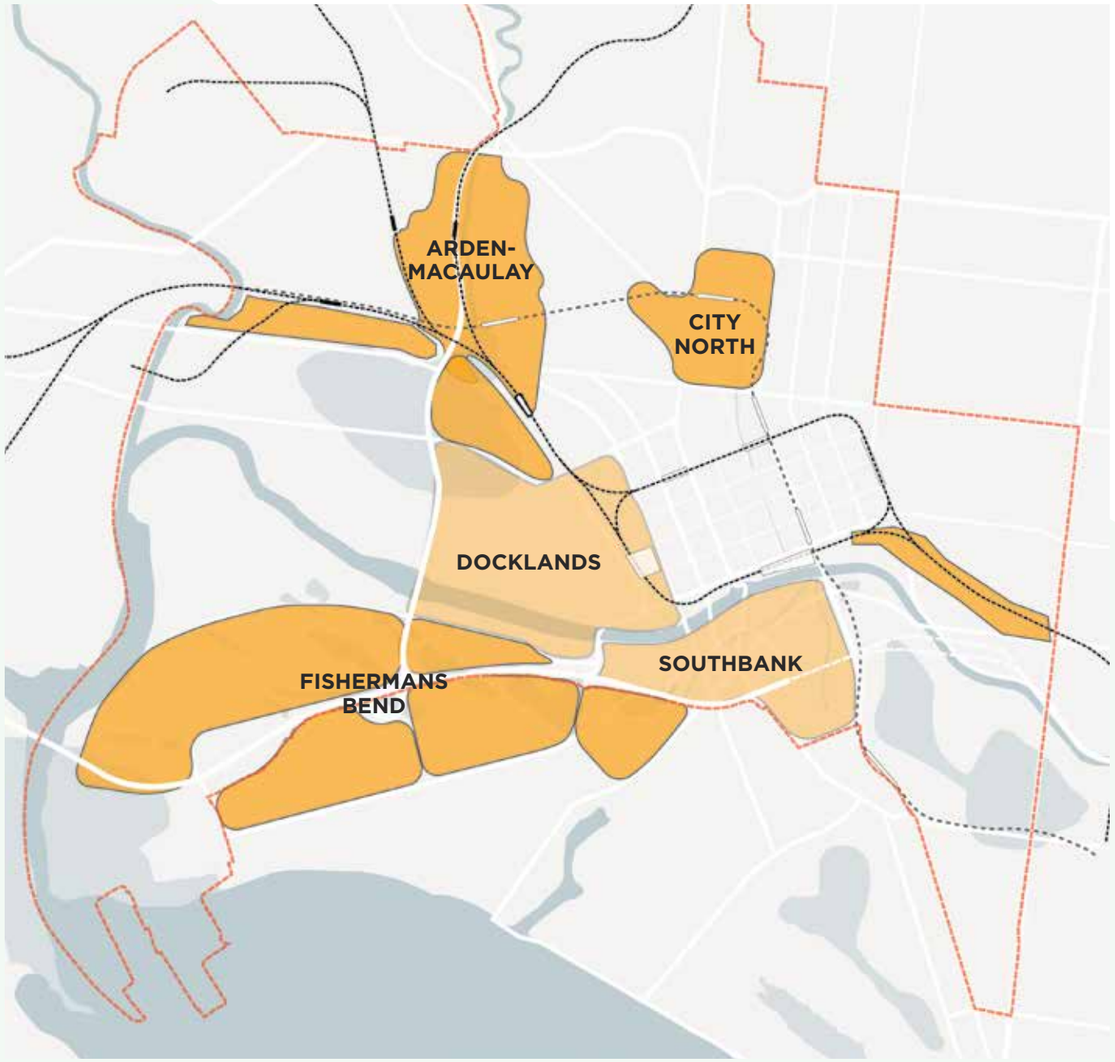


Figure 8: Areas of growth and focus areas for the Plan

4.1 Fishermans Bend

Fishermans Bend will be transformed over the next 30 years to house 80,000 residents and 60,000 workers by 2050. Fishermans Bend includes five precincts located in two water catchments. Lorimer and the Employment Precinct are located within the City of Melbourne and drain to the Yarra River. The three other precincts (Sandridge, Montague and Wirraway) are located within the City of Port Phillip and drain both to the Yarra River through Lorimer and to Port Phillip Bay.

Key issues and opportunities

Water must be recognised as a key driver of planning and design for Fishermans Bend as the area faces several challenges:

- Sea level rise is expected to exacerbate flooding in Montague, Lorimer and the Employment Precinct, with effects already expected this century.
- Shallow and contaminated groundwater, as well as contaminated soil, limits the ability to construct underground infrastructure.
- South East Water is proposing to build the first large-scale sewer mining plant in an inner city area within the Employment Precinct.

In response to these challenges, we are working with key stakeholders to develop a water management approach for Fishermans Bend. Proposed approaches include:

- Implementation of a third pipe network supplied by a precinct sewer mine that will also have the ability to supply surrounding areas.
- Requirement for “smart” rainwater tanks above ground within buildings that capture rainwater to assist in mitigating flooding. These will also link into the third pipe network to enable rainwater reuse and tank emptying for the next rain event, thus maximising capture.
- Upgrades to the current drainage network.
- Development of an approach to control sea level rise impacts in the future. This may include a perimeter levee and drainage pump stations.
- Prepare options which articulate how water will drive the planning and design of Fishermans Bend including: holistic, whole of catchment solutions, integrated engineering and landscape approaches and the celebration of water in the landscape.

Figure 9: Fishermans Bend renewal area and precincts

Action Plan for Fishermans Bend

The complexity of managing water in Fishermans Bend calls for an inter-agency collaborative approach. Key actions for the City of Melbourne include:

Continue to advocate for integrated outcomes that deliver multiple benefits in alignment with its strategies and policies (Action 4.1.1). In particular:

- Advocate/partner with Melbourne Water to update the Land Subject to Inundation Overlay to best current knowledge and accepted flood mapping.
- Partner with The Fishermans Bend Taskforce, Department of Environment, Land, Water and Planning, State Emergency Service and others to determine the minimum access and egress requirements for buildings if we are to live with flooding or tidal inundation.

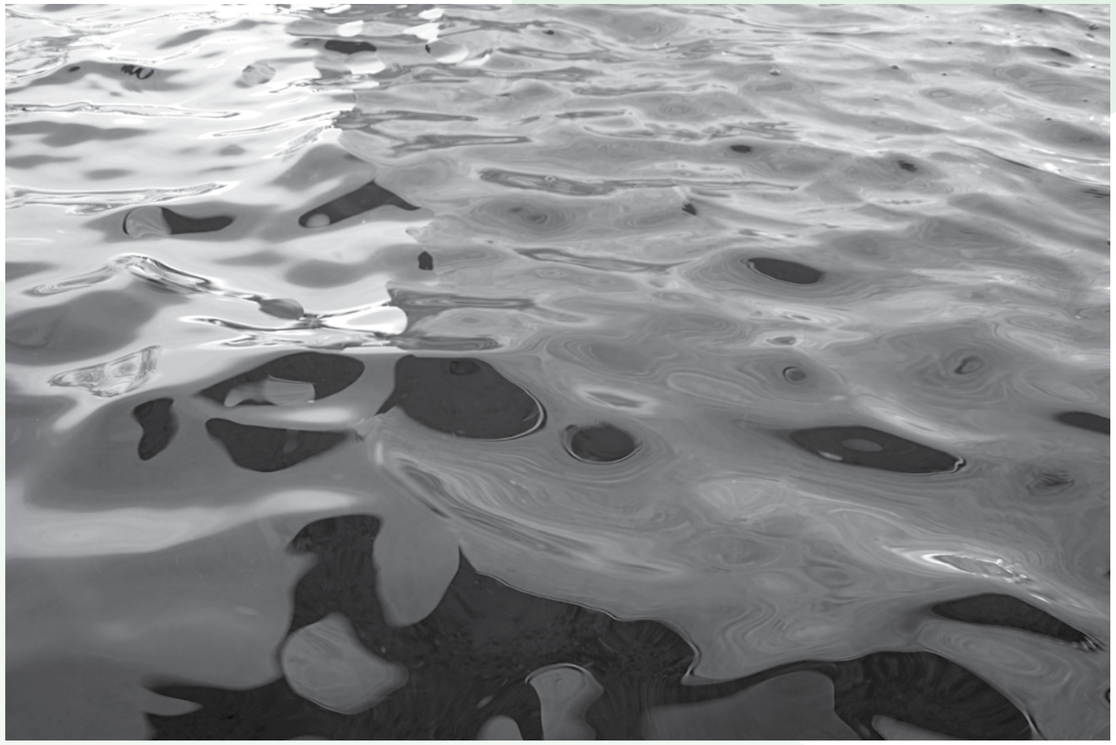
Partner with key stakeholders in the development of an Integrated Water Management Plan for Fishermans Bend by 2018 (Action 4.1.2) that will:

- Address the challenges and opportunities.
- Celebrate water in the landscape.
- Inform the precinct plans.
- Develop place-based targets for permeability and level of service for flood management.
- Be aligned with the directions in City of Melbourne’s strategies.

Plan and partner to deliver augmentations to the drainage system (Action 4.1.3) including:

- Augment the drainage along Clarendon Street to mitigate the current frequent flooding and transport disruption in this area.
- Advocate to Melbourne Water and deliver increased monitoring and maintenance of drainage outlet to tidal river system (Lower Yarra River and Moonee Ponds Creek).
- Plan for flood protection from increased Yarra River levels due to sea level rise.
- Partner with Melbourne Water to investigate, design, build and manage pumped drainage systems for low-lying areas including a sustainable funding pool, increased reliability and reduced maintenance.

The Fishermans Bend Integrated Water Management Plan and associated strategies will consider how best to integrate water management and urban design outcomes, who is best placed to finance the infrastructure required, when to build, and how to ensure the systems function effectively and are appropriately maintained.



4.2 Arden-Macaulay and the Moonee Ponds Creek corridor

The Arden-Macaulay renewal area is located in Kensington and North Melbourne, either side of the Moonee Ponds Creek. It is currently a mix of industrial, mixed use and residential areas. It is expected to grow from 3,231 residents to 25,000 by 2051 and have a jobs growth from 6,527 to 43,500 over the same period.

Key issues and opportunities

The City of Melbourne has a vision of Moonee Ponds Creek as a natural habitat and open space corridor to serve its rapidly growing population and manage climate risks. Our commitment to the revitalisation of the Moonee Ponds Creek corridor is to: expand and upgrade the Moonee Ponds Creek corridor to improve habitat values, provide new opportunities for recreation and links to improved open spaces in the E-Gate and Docklands sections of the creek corridor.

Flooding in Arden-Macaulay is significant now and will get worse by 2100. Current flooding is caused by catchment runoff trapped behind the levees and pumps station not being able to keep up or failing. Moonee Ponds Creek's flows are mostly contained by the current levees at present but they will not be by 2100. Melbourne Water is working to develop a flood mitigation strategy that will reduce future flooding and enable land development.

The urban renewal of the precinct offers opportunities to optimise the flood mitigation strategy by integrating it with open space requirements and an attractive urban design that embraces water as an element of the identity of the precinct.

Currently only standard Melbourne Planning Scheme clauses apply, Clause 22.19 for energy waste and water efficiency within buildings and Clause 22.23 for stormwater management (see page 15 for more details).

Figure 10: The Arden-Macaulay renewal area

Action Plan for Arden-Macaulay and the Moonee Ponds Creek corridor

Managing water in Arden-Macaulay is complex and will require a collaborative approach. The City of Melbourne will:

- Advocate to/Partner with Melbourne Water to update the Land Subject to Inundation Overlay to best current knowledge and accepted flood mapping (Action 4.2.1).
- Advocate for the incorporation of a new Special Building Overlay in the Planning Scheme to align with the current flood extents (Action 4.2.2).
- Partner with Victorian Planning Authority and Melbourne Water to develop an Integrated Open Space and Drainage Strategy for Arden-Macaulay that builds on international best practice and opportunities to capture water upstream in the Moonee Ponds catchment (Action 4.2.3) and implement agreed actions.
- Partner with City West Water and Melbourne Water to develop a place-based Integrated Water Management plan to guide the implementation of the strategy and inform the structure plans developed for the precincts (Action 4.2.4).
- Partner with other stakeholders to collaboratively manage the Moonee Ponds Creek catchment including advocating for good urban design, enhanced amenity and ecology, and improved access to and across Moonee Ponds Creek while providing adequate flood protection (Action 4.2.5).
- Complete the investigation and, if feasible, build the stormwater harvesting system at Ievers Reserve (Action 4.2.6).
- Construct the stormwater diversion and associated amenity improvements and, if feasible, stormwater harvesting at Elliott Avenue (Action 4.2.7).

Key elements we will advocate for in water management in the precinct include:

- Mitigating current and projected 2100 flooding without compromising urban design.
- Increasing access to and minimising connectivity barriers across Moonee Ponds Creek.
- Celebrating water in the landscape.
- Integrating water management with open space without overly encumbering the open space.
- Developing place-based targets for permeability and level of service for flood management.
- Meeting best practice stormwater quality discharge.
- If feasible, providing alternative, non-potable water supply to the precinct and beyond.

Figure 11: Water Square Bethemplein, Netherlands: Using engineering and landscape approaches to drive different water management solutions

4.3 Southbank and the Yarra River corridor

The projected population for Southbank is up to 74,000 residents by 2040 based on development capacity available within the new built form recommendations. There is a significant shortfall in open space.

The Yarra River is one of Victoria's most iconic waterways, integral to Melbourne's identity and the liveability of the city. Before it arrives at the City of Melbourne and empties into Port Phillip Bay the river traverses more than 200 kilometres of urban and rural landscapes. It is the major source of Melbourne's drinking water and a biodiversity corridor supporting diverse life forms. The Yarra River has particular spiritual and cultural significance for Aboriginal communities. To the Wurundjeri people the river, known as Birrarung, was the life source and an important meeting place. The City of Melbourne was founded on the banks of the Yarra River as it provided a supply of fresh water to what is now Southbank and ships could anchor safely close to shore.

The development of Southbank and the continued development downstream, including Docklands and Fishermans Bend, have embraced to value of the Yarra River as an iconic feature of Melbourne.

Key issues and opportunities

In 2015 the City of Melbourne commissioned flood modelling, including future climate scenarios, for the Southbank precinct. This work has shown that there is a significant flood risk to the Southbank precinct currently and that this risk will increase into the future due to the expected impacts of climate change on both extreme rainfall intensity and sea level rise. The study highlighted opportunities for Integrated Water Management that would help alleviate some of this flood risk.

Work undertaken to develop the Fishermans Bend integrated water management approach also identified an opportunity to connect Southbank to the Fishermans Bend third pipe network, however at present no such provision exists.

Population growth, not just in the City of Melbourne, will continue to put pressure on the health of the Yarra River. Unless managed properly, urban development will increase stormwater run-off and negatively impact the health of the Yarra and the bay.

Action Plan for Southbank and Yarra River corridor

Key actions for the City of Melbourne addressing the issues and opportunities in Southbank and the Yarra River include:

- Work towards the successful delivery of the Yarra River Action Plan through active participation at multiple levels in the development of the Yarra River Strategic Plan, The Yarra River Protection Bill and the Community Vision for the River (Action 4.3.5).
- Deliver Water Sensitive Urban Design and flood mitigation interventions as part of the Southbank Boulevard redevelopment (Action 4.3.6).
- Partner with Parks Victoria and City of Port Phillip to further investigate the flood mitigation opportunity of the Albert Park Lake Stormwater Harvesting project (Action 4.3.4).
- Incorporate our integrated water management objectives in the City River Concept Plan that will drive integrated public realm improvements along the river (Action 4.3.7).
- Advocate for Melbourne Water to update the Land Subject to Inundation Overlay to the best current knowledge and accepted flood mapping (Action 4.3.1).
- Partner with Melbourne Water to investigate, design, build and manage pumped drainage systems for low-lying areas including a sustainable funding pool, increased reliability and reduced maintenance (Action 4.3.3).

Figure 12: Southbank and Yarra River corridor precinct

4.4 Elizabeth Street Catchment

Covering 308 ha, the Elizabeth Street Catchment sits entirely within the municipality of Melbourne and includes both the Swanston Street and Elizabeth Street drain systems. The catchment starts at College Crescent in Carlton and finishes where the Elizabeth Street drain joins the Yarra River below Flinders Street Station.

Key issues and opportunities

The Elizabeth Street catchment is categorised by Melbourne Water as being at extreme flood risk – the highest level. The City of Melbourne has developed a place-based Integrated Water Management plan to respond to this risk, while considering opportunities to improve all elements of the water cycle: water consumption, rainwater, stormwater, wastewater and groundwater management.

The objectives of the Elizabeth Street Integrated Water Management Plan are to:

- Reduce the Catchment's Melbourne Water flood rating from Extreme to High.
- Increase open space, permeability and soil moisture in Elizabeth Street Catchment.
- Mimic the natural water cycle by retaining more rainwater in the upper catchment and reducing the volume running off.
- Improve the health of existing vegetation through irrigation from alternative water sources.

A suite of strategic, advocacy, partnership and capital actions to be delivered over five years has been developed as part of the plan.

We have commenced delivery of these actions, including:

- Installing a 2,000,000 litre storage tank in Lincoln Square.
- Completing flood modelling to inform options for the conveying of overland flow past and through the Flinders Street Railway Station.
- Establishing a reference group.

Action Plan for Elizabeth Street Catchment

- Continue to implement the actions of the Elizabeth Street Catchment Plan (Action 4.4.1).
- Advocate that Melbourne Water updates its Special Building Overlay to reflect latest flood modelling results (Action 4.4.2).
- Develop a new council Special Building Overlay in the Catchment in line with the new flood model (Action 4.4.3).

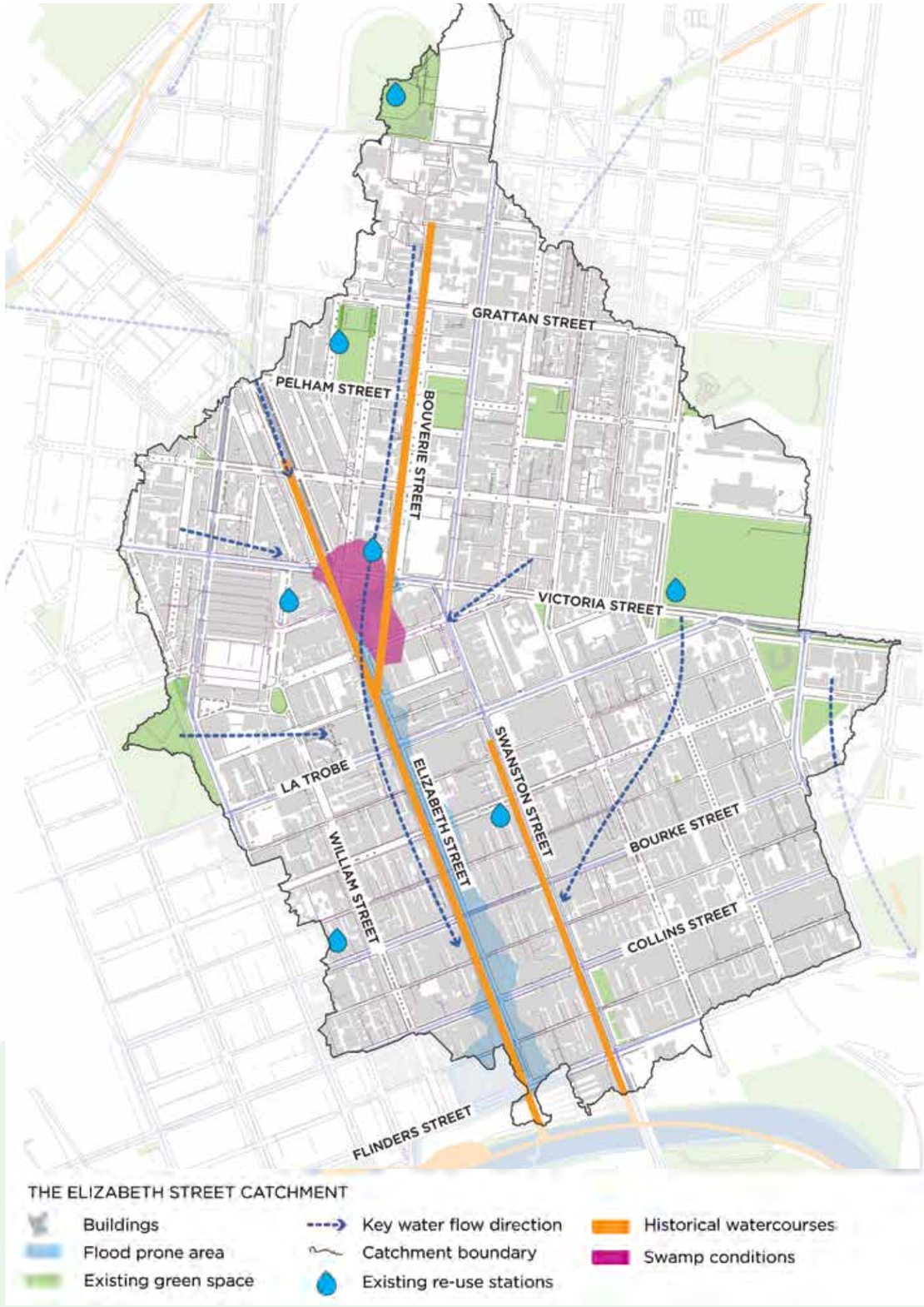


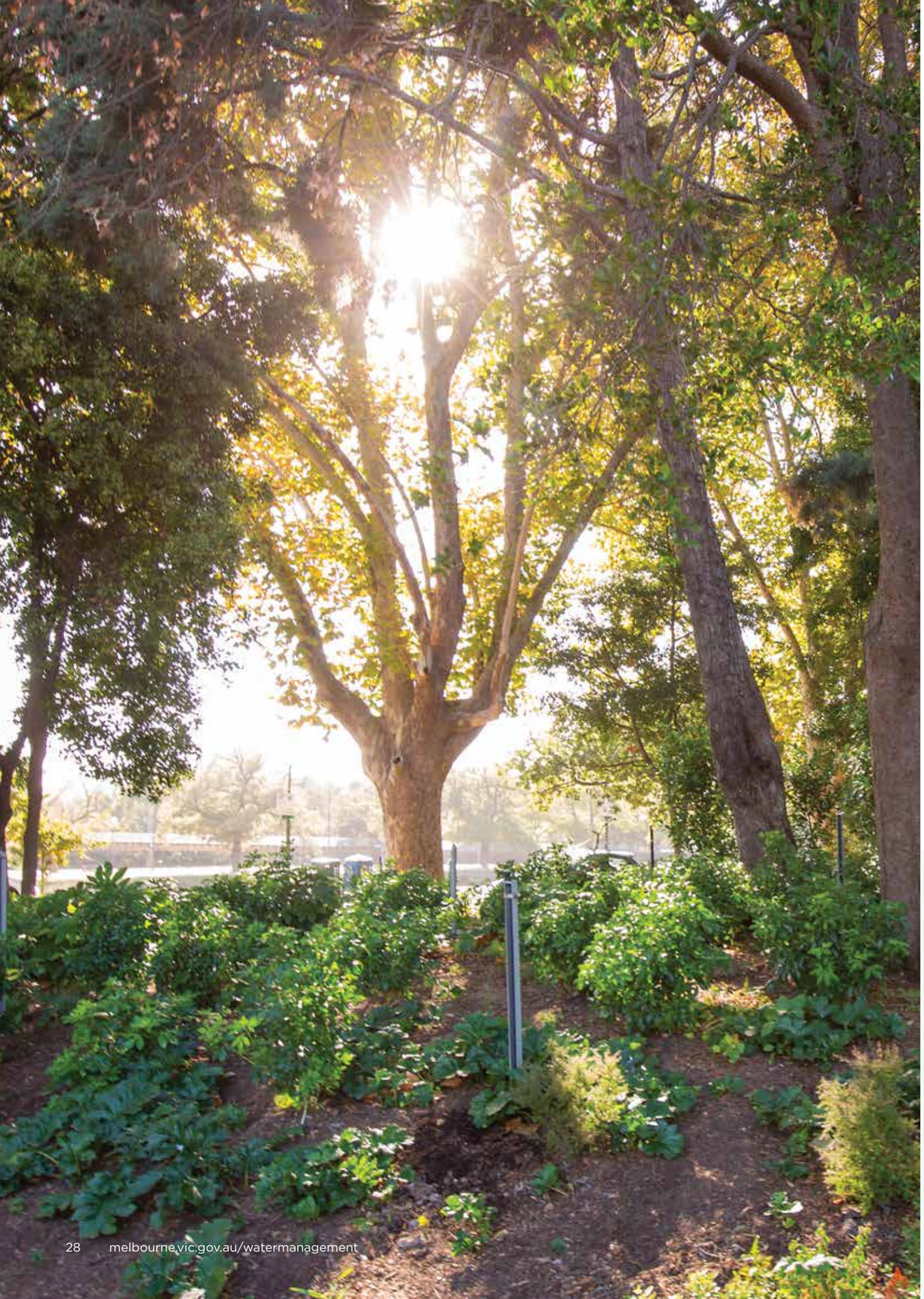
Figure 13: Elizabeth Street Catchment

4.5 Other areas in the municipality

There are priority areas and catchments across the rest of the municipality that require attention. Key actions for the City of Melbourne addressing the issues in these areas of the municipality include:

- Undertake flood and sea level rise modelling for renewal areas early in the planning process such as E-Gate (Action 4.5.2.1) and retrospectively in Docklands (Action 4.5.1.1).
- Capture and infiltrate rainwater and stormwater within the West Melbourne Structure Plan area to reduce flooding impact in Dudley Street (Action 4.5.3.1).
- Advocate for and improve the quality of the water and open space along the Dynon Road tidal channel and bird sanctuary (Action 4.5.4).
- Partner with Melbourne Water to mitigate the flooding in Hobsons Road in Kensington and explore stormwater harvesting opportunities (Action 4.5.5.1 and 4.5.5.2).
- Continue to partner with Parks Victoria and the City of Port Phillip to further investigate and deliver the Albert Park Lake Stormwater Harvesting scheme to provide an alternative water source for irrigating Fawkner Park and St Kilda Road (Action 4.5.12).
- Partner with Melbourne Water to maintain the Royal Park wetland system to best practice standard (Action 4.5.11.1) and implement improvements to the Galada Avenue swale to maximise usability and improve stormwater quality outcomes (Action 4.5.11.2).

Figure 14: Trin Warren Tam-Boore wetlands in Royal Park



4.6 Whole of municipality actions

Several of our advocacy, partnership and delivery actions apply to the whole of the municipality and are listed in Appendix 4.

Some key actions include:

- Advocate for a consistent Planning Scheme approach across Victoria for climate change and extreme weather event mitigation including provision for onsite/on-lot flood retention in flood prone catchments (Action 6.1.1).
- Advocate for a 1 in 20 year ARI drainage standard for high-density areas (Action 6.1.2) (central city, growth areas, commercial precincts).
- Advocate for a consistent, whole-of-government approach to sea level rise mitigation (Action 6.1.3) and a resourcing strategy to support this long term action (Action 6.1.4).
- Advocate for major projects and developments (such as Metro Rail, Westgate Tunnel) to meet the City of Melbourne's sustainability targets including those in Total Watermark (Action 6.1.5).
- Advocate for increased permeability of the city in private and public realms (Action 6.1.7).
- Advocate for an increase in the quantity and quality of green roofs, including for the capture and retention of rainwater (Action 6.1.8).
- Advocate for Open space used for flood management only over and above the un-encumbered open space requirement set out in the open space strategy and/or the planning scheme (Action 6.1.9).
- Partner with Resilient Melbourne to develop decision-support tools that encourage water sensitive urban design and integrated water management (Action 6.2.1).
- Partner with academic institutions, such as the CRC for Water Sensitive Cities to learn from and further best practice (Action 6.2.2).
- Partner with international associations of cities such as C40 and ICLEI to share and learn from international best practice (Action 6.2.3).
- Continue to partner with the plumbing industry, water authorities, Municipal Association of Victoria and other local governments on developing an approach to best manage on site storages to ensure flood benefit (Action 6.2.4).
- Continue to partner with City West Water, South East Water, Melbourne Water and/or others to further investigate the feasibility of an Alternative Water ring main around the inner city, connecting the many alternative water supplies for optimal use (Action 6.2.5).
- Partner with the Department of Environment, Land Water and Planning and others to consider the benefits of an impermeability charge to incentivise the private realm to provide green space, retain rainwater and provide urban cooling and improved amenity (Action 6.2.6).
- Continue to partner with Melbourne Water and other councils to deliver on the relevant actions from the Port Phillip Bay and Westernport Flood Management Strategy (Action 6.2.7).
- Share our learnings and practices through keeping the Urban Water website updated and providing tours, case studies and presentations (Action 6.3.2).
- Investigate how to best use the Yarra River water gifted to City of Melbourne at the closure of the AMCOR paper mill (Action 6.3.3).
- Maintain, renew and upgrade, as required, council's drainage network to achieve the level of service targets described in the Drainage Asset Management Plan (Action 6.3.4).
- Update the Drainage Asset Management Plan (Action 6.3.5).

5.0 MONITORING AND EVALUATION

A robust, ongoing monitoring and evaluation program will be fundamental to understanding the success of our actions, helping to track progress towards our targets and guide future decisions.

To assess the effectiveness of our actions, we will establish an ongoing monitoring program to track changes over time. The City of Melbourne will:

- Conduct a twice-yearly check-in of the action plan (Sept-Oct for input into capital and budget planning and April-May for final input into business planning).
- Request data and/or models for all capital works projects and planning application to track progress towards stormwater quality and water use targets.
- Conduct a strategic review (including modelling) every second year towards achievement of our IWM targets.

APPENDIX 1: SUMMARY OF CHANGES IN THE OPERATIONAL ENVIRONMENT SINCE 2014

Economic and social	• Fishermans Bend has become an urban renewal area expected to accommodate 80,000 residents and 60,000 employees. • The land use across the municipality is changing with an expectation of far higher densities by 2050. This will create higher demands on water use, on access/use of open space and expose more people and businesses to the impacts of flooding. • Increase in population expected from 136,000 in 2016 to 262,000 in 2036. • The City of Melbourne and the Royal Botanic Gardens have been gifted Yarra River extraction licences that where formally held by the Amcor paper mill in Alphington. Access to this water is yet to be determined. • Future Melbourne 2026 sets out the community's aspirations for the city. The plan includes, as Goal 1: A city that cares for its environment with: - FM 2026 Priority 1.4: Capture & reuse stormwater Melbourne will conserve water and improve the health of its waterways by capturing stormwater. This will reduce both the potable water demand for irrigation and the pollution entering our waterways.
Technological	• The East West link has been scrapped; this has renewed progress on the Arden-Macaulay urban renewal area, and shelved ideas of transferring water across the north of the municipality via these works. • Metro Rail has progressed instead. This will have a significant impact on the city, with underground stations in Arden, Parkville, Swanston St and the Domain. All these areas are flood affected to some extent and the works will impact on our drainage system as well as many other assets and operations. • Detailed flood studies and recommended base flood solutions have been developed for Southbank, Fishermans Bend and Arden-Macaulay. • South East Water is moving ahead with plans to build a sewer mine and associated third pipe network for Fishermans Bend. • The City of Melbourne has built the Carlton Squares flood mitigation and stormwater harvesting project, the first to include a purge function that will allow us to release any water in the tank prior and during heavy rainfall events, reducing flooding in Bouverie and Elizabeth Streets.
Legal	• Reform to the Water Act proposed under the previous Victorian Government has been shelved. • The State Environmental Protection Policies (SEPP) – Water of Victoria and Groundwaters of Victoria are being reviewed by DELWP. The review will have an emphasis on on-site domestic water and stormwater management. • Independent Inquiry into the EPA – part of the Victorian Government's response to the Ministerial Advisory Committee's recommendations is to modernise the EPA Act. They will also pilot Environment Protection Officers placed within local governments. • Yarra River Act. • Updated flood mapping by Melbourne Water and the City of Melbourne has created a gap between what is gazetted as Land Subject to Inundation or Special Building Overlay and our legal liability through the Building Regulations.
Environmental	• The flood levels experienced in the municipality will also change in the future under a changing climate. • Stormwater quantity is the limiting factor to ecological health of waterways.

APPENDIX 2: PROGRESS AGAINST 2014 TOTAL WATERMARK IMPLEMENTATION PLAN

CLIMATE CHANGE ADAPTATION AND FLOOD				
Action	**BAU or Ongoing**	**Key achievements**	**Gaps**	**Key Partners**
Enhance the urban planning process	✓	Considering flood risk in future design for Elizabeth St, Fishermans Bend and Arden-Macaulay		City of Melbourne External
Enhance infrastructure	✓	Modelling effects of green infrastructure on reducing flooding. Included in flood models for renewal		City of Melbourne External
Increasing community education and awareness	✓ ✗	Re-issuing warnings from the relevant agencies (SES) and broadcasting Heat Health Alerts from the Department of Health and Human Services	Insurance education and awareness campaign. This will be a future project under the climate adaptation strategy	City of Melbourne External
Undertake research	✗	Climate projection built in Integrated Climate Adaptation Model	Urban heat island effect, climate projection updates have not yet been undertaken	External
Enhance the public realm and waterways	✓	Waterways strategy, increased boating access, implementing open space enhancement works		City of Melbourne
WATER FOR LIVEABILITY				
Enhance the urban planning process	✓	Flood and Integrated Water Management infrastructure investigated or included in the structure plans for renewal areas		City of Melbourne External
Enhance Melburnians' health and amenity	✓	1:20 ARI standard being included in renewal area structure plans as new minimum service standard. Alternative water used to irrigate open space		External
Ensure access to clean, affordable water	✓	City of Melbourne advocate to ensure equity for our community. The Victorian Government manages water pricing		Water Corporations
Undertake research	✗		Further understand the linkages between human health and access to waterways and public open spaces	External
Enhance public open spaces and the use of fit-for-purpose water to cool the environment	✓	Growing Green Guide developed in 2014. Alternative water used to irrigate open space		City of Melbourne

WATER FOR THE ENVIRONMENT				
Action	**BAU or Ongoing**	**Key achievements**	**Gaps**	**Key Partners**
Enhance our waterways – Yarra River, Maribyrnong River, Moonee Ponds Creek	✓	Parks and Waterways are implementing the Docklands Waterways Strategic Plan		City of Melbourne External
Enhance stormwater quality	✓	Stormwater harvesting systems, passive irrigation, infiltration pits and trenches, expanded open space		City of Melbourne
WATER USE				
Enhance fit-for-purpose water use	✓	Alternative water used to irrigate open space		City of Melbourne External
Enhance infrastructure and buildings	✓	Rainwater tanks, 5-Star Green Star rated buildings incorporating water efficiency, recycled water systems		City of Melbourne External

APPENDIX 3: 10-YEAR STORMWATER HARVESTING PLAN (2014-2024)

PROJECTS	CATCHMENT	IMPLEMENTATION YEARS	STATUS	BUDGETS ESTIMATES
Carlton Squares	Elizabeth St	2015-17	Tanks complete, control system under construction	$2,500,000
Elliott Avenue Billabong	Arden/Moonee Ponds Creek	Stage 1 2017-2018 Stage 2 2019-2021	Current concept design and investigation.	$2,250,000
Ievers Reserve	Arden	2018-2020	Current concept design and investigation.	$3,500,000
Fawkner Park/Albert Park Lake	Southbank	2019-2021	Developing business case with Parks Victoria and City of Port Phillip.	$4,300,000
JJ Holland Park	Kensington	2020-2021	Current concept design and investigation.	$5,000,000
Amcor water pipeline	N/A Investigation of how to best access the 1,000,000,000L water take and use licence gifted to City of Melbourne at the closure of the AMCOR paper mill.	tbc	Under Investigation.	$4,730,000 (initial estimate)
QVM/Elizabeth St	Elizabeth St	tbc	Being considered as part of the QVM renewal.	$4,800,000
Arden Street Reserve	Arden	tbc	Possible flood mitigation solution as part of the Arden-Macaulay precinct.	$2,500,000

APPENDIX 4: DETAILED PRIORITISED MUNICIPAL IWM ACTIONS TABLES

NON PLACE SPECIFIC ACTIONS (WHOLE OF MUNICIPALITY)					
Actions			**Rationale**	**Priority**	**Business impact**
Advocate for	6.1.1	A consistent Planning Scheme approach across Victoria for climate change and extreme weather event mitigation including provision for onsite/on-lot flood retention in flood prone catchments.	Consistent approach with developers regarding stormwater quality and flooding, maximising water that is retained upstream.	High	Business as usual budgets
	6.1.2	1 in 20 year ARI drainage standard for high density areas (central city, growth areas, commercial precincts).	Current drainage is 1 in 5 year ARI, reduce impacts of floods on businesses and communities.	High	Subject to annual plan and budget
	6.1.3	Consistent, whole-of-government approach to sea level rise mitigation.	Protecting all low lying areas from sea level rise impacts not just the renewal areas.	Medium	Business as usual budgets
	6.1.4	Resourcing strategy to support the planning and building of expensive, long term mitigation action (such as for sea level rise).	Require large, multi-year budgets to implement, multiple beneficiaries, multi implementation agencies.	Medium	Business as usual budgets
	6.1.5	Major project and developments (such as Metro Rail, Westgate Tunnel etc.) to meet City of Melbourne's sustainability targets including those in Total Watermark.	Ensure city changing project leave an improved, positive legacy.	High	Business as usual for general advocacy, subject to business case for extra resources
	6.1.6	Above ground water storages in low lying areas to avoid saline water intrusion.	Avoid past failures of design and implementation. Risk is very high of saline water intrusion into underground storage in our low-lying areas.	Medium	Business as usual budgets
	6.1.7	Increased permeability of the city in private and public realms.	Reduced UHI effect, increased infiltration thus reducing stormwater run-off, increased opportunity for biodiversity and soil healthy.	High	Business as usual budgets
	6.1.8	An increase in the quantity and quality of green roofs, including for the capture and retention of rainwater.	Reduced UHI effect, increased infiltration thus reducing stormwater run-off, increased opportunity for biodiversity, open space and building insulation.	High	Business as usual budgets
	6.1.9	Accepting open space used for flood manage over and above the unencumbered open scape requirement set out in the open space strategy and/or the planning scheme.	To maximise the utility and amount of open space.	High	Business as usual budgets

NON PLACE SPECIFIC ACTIONS (WHOLE OF MUNICIPALITY)					
Actions			**Rationale**	**Priority**	**Business impact**
Partner with	6.2.1	Resilient Melbourne to develop decision-support tools that encourage water sensitive urban design and integrated water management.	Consistent and easier implementation of WSUD across Melbourne.	High	Business as usual budgets
	6.2.2	Academic institutions, such as the CRC for water sensitive design to learn from and further best practice.	Stay abreast of and inform the best practice.	Medium	Subject to annual plan and budget
	6.2.3	International associations of cities such as C40 and ICLEI to share and learn from international best practice.	Stay abreast of and inform the best practice.	Medium	Subject to annual plan and budget
	6.2.4	Plumbing industry, water authorities, MAV (and other local governments) on developing an approach to best manage on site storages to ensure flood benefit.	Guidance currently not available, high risk of developer and contractor installing sub-optimal systems.	High	Subject to annual plan and budget
	6.2.5	City West Water, South East Water, Melbourne Water and/or others to further investigate the feasibility of an Alternative Water ring main around the inner city, connecting the many alternative water supplies for optimal use.	Reduce potable water use, maximise the reuse opportunity for individual systems. Avoid high cost, building scale solutions to alternative water supply.	Medium	Business as usual and subject to annual plan budget and business case
	6.2.6	DELWP and others to consider the benefits of an impermeability charge to incentivise the private realm to provide green space, retain rainwater, provide urban cooling and improved amenity. Consider rewarding land owners who have taken action.	Mechanism for promoting permeability or aligned interventions such as green roofs and water tanks. Collected fees used for council permeability projects or as a fund for implementation of permeability on private land.	Medium	Business as usual and subject to annual plan budget and business case
	6.2.7	Melbourne Water and other councils to deliver on the relevant actions from the Port Phillip Bay and Westernport Flood Management Strategy.	Contribute to and provide improved flood management in collaboration with Melbourne Water and other agencies for improved community outcomes.	High	Business as usual and subject to annual plan budget and business case

NON PLACE SPECIFIC ACTIONS (WHOLE OF MUNICIPALITY)					
Actions			**Rationale**	**Priority**	**Business impact**
Deliver	6.3.1	Develop a business case for the update of the City of Melbourne's Water Sensitive Urban Design Guidelines.	Last update in 2009, the guidelines do not reflect current best practice.	High	Business case
	6.3.2	Share our learnings and practices through keeping the Urban Water website updated and providing tours, case studies and presentations.	Continue to share knowledge with the industry, develop networks and grow City of Melbourne's reputation as a world leader in integrated water management.	Medium	Business as usual or business cases for extra resources
	6.3.3	Investigate how to best use the Yarra River water gifted to City of Melbourne at the closure of the AMCOR paper mill.	Access to the water could meet a large part of City of Melbourne's irrigation needs.	High	Subject to annual plan and budget
	6.3.4	Maintain, renew and upgrade, as required, council's drainage network to achieve the level of service targets described in the Drainage Asset Management Plan.	Ensure council's drainage network is fit for purpose and accords with the Life Cycle Management principles described in the Drainage Asset Management Plan.	High	Current budgets, business as usual, and subject to business case for projects
	6.3.5	Update the Drainage Asset Management Plan.	Improved information around flood depth and extents as well as drainage asset condition data since previous document was prepared in 2012.	High	Business as usual

FISHERMANS BEND

Actions			Rationale	Priority	Business impact
Advocate for	4.1.1	Integrated outcomes that deliver multiple benefits in alignment with council's strategies and policies. In particular: • Advocate/partner with Melbourne Water to update the Land Subject to Inundation Overlay's (LSIO) to best current knowledge and accepted flood mapping. • Partner with Victorian Planning Authority, DELWP, SES and others to determine the minimum access and egress requirements for buildings if we are to live with flooding or tidal inundation.	Provide best whole of community outcomes.	High	Business as usual and business case for discrete projects
Partner with	4.1.2	Key stakeholders in the development of an IWM plan for Fishermans Bend by 2018 that will: • Address the challenges and opportunities. • Celebrate water in the landscape. • Inform the precinct plans. • Develop place-based targets for permeability and level of service for flood management. • Be aligned with the directions in City of Melbourne's strategies.	Action by Victorian Planning Authority.	High	Business as usual and business case for discrete projects
Deliver	4.1.3	Plan and partner to deliver augmentations to the drainage system including: • Augment the drainage along Clarendon St to mitigate the current frequent flooding and transport disruption in this area. • Advocate for and deliver increased monitoring and maintenance of drainage outlet to tidal river system (Lower Yarra River and Moonee Ponds Creek). • Plan for flood protection from increased Yarra River levels due to sea level rise. • Partner with Melbourne Water to investigate, design, build and manage pumped drainage systems for low-lying areas including a sustainable funding pool, increased reliability and reduced maintenance.	Mitigate current and expected future drainage, flooding and sea level rise impacts.	High	Business as usual budgets and subject to business case for infrastructure improvements

ARDEN-MACAULAY AND MOONEE PONDS CREEK

Actions			Rationale	Priority	Business impact
Advocate for	4.2.1	And partner with Melbourne Water to update the Land Subject to Inundation Overlay (LSIO) to best current knowledge and accepted flood mapping.	Reduce risk and duplicate work load for City of Melbourne and Melbourne Water during the planning process.	High	Business as usual budgets and subject to business case for amendments
	See 4.1.3	And deliver increased monitoring and maintenance of drainage outlets to tidal river systems (Lower Yarra River and Moonee Ponds Creek).	Reduce flood frequency and risk.	High	Business as usual budgets and subject to business case for infrastructure improvements
	4.2.2	The incorporation of a new Special Building Overlay in the Melbourne Planning Scheme to align with current known flood extents.	Achieve flood resilient property development through planning controls.	High	Business as usual budgets and subject to business case for amendments
Partner with	4.2.3	Victorian Planning Authority and Melbourne Water to develop an Integrated Open Space and Drainage Strategy for Arden-Macaulay that builds on international best practice and opportunities to capture water upstream in the Moonee Ponds catchment and implement the agreed actions.	Reduced flood risk while enhancing liveability and connectivity.	High	Business case
	4.2.4	City West Water and Melbourne Water to develop a place-based IWM plan to guide the implementation of the strategy and inform the structure plans developed for the precincts.	Action by City West Water.	High	Business case
	4.2.5	Other stakeholders to create a collaborative approach for the management of the Moonee Ponds Creek catchment including advocating for good urban design, enhanced amenity and ecology and improved access to and across Moonee Ponds Creek while providing adequate flood protection.	Improved management of the creek leading to reduced flooding impacts within City of Melbourne.	High	Annual plan budgets
Deliver	4.2.6	Complete the investigation and, if feasible, build the stormwater harvesting system at Ievers Reserve	Flood mitigation, improved stormwater quality and provision of alternative water.	High	Current budget and business case
	4.2.7	Construct the stormwater diversion and associated amenity improvements and, if feasible, stormwater harvesting at Elliott Avenue.	Amenity enhancement, stormwater quality and soil moisture improvements, reduced stormwater runoff and possible alternative water supply.	High	Current budget and business case

SOUTHBANK AND THE YARRA RIVER

Actions			Rationale	Priority	Business impact
Advocate for	4.3.1	Melbourne Water to update the Land Subject to Inundation Overlay's (LSIO) to best current knowledge and accepted flood mapping.	Reduce risk and duplicate work load for City of Melbourne and Melbourne Water during the planning process.	High	Business as usual budgets and subject to business case for amendments
	See 4.1.3	And deliver increased monitoring and maintenance of drainage outlet to tidal river system (Lower Yarra River and Moonee Ponds Creek).	Reduce flood frequency and risk.	High	Business as usual budgets and subject to business case for infrastructure improvements
	4.3.2	The connection to the Fishermans Bend third pipe network.	Reduced cost to developers for building scale alternative water supply.	Medium	Business as usual budgets
Partner with	4.3.3	Melbourne Water to investigate, design, build and manage pumped drainage systems for low lying area including a sustainable funding pool, increased reliability and reduced maintenance.	Early planning to reduce risk exposure to sea level rise and storm surge impacts.	Medium	Business as usual and annual plan budgets
	4.3.4	Parks Victoria and City of Port Phillip to further investigate the flood mitigation opportunity of the Albert Park Lake project.	Possibility of reducing flooding in Southbank.	High	Business as usual budgets and subject to business case for infrastructure.
	4.3.5	Melbourne Water and other stakeholders to work towards the successful delivery of the Yarra River Action Plan through active participation at multiple levels in the development of the Yarra River Strategic Plan, The Yarra River Protection Bill and the Community Vision for the River.	Improved management and health of the Yarra River.	High	Business as usual budgets
Deliver	4.3.6	WUSD and flood mitigation interventions in Southbank boulevard redevelopment.	Flood mitigation, reduced stormwater runoff and pollution.	High	Current budget
	4.3.7	Incorporate our integrated water management objectives in the City River Concept Plan that will drive integrated public realm improvements along the rivers.	Alignment of objectives.	High	Business as usual

ELIZABETH STREET CATCHMENT

Actions			Rationale	Priority	Business impact
Advocate for	4.4.1	Melbourne Water to update its Special Building Overlay to reflect latest flood modelling results.	Reduce risk and duplicate work load for City of Melbourne and Melbourne Water during the planning process.	High	Business as usual budgets and subject to business case for amendments
Deliver	4.4.2	Continue to implement the actions of the Elizabeth Street Catchment Plan.	Successfully implement the endorsed plan.	High	Current budgets, Business as usual budgets and subject to business case for projects
	4.4.3	Develop a new council Special Building Overlay in the Catchment in line with the new flood model.	Reduce risk for City of Melbourne and community of future flood damages.	High	Business as usual budgets and subject to business case for amendments

REST OF MUNICIPALITY, PRIORITY AREAS OR CATCHMENTS, ASSOCIATED KEY ISSUES, OPPORTUNITIES, ACTIONS.

Area		Key IWM issues and opportunities	Proposed way forward		Priority	Business impact
1	Docklands	Flood/sea level rise.	4.5.1.1	Undertake flooding and sea level rise modelling similar to Fishermans Bend.	High	Subject to annual plan and budget
		Challenge maintaining WSUD assets.	4.5.1.2	Provide improvements to infrastructure design and work with Serco/Citywide to develop a sustainable maintenance/ rectification approach.	Medium	Business as usual budgets
		Intrusion of saline water to harvesting systems.	4.5.1.3	Decommission affected systems, recommend against building harvesting system in saline water table or near the bay.	Medium	Subject to budget approval
2	EGate	Moonee Ponds Creek flooding/sea level rise.	4.5.2.1	Undertake flood modelling early in the planning for the development.	High	Subject to annual plan and budget
		Impact of West Gate Tunnel Project.	4.5.2.2	Advocate for minimal impact of the road to the future development including best practice treatment of stormwater runoff.	High	Business as usual budgets
		Interface with the creek.	4.5.2.3	Advocate for a positive connectivity to Moonee Ponds Creek.	High	Business as usual budgets
3	West Melbourne	Low permeability and the associated stormwater runoff volume. Relieve flooding in Dudley Street.	4.5.3.1	Reduce runoff in the West Melbourne Structure Plan area (and improve stormwater quality and provide alternative water supply) by requesting on-site retention (Rainwater tanks) through the Stormwater Management planning clause.	High	Business as usual budgets
			4.5.3.2	Implement opportunistic streetscape WSUD interventions in collaboration with the Urban Forest Strategy precinct plan.	Medium	Subject to budget and business case
4	Dynon Road	Extremely poor water quality in the Dynon Road tidal channel and bird sanctuary.	4.5.4	Advocate for improved runoff quality from the rail yards and transfer station.	Medium	Business as usual budgets
5	Kensington Road	Flooding in Kensington Road. Maribyrnong River flooding.	4.5.5.1	Model flooding and proposed flood mitigation option to allow development in Kensington and Hobsons Roads.	High	Current budget
		Reduced flood plain capacity due to renewal from industrial to residential.	4.5.6.1	Determine appropriate action and funding allocation. Implemented flood mitigation options.	High	Subject to annual plan and budget, or business case

REST OF MUNICIPALITY, PRIORITY AREAS OR CATCHMENTS, ASSOCIATED KEY ISSUES, OPPORTUNITIES, ACTIONS.

Area		Key IWM issues and opportunities	Proposed way forward		Priority	Business impact
6	East Melbourne	Catchment well covered by stormwater harvesting schemes.	4.5.6	Continue to operate and improve as required the Darling St, Fitzroy Gardens and Birrarung Marr stormwater harvesting scheme.	Medium	Business as usual budget and improvements subject to business case
7	Sports Precinct	Major sporting facilities along Swan Street.	4.5.7.1	Advocate for the state government managed land to achieve stormwater quality and alternative water supply targets.	Medium	Business as usual budgets
			4.5.7.2	Advocate for the ongoing operation and maintenance of existing system: MCG sewer mine and water tanks, Tennis centre stormwater harvesting system.	Low	Business as usual budgets
8	Carlton North	Downstream flooding in City of Yarra along Alexandra Parade.	4.5.8.1	Work with City of Yarra to determine an appropriate solution.	Low	Business as usual budgets
			4.5.8.2	Investigate options for harvesting and flood retention system in Neil Street.	Low	Business as usual budgets
9	Flemington Racecourse/ Showgrounds	Flooding / Stormwater Quality.	4.5.9	Advocate for future development to achieve TWM targets, open space and access to Maribyrnong River.	Medium	Business as usual budgets
10	Footscray Road	West Gate Tunnel Project. Wholesale market site. Port of Melbourne.	4.5.10	Advocate for future development to achieve TWM targets, open space and access to Maribyrnong River.	Medium	Business as usual budgets
11	Royal Park North/Parkville Garden	Royal Park Wetlands.	4.5.11.1	Partner with MW to maintain the Royal Park system to best practice standard.	High	Business as usual budgets
		Galada Ave swale.	4.5.11.2	Implement improvements to swale to maximise usability and improve stormwater quality outcomes.	High	Subject to annual plan and budget, or business case
12	Fawkner Park	High irrigation priority. City of Melbourne has started to investigate the possibility to divert stormwater to Albert Park Lake.	4.5.12	Continue to partner with Parks Victoria to further investigate and, if feasible, deliver the Albert Park Lake Stormwater Harvesting scheme	High	Investigation co-financed by Parks Victoria, City of Melbourne, and City of Port Phillip (2015/16 budget) Implementation subject to annual plan and budget

How to contact us

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CITY OF MELBOURNE

REQUEST FOR QUOTATION—PANEL

PANEL OR STANDING OFFER CONTRACT REFERENCE	
Contract Title	Arden Urban Renewal Precinct – Public Spaces – Design and Costing
CONTRACTOR DETAILS	
Company:	GHD
Address:	Level 18, 180 Lonsdale Street, Melbourne VIC 3000
Contact person:	Brad George
Email:	brad.george@ghd.com
Phone:	03 8687 8000
Victorian Planning Authority Project Manager to complete proposal for the provision of the services detailed in the Project Brief Part A. Contractor to complete the Proposal Form Part B.	

RFQ Trim REF	**D/20/6058**
Lodgement Details:	Please submit by 5pm Friday 4 December via email to Stefan.Bettiol@vpa.vic.gov.au
Date issued:	26 November
Requested by:	Stefan Bettiol
Requestor contact details:	Telephone: 0419 155 658 Email: Stefan.bettiol@vpa.vic.gov.au
Contractors please note – Your Proposal Form Part B is not to be considered as accepted unless and until you receive *written notice* of such acceptance from the Victorian Planning Authority (VPA).	

EVALUATION CRITERIA

The Contractor will be evaluated against selection criteria listed below (in no particular order) including the overall value for money proposition.

The following evaluation criteria consists of two parts, the consideration of the actual process of research and analysis to be undertaken by the contractor in accordance with the brief and the ability of the contractor to meet the VPA's expected timelines and operational context.

The criteria consists of:

1. **Response to Brief / Methodology** – process of research, ability to source information, data collection, desk top review, ground truthing, appropriate consultation, analysis and forecasting. Ability to meet brief.
2. **Capability / Experience** – appropriate mix of skills, knowledge and experience within the nominated team, including infrastructure to undertake the work. Ability to lead other sub-consultants as required.
3. **Performance** – ability of the consultant to complete the brief within agreed timelines, including the ability to project manage, undertake internal/external consultation and comply with OH&S.
4. **Presentation** – ability to present in plain English, in the context of VPA templates and in accordance with the appropriate frameworks.
5. **Price** – ability to cost work competitively, pre-empt additional costs and include amended documentation, including overall fee structure.
6. **Social, environmental and sustainability outcomes** – A demonstrable and verifiable commitment to social, environmental and sustainability outcomes in accordance with the aims and objectives of the Victorian Government's *Social Procurement Framework*. Where the Contractor has previously provided a social procurement commitment to VPA (e.g. as part of the panel refresh), then the assessment will be based on this information.

In addition to the above criteria, the VPA must take into consideration **Value for Money**, which is a foundation principle that underpins Victorian Government Procurement. Value for money is the optimum combination of quality levels, quantity, risk, performance standards, timeliness, environmental impacts and cost for government on a whole-of-life basis.

PART A – PROJECT BRIEF

Services

1. Purpose

The purpose of this contract is to prepare concept level design drawings and associated cost estimates for public realm projects and infrastructure projects to service the Arden Structure Plan area and inform the preparation of the draft Arden Development Contributions Plan (DCP).

The brief for each project has been prepared with the ambition of transitioning a historically industrial precinct to a high-value innovation precinct. The designs must be prepared in accordance with the sustainability and urban design principles of the structure plan, specifically, the precinct is seeking to achieve the following objectives through the delivery of infrastructure:

- Dealing with water sensitively within the landscape, aligning with IWM principles
- Achieving a mode split of 10% private vehicle 90% active and public transport through high amenity public realm
- High amenity public realm to support the transportation mode shift and a transition from a historical industrial setting to a high-tech, high-value jobs precinct
- Sensitively responding to character and heritage of the area i.e. use of recycled blue stone, where possible.
- In accordance with City of Melbourne design and construction standards.

2. Scope

The Victorian Planning Authority and the City of Melbourne seek the services of a suitably qualified consultant with in-house design expertise and capabilities in urban design, open space, drainage/IWM/WSUD, transport and utility engineering and quantity surveying. Noting where applicable expertise may be sub-consulted by the successful consultant as required.

The consultant is to prepare concept level drawings and associated cost estimates for the proposed projects. Project descriptions and locations are indicated in the **Attachments.**

Project details are outlined as follows:

Network summary plan
The preparation of a transport and open space network summary plan is required. The plan must lay out all projects to form a single network to clearly illustrate how each is integrated. This will involve overlaying cycle, vehicle, drainage/IWM and open space networks. Projects must be labelled, numbered and correspond to a project table with a description of each project. Each project must also be illustrated on its own individual sheet in greater detail.

It is requested that the consultant interprets the information provided and uses it as the basis to design the network of projects. Rationalisation and the merging of multiple projects may be required from a design perspective although costing must be undertaken as separate projects.

Streetscape projects
Any public transport infrastructure shown on the plans provided in the appendix should not include the costs for tram infrastructure and instead should be costed as pavement. All design and costing work undertaken for streetscape projects should include areas allocated for ‘cloudburst conveyance & storage and ‘open space’. When calculating the costs for these spaces the following must be considered:

- The costing sheet must clearly delineate the costs associated with each land use including transport (i.e vehicle lanes, pedestrian paths and cycle lanes), flood conveyance (i.e

cloudburst & storage) and open space as well as detailed items associated with each land use.

- The costing sheet must include approximates areas, locations and quantum of infrastructure.
- City of Melbourne's 'Blue Green Infrastructure Design Typologies for Streetscapes' should be used to guide the general design principles of the 'cloudburst conveyance & storage' areas.
  (http://urbanwater.melbourne.vic.gov.au/industry/blue-green-infrastructure-design-typologies-for-streetscapes/)
- Trees should be designed to have WSUD tree pits. The consultant should specify the appropriate typology for example 'side of road passive irrigation tree trench' consistent with typology 7 of City of Melbourne's Blue Green Infrastructure Design Typologies for Streetscapes;
- Cloudburst conveyance & storage areas located on Queensberry Street and Fogarty Street (south of Queensberry Street) must consider the storage and overland flow path modelling illustrated in the plans and cross sections as prepared by Engeny Water Management. **Attachment 15** shows an example of the cross section prepared by Engeny Water Management, the design solution presented should not be interpreted literally, the overland flow path is to be designed as a series of connected basins broken up by crossings structures and other streetscape elements. The VPA will provide the recommended extent of works upon its completion.
- Pedestrian crossing structures should be provided for the larger stormwater conveyance spaces on Queensberry Street and Fogarty Street (south of Queensberry Street) where appropriate in accordance with the urban design concepts provided Attachment 17.
- Cloudburst conveyance & storage areas located on all other streets should be designed and costed as a 'large outstand raingarden' consistent with City of Melbourne's typology 4 from Blue Green Infrastructure Design Typologies for Streetscapes;
- The urban design concepts have been designed in consideration of local drainage catchments and contours, this must be checked by the consultant.
- Costing must include a line item for removal of expected contaminated soil (minimum category c).
- Costing must include line item for shared utility trenches.
- Design and costing must make allowance for public transport infrastructure along Fogarty St, Henderson St and Boundary Road.

Streetscape projects

Project No.	Project Location	Project Description
1 RD-01	Macaulay Road - Boundary Road to Moonee Ponds Creek.	Reconstruction of roadway: • Cross section **Attachment 6.**
2 RD-02	Boundary Road – (between Macaulay Road and Henderson Street)	Reconstruction of roadway: • Cross section **Attachment 16.**
3 RD-03	Henderson Street (between Gracie Street and Fogarty Street)	Reconstruction of roadway: • Cross section **Attachment 16.**
4 RD-04	Fogarty Street (between Henderson Street and Arden Street).	Reconstruction of roadway: • Cross section **Attachment 16.** • Construction costs to include uncovering, recoating, concrete slab protection of high-pressure gas pipelines. The consultant will be

		required to liaise with the relevant authorities to determine the relevant construction standards. (see location of pipeline at **Attachment 5**).
5 RD-05	Arden Street (between Moonee Ponds Creek and Fogarty Street)	Reconstruction of roadway: • Cross section **Attachment 7**
6 RD-06	Arden Street – (between Fogarty Street and Laurens Street)	Reconstruction of roadway: • Cross section **Attachment 8**
7 RD-07	Arden Street (between Laurens Street and Munster Terrace)	Reconstruction of roadway: • Cross section **Attachment 7**
8 RD-08	Fogarty Street (between Arden Street and Barwise Street)	Reconstruction of roadway: • Cross section **Attachment 9**.
9 RD-09	Fogarty Street (between Barwise Street and Queensberry Street	Construction of new roadway: • Cross section **Attachment 9.** • Design of cross section to ensure appropriate accessibility to western station building as shown in **Attachment 14**.
10 RD-10	Fogarty Street (between Queensberry Street and Laurens Street)	Construction of new roadway: • Cross section **Attachment 10** • Note that the design of the Cloudburst conveyance & storage area must respond to the recommended design features and cross section prepared by Engeny Water Management. This is **to be provided.** • Note that no vehicle access should be provided onto Laurens Street, vehicle movement will terminate immediately prior to the intersection.
11 RD-11	Queensberry Street (between western boundary and Fogarty Street)	Construction of new roadway: • Cross section **Attachment 11** • Note that the design of the Cloudburst conveyance & storage area must respond to the modelling and cross section prepared by Engeny Water Management. **This is to be provided**. • Note the urban design concept for the linear green space and Cloudburst conveyance & storage shown within the cross section is provided at **Attachment 17.**
12 RD-12	Queensberry Street (between Fogarty Street and Laurens Street)	Construction of new roadway: • Cross section **Attachment 11** • Note that the design of the Cloudburst conveyance & storage area must respond to the modelling and cross section prepared by

		Engeny Water Management. **This is to be provided**. • Note the urban design concept for the linear green space and Cloudburst conveyance & storage shown within the cross section is provided at **Attachment 17.**
13 RD-13	Barwise Street (between Fogarty Street and Laurens Street)	Construction of new roadway: • Cross section **to be provided.**
14 RD-14	Laurens Street (between Arden Street and Queensberry Street)	Reconstruction of roadway: • Cross section **Attachment 18.**
15 RD-15	Laurens Street (between Queensberry Street and Fogarty Street)	Reconstruction of roadway: • Cross section **Attachment 17.**
16 RD-16	Laurens Street (between Fogarty Street and Millar Street)	Reconstruction of roadway: • Cross section **Attachment 17.** • When adjacent to 1 Laurens Street, the design must avoid any land acquisition.
17 RD-17	Munster Terrace (between Arden Street and Queensberry Street)	Reconstruction of roadway: • Cross section **Attachment 12.**
18 RD-18	Munster Terrace (between Queensberry Street and Victoria Street)	Reconstruction of roadway: • Cross section **Attachment 13.**

Intersection Projects

Project No.	Project Location	Project Description
19 IN-01	Macaulay Road and Boundary Road intersection	Reconstruction of the existing intersection: • Must align with the proposed Fogarty St/Henderson St/Boundary Rd cross section **Attachment 16** and the Macaulay Road cross section (**Attachment 6).**
20 IN-02	Boundary Road / Henderson Street / Gracie Street	Reconstruction of the existing intersection: • Location shown on **Attachment 2** • Un-signalised.
21 IN-03	Fogarty Street / Henderson Street	Reconstruction of the existing intersection: • Location shown on **Attachment 2** • Un-signalised • Construction costs to include uncovering, recoating, concrete slab protection of high-pressure gas pipelines. The consultant will be required to liaise with the relevant authorities to determine the relevant construction standards. (see location of pipeline at Attachment 5).

22 IN-04	Fogarty Street / Arden Street	Reconstruction of the existing intersection: • Location shown on **Attachment 2** • Must align with the proposed Arden Street cross section **Attachment 7&8** • Must allow for cycle accessibility and turning • Signalisation required, including signalisation for bicycle movements.
23 IN-05	Arden Street / Laurens Street	Reconstruction of the existing intersection: • Location shown on **Attachment 2** • Must align with the proposed Arden Street cross section **Attachment 8&9** and Laurens Street cross section **Attachment 18.** • Signalised
24 IN-06	Arden Street / Munster Terrace	Reconstruction of the existing intersection: • Location shown on **Attachment 2** • Must align with the proposed Arden Street cross section **Attachment 9** Munster Terrace cross section **Attachment 12** • Un-signalised
25 IN-07	Fogarty Street / Barwise Street	Reconstruction of the existing intersection: • Location shown on **Attachment 2** • Must align with the proposed Fogarty Street cross section **Attachment 9** and Barwise Street cross section **to be provided.** • Un-signalised
26 IN-08	Fogarty Street / Queensberry Street	Reconstruction of the existing intersection: • Location shown on **Attachment 2** • Must consider Queensberry Street drainage projects either side of intersection • Must align with the Fogarty Street cross section **Attachment 9 and 10** and Queensberry Street **Attachment 11**
27 IN-09	Laurens Street / Queensberry Street	Reconstruction of the existing intersection: • Location shown on **Attachment 2** • Must align with the proposed Laurens Street cross sections **Attachment 17 and 18..** • Un-signalised • Left turn only onto Laurens Street • Raised pedestrian treatment to achieve a pedestrian priority space

		• Provision for drainage overland flow path • Low speed environment – approx. 20 km/h.
28 IN-10	Munster Terrace / Queensberry Street	Reconstruction of the existing intersection: • Location shown on **Attachment 2** • Must align with the proposed Munster Terrace cross sections **Attachment 12 and 13** and the proposed Queensberry Street. • Un-signalised
29 IN-11	Laurens Street / Fogarty Street	Reconstruction of the existing intersection: • Location shown on **Attachment 2** • Must align with the proposed Fogarty Street cross section (see **Attachment 7**) and Laurens Street cross section **Attachment 17.** • Un-signalised
30 IN-12	Munster Terrace / Victoria Street	Reconstruction of the existing intersection: • Location shown on **Attachment 2** • Must align with the proposed Munster Terrace cross section **Attachment 13**
31 IN-13	Laurens Street / Miller Street	Reconstruction of the existing intersection: • Location shown on **Attachment 2** • Must align with the proposed Laurens Street cross section **Attachment 17** and the existing Miller Street. • When adjacent to 1 Laurens Street, the design must avoid any land acquisition. • Un-signalised

<u>Roads & Intersection - Outputs</u>

- Prepare a concept layout drawing for each of the projects, drawn to scale and including the following:
  - Plan view of full extent of works overlaid on the existing site features;
  - Plan view of contours on the existing site features;
  - Existing utilities and road infrastructure types/locations;
  - Property boundaries;
  - Limit of works;
  - Dimensions to extents of each leg of intersection and road length;
  - Layout of all through and turning lanes;
  - Intersection function referencing traffic signals and/or lanterns
  - Layout of major features such as medians, separators and tapers;
  - Layout of verge features such as landscaping, open space, raingardens or cloudburst conveyance & storage
  - Footpaths/shared paths/separated bike lanes;
  - Typical pavement detail;

- Distinction between permeable and non-permeable finishes;
- Typical cross sections;
- Scale/s;
- Relevant notes;
- Title block with relevant details including CoM design and construction standards.

- Based on the concept designs, calculate quantities and prepare an opinion of cost for each of the projects**;**
- Present an opinion of cost for each of the projects, based on the format of the *Roads/Intersections* estimate template (**Attachment 4);** Provide a discussion on the scope and standards forming the basis for all cost advice.

Cycle Path Projects

Project No.	Project Location	Project Description
32 CC-01	Western cycling Path – full extent of western precinct boundary from Laurens Street to Macaulay Road	On and off-road shared path: • **Attachment 2** • 4m width, two-way, off-road • 1.16km length
34 CC-03	North Melbourne Recreation Reserve,	Off-road cycling path: • **Attachment 3** • 4m width, two way, off-road • 200m in length.
33 CC-04	Queensberry Street cycling path between Abbotsford Street and Laurens Street.	On-road cycling path including: • **Attachment 2** • 2m wide kerbside separated cycle lanes on both sides of Queensberry Street • Designed in accordance with the City of Melbourne Bike Lane Guidelines • Car parking located adjacent to the carriageway • Minimum carriageway width is 3.1m.
35 CC-05	Victoria Street cycling path between Munster Terrace and Dryburgh Street	Victoria Street on-road cycling path including: • **Attachment 1;** • 2m wide kerbside separated cycles lanes on both sides of Victoria Street • Designed in accordance with the City of Melbourne Bike Lane Guidelines • Car parking located adjacent to the carriageway • Minimum carriageway width is 3.1m • Width of median strip should be maintained and at the minimum should allow for tree planting.

Pedestrian Operated Signals and Bridge

Project No.	Project Location	Project Description
36 PED-01 PED-02	Arden Street at two locations: • 100m west of Fogarty Street; • Adjacent to Langford Street	Pedestrian Operated Signals: • **Attachment 2**; • Including kerb outstands; • Fogarty Street – to improve accessibility for pedestrians; • Langford Street – to improve accessibility for cyclists.
37 BR-01	Pedestrian bridge between Chelmsford Street and Straker Street	Construction of 4m wide pedestrian/cyclist bridge between Chelmsford Street and Straker Street. • construction specification suitable for light vehicle traffic • includes balustrade both sides • includes lighting @ 15m spacing • Note landscape architects McGregor Coxall have previously prepared a very high-level cost estimate.

Cycle Path, Pedestrian Operated Signals & Bridge - Outputs

- Prepare concept plan drawings for each of the cycle path projects, drawn to scale and including the following
    - Plan view of full extent of works overlaid on the existing site features;
    - Existing utility and road infrastructure types/locations;
    - Property boundaries;
    - Dimensions to extents of each leg of intersection;
    - Layout of features such as medians, separators and tapers;
    - Footpaths/shared paths;
    - Typical pavement detail;
    - Typical cross sections;
    - Scale/s;
    - Relevant notes;
    - Title block with relevant details.
- Based on the concept plan drawings, calculate quantities and prepare an opinion of cost for each of the road projects**;**
- Present an opinion of cost for each of the projects, in the format of the *Roads/Intersections* estimate template (**Attachment 4);**
- Provide a discussion on the scope and standards forming the basis for all cost advice.

High Pressure Gas Pipeline

Project No.	Project Location	Project Description
38	• The gas pipeline protection cost needs to include the extents of the measurement length that impacts on the precinct as shown **Attachment 5**	• Construction costs to include uncovering, recoating, concrete slab protection of high-pressure gas pipelines. The consultant will be required to liaise with the relevant authorities to determine the relevant construction standards.

Gas pipeline-Outputs

- Prepare concept plan drawings for the pipeline, drawn to scale and including the following
    - Plan view of full extent of works overlaid on the existing site features;
    - Property boundaries;
    - Layout of major features;
    - Footpaths/shared paths;
    - Typical pavement detail;
    - Typical cross sections;
    - Scale/s;
    - Relevant notes;
    - Title block with relevant details.
    - Illustration of 3m offset each side of the gas pipeline in accordance with the *Pipelines Act 2005.*
- Based on the concept plan drawings, calculate quantities and prepare an opinion of cost for the gas pipeline protection**;**
- Present an opinion of cost for each of the gas pipeline projects, in the general format of the *Roads/Intersections* estimate template (**Attachment 4);**
- Provide a discussion on the scope and standards forming the basis for all cost advice.

Open space projects

Project No.	Project Location	Project Description
39	Fogarty Street (south of Arden Street) open space (LP-01), as per the 'Arden Open Spaces' document prepared by City of Melbourne attached.	Design and costing of the open space in accordance with the urban design concepts prepared. Please see attached.
40	Laurens Street, the corner of Arden and Laurens Street (LP-02), as per the 'Arden Open Spaces' document prepared by City of Melbourne attached.	Design and costing of the open space in accordance with the urban design concepts prepared. Please see attached.
41	Queensberry Street open space (LP-03), as per the 'Arden Open Spaces' document prepared by City of Melbourne attached.	Design and costing of the open space in accordance with the urban design concepts prepared. Please see attached.
42	Arden Central Neighbourhood Open Space (LP-04), as per the 'Arden Open Spaces' document prepared by City of Melbourne attached.	Design and costing of the open space in accordance with the urban design concepts prepared. Please see attached.

43	Arden North open space (DR-01), as per the 'Arden Open Spaces' document prepared by City of Melbourne attached.	Design and costing of the open space in accordance with the urban design concepts prepared. Please see attached.
44	Arden North open space (DR-02), as per the 'Arden Open Spaces' document prepared by City of Melbourne attached.	Design and costing of the open space in accordance with the urban design concepts prepared. Please see attached.
45	Arden Central western edge (DR-03), as per the 'Arden Open Spaces' document prepared by City of Melbourne attached.	Design and costing of the open space in accordance with the urban design concepts prepared. Please see attached.
46	Moonee Ponds Creek to be provided.	Design and costing of an open space in accordance with the urban design concept currently under preparation. The design will be provided once completed.
47	Moonee Ponds Creek to be provided.	Design and costing of an open space in accordance with the urban design concept currently under preparation. The design will be provided once completed.

Open Space-Outputs

- Prepare concept plan drawings for the open spaces, drawn to scale and including the following
    - Plan view of full extent of works overlaid on the existing site features;
    - Property boundaries;
    - Layout of features;
    - Footpaths/shared paths;
    - Typical pavement detail;
    - Scale/s;
    - Relevant notes;
    - Title block with relevant details.
- Based on the concept plan drawings, calculate quantities and prepare an opinion of cost for each of the projects**;**
- Present an opinion of cost for each of the open space projects, the format of the *Roads/Intersections* estimate template should be used (**Attachment 4);**
- Provide a discussion on the scope and standards forming the basis for all cost advice.

Responses to this brief must include two single costs, part A and part B:

Part A

- A project fee to undertake the work as stated above, the estimate project fee is approximately $60,000;
- The project fee must include costs for 5 x 1 hour meetings.
- An optional fee for each requested new design of a streetscape, intersection, cycling or open space project.

Part B

- Acknowledge availability to provide expert assessment and recommendations that can be relied upon as expert evidence at Planning Panels Victoria, if required.
- Please provide an estimated cost for 10 days for two people.

- The estimate should include allowance for development of or update to plans/report/costs, meetings and attendance at Panel.

3. Background

Planning for Arden is being undertaken jointly by the Victorian Planning Authority (VPA) and City of Melbourne. Arden is a 50-hectare urban renewal precinct in the inner urban area of Melbourne. It is situated less than 2 kilometres from the central city and adjacent to the established residential areas of North Melbourne, Kensington and West Melbourne and immediately south of the evolving, mixed use, Macaulay urban renewal area. At Arden's core will be a world class innovation and technology district catalysed by the new Arden station – scheduled open in 2025 as part of Metro Tunnel and significant state government land holdings. Arden's exceptional connectivity is central to its value proposition – just 25 minutes from Melbourne's airport, 4.5 kilometres from the Port of Melbourne and 2 kilometres from the Central Business District (CBD).

Arden is one of several precincts at various stages of planning, development or completion within inner metropolitan Melbourne. The Victorian Government has identified Arden as a Priority Precinct, making it part of a network of precincts that will work together to boost innovation, productivity and build on Victoria's global record of commercial success.

Arden will play a pivotal role in linking National Employment and Innovation Clusters, from Sunshine, through Parkville and the central business district, to Monash and Dandenong. The structure plan area includes three sub-precincts:

- **Arden North (approx. 22 ha)**
  New land uses in this precinct will include commercial, residential, civic and community uses, drainage functions and open space. A blue-green open space will create a landscape that reduces flooding risks and expands the recreational and biodiversity assets along the Moonee Ponds Creek.

- **Arden Central (approx. 16 ha)**
  The future redevelopment of the land will be staged over a period of up to 30 years. The precinct will feature a mix of research, institutional, commercial, educational, recreational, retail, cultural and residential land uses. The greatest intensity of activity will be around the new Arden Metro Tunnel train station. A potential new government primary school is proposed near Laurens Street.

- **Laurens (approx. 12 ha)**
  The area's notable heritage buildings will guide the character of the sub-precinct. Existing industries in the sub-precinct are expected to transition over time to commercial and residential uses, and there are opportunities to expand North Melbourne's vibrant creative start-up sector, including additional innovative co-working spaces.

The draft Arden Structure plan has been prepared by the VPA and City of Melbourne in collaboration with the Department of Jobs, Precincts and Regions and other government departments and agencies. The Structure Plan recently finished community engagement seeking the views of the community to prepare the final structure plan for Arden. The Draft Arden Structure Plan responds to the key directions of the Arden Vision (2018).

4. Deliverables

Deliverable 1 – Project Inception Meeting

Consultant to attend an inception meeting with the VPA and City of Melbourne Project Manager to:

- Confirm specific project requirements.
- Confirm project timing and milestones.
- Handover VPA provided documentation.
- Discuss any issues of concern.

Deliverable 2 – Preparation of draft concept designs

Consultant to prepare and circulate draft concept designs for the infrastructure items.

Hold Point – Review Period

Deliverable 3 – Update draft concept designs

Consultant to update concept designs in accordance with the feedback from the VPA.

Hold Point – Review Period

Deliverable 4 – Preparation of final draft concept designs

Consultant to update concept designs in accordance with the feedback from the VPA.

Deliverable 5 – Preparation of draft costings

Consultant to prepare cost estimates for the delivery of the concept designs. An external sub-consultant quantity surveyor may be utilised for this component of the project.

Hold Point – Review Period

Deliverable 6 – Preparation of final package including updated design and costings

Consultant to prepare a complete package which includes design and cost estimates which reflects all feedback and information provided.

Hold Point – Planning Panel

Deliverable 7 – Preparation of final designs and costings

Consultant to update designs and cost estimates following feedback from Planning Panels Victoria. Fee submission should provide an itemised rate for design and costing revisions beyond this scope. It is anticipated updated designs and costings will be required pre and post planning scheme amendment.

	Deliverable	Delivery Date
PART A		
1	Deliverable 1– Project Inception Meeting	1 week after appointment
2	Deliverable 2 – Preparation of draft concept designs	**18 December 2021**
	Hold Point – VPA Review	1 week
3	Deliverable 3 - Preparation of updated concept designs	**15 January 2021**
	Hold Point – VPA Review	1 week
4	Deliverable 4 - Preparation of draft costings	**29 January 2021**
	Hold Point – VPA Review	1 week
5	Deliverable 5 - Preparation of updated costings	**12 February 2021**
	Hold Point – VPA Review	1 week
6	Deliverable 6 - Preparation of final costings	**26 February 2021**
PART B		
	Hold Point – Planning Panel	TBC
7	Deliverable 6 - Preparation of design and costings post panel recommendations.	**TBC**

5. Assumptions

The contractor should base the proposal on the assumption that the VPA will provide the following:

- Details of VPA and Council policies, strategies and reports relevant to the project
- Details of previous relevant research undertaken for the VPA by other consultants
- All relevant GIS layers
- All relevant demographic and population forecasts
- Telephone and email contacts for all relevant stakeholders
- Invitation list management (distribution of invitations, coordination of RSVPs) venue and refreshments (if required) for stakeholder consultation
- Coordination with Council officers and external stakeholders to ensure the completion of all project consultations
- Costs associated with stakeholder engagement communications materials

6. Service Hours

The hours during which the Contractor shall normally provide the services to the Department are:

8.30am to 5:00pm Melbourne local time – Monday to Friday (public holidays excluded)

7. Relationship Management

Management Administration:

VPA Project Officer(s):	Stefan Bettiol
Title:	Strategic Planner
Address:	Level 25, 35 Collins Street, Melbourne, Victoria 3000
Telephone:	0419 155 658
Email:	Stefan.bettiol@vpa.vic.gov.au

8. Reporting Requirements

The Contractor shall provide the Project Manager with brief reports on progress at the end of each stage. Any matters which arise that may be deemed to materially affect the development of the project should be communicated to the Victorian Planning Authority Project Manager within twenty-four hours of the matter being known to the Contractor.

Vision Accessibility

The Contractor shall ensure all reports and diagrams, maps or other presentation material are accessible for those with vision of colour impairment. To this end:

- All documents shall be provided in MS Word or Adobe PDF (not scanned) formats, which are machine readable or can readily be converted; and
- All graphic material shall be developed to be legible by those with colour impairment. This could involve the use of special colour palettes, including monochrome, labelling or the use of layered PDFs.

Further information relating to accessibility for those with vision or colour impairment can be found at: http://www.dtpli.vic.gov.au/planning/planning-publications/codes-and-guidelines/communicating-data-with-colour

Where historic or externally sourced material is used that cannot be made colour accessible, the report should include a note to this effect.

Report Format

All deliverables shall be provided in both hard and soft formats. Three hard copies should be provided (2 bound, 1 unbound). Electronic copies should be provided in both MS Word and Adobe PDF format.

Data Format

Raw data created under this engagement for all maps or plans within any document or other output is to be provided. Where the data is publicly available, it is sufficient to provide a contact or source for the data. If the data is not publicly available, it shall be provided in a suitable GIS format (preferably Shapefile or MapInfo Tab) and/or geo-referenced AutoCad (.dwg) as appropriate or agreed. Adequate documentation and metadata must be provided with the data.

9. Performance Measures

Performance measures may be a measure of the deliverables outlined in 'Section 3'. If the Contractor completes the required deliverables in a timely fashion and to the standard required under the Panel contract, this requirement should be fulfilled (unless further performance measures are warranted under the contract). Other performance measures may require the contractor to comply with OAAV reporting requirements or DELWP reporting standards. **Performance measures should also include social procurement outcomes, as required by the Victorian Government's *Social Procurement Framework***.

10. Special Conditions Applicable to the Services

If the contractor believes a variation to the agreed scope of works is required, the contractor must submit to the VPA a proposed change and obtain agreement in writing from the VPA before proceeding. Additional work that has not received prior written approval from the VPA will not receive additional fees.

11. Allowable Expenses

The reimbursement of expenses shall only be in accordance with the applicable rules of the VPA and then only as agreed in advance. The Contractor is to detail proposed travel and related expenses in Part B: Proposal Form - Travel and Other Expenses.

PART B: PROPOSAL FORM

I/We offer to provide to the Victorian Planning Authority (VPA) the services specified in the Project Brief in Part A at the fees and charges set out in Part B (Proposal) to be performed by the Date of Completion stated in Part A on the terms and conditions of the pre existing panel contract.

Conflict of Interest Declaration Under section 32 of the *Victorian Planning Authority Act 2017*, a consultant who provides advice to the VPA must disclose any circumstances that may create a conflict of interest. This includes undertaking work for landowners or developers in the relevant area, owning land in a private capacity in the relevant area, or any other circumstance that may be perceived as a conflict by an impartial fair-minded person.	
No current or potential conflict of interest exists	☐
A current or potential conflict of interest means that we are unable to provide the services requested. Please provide details of the conflict of interest: [Type here]	☐
A current or potential conflict of interest exists, but it can be managed. Please provide details of the conflict of interest, and a suggestion of how that conflict could be managed: [Type here]	☐

Staff to perform Services		
Name / Title	**Role and Responsibilities**	**Available from**
		[Day] /[Month] /[Year]
		[Day] /[Month] /[Year]
		[Day] /[Month] /[Year]

The prices offered for this service need to be in the form of Project Fees as tabled below, detailing the estimated hours, and the fee against each deliverable, GST Inclusive.

Project Fee	
GST exclusive amount:	$
GST amount:	$
Total price (including GST):	**$**

Project Fee "[e.g. Milestone Payments]"			
Description	**GST exclusive amount**	**GST amount**	**Total (including GST)**
Deliverable 1 & 2	$	$	$
Deliverable 3 & 4	$	$	$

Deliverable 5	$	$	$
Total price (including GST):	**$**		

Project Rates Project Rates must not be greater than the rates agreed to under the panel contract.					
Personnel Description – Stage 1	**Unit Rate [per hour, per day, etc.]**	**No. of units [e.g. hours, days, etc.]**	**Cost (GST exclusive amount)**	**Cost (GST amount)**	**Cost Total amount (including GST)**
	$		$	$	$
	$		$	$	$
Total price – Stage 1:			**$**	**$**	**$**
Personnel Description – Stage 2	**Unit Rate [per hour, per day, etc.]**	**No. of units [e.g. hours, days, etc.]**	**Cost (GST exclusive amount)**	**Cost (GST amount)**	**Cost Total amount (including GST)**
	$		$	$	$
	$		$	$	$
Total price – Stage 2:			**$**	**$**	**$**
Personnel Description – Stage 3	**Unit Rate [per hour, per day, etc.]**	**No. of units [e.g. hours, days, etc.]**	**Cost (GST exclusive amount)**	**Cost (GST amount)**	**Cost Total amount (including GST)**
	$		$	$	$
	$		$	$	$
Total price – Stage 3:			**$**	**$**	**$**

Discounts applicable
(If applicable) Describe the discounts used in the preparation of this Quotation:

Travel and Other Expenses

If this table is not completed, the amounts described under the 'Milestone Payments' will be taken to be inclusive of all travel expenses and disbursements.

Please provide details and estimates of all expenses (such as travel, accommodation, printing, and other disbursements) you propose to claim from VPA.

Personnel Names	Description of Expenses or Disbursement	Rate Total $AUD (including GST)

Social Procurement Commitment

This section (and Part C) is only required to be completed if the Contractor has NOT previously completed a social procurement commitment.

Please complete and attach Part C: Social Procurement Commitment Form to outline your commitment to the Victorian Government social procurement objectives.

Additional Information

Please attach additional information to demonstrate how your proposal meets the evaluation criteria. This may include:

(a) A brief description of the Company's relevant experience (attached as a separate document if required).

(b) A brief description of qualifications and other professional experience of the Contractor's Staff relevant to the provision of the project services.

(c) A description of the proposed methodology for the project.

(d) Any other relevant information.

"[Type Additional Information Here]"

.....

Signature

Dated: [Day] /[Month] /[Year]

Company Name:	[Type here]
Contact name:	[Type here]
Title or position:	[Type here]
Address:	[Type here]
ABN:	[Type here]
Contact Telephone No.:	[Type here]
Contact Facsimile No.:	[Type here]
Contact Email Address:	[Type here]

Note: Should the VPA not agree with the reimbursement or payment of any additional expenses outlined in 'Travel and Other Expenses', or any other fees and/or charges proposed in Part B, an amendment to Part B or charges to Part B may be required (as negotiated between the parties).

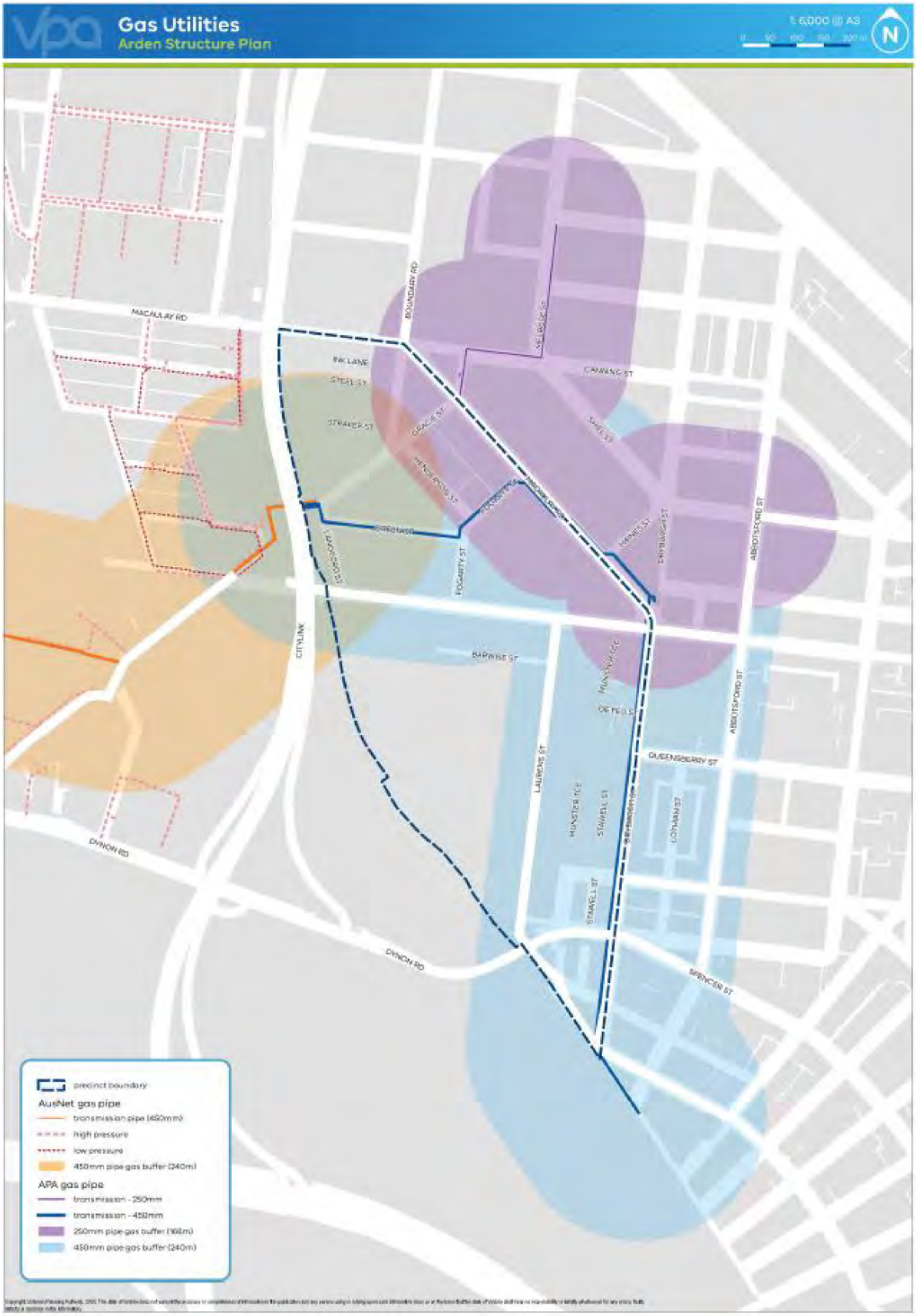
ATTACHMENT 1 – Transport Projects

ATTACHMENT 2 – Cycling and Pedestrian Projects

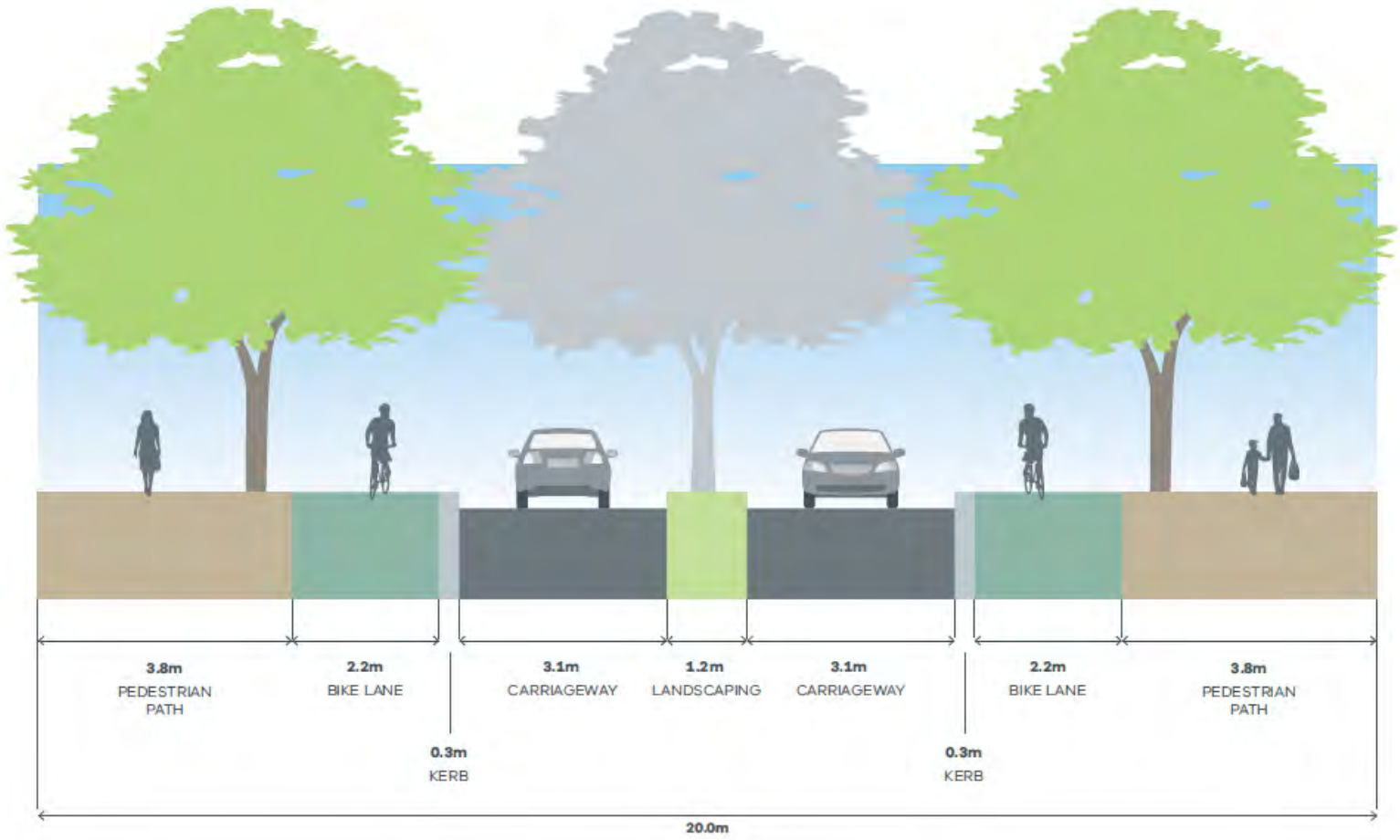
ATTACHMENT 4 – Road Costing Template

Item	Description	Quantity	Unit	Rate $	Amount $	Comments
	WORKS					
1	**SITEWORKS AND EARTHWORKS**					
1.1	Site preparation		Item			
1.2	Earthworks		m3			
1.3	Other *(Description)*		Item			
2	**ROAD PAVEMENT**					
2.1	New pavement *(List pavement courses)*		m2			
2.2	Pavement Other *(Description)*		m2			
3	**CONCRETE WORKS**					
3.1	Kerb and Channel		LM			
3.2	Pedestrian & Cycle Paths		m2			
4	**DRAINAGE**					
4.1	Drainage - pipes		LM			
4.2	Drainage - pits		No.			
4.3	Drainage - Sub-soil		LM			
4.4	Drainage - Miscellaneous *(Description)*		Item			
5	**TRAFFIC**					
5.1	Traffic Signals		Item			
5.1	Traffic Safety		Item			
6	**LANDSCAPE**					
6.1	Trees		No.			
6.2	Landscaping		Item			
7	**STREET LIGHTING**					
7.1	Street Lighting		Item			
8	**MISCELLANEOUS**					
8.1	Line marking		Item			
8.2	Regulatory Signage		Item			
8.3	Works maintenance - up to 1 year		Item			
8.4	Landscape maintenance - 1yr/2 summers		Item			
8.5	Traffic signals 10 year Maintenance Fee		Item			
9	**OTHER**					
9.1	*List (Description)*		Item			
	SUB-TOTAL WORKS				$	
10	**DELIVERY**					
10.1	Council Fees	3.25	%			
10.2	VicRoads Fees	1	%			
10.3	Traffic Management	7	%			
10.4	Environmental	0.5	%			
10.5	Survey/Design	5	%			
10.6	Supervision & Project Management	9	%			
10.7	Site Establishment	2.5	%			
10.8	Contingency	20	%			
	SUB-TOTAL				$	
11	**TOTAL ESTIMATED**				$	

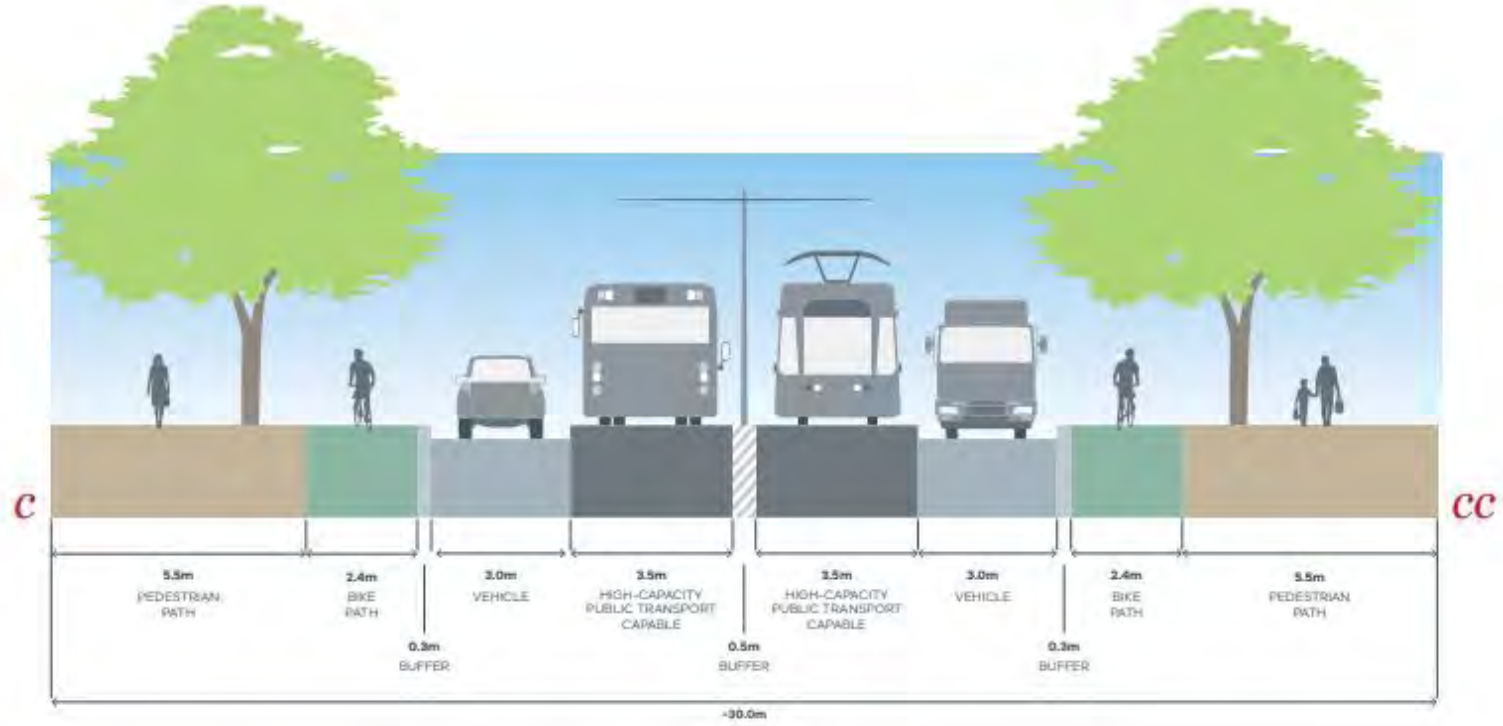
ATTACHMENT 5 – Location of high pressure gas pipeline



ATTACHMENT 6 – Macaulay Road – Between Boundary Road and Moonee Ponds Creek



ATTACHMENT 7 – Arden Street between Macaulay Road and Fogarty Street

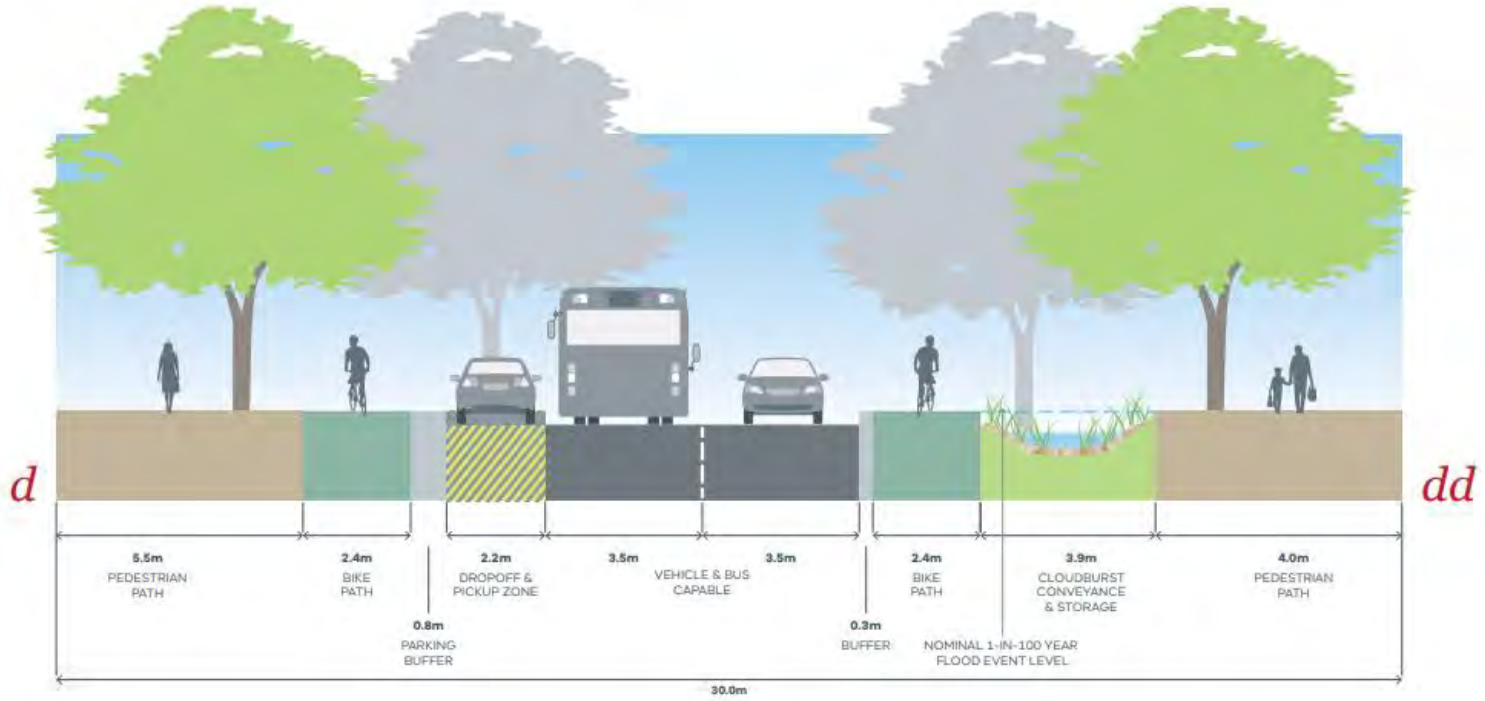


Notes:

- Future modal interchanges to be delivered as accessible, cycle-/drive-over stops subject to detail design.
- Bike path widths may be reduced at future modal interchanges to manage speed if required by detail design.
- Bike paths to be designed at grade of foot paths and be clearly delineated using material and surface textural finishes.
- High Capacity Public Transport Capable Corridor to be grade separated from adjacent vehicle lanes.
- Vehicle and public transport lane to be designed with traffic calming devices including raised pedestrian crossings and the use of textural surface changes (such as the use of granitic paving stones, etc) to achieve a target speed of 50km/h generally and 10 km/hr at modal interchanges.

Arden Street

ATTACHMENT 8 – Arden Street between Fogarty Street and the Moonee Ponds Creek

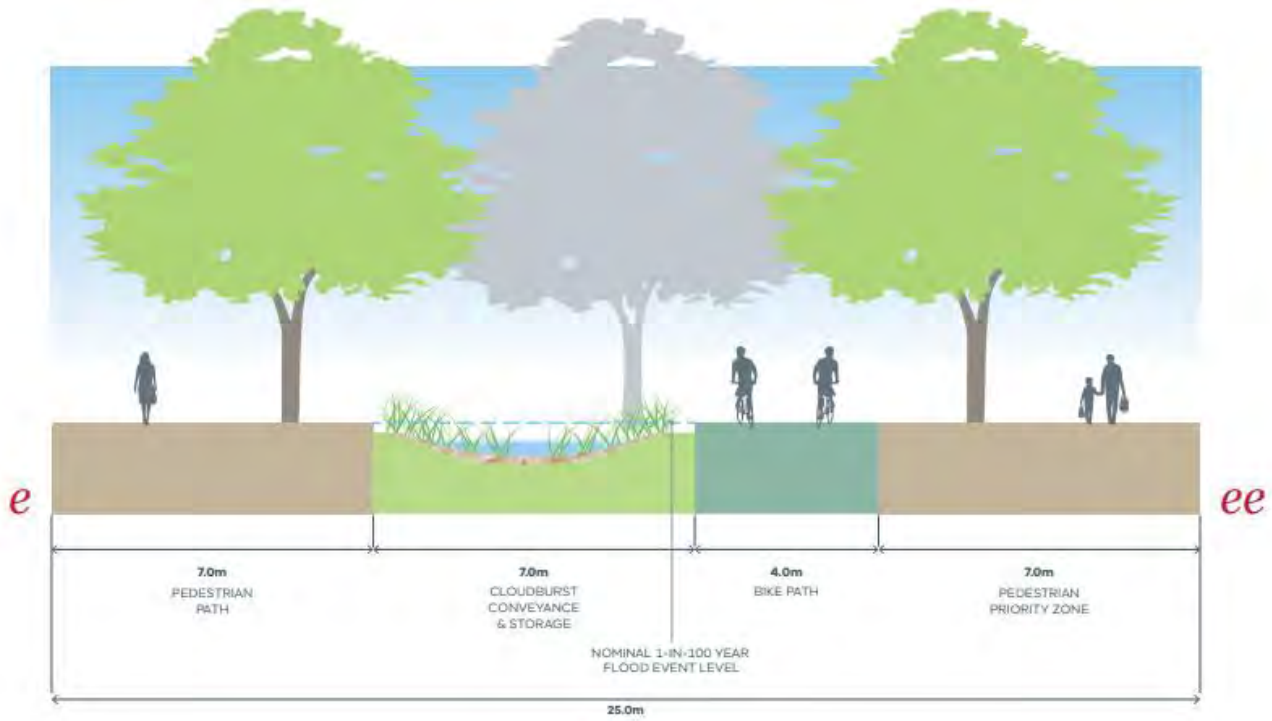


Notes:

- Bike paths to be designed at grade of foot paths and be clearly delineated using material and surface textural finishes. Bike paths may be designed at grade of vehicle lane where abutting cloudburst elements required for flood management.
- DDA compliant pedestrian paths to be designed to cross over cloudburst conveyance at appropriate intervals that align with other laneways or pedestrian connections.
- Vehicle / public transport lane to be designed with traffic calming devices including raised pedestrian crossings, traffic & pedestrian signals and the use of textural surface changes (such as the use of granitic paving stones, etc) to achieve a target speed of 50km/hr generally and 10 km/hr at modal interchanges.
- Bike path widths may be reduced at future modal interchanges to manage speed if required by detail design.
- Detailed design of street sections and plans will explore opportunities to integrate water sensitive urban design within road reserve and cloudburst elements, in particular to provide for urban forest irrigation and stormwater treatment.

Arden Street

ATTACHMENT 9 –

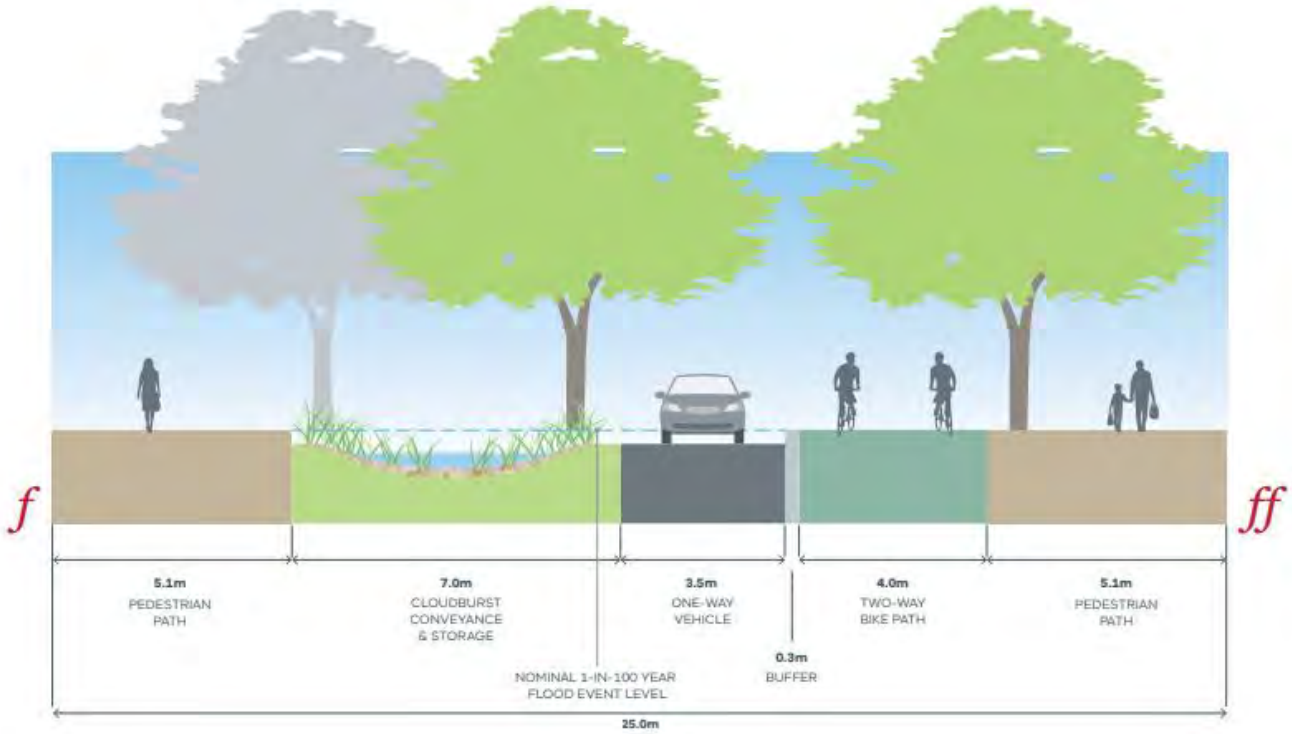


Notes:

- Bike paths to be designed at grade of foot paths and be clearly delineated using material and surface textural finishes.
- DDA compliant pedestrian paths to be designed to cross over cloudburst conveyance at appropriate intervals that align with other laneways or pedestrian connections.
- Pedestrian priority zones designed to accommodate service vehicle access.
- A 10 km/hr speed limit should apply to the Pedestrian Priority Zone and it should be designed accordingly (to achieve an outcome similar to the Bourke Street Mall).
- The cloudburst conveyance could be designed to one side of the street allowing a wider area for foot/bike service vehicle access, subject to detail design and the access and servicing needs of abutting development.
- Detailed design of street sections and plans will explore opportunities to integrate water sensitive urban design within road reserve and cloudburst elements, in particular to provide for urban forest irrigation and stormwater treatment.

Fogarty Street extension

ATTACHMENT 10– Fogarty Street (south of Arden Street) – Between Queensberry Street and Laurens Street

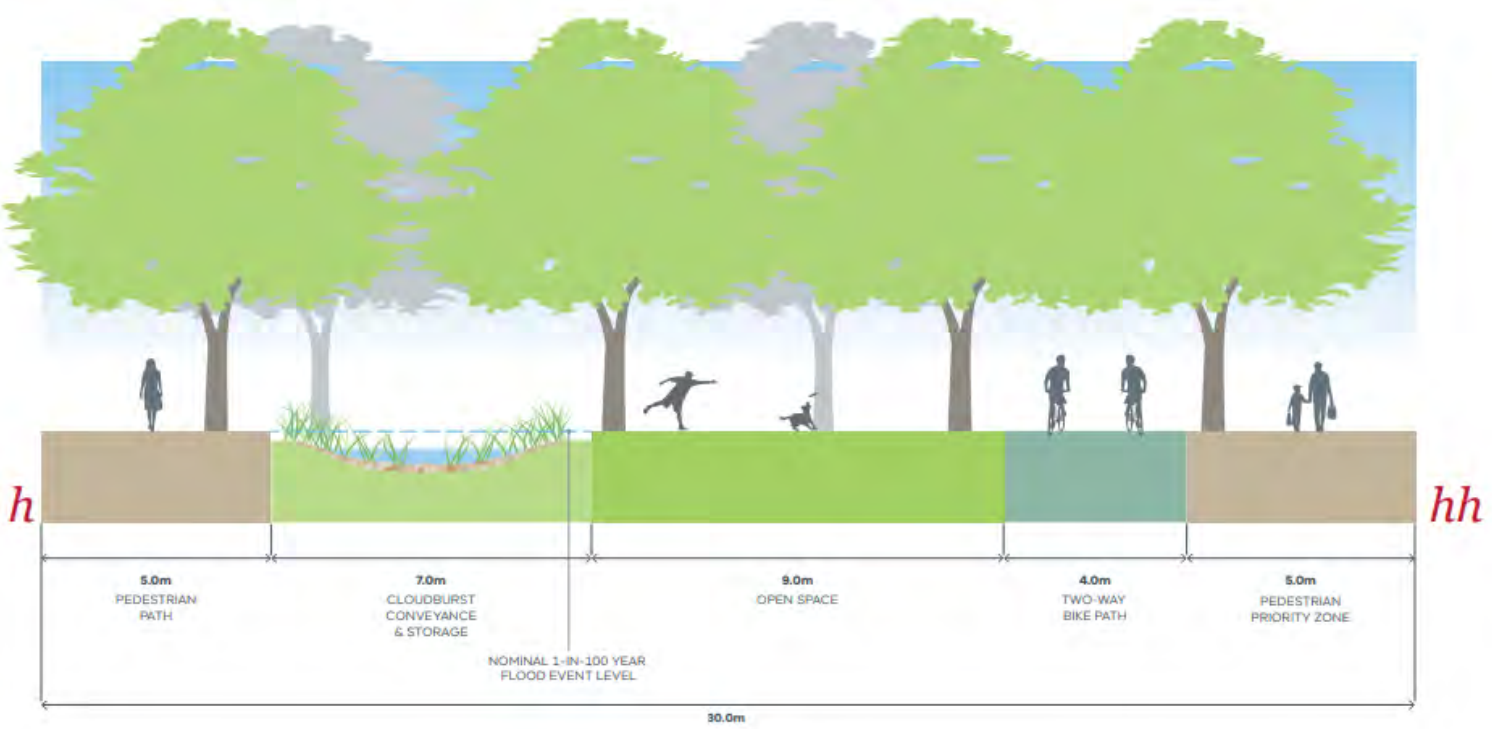


Notes:

- Bike paths to be designed at grade of foot paths and be clearly delineated using material and surface textural finishes.
- DDA compliant pedestrian paths to be designed to cross over cloudburst conveyance at appropriate intervals that align with other laneways or pedestrian connections.
- Vehicle lane to be designed with traffic calming devices including the use of textural surface changes (such as the use of granitic paving stones, etc) to achieve a target speed of 30km/h.
- Detailed design of street sections and plans will explore opportunities to integrate water sensitive urban design within road reserve and cloudburst elements, in particular to provide for urban forest irrigation and stormwater treatment.

Fogarty Street extension

ATTACHMENT 11 – Queensberry Street (west of Laurens Street)

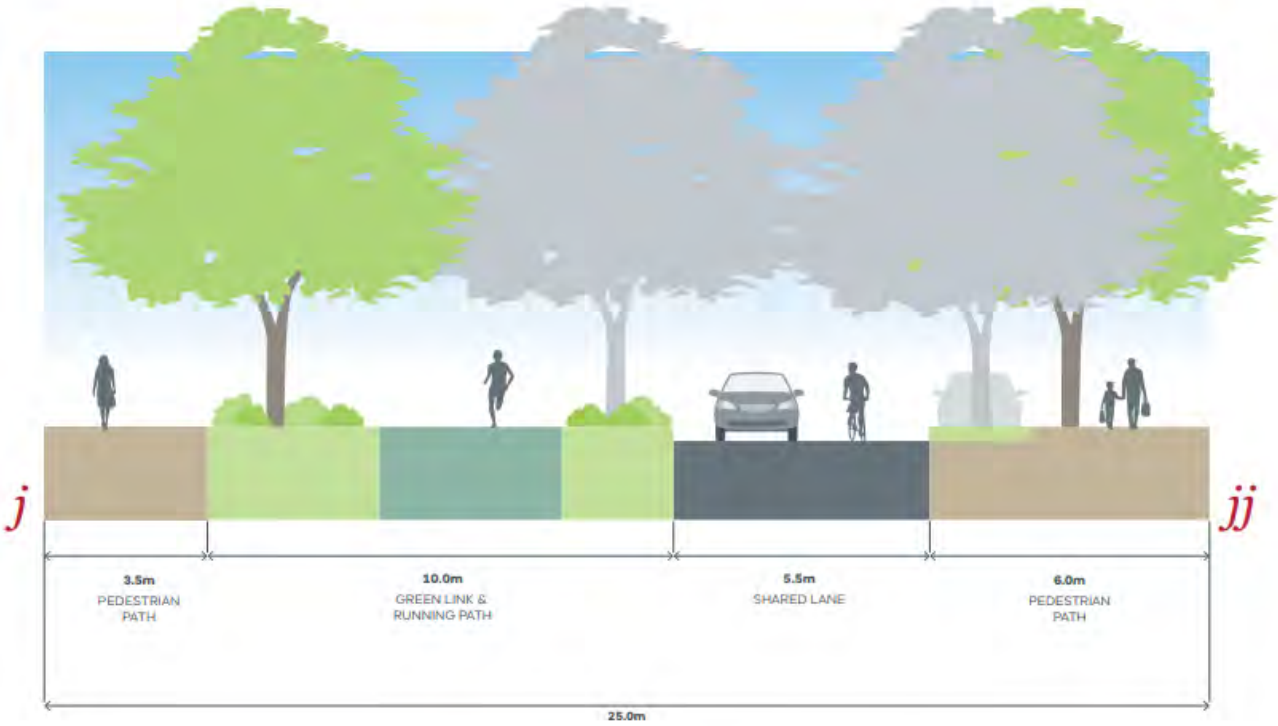


Notes:

- Bike paths to be designed at grade of foot paths and be clearly delineated using material and surface textural finishes.
- DDA compliant pedestrian paths to be designed to cross over cloudburst conveyance at appropriate intervals that align with other laneways or pedestrian connections.
- Pedestrian priority zones designed to accommodate service vehicle access and slower moving cyclists.
- Detailed design of street sections and plans will explore opportunities to integrate water sensitive urban design within road reserve and cloudburst elements, in particular to provide for urban forest irrigation and stormwater treatment.

Queensberry Street extension

ATTACHMENT 12 – Munster Terrace between Arden and Queensberry Street

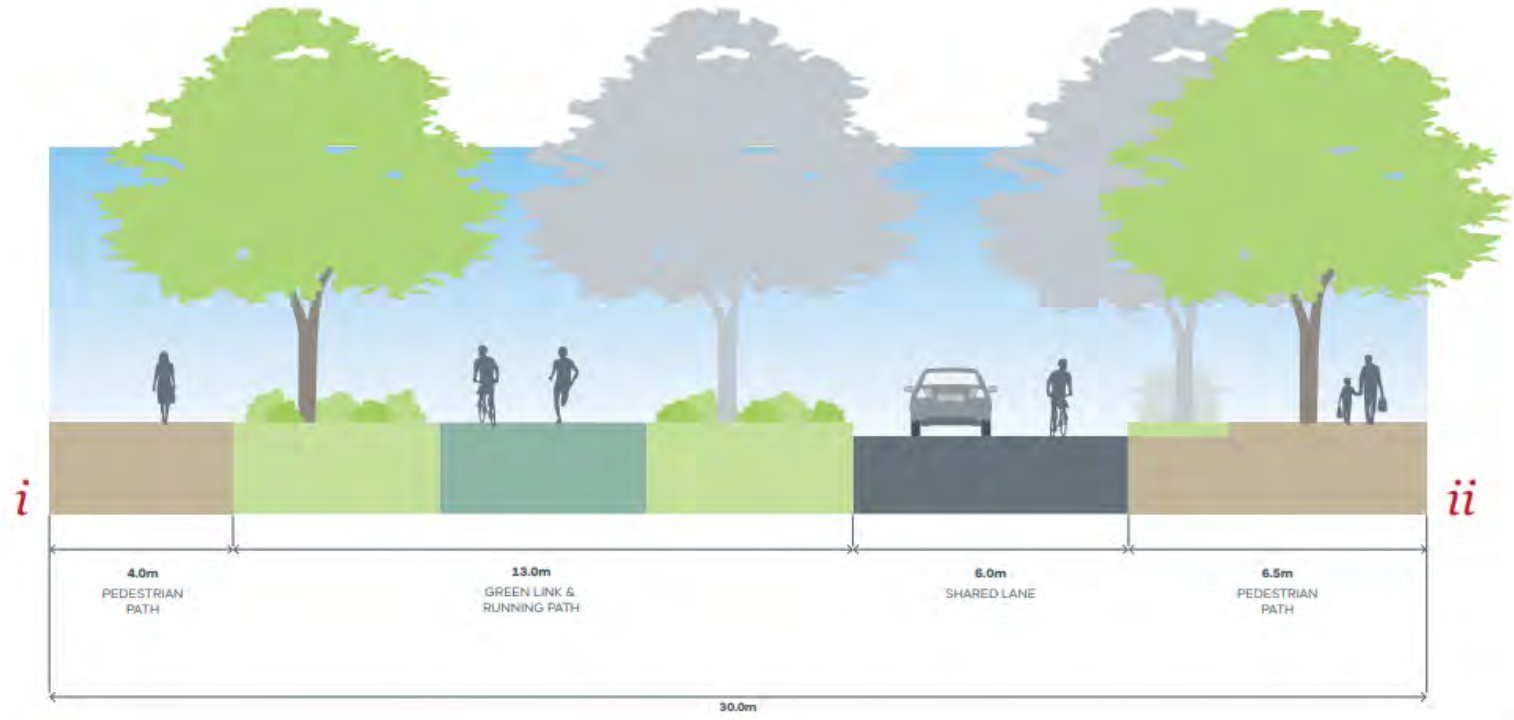


Notes:

- DDA compliant pedestrian paths to be designed to cross over cloudburst conveyance at appropriate intervals that align with other laneways or pedestrian connections.
- Vehicle lane to be designed with traffic calming devices including raised pedestrian crossings, traffic & pedestrian signals and the use of textural surface changes (such as the use of granitic paving stones, etc) to achieve a target speed of 30km/h generally.
- Detailed design to manage vehicle cross overs over green link to ensure pedestrian and cyclist safety on running path.
- Detailed design to appropriately manage parking / loading requirements within eastern tree line.
- Detailed design to facilitate safe cycling while allowing for local vehicle access.
- Detailed design to appropriately incorporate street level changes within green link.

Munster Terrace between Arden and Queensberry Streets

ATTACHMENT 13 – Munster Terrace between Victoria and Queensberry Streets

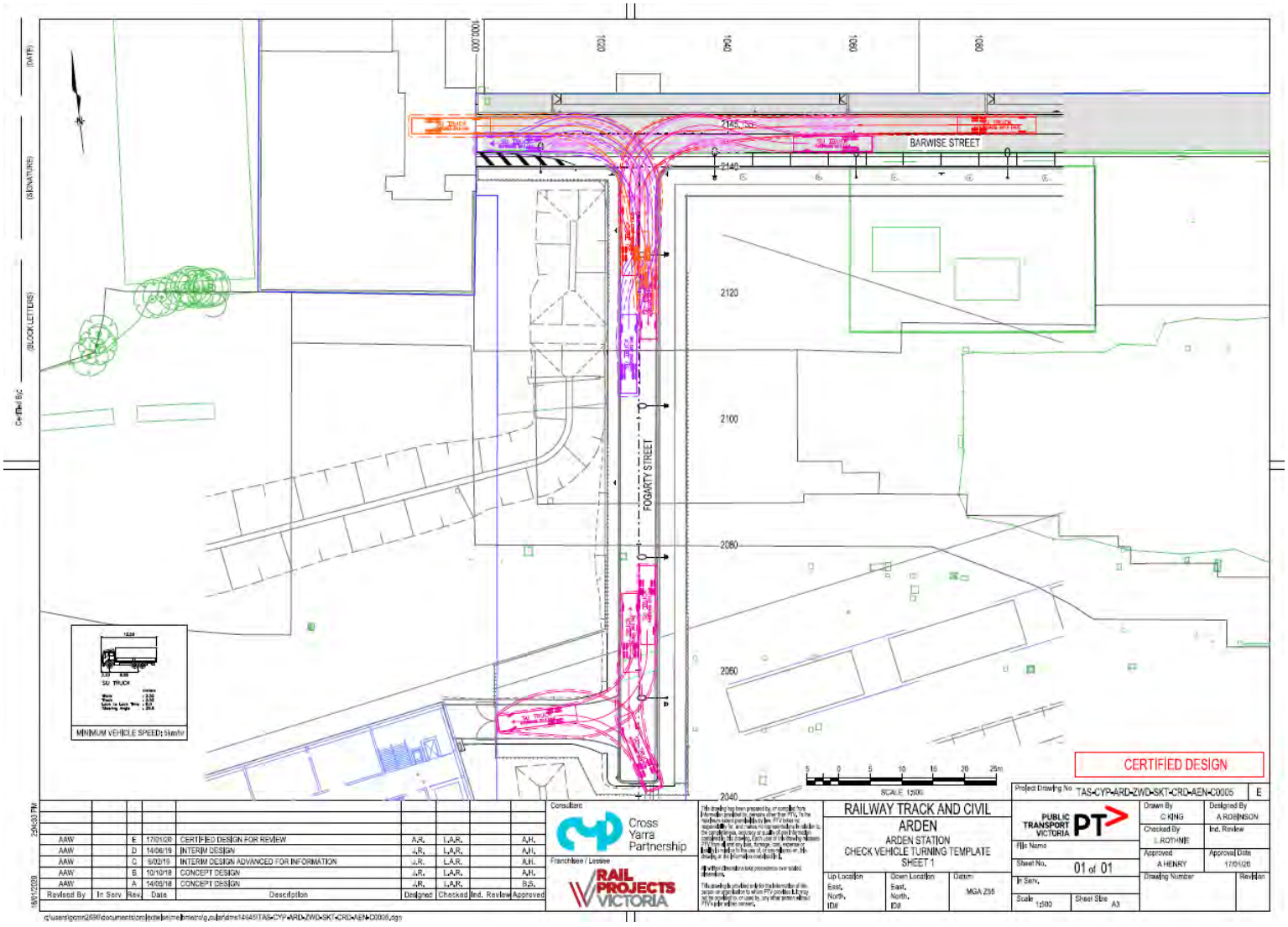


Notes:

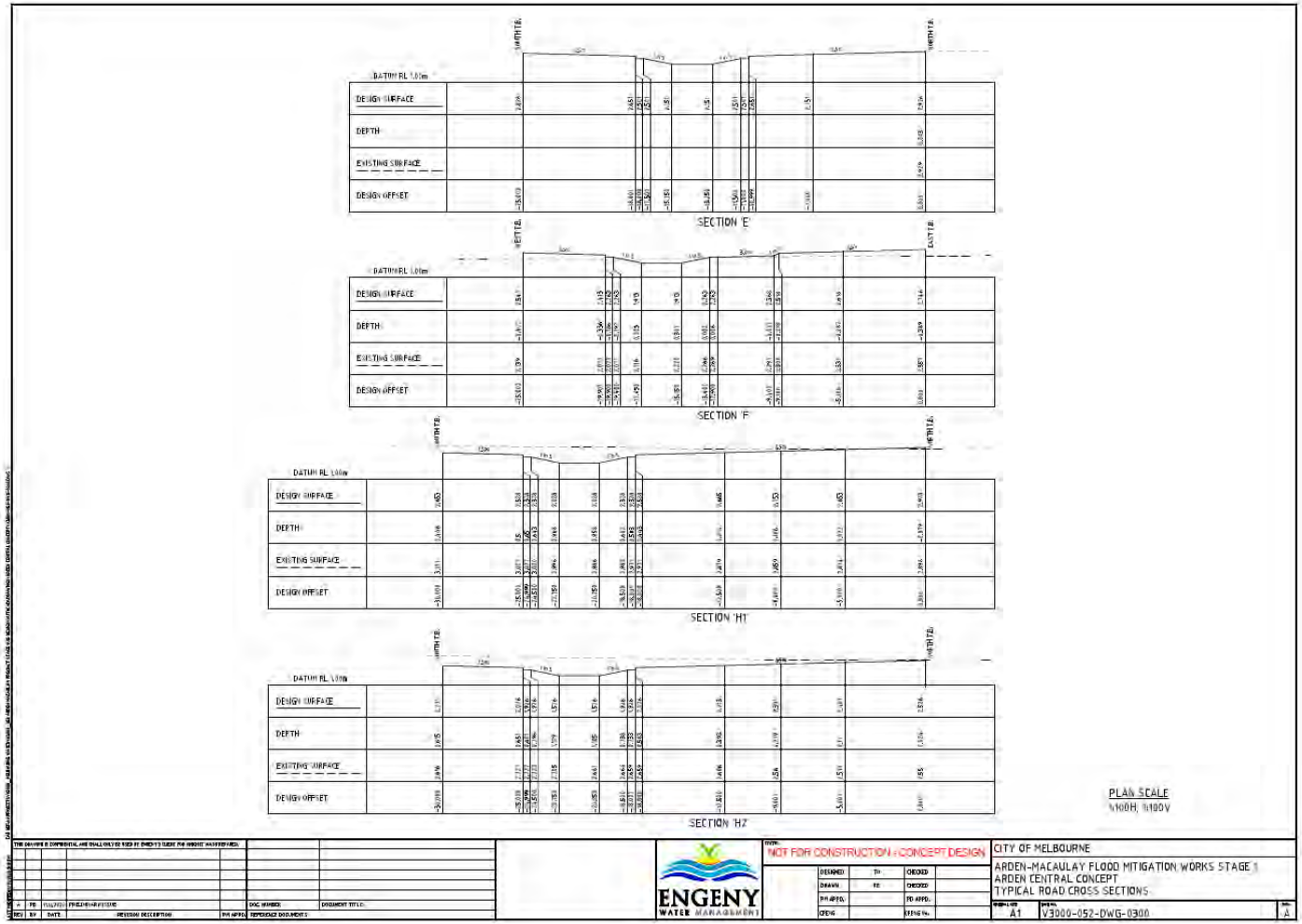
- DDA compliant pedestrian paths to be designed to cross over green link at appropriate intervals that align with other laneways or pedestrian connections.
- Vehicle lane to be designed with traffic calming devices including raised pedestrian crossings, traffic & pedestrian signals and the use of textural surface changes (such as the use of granitic paving stones, etc) to achieve a target speed of 30km/h generally.
- Detailed design to manage vehicle cross overs over green link to ensure pedestrian and cyclist safety on running path.
- Detailed design to appropriately manage parking / loading requirements within eastern tree line.
- Detailed design to facilitate safe cycling while allowing for local vehicle access.
- Detailed design to appropriately incorporate street level changes within green link.

Munster Terrace between Victoria and Queensberry Streets

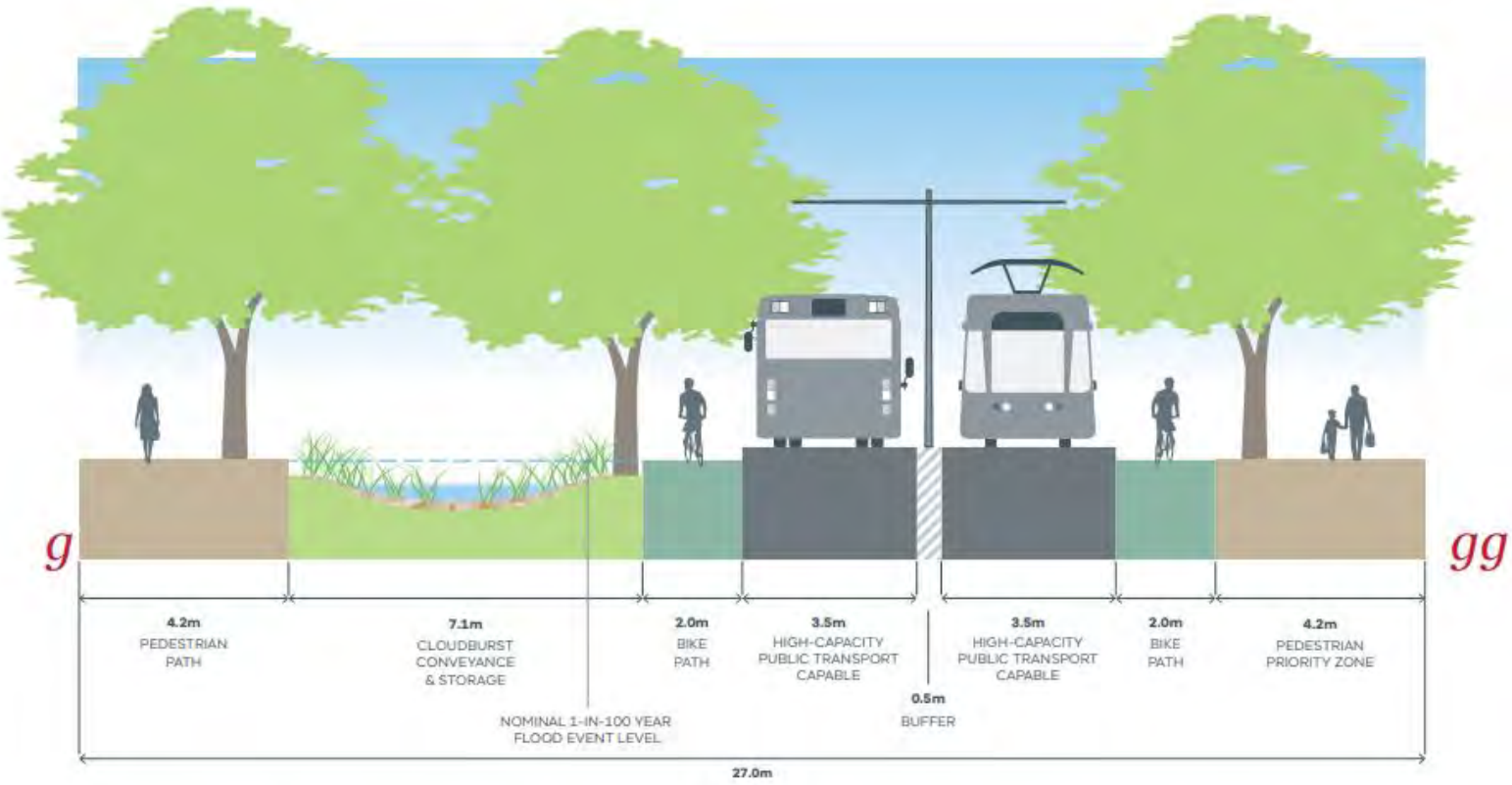
Attachment 14 – Vehicle Access Requirements – Fogarty Street



Attachment 15 – Example of storage cross section



Attachment 16 – Fogarty Street, Henderson Street and Boundary Road

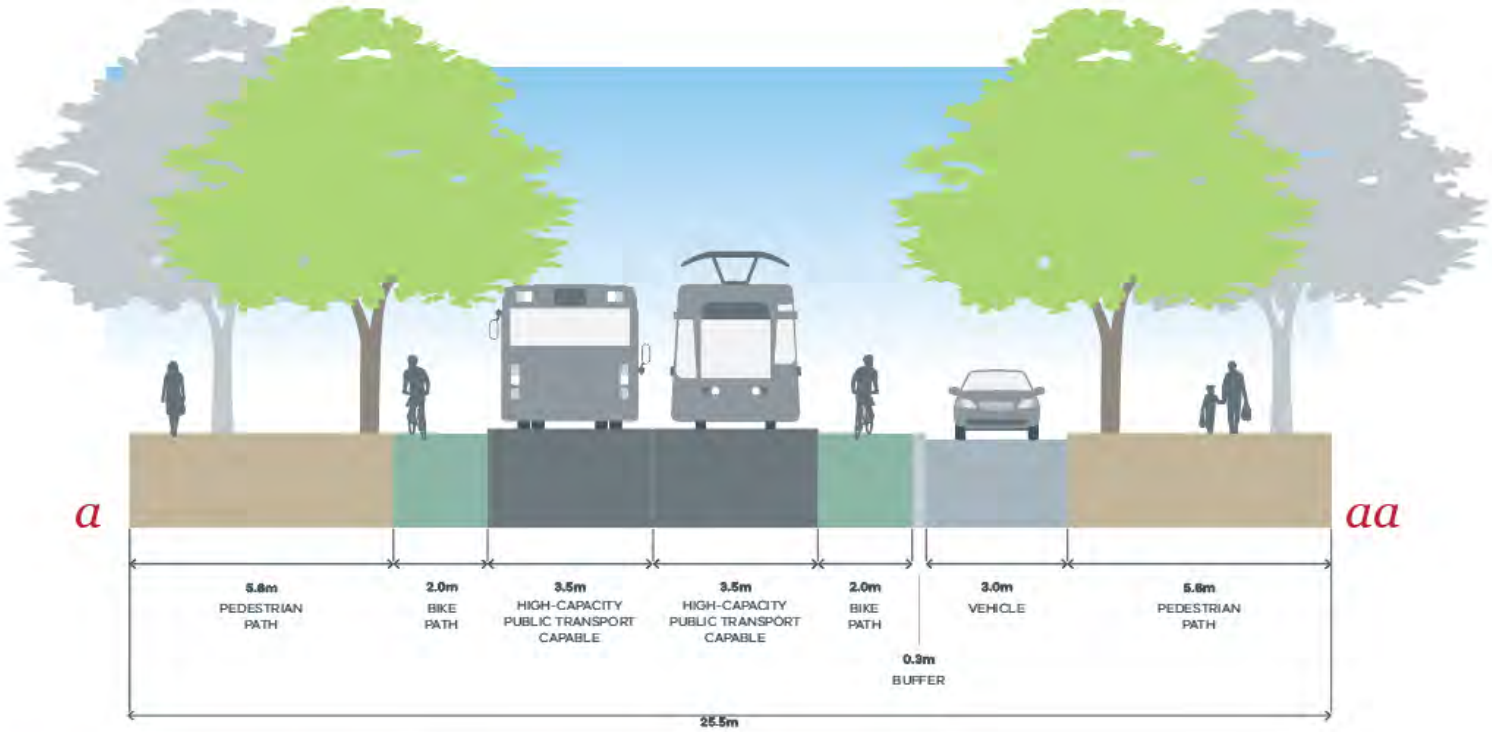


Notes:

- Bike paths to be designed at grade of foot paths and be clearly delineated using material and surface textural finishes.
- Bike path widths may be reduced at future modal interchanges to manage speed if required by detail design.
- DDA compliant pedestrian paths to be designed to cross over cloudburst conveyance at appropriate intervals that align with other laneways or pedestrian connections.
- High capacity public transport capable corridor to be grade separated from adjacent bike paths and designed to achieve a target speed of 30km/hr and 10 km/hr at modal interchanges.
- Pedestrian priority zones designed to accommodate service vehicle access and slower moving cyclists.
- Detailed design of street sections and plans will explore opportunities to integrate water sensitive urban design within road reserve and cloudburst elements, in particular to provide for urban forest irrigation and stormwater treatment.

Fogarty Street extension

Attachment 17 – Laurens Street between Miller Street and the new North Melbourne station

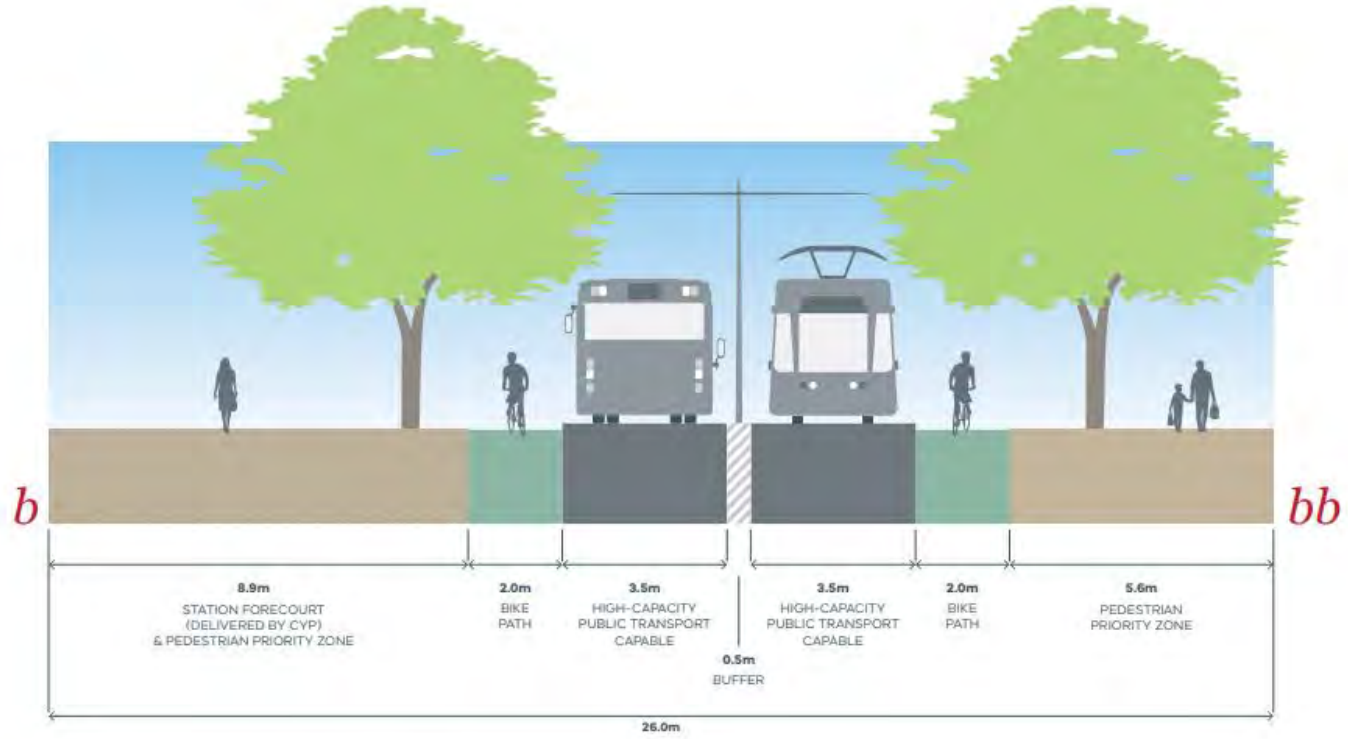


Notes:

- Future modal interchanges to be delivered as accessible, cycle-/drive-over stops subject to detail design.
- Bike path widths may be reduced at future modal interchanges to manage speed if required by detail design.
- Bike paths to be designed at grade of foot paths and be clearly delineated using material and surface textural finishes.
- Vehicle and public transport lane to be designed with traffic calming devices including raised pedestrian crossings and the use of textural surface changes (such as the use of granitic paving stones, etc) to achieve a target speed of 30km/h.

Laurens Street

Attachment 18 – Laurens Street between Arden Street and Queensberry Street



Notes:

- Future modal interchanges to be delivered as accessible, cycle-over stops.
- Bike path widths may be reduced at future modal interchanges to manage speed if required by detail design.
- Bike paths to be designed at grade of foot paths and be clearly delineated using material and surface textural finishes.
- Pedestrian path on eastern side of street to integrate with future station forecourt delivered by Cross Yarra Partnership.
- Pedestrian priority zones designed to accommodate service vehicle access
- A 10 km/hr speed limit should apply through this section and apply to bicycles, service vehicles and public transport to prioritise pedestrians and it should be designed accordingly (to achieve an outcome similar to the Bourke Street mall)

Laurens Street

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