



OCEAN REEF MARINA PUBLIC REALM MASTERPLAN SUPPORTING DOCUMENT

Prepared for



PUBLIC REALM MASTERPLAN SUPPORTING DOCUMENT | 1



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Image 1. Ocean Reef Boat Harbour (Cover)

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EXECUTIVE SUMMARY

Ocean Reef Marina is proposed to be a world-class tourism waterfront precinct accommodating residential, recreational, educational and business opportunities.

UDLA were awarded the landscape scope in 2018 and have been working collaboratively with the project team to develop a revised masterplan and associated Public Realm Approach. This report provides a summary of the works as follows:

- The refined concept plan process and outcomes;
- The process to develop the public realm masterplan; and,
- The Public Realm Masterplan and associated details, such as planting and material palettes, sustainability initiatives, pedestrian and vehicle movement etc.

As the project progresses over the next ten years it is intended that this Public Realm Masterplan will be a guiding document throughout the delivery of all packages of works.

Refined Concept Plan

The current concept plan was developed by planners Taylor Burrell Barnett (TBB) in collaboration with the full consultant and stakeholder team. The process involved three workshops with the intent of developing a concept that is economically viable and achieves the broader project vision and objectives (developed by TBB), being as follows:

1. An iconic waterfront precinct providing a range of

recreational, tourism, residential, boating facilities and employment opportunities;

2. Creation of a vibrant waterfront commercial precinct and public open space that will provide recreational amenity and become a tourist attraction;
3. Creation of sustainable employment opportunities for local residents in food and beverage, retail, service commercial, tourism and marine related industries;
4. Provision of increased housing density and diversity, within a high quality residential development;
5. Provision of future capacity of boat pens and boat-stacking in the Perth metropolitan area; and
6. Delivery of an economically viable marina development within the State Government's approved budget.

The collaborative workshop process led to the development of the 'Preferred' plan. Through ongoing consultation with Department of Transport and existing/future boating organisations, amendments have been made to the marine services area. This 'Revised Preferred' Concept plan forms the basis for current works, but will most likely be updated as the plan continues to be developed in consultation with relevant stakeholders.

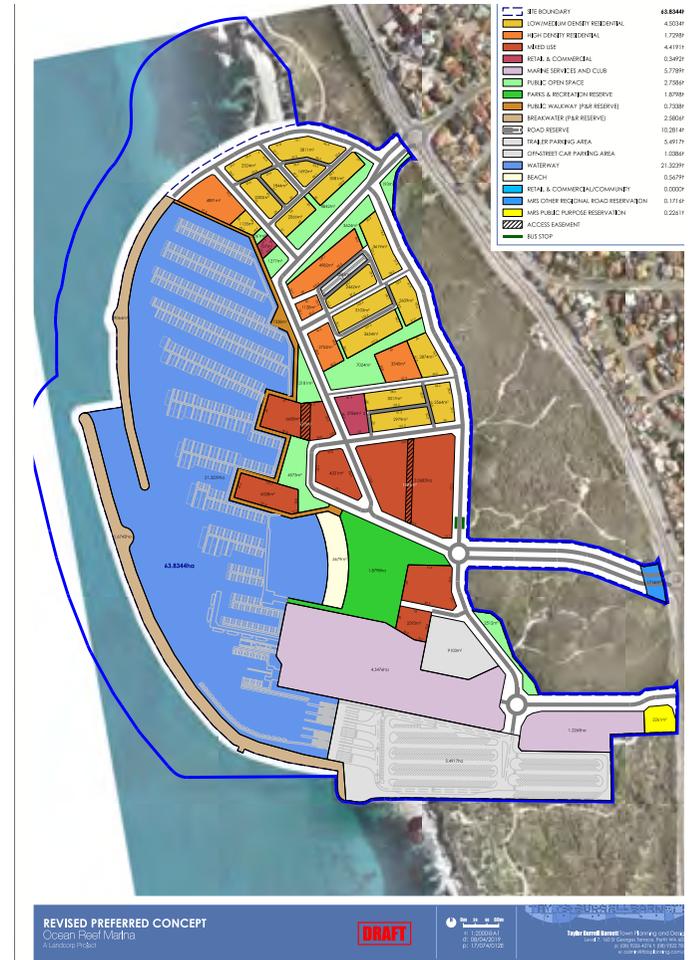


Figure 1. Revised Preferred Concept Plan (Plan by TBB)

Participatory Design Process

The community engagement phase of the design was undertaken utilising a participatory design approach, meaning the Masterplan was developed within a loop of feedback with the community.

This process involved three main phases of engagement, as follows:

- Community and stakeholder open days;
- A Community Reference Group workshop process; and,
- A school engagement process.

The outcomes of these engagement processes significantly impacted the design direction of the Public Realm Masterplan, as follows;

- In guiding key community wants, needs and concerns and providing opportunity to respond to these both through information sharing and/or design approaches,
- Creating a strong vision and objectives for the landscape development, and
- Developing relationships with a broad group of community members who will continue to assist as community conduits throughout the project.

Four over-arching objectives emerged from this process, as shown in Figure 2.

It is noted that an Aboriginal engagement process has not yet been undertaken, and it is intended that this process will be under taken as soon as possible.

Public Realm Vision

The Ocean Reef Marina public realm will provide inclusive, all seasons, coastal amenity for locals and visitors.

The public realm will provide continuity to this world class development through an authentic relationship to the surrounding environment and its own unique character.



Figure 2. Design Objectives and Vision Developed in the Participatory Design Process

Public Realm Masterplan

The Masterplan reflects the outcomes of the ongoing planning and participatory design process's and has been strongly guided by the Public Realm Vision and Objectives. The Masterplan will guide the ongoing development of the public realm and has provided detailed information on areas including:

- Public Open Space;
- Streetscape Treatments;
- Water Movement and Treatment;
- Movement Networks;
- Bush Forever Development and Treatment;
- Plant and Tree Species;
- Water Sensitive Urban Design Approaches;
- Sustainable Design Approaches;
- Heritage and Interpretation Opportunities;
- Activation and Events; and,
- Materials and Infrastructure.

The delivery of the project is expected to be staged, with landscape construction works expected to begin 2021-22. It is intended that this Public Realm Masterplan will be a guiding document throughout the continuing design and delivery of the landscape works.

Refer Appendix A for detailed Masterplan.



Public Realm Masterplan (Not to Scale)

1.0 INTRODUCTION



1.0 PROJECT SITE INTRODUCTION

Ocean Reef Marina is proposed to be a world-class tourism waterfront precinct accommodating residential, recreational, educational and business opportunities. The project is state government funded and is being delivered by Development WA in partnership with the City of Joondalup and Department of Transport.

The development will deliver a range of benefits including:

- Addressing a shortage of boat pens and boat-stacking in the Perth metropolitan area;
- Providing increased housing density and diversity, at a high amenity node;
- Creating a vibrant waterfront commercial precinct and public open space that will provide recreational amenity and become a tourist attraction; and
- Creating sustainable employment opportunities for local residents in food and beverage, retail, service commercial, tourism and marine related industries.

The project has been in planning for a number of decades. Previously led by the City of Joondalup a draft concept plan was developed with input from the community, known as plan 7.2A. In 2016 Development WA was selected as lead proponent and a process was undertaken to review plan 7.2A and progress the project through to construction.

UDLA were awarded the landscape scope in 2018 and have been working collaboratively with the project team to develop a revised Masterplan and associated Public Realm Approach. This report provides a summary of the works associated with this process.



Image 2. Ocean Reef Boat Harbour Aerial

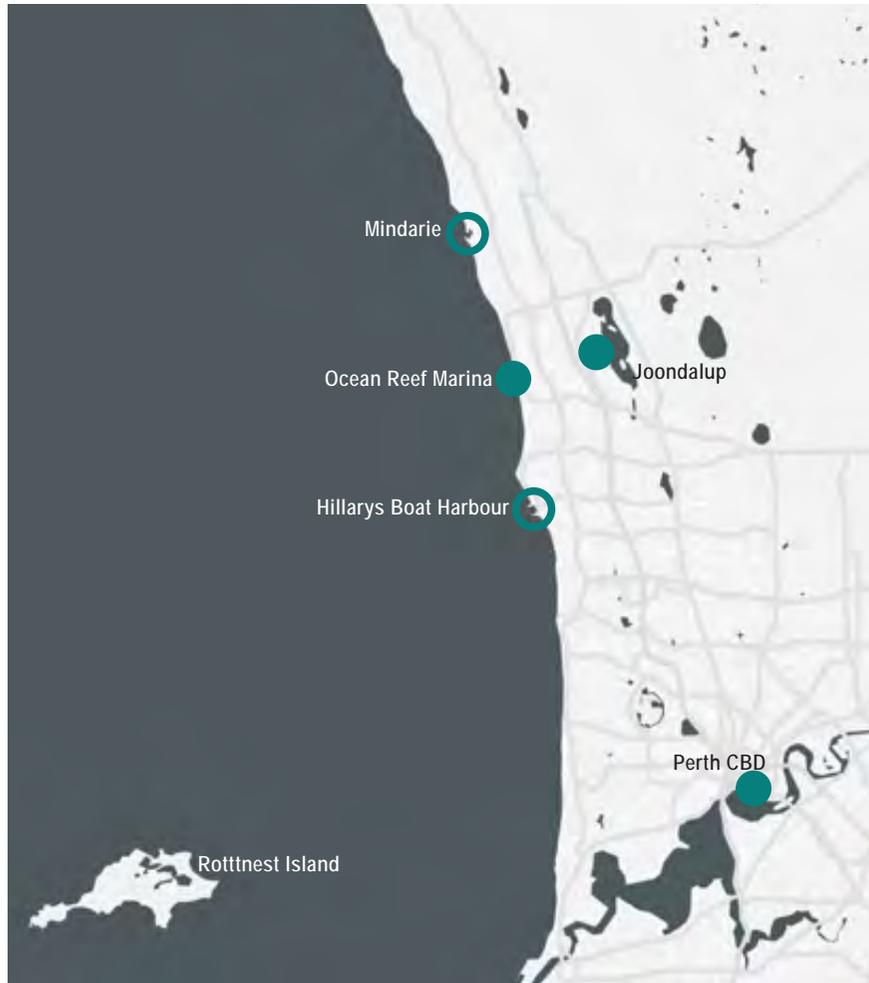


Figure 3. Location Plan

Site

Ocean Reef Marina is proposed at the current Ocean Reef Boat Harbour, located 29 kilometres north of Perth CBD and approximately 6 kilometres south-west of the Joondalup City Centre.

The project area contains the existing Ocean Reef boat ramp and marine facilities, which is approximately midway between Hillarys Boat Harbour (approximately 9 kilometres to the south) and Mindarie Marina (approximately 10 kilometres to the north). This coastal area is adjacent to developed residential areas of Ocean Reef and approximately 2.5 kilometres south of Iluka and 4 kilometres south of Burns Beach.

Primary access to the harbour is via Ocean Reef Road. Regional road access to Ocean Reef Road is via Marmion Avenue and the Mitchell Freeway via Hodges Drive. A system of dual use paths provides pedestrian and cyclist access.



Figure 4. Ocean Reef Marina Site Analysis

Site Conditions

The existing Ocean Reef Boat Harbour site is home to the Whitford's Volunteer Sea Rescue Group and Ocean Reef Sea Sports Club, both co-located to the north of the existing marina site. The marine infrastructure includes boat ramps, parking, wash down facilities, beach, picnic seating and a toilet block. A popular Shared Use Path runs north/south through the site. The vegetated dunes are part of Bush Forever site and are made up of a three vegetation complexes including Northern Spearwood shrublands and woodlands, Coastal shrublands on shallow sands, southern Swan Coastal Plain and Acacia shrublands on taller dunes, southern Swan Coastal Plain. Vegetation on site is largely considered to be in good to very good condition. On inspection of historical aerial maps, rehabilitation works to degraded areas appear to have occurred on site over recent years.

Marina Timeline

1970s - The idea of a marina at Ocean Reef was first 'floated'.

2004 - \$700,000 commitment from State Government.

2008 - Start of preliminary studies including engineering, environmental, financial feasibility, land assembly, and surveying.

Concept Plan development.

2009 - City of Joondalup survey on Concept 7.

2014 - Request to amend the Metropolitan Region Scheme (MRS) boundary submitted to the WA Planning Commission.

Environmental Protection Authority decided to assess the marine-based components via a Public Environmental Review (PER).

2016 - State Government endorses Development WA as lead delivery agency.

PER and MRS amendment report released for public consultation.

2017 - State Government formally supports and allocates \$120million to the project.

2018 - Memorandum of Understanding signed between the State Government and City of Joondalup.

Concept Plan review and refinement complete.

Project History

Ocean Reef Marina has been in development for over forty years in response to the need for a marina to address future capacity concerns in the northern corridor of Perth. State Government agencies and the City of Joondalup first acquired portions of the site for recreational and commercial development in 1979. As boat ownership increases the demand for Ocean Reef Marina has also increased and in 2017 the State Government officially committed funding to the project.

Beyond the marine infrastructure requirements the development will address economic and recreational amenity to the broader Joondalup community. Community engagement undertaken by the City in 2009 showed significant community support for the project.

Figure 5. Ocean Reef Marina Timeline



Figure 6. Ocean Reef Marina Opportunity and Constraints

Opportunity and Constraints Summary

Like every project the Ocean Reef Marina project has a number of Opportunities and Constraints.

A summary of the identified landscape/public realm related constraints include but are not limited to:

- The ability to maintain community expectation through the development of the public realm;
- Maintain a 'Sense of Place' so that the development feels of place in Ocean Reef;
- Create a public realm that is world class and encourages tourism;
- Develop an approach that is in line with statutory expectations and requirements;
- Manage the wants and needs of the surrounding residential population;
- Manage traffic through the development, including all vehicles, bikes and pedestrians;
- Ensure the needs of the site as a working marina is achieved whilst providing a high quality visitor experience;
- Provision of public realm that supports the needs of the clubs, groups and organisations that will utilise the site;
- Design of public realm to support important and unique coastal processes both in the marine environment and the Bush Forever site;
- Limitations on access to the site via Bush Forever; and
- Designing usable 24hour/all seasons spaces in a front line coastal environment.
- Creation of public realm experience that is comfortable within the challenges of the harsh WA coastal environment i.e. wind and sun.

Adopted Concept Plan

Concept 7.2A was previously adopted by the City of Joondalup for the proposed development. This plan identifies the opportunity for a mixed use marina including facilities; service commercial and marine industrial uses in the north; a central retail spread north - south along waterfront interface, tourist and residential precinct; and a southern trailer boating precinct inclusive of ramps, coastal amenities and parking.

The project approach has, to date, been on the premise that the site development will include a residential component. Along with the right mix of retail/commercial development will ensure the projects financial viability and ongoing economic sustainability.

Concept 7.2A included two large public open spaces/ parklands, namely the beach to the south and the amphitheatre community park to the north. The proposal also included a significant park to the northern 'seasonal' beach (due to coastal processes sand is not always at this beach). The plan also included a list of community requested infrastructure, such as fauna underpass, active play area, grassed terraces and an beach pool listed as a potential amenity etc.



Figure 7. Ocean Reef Marina Concept Plan 7.2A (Source: TBB)

1.1 KEY PROJECT CONSIDERATIONS



Image 3. Ocean Reef Boat Harbour Existing Dunes

Environmental Considerations

Approvals

The marina component of the development has been assessed by the Environmental Protection Authority (EPA) at the highest possible level (Public Environmental Review). Substantial studies have been undertaken to understand potential impacts on the environment and provide strong confidence the development can be implemented in an environmentally acceptable manner.

The environmental assessment has taken place and the EPA report and recommendations was released for comment. The comment period has closed and a final outcome is imminent.

There are a number of matters related to the project that require a whole of government approach, including encroachment into Marmion Marine Park and impacts to commercial and recreational fishing. Development WA is continuing to work closely with relevant agencies and stakeholders to find acceptable solutions.

Engineering Considerations

Site Levels

There is a grade change across the site, which will require that certain areas of the site will need retaining walls. Whilst there is a current example of this in the existing car park the development aims to ensure that wall heights in the new works are minimal. This ensures that all edges are activated with building or vegetation as opposed to having blank walls.

Water Management

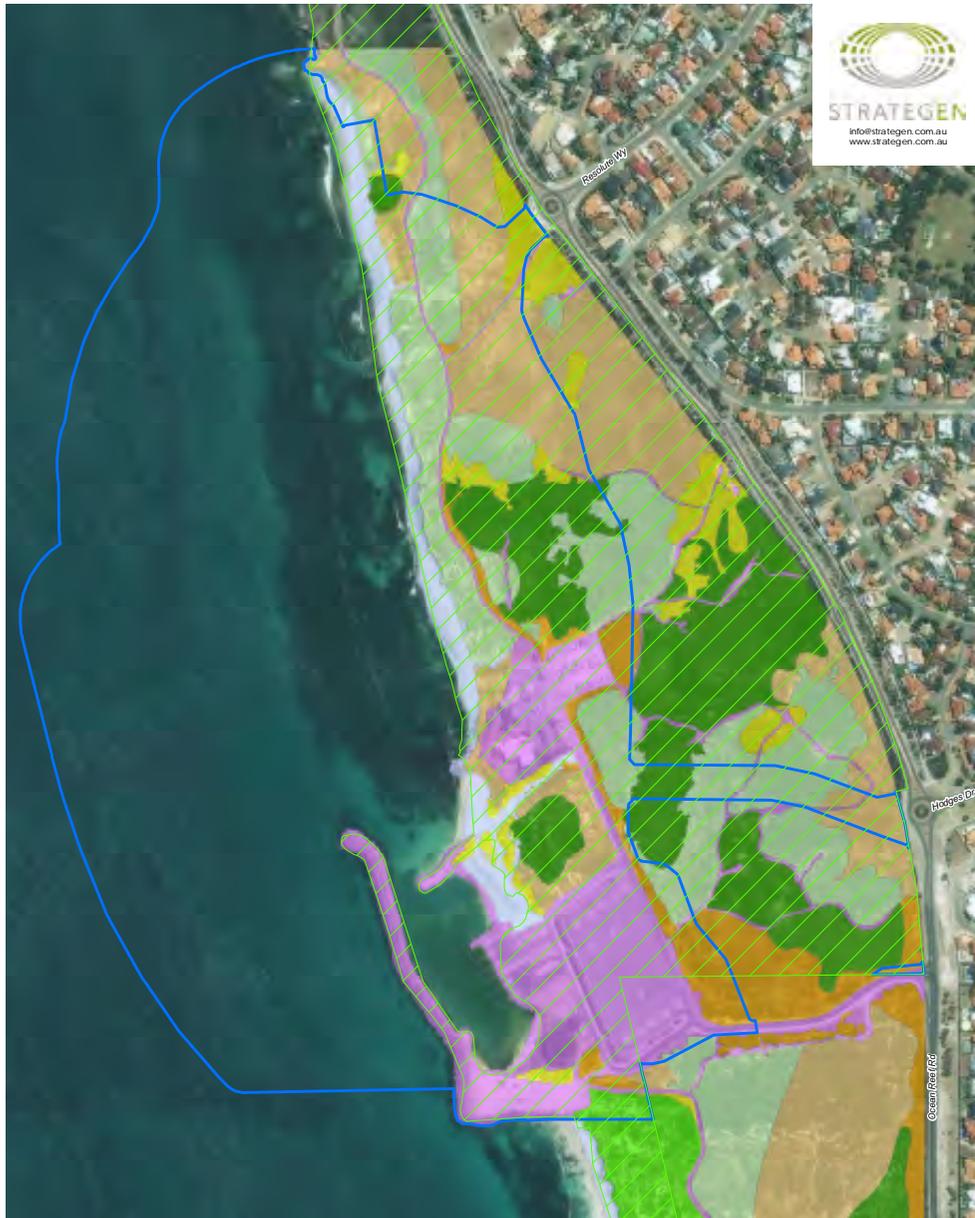
Water run off will be captured on site and treated, ensuring pollutants and nutrients in the water are stripped prior to returning to groundwater utilising Water Sensitive Urban Design (WSUD). This will be done with basins that are vegetated with nutrient stripping plants and designed to avoid mosquito breeding or stagnation of water, whilst maintaining a high aesthetic outcome. The inclusion of rocks, trees, crossing points, information signage and art will provide an opportunity to tell the 'story' of and celebrate water movement across site.

Location and sizing of WSUD basins are dependent on ongoing site design. Detailed design during the project will locate these basins in a way that improves the communities experience of the public realm.

Further exploration of water harvesting and storing opportunities are to be undertaken early in the design process in order to mitigate irrigation allocation issues.

Traffic

A pertinent consideration for the public realm is how traffic will move around the site, and in doing so facilitate or hamper pedestrian movement and enjoyment. It is important to consider public parking and car movement, however equally important is pedestrian and bike movement, and the impacts of parking and vehicle movement on use and enjoyment of public realm. For example the design will need to have parking available for boat users to the north of the site with users of these car bays transferring equipment and personal items from their car to boat, directly across pedestrian north-south movement corridors. The design should minimise the impact of these multiple uses and as such it will be important to consider how each of these areas of potential conflict will function.



Scale 1:4,655 at A3
 0 50 100 150 m
 Coordinate System: GDA 1994 MGA Zone 50
 Note that positional errors may occur in some areas
 Date: 29/01/2015
 Author: JCrute
 Source: Aerial image: ESRI online 2010.
 Vegetation: Mattiske 2013. Bush Forever: DoP 2012.

Legend

Bush Forever site 325	Vegetation condition	D-G
MRS boundary	EX	D
	VG-EX	CL
	VG	BSL
	G	

Bush Forever

Bush Forever identifies 51,200 ha of regionally significant bushland (and wetlands) on the Swan Coastal Plain within the Perth Metropolitan Region for protection and management. The sites are selected based on criteria relating to the nature and condition of existing native vegetation and its value in maintaining ecological linkages.

The Ocean Reef Marina Site falls within Bush Forever site 325 (BF 325) which spans between Burns Beach and Hillarys and covers approximately 195.3 ha.

Whilst Bush Forever sites are generally protected from clearing, the Ocean Reef Marina Site has previously been recognised as a 'Possible Future Strategic Regional Recreation and Tourism Node' by State Government within the BF 325. The total size of the land component of the Ocean Reef Marina is 28.16 ha. 26.26 ha is within BF 325 and of this 16.79 ha comprises remnant vegetation, with the remainder being already cleared or mapped as bare sand or limestone.

Figure 8. Bush Forever Vegetation Quality (Sourced from Strategen Flora Report)



Flora

A number of flora and vegetation surveys have been undertaken over the Ocean Reef Marina Site area, the most recent of which was a detailed survey in 2013. Vegetation condition across the Ocean Reef Marina Site area ranges in condition from cleared to excellent. The Ocean Reef Marina site avoids the majority of vegetation is assessed as being in excellent condition.

No Threatened flora species have been identified within the Ocean Reef Marina Site site during surveys. Two state listed Priority flora species have been identified: *Grevillea* sp. Ocean Reef (Priority 1) and *Conostylis bracteata* (Priority 3). The proposed development will not alter the conservation status of these species.

Fauna

A Level 1 fauna assessment was undertaken by Western Wildlife in 2008, including a desktop assessment and site survey. Based on available habitat, four conservation significant species were considered likely to occur in the Proposal area: Carnaby's Black-Cockatoo, Rainbow Bee-eater, Black-Striped Snake and Quenda.

The Proposal area does not contain any trees suitable for Carnaby's Black-Cockatoo nesting hollows. However, it does contain a number of flora species that may be used as food sources, primarily *Banksia sessilis*. Accordingly, it is expected that Carnaby's Black-Cockatoo will not reside in the marina area but may visit the site to feed.

The Rainbow Bee-eater (*Merops ornatus*) is a common

summer visitor to Perth, where it breeds in sandy banks (*Western Wildlife 2008*). This species will forage and breed in relatively degraded areas and is likely to be a breeding visitor to the marina area.

The Black-striped Snake is a Priority 3 listed species restricted to coastal plains between Mandurah and Lancelin and as such is vulnerable to habitat loss, primarily resulting from urban development (*Western Wildlife 2008*). The Black-striped Snake is known to occur in Banksia and Eucalyptus woodlands. The species has the potential to occur in the marina area as suitable habitat exists.

The Quenda is known to occur in areas with dense understorey and is often particularly common in dense wetland vegetation (*Western Wildlife 2008*). The Quenda has been recorded nearby as identified in Parks and Wildlife Threatened and Priority Fauna database (*Western Wildlife 2008*). Characteristic diggings of the species were not observed in the marina area, however Quenda may occur.

Minimising Impact

Bush Forever Site 325 represents a linkage between adjacent bushland to the east and is recognised as part of a regionally significant fragmented bushland/wetland linkage. Impacts to BF 325 will be minimised as far as practicable through the following management techniques:

1. Retention of a north-south linkage of remnant vegetation between Ocean Reef Rd and the marina area (with the exception of entry roads).
2. The marina boundary was designed to avoid areas of

Excellent vegetation to the north-east of the existing Boat Harbour (Figure 2).

3. The marina area was decreased from early proposed designs to minimise vegetation clearing and the marina boundary was moved slightly west near the entrance from Hodges Drive.
4. A Construction Environment Management Plan will be prepared to support subdivision and will include vegetation clearing protocols which ensure that there are no indirect impacts to adjacent vegetation outside the Proposal boundary.
5. Fencing and formalised access tracks through BF 325 (using existing cleared areas) to prevent unauthorised access to retained vegetation.
6. Interpretive signage will also be incorporated to inform the community of the environmental and heritage values of the area.

Land Offset

Development WA is required to offset the loss of vegetation within BF 325 as part of the planning approvals for the development through a Negotiated Planning Outcome (NPO).

The NPO is designed to provide an appropriate conservation outcome through a combination of acquisition of land (with similar values) and rehabilitation within BF 325 over a total minimum offset area of 25.2ha. The NPO was released for public comment along with the Metropolitan Regional Scheme amendment report.



Image 4. Ocean Reef Boat Harbour

Water and Coastal Processes

The proposed public swimming beach will be a popular facility for the community and as such the project team has undertaken all design modelling for the site to ensure the water quality is clean and safe.

The construction of the Marina will result in the loss of two surf breaks in the region. These breaks are known as Mossies and Big Rock. The Loss of Pylons surf break is also likely. Development WA is currently engaging with members of the local surfing community to understand the impact of the removal of these breaks. Investigations are currently being undertaken by the project's coastal engineer to determine the possibility of developing a wedge wave from the breakwater.

Ocean Reef has been chosen as the site for an offshore artificial reef to benefit the fishing, diving and boating community. This was announced by the state government in December 2018, a media statement is available via the Development WA website.

The beach to the north of the development will be transient, meaning that sometimes sand will be there and other times it will be rock. Whilst this is reflective of current coastal processes it is important to consider how this may impact public use of this site.

Whilst these coastal processes, and their design, are somewhat out of the scope of the 'public realm' it is important for the landscape to consider how each of these outcomes impacts the experience of visitors to Ocean Reef Marina and subsequently how the public realm can improve these experiences.

Heritage and Social Values

The following are social values recognised in the 10 year audit of Marmion Marine Park of which the Ocean Reef Marina site is located within, published in *Public Environmental Review - Section 11 - Other Factors*. It should be noted that Aboriginal engagement and community engagement will be undertaken throughout the design process.

Seascapes

Qualities: Panoramic vistas of azure waters, offshore islands, reefs and beaches are major aesthetic attractions of the marine park.

Aboriginal Heritage

Qualities: The area has significant Aboriginal heritage value, including oral recall of fish trap usage, possibly at Mettams Pool.

Marine Heritage

Qualities: The marine park has a significant maritime heritage and at least one historic shipwreck (the Centaur, wrecked 1874) is located in the marine park.

Marine Nature-based tourism

Qualities: The marine park offers a wide range of attractions and opportunities for visitors to the area, which support a marine nature-based tourism industry.

Commercial Fishing

Qualities: The marine park is important for commercial fishers targeting rock lobster, abalone, and a variety of fish species through beach seine netting.

Recreational Fishing

Qualities: Line fishing, netting and spear fishing methods target a variety of pelagic and reef fin fish species, crabs, rock lobster and other invertebrates.

Recreational Water Sports

Qualities: The location, scenery, wildlife and marine environment makes the marine park a popular location for a range of activities including boating, diving and surface water sports.

Coastal and Island Use

Qualities: The coastline (including beaches, dunes and rocky shorelines) in and adjacent to the marine park provides for a range of recreational uses.

Scientific Research

Qualities: The diversity of the flora and fauna, combined with the range of human activities which occur in the marine park, provide opportunities for ecological and social research.

Education

Qualities: The unique array of ecological and social values in the marine park combines with the ease of access and the close proximity of the marine park to the Perth metropolitan area provides opportunities for community education about the marine environment.



Image 5. Anzac Memorial, Ocean Reef Sea Sports Club
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Sustainability Considerations

Development WA has committed to developing Ocean Reef Marina in a sustainable 'best-practice' manner. To ensure that the project team is held to account for this the team will be utilising the Infrastructure Sustainability Council of Australia (ISCA) rating scheme. The Infrastructure Sustainability (IS) Rating scheme facilitates the ratings of infrastructure projects and assets. The IS Rating scheme is Australia and New Zealand's only comprehensive rating system for evaluating sustainability across design, construction and operation of infrastructure.

There are a number of considerations that ISCA take into account when providing a rating. These include; categories and criteria for Governance, Economic, Environment, Social and Innovation. The project team have identified a number of ideas for investigation to ensure that Ocean Reef Marina is an example of world leading sustainable design practise including:

1. A Water Wise Development: achieving best practice performance across total water cycle in the urban and marine environment. Including consideration of Water Sensitive Urban Design (WSUD), water balance, precinct as a water supply catchment for landscape irrigation), Marina water quality management, green infrastructure such biofilters, green roofs and walls and smart metering;
2. An Energy Efficient Community: Low carbon integrated energy system /micro-grid; achieving high penetration

of renewable energy for precinct demand and low carbon/high performance buildings;

3. A Smart Waste Precinct: Waste minimisation and recycling options for all waste streams (boating, commercial and residential);
4. A Development that Supports A Sustainable Marine Environment: Artificial Reef; How this may be integrated into the marina development;
5. Future Proofed Transport: Including consideration of EV charging /Hydrogen/ autonomous vehicle, EV shuttle bus, CAT Bus from Joondalup City Centre, Coast bus from Hillarys Marina;
6. A Community Led Development: website/ platform such for Community events and information. Sprout community café/social enterprise for early activation;
7. Celebrating the coastal maritime and indigenous cultural history: 'Ship Wreck Coast', Indigenous cultural history interpretation through signage and artworks throughout pedestrian dual use walkways, lookouts etc.; and
8. Smart Precinct/ Smart Marina: Smart Technology, Internet of Things (IoT) connectivity, for ORM data and communications (e.g. live weather, parking info, bus and ferry boat arrivals/departures), lighting, environmental sensing, monitoring and data analytics.

These are all highly aspirational approaches and additional work will test the feasibility, costs and practicality of many of these outcomes.



Image 6. Ocean Reef Marina Beach View Perspective Render (Sourced: City of Joondalup Website)

Moving Forward

The time spent in planning phases of this project to date have produced a significant amount of information and recommendations for the project. Now that funding has been allocated to the project and it moves into design and construction phases it is important to ensure that all relevant elements of previous works are considered. However it is equally important to ensure that the project is progressing in a manner that ensures it will be a world class facility for the people of Western Australia to enjoy. This report will document the process of refining the concept plan and developing the Public Realm Masterplan to achieve this outcome.

2.0 LANDSCAPE APPROACH



2.1 PUBLIC REALM MASTERPLAN

The Public Realm masterplan progresses the agreed plan to incorporate feedback from the participatory design process. Design decisions have been made by working closely with the CRG to include their preferences, others align with the principles and priorities determined by the overall project aims and/or CRG workshops.

Refer to Appendix A for full Masterplan.



Image 7. Ocean Reef Sea Sports Club Foyer (left)

Public Realm Masterplan (Scale: 1:7000 @ A4)

2.2 DESIGN PRINCIPLES

The development of the landscape approach has been guided by the agreed project vision and Objectives that were created with the CRG.

Vision

'The Ocean Reef Marina public realm will provide inclusive, all seasons, coastal amenity for locals and visitors.'

The public realm will provide continuity to this world class development through an authentic relationship to the surrounding environment and its own unique character.'

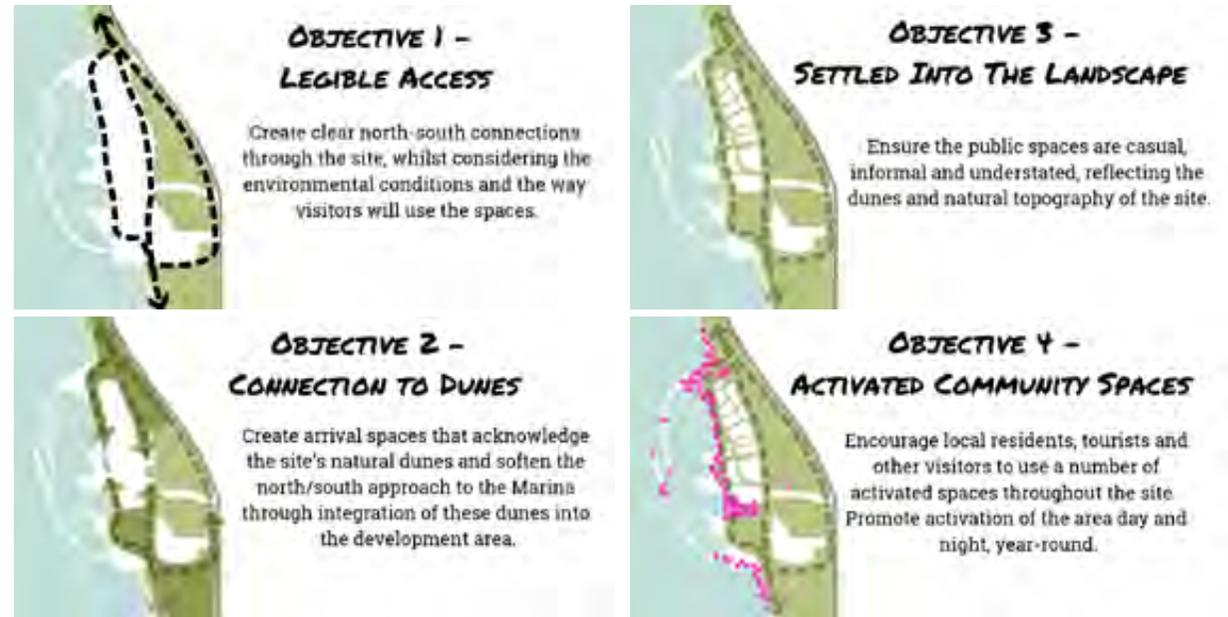


Figure 9. Design Objectives and Vision have led the development

2.3 PUBLIC REALM INSPIRATION 'A CELEBRATION OF WA MARINE CULTURE AND HERITAGE'



LIMESTONE CLIFFS



COASTAL PATH



MEMORIES, STORIES AND FOLKLORE



FISHING*



SURF



BOATING



COMMUNITY PLACES*



ABALONE SEASON

* Image sourced from orssc.asn.au

2.4 PUBLIC REALM VISION

The development of the Public Realm Masterplan has been driven through a participatory design process, broader community engagement and coordination with consultants and stakeholders. The Vision and Objectives remain a touchstone for every decision made.

A number of key moves guide the Public Realm Masterplan as outlined in the following landscape zones;

1. Northern Arrival + Southern Arrival - 'Settled into the Dunes'

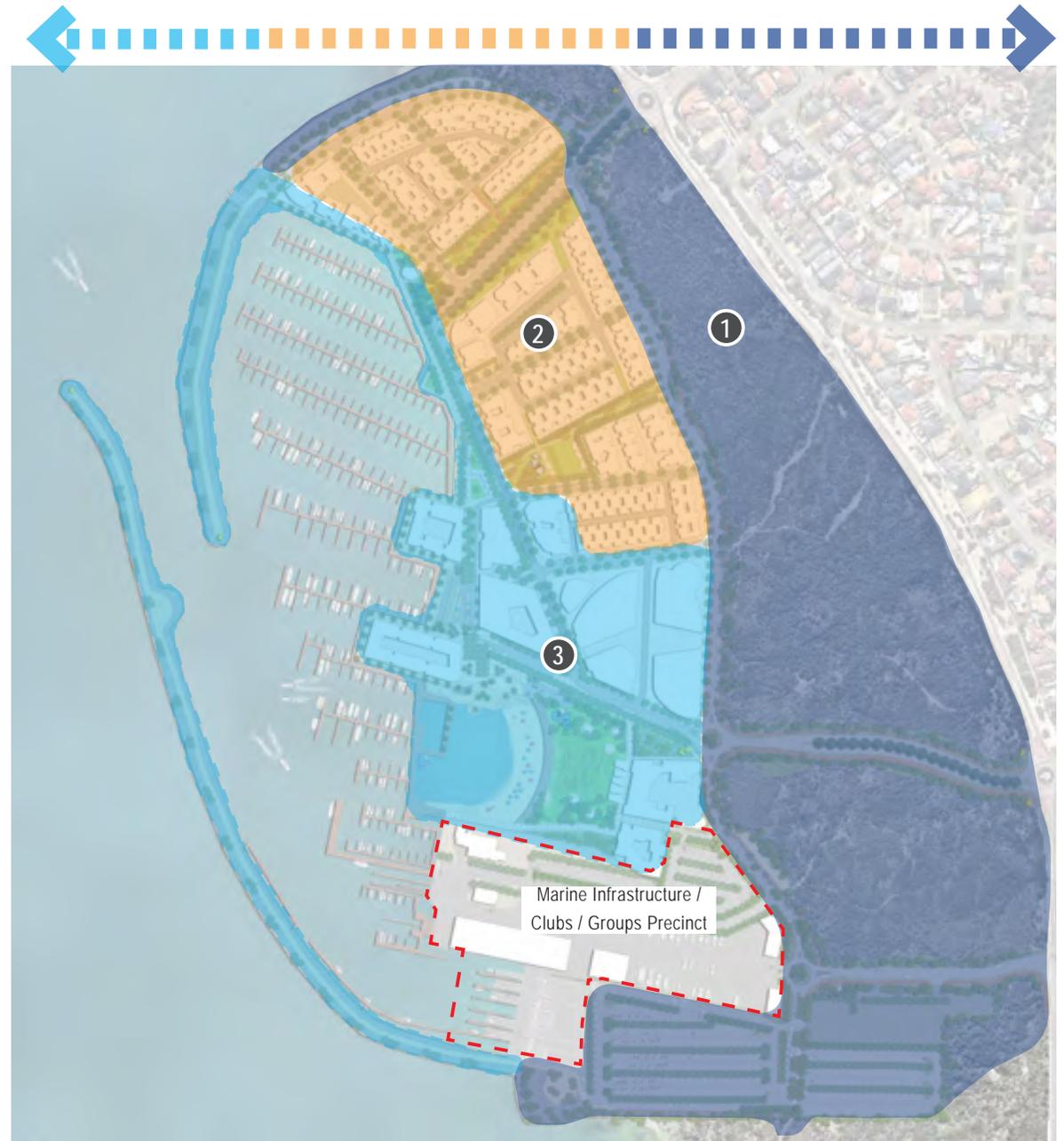
The dunes are fundamental to the identity of this site and as such the approach to the development from the dunes, and this interface is extremely important to the Marina's sense of place. The north/south 'arrival' zones will bookend the site and will be connected through a green spine dunal interface.

2. Central Residential - 'A Marina Community'

The residential zone of the Marina is both literally (for a majority of the site) and thematically the transition between the dune system and the water edge. Streetscapes and POS utilise an east west orientation to create visual and physical connections from water to dune.

3. Mixed Use Waterfront Precinct - 'Celebrating WA Marine Culture and Heritage'

The Ocean Reef Marina will be a celebration of WA maritime culture and heritage, with a central activated heart connecting out into the water through the breakwaters. This high activated zone is to be an aspirational public realm that draws inspiration from the local vernacular, stories and memories of WA boating, fishing, diving, surfing, maritime culture.



Landscape Zones (Scale: 1:7000 @ A4)

1. Northern Arrival + Southern Arrival - 'Settled into the Dunes'

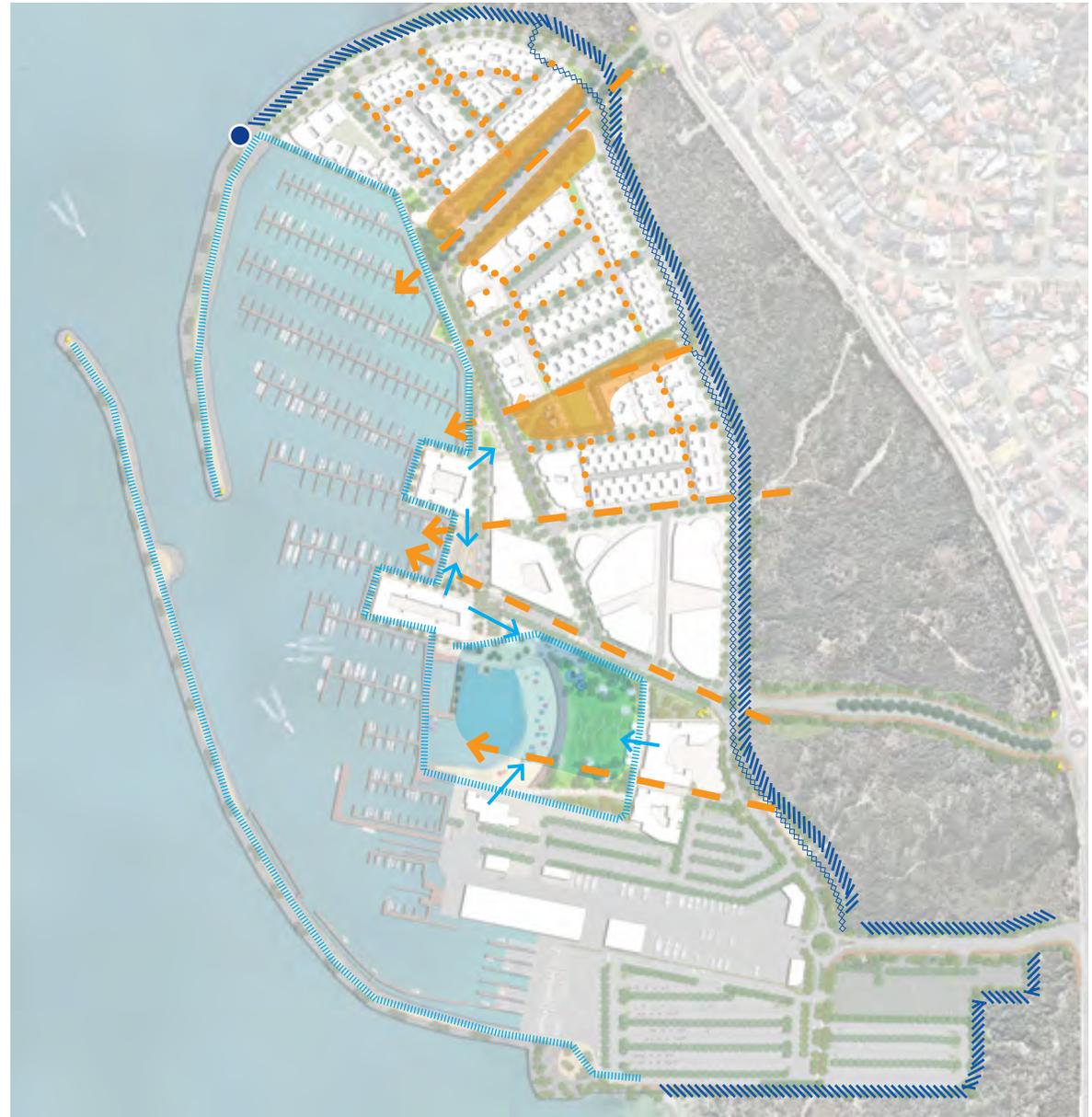
-  - Densely plant verge adjacent to Bush Forever to reduce impact of built form on dunes.
-  - Maintain and enhance north/south movement through site with accessible and well connected path system, supported with clear wayfinding.
-  - Provision of community facilities that enhance existing recreational opportunities such as swimming and fishing.

2. Central Residential - 'A Marina Community'

-  - Utilise POS and streetscapes to connect dunes to water edge.
-  - North South Orientated Lots to provide lot/street views of both marina and dunes, connected with well connected internal street network.
-  - Significant centralised POS.

3. Commercial Waterfront Precinct - 'Celebrating WA Marine Culture and Heritage'

-  - An activated public water front.
-  - Public Realm interface to key commercial and community use buildings.
-  - Beach that is the heart of the marina; is highly activated, is unique and represents the local community and environment.



Landscape 'Big Moves' (Scale: 1:7000 @ A4)

2.5 PUBLIC OPEN SPACE

POS will form a key part of the look and feel of the Public Realm. The POS will reflect the theming and hierarchy outlined in the Big Moves.

- A. Northern Entry Road POS = 1193sqm
- B. Southern Entry Road POS = 2512sqm
- C. Northern Linear POS = 4842sqm
- D. Southern Linear POS = 3624sqm
- E. Central POS = 7024sqm
- F. Promenade North POS (both) = 1638sqm
- G. Triangle POS = 2181sqm
- H. Plaza POS = 4573sqm
- I. Beach Park POS = 24,477sqm
- TOTAL POS = 46,385sqm

Note: Whilst the beach will be a significant recreational facility it is not calculated in the POS schedule. The beach treatment will be considered as part of the Beach Park POS.

The Breakwaters and Bush Forever will also not be considered as POS but shall form an important public realm space. Treatments to these sites are outlined following POS treatments.



POS Locations (Scale: 1:7000 @ A4)

A. Northern Entry Road POS

B. Southern Entry Road POS

Whilst small these two POS will form interpretation nodes, providing information on the dune systems, providing access to path network and viewing platforms and including opportunity for respite along the north south bike track.

Alignment to Vision and Objectives

These POS nodes will provide connection to dunes and offer educational opportunity to for visitors.

Key Moves

- A. No turf or other weed species at direct interfaces to dunes, these POS will utilise only dune species planting.
- B. Informative and interpretative signage/artwork.
- C. Seating nodes with facilities such as bike fixing stations.
- D. Viewing platforms and dune access tracks.



Northern Entry Road POS (Scale: 1:1000 @ A4)



Southern Entry Road POS (Scale: 1:1000 @ A4)

C. Northern Linear POS

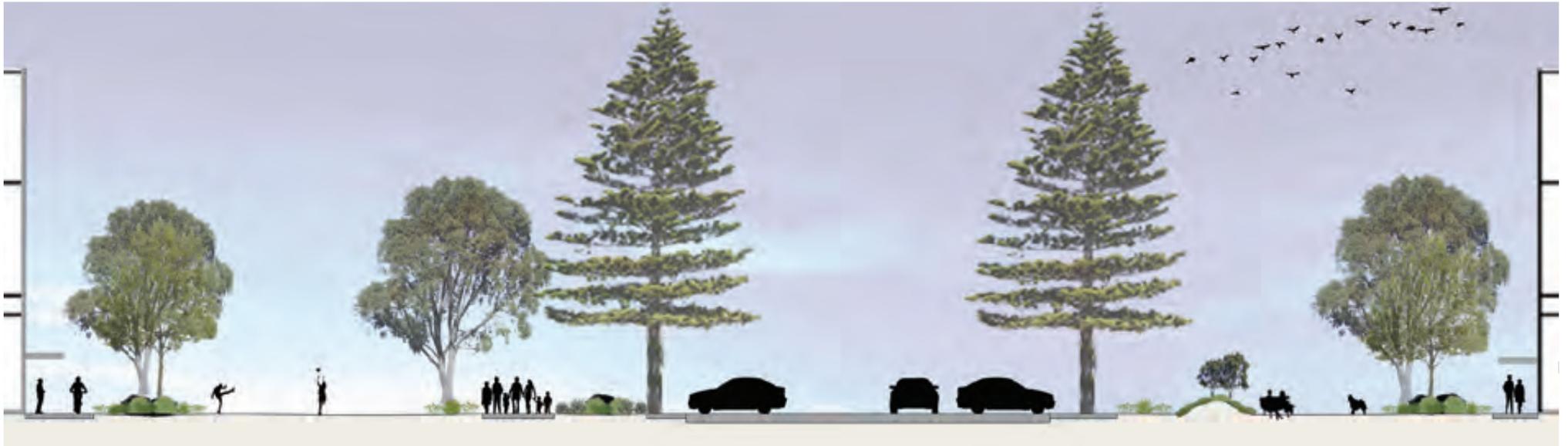
D. Southern Linear POS

The two POS will form the northern entry to the site, create significant recreational opportunities for residents and draw the dune vegetation to the water front.

Alignment to Vision and Objectives

The POS is significant enough to create opportunity to replicate dune forms with endemic planting to connect to the waterfront and provide clear access ways and vistas to the waterfront precinct along with infrastructure for residents to enjoy.

Image 9. Both - South Park, San Francisco (Source: Landezine)



Northern Arrival Section AA (Scale: 1:250 @ A4)



Northern Arrival Plan (Scale: 1:2000 @ A4)



Image 10. Turf and Vegetation to address grade change and provide buffer from wind.

Key Moves

- A. Strong East/West POS connection to provide dune/water connection.
- B. Use of grading and vegetation to protect from wind and create green rooms to ensure this space maintains use and function for the community.
- C. Utilise iconic planting to create an entry road to the precinct and reinforce broader precinct aesthetics.

E. Central POS

The central residential POS will provide recreational and social opportunity that focuses on local community needs. This will include infrastructure such as play equipment, gathering spaces, informal sport facilities and passive recreation opportunities to support the health and well-being of users.

Alignment to Vision and Objectives

The community spaces will reflect the 'relaxed vibe' of Ocean Reef with inclusive and safe spaces, space to support the natural coastal landscape and numerous recreational opportunities. This park will become the heart of the residential development.



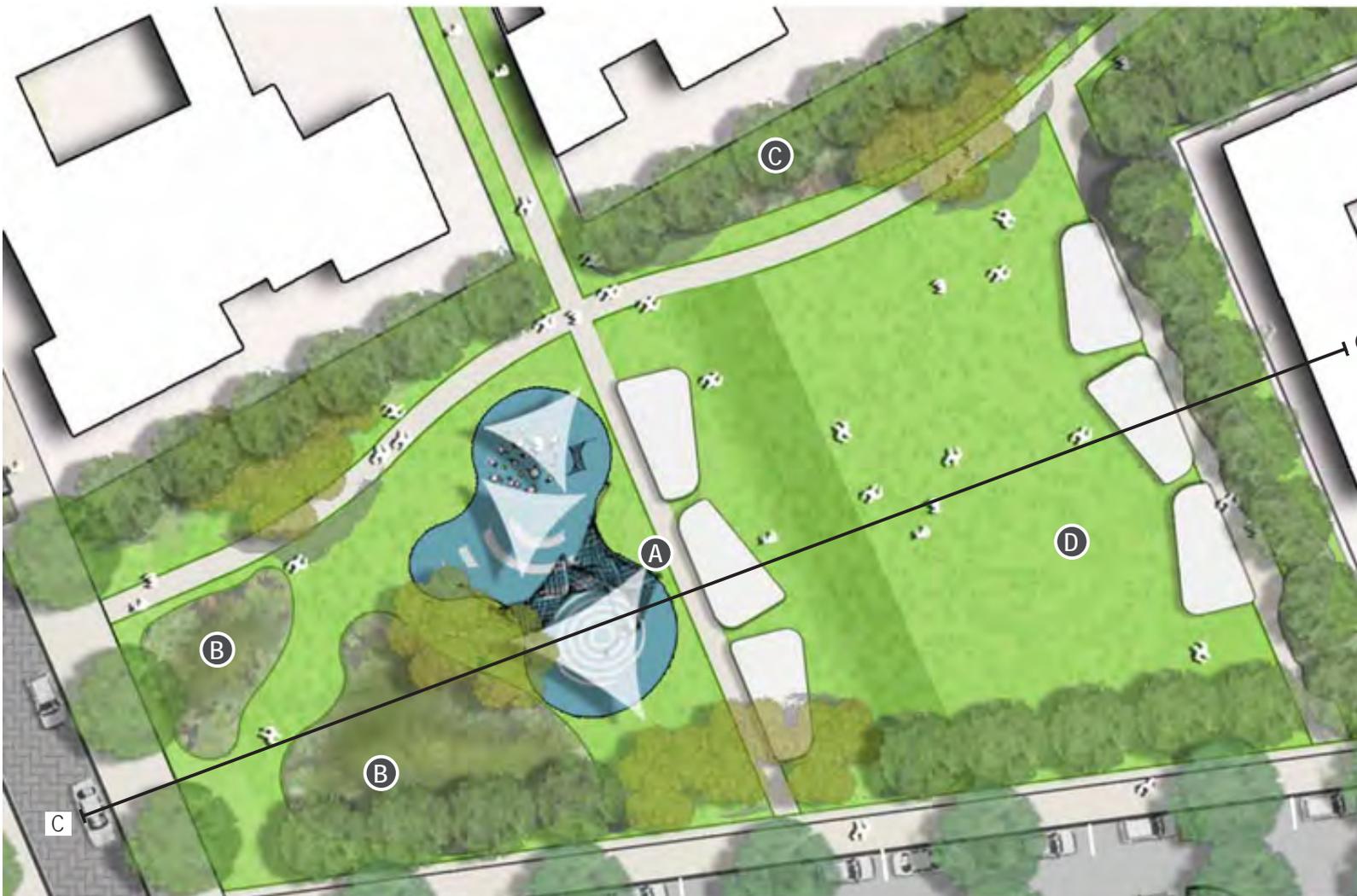
Image 11. Adelaide Zoo Playground (Source: Landezine)



Image 12. Dunes and Turf at Scarborough



Central POS Section CC (Scale: 1:500 @ A4)



Key Moves

A. Provision of infrastructure that support community needs such as play spaces, seating nodes and recreational opportunities.

B. Inclusion of bunds to protect gathering spaces from winds and sea spray.

C. Provision of an east-west flora/fauna connection between the dunes and water.

D. Level turf space for active recreation.

- POS will accommodate a Pump Station, the approach will be to screen/ incorporate the station into the landscape to maximise usable space.

Central POS Plan (Scale: 1:500 @ A4)

F. Promenade North POS (both)

Small POS situated around proposed cafe/restaurant. This POS provides an activation to the northern promenade, services the residential community and provides for unique POS activities that may not be easily accommodated in larger POS.

Alignment to Vision and Objectives

This space provides activation away from the busier active central areas, potentially creating a more community led space and providing a destination to the north of the promenade.



Image 13. Early childhood nature play (Source: natureplaywa.org.au)



Image 14. Outdoor meeting place (Source: compasshousing.org)



Key Moves

- A. Opportunity for dog park or community garden, uses that are more suited to smaller, 'controlled' POS.
- B. Small play area aimed at very young children/babies to service cafe/restaurant.
- C. Informal outdoor seating and gathering nodes.
- D. Connection to waterfront and promenade.

Promenade North POS Plan (Scale: 1:500 @ A4)

G. Triangle POS

A strong pedestrian spine will support the north-south movement across site via the promenade.

Alignment to Vision and Objectives

The promenade allows for significant recreation opportunities, along with a connection to the water front and boats.



Image 15. Buenos Aires Waterfront (Source: Timeout.com)



Image 16. Marina Promenade Split Croatia (Source: archittravel.com)



Promenade Section EE (Scale: 1:250 @ A4)



Promenade Plan (Scale: 1:500 @ A4)

Key Moves

A. The promenade shall maintain width to facilitate clear passage for all activities including bikes, pedestrians, dog walkers etc.

B. Small event space, market stalls, food trucks etc. to be accommodated in this POS.

C. School students highlighted opportunity to provide access to the water at some point in the form of an outdoor classroom or similar opportunity. Further discussion is required on best location for this.

D. Small activation pods for play, seating and exercise.

Note: There is opportunity for golf buggies to be utilised on the site to service boat users, the movement of these buggies, and generally between boat access (east/west) and pedestrian movement (north/south) will require ongoing consideration during detail design.

H. Plaza POS

A highly functional urban plaza that will address the retail and commercial hubs providing infrastructure for markets, alfresco and events.

Alignment to Vision and Objectives

This central plaza will reflect the iconic and recognisable elements of the Ocean Reef Marina in a manner that is inherently unprogrammed to allow flexibility and use.



Image 17. Scarborough Beach Events (Source: MRA)



Image 18. Freyberg Place (Source: Landezine)



Plaza Section DD (Scale: 1:500 @ A4)

Key Moves

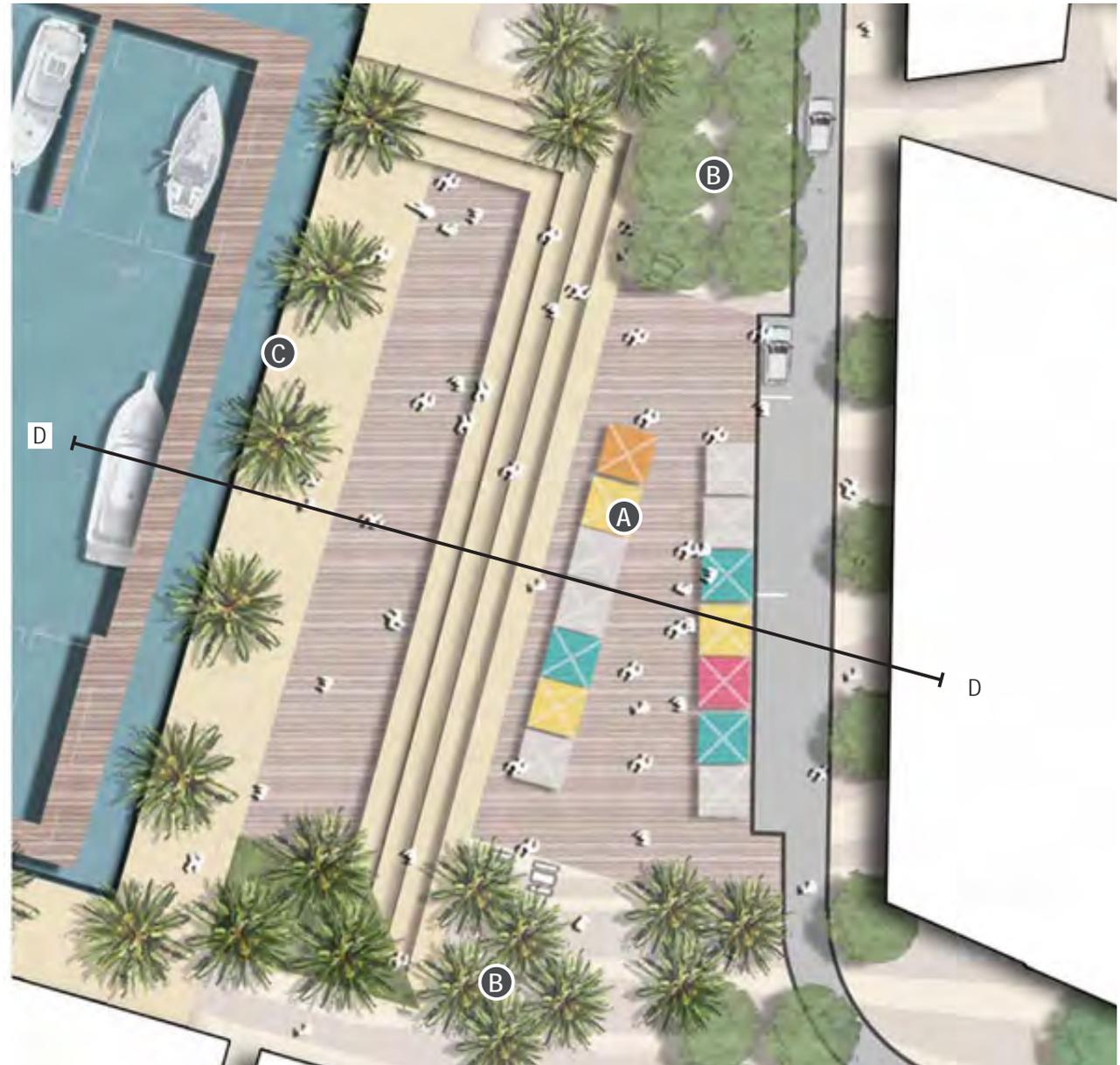
A. Civic space to remain flexible to provide opportunity to activate in relation to the adjoining businesses and community wants.

B. Maintain shady wide pathways to encourage promenading.

C. Engage the space with the adjacent boat pens.

- Opportunity for the plaza to be above a car park in which case it will have to consider constraints of 'on-slab' construction/maintenance, such as water movement, vehicle movement and weight loading.

- Provide flexibility in the space to ensure the plaza supports changes in business use over years.



Plaza Plan (Scale: 1:500 @ A4)

I. The Beach Park

The beach park will be the 'jewel in the crown' of the site, a central recreational hub that will be a regional destination.

Alignment to Vision and Objectives

The beach park will be a regional attractor and the design approach will provide an iconic and recognisable space for the Ocean Reef Community.

Images Left to Right

Image 19. Scarborough 'Snake Pit' Multi-Sport Precinct

Image 20. Southbank Lagoon, Brisbane (Source: www.gonewiththefamily.com)

Image 21. Darwin Waterfront (Source: Vibe Hotel)

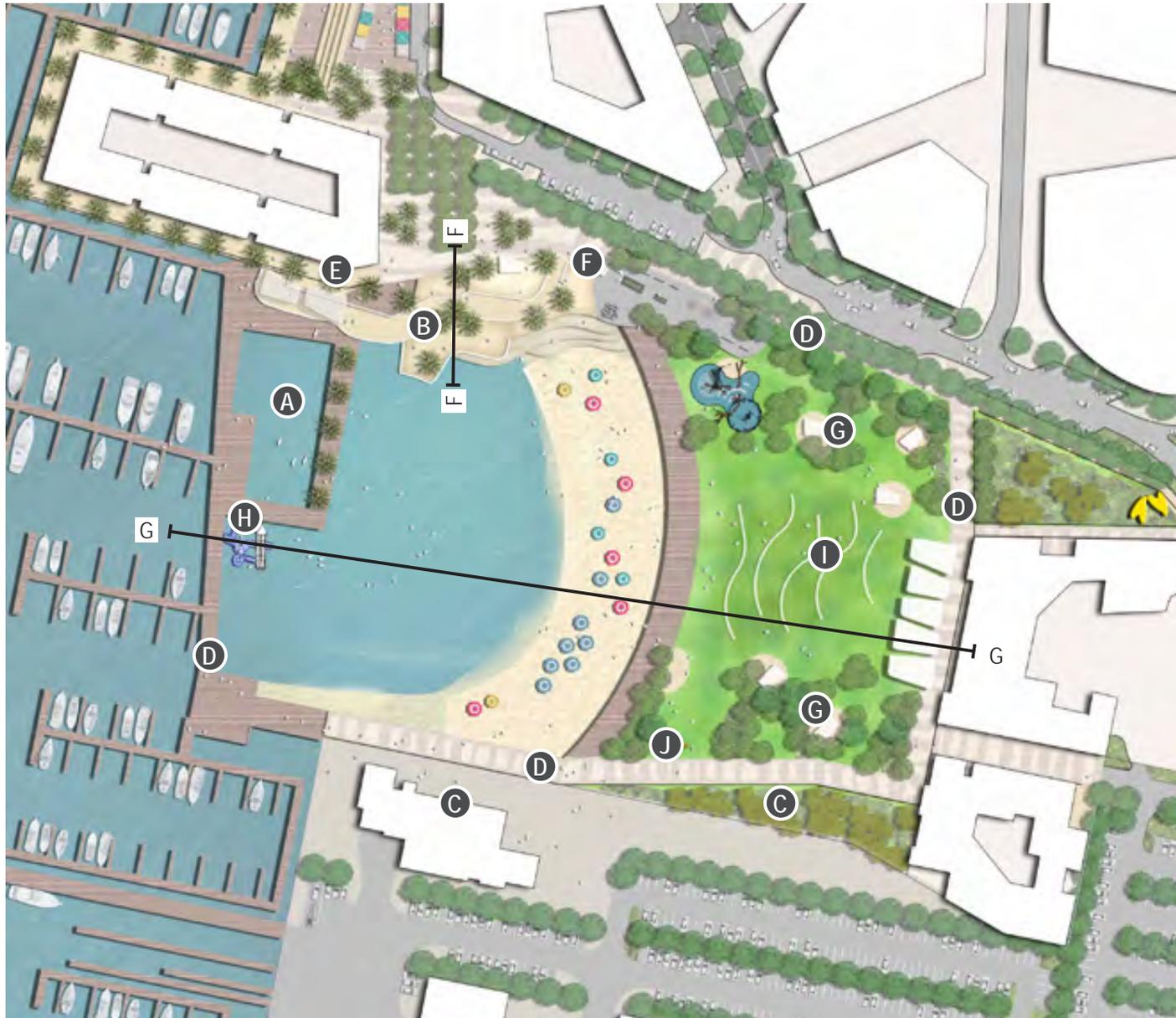
Image 22. Allas Sea Pool (Source: Pinterest)



The Beach Park Section FF (Scale: 1:200 @ A4)



The Beach Park Section GG (Scale: 1:1000 @ A4)



The Beach Park Plan (Scale: 1:2000 @ A4)

Key Moves

A. The beach pool is likely to be a popular community facility - a number of community groups have highlighted potential use for this space. This will require supporting infrastructure to ensure the space functions in the short term.

B. The tiered edge provides additional beach, water based activities and is a reflection of the coastal rock lagoons around the site. It will create a unique experience in WA.

C. Built form and small hills provide a buffer from wind.

D. Creation of a promenade surrounding the site to support pedestrian movement.

E. Interface with built form and recreational infrastructure to activate the beach area and provide supporting services/facilities such as takeaway food, change rooms/bathrooms etc.

F. Skate Park and Playground integrated into northern promenade.

G. Small picnic nodes and shady gathering spaces.

H. Water play opportunities (slides, jumping platforms).

I. Amphitheatre to support large community events.

J. Ceremonial space, with ANZAC memorial.

The Breakwaters

The Breakwaters will present opportunity for increased, improved public realm through design approaches with the engineering team to include lighting, vegetation, seating nodes, recreational opportunities and art elements, where possible.

Alignment to Vision and Objectives

The opportunity to create 'front-line' marine environments that are both functional and aesthetically pleasing will be a unique feature of the development.

Key Moves

- Marine based recreational facilities, such as all-access fishing platforms, along with art installations will activate the breakwaters.
- The development of these spaces will require significant coordination with engineering and maintenance teams.
- Focus on these elements to be inclusive and all-ability, in line with the mainland public realm, to ensure marine recreation opportunities available to all.



Images Top to Bottom

Image 23. The Gap Seating Node

Image 24. Breakwater Sculpture (Source: Unknown)

Image 25. Breakwater Lighting (Source: Seoultravelpass)



Figure 10. Breakwater Treatments

The Dunes

A reality of the development will be the removal of bush-forever vegetation, the retained elements will be carefully considered to protect and enhance ecological value and social value of the 'low-impact' recreational opportunities of the retained bushland.

Alignment to Vision and Objectives

The dunes are seen as a highly valued element of the development and the treatment of the retained bush-forever will set the tone for the relationship the rest of the development has with the dune system surrounding the site.

Key Moves

- Rehabilitation to dunes to ensure protection and enhancement of retained dunes.
- Controlled, low impact recreation opportunities to this area, such as pedestrian pathways, lookouts, viewing platforms etc.
- All works to be undertaken in line with for Bush Forever parameters.
- Access routes will be identified and created to support controlled access through site and pedestrian access to the Marina.



Image 26. Existing Dune Footpath



Image 27. Whale Watching Deck Warrnambool



Image 28. Timber Deck Kangaroo Island (Source: Unknown)



Figure 11. Bushforever Treatments

2.6 STREETSCAPE ENVIRONMENTS

A well designed street provides amenity beyond a simple movement network, as such the approach to the street network at Ocean Reef will provide the following uses:

- Design approaches that are unique and support the sites iconic approach.
- Create social and recreational spaces so that the streetscape becomes a key element of the sites public realm.
- The street network shall provide environmental function, supporting endemic species, connecting key vegetated area and supporting fauna.
- Create a tree lined gateway to frame entry views and enhance arrival experience
- Provide a state of the art, safe and efficient bus interchange
- Wayfinding will include both signage and intuitive design approaches.
- Enhance active interface with adjacent development
- Support sustainability approaches through material selection, encouragement of alternative modes of transport and WSUD approaches.
- Provide a strong, cohesive and consistent design approach that will engender the site aesthetic, addressing concern with potential built form outcomes.

NOTE: Streetscapes will be subject to detailed design. Approaches shown here are indicative of preferred landscape approach.

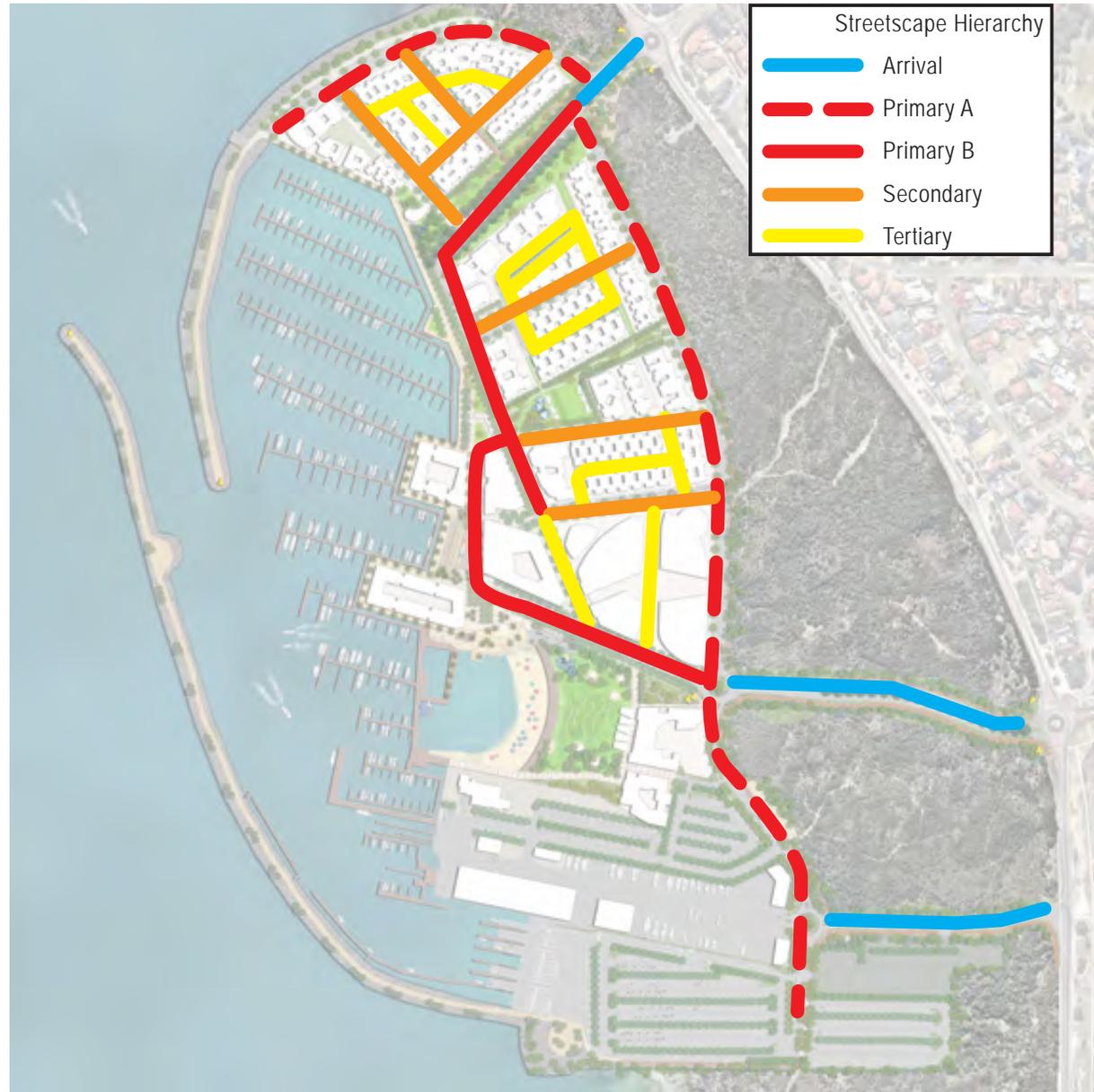


Figure 12. Street Hierarchy

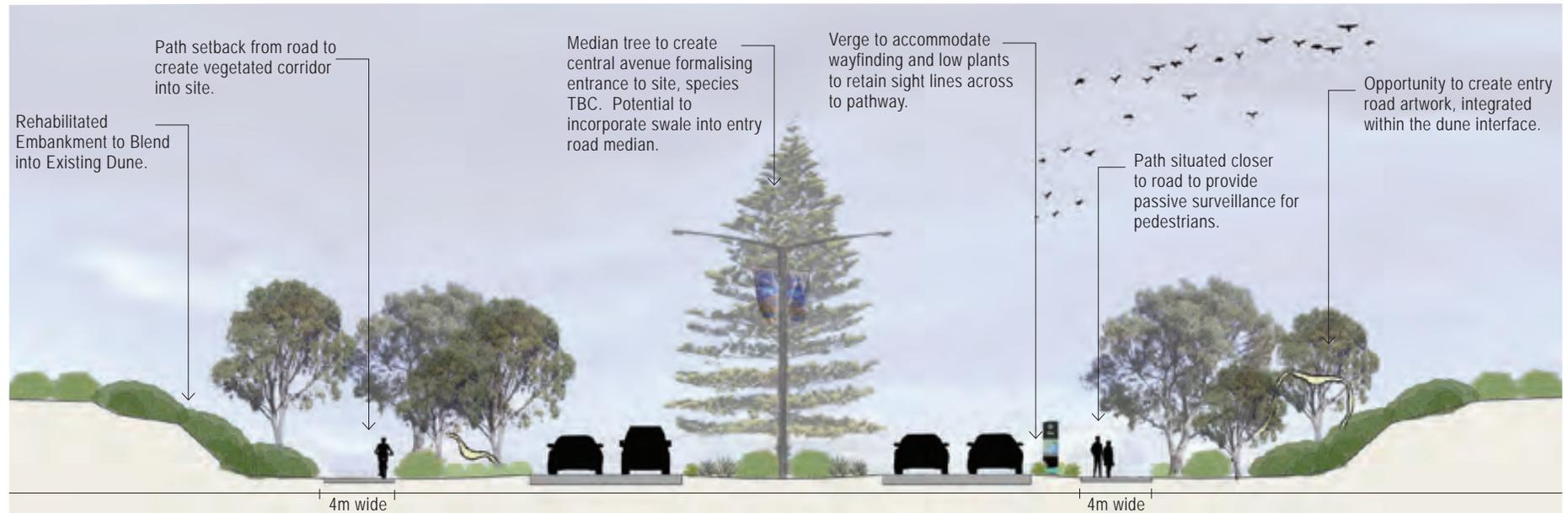
Arrival

Nestled into the dunal landscape, utilising art, lighting and way-finding elements to create an arrival experience for visitors.

The arrival space will be integrated into the existing site contours to ensure a 'natural' interface to the dunes and into the site.



Image 29. Saltwater Coast (Source: LandscapeAustralia.com)



Arrival Road Section (Scale: 1:300 @ A4)

Primary A

The main North/South feeder road will be strongly guided by the aesthetic of the dunes to the north and its role to feed traffic (pedestrian and vehicular) efficiently through the site.



Image 30. Akimos Beach (Source: domain.com)



Primary Road A, Section (Scale: 1:250 @ A4)

Primary B

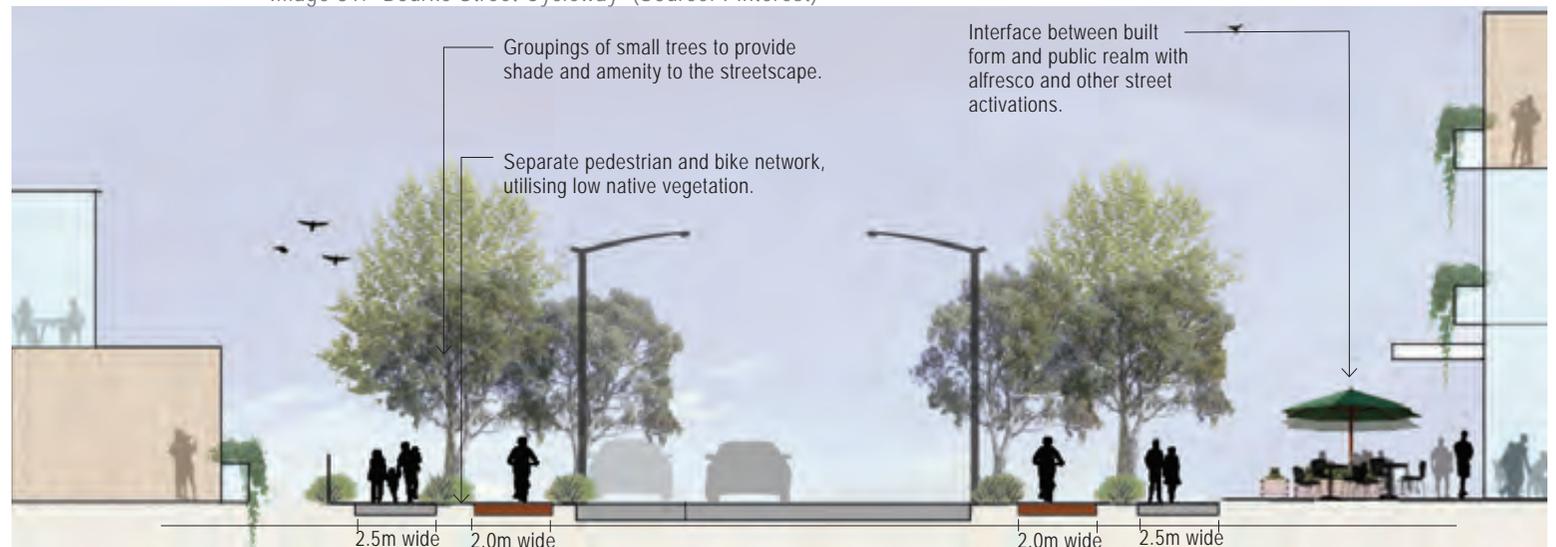
The main access road for waterfront facilities, boat pens and western residential lots, this road will need to be designed to provide clear way-finding, encourage slower speeds due to higher pedestrian interface and will incorporate design approaches that prioritise pedestrians at the waterfront areas.



Image 31. Bourke Street Cycleway (Source: Pinterest)



Image 32. Jellicoe Street (Source: Pinterest)



Primary Road B, Section (Scale: 1:250 @ A4)

Secondary

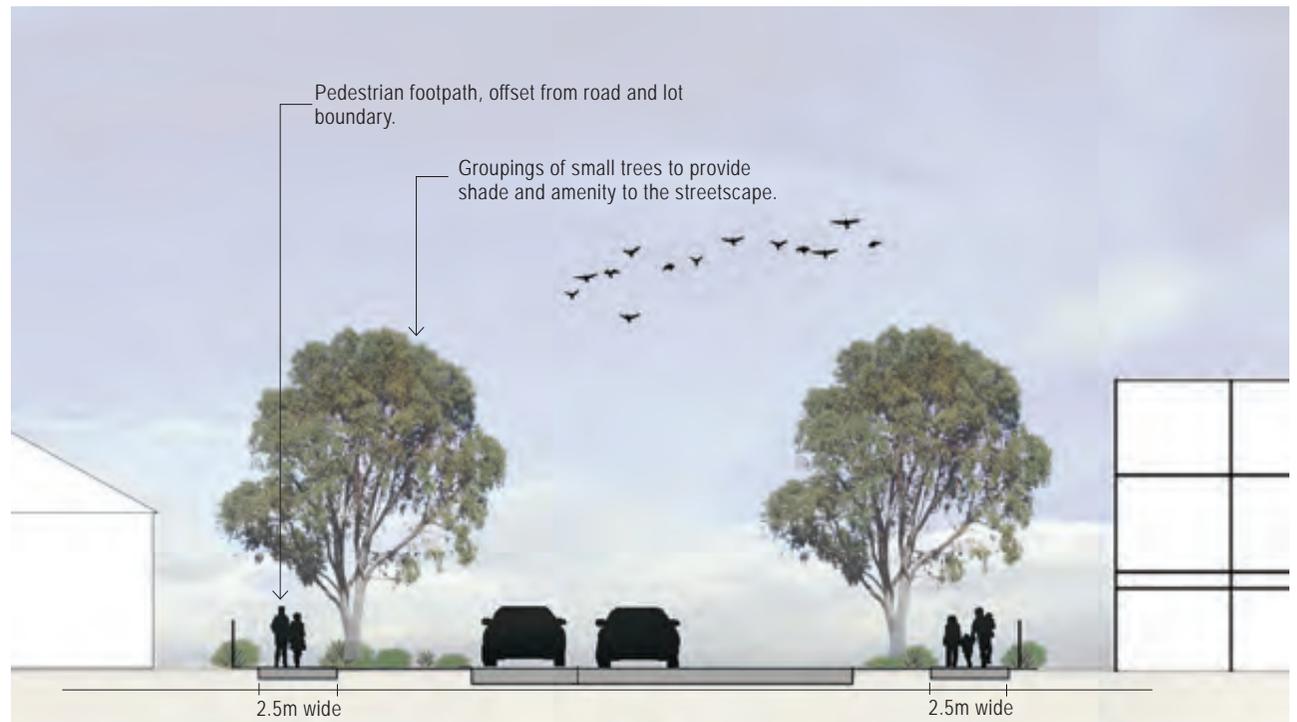
Roads will service residential lots, treat water and provide for localised pedestrian thoroughfare.



Image 33. Stormwater Treatment (Source: Equatica.com)



Image 34. Constitution Avenue, Canberra (Source: Landezine.com)



Secondary Road, Section (Scale: 1:250 @ A4)

Tertiary

Laneways and low-traffic roads servicing residents throughout the development. Where possible trees will be accommodated..

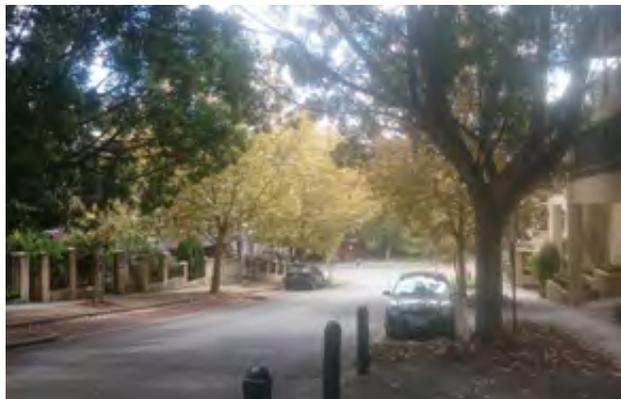
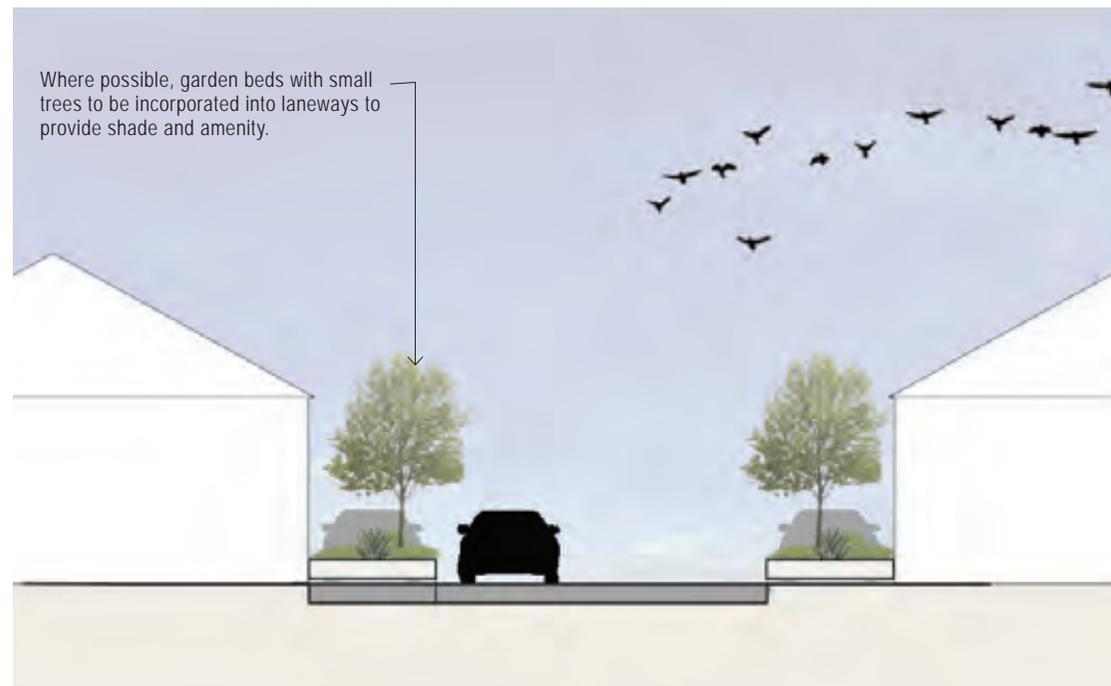


Image 35. East Perth Streetscape



Tertiary Road, Section (Scale: 1:250 @ A4)

Bus, Coaches, Rideshare, Electric Charging Outlets and Buggies

There are a number of approaches that will be considered to provide alternatives to arriving at the site by car.

Bus: Further to ongoing discussions with Perth Transport Authority and City of Joondalup, it is intended for the site to be serviced by a bus route to connect to Joondalup, both regular and seasonal CAT. The final route shall respond to key destinations on site and ensure these areas are accessible, especially as this encourages access to site for those who are not physically mobile, do not have access to a car or are unable to drive.

Coaches: Ocean Reef will be accessed by groups, especially at facilities such as the beach area. Coach pick up/drop off bays are to be considered at these locations.

Pick up / drop off zones: With the increasing utilisation of private transport services such as rideshare, autonomous vehicles and car share pick up / drop off zones will be required in key locations. These zones are also useful for those who may have limited mobility to be dropped off before parking. These key locations will also incorporate bike parking.

Electric Charging Outlets: Electric Vehicle Charging Stations, charging points for electric bikes (private and shared) and other commercial charging opportunities will be explored. Locating these services will be key in the uptake of this technology.

Buggies: Servicing a site as large as Ocean Reef Marina to a world class standard will require implementation of site specific systems and processes. For consideration is a fleet of Buggies to services between car parks and marine infrastructure. Whilst this is still to be resolved, the location of this infrastructure will need to be considered.



Carparks

As a marina the site will require significant parking facilities that are well designed to ensure maximum efficiency and function. The parking lots at Ocean Reef Marina will be designed to only to provide efficient use for vehicles but to also provide other benefits to the site as follows:

- Material selection and planting will reduce the visual dominance of car-parking, settling the entire development into the surrounding dunes;
- Provision of clear pedestrian circulation via extended north-south promenades and improved east-west beach connections;
- Increase shade amenity via added tree planting while minimising disruptions to ocean views;
- Coastal appropriate High quality furniture and materials consistent with a defined material palette to provide suitable amenity as required;
- Development of approaches to introduce significant areas of vegetation into large expanses of car park to reduce Urban Heat Island effect; and,
- Provision of drainage basins as an integrated approach to WSUD.

All parking to be confirmed during detail design phase in line with ARUP Traffic Modelling and Parking report and site Design Guidelines.



Non Vehicular Movement

The existing North/South track is an important connection to the local community both for transport and recreational use.

It will be a key focus of the development to prioritise pedestrian movement and bike movement not only in streetscapes, but in parks, promenades and the dunes (via controlled methods and subject to approval). This network of pathways will utilise materials, wayfinding and design approach to encourage users across the site in a comfortable and safe manner.

Sites of potential conflict, namely at key intersections and at boat facility uses, will be considered in detail to ensure an outcome that supports ongoing active transport opportunity for the community.



Figure 13. Sydney Bike Lane (Photographer: Matt Smith)



2.7 PLANT PALETTE

The planting approach will be driven by a number of considerations, namely:

- A preference for native/endemic species;
- Water-wise and hydro-zoned planting;
- Turf areas to be kept minimal and only in functional areas;
- Ability to maintain views and sight lines to the water;
- Availability;
- Habitat value;
- Tolerant of front line coastal conditions;
- Ability to be easily maintained; and,
- Have functional values i.e. provision of shade, aesthetically pleasing, iconic.

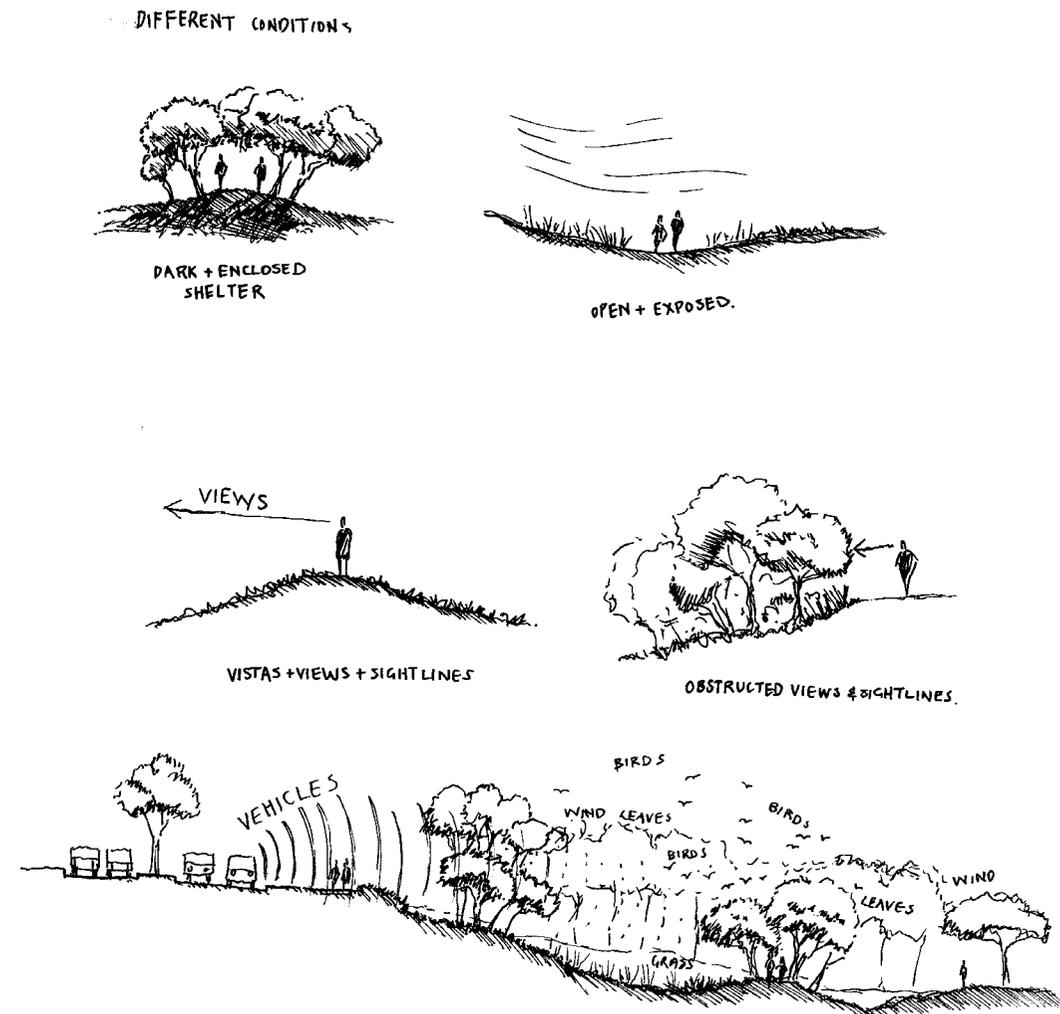


Figure 14. Site Conditions (existing and proposed) will be a deciding factor in plant selection.

Groundcovers and Low Shrubs

Groundcovers shown are endemic to the site or the surrounding area and are able to withstand the harsh marine environment and the possibility of being touched or trampled. Potential species include:

- *Lepidosperma gladiatum*, Coastal Sword Sedge
- *Ficinia nodosa*, Knotted Club Rush
- *Conostylis candicans*, Grey Cottonheads
- *Myoporum insulare* Prostrate, Creeping Boobialla
- *Spinefex longifolius*, Beach Spinefex
- *Hardenbergia comptoniana*, Native Wisteria



Shrubs

Shrubs are to be kept to around 600mm high to maintain clear view-lines through the site. Each type shown is either endemic to the site or a hybrid variety of a local species. Potential species include:

- *Rhagodia baccata*, Berry Salt Bush
- *Leucopogon parvifolius*, Coast Beard-Heath
- *Thomasia cognata*, Coast Thomasia
- *Melaleuca huegii* dwarf, Chenile Honey Myrtle
- *Scaevola crassifolia*, Thick-leaved Fanfare



Screening Shrubs/Small Trees

The screening plants grow naturally on site and with little maintenance can be kept dense and tidy as screening specimens. The species shown attract small birds and insects for their nectar and safe habitat. Potential species include:

- *Melaleuca systema*, Coastal Honey Myrtle
- *Alyogyne huegii*, Lilac Hibiscus
- *Templetonia retusa*, Cockies Tongue
- *Acacia rostellifera*, Summer-scented Wattle
- *Olearia axillaris*, Coastal Daisy Bush



Basins, Swales and WSUD

Infiltration Beds will be planted out with grasses and sedges selected for their nutrient stripping qualities, coastal suitability and at densities as outlined in the South-West Vegetation Guidelines (Monash University, 2014). Potential species include:

- *Conostylis aculeata*, Prickly conostylis
- *Ficinia nodosa*, Knobby Clubrush
- *Lepidosperma gladiatum*, Coast Sword Sedge
- *Meeboldina scariosa*, Velvet Rush



Bushfire

There may be requirements on site for low fuel load planting to address bushfire planning requirements. Usually these species are planted at lower density to assist with ongoing maintenance. This is to be confirmed by relevant consultant at details design phase. Potential species include:

- *Acanthocarpus preissii*, Prickle Lily
- *Lepidosperma gladiatum*, Coastal Sword Sedge
- *Spinefex longifolius*, Beach Spinefex
- *Threlkeldia diffusaa*, Coast Bonefruit



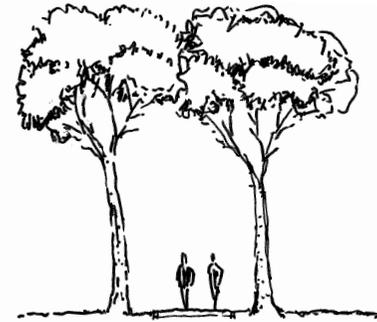
Tree Species

Tree species are regularly the identifier for various coastal areas of Western Australia, for example Norfolk Island Pines are synonymous with Cottesloe Beach. Unfortunately this can lead to community having strong opinions on which trees should be utilised on site, based on these associations. Tree growth is highly impacted by the environment, and the harsh winds and salt of the West Australian coastline limits suitable species significantly. Further to this trees in popular public realm spaces have to work very hard, often growing in restricted environments and there is still an expectations that trees will grow fast, provide shade, fauna habitat, establish quickly and look great. With the size of the development it will also be important that trees are available to be grown on at a nursery in a large quantity for the project.

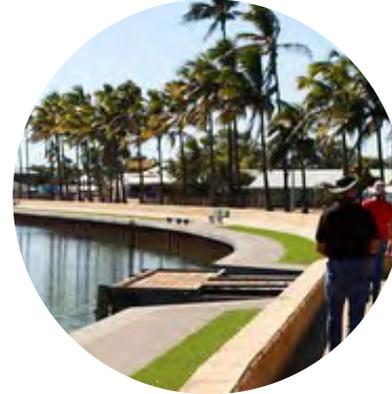
These limitations leave only a very small palette of trees suitable for use on the site. Final selection of species will be made to suit the functional sue of the site and in consultation with the ongoing management team.

**Trees which are on the City of Joondalup preferred tree species list.*

FORMAL AVENUES



*Araucaria heterophylla, Norfolk Island Pine**

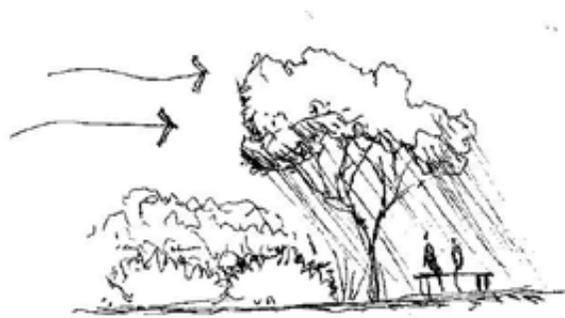


Washingtonia robusta, Palm Tree



*Agonis flexuosa, Native Peppermint**

PARKLAND PLANTING



INFORMAL GROUPINGS



Allocasuarina fraseriana, Sheoak



Eucalyptus tottiana, Coastal Blackbutt*



Ficus rubiginosa, Port Jackson Fig*



Melaleuca lanceolata, Rottnest Island Tea-tree*

2.8 WATER USE AND TREATMENT

Generally across Perth a forecast in reduction of water availability and a steady increase in demand will mean more efficiencies are required. Department of Water and Environmental Regulation is that users will be able to reduce water demand by 10% through efficiencies in design and use of watering systems. Treatment of water on site is also important to ensure recharging of ground water systems.

Site wide, UDLA will work with other consultants and Development WA to develop innovative and best practice approaches to sustainability including:

- Approaches to Car Parking that capture water immediately and allow flexibility should parking demand reduce into the future.
- Integrated technologies that allow for ongoing management of irrigation systems in line with Smart City approaches.
- Implement Hydrozoning strategies to reduce water application throughout the city, utilising appropriate water sensitive treatments.
- Selection of water wise plants/ turf varieties and improve habitat for fauna.
- Considerations of alternative waste water treatment on site.



Image 38. Scarborough Beach WSUD Basins

Water Supply and Use

Water Supply

The site currently has a bore allocation within the site of 6900kl of which 5400kl is currently allocated to the boat wash down and 1500kl to turf area at the beach. The short term water supply, for stage 1, is proposed to utilise the sites current bore allocation to establish native vegetation to the entry roads. This will be achieved through application of water saving techniques across the existing site to accommodate additional irrigation needs.

The long term water supply for the project is currently being discussed with a number of opportunities being investigated; refer to *Local Water Management Strategy (Rev E, Strategen 2019)* for detailed information. It is unlikely that a water allocation will be available to allow bore water utilisation. As such Non-potable water supply options will continue to be investigated including:

- Scheme water-The use of scheme water is not a preferred approach given that its source in this area is groundwater and it undergoes an expensive treatment process (in both cost and energy) to treat it to potable standards. Using scheme water for the purpose of irrigation does not therefore meet the objectives of water sensitive urban design (*BMT WBM 2009*).
- Wastewater - Treating the development's wastewater will require approvals process and appointment of a suitable water service provider to manage the system. This is being further investigated by the team.

The proposed landscape design will, as part of sustainable design, be low water use and will therefore aim to minimise water demand. However, if required, further more extreme demand management may also be considered as part of the solution. This will involve the further reduction of irrigable areas and/or application rates.

Irrigation Systems

Despite increasing scarcity of water for public realm use there remain pressures on Public Realm to present to a high standard, function year round and provide significant amenity, which can mean a reliance on water to irrigate turf and garden beds. Approaches to managing this at Ocean Reef Marina include the following;

- All irrigation infrastructure will be 5-Star WELS rated water efficient devices;
- Automatic Irrigation system is proposed due to minimal labour installation and ongoing maintenance;
- Design and installation is to be undertaken by a qualified irrigation consultant and contractor to ensure best practise is achieved;
- A maintenance program is to be prepared to ensure the system is running optimally at all times;
- A superficial groundwater licence will be applied for to ensure an ongoing water supply is available for the site; and
- A SMART irrigation system will be considered to ensure irrigation is running only at times of need.

Ongoing Management and Water Use Reduction

It is expected that water usage can be significantly reduced after two years establishment by undertaking the following actions:

- Undertake an annual audit of water usage on site and ensure that volumes are aligning with expected usage;
- Turn off irrigation to vegetated areas that are not in high presentation or use zones;
- Detailed design of soil profiles will be considered to ensure fertiliser and water uptake is maximised in root zones;

- Undertake replacement planting with tubestock in winter to avoid additional irrigation requirements;
- High traffic areas will be highlighted across site during detailed design to ensure resources are focused to these areas to ensure better return on investment. These areas may require upgraded maintenance processes, additional water, top dressing and fertilisations. Accordingly lower use areas will receive less water, fertilisers and maintenance;
- Hydrozoning will occur to all garden beds; and
- All species will be selected to support long term low to no irrigation.

Current Expected Water Requirements

POS: Park (2.89Ha w. 90% Irrigated) - 17,557kl/p.a.

Civic/Dune (1.74Ha w. 60% Irrigated) - 7,080kl/p.a.

Streetscape (Trees Only) - 820kl/p.a.

Car Park - 9,800kl/p.a.

Boat Washdown Bay - 1000kl/p.a.**

TOTAL = 36,258kl/p.a.

Water Volumes have been calculated on the following assumptions:

- 6750 kl water per hectare p.a. to garden beds and Turf (DoW Approved Application)
- 4.5kl water per hectare p.a. for rehabilitation and WSUD basins within car parks

** Supplied by Newton J CoJ, 2014, pers. comm. 23 July

Water Treatment

In line with the *Local Water Management Strategy (Strategen, 2019)* water will be treated as follows:

- 1 in 1-year ARI event will be treated and infiltrated on site through a mixture of:
 - open bottomed manholes and side entry pits
 - sub-surface USCs (e.g. Stormtech or Atlantis cells)
 - biofiltration swales.
- 1 in 5 year, pit and pipe infrastructure for major roads with discharge to marina and ocean (through multiple discharge outlets with gross pollutant traps) consistent with liveable neighbourhoods, minor roads may flood.
- 1 in 100 year event will flood roads and discharge directly to the marina.

Biofiltration Swales

- The stormwater drainage design incorporates water sensitive urban design (WSUD) principles and supports achieving best management practice systems;
- WSUD basins will be planted out with coastal species selected for their nutrients stripping qualities and at densities as outlined in the *South-West Vegetation Guidelines (Monash University, 2014)*;
- The base of retention basins that are inundated in every rainfall event will be planted with reeds and sedges in line with the *South-West Vegetation Guidelines (Monash*

University, 2014) and will have initial establishment irrigation only;

- Semi or seasonally inundated retention basin embankments will be planted with species suitable for stabilisation and in line with the *South-West Vegetation Guidelines (Monash University, 2014)* and will have initial establishment irrigation only;
- Basins will be designed to allow for egress for maintenance and safety purposes, in line with the LGA requirements;
- Ongoing maintenance of WSUD basins will include assessment of vegetation health, removal and replacement of dead plants, removal of excessive sediment build up and use of low PH or slow release fertiliser as required;
- Turf swales will be avoided where possible; and
- Swales will not utilise bark mulch, due to wash-outs, but will investigate opportunity to utilise other materials, such as gravel or by-products to create a mulch. A mulch such as the oyster shell could provide a unique use for a waste product and relate to the sites themes and location.

Minimise Fertiliser Loss

- Fertiliser will be utilised on active turf areas at critical times, ensuring the performance of the turf is maintained whilst minimising fertiliser use. Fertiliser will only be used during stress periods or periods of expected high use;
- Detailed design of soil profiles will be considered to ensure

fertiliser and water uptake is maximised in root zones;

- Native plant species will be used across site, reducing fertiliser and water rates;
- Ongoing maintenance of the site will include regular assessment and testing of vegetation to ensure that fertiliser is only used as required;

See diagram overleaf for opportunities to incorporate drainage into the landscape.



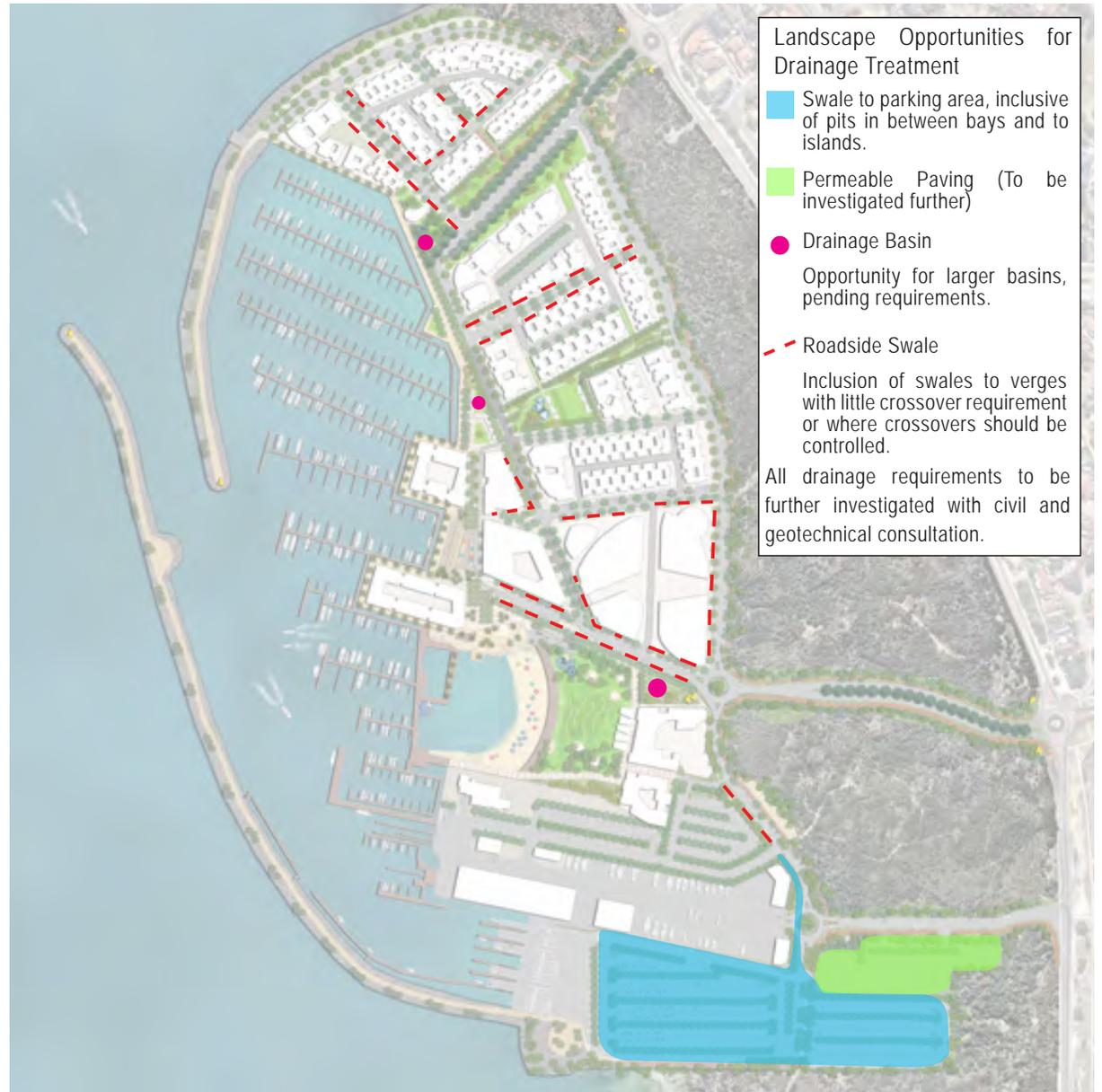
Figure 15. Example of Vegetated Swale



Image 40. Opportunity to explore alternative mulch in swales (Source: Unknown)



Image 39. Roadside Swale Treatments (Source: Unknown)



2.9 SUSTAINABILITY APPROACHES

Nine Innovation Ideas that will be scoped as part of the projects Innovation Plan. The design of the Public Realm, and its ongoing management and activation will be key to the success of these initiatives. The following outlines how landscape works will address the Nine Ideas;

Idea	Aim	Description	Approaches for Consideration
Big Picture World Scale Uses	To attract visitors and create a vibrant place.	Create a destination that not only provides world-class facilities but is world class in its approach to design and implementation. This includes the creation of a space that is unique and truly 'of place'	The public realm will support a world class facility through excellence in design and integration of built form and marine infrastructure
Smart Precinct/ Smart Marina	Create a smart urban development that is guided by a strategy that clearly identifies how investments in technology and data solutions will accelerate liveability, productivity and sustainable outcomes	Embedding technology into the landscape mean an integrated, sustainable and easy to maintain landscape into the future.	Smart Technologies such as smart bins, monitored irrigation and smart lighting, smart BBQs, free Wi-Fi and knowledge sharing.
Water Wise Development Exemplar	The water impacts and challenges in this project include using water efficiently, investigating alternative water sources; and protecting local water resources and marine environment.	There is a shortage of water supply to the site and with a drying climate it will be important to minimise water requirements, investigate alternative water supplies and manage water on site utilising best practise.	Preference for water wise/endemic species, exploration of alternative water supply (3rd Pipe or Mini Desal), WSUD approaches.
Low Carbon Integrated Energy System/Micro-grid	Creating low carbon environments that reduce carbon emissions in line with international targets and the overall ecological footprint of development.	Whilst there are not a significant amount of opportunities to reduce power use in public realm, where possible power saving technologies will be implemented.	Smart Lighting, Solar Wind Lighting, Low Sodium Lighting
Smart Waste Precinct*	Minimising waste to landfill and costs and achieving resource efficiency through the application of best practice and development of innovative solutions.	Management of waste in the public realm will be coordinated with the Cities Waste Management Team to ensure all rubbish, from day-to-day through to events is implemented utilising best practise approaches.	Smart Bins, Event Waste Management Protocol.
Abalone Artificial Reef and Dive Trail	Habitat Enhancement to allow succession and development of marine biodiversity to replace that which is lost to through Marina development.	Artificial reefs are being considered to improve habitat of Abalone and return habitat to post-construction levels.	Diving trails on reef to reflect heritage value of the site, Infrastructure to support dive/surfing/ fishing activities.
Transport	Create a place with transport options that are future proofed and trial innovative modes of transport.	Considered Public Realm design approaches encourage the community to use alternative to car transport methods improving community, environmental and social health.	Well designed and located pedestrian movement network, effective way-finding, collocation of public transport with key destinations.
Community Development*	Facilitate vibrant long-term self-sustaining local community development.	Community engagement ensures that the landscape design is addressing local community needs, considers local conditions and encourages community ownership and activation of the public realm into the future.	Community Engagement Plan, including CRG, open days and school workshops.
Celebrating the Coastal Maritime and Indigenous Cultural History**	Integrated history outcome that reflects the natural coastal and cultural (both indigenous and post-colonial) heritage.	Involvement of history to reflect local identity and heritage, and empower communities	Coordination with Wadjuk Working Party, Aboriginal Liaison Officer, salvage of materials and items where possible and reference and interpretation of Heritage studies and reports.

* UDLA are a responsible partner for delivery of this Idea.

** UDLA are lead for delivery of this Idea.

2.10 HERITAGE AND INTERPRETATION

There are multiple opportunities for heritage interpretation throughout the public realm of Ocean Reef Marina.

Some preliminary themes and locations on site as follows:

Marina Construction Process

This may be about educating visitors and locals around the construction process as it is undertaken, as well as when works are completed, such as before and after images integrated into shade structures.

Dune Ecology

Informative signage on significant species in the area, as well as the Marmion Marine Park as a connected system.

Ocean Ecology

Informative signage on significant species in the area, as well as the Marmion Marine Park as a connected system.

Aboriginal Stories and Significance

Recognition of pre-colonial heritage. Potentially through sculptural elements or other artwork

Maritime Heritage

Fishing, boating and other maritime recreational activities have long occurred in the area.

Weather

The weather, and in particular the wind, has a strong presence in Ocean Reef. A responsive sculptural element that responds and interacts with the wind could be appropriate.



Image 41. Scarborough Beach Whale Playground

2.11 EVENTS AND ACTIVATION

Abalone Festival (or similar) - Raised during the CRG as an opportunity to celebrate a unique element of the site.

Location: Beach POS

Water Polo - Members of Water Polo WA attended the Community Open Day and were extremely interested in the opportunity to activate a pool on site.

Location: Pool

Dog Walking - Many community members note that they currently walk their dogs on the site and would like to be able to continue this.

Location: TBC (as appropriate)

Stage - Students highlighted the opportunity for a stage to be utilised by local 'up and coming' singers regularly.

Location: Beach POS + Central Plaza

Outdoor Classrooms - Consultation with schools highlighted an interest in classes

Location: TBC - contact with water and sheltered seating required.

Blessing of the Fleet - Raised during the CRG as an opportunity to celebrate and create an event.

Location: Groynes

Places to see Sunset - Raised during the CRG, the community wants to have picnic opportunities overlooking the water.

Location: Viewing points in the dunes, potentially central POS (given topography).

Markets - Both the CRG and general community open day highlighted an interest in markets on site.

Location: Promenade + Central Plaza

Cultural Facility / Visiting Exhibitions - Community highlighted interest in indoor/outdoor exhibition opportunity.

Location: POS adjacent to Cultural Centre (TBC)

Muscle Beach / Exercise Equipment - A well-designed outdoor training centre is lacking in the northern suburbs and contact has been made by Renee Wingfield (Fliptease and Access Circus) to assist in creating a space that can accommodate national Fitness shows in an outdoor facility.

Location: TBC

Educational Experiences with Dunes - The JCCCF has identified opportunity for the site to support educational and interpretive experiences to further support the protection of dunes surrounding the site.

Location: Dune and adjoining parks.

Surf Break / Reef - Significant support has been identified for an artificial reef or surf break by the local surfing community due to the loss of existing breaks.

Location: Ocean

Cinema - An outdoor cinema programme was widely supported during community consultation, this may be

facilitated by buildings (boat stacker) adjacent to the Beach POS.

Location: Beach POS

Community Meeting Space - Provision of space for local community groups to meet will support ongoing community ownership of the site.

Location: TBC

Art / Lighting on Groyne - An opportunity highlighted by the consultant team.

Location: Groyne

SUP, Kayak Launch - Requested by both the Boating groups and the paddling communities.

Location: Near boat launching facilities.

Snorkel Trail (Sunken Ship) - Highlighted in a number of forums, a snorkel trail could facilitate a number of recreational, cultural and environmental outcomes.

Location: Ocean

Weddings - A member of the public noted they had been married on the site and suggested this be considered in future development. Locations for large grounds to gather and have 'private' events in the POS could be a useful proposition for the council into the future.

Location: Main POS

CAT Bus - Whilst there will certainly be some form of public transport to the site the format this takes is an important issue for the community. Early collaboration with DoT, PTA and the City will be important to ensure the design of the transport system meets the site and community needs.

Location: To connect to key sites.

Fish Markets - During a project team sustainability workshop the Fish Markets was the most popular suggestion and could be a district draw card to the site.

Location: Marina

Boat Show - The community highlighted the Mandurah Boat Show as an extremely popular event and suggested Ocean Reef may be suitable for a similar event.

Location: Boat Pens and Promenade

Food Trucks - The students at both school consultation were very supportive of food trucks as a weekly event.

Location: Promenade

Fishing Competitions - Opportunity to have groyne, beach and boat fishing competitions running for the local community.

Location: Waterfront

Community Event Spaces - Infrastructure to support large community gatherings for events such as Australia Day, ANZAC Day and Christmas and Boxing Day.

Location: Throughout



Image 42. (Clockwise) Scarborough Sunset Markets (Doug Black), Scarborough Groundswell Event (Freestyle Now), Outdoor Cinema (Moonlight Cinema), Leederville Street Party (unknown)

2.12 ARTWORKS

Ensuring the artworks reflect the site, the community and the overall public realm approach is important. Whilst the artwork is often engaged as part of a separate process to landscape works it is recommended that for the Ocean Reef Marina project the opportunity to integrate artists into the design team is considered. This may include opportunity for integrated artworks that;

- Provide Wayfinding;
- Are street furniture or lighting;
- Incorporate elements of play; or
- Tell a story.



Image 43. The National Arboretum playground is sculptural and iconic (source: Landezine)

2.13 MEMORIALS

There are existing memorials on site, including the Gilt Dragon, which will be removed for construction works. Reinstatement of these memorials or consideration of new memorials should be undertaken holistically as part of the public realm, and where possible integrated into the landscape. Whilst this may depend on the memorial and the family/organisation associated with it, opportunity tell a story with the memorial should be considered. For example the playspace at Scarborough incorporates sketches of the Maslin children who died in the MH17 flight, a simple memorial to Otis, Mo and Evie, in consultation with their parents.



Image 44. Memorial to Maslin Children (Source: Buggybuddies)

2.14 WAYFINDING

Given the sites linear nature and waterfront elements wayfinding, to a certain extent, will be simple. However interpretive signage will be required to provide detailed information, instructions and information. This may take form in;

- Selection of materials to encourage subconscious wayfinding;
- Use of art/landscape elements to provide markers across the site;
- Signage that delivers information quickly and easily; and
- Development of technology to support wayfinding (such as a site specific app).



Image 45. Simple and effective delivery of information, Ciclovia de Lisboa by Joao Gomes Da Silva (Source: Landezine)

3.0 MATERIAL & INFRASTRUCTURE PALETTE

A wide-angle photograph of a coastal landscape. In the foreground, there is a sandy beach with several large, flat, grey rocks scattered across it. To the left, the ocean waves are breaking onto the shore, creating white foam. In the background, there are dunes covered in green and brown vegetation. The sky is a deep blue with a few white clouds. The text '3.0 MATERIAL & INFRASTRUCTURE PALETTE' is overlaid in a large, white, sans-serif font across the middle of the image.

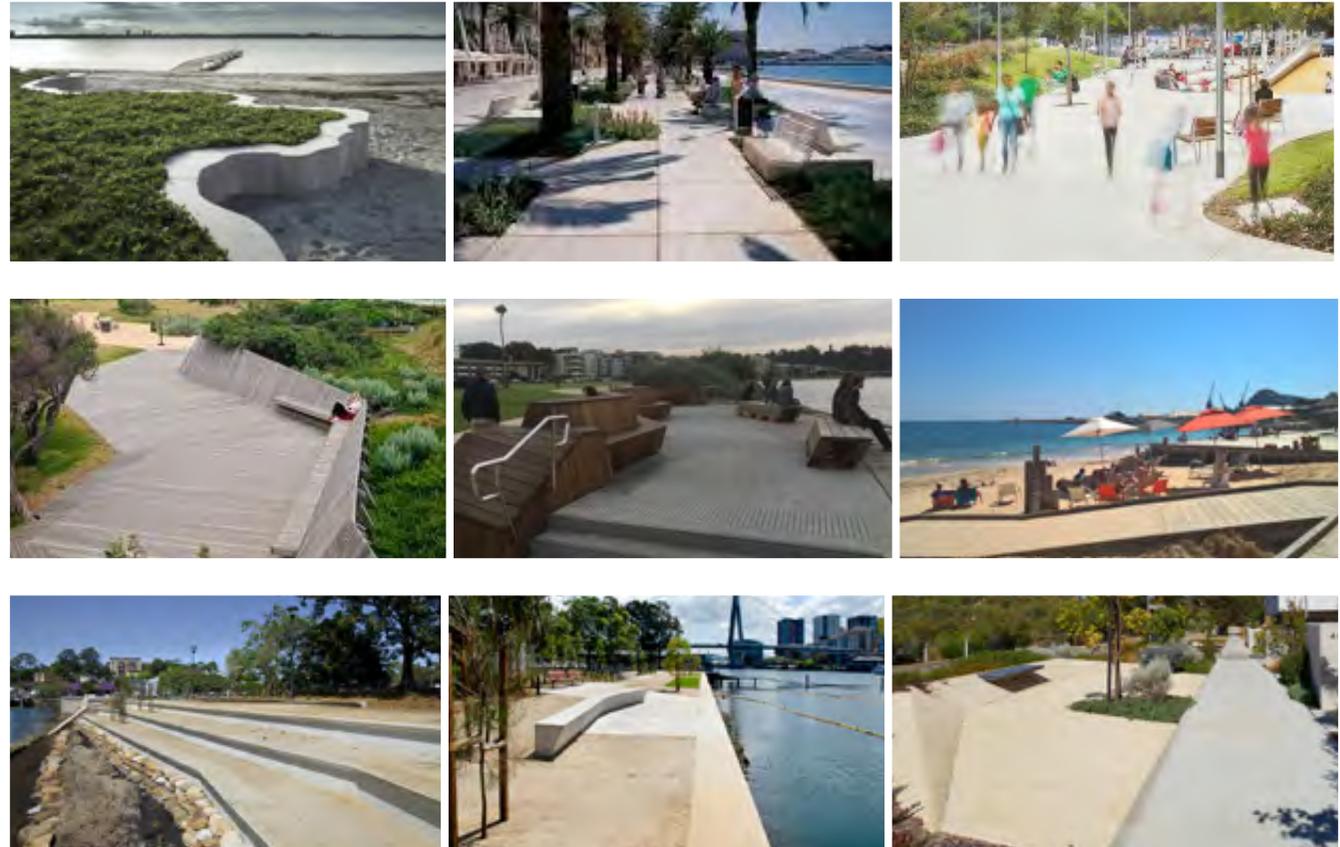
3.1 MATERIALS

The community feedback was supportive of a finish that felt 'of place' to the local environment and community. The palette developed will utilise simple natural materials where possible, referencing the natural limestone, sand and shell grit of the beaches, washed out creams of the coastal plain.

All materials will be selected with the following criteria in mind:

- Vandal Resistant;
- Consideration for ability to upkeep/maintain;
- Have local suppliers and materials;
- Environmentally-friendly, i.e. recycled, sustainably sourced, life-cycle orientation, low water use, suitable for location etc;
- Cost effective;
- Meet an aesthetic expectation;
- Suitable to the front-line coastal conditions of the site, i.e. wind and saline;
- Ability to source and install;
- Reflect the local environment; and,
- Cohesively create a palette of materials that assist in forming a unique and iconic public realm.

High Use



→ Medium Amenity ←

→ Simple /Functional



3.2 PRECINCTS

Given the scale and diversity of uses/activities of the site, it is useful to break the site into precincts of use. These precincts will be delineated by materials, finishes and furniture that reflect the zones use. Benefits of this approach include ability to match type of materials and finishes to the expected use, maintenance and budget.



Figure 16. Precinct A - Destination Precinct

Precinct A: Destination Precinct

Areas likely to be highly utilised by local, state, inter-state and international visitors for recreational purposes. These areas are defined as follows:

- This precinct will have a higher design aesthetic in line with its status as a key tourist destination for WA;
- With the large number of visitors the materials and design approaches will be high quality, robust and vandal resistant;
- Materials will be utilised to assist in way-finding;
- It is expected that this area will require higher maintenance than the rest of the site, due to significant visitor numbers and an expectation for a high level of presentation; and
- These areas will support the marina's objective to be iconic and of-place, utilising local materials in a unique manner to create a strong character immediately identifiable as Ocean Reef Marina.



Figure 17. Precinct B - Community Precinct



Figure 18. Precinct C - Operational Precinct

Precinct B: Community Precinct

Precinct more likely to be populated by the local community to meet their day to day social and recreational needs. These areas are defined as follows:

- The community has strongly advocated for community use areas to be reflective of the local vernacular, to feel 'of place';
- Materials will be a more simple type and application but will be good quality and provide an ease of maintenance to ensure longevity and condition are continued; and
- The community precinct palette will support the Destination Precinct to create a cohesive and unique palette for the entire site.

Precinct C: Operational Precinct

This precinct will incorporate the 'functional' marine infrastructure. These areas are defined as follows:

- Materials will be robust and functional, supporting the public realm elements of spaces which will be both open to public and utilised for industrial works;
- Given the large expanses of hard stand in these areas materials will be cost-effective but will, where possible, work to soften or breakup the landscape, through both aesthetic and opportunity to incorporate living/green elements;
- Mitigate and manage any heat island effect; and
- Materials will work to intuitively guide and direct visitors through these areas.

3.3 PAVEMENTS

Pavements (Stone) - *Precinct A*

WA stone, including Tamala Limestone Pavers (shown top) and WA Granite (below).



Image 46. Hospice Fredericksberg, (Source: Landezine)

Technical Stone; Top Cobbles from Eco Outdoor and, below, Brikmakers Trafficable Pavers in Lundra.



Image 47. Barangaroo, Sydney

Pavement (Timber Decking) - *Precinct A, B*
Weathered timber decking from recycled pieces.



Image 48. Pirrama Park (Source Fleetwood.com)

Pavement (Feature) - Precinct A, B

Feature paving elements utilised to address localised site requirements or way-finding. Shown; Outdoor Tiles (Top Left), Timbercobble (Bottom Left) and Stabilised Limestone (Right).

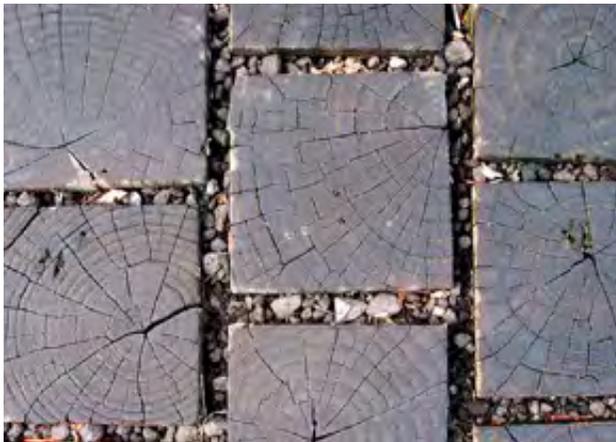


Image 49. Booyeembara Park, Fremantle

Pavement (Concrete) - *Precinct A, B, C*
Exposed Aggregate, shown Boral 'Lucky Bay' and Luminescence. Opportunity to incorporate custom colours and aggregates for a mix that meets specific project needs.



Image 50. Ladeira de Barroquinha Urban Staircase (Source: Pinterest)

Grey Concrete with broom finish or Salt Finish.



Image 51. Riva Waterfront, Split (Source: Pinterest)

3.4 WALLS

Walls (Concrete) - *Precinct A*
Grey Concrete Wall



Image 52. St Kilda Foreshore (Source: Pinterest)

Walls (Stone) - Precinct A, B, C
Limestone Block Walls



Image 53. Knutsford Limestone Path and Wall

Walls (Feature) - Precinct A

Feature bricks Austral (Left Top), Off-Form Concrete (Left Bottom) and Timber (Right).



Image 54. Keast Park (Source archdaily.com)

3.5 FURNITURE

Given the regional importance of Ocean Reef Marina it is expected that a palette of customised furniture will be developed specifically for the project. The materials will reference the material palette and will be simple, robust and suitable for the coastal environment. Opportunity to utilise salvaged jetty timber from site will be considered to ensure the suite of furniture feels local and 'of place'. The custom palette will mostly be utilised in high amenity areas, areas of medium and low amenity will preference furniture selected from a local suppliers 'off-the-shelf' range.

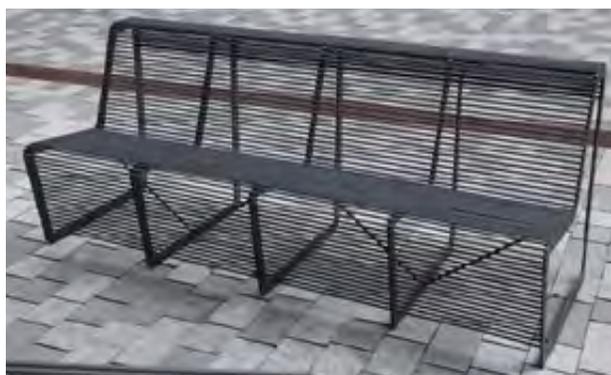


Image 55. Agence Ter Boulogne (Source: Pinterest)

Furniture (Bench Seats)



Off The Shelf Concrete Bench Seats, shown seats supplied by Bellitalia, Rages are shown Left to Right Arrow, Kubba and Lido



Off The Shelf Steel Bench Seats, shown range Limpido by MMCite.

Furniture (Table & Chairs)

Table and Chairs, Brushed Steel Base with Recycled Weathered Timber to Top. Setting shown Left by Botton and Gardiner PicBul Setting.



Furniture (Other)



BBQ - Christie A-Series All Access



Drink Fountain - Arqua Dog Bubbler



Tree Ring (when needed) - Circle BellItalia



Bin - Big Belly



Bike Hoop - SPARK Corso

3.6 CUSTOM ITEMS

Custom Items (Integrated Furniture)

Utilising weathered timber and concrete to create unique integrated elements.



Custom Items (Independent Furniture)

- Utilising Salvaged and Recycled elements to create unique and site specific elements.



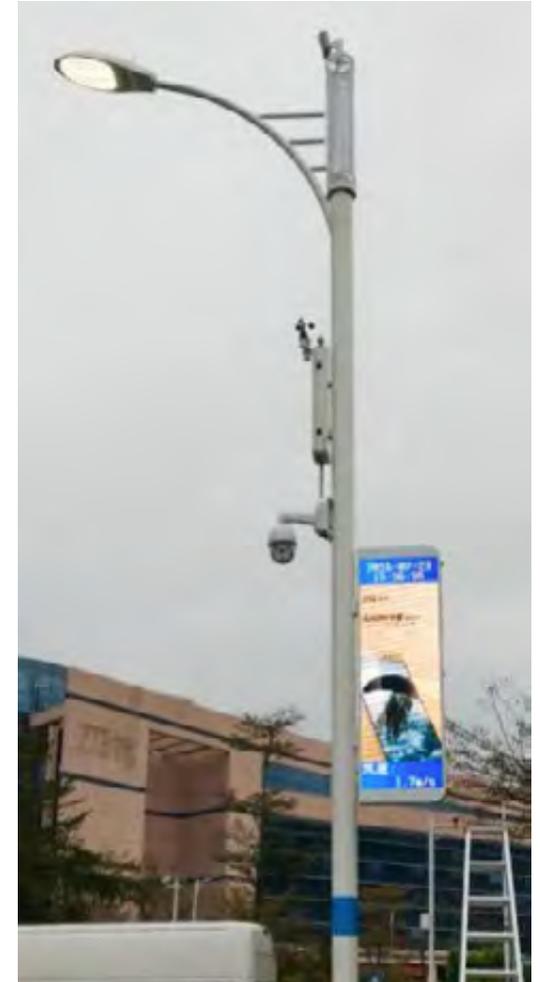
Custom Items (Shelter)

- Shelter materials to reflect site material palette and to be designed to allow for scaling and assorted uses.



Custom Items (Integrated Technologies)

Integrated technologies such as Smart Poles, dynamic lighting and adaptable way-finding. These technologies will be implemented in line with a precinct wide sustainable smart infrastructure approach.



4.0 CONCLUSION



4.1 CONCLUSION

Whilst the Ocean Reef Marina project has been in planning phase for decades the State government funding contribution, refined concept and associated consultant works has shown a tangible commitment to the construction of the Marina. This Public Realm Masterplan document captures both the processes in developing the Masterplan, and the outcomes of this process. The document will be a reference for the project team moving forward through delivery phases of this Ocean Reef Marina.

Project delivery phases are dependent on a number of factors, most significantly successful and timely approvals. Currently the approach to delivery of landscaped public realm works will be programmed to follow on from key civil construction phases, likely to begin early 2020.

Beyond 2020 the project delivery will be in line with the community desire, economic considerations and ongoing approvals and funding requirements.

It is intended that this Public Realm Masterplan will be a guiding document throughout the delivery of all packages of works.



5.0 APPENDICES

APPENDIX A - LANDSCAPE MASTERPLAN

APPENDIX B - DEVELOPMENT OF PREFERRED CONCEPT PLAN

APPENDIX C - PARTICIPATORY DESIGN

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NEW IDEAS THROUGH
SHARED DESIGN-THINKING