

MANDURAH FORESHORE FOCUS 2020

Vision

VOLUME 2 – CONTEXT ANALYSIS

APRIL 2007



Table of Contents

1.0	CULTURAL CHARACTERISTICS & ISSUES	1
1.1	THE PEOPLE – DEMOGRAPHICS	1
1.2	CULTURAL ASSETS OF MANDURAH FORESHORE	2
1.3	COMMUNITY SERVICES	3
1.4	SOCIALISING NEEDS OF PEOPLE	4
1.5	OPPORTUNITIES AND CHALLENGES	5
2.0	HERITAGE CHARACTERISTICS & ISSUES	13
2.1	PRE-EUROPEAN SETTLEMENT	13
2.2	HISTORIC EVOLUTION	14
2.3	PLACES OF HERITAGE INTEREST	19
2.4	OPPORTUNITIES & CONSTRAINTS	22
3.0	LAND USE, CHARACTER & FORM ANALYSIS	35
3.1	GENERAL OVERVIEW	35
	PRECINCT 1	35
	PRECINCT 2	35
	PRECINCT 3	35
	PRECINCT 4	36
	PRECINCT 5	36
	PRECINCT 6	36
	PRECINCT 7	37
	PRECINCT 8	37
	PRECINCT 9	37
	PRECINCT 10	38
3.2	PUBLIC SPACES NETWORK	38
3.3	PLANNING AND DESIGN OPPORTUNITIES & CONSTRAINTS	38
4.0	MOVEMENT	41
4.1	ROAD HIERARCHY	41
4.2	PUBLIC TRANSPORT	41
4.3	PEDESTRIAN AND CYCLE NETWORK	41
4.4	TRAFFIC AND ACCESS ISSUES	41
4.5	PARKING	42
4.6	OPPORTUNITIES AND CONSTRAINTS	42
5.0	ENVIRONMENTAL CHARACTERISTICS	43
5.1	HYDROLOGY	43
5.2	WATER QUALITY	43
5.3	ACID SULFATE SOILS	44
5.4	BOAT WASH	44
5.5	ENVIRONMENTAL CHARACTERISTICS	44
5.6	OPPORTUNITIES & CONSTRAINTS	47
6.0	MARINE CHARACTERISTICS	49
6.1	BOAT USAGE/DEMAND	49
6.2	NAVIGATION CHARACTERISTICS	49
6.3	FORESHORE CHARACTERISTICS	52
7.0	SERVICES	56
7.1	DRAINAGE	56
7.2	WATER SUPPLY	56

7.3	ELECTRICITY	56
7.4	GAS AND TELECOMMUNICATIONS	56
7.5	SEWER	56
8.0	TOURISM & COMMERCIAL	57
8.1	TOURISM CHARACTERISTICS	57
9.0	COMMERCIAL DEVELOPMENT	59
9.1	MANDURAH REGION COMMENTARY	59
9.2	MANDURAH FORESHORE FOCUS 2020 – PRECINCT ANALYSIS	60
	PRECINCT 1	60
	PRECINCT 2	60
	PRECINCT 3	61
	PRECINCT 4	61
	PRECINCT 5	62
	PRECINCT 6	62
	PRECINCT 7	62
	PRECINCT 8 – SOLDIERS COVE	62
	PRECINCT 9	63
	PRECINCT 10 – WESTERN MARINA EDGE	64
10.0	SUMMARY OF KEY CONSIDERATIONS	65
10.1	GENERAL	65
10.2	LAND USE	65
10.3	MOVEMENT	65
10.4	PUBLIC SPACES AND ENVIRONMENT	65
10.5	BUILT FORM	66
11.0	REFERENCES	67

1.0 CULTURAL CHARACTERISTICS & ISSUES

At the centre of functional settlements across the globe is 'common ground', where the community gathers to celebrate, recreate and meet socially.

Mandurah grew around Mandjar Bay. Generations have fished for crabs, chased seagulls in the shallows or picnicked on the lawns. Simple, innocent, and free-entry activities that are community and family based, inextricably linked to the estuary and ocean landscape. This distinctive communal way of life, linked to its natural environment and heritage, is the basis of Mandurah's culture, its sense of place and its sense of identity.

The Mandurah Foreshore Focus 2020 Study represents a significant opportunity to plan holistically for a sustainable future for the cultural heart of Mandurah, as well as work towards achieving key objectives in the City's Community Charter & Strategic Plan.



Figure 1.1: Family gathering on the foreshore edge between King Carnival and the estuary in Hall Park (Precinct 4)

1.1 THE PEOPLE – DEMOGRAPHICS

1.1.1 Rate of Overall Population Growth

In 14 years, the City's population has doubled from 29,000 in 1991 to more than 60,000 in 2005. Based on continued average annual growth of 5.1%, Mandurah's population will exceed 100,000 by 2015, and reach 115,000 by 2020. A combined population growth in the City of Mandurah and Shire of Murray of 167% between 2001 and 2031, will allow the population to reach 188,000 by 2031.

1.1.2 Age Distribution

The 65 plus age group has been the fastest growing, with 18.2% of the city's population in 2003. Also the 55-59 age group grew by 45.6%, or 1,091 people, between 1999 and 2003. The availability of relatively affordable housing has seen an increase in younger families moving to Mandurah. Between 1999 and 2003, growth in the 15-19 and 20-24 age groups was above the city average (24.9% and 31% respectively), whilst the largest population category in recent years has consistently been the 10-14 age group, comprising 7.5% of Mandurah's population in 2003.

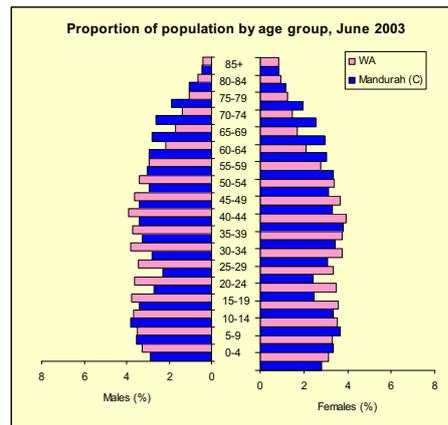


Figure 1.2: Age distribution comparison Mandurah and WA 2003

1.1.3 Families

The proportion of couples without children is 45% compared to 36% state wide. There is a significant proportion of one parent families 16% (compared to 15% in WA). Indigenous people make up 1.9% of the population. There is a growing number of migrants from the UK and from non-English speaking backgrounds, including refugees from Sudan, Ethiopia and Kenya.

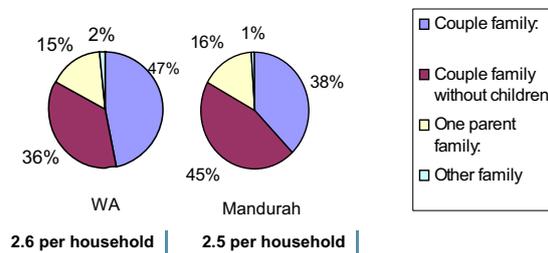


Figure 1.3: WA & Mandurah Family Profile – Adapted From ABS 2001

1.1.4 A Tale of Two Cities

Peel Away the Mask, a report documenting social conditions in Mandurah and Peel Region, dispelled the notion that Mandurah was a city populated primarily by wealthy retirees, and revealed that a high proportion of socially isolated and vulnerable people existed. Mandurah currently has a high pension and welfare dependant demographic, prompting concerns for community / health services provision, transport and mobility needs, recreation trends and disposable income and financial issues.

1.1.5 Income

The percentage of age, disability support pension, parenting allowance, youth and new start allowance recipients in Mandurah is considerably higher than both the Western Australian and national average 26% of Mandurah's population (2002) compared to 18.5% in WA (2002) and 18.7% nationally (2001).

In 2001, 24% (the biggest single proportion) of Mandurah households had a weekly income of \$120-\$299, compared to 7% in Perth Metro region. Mandurah's median weekly household income in 2001 was \$581, compared to \$805 in Perth Metro region.

1.1.6 Employment and Education

Whilst the unemployment rate for Mandurah has been steadily falling, 7.9% in 2005 (4.7% for WA in 2005), youth unemployment has been rising. The City had a youth unemployment rate of 22.8% in 2001, compared to 14.1% in WA. 49.6% population of Mandurah are in the workforce (WA 62.5%). In 2001 24% of school students completed Year 12 or equivalent compared to 38.3% in WA.

1.2 CULTURAL ASSETS OF MANDURAH FORESHORE

For each of the 10 study precincts, **Appendix A** summarises the value of the foreshore as a multifaceted cultural resource, including community use facilities, events, festivals and celebrations; recreation opportunities, community and cultural assets.

1.2.1 Mandurah's Cultural History

Mandurah's first inhabitants were the Binjareb people of the Bibbulmun Nation. Today Mandurah has a thriving Noongar community with links to Binjareb culture and respect for country.

Mandurah was originally a meeting place where fish were traded with visitors from other areas and where significant community celebrations were conducted.

Longer term Mandurah residents and those that holidayed as children have happy memories of days at the beach, knowing the neighbours, links to fishing and farming, catching crabs, wading along the foreshore.



COMMUNITY SERVICES

1.2.2 Cultural Icons

Natural Foreshore - Mandurah's relatively slow infrastructure in the latter part of the 20th Century has left many of the original features along the water's edge:

- sandy, shallow beach shaded by Casuarina trees on the Western foreshore;
- tree lines dominating the landscape and unimpeded views of the estuary mouth;
- remnant wetlands - sites for wading birds; and
- the popularity of the bay with dolphins and pelicans, despite the increase in motor boat traffic.

These are natural attractions for residents and visitors to experience. They cannot be replaced and are invaluable assets to the community.

Robert Point and Halls Head (Doddy's) Beach

- Cultural and heritage artefacts from the Sir James Service shipwreck (right)
- Glorious viewing point eg Dolphins surfing
- Family Ocean Beach

Eastern Foreshore (Precinct 9) is a gathering place which includes modern icons:

- **Mandurah Performing Arts Centre** (MPAC)
- **Mandjar Square** cultural precinct including the cinema
- **Dome Café** and adjacent restaurants

Old Traffic Bridge is valued for:

- its form framing the estuary views rather than dominating them;
- its function connecting east to west; and
- its unique elements – jetties underneath providing opportunities to interact with the water.

Hall Park (Precinct 4) is a multi-purpose space including:

- **King Carnival** - in particular the ferris wheel.
- **Skate Park** - an icon with young people.
- **The War Memorial** - appreciated by all sections of the community, seniors in particular.
- **Halls Cottage** - one of the oldest remaining buildings in Mandurah c 1832.

Mandurah Community Museum (Precinct 8) holds the memories of Mandurah and also memories of people born in Perth and the wheat belt who have holidayed in Mandurah for over 100 years.

1.3

Mandurah foreshore's value as a "common", a heart for its diverse community, is reflected in its role as a major location for Community Services facilities infrastructure and service delivery including:

1.3.1 Events, Arts & Culture



Free community events and festivals held in partnership with the local business community and voluntary groups involve up to 50,000 participants. Precincts 4 and 9 host the majority of events.

Table 1 - Events / community activities focussed on foreshore study area

Event	When	Attendance	Audience	Demographic
Australia Day	26 Jan	2000+	Local	All ages
Touch the Sun	Jan - Mar	1000 - 2000	Local	All ages
Stretch	May	500+ / event	Regional	All ages
Little Nippers	October	7 - 10,000	Regional	0-13 & 30+
Christmas Carnival	December	15-20,000	Regional	All ages
New Years Eve	31 Dec	20-25,000	Regional	All ages
Crab Fest	March	80,000	State	20-65

1.3.2 Community Infrastructure

Many civic buildings and agencies have been located in prominent positions around the foreshore (Precincts 8 & 9), including Council offices, Mandurah Senior Citizens Centre, Mandurah Community Museum and meeting halls.

1.3.3 Principle of Inclusiveness

By promoting access to the foreshore and other places that are vested publicly in the whole of community, the City of Mandurah continues to value all its citizens equally and cares about creating opportunities for them to come together in diverse, social / recreational ways.

1.3.4 Importance of Mandurah Foreshore to Community Wellbeing

Human interactions with nature through parks and open space, such as the foreshore may have significant capacity for building social capital, cohesion and a sense of belonging. Parks are a fundamental health resource, particularly in terms of disease prevention. Well managed, socially inclusive open spaces can reduce crime, reduce stress, boost immunity and promote healing, and generally improve individual and community well being in the areas of social, mental, spiritual, physical and environmental wellbeing.

1.4 SOCIALISING NEEDS OF PEOPLE

Humans are naturally gregarious. Mandurah Foreshore provides the public realm for residents and visitors to congregate, interact, recreate and celebrate.

1.4.1 Young People (Aged 13 to 25)

In June 2003 the highest proportion of Mandurah's population was 7.5% (approximately 4,200) in the 10 – 14 age bracket. As this group matures it will boost the proportion of young people in the city. The main socialising needs of young people are:

- to congregate with people their own age in a safe and welcoming environment;
- to be accepted by their peers and the wider community;
- to be physically part of the public realm; and
- to have affordable and accessible recreation opportunities.

The City's Youth Strategy Report (2000) recognises these needs in three relevant objectives, which the Vision can help to achieve, namely:

- **Public Space:** to improve connection of young people to the community by ensuring their acceptance in utilising public space;
- **Recreation & Leisure:** to ensure provision of leisure choices both formal and informal, which enhance social opportunities and improve the quality of life for young people; and
- **Culture & Arts:** to encourage creative expression of both youth sub-culture and community culture which recognises and celebrates differences in cultural identity.

In a survey of Mandurah youth, *hanging out* and *time with friends* (55.8%) were the most frequent responses to *often enjoyed* activities. Current important places to *hang out* for young people within the study area include:

Mandurah Skate Zone Skate Park important to young people as a meeting point, and not just as a place to skate. It is successful because:

- its central location demonstrates that young people are a valued part of the community;
- excellent natural surveillance ensures a relatively safe and crime free venue in accordance with CPTED principles; and
- It is accessible by active and public transport.

Skate Zone would benefit from the addition of seating, shade and water bubbler to enhance its function as a key social gathering area for young people of both sexes, and additional space to cater for female use of the facility such as a rollerblading area. Skate boarders are always looking for a new challenge. Creation of a skater's trail with obstacles at intervals might help prevent inappropriate use of the War Memorial.

King Carnival fulfils a role in providing younger teenagers with a place to socialise, independent of parent / guardian supervision, as well as fun and entertainment.

Older teenagers, from 16 years and above prefer not to socialise with the younger ones, although the potential relocation of King Carnival presents an opportunity to introduce more exciting rides / activities aimed at the older teenage audience.

Old Traffic Bridge Fishing Jetties and to a lesser extent the jetties beneath the Estuary Bridge (Mandurah Bypass) between Precincts 6 and 7, provide opportunities for all to interact closely with the aquatic environment. It is attractive as a meeting place for young people as it is free to be there and revolves around relatively affordable activities such as fishing / crabbing.

There is an opportunity in the Old Traffic Bridge reconstruction to duplicate and improve upon this iconic feature by increasing the amount of space on the platforms, improving safety through application of CPTED principles and provide universal access.

Halls Head (Doddy's) Beach is popular with young people but under utilised because of its relative inaccessibility, and its lack of facilities. Potential initiatives which may attract more young people and families in general with economic benefits for the area include:

- a footbridge connection across the canal entrance between Precincts 4 and 3 would reduce the journey time from the CBD and facilitate an attractive foreshore active transport route;
- a frequent CAT type bus service would improve public transport in summer months; and
- a youth focussed café, perhaps as part of a Surf Life Saving Club.

The **Eastern Foreshore's** southern end is becoming increasingly congested by both people and traffic and this poses a challenge in planning for:

- a safe meeting place for young people and other groups such as seniors;

- conflicting needs of commercial sector and young people; and
- accommodating transport modes of young people – cycles, stake-boards, scooters.

Music Venue: currently there is no venue in Mandurah for contemporary music concerts, a vital part of youth culture. An opportunity to provide a large tavern / hotel type facility with music licence within the study area would be welcomed by the youth of Mandurah, young parents and other groups.

1.4.2 Seniors

Mandurah has a large population of over 65's, as well as an ageing population. This ageing population group is not homogenous in need and interests. They do not like being isolated but like inter-generational contact. A basic need for many seniors is human contact. Whilst many seniors reside in purpose built retirement villages, others live independently in older residential areas close to the foreshore. They are often socially isolated, with few chances to engage in conversation with people.

The foreshore, particularly Precinct 9, fulfils a vital function in providing opportunities for social interaction (often seniors cannot afford to purchase entertainment and sitting on a bench in a pleasant location can fill the gap) and socially inclusive meeting spaces which bring together all citizens.

Seniors and other groups also value:

- accessible, welcoming spaces to meet others, with plenty of shaded seating areas close to water fountains and toilets;
- the village like atmosphere of the foreshore and the CBD area immediately adjacent to it ; and
- the human scale of the built environment, not dominated by the car, with vegetation and foreshore views which add visual character.

There is an opportunity to enhance existing foreshore areas to cater more for needs of the wider community:

- by providing wider paths to cater for all active transport modes including gophers;
- gopher parking infrastructure;
- more frequent shaded seating areas with water fountains and toilets; and
- improved public transport network – kneeling buses and central stopping off points.

1.4.3 People with Disabilities

As well as paths built to universal access Australian Standards, people with disabilities would benefit considerably from the provision of facilities catering to their needs within the public realm. For example an innovative wheelchair access *Liberty Swing* located along the eastern foreshore (Precinct 9) would provide recreational benefits for disabled people in a prominent location.

1.4.4 Families and Baby Boomers

Historically the foreshore has always been popular with families. The natural foreshore edge and shallows provide safe beach and water based activities for children, and shaded barbecue areas are popular for picnics. The playground in precinct 9 is a hive of activity. The annual community events attract large numbers of families.

Whilst there has always been a focus on the needs of seniors and youth, those in their fifties who are *empty nesters* or divorced need access to entertainment appropriate to their age, disposable incomes, marital status and tastes. An increase in al-fresco dining, open air musical performances, dual use paths and interpretive trails, and workshops based on arts practice are appealing to this demographic.

1.5 OPPORTUNITIES AND CHALLENGES

The Mandurah Foreshore Focus 2020 Vision represents an opportunity for a sustainable vision for the heart of Mandurah, that reflects contemporary social, environmental and economic challenges facing the whole community. Foreshore Focus 2020 Vision has the potential to become a best practice demonstration project in place making, incorporating social inclusiveness, connectivity and circulation, active and public transport links, co-location of activity, innovative ecologically sustainable design, employing crime prevention through environmental design (CPTED), livable neighbourhoods and healthy active living design principles.

1.5.1 Social and Cultural Inclusion

The foreshore is largely public space. Considering public as a neighbour and collective owner of this space should be a key thought in the planning for 2020. To facilitate genuine involvement and ownership it is necessary to take the concept plan out to community stakeholders, to where the community meets through:

- Exhibitions and presentations to existing community group meetings and gatherings.
- Exhibitions at key locations - Mandurah Library, Forum, Centro Halls Head, MPAC and Council Administration Foyer, Billy Dower Youth Centre and The Senior Citizens Centre.

It is important to engage vulnerable groups such as sole parent families and low income families with young children, who rely on the foreshore for free entry recreational activities, and appreciate the non-commercialised character of Hall Park in particular.

Opportunity 1 – Cultural Mapping and Recreation Needs Strategy

Further research is needed into patterns of use of the foreshore, involving the participation of the community. This could take the form of a cultural mapping exercise, focussing on:

- Local identity - how people interact with the natural and built environments of the foreshore; history and stories; and the cultural mix of the population using the foreshore;
- Public Participation – people’s usage of the foreshore, participation in events, festivals, arts, existing and future land based and aquatic recreation needs patterns; and
- Local Economy: cultural industries such as markets, local food and drink, and cultural tourism.

Opportunity 2 – Engage the Noongar Community

The outreach approach is most relevant to the local Aboriginal community. Noongar people have generally been excluded from decision making processes. Traditional local government public meetings can be threatening and disempowering to Aboriginal people.

Consultation observing appropriate protocols needs to be on several levels:

- Traditional ownership – engage South West Aboriginal Sea and Land Council and native title claimants and to clarify any existing or proposed land claims over the foreshore in particular the Single Noongar Claim (SNC);
- Traditional Owners speaking for Country - engage elders of the Peel Region main family groups;
- Cultural Importance of the Foreshore - with elders and other members of the community, explore historical links to the foreshore, cultural tourism, arts and interpretation, business opportunities. For example develop an interactive trail utilising the pedestrian network, such as *One Track for All* in Ulladulla NSW. (Fig 9 below)
- Community Value and Current Use of the Foreshore: What are the wider Indigenous community’s recreational needs and usage patterns along the foreshore?



Figure 2.4: One Track For All - Ulladulla’s Budawang people partnered the non Indigenous community to create a 2 km shared use trail with 200 carvings depicting the area’s history.

1.5.2 Universal Access

In order to manage access to and movement in and around the foreshore by residents, visitors and tourists, it is important to plan strategically for integrated movement and transport systems, which relate to land use patterns, health and environment and which take into account:

- increasing population and visitor pressures on the foreshore and CBD areas;
- exploiting the opportunities the southern suburbs rail link will deliver to Mandurah;
- prioritising the public and active transport opportunities which utilise land and water, and contribute to reducing traffic impacts, car dependency and fossil fuel use;
- the demographics of the City - high proportions of children, seniors and people with disabilities; and
- the space requirements for community events and gatherings to remain viable

Opportunity 3 – Connecting foreshore to the wider community.

Opportunity exists to integrate a foreshore pathway system with city wide network of walking and cycling paths for social, recreation and transport purposes, including:

- Safety - ensuring a safer environment for walking and cycling, minimising traffic conflict
- Connectivity – connecting foreshore precincts directly and conveniently to key trip generators such as:
 - the rail / bus transit station,
 - Mandurah Forum and commercial areas
 - parking outstations,
 - public transport access points (including future estuary ferry or water taxi services)
 - civic, cultural and library precincts,
 - recreation areas, schools and surrounding suburbs

to encourage integration and social interactions in and between neighbourhoods and the foreshore.

- Accessibility – providing equity of access and mobility for all users. It would be designed to cater for pedestrians, cyclists, gophers, skateboards, strollers, wheelchairs. Consideration needs to be given to separation of wheeled traffic from foot traffic in the congested parts of the foreshore.
- Amenity Vitality and Cost Effectiveness – environmentally attractive routes designed to encourage walking and cycling. More active spaces and corridors for people to gather have potential to boost the local economy.

A well signposted network, incorporating frequent shaded resting areas, with access to water and toilets can promote active living and better community health, as well as being a venue for interpretive cultural, nature and educational trails. These would complement existing heart walks infrastructure.

Opportunity 4 – Connecting Hall Park to Henry Sutton Grove

The opportunity to connect previously fragmented sections of foreshore open space and nodes of activity via a traffic free people corridor has the potential to make a major contribution to improving equity of access, the quality of life for residents of Mandurah and the region, as well providing an attraction for visitors.

In particular by prioritising the bridge connection of Hall Park to Henry Sutton Grove would be socially beneficial by linking the two parks across the canal. There are economic benefits in encouraging people to stay on the foreshore longer, especially if night markets and eating/drinking outlets are introduced. The link will also encourage people to explore further around the estuary, and reduce travel times on foot and by bike to Halls Head Beach.

1.5.3 External Factors Impacting on Mandurah Foreshore

Increasing population pressure Population growth and increase in tourism will place enormous stress on: existing social dynamics; finite open space resources; and the ecological integrity of terrestrial and aquatic environments of the foreshore, estuary and Peel Harvey waterways system.

Climate change - South West Australia is experiencing world wide trends of warming and sea level rise. A greater understanding of these processes, taking into account rising sea level, would guide appropriate infrastructure development to ensure it does not impede the natural system.

Oil vulnerability and car dependency - As oil supply becomes less certain, less affordable and its use becomes less environmentally acceptable, decision makers are employing a range of solutions including tougher emission standards and the use of cleaner fuels; and reducing car dependency by better integrating land use and transport planning. The future health and viability of the foreshore depends on whether its circulation network reflects this change in thinking or otherwise.

Loss of Biodiversity – The need to educate and raise awareness of the value of and need to conserve vital ecosystems such as the wetland areas in the southern sector of the foreshore study area for this and future generations is paramount, including an opportunity to aim for a net biodiversity gain.

1.5.4 Integrated Planning - Towards a Foreshore Authority

The key to managing these impacts is to adopt a whole of government approach, and create a unitary authority with jurisdiction over the whole foreshore and CBD area. Steps to achieving this goal include integrating planning for Foreshore 2020 with:

- CBD Revitalisation planning, as the two study areas are physically and culturally linked.
- Strategic plans for the City and Peel Region.
- Community Infrastructure and Active Reserve Planning.
- Peel Region Economic, Recreation and Tourism Plan.
- Peel Harvey Catchment and Coastal Plans.

1.5.5 Community & Cultural Values of Mandurah Foreshore

		1 Halls Head (Doddies) Beach	2 Kingsley Fairbridge Res. & Mary Street Lagoon	3 Henry Sutton Grove	4 Hall Park
COMMUNITY VALUES AND USES	Facilities	<ul style="list-style-type: none"> North facing ocean beach. Deli, telephone, ablutions. Beach wheelchair hire. 	<ul style="list-style-type: none"> Mary Street Lagoon moorings. Old Yacht Club Community Hall (250+ capacity) 	<ul style="list-style-type: none"> Toddlers Play area Safe Beach Shaded Picnic Area 	<ul style="list-style-type: none"> Swim Enclosure Dive Platform. Pedal Boats Sea Trampoline. Skate Zone King Carnival BBQs Picnic area Small play area Diner War Memorial Helicopter landing area
	Events Festivals & Celebrations	<ul style="list-style-type: none"> Dolphins Dash Fun Run. Touch the Sun Summer Concerts. Triathlon. Swimming and Water Safety Training. Ceremonies & Community Gatherings. 	<ul style="list-style-type: none"> Playgroups. Yoga & exercise class Educational seminars. Vietnam vets meet Fundraisers eg Lions. Heart & Soul Choir. Beat the Feat. Bands. Over 55s cycling. Blue light discos. Weddings/birthdays 	<ul style="list-style-type: none"> Christmas Pageant New Years Family, religious, school, sport picnics 	<ul style="list-style-type: none"> Little Nippers Children's Festival Christmas Pageant New Years Eve Fireworks. Concerts. eg Schoolies NAIDOC Week Remembrance Day & Anzac Days Commemorative Events for War Veterans. Triathlon. Dolphins Dash Fun Run. Dragon Boat Regatta. Frederick Ashton Circus. Equestrian Event. Open Water Swim. Physical Activity Day Family, religious, school, sport picnics. Weddings & birthdays. CrabFest (overflow parking) Boat Show (overflow parking)
	Recreation Opportunities	<ul style="list-style-type: none"> Swimming. Diving platform. BBQs & picnics. Weddings & birthdays. Safest ocean beach for children and novice swimmers. 	<ul style="list-style-type: none"> Picnics. Walking Heartwalk 2. Dog exercise and socialising area. Sundowners. Wildflowers Boating & Sailing Canoeing & Sailing Fishing Beach Volleyball 	<ul style="list-style-type: none"> Safe paddling for toddlers Foreshore walks Heartwalk 2 Picnic Fishing Play 	<ul style="list-style-type: none"> King Carnival. Walking / promenading. Picnics & BBQs Estuary swim, dive & beach activities Dingy Sail Training. Kayaking & Canoeing. Disabled Fishing Fishing Halls Head Junior AFL Mandurah Pirates Rugby Mandurah City Soccer. Touch Football. Skate & BMX Series Skateboard Workshops
	Other				<ul style="list-style-type: none"> RSPCA dog training. Volunteer Fire & Rescue Brigade Training Charity Motor Cycle Rides.

		5 & 6 Sutton Farm & Samphire Cove	7 & 8 Waterside & Soldiers Cove	9 Eastern Foreshore & Manjar Square	10 Mandurah Ocean Marina
COMMUNITY VALUES AND USES	Facilities	<ul style="list-style-type: none"> CALM Bird Sanctuary Bird Hides Interpretative Shelter Boardwalk and Trail Sutton Farm Small Beach & Jetty 	<ul style="list-style-type: none"> 7 Waterside Estuary Beach Picnic area 8 Dalrymple Park Museum Old School House BBQ & Picnic Ground 	<ul style="list-style-type: none"> 800 metres of picnic lawns Large Adventure Playground Rotunda – bandstand BBQ shelters Close to CBD facilities 	<ul style="list-style-type: none"> Small Beach Adventure Play Area Multipurpose open space area Boche Courts Boardwalks Market Hall
	Events Festivals & Celebrations		<ul style="list-style-type: none"> 7 Waterside Large flat area has potential for small intimate events 8 Dalrymple Park Monthly markets. Weddings / Birthdays. Family Picnics & Gatherings. Outdoor Museum events. 	<ul style="list-style-type: none"> Crabfest Children’s Festival Christmas Pageant Carols by Candlelight. New Year’s Eve Australia Day Touch the Sun concerts Stretch Festival Naidoc Week Seniors Expo Manjar Summer Markets. Dolphins Dash Fun Run. Rotunda – various band concerts, events. Weddings & birthdays Family picnics and BBQs. Religious gatherings. Physical activity day. Aerobics and dance. 	<ul style="list-style-type: none"> Mandurah Boat Show Touch the Sun Concerts Celebrations
	Recreation Opportunities	<ul style="list-style-type: none"> Fishing & Crabbing. Gathering point. Estuary Views. Disabled fishing workshops. Canoe and kayak landing. 6 samphire marshes photo Indigenous site Flora and Fauna spotting Educational value – activity for school & community groups. 	<ul style="list-style-type: none"> Heartwalk 1 Historical Walk Informal play Picnics Walking / Cycling Flora & fauna observation 	<ul style="list-style-type: none"> Heartwalk 1 Historical Walk Informal shallow water activities – eg paddling Picnics & BBQs 	<ul style="list-style-type: none"> Swimming Boating Fishing Play area Kick-a-bout Boche
	Other	<ul style="list-style-type: none"> Key ecological value as the “kidneys” of the estuary. 			

COMMUNITY & CULTURAL ASSETS	1 Halls Head (Doddies) Beach	2 Kingsley Fairbridge Res. & Mary Street Lagoon	3 Henry Sutton Grove	4 Hall Park
	TANGIBLE	<ul style="list-style-type: none"> Artefacts from Sir James Service. Memorial to those lost in wreck. Viewing point. 	<ul style="list-style-type: none"> Old Yacht Club. Burial ground for Aboriginal prisoners who drowned in Cod Bay and thought to be buried at bottom of Hill St. Camping ground for 10th Light Horse Regiment who exercised their horses in the ocean. Noongar camps. Summer camp for Fairbridge kids. 	<ul style="list-style-type: none"> Significant stands of original foreshore vegetation Connections to original settlers farm Quiet informal area suitable for young children and family gatherings
INTANGIBLE	<ul style="list-style-type: none"> Dolphins often surf off Roberts Point. The sense of freedom and openness to the elements. Likely place to find middens of Binjareb people. 	<ul style="list-style-type: none"> Sense of space and openness. Uninterrupted views of ocean, beach, city, Estuary Bridge. 	<ul style="list-style-type: none"> Quiet informal area suitable for family gatherings, informal play and interaction with water Juxtaposition of trees, beach water - timeless quality. Uninterrupted views of Eastern Foreshore, City, marina and estuary mouth. Relaxed ambience, sense of space and freedom. 	<ul style="list-style-type: none"> 'Common ground' - universal space Fringing Casuarina Trees - example of vegetation which originally covered majority of area. Juxtaposition of trees, beach water timeless quality. Uninterrupted vies of Eastern Foreshore, city, marina and estuary mouth. Relaxed ambience sense of space and freedom.
OPPORTUNITIES	<ul style="list-style-type: none"> Improve universal access – pedestrian/cycle/gopher links to city. Public transport. Upgrade beach, facilities and landscape (eg more indigenous shade trees). Café(s) to attract more people. Roberts Point and historic artefacts could be more of a feature. Link foreshore walkway to Halls Head / Seascapes foreshore share use path. Adventure playground. Beachside public art. 	<ul style="list-style-type: none"> Enhance remnant dune vegetation – maze. Aboriginal heritage trail. Alfresco square meeting area cafe etc – hub of activity around existing hall. Aquatic environmental research. Landing for water taxi. 		<ul style="list-style-type: none"> Restore connectivity of Hall Park to rest of Western Foreshore to the north. Create innovative play areas for all seasons Increase activity at night, eg markets, alfresco dining. Upgrade informal gathering areas to cater for all age groups particularly the most vulnerable eg youth & seniors. Enhance beach and swimming areas for paddling. Promote low impact interaction with aquatic environment eg canoeing Provide power along the King Carnival side of park for major events. Provide unobtrusive jetty to serve the war memorial site and provide ease of access for less mobile residents and visitors. Landing for water taxi. Refer to previous plan for Hall Park. Extend skate park to include viewing/meeting area Conduct an analysis of children/youth recreation needs.
CHALLENGES	<ul style="list-style-type: none"> Transitional coastline. 			<ul style="list-style-type: none"> Congested pinch points around interface with bridge & entrance road.

COMMUNITY & CULTURAL ASSETS		5 & 6 Sutton Farm & Samphire Cove	7 & 8 Waterside & Soldiers Cove	9 Eastern Foreshore & Manjar Square	10 Mandurah Ocean Marina
		TANGIBLE	<ul style="list-style-type: none"> Fishing and crabbing spot Bridge – icon Interaction with aquatic environment. Dolphin spotting. Sutton Farm Samphire CALM reserve. 	<ul style="list-style-type: none"> Museum Old School. Dalrymple Park. Old Dalrymple Jetty. Samphire flats of Soldiers Cove biodiversity and educational value Binjareb women's site. Walk trail. 	<ul style="list-style-type: none"> Heritage Art Walk – a series of statues, mosaics that depict people, wildlife and events from times gone by. Almost 1km long Casuarina lined promenade. Rotunda. Cultural precinct including MPAC and cinema. Manjar Square. Alfresco dining opportunities. Adventure playground. Senior Citizens Centre.
INTANGIBLE		<ul style="list-style-type: none"> Estuary views. Tranquility Native trees Bridge views. Noongar camp? Unique habitat value of samphire. Dolphin fishing area. 	<ul style="list-style-type: none"> Ambience. Uninterrupted view. Sacred Manjar Bay. Whistling in the Casuarina trees. Socialising. Close to residential areas with high proportion of seniors. 	<ul style="list-style-type: none"> Hub of activity. Embodies new more sophisticated lifestyle aspect of Mandurah's culture 	
OPPORTUNITIES	<ul style="list-style-type: none"> Indigenous interpretation. Ecological interpretation. 	<ul style="list-style-type: none"> Rebuild part of jetty. Outdoor museum. Add interest to walk trail. Landing for water taxi. Museum development. Eco-tourism Educational opportunities 	<ul style="list-style-type: none"> Holistic strategy combining MF2020 and CBD revitalisation Build Liberty Swing to cater for recreational needs of people with disabilities. 	<ul style="list-style-type: none"> Strengthen pedestrian links with cultural civic precincts and Eastern Foreshore – dedicated path through MPAC car park and signage. Interface between western edge of marina and estuary – landscaping with native trees to soften built form and provide walkway shade. Water taxi landing 	
CHALLENGES			<ul style="list-style-type: none"> Traffic, noise and fumes. Safety.- increasingly crowded traffic/ped conflict. 		

COMMUNITY & CULTURAL VALUES OF MANDURAH FORESHORE

		1 Halls Head (Doddies) Beach	2 Kingsley Fairbridge Res. & Mary Street Lagoon	3 Henry Sutton Grove	4 Hall Park
COMMUNITY VALUES AND USES	Facilities	<ul style="list-style-type: none"> • North facing ocean beach. • Deli, telephone, ablutions. • Beach wheelchair hire. 	<ul style="list-style-type: none"> • Mary Street Lagoon moorings. • Old Yacht Club Community Hall (250+ capacity) 	<ul style="list-style-type: none"> • Toddlers Play area • Safe Beach • Shaded Picnic Area 	<ul style="list-style-type: none"> • Swim Enclosure • Dive Platform. • Pedal Boats • Sea Trampoline. • Skate Zone • King Carnival • BBQs Picnic area • Small play area • Diner • War Memorial • Helicopter landing area
	Events Festivals & Celebrations	<ul style="list-style-type: none"> • Dolphins Dash Fun Run. • Touch the Sun Summer Concerts. • Triathlon. • Swimming and Water Safety Training. • Ceremonies & Community Gatherings. 	<ul style="list-style-type: none"> • Playgroups. • Yoga & exercise class • Educational seminars. • Vietnam vets meet • Fundraisers eg Lions. • Heart & Soul Choir. • Beat the Feat. • Bands. • Over 55s cycling. • Blue light discos. • Weddings/birthdays 	<ul style="list-style-type: none"> • Christmas Pageant • New Years • Family, religious, school, sport picnics 	<ul style="list-style-type: none"> • Little Nippers Children's Festival • Christmas Pageant • New Years Eve Fireworks. • Concerts. eg Schoolies • NAIDOC Week • Remembrance Day & Anzac Days • Commemorative Events for War Veterans. • Triathlon. • Dolphins Dash Fun Run. • Dragon Boat Regatta. • Frederick Ashton Circus. • Equestrian Event. • Open Water Swim. • Physical Activity Day • Family, religious, school, sport picnics. • Weddings & birthdays. • CrabFest (overflow parking) • Boat Show (overflow parking)
	Recreation Opportunities	<ul style="list-style-type: none"> • Swimming. • Diving platform. • BBQs & picnics. • Weddings & birthdays. • Safest ocean beach for children and novice swimmers. 	<ul style="list-style-type: none"> • Picnics. • Walking Heartwalk 2. • Dog exercise and socialising area. • Sundowners. • Wildflowers • Boating & Sailing • Canoeing & Sailing • Fishing • Beach Volleyball 	<ul style="list-style-type: none"> • Safe paddling for toddlers • Foreshore walks Heartwalk 2 • Picnic • Fishing • Play 	<ul style="list-style-type: none"> • King Carnival. • Walking / promenading. • Picnics & BBQs • Estuary swim, dive & beach activities • Dingy Sail Training. • Kayaking & Canoeing. • Disabled Fishing • Fishing • Halls Head Junior AFL • Mandurah Pirates Rugby • Mandurah City Soccer. • Touch Football. • Skate & BMX Series • Skateboard Workshops
	Other				<ul style="list-style-type: none"> • RSPCA dog training. • Volunteer Fire & Rescue Brigade Training • Charity Motor Cycle Rides.

2.0 HERITAGE CHARACTERISTICS & ISSUES

2.1 PRE-EUROPEAN SETTLEMENT

2.1.1 Indigenous Heritage

Investigation of indigenous heritage along the Mandurah Inlet reveals evidence of Aboriginal activity and stories associated with the area. A range of sites have been identified which reflect the diverse use of the area including ceremonial, camp, artefacts, burial and mythological sites. The study area is located near the junction between the Whadjug and Bindjareb tribes of the Nyungar people (O'Connor *et al.*, 1989). The Peel Inlet contained a number of Aboriginal camping grounds, and a freshwater spring, the location of which is no longer known (O'Connor *et al.*, 1989). The inlet and associated wetland areas of the region were intensively occupied as a result of the fresh water and food resources they provided. The coastal inlet area was important to the Aboriginal people, yielding potential for hunting, gathering and fishing with many indigenous plants consumed for food and medicine.

A search of the Department of Indigenous Affairs Site Register revealed several sites which potentially occur within the study area.

Sites are categorised by status and access:

- **Interim** - sites of possible Aboriginal heritage which have not yet been considered by the Aboriginal Cultural Material Committee (ACMC).
- **Permanent** - sites which have been evaluated under Sections 5 and 39 of the Act by the ACMC.

- **Stored** - have not, at the time of assessment, sufficiently met the criteria under Section 5 of the Aboriginal Heritage Act 1972.
- **Open** - site information is not restricted in any way.
- **Closed** - site information confidential, therefore their locations cannot be accurately defined.

The public disclosure of explicit details for Aboriginal sites is not permitted under the general licensing agreement for access to the Aboriginal Sites Register, but it can be confirmed that Stingray Point Osprey Camp (Site ID 22014) occurs within in the study area. A report on an Aboriginal Site Survey of the Proposed Mandurah Peninsula Hotel Redevelopment (Yates Heritage Consultants, 2005) identified the Stingray Point Osprey Camp (Site ID 22014). The site is associated with the Waugal mythology that still holds much significance to Aboriginal people.

The Aboriginal view of environmental protection is shaped by the Waugal myth, and so any activity near water must not disturb the Waugal and the health of the waterway. The Aboriginal significance of the site was recommended for incorporation into the development design concept for the proposed Mandurah Peninsula Hotel redevelopment.

Seven of the ten sites are listed as having 'closed' access; therefore detailed information was not available for these sites.

An ethnographic survey would be required to confirm the location and extent of Aboriginal sites within the study area, and consultation with the Aboriginal community would be required to ensure subsequent decisions are appropriate.

Given the Aboriginal ties to the study area, there are opportunities to interpret Aboriginal culture, though this will also require further consultation and need to take into account the exact location of paths and the appropriation of oral stories with written signs.

ID	Site Name	Type	Status	Access
22014	Stingray Point Osprey Camp	Mythological	Permanent	Open
3439	War Memorial Park Camp	Camp	Interim	Open
22015	Mandurah Bushland 1	Ceremonial, mythological, burial, artefacts, historical	Interim	Closed
3724	Winjan's Camp	Camp, water source	Permanent	Closed
18167	Estuary Bridge (West)	Ceremonial, modified tree	Interim	Closed
18170	Scarred Tree No. 2	Ceremonial, burial, modified tree	Interim	Closed
18171	Initiation Area/Keeping Area/Burial Site	Ceremonial, repository, burial, modified tree, artefacts	Interim	Closed
18172	Scarred Tree No. 1	Ceremonial, repository, burial, modified tree	Interim	Closed
18168	Bird Dreaming Area	Ceremonial, mythology, repository, artefacts	Interim	Closed
18169	Women's Weeping Ground	Ceremonial, burial, modified tree, artefacts	Stored	Open

2.2 HISTORIC EVOLUTION

Mandurah was founded on the strength of its fishing and agricultural industries. These primary industries, and related industries such as fish preserving, changed into one more related to tourism and recreation. Generally, the Estuary has played an integral role in all themes, and has provided a focal point in the development of the area.

The physical landscape of the Mandurah Estuary foreshore has altered substantially since settlement, with the most significant change occurring in the last 50 years. This is largely due to the introduction of 'canal living' housing estates and the reclamation of land into public recreation space along the Estuary and ocean. The Estuary and its edges remain a very strong physical and social focus.

This section of the report looks at the themes related to Mandurah's history since its settlement in 1829.

2.2.1 Development of Mandurah and the Estuary

The Estuary formed a focal point in the development of housing and businesses in Mandurah, and the foreshore was both an area of commerce and recreation. Several residences and businesses had private jetties and boatsheds, and the foreshore was an area of high activity.

The treatment of the junction between land and the Estuary has also changed significantly, with hard landscape edges used to define and control the shoreline and the loss of reedy edges.



Photo 1: *Estuary foreshore, 1910* (Courtesy of the Battye Library, 001746d)



Photo 2: *Estuary foreshore showing Brighton Hotel (left) and sheds located on waters edge, 1918.* (Courtesy of the Murray and Mandurah, p 347)



Photo 3: *People walk on the Estuary edge, 1924?* (Courtesy of the Battye Library, 012155d)



Photo 4: *Jetty, buildings along the Estuary, 1924?* (Courtesy of the Battye Library, 012156d)

2.2.2

Fishing

Fishing was originally a lucrative business in Mandurah due to high levels of fish stock evidenced in the 1890s. This was further promoted by the location of three canneries within the Mandurah area. However, already by the early 1900s fish stocks had dramatically declined, and this was noted in a 1906 report by Lou Dawe, one of the cannery owners:

“You seldom get good fish now – It is a rare thing. When we started we used to have to cut a fish in lengths and take a piece of the flap off the belly to get them into the tin. If you get two fish to a tin now they are regarded as decent sized fish. ¹”

Fishing also proved a drawcard for Mandurah in relation to the local community as well as tourism. Jetties were a place of community gathering for recreational fishing, and crab fishing was also a popular pastime.



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Photo 5: Estuary view, Mandurah, 1924?, showing view of jetty located adjacent to traffic bridge. (Courtesy of the Battye Library, 012157d)



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Photo 6: Fishermen with their catch, 1890-1900 (Courtesy of the Battye Library, 009579d)



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Photo 7: Fishing, c.1912 (Courtesy of the Battye Library, 003591d)



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Photo 8: Fishing off a jetty in Mandurah, 1953 (Courtesy of the Battye Library, 010955d)



Photo 9: Mandurah from Sutton's Side, c1893. The ferry landing on the eastern foreshore is visible. The jetty in the foreground may be the western ferry landing. (Courtesy of Murray and Mandurah, p. 76)

¹ Griffin and Chishom, 'Allandale Homestead' Heritage Assessment fore the Heritage Council of Western Australia, 1997, p3.

2.2.3 Transportation

Transportation through the Estuary has been a historic problem due to the Mandurah sandbar. Many attempts have been recorded in the removal of sand from the Estuary mouth, and this is noted in *Murray and Mandurah*:

“Back in 1914 the bar had all but closed by November; it was solid land by the middle of December. By February 1915 the residents decided to attempt to breach the entrance with shovels and a keg of beer kindly supplied by the Brighton Hotel. Unfortunately this piece of civil engineering was not a success.

On Feb. 12, 29 fishermen and residents formed a working bee to cut a channel from River to sea. They succeeded after two days of work. 12 hours afterwards the sea had filled it in again.”²

Sea walls have been successfully and unsuccessfully used in the control of the sandbar, with one of the earliest constructed in 1872, for the sum of £454.³ When the sandbar eventually broke through, five months after its closure in 1914, much of this sea wall was destroyed.⁴

The aerial **photographs 15 to 24 (Appendix A)**, illustrate the historic attempts to alter the mouth of the Estuary to improve transportation to the settlement. The photographs also record the development of the town and infrastructure, such as the Estuary bridges.

Prior to the construction of the first Estuary bridge in 1894, a ferry service provided the only way across the Estuary. This service was run by the Sutton family, who were local dairy farmers. The original Mandurah bridge was timber construction, and replaced by the present day bridge in 1953. The current day bridge retains the tradition of providing space for recreational fishermen, as well as the original link across the Estuary.

Pedestrian bridges have a tradition of use in Mandurah, to combat the sometimes swamp-like land around the Estuary. When the Peninsula Hotel started up in 1904, a footbridge was constructed linking the hotel to Mandurah Terrace.⁵ This footbridge is documented in **photographs 10, 11 and 12**.

2.2.4 The Development of the Estuary and Supporting Infrastructure

The aerial photographs provided by the Department of Land Information’s historic archives gives a clear picture of the development of the Estuary and the study area from 1957 onwards. For the full selection of photographs and analysis, refer to **Appendix A**. The photographs provided below show the contrast between 1957 and 1996.



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Photo 10: The Peninsula Hotel footbridge, 1924?
(Courtesy of the Batty Library, 012152d)



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Photo 11: The Peninsula Hotel footbridge, 1928
(Courtesy of the Batty Library, 007235d)



Photo 12: The Peninsula Hotel footbridge, 1938
(Courtesy of Murray and Mandurah, p220)

² Richards, R., *Murray and Mandurah*, Shire of Murray and City of Mandurah, Perth, 1993, p178

³ Ibid, p.38

⁴ Ibid, p.178

⁵ Ibid, p. 219



Photo 13: *Mandurah Bridge*, 1912 (Courtesy of the Batty Library, 001744d)



Photo 14: *Mandurah Bridge*, 1951 (Courtesy of the Batty Library, 008325d)



Photo 15: Aerial, 1957



Photo 21: Aerial, 1996

2.3 PLACES OF HERITAGE INTEREST

Within the strict study boundaries there are no places registered by the Heritage Council of Western Australia; however, within close proximity to the study area there are places registered, with several others included in the Mandurah Municipal Heritage Inventory. These places have been identified and described below.

The Heritage Council has statutory powers with respect to a place included on the register under the Heritage of Western Australia Act 1990. Importantly, under Section 78 of the Act, all development must be referred to the Heritage Council for its advice.

Inclusion in the City of Mandurah's Municipal Heritage Inventory under Section 45 of the Heritage of Western Australia Act 1990 does not, in itself, have any legal effect unless inclusion in the inventory is tied into the Town Planning Scheme and its heritage protection provisions. It is likely, however, to be an indication of community values.

A short summary of each place of heritage interest has been provided, and these have been largely based on information provided by the 1999 Municipal Heritage Inventory. The places are located in **Figure 4.1**.

PRECINCT 4 – HALL PARK

Hall's Cottage

Hall's Cottage, also called 'Dedallamup', was built by Henry Hall in 1830 and located adjacent to the Estuary's western foreshore ferry landing. It is believed to be the oldest building extant in Mandurah.⁶ Hall's Cottage was assessed by the Heritage Council and included in the Register of Heritage Places on an interim basis on 19 April 1994, then included on a permanent basis on 7 April 1995.

PRECINCT 5 – SAMPHIRE POINT

Sutton's Farm and Graveyard

Sutton's Farm and Graveyard comprises a residence, single men's quarters and barn, all built in the Victorian Georgian style, together with a graveyard. The place has cultural heritage significance for its rarity as a collection of farm buildings dating from the 1860s and for having operated as a dairy farm throughout the development of Mandurah.⁷

The Sutton family ran the ferry service which provided the only means of transport across the Estuary until the construction of the first bridge in 1894. The Suttons were prominent settlers in the Mandurah area in the first decades of the colony. Sutton's Farm and Graveyard was assessed by the Heritage Council and included in the Register of Heritage Places on an interim basis on 27 August 1999, then included on a permanent basis on 30 May 2000.⁸

PRECINCT 8 – SOLDIERS COVE

Agricultural Hall - Reserve 4121939 Pinjarra Rd, Mandurah

The Agricultural Hall was constructed in 1898 by the people of Mandurah to serve as a community function centre and, as such, is significant to the development of the Mandurah community.⁹ The place is considered one of the oldest buildings extant in Mandurah and is listed as having considerable local significance in the Municipal Inventory.

Mandurah Community Museum - Reserve 22284 Cnr Pinjarra Road and Mandurah Terrace

The Mandurah Community Museum was constructed in 1900 as the Dalrymple School, Mandurah's first Government school. The school was in use until 1949, when operations moved to the new Mandurah Primary School in Hackett Street. In 1950, the building was converted into the town's police station, and further alterations were made to the building in the 1960s, when a court house was added. In 1988, the police vacated and the Mandurah Historical Society opened the community museum, with the front rooms occupied by the Education Department. Currently, the Mandurah Community Museum, the Genealogical Society and the Citizen's Advice Bureau occupy the building.¹⁰ The museum is included in Mandurah's Municipal Inventory and classified as being of considerable local significance.

Mandurah Bridge

The first Mandurah bridge was constructed on this location in 1894, providing the first link between the eastern and western foreshores of the Estuary. The present bridge was constructed in 1953, and replaced the original timber structure.¹¹ The Mandurah Bridge is included in Mandurah's Municipal Inventory and classified as being of considerable local significance. The traditions of a bridge crossing and fishing facilities on the bridge are more important than the fabric of the present bridge.

⁶ 'Hall's Cottage' Heritage Assessment for the Heritage Council of Western Australia.

⁷ Griffin and Loreck, 'Sutton's Farm and Graveyard' Heritage Assessment for the Heritage Council of Western Australia, 2000, p.1.

⁸ Ibid, pp. 3-4

⁹ *Municipal Heritage Inventory*, City of Mandurah, 1999, p80

¹⁰ Ibid, pp. 78-79

¹¹ Ibid, pp. 84-85

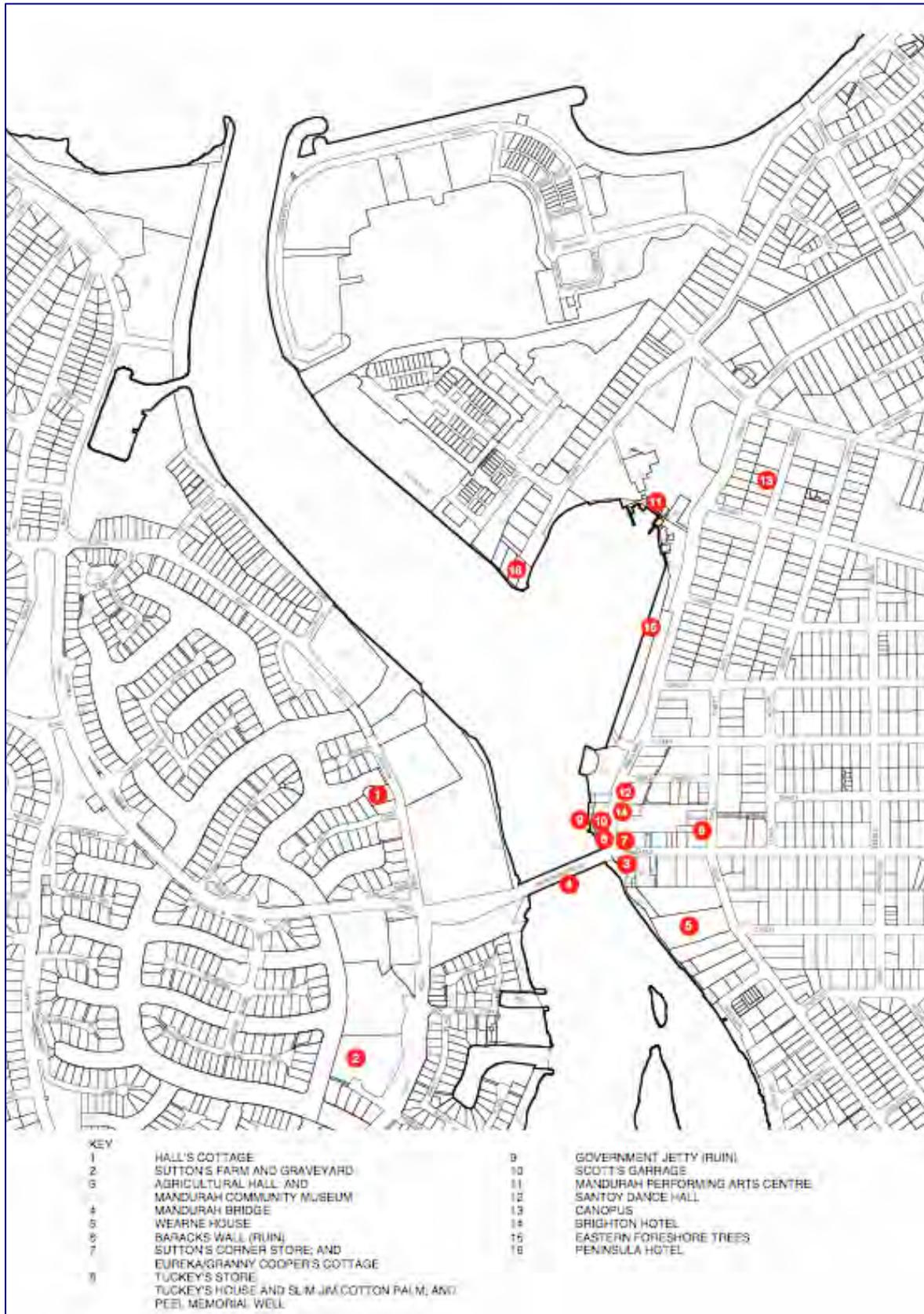


Figure 4.1: Location of places of Heritage Interest. *Considine and Griffiths Architects P/L*

Wearne House - 7 Leslie Street

Wearne House was constructed in 1926 as a holiday house for Charles Wearne. In 1957, the building was donated to the Anglican Church and modified to become an aged care centre, which was opened in 1968.¹² The place is included in the Municipal Inventory as having local significance.

PRECINCT 9 – CBD WATERFRONT AREA

Barracks Wall (ruin) - 2 Sholl Street

The Barracks Wall is a remnant of the military barracks built on the site in 1832. The ruin is constructed of random rubble limestone.¹³ The place was registered by the Heritage Council, but removed from its listing in 2001.

Sutton's Corner Store - Lot 5 Mandurah Terrace

Sutton's Corner Store was constructed by Charles Wearne in 1928 for his cousin Violet Sutton (nee Cooper), who had previously lived on Sutton's farm. The building comprised a weatherboard residence fronting Pinjarra Road with the brick store fronting Mandurah Terrace.¹⁴ The place is included in the Municipal Inventory and categorised as having considerable local significance.

Eureka/Granny Cooper's Cottage - Lot 5 Mandurah Terrace

The Tuckey family built the cottage, which housed Ellen Cooper (nee Tuckey), in c.1862. From the late 1860s, Cooper conducted a school from the residence until 1872, when the first schoolmaster to the area was appointed.¹⁵ The building is included in the Mandurah's Municipal Inventory and classified as being of National/ State significance.

Tuckey's Store - 3 Mandurah Terrace

Tuckey's Store was constructed in c. 1880, and served as a general store until 1974, from which time it housed a tackle shop. One wall of the building may be part of the original fish preserving works located on the site, prior to the store's construction. The store, built by the Tuckey's, is located next to Tuckey's House. The building is included in the Municipal Inventory and categorised as having National/State significance.

Tuckey's House and Slim Jim Cotton Palm - 2 Mandurah Terrace

Tuckey's house was built next to Tuckey's Store, opposite the Brighton Hotel (also owned by Tuckey), on land which formed part of Tuckey's Peel Inlet Preserving Works, in 1928. The brick and tile residence is prominently located near the bridge and a Cotton Palm and Norfolk Island Pine are likely to be original plantings associated with the building.¹⁶ The place is included in the Municipal Inventory and classified as being of considerable local significance.

Government Jetty (demolished)

The Government Jetty, built in 1896, was important to the early fishing industry and transportation of the settlement, and was one of the earliest public works structures in the area. The timber structure, fitted with a crane to assist in the loading and unloading of cargo from boats, was also used for net repairing, net drying, recreational fishing, crabbing, swimming and boating.¹⁷

Scott's Garage (Little Mandurah Theatre) - 5 Mandurah Terrace

Scott's Garage was constructed by Hobart Tuckey in 1937 for the Scott Brother's transport company, which leased the place as a petrol station. The building is a rare example of an extant art deco petrol station, and is listed with the Art Deco Society. The building began use as a theatre in 1983.¹⁸ The place is included in the Municipal Inventory and described as having considerable local significance.

Santoy Dance Hall - 14-21 Mandurah Terrace

The dance hall was constructed by Roy Tuckey in c. 1955, and was used as a function venue. In 1963, a shop addition was added to the Smart Street elevation, and in c. 1968, the entire building was converted into a shopping arcade. The place is included in the Municipal Inventory as having local significance.

Peel Memorial Well - Cnr Mandurah Terrace and Pinjarra Road

The well was constructed in 1955 by the Mandurah Progress Association to commemorate the arrival of Thomas Peel and pioneer settlers to the area in 1829.¹⁹ The place is included in the Municipal Inventory as having local significance.

¹² Ibid, pp. 118-119

¹³ Database of Heritage Places, Heritage Council of Western Australia.

¹⁴ *Municipal Heritage Inventory*, op cit, pp. 72-73

¹⁵ Ibid, pp. 40-41

¹⁶ Ibid, pp. 76-77

¹⁷ Ibid, pp.146-147

¹⁸ Ibid, pp. 92-93

¹⁹ *Municipal Heritage Inventory*, op cit, pp. 120-121

Canopus - 62 Sholl Street

The Canopus was a cutter boat used to carry freight between Mandurah and Fremantle in the early 20th Century.²⁰

Brighton Hotel - 8 Mandurah Terrace

The Brighton Hotel was constructed in 1882 as a private residence, and later converted into Mandurah's first hotel. The building has undergone significant modification.

Eastern Foreshore Trees - Mandurah Terrace

The eight Morton Bay Fig trees and three Norfolk Island Pines on Mandurah Terrace were planted in 1935.

Mandurah Performing Arts Centre - Ormsby Terrace

The Mandurah Performing Arts Centre, designed by Hames Sharley and completed in 1997, has won a number of design awards and is a landmark building in Mandurah. The place is included in the Municipal Inventory as having considerable local significance.

Peninsula Hotel - 2-20 Ormsby Terrace

The Peninsula Hotel was constructed in 1899 as a holiday home for George Brookman (former Mayor of Perth). The residence was converted into a hotel in 1904 and a timber footbridge was constructed to link the hotel with Mandurah Terrace. The hotel was sold and bought in 1907 and again in 1910, by Walter Bramwell and Charles Slee (respectively). The first licence, issued in 1911, recorded the premises as the 'Wayside House'. In 1925, the licence was owned by Hobart and Clarence Tuckey and sold to Thomas Blakeley for his son, at which time the building contained 23 rooms, as well as several sleep-outs. The hotel was referred to as 'the Pen' and housed British submariners based in Fremantle during World War II. In c.1990, the place was sold for redevelopment purposes.²¹ The hotel is included in the Municipal Inventory as being of considerable local significance.

Development approvals granted have meant that the building has been demolished, but that the landmark Moreton Bay Fig tree on Stingray Point will be retained.

2.4 OPPORTUNITIES & CONSTRAINTS

2.4.1 Pre-European Settlement

Opportunities

- A study on the indigenous heritage of the area should be undertaken, with information from the local indigenous community. This will lead to more interpretative opportunities and opportunities with indigenous community involvement in outcomes.
- Interpretative panels, including information or stories specific to the significance of the site, could be erected in areas of high interest, subject to approval.
- An Aboriginal heritage walking trail may be created, subject to approval.
- Aboriginal involvement in projects.

Constraints

- Any works or development in an area included in the Aboriginal Heritage Sites Register will be subject to Section 18 of the Aboriginal Heritage Act.
- The area may include sites which are categorised as Restricted Access in the Aboriginal Heritage Sites Register.

2.4.2 Development of Mandurah and the Estuary

Opportunities

- The Estuary must remain the focal point of future town planning and development in Mandurah, to maintain its heritage values.
- Private jetties are a strong tradition and should be conserved.
- Encourage the construction of a limited number of public jetties, especially on sites of former jetties.
- Interpretation relating to the changing form of the Estuary and the increased land development.
- Retention of wetland areas as examples of the natural landscape of the Estuary foreshore.
- Re-establishment of more soft edges to the Estuary to reflect traditional values.

²⁰ Database of Heritage Places, Heritage Council of Western Australia.

²¹ *Municipal Heritage Inventory*, op cit, pp. 82-83

2.4.3 Fishing

Opportunities

- Interpretation relating to the development of Mandurah and its relationship to the originally lucrative fishing industry.
- Interpretation relating to the environmental impact of over-fishing. This may include information on any measures taken to restore fishing numbers in the Estuary.
- The reconstruction of jetties to the north and south of the Mandurah Bridge, based on documentary evidence.
- The retention of the provision made for recreational fishing under the existing Mandurah Bridge.

2.4.4 Transportation

Opportunities

- Maintain the presence of boats within the Estuary.
- The retention of the original link between the western and eastern foreshores of the Estuary via a bridge on the Mandurah Bridge alignment.
- Consider the reconstruction of the Peninsula Hotel footbridge and the relinking of the two shorelines.
- Interpretation relating to the original ferry service. This may be combined with interpretation located on Sutton Farm and Hall's Cottage.
- Interpretation relating to the original construction of the Mandurah Bridge, and the later construction of the second bridge to the south.

Constraints

- Conflict between bridge heights for current requirements and scale of town centre.

2.4.5 Pictorial Study of the Development of the Estuary and Supporting Infrastructure

The analysis of the photographs is below:

1957 to 1963

- Mary Street Lagoon has been partially reclaimed, and as a result, is significantly reduced in size.
- Land to the north of the Mandurah Bridge has been reclaimed to form Halls Park.
- Many jetties on the south side of the Mandurah Bridge appear to have been removed.
- The footbridge from the Peninsula Hotel to Mandurah Terrace has been removed.
- The parkland to the east of Soldiers Cove is cleared for the development of roads and housing.
- The mouth of the Estuary is modified with the construction of sea walls and sand is removed from some areas.

1963 to 1968

- Mary Street Lagoon is further modified and reduced in size.
- New sea walls are constructed, which will form the present day Estuary foreshore alignment.

1968 to 1973

- New lagoon is cut into eastern foreshore near mouth of Estuary, opposite Mary Street Lagoon.
- Two small marinas located near present day San Marco's Quay are constructed.

1973 to 1983

- More land is reclaimed along the eastern sea wall and reclaimed to the north, to construct the Mandurah Ocean Marina and Boat Harbour. The 'new' lagoon forms part of the marina.

1983 to 1989

- Estuary Bridge is constructed.
- Dudley Park canal living estate is constructed to the south of Soldiers Cove, almost severing the Creery Wetlands from the mainland through the close proximity of the canal entrance.
- Halls Head canal estate land is cleared.

1989 to 1996

- North section of Halls Head canal estate is constructed.

- Mandurah Marina, south of Rialto Place, begins construction.

1996 to Present Day

- Remaining section of Halls Head canal estate is constructed.
- Mandurah Marina is constructed, north of Rialto place.

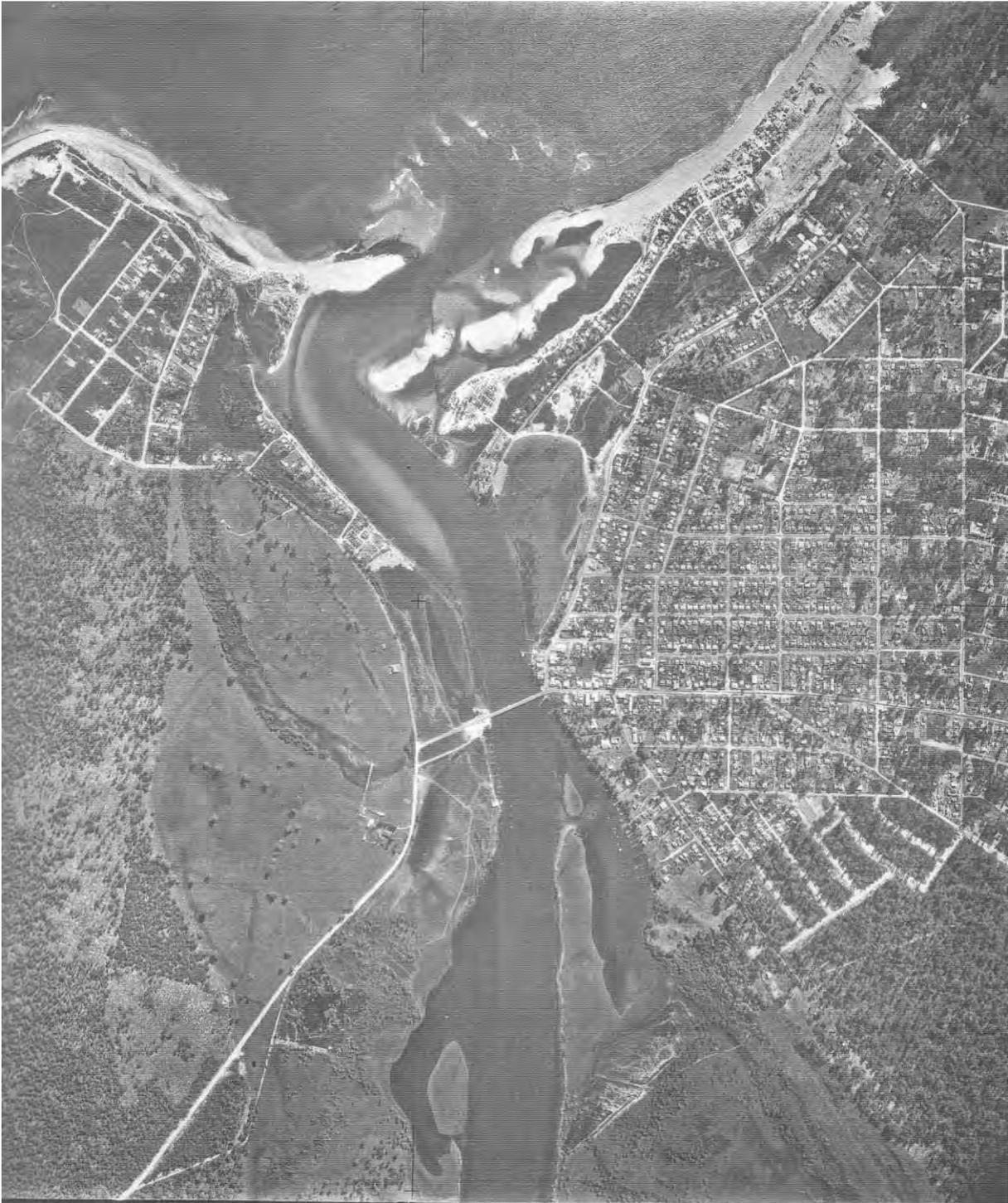


Photo 15 Aerial, 1957



Photo 16 Aerial, 1963



Photo 17 Aerial, 1968

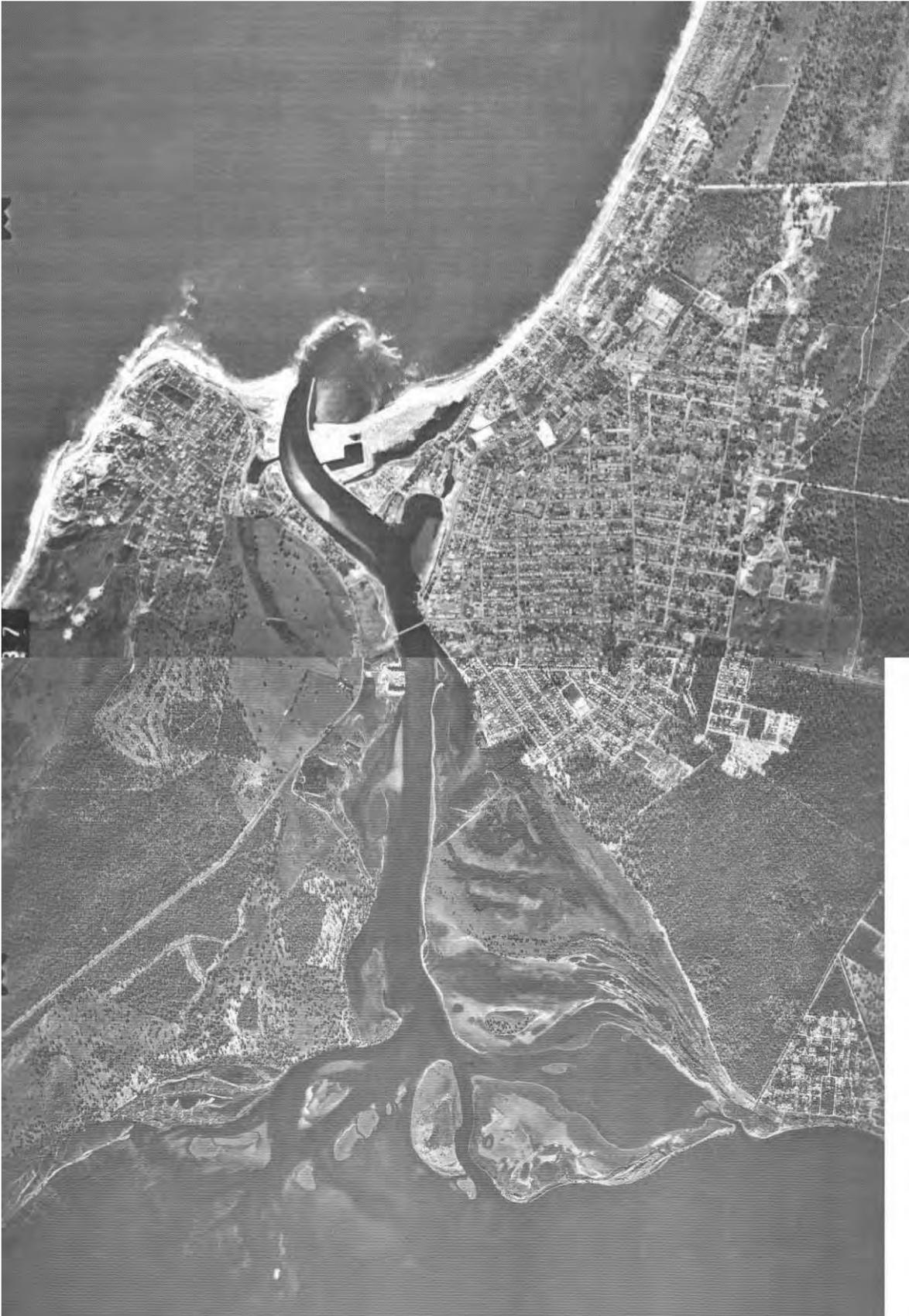


Photo 18 Aerial, 1973



Photo 19 Aerial, 1983



Photo 20 Aerial, 1989



Photo 21 Aerial, 1996



Photo 22 Oblique aerial, 1973



Photo 23 Oblique aerial, 1973



Photo 24 Oblique aerial, 1997

3.0 LAND USE, CHARACTER & FORM ANALYSIS

3.1 GENERAL OVERVIEW

The study area contains a variety of land uses, however is predominantly characterised by residential land use for the most part and commercial land use (in the town centre). The disposition of uses is described by precinct in more detail below.

PRECINCT 1



Halls Head Beach is a district level beach and thus significant numbers of people are attracted to this beach. This places significant demands on this foreshore area and the adjacent land uses and infrastructure. The adjacent land use is predominantly low-density residential development.

The main access route to the beach is via Halls Head Parade and Mary Street.

The Gallop Street Reserve is a flat parcel comprising a grassed public open space quadrangle with minor children's play equipment that is in a fair condition. Surrounding development comprises single detached residences ranging from older style 'beach shacks' to more modern (1990s) dwellings on larger lots, most of which are single storey.

PRECINCT 2



The eastern half of Halls Head Beach (up to the western wall of the Mandurah Estuary) is a dog beach/recreation area. The remainder of the precinct is largely unimproved and includes the old yacht club building and Victor Adam Park, which extends to the northern bank of the Mary Street Lagoon.

Adjacent development comprises of low-density residential.

The Mary Street Lagoon abuts the southern boundary of the precinct, which is a very active boat launching area.

The main access route to the beach is via Mary Street.

PRECINCT 3



Precinct 3 comprises of low-density residential development, most of which overlooks public open space (Mary Cooper Reserve and Kingsley Fairbridge Reserve), the Mandurah Estuary and canals. The built form is generally one to two storeys in height. There are good views over the Estuary to the town centre and eastern foreshore from Henry Sutton Grove. There is also a strong visual link with the War Memorial and King Carnival adjacent the canal entrance.

The Mary Street Lagoon is an active boat launching area, comprising a 56 pen marina with three boat launching ramps enclosed by limestone and concrete marina walls. Several minor jetties are located on the Estuary banks.

Kingsley Fairbridge and Mary Cooper Reserves contain landscaped parkland with minor barbeque facilities and children's play equipment.

Harry Sutton Grove is landscaped with barbeque facilities, brick toilets, gazebos, children's play equipment and bituminised parking and driveway areas. A number of indigenous trees have been retained in this public open space area.

The precinct is accessible from Mary Street and Leighton Road. The majority of the foreshore is reserved 'Conservation and Foreshore' under the City of Mandurah's scheme.

PRECINCT 4



Precinct 4 has distinct edges. Pinjarra Road/ Mandurah Bridge, Old Coast Road, canals and Mandurah Estuary define the extent of the precinct and its ability to integrate with adjoining areas. The precinct contains King Carnival, which is a prominent historic landmark, the War Memorial, a skate park and Hall Park. This area is used regularly for large events and exhibits. The remainder of the land is landscaped open space comprising gazebo, barbeque facilities and a leased diner.

Notwithstanding the isolated nature of Hall Park and the War Memorial, there is a strong visual connection with the eastern foreshore, especially the area immediately adjacent (narrowest part of Estuary). The precinct also boasts good views north and south along the Estuary (including the Mandurah bridges and built form along Mandurah Terrace on the eastern foreshore).

PRECINCT 5



Precinct 5 is predominantly residential canal-side low-density residential development and includes the Mandurah Marina. The Estuary, canals and the intersection of Pinjarra Road and Old Coast Road form a barrier to the precinct and constrain its relationship with adjoining areas.

The foreshore in this location has been privatised due to the marina and residential development directly abutting the Estuary.

PRECINCT 6



There are strong environmental values associated with this portion of the study area, which contains samphire salt marshes. Bird-hides and a boardwalk are provided along the western edge of Samphire Cove. A small portion of low to medium density residential development is proposed in the southern portion of the precinct. The residential portion is an extension of development west of the precinct and is immediately adjacent the Mandurah Bypass.

PRECINCT 7



The Waterside foreshore comprises a large open space area overlooked by low-density residential canal development. The recreation area is generally flat and comprises landscaped open space with barbeque facilities. The site is adjacent the Mandurah Bypass bridge. The canal entrance restricts connections to the north and has subsequently isolated this portion of the foreshore.

PRECINCT 8



Soldiers Cove, similar to Samphire Cove, has very strong environmental values associated with it and contains samphire salt marshes. The precinct only includes the foreshore and the Soldiers Cove Reservation. Development outside the precinct, adjacent to Soldiers Cove Terrace, is predominantly low-density residential development. There are several timber jetties along the foreshore.

The residential development which fronts directly onto the Estuary and canal entrance peninsula has resulted in the creation of an exclusive residential enclave which cannot be accessed by the general public.

PRECINCT 9



Precinct 9 contains the Mandurah town centre and is the major activity area within the study area. This central-eastern portion of the foreshore has a strong pedestrian focus and is well connected with surrounding development/activity nodes along the eastern foreshore. Public open space improvements include pathways, children's play equipment, gazebos, barbeque areas and toilets.

As previously discussed, the relatively narrow width of the Estuary in the southern portion of the precinct creates a strong visual connection between King Carnival and Hall Park on the western foreshore.

Administration Bay is characterised by modern architecture at the base of the Bay and provides an interesting focal point for precincts on the opposite side of the Estuary and from the commercial uses and foreshore areas along Mandurah Terrace.

Administration Bay includes a mix of retail, civic and cultural uses including the Boardwalk Precinct, which comprises Cicerellos, Mirage Souvenir and Gift Shop, Amalfi Café, Dome Café and Simmo's Icecream. The Mandurah Performing Arts Centre and a cinema complex are also located within this area.

Civic uses include the City of Mandurah offices and a visitor centre. A mooring facility that is located off the main boardwalk services a number of boat cruise businesses including Mandjar Ferry Cruises, Dolphin Discoverer and Encore ferry services. Also located around Administration Bay are the Mandurah Senior Citizens Centre and the Mandurah Community and Health Development Centre, most of which are single level buildings being around 20-30 years old. The Mandurah Council offices have been expanded in the form of a modern, double storey, good quality extension at the rear of the single level existing 20-year old building.

PRECINCT 10



Precinct 10 contains the western portion of Mandurah Ocean Marina. The marina entrance divides the marina into two halves – the northern Estuary foreshore edge which comprises the marine service area of the marina and the foreshore edge south of the entrance. The latter, although currently not fully developed, is planned for tourism, residential and mixed use development.

The built form along the southern foreshore component of Mandurah Ocean Marina is proposed to be three to four storeys in height. A foreshore reservation has been set aside and there is good pedestrian connection with the town centre. The northern portion of Mandurah Ocean Marina has a commercial and active marine activity function and is also a very popular boat ramp and car/trailer parking area.

3.2 PUBLIC SPACES NETWORK

The main public open space and recreation areas in the study area include Hall Park (and the War Memorial area), Kingsley Fairbridge Reserve and the narrow strip of foreshore along the eastern foreshore edge (Mandurah Terrace).

The location of canals, roads and general poor planning has constrained the ability to integrate areas of public open space in the study area.

With the exception of the eastern foreshore (town centre edge), the areas of public open space are generally under-utilised and poorly landscaped.

Victor Adam Park is an expansive area of open space that is not landscaped and is poorly utilised. There are several other parks in the study area, all of which are poorly integrated and disjointed to each other.

The remainder of smaller, disconnected parks are generally undeveloped, degraded and require facilities for various recreation opportunities, i.e. seating, public art, landscaping for passive recreation, and playgrounds, etc. for active recreation. The skate park (within Hall Park) is the only active recreation facility for youths in the study area.

3.3 PLANNING AND DESIGN OPPORTUNITIES & CONSTRAINTS

3.3.1 General

Opportunities

- To repair the edges of protected wetlands by:
 - protecting them against boat wash;
 - repairing and tidying up the crude edges and at the same time installing buffer landscapes where possible; and
 - using the edge repair to provide educational resource in telling the story and benefit of the wetland i.e. educational boardwalk.
- To create some quality landscape recreation amenity in the residual and under-utilised spaces fringing the waterway.
- To upgrade the larger parks and reassess their use and benefit to the community and possibly change their use.
- To provide services amenity in the public landscape for visitors as well as the local community, e.g. toilets.
- To provide a broader habitat for a diversity of animals and birdlife along the waterfront and fringing open space.
- The heritage of the area needs more recognition and the story told in the landscape.
- Opportunity to increase quality of landscape to attract more park users and provide local residents with greater amenity.
- An informative signage system would be of benefit.
- Provide waterfront landscapes people want to be in.
- Retain wherever possible the tradition or iconic uses of the foreshore such as King Carnival.
- To create open space links back into the community to provide better access and awareness of the waterfront.
- To secure the quality of water and the environment.
- To create an integrated Mandurah foreshore with a series of activity nodes connected with walking/ bike trails.
- Creation of a diverse range activity nodes - from passive and active recreation to mixed use development.
- Integration of public art and imaginative architecture (and landscape architecture) to create a unique sense of place to the residents of Mandurah.
- Creation of a layer of interpretation ensuring different precincts are expressed individually but within an overall design framework.
- Connecting the foreshore to the existing urban (and suburban) fabric.
- The protection of the natural foreshores is integral to ensuring the intrinsic values of waterways are maintained for the whole community. Such measures can also sustain long-term high value, low impact eco-tourism and recreation activities.

Constraints/Risks

- Access to the waterway is blocked in areas by urban development and, where foreshore access has been provided, it is too narrow in some areas or has been blocked-off illegally.
- Resident expectation is that views to the waterway will remain as expansive as they presently are, even at the expense of public amenity.
- The large number of boats accessing the waterway causes constant damage and modification to the fringing landscape.
- Public recreation desires and the desires of the waterfront residents are mutually exclusive.
- Landfill and modification to the fringing landscape may make establishing a new landscape very difficult and slow.
- Some pockets of public land are very isolated and difficult to access.
- Some of the foreshore activities are now tired and need overhaul, e.g. King Carnival.
- Potential loss of community amenity due to the influence of wealthy waterfront residents - the less well-off cannot afford the land or do not have the resources to fight for their rights.
- The four entries to the existing canal developments and boat launching facilities create a costly need for infrastructure for pedestrian access between foreshore areas.
- Parts of the community may be concerned about development in the foreshore areas.
- The existence of samphire salt marshes is a significant environmental consideration which may constrain any type of development in particular locations.

3.3.2 Precinct Specific

The following opportunities and constraints have been identified for specific areas.

PRECINCT 1

Opportunities

- Improved beachfront facilities and access.
- Primary swimming beach for residents.
- Possible commercial (or mixed use) development along Halls Head Parade:
 - Development of this area with strong pedestrian links across road to beach
 - Possibility of including a shaded plaza connecting the beach to these commercial areas (ice-creams, cafés, pub, lunches etc.)

Constraints

- Probable public opposition to development on beachside.

PRECINCT 2

Opportunities

- Potential major development site.
- Views to eastern foreshore and northern views to ocean.
- Full northern aspect to ocean.
- Iconic structures could be viewed from eastern and western foreshores to create a unique sense of place.
- Potential to be major tourist attractor.
- Deep-water access to ocean.
- Improve sand-bypass operation.
- Possible water taxi /physical connection with eastern marina development.
- A major tourism and community-oriented development would create a bookend to the western foreshore, drawing people through other activity nodes from the Mandurah Bridge and activate Hall Park and associated activities (Mary Street Lagoon etc.).

Constraints

- Implications of built form development in relation to perception of open space character.
- Management of parking access and provision.

PRECINCT 3

Opportunities

- Expansion of boating facilities in Mary Street Lagoon.
- Potential mixed-use development with medium density waterfront residential.
- Pedestrian bridge across Mary Street Lagoon entry.
- Pedestrian bridge across Port Mandurah canal entry and connection through to the north.
- Maintain passive recreational pursuits in Henry Sutton Grove.
- Improve environment for family and children recreation/leisure.
- Reduce impact of vehicle traffic using boat ramp.
- Improve connection to water.

Constraints

- Implications of pedestrian bridges on boating movement.

PRECINCT 4

Opportunities

- Development of vibrant public pedestrian recreational waterfront area with focus on diversity and people.
- Opportunity for landmark structures or buildings.
- Location of public art for viewing from eastern foreshore for legibility and visitor awareness.
- Strong built edge with excellent legibility and pedestrian focus.

- Develop strong connections to large open spaces (to west) for organised cultural events through defined edges.
- Focus on family activity.
- Removal of existing kiosk.
- Important water taxi across node.
- Water park (The Strand in Townville)
- Well defined pathways and links to passive and active nodes to the north.
- Expand and improve skate park facility.
- Potential relocation of King Carnival.

Constraints

- Need to continue provision of significant area of open space for active recreation.
- Parking access and provision.
- Management of noise and night-time activities.

PRECINCT 5

Opportunities

- Improve edge between samphire salt marshes and residential development.
- Provide pedestrian/bike access from Estuary Bridge to the Mandurah Bridge along the foreshore.
- Mandurah Bridge is primary east-west pedestrian access opportunity which presents the possibility for reuse/conversion to pedestrian walkway and location of stalls/events.
- Possible large-scale artwork project on northern side of bridge (lights and colour).
- Great opportunity for unique sense of place creation through historical expression of Mandurah Bridge.

Constraints

- Level of protection of samphire salt marshes conservation.
- Timing, cost and design of future Mandurah Bridge replacement .
- Boat clearances under the traffic bridge.

PRECINCT 6

Opportunities

- Reinforce north/south pedestrian connections from the bridge along the foreshore.
- Environmental values present the opportunity of integrating a interpretive centre as part of the proposed residential development.
- Fishing structures included with potential for historical/environmental interpretation.

Constraints

- Current vehicular traffic connections difficult.
- Environmental considerations for development or improvements on, or adjacent to, the foreshore (salt marshes).

PRECINCT 7

Opportunities

- Create a north-south pedestrian connection with Precinct 8.
- Inclusion of a café/kiosk and jetty.
- Focus on family activity.
- Increased parkland amenities including barbeques, toilets, seating and playground equipment.

PRECINCT 8

Opportunities

- Increased parkland amenities including barbeques, toilets, seating and playground equipment.
- The introduction of interpretive walks or park nodes along existing track.
- Low-rise sensitive commercial developments such as cafés, restaurants or an interpretive centre.
- Existing or new jetties for bird hides or lookouts or interpretive opportunities. Each jetty - a different bird. The end of the jetty could contain an abstract sculpture representing the particular bird.
- Increase connection to eastern foreshore area under the old bridge.
- Possible increase of residential density zonings along waterfront properties with attention paid to the creation of a stronger, more publicly interactive building edge.
- Strong connection to the eastern foreshore (Precinct 9).
- Reinforce strong connection to Soldiers Cove parklands.

PRECINCT 9

Opportunities

- Continue the recommendations of the Mandurah CBD study.
- Provision of additional public facilities along the foreshore, especially adjacent The Point development.

PRECINCT 10

Opportunities

- Improve waterside experience by providing points of interest.
- Extended marina and boating facilities to accommodate increasing demand.
- Further development of the critical mass of commercial and leisure activities at the marina.
- Create a physical connection between Precinct 2.

Constraints

- Possible environmental management implications of development in this area.
- Impacts of marina associated activities on existing and future residents, including traffic and parking (resulting from commercial uses).

4.0 MOVEMENT

4.1 ROAD HIERARCHY

A road hierarchy describes the types of roads that perform designated functions required within the road network. It also provides criteria to describe each road functional type. The functional type designated to each road should represent the function that the road is intended to perform. It may not necessarily reflect the current conditions on the road.

Within the study area there are three District Distributor roads: Mandurah Terrace to the east, Pinjarra Road to the south and Old Coast Road to the west of the Mandurah Bridge. The function of these roads within the road network is to carry traffic between industrial, commercial and residential areas. These are likely to be truck routes and should provide only limited access to adjoining property. District Distributor roads are managed by Local Government.

The remaining roads are access roads, which provide access to abutting properties with amenity, safety and aesthetic aspects having priority over the vehicle movement function. These roads should be bicycle and pedestrian friendly.

Halls Head Parade is being encouraged as a tourist drive. Its classification should be Foreshore Access Road, a type of local distributor that not only carries foreshore bound traffic, but is also needs to carry locally generated traffic. These roads are low speed and low capacity.

4.2 PUBLIC TRANSPORT

Bus

There is a new bus station at Allnutt Street with regular services to and from Perth and within the town centre.

Taxi

There are a number of taxi ranks in Mandurah, with the rank in Mandurah Terrace coming within the study area. With a large proportion of elderly residents, the taxis are a vital service; however, there is an opportunity to improve the taxi services at night within Mandurah.

4.3 PEDESTRIAN AND CYCLE NETWORK

Currently the pedestrian and cycle network is uncoordinated along the foreshore. The paths are of varying standards and whilst the trip from Precinct 1 to Precinct 10 can be made on foot or by bike, it requires several detours.

Country Pathways Grants 2004-05

The City of Mandurah has received a planning grant that will enable it to undertake a comprehensive bicycle planning study extending to the City boundaries. The Bike Plan will build on the work done by the City of Mandurah in recent years and will include planning for the new rail station links, resulting in a coordinated and integrated plan including both off-road paths and potential on-road bicycle routes.

4.4 TRAFFIC AND ACCESS ISSUES

The *Mandurah Central Revitalisation Strategy* (May 2005) and *Mandurah Inner Area Strategic Plan* (June 2002) comprehensively cover the traffic and access issues for the CBD and there is an opportunity to tie this into the work of this project.

Boat Traffic

There are 4,273 registered boat owners within the City of Mandurah according to Department for Planning and Infrastructure (DPI) figures. Whilst not all these boats will be in the water at the same time, it gives an indication of likely boat traffic.

Mandurah Bridge

A major constraint to the movement of traffic within the study area is the existing bridge. Main Roads WA estimate the current life of the bridge as eight years, with the current traffic loads. If the bridge was closed to motorised traffic then its life could be extended by a further eight years, however, at that time the maintenance costs would become prohibitive.

The City of Mandurah has current plans, and a listing in its ten-year Capital Works Plan, for a new bridge to the south of the existing bridge. The 'Mandurah Inner Area Strategic Plan' proposes "*that the bridge should provide two eastbound lanes, one westbound lane and a shared cycle/pedestrian lane.*" The City of Mandurah will revisit the report once the new bridge is needed, and look at the growth of population and traffic before finalising the configuration. The Peel Deviation, scheduled for 2009, will also alter the traffic patterns across the bridge.

Mandurah Bypass Bridge

There are no current plans to make any changes to the Mandurah Bypass Bridge, which is managed by Main Roads WA.

Dolphin Drive

The success of the Mandurah Ocean Marina has created a bottleneck at Dolphin Drive, which is the only entry and exit to the development. In peak times Dolphin Drive is heavily congested, creating a risk that should emergency services be required at the marina their access would be blocked with no alternative available.

With the construction of a new bridge to replace the Mandurah Bridge, there is an opportunity to regulate the traffic flow into the CBD. If the traffic capacity of the new bridge is limited this in turn will limit the amount of vehicular traffic through the area.

4.5 PARKING

With the seasonal demand, the amount of parking needs to be balanced between the peak times and the provision of areas that will be under-utilised for much of the year and may attract antisocial behaviour.

4.6 OPPORTUNITIES AND CONSTRAINTS

The Mandurah foreshore has an opportunity to develop recreation trails that provide many benefits to individuals, local communities, and society in general. Trails present a unique opportunity for education, not only environmental, but also cultural and historical. A legible network of paths can be developed based on the work already carried out by the City of Mandurah.

With the flat terrain and extensive public open space on the foreshore there is a significant opportunity to create walking and cycle trails. The pedestrian and cycle network falls into two categories: firstly as a functional transport network; and secondly as an active recreational network. As part of the transport network it can provide connection to public transport and to areas frequented by non-drivers, for example young teenagers. When serving this function the destinations are the attractors to using the paths. End of trip facilities, such as cycle lockers, are important for this type of user.

As a recreational activity the function is to provide pleasant surroundings and a circuit-type layout is the attractor; for example 'Round the Bridges' in Perth is popular with the locals for walking, running, rollerblading and cycling. This is a scenic 10 km circular route following the Swan River to South Perth foreshore and back to the city.

The major constraint to this proposal is that the most direct routes require bridges, which increases the cost. In addition, the bridges will need to accommodate boats that currently use the waterways. The heights of the bridges are constrained by the limitations of the shallow navigation of the Peel Inlet and ocean entrances and the clearances at the existing bridge crossings.

With the development of an extension to the existing Mandurah Ocean Marina there is an opportunity to construct an alternative access to Dolphin Drive.

5.0 ENVIRONMENTAL CHARACTERISTICS

5.1 HYDROLOGY

Surface Water

The water passing through the Peel Inlet is derived from two major components – the Serpentine and Murray Rivers. The two rivers arise in the agricultural areas east of the Darling Scarp, and flow west across the Darling Plateau, turning south-west through the Bassendean Dunes before discharging into the Peel Inlet.

Prior to the construction of the Dawesville Channel, the Peel Inlet had limited water exchange with the Indian Ocean through the shallow, narrow Mandurah Channel (McComb *et al.*, 1995). The Mandurah Channel also virtually eliminated the diurnal or semidiurnal components of the tide, resulting in a small tidal range of about 10 cm within the Peel-Harvey Estuary (Lane *et al.*, 1997).

The Dawesville Channel was opened in April 1994, with the aim of increasing tidal flushing of the Estuary to reduce the effects of eutrophication. Since the opening of the channel, tidal range has increased to 32 cm for the Peel Inlet and 45 cm for the Harvey Estuary (Lane *et al.*, 1997).

Hydrological features of salt marshes such as Samphire Cove and Soldiers Cove, include pannes (or pans) and tidal creeks (McComb *et al.*, 1995). Pannes are shallow depressions in the salt marsh which fill periodically with water. Pannes vary between half a metre and several metres in width, and a few centimetres to half a metre deep. Migratory birds searching for food often utilise pannes. Tidal creeks transfer material and energy between the marsh and adjacent body of water (McComb *et al.*, 1995).

5.2 WATER QUALITY

Nutrients

The Peel-Harvey Estuary represents a significant source of nutrients to the southern metropolitan coastal waters. The Peel-Harvey Estuary is estimated to discharge between 450 and 900 tonnes of nitrogen and between 60 and 120 tonnes of phosphorous annually (DEP, 1996). The main tributaries entering the Peel-Harvey Estuary discharge 90% of their flow during the three months of winter and early spring. It is during this period that the majority of nutrients and sediments enter the system after draining from rural lands (DEP, 1998).

Environmental monitoring shows that water quality in the Peel-Harvey Estuary has improved significantly in terms of nutrient concentrations, chlorophylla and Secchi depths (transparency) since completion of the Dawesville Channel due to improved flushing of the system, particularly during the summer months. *Nodularia* blooms have not been observed in the Estuary since the Channel was completed, even though there have been two years where streamflow and nutrient delivery to the Estuary were above the threshold level that would have been expected to trigger a *Nodularia* bloom prior to the construction of the Dawesville Channel (Robinson & Humphries, 2003).

The City of Mandurah monitors nitrogen and phosphorous in Mandurah Ocean Marina and Port Mandurah on a regular basis. The majority of results are within guideline levels and no adverse long-term trends have been identified (City of Mandurah, 2004).

Bacteria

The City of Mandurah monitors faecal coliforms and faecal streptococci in Mandurah Ocean Marina and Port Mandurah on a regular basis. Some spikes in bacterial levels have occurred however this is not unusual for long-term environmental sampling programs. The majority of results are within guideline levels and no adverse long-term trends have been identified (City of Mandurah, 2004).

Sediment

Another issue potentially effecting water quality at the mouth of the Peel Inlet is sediment transported by the sand bypassing operations. Sediment can degrade the amenity of an area through increasing the turbidity (cloudiness) of the water and changing the structure of a nearshore area. The impacts of sediment can vary with site conditions. It can scour and abrade high energy environments (stripping vegetation from reefs) and infill and cover reefs in low energy systems (Montgomery, 1995).

Contaminants – Heavy Metals

Monitoring of the Peel-Harvey Estuary between 1995 and 1996 found elevated levels of the heavy metals chromium, lead, mercury, selenium and zinc. The majority of samples that were in excess of the EPA guidelines were found in the Estuary and at the tidal sections of the rivers (City of Mandurah, 1997). Many of the occurrences were during the first flush of rainfall at the beginning of winter.

The likely source of these metals in the lower parts of the Peel-Harvey Estuary system appears to be from fossil fuel combustion by-products and deposits from the wear of rubber automobile tyres which are associated with the increased urbanisation present in this part of the catchment (Rivers, 1997).

5.3 ACID SULFATE SOILS

Acid sulfate soils are sedimentary soils that have been formed under dormant depositional environments. Anaerobic conditions in sediments during deposition lead to an accumulation of iron sulphides in sediments. Subsequent exposure of these soils to the atmosphere through excavation or draining leads to oxidation of the sulphides and the formation of sulphuric acid. The resulting lowering of pH caused by the acid can have significant adverse impacts on organisms coming in contact with these conditions or for downstream receiving environments.

Significant quantities of sulfuric acid may be dispersed into the surrounding environment when oxidised pyritic layers are flushed following a dry period. The acid generated can seep into groundwater and surface waters and if left unchecked, can corrode steel and concrete and liberate toxic levels of aluminium, iron, and heavy metals from the breakdown of clays and silts. Toxic levels of these metals, combined with acidic conditions, pose a significant threat to vegetation, concrete and steel infrastructure and aquatic organisms.

The types of development that may disturb acid sulfate soils within the study area involve large-scale drainage and excavation works which expose these soils to air, and may include:

- large-scale dewatering and drainage works associated with the development of residential estates;
- developments involving disturbance to wetlands, salt marshes, lakes and waterways; and
- infrastructure projects such as bridges, port facilities, flood gates, dams, dredging, railways and roads.

Procedures for dealing with acid sulfate soils are outlined in the *General Guidance on Managing Acid Sulfate Soils* (Department of Environment) and *Planning Bulletin No. 64* (Western Australian Planning Commission 2003).

The majority of the study area has a moderate to high risk of shallow (<3m) acid sulfate soil or potential acid sulfate soil occurring.

5.4 BOAT WASH

The environmental impacts from recreational boating were addressed in a report entitled *Effects of Increased Boat Populations on Foreshore Erosion and Congestion* (Dick, 1978). The major issue raised was that different design hulls create varying degrees of wash which in turn may cause erosion of river banks and foreshores. Reducing boat wash requires improved boat trim so that wakes are reduced.

The majority of the inlet has hardened edges, therefore foreshore erosion from boat wash is not an issue in these areas. Areas which may be affected include grass covered foreshore areas in Precincts 3, 4, and 7; and to a lesser degree, salt marsh areas in Precincts 6 and 8 (Sapphire Cove and Soldiers Cove). Analysis of archival aerial photography reveals very little change occurring to the edge of the salt marsh areas, primarily due to the natural resilience of these areas to tidal movements.

5.5 ENVIRONMENTAL CHARACTERISTICS

5.5.1 Precinct 1

District Beach

This stretch of coast is popular for swimming with family groups and young children and represents one of only a few coastal areas within central Mandurah that is capable of supporting increased utilisation due to the potential development of the adjacent degraded land. The *1996 Coastal Strategy* (City of Mandurah, 1996) and *2003 Coastal Management Plan* (Ecoscape, 2003) proposed this area be upgraded as a District Beach facility. The essential elements of a District Beach are presently in place, but require expansion and upgrading in order to fulfil the design function.

Beach Safety

There is an element of hazard on all beaches and the nature of hazards varies considerably between beaches as they differ in their physical structure and as the conditions of waves, tides and weather fluctuate over time. Recognition and evaluation of such hazards is important to improve recreational use of beaches and protect the public from beach hazards.

As part of a proposal for a contract lifeguard service, Peel Surf Life Saving Club (1999) produced a Beach Hazard Plan where popular beaches were given a beach hazard rating. The beach hazard ratings refer to the scaling of a beach according to the physical hazards associated with beach type and any other local hazards. It ranges from a low rating of 1 (least hazardous) to a high rating of 10 (most hazardous) and provides an indication of the level of hazard. Doddy's Beach, which is a popular spot for families and various recreation clubs, was given a rating of 1.

Erosion Risk

Mandurah's shoreline study (MP Rogers & Associates, 1999) found Halls Head Beach to have a high erosion risk because the size of the foredune would be insufficient to accommodate erosion during a severe storm. This area has experienced a long history of erosion and the construction of the groyne limits the impact that the removal of sand from the training wall at Roberts Point has upon the width of the adjacent beach.

5.5.2 Precinct 2

Sediment Movement and Sand Bypassing

The transport of sand along the coast is one of the fundamental mechanisms in beach dynamics. The prevailing direction of swell is from the south-west, consisting of long period (8 to 16 seconds) swell continually generated in the Southern and Indian Oceans. Waves arriving on the shore from the south-west generate a northward longshore current in the surf zone. Sediment is suspended and transported in the surf zone, giving rise to drift of sediment (northwards) along the Mandurah Coast.

The process has been interrupted at several points along this coastline, most notably at the mouth of the Peel Inlet and at the Dawesville Channel. Mechanical bypassing of sand at these points has been undertaken by the Department for Planning and Infrastructure with the primary objectives of maintaining navigable channels whilst minimising any associated negative impacts by maintaining a process of transporting littoral drift sand northwards. (Moloney, 2003)

Since the initial stages of these bypass operations (1995-1997), the timing and volume of bypassing has been modified. Neither the natural littoral movement nor the mechanical bypassing occurs constantly throughout the year. The present timing of the operations at each site corresponds to the periods of greatest littoral sand movements at these sites. Dominant wind and wave conditions move sand northwards into the Dawesville sand trap during summer, while storms move sand from Roberts Point into the Mandurah sand trap during winter (Moloney, 2003).

The typical rates of nett annual longshore drift at Roberts Point are estimated to be 120 000 m³ (MP Rogers & Associates, 1999). With the volumes now being bypassed, processes such as the formation of the sandbar at Avalon during summer have recommenced (Moloney, 2003).

Prior to the annual bypassing program being established at the Mandurah Channel, sand moved from Roberts Point to Comet Bay mechanically via dredging of the channel and naturally via littoral drift onto a sandbar just offshore and then back onshore north of the channel. With increased mechanical removal of sand from Roberts Point, the sand available to move naturally onto the sandbar has decreased and it has therefore diminished in size. Extreme levels of sand bypassing will eliminate this sandbar but present volumes are not believed to be of this magnitude. Current navigation depths within the channel are considered adequate and the sandbar's remaining presence is useful in providing some protection to the Mandurah Marina development from large ocean waves (Moloney, 2003).

Fairy Tern Habitat Conservation Area

As part of Ministerial conditions set as part of the approval for Mandurah's Marina in 1999, a portion of land was placed under Conservation Reserve for the purposes of maintaining a habitat for Fairy Terns which inhabited the eastern foreshore of the inlet. The Fairy Terns have not returned to the reserved area, preferring to utilise other areas of the coast for nesting.

5.5.3 Precincts 3, 4 & 7

Foreshore Erosion

These precincts include the passive and active recreation areas of Henry Sutton Grove, Hall Park and Waterside Park. They are typically characterised by grass-covered passive recreation areas with occasional stands of *Casuarina obesa* (*Swamp Sheok*) and *Melaleuca cuticularis* (*Saltwater Paperbark*). While some of these areas serve specific functions related to sport and other recreation activities, others sit largely unused. Public open space in this form provides an opportunity to establish vegetation at edges or other under-utilised areas, which will reduce expenditure on the maintenance of grassed areas, provide additional shade for recreational activities and maximise the environmental values of the area. The grassed areas also extend to the foreshore edge causing erosion problems from natural tidal flows and boat wash with erosion occurring in Hall Park currently threatening some *Casuarina obesa* along the foreshore.

5.5.4 Precincts 5, 6 & 8

Samphire Cove and Soldiers Cove

Salt marshes are areas of land vegetated by herbs, grasses or low shrubs, bordering saline waterbodies, and are amongst the most productive ecosystems in the world (McComb *et al.*, 1995). Salt marshes are considered to be critical to the health of estuarine systems for a number of reasons. Salt marshes supply organic matter to estuarine food chains, act as biological filters which remove nutrients and pollutants from runoff entering the Estuary, provide feeding grounds and habitat for a variety of waterbirds and prevent erosion of the shores of the Estuary from tides and waves (McComb *et al.*, 1995).

The majority of Samphire Cove consists of samphire flats (*Sarcocornia quinqueflora*, *Halosarcia halocnemoides*, scattered *Frankenia pauciflora* and *Sporobolus virginicus*) with fringing woodland of *Casuarina obesa* (Ecoscape, 2000).

Soldiers Cove consists of closed samphire (predominantly *Sarcocornia quinqueflora* and *Suaeda australis*, with scattered *Frankenia pauciflora*) with areas of deep (>0.5m) pooled water (Ecoscape, 2000).

Regional Significance

Samphire Cove and Soldiers Cove were recommended for conservation reserves in the System 6 report due to their regional conservation significance (Department of Conservation and Environment, 1983). System 6 Site C50 (Peel Inlet) includes the Coodanup Foreshore, Creery Island, Boundary Island, Soldiers Cove, Samphire Cove and the western foreshore of the wetland area known as the Chimneys (Department of Conservation and Environment, 1983). The Peel-Harvey Estuary was recognised as probably the most important Estuary in south-western Australia as a conservation area for waterbirds, with the tidal flats and shallows around Creery Island forming one of the most important habitat areas for waterbirds. The shore areas in the north of Peel Inlet and either side of Mandurah Channel contain samphire flats and marshes that also form important habitat for waterbirds (Department of Conservation and Environment, 1983).

National Significance

At a national level, the Peel-Harvey Estuary has been included in the *Directory of Important Wetlands in Australia* (Environment Australia, 2001) and the *Register of the National Estate* (Australian Heritage Commission, 1990). The Directory provides the best available compilation of Australia's nationally important wetlands, based on their representativeness, rarity, biodiversity, wetland functions and historic and cultural significance (Hill et al., 1996). The Register of the National Estate is a list of parts of Australia's natural, historic and cultural heritage which should be preserved, as determined by the Australian Heritage Commission.

The Peel Inlet and Harvey Estuary are protected under the Environmental Protection and Biodiversity Protection (EPBC) Act 1999 which also protects a number of migratory wetland birds that visit the area. EPBC Act requires activities that are likely to have a significant impact on a matter of national environmental significance and other matters concerning the Commonwealth to be assessed and approved under the Act by referral to the Commonwealth Environment Minister.

International Significance

The Peel Inlet is included on the Ramsar List of Wetlands of International Importance as part of the Peel-Yalgorup System, one of nine wetland systems listed for Western Australia. The Peel inlet has been included in this list because it meets the following criteria:

- The site includes the largest and most diverse estuarine complex in south-western Australia and also includes particularly good examples of coastal saline lakes and freshwater marshes.
- The site is one of only two locations in south-western Australia and one of very few in the world where living thrombolites (a type of microbialite, superficially similar in appearance to stromatolites) occur in hyposaline water.

- The site comprises the most important area for waterbirds in south-western Australia, supporting in excess of 20,000 waterbirds annually, with greater than 150,000 individuals recorded at one time (February 1977).
- The site regularly supports 1% of the population of at least six shorebirds: Red-necked Avocet (*Recurvirostra novaehollandiae*), Red-necked Stint (*Calidris ruficollis*), Red-capped Plover (*Charadrius ruficapillus*), Banded Stilt (*Cladorhynchus leucocephalus*), Caspian Tern (*Sterna caspia*) and Fairy Tern (*Sterna nereis*).

The Peel Inlet is also host to a number of waders (or shorebirds) that visit Australia during September to April, but breed in northern Asia during the northern hemisphere winter. Many of these species are listed on the JAMBA (Japan-Australia Migratory Bird Agreement) and/or CAMBA (China-Australia Migratory Bird Agreement). These agreements between international governments aim to conserve the birds and their habitats.

Avifauna

The Peel-Harvey system is recognised as being one of the most important sites in the south-west for waterbirds, and forms part of the Ramsar listed Peel-Yalgorup Wetland System. The region was nominated for listing under the Ramsar Convention because of its importance for waterbirds, being regularly used by in excess of 20,000 individual waterbirds in most years. Eighty-six waterbird species have been recorded in the area, of which 34 are listed under international conservation treaties, with most of these being trans-equatorial migrants (Jaensch and Lane 1993).

Waterbird numbers on the Estuary are highly seasonal, with numbers generally being greatest over summer when many trans-equatorial migrants (mostly sandpipers and plovers) are present and Australian species such as swans, ducks and stilts gather as seasonal wetlands in the region dry out.

Waterbirds use salt marsh extensively for foraging, with most activity occurring in pools (Ninox, 1990; Latchford, 1997; Bamford, 2000). Waterbirds also use salt marsh for roosting, with this activity also being concentrated around pools, especially in shallow areas or where the pool has some bare shoreline or a bare island. Some waterbirds use salt marsh for breeding: Black-winged Stilts, White-fronted Chats, Black Swans, Hardheads, White-faced Herons and Red-capped Plovers have been recorded breeding in salt marsh areas (Jaensch et al., 1988; Latchford, 1997).

Site Sensitivity

A number of bird counting studies have been undertaken for the Port Mandurah areas and a total of 74 species have been observed feeding, resting, roosting or breeding in the area. Fifteen of these have been recorded as breeding within these areas. Human access to breeding areas during the breeding season (which varies between species) has been found to negatively affect the reproductive success of sensitive species (Giese 1995). Sensitive breeding species found in Samphire Cove and Soldiers Cove include Pied Cormorants, Crested Terns, Caspian Terns, Little Pied Cormorants and Pelicans (WBM Oceanics Australia & Gordon Claridge, 1997). Only a small proportion of birds have been studied for sensitivity to disturbance so there is expected to be more sensitive species than currently known. Considering the significance and sensitivity of the area, any additional access in close proximity to these areas should be carefully planned based on precautionary principles to minimise potential disturbance.

Foreshore Edge

The edges of salt marsh areas are naturally resilient to tidal erosion and examination of archival aerial photography dating back to 1963 shows very little change to these areas. A noticeable change that has occurred in the last 20 years is a small reduction in the size of the island in Soldiers Cove. This may be attributed to the increased tidal influence from the mouth of the Peel Inlet and Dawesville Channel and natural changes to dynamic riverine systems or from increased boat wash. Prior to the construction of the Dawesville Channel and bypassing operations at the Peel Inlet, the Peel-Harvey experienced a small tidal range of about 10 cm. Since the opening of the channel and regular sand bypassing at the mouth of the inlet, the tidal range has increased to 32 cm. The salt marsh areas of Samphire Cove and Soldiers Cove should be monitored yearly to identify any erosion occurring and whether it is occurring due to natural inlet flow or boat wash.

Ecotourism and Interpretation

The walk trails, hides, viewing platforms and information shelters at Samphire Cove Nature Reserve provide an opportunity to view and understand this unique environment. A website (Bamford Consulting Ecologists, 2004) also provides information about the reserve with downloadable education packages for schools planning to visit the area.

5.5.5 Precinct 9 & 10

These precincts include the hard landscaped areas of the CBD waterfront area and the western marina edge. The most notable environmental feature of this area is the large sandbar adjacent to the CBD Waterfront.

5.6

OPPORTUNITIES & CONSTRAINTS

Environmental opportunities and constraints relevant to the various precincts are outlined below.

5.6.1 Precinct 1

Opportunities

- Safe beach.
- Increased beach width by extension of groyne.
- Foredune reconstruction to protect parkland and infrastructure from storms.

Constraints

- High erosion risk with current width of beach and lack of foredune.

5.6.2 Precinct 2

Opportunities

- Large under-utilised area of land for landscaping opportunity.
- Reinstate indigenous coastal species on foredune and parklands to improve coastal protection, habitat, passive recreation and landscape value.
- Reinstate wetland habitat adjacent to Mary Street Lagoon to improve stormwater management, passive recreation and landscape value and habitat.
- Fairy Tern Conservation Reserve not used by Fairy Terns.

Constraints

- Noise and visual impact of current sand bypassing operations.

5.6.3 Precinct 3

Opportunities

- Improve foreshore edge with indigenous rushes and sedges to protect from erosion and stripping of nutrients from fertilised lawns.

Constraints

- High risk of acid sulfate soils being within 3m from the surface.

5.6.4 Precinct 4

Opportunities

- Establish indigenous vegetation at edges or other under-utilised areas which will reduce expenditure on the maintenance of grassed areas, provide additional shade for recreational activities and maximise the environmental values of the area.

- Improve foreshore edge with indigenous rushes and sedges to protect from erosion and strip nutrients from fertilised lawns.

Constraints

- High risk of acid sulfate soils being within 3m from the surface.

5.6.5 Precinct 5

Opportunities

- Conservation of salt marsh area adjacent to Rialto Place.

5.6.6 Precinct 6

Opportunities

- Conservation of salt marsh habitat.
- Existing ecotourism and interpretation facilities.

Constraints

- Sensitivity of wetland bird species to disturbance during breeding season.
- Development in proximity to wetlands will require formal environmental assessment.

5.6.7 Precinct 7

Opportunities

- Improve foreshore edge with indigenous sedges and rushes to protect from erosion and strip nutrients from fertilised lawns.
- Improve landscaped gardens with edge planting.

5.6.8 Precinct 8

Opportunities

- Conservation and interpretation of salt marsh and fringing riparian habitat.

Constraints

- Sensitivity of wetland bird species to disturbance during breeding season.
- Development in proximity to wetlands will require formal environmental assessment.

6.0 MARINE CHARACTERISTICS

6.1 BOAT USAGE/DEMAND

Boating is a major activity in Mandurah, bringing increasing colour and life to the City's waterfront. A brief non-exhaustive characterisation of boating within the City may be made as follows:

- At 90 boats per 1,000 people, Mandurah has a boat to population ratio almost three times the State average. A total of 4,917 boats were registered in the Peel region in 1998, 3,900 of which were Mandurah boats.
- DPI (1999) estimated boating growth rates in the order of 4% per annum for planning reviews of the Mandurah Ocean Marina (less than the reported population growth rates of 5.0 to 7.5%). Based on these projections, over 40% increase in boating numbers is anticipated by 2020.
- DPI (1999) also estimated there was a demand for between 1,081 and 1,428 10m vessels requiring berths in 1998. Based on the projections, there will be a demand of between 2,600 and 3,400 10m vessels requiring pens in 2020 – doubling the demand for pens.
- There are presently about 960 marina pens (including existing and planned mini marinas) and about 1,830 canal lots in the Mandurah and Port Bouvard areas. Not all canal lots utilise their mooring. A pen take-up rate of between 20% and 50% is estimated in various existing canal developments. Therefore, with all known developments, there will only be about 1,300 to 1,900 pens available to meet demand. This is a deficit of 1,300 to 1,500 pens.
- This will require between 30 ha and 37 ha of additional water area as well as servicing and other support areas. The existing Mandurah Ocean Marina has about 12 ha of berthing water, 5.5 ha of support areas and 0.5 ha of commercial/tourist.
- The Mandurah Ocean Marina is already close to building out the last of its 540 pens, with final stages of the yacht club and City pens planned for the coming year.
- Over half of the pens managed by the City are owned by residents outside the immediate draw area. Therefore, there may be significant demand from elsewhere in addition to the local demand (pers comm. and details provided by Stephen Smith, Waterways Manager).
- Recreational boating is well placed to benefit from the strong increase in demand for leisure-based activities with the demographic change of the 'baby boomers', with Mandurah well placed to be a major beneficiary (ICOMIA: Natchez et al, Robinson, 2002).

- There are signs that the boating population is becoming more sophisticated and is seeking more opportunities for high intensity waterside experiences. There is increasing demand for short term moorings at commercial waterfront nodes and destination/stopover visiting (ICOMIA: Natchez et al, Robinson, 2002 & other sources).
- Boat dealers, industry sources and marina operators report increasing demand for pens over 20m in length and 'super' yachts. This trend is attributed to a perceived decrease in security in overseas travel (sourced from up to date boating industry press releases and other projects in WA).

Therefore, there is a significant challenge for the City to provide facilities to meet the expectations of the resident and visiting boating public alike.

6.2 NAVIGATION CHARACTERISTICS

Navigation in the Mandurah area may be characterised as being limited by:

- the currently maintained depth of Mandurah Ocean Entrance bar by bypassing operations;
- major flood tide bar feature of the Fairbridge Road Bank;
- navigable depths within the various canal estates and marina basins;
- very shallow waters of the Peel Inlet; and
- bridge clearance heights within the Mandurah Channel and canal estates.

These parameters are detailed in Rogers & Associates (2004). As a result, navigation for larger vessels is limited to the Mandurah Channel, the Dawesville Channel and ocean access unless they are specifically designed shallow draft vessels such as houseboats. Tall masted vessels are currently limited to access to the Port Mandurah canals and in the Mandurah Channel as far as the Mandurah Bridge.

The above navigational characteristics have an impact on the development of public access to link the various parts of the Mandurah foreshore. These links rely on a number of pedestrian bridge crossings of the Mandurah Channel and the Estuary link to the Peel Inlet. A crossing of the Mandurah Channel has been mooted for a number of locations to the ocean side of the Mandurah Bridge. Also, pedestrian bridges for dual-use purpose crossings are proposed at the entrance channels to the various canal developments. A summary of the navigational analysis for each of these crossing is presented in the following sections. **Figure 8.1** presents an excerpt from the navigation chart of the area identifying key developments for reference in the report.

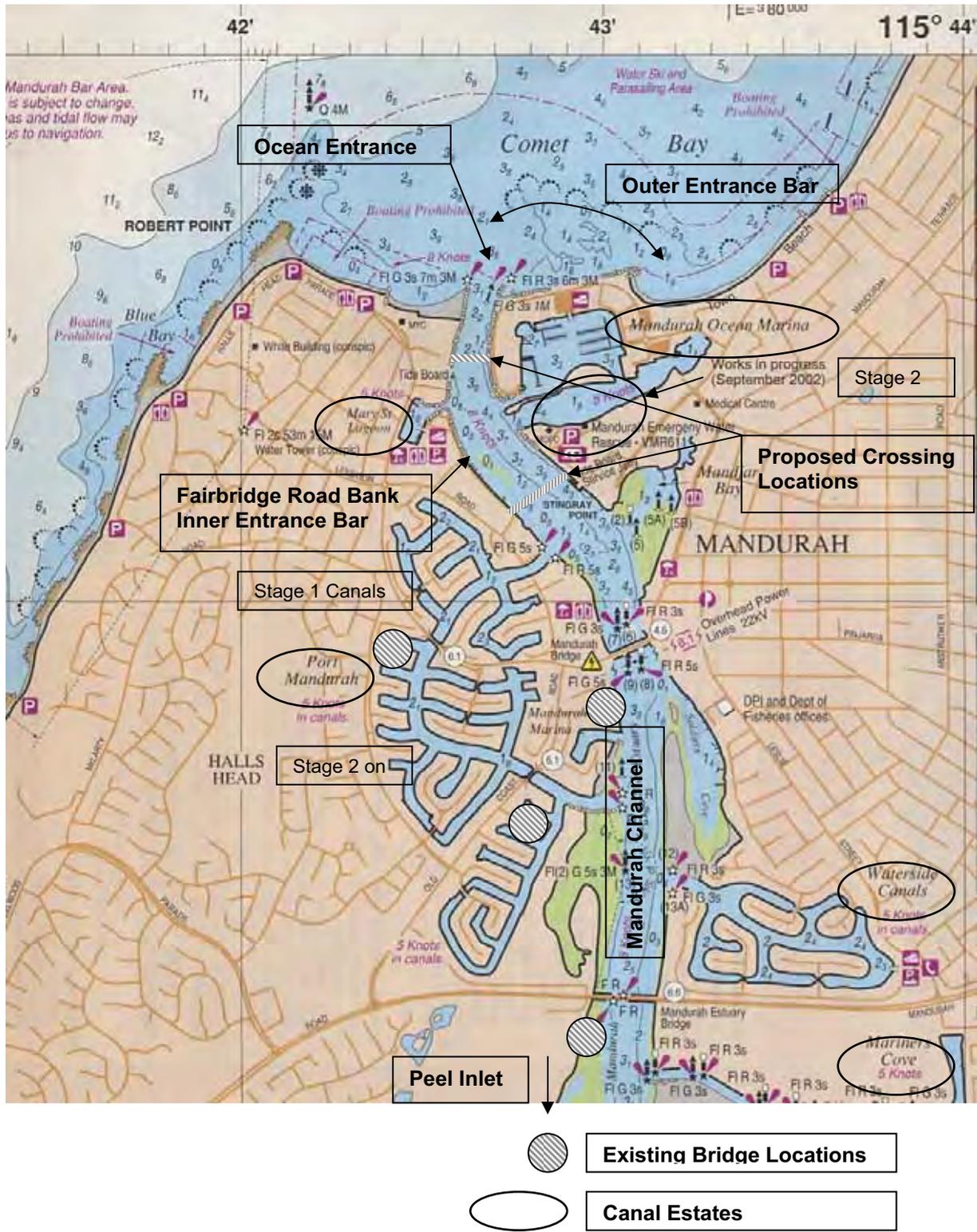


Figure 8.1 Location Diagram

6.2.1 Bridges over Mandurah Estuary

Ocean Entrance

Large vessels including ocean going yachts use the Mandurah Ocean Marina facility via the ocean entrance. Access is limited by navigable depth at the ocean entrance. This could be increased by changing the entrance sand bypassing regime.

Clearance for yachts is important unless a marina is developed outside the entrance.

- Yachts: Clearances of up to 21m for 10 to 15m vessels or opening.
- Power: Clearances of over 7m for power boats to 25m currently accommodated in marina.
- Clearances of up to 10m for ferry and large motor yacht access.

(Note: all clearance quoted to Highest Astronomical Tide (HAT) as shown on DPI charts)

Mandurah Bridge

There is significant merit in at least matching the existing bridge clearances within the Port Mandurah development to reduce bypassing traffic through these developments. Navigation is limited by internal depth and geometry, the Mandurah Bridge and the internal Port Mandurah bridges. A rationalization of Mandurah Channel navigation would require a clearance of 6.6m to match the Mandurah Estuary Bridge.

- Minimum clearance: 6.1m to match existing minimum bridge clearance.
- Recommended clearance: 6.6m to rationalise navigation.

6.2.2 Bridges over Other Waterway Entrances

Mandurah Ocean Marina

Navigation is currently limited to about 25m vessels by navigable depth at the ocean entrance as above but waterway depths would allow access to larger vessels should changes in ocean entrance navigation allow this.

Clearance for yachts is important unless a marina is developed outside the entrance.

- Yachts: Clearances of up to 21m for 10 to 15m vessels or opening.
- Power: Clearances of over 6.6m for power boats to 25m currently accommodated in marina.
- Clearances of up to 10m for ferry and large motor yacht access.

Mary Street Lagoon

Navigation is limited to 9m power vessels and lift keel yachts.

Yachts could be made to use the marina ramp. However, maintaining access to the western side of the channel may help reduce traffic congestion in Precinct 10.

- Yachts: Clearances over 13.5m for up to 9m lift keel vessels or opening.
- Power: Clearances over 4m.

Port Mandurah Stage 1

Navigation is currently limited by navigable depth at the ocean entrance, the canal entrance and by the existing bridges.

- Yachts: Clearances over 15m for up to 10m vessels or opening.
- Power: Clearances over 6m to accommodate flybridge vessels.
- Minimum clearance: 6.1m to match existing bridges.

Waterside Mandurah

Navigation is limited by internal depth and geometry, the Mandurah Bridge and the internal Port Mandurah bridges.

- Yachts: clearances to 10m vessel, drop mast or opening.
- Power: Clearances over 6m to accommodate flybridge vessels.
- Minimum clearance: 6.1m to match existing bridges.

6.2.3 Opportunities & Constraints

Opportunities

- Marinas outside the entrance were raised by the Community Reference Group to take up boating demand and improve entrance management. There is opportunity here to cater for a large portion of the significant demand identified. This demand would require development of marina facilities with over twice the size of the current Mandurah Ocean Marina basin. Such developments are important for future access to recreational boating facilities in the region because of the limited navigable access to the Estuary for larger vessels.
- In addition, opportunities exist to enhance the boating experience with berthing facilities within Mandjar Bay (Precinct 9) associated with the development of the Peninsular site and enhanced public short term facilities within the bay. This will require dredging of the western side of the basin.
- There is additional scope for short term parallel berthing and short stay visitor berthing to the boardwalk areas between the Peninsular site and the Mandurah Ocean Marina entrance. The site has a previous history of maritime usage.

- There is also an opportunity to address Community Reference Group desires for moorings within the Mandurah Channel in the vicinity of Fairbridge Road. This could be achieved by the provision of piled moorings on the western side of the main navigation channel against Fairbridge Road Bank south of the Mandurah Ocean Marina entrance, and on the eastern side of the channel just north of the marina entrance when the outer marinas are developed. These mooring schemes are used quite effectively in the tidal estuaries and rivers of the eastern seaboard of New South Wales and Queensland, one of the most well known being the Botanical Gardens on the Brisbane River.
- An opportunity is identified to improve navigation for larger air draught motor vessels by rationalising bridge clearances or providing opening operations to the Mandurah Bridge. This will limit undesirable and increasing through-traffic within residential canals.

Constraints

- Navigation for larger vessels is limited to the Mandurah Channel, the Dawesville Channel and ocean access unless they are specifically designed, shallow draft vessels such as houseboats.
- The inlet characteristics also impact the nature of the outer Mandurah Channel with the Fairbridge Road Bank being a part of the larger inlet dynamics. This is a barrier to navigation and requires management to maintain entrances in its vicinity. A small channel against the western bank of the channel is a well-accepted berthing area, however, berthing over the bank is restricted by water depth. Upgrading the Fairbridge Road precinct to short-stay developments could see short-stay berthing incorporated into boardwalk-type waterfront treatments for small vessels.
- Tall masted vessels currently have limited access to the Mandurah Channel as far as the Mandurah Bridge and within the Port Mandurah Stage 1 canals. Further restrictions to this access may draw criticism from the boating population.
- Another existing constraint to navigation is the height of existing bridges, both in the Mandurah Channel and the canal estates, for large air draught power vessels. Limitation of height at the Mandurah Bridge diverts traffic of flybridge vessels through residential canals.
- The shallow depth within the Peel Inlet remains an impediment to navigation of large vessels.
- Navigation and boating is also constrained by the presence of natural and heritage conservation reserves within the waterway. These have impacts on boating infrastructure development in Precincts 6, 8 and 9. Management of the impacts of boating traffic will continue to be a management concern for these areas.

6.3 FORESHORE CHARACTERISTICS

6.3.1 Precincts 1, 2 & 10 – Coastal Characteristics Mandurah Ocean Entrance

The Mandurah Ocean Entrance is the navigable entrance of the Peel Inlet Estuary referred to as the Mandurah Channel. The entrance is situated on a sandy coast along which there is a large wave-induced net northward movement of sand. Rogers & Associates (1999) estimated the annual net longshore drift of sediment past the entrance was in the order of 120,000 m³ with significant seasonal and interannual variations. The entrance may be characterised as follows:

- A typical dynamic littoral drift tidal inlet entrance, a flood tide bar forms within the entrance (part of the Fairbridge Road Bank complex) and an ebb tide bar forms outside the entrance across which waves are able to transport sand past the opening. **Figure 8.2** shows an aerial photograph of the untrained entrance without bypassing operations. **Figure 8.3** shows typical sediment movements in and around the entrance of the trained entrance with sand bypassing management.
- Sand bypassing at the entrance is required to maintain navigation. Without regular bypassing, reduced navigability of the entrance quickly becomes a problem. Currently, in the order of 100,000 m³ is passed across the entrance by mechanical means every year.
- If bypassing is not regular, movement past the entrance is inhibited, or should sand from this system be trapped in any way, erosion of beaches to the north of the marina will result.
- The beach immediately to the west of the entrance is currently used as a sand trap for bypassing operations. There is an increasingly vocal desire to increase the amenity of the beach that is presently disrupted by these operations.
- The beach at Roberts Point was identified by Rogers & Associates (1999) as having a high erosion threat with a limited setback of only 10m to Halls Head Parade. This was recognised as requiring beach renourishment and management.
- The beach immediately north of the Mandurah Ocean Marina relies on continuing bypassing activities to maintain beach width and protection of the adjoining land.

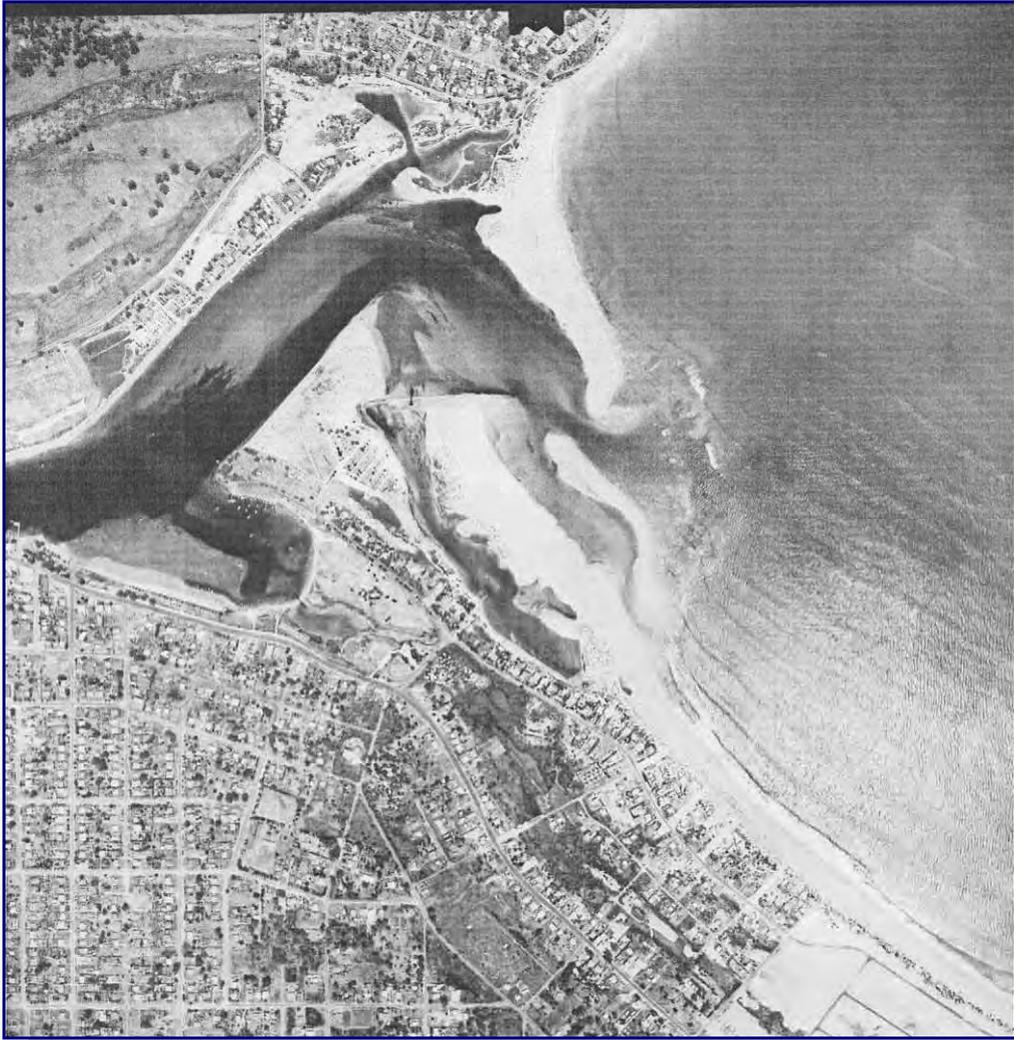


Figure 8.2 Untrained Ocean Entrance



Figure 8.3 Ocean Entrance Dynamics

6.3.2 Other Precincts - Mandurah Channel Foreshore Dynamics

The Mandurah Channel has a tidally dominated flow but also experiences flood flows out of rivers feeding the Peel Inlet. In general this may be characterised as follows:

- Having tidal channel flow dominated beaches along its foreshores that can also be influenced by boat wake and the limited wind wave fetches to form their shape.
- In general this results in shorelines parallel to channel flow.
- Protection from wind and wave action can result in localised sediment build-up along the shore requiring management.
- Disruption across the banks can also cause localised build-ups and other changes from diversion of flow.
- The Fairbridge Road Bank is a dynamic part of the entrance system and removal of sand from the system from this source will reduce sediment available to the northern beaches.

6.3.3 Opportunities & Constraints

Opportunities

Development of the foreshores presents the following opportunities:

- Marinas outside the entrance were raised by the Reference Group to take up boating demand. There is opportunity to cater for demand as well as increase the amenity and efficiency of bypassing operations in construction of these structures.
- Opportunity in Precincts 1 & 2 to increase the erosion buffer to protect Halls Head Parade and enhance beach amenity west of the channel entrance, utilising any structures or developments there.
- To provide better amenity to beach users by investigating less obtrusive bypassing operations including the provision of electric power, the implementation of full or partially fixed (e.g. fixed hopper and pump) bypassing operations and improved outlet siting to improve amenity of the eastern (resort) beach.
- Improve the efficiency of bypassing operations by improving management including improving trapping to prevent sand movement into the entrance from the west and more regular bypassing episodes.

Constraints

Development of the foreshores is constrained by the following:

- Maintaining navigability of the Mandurah Channel that will not unduly impact access to the limited areas of the Estuary.
- Maintenance of the natural inlet system sediment dynamics. This could be done by training the ocean entrance seaward of its present position using the proposed marina structures. This would require a review of the entrance hydrodynamics through the detailed planning phase to identify its final form and any impacts.
- No interruption, 'borrow' or 'sinking' of sediments from the system, which would result in erosion losses to the northern beaches or threaten limited foreshore setbacks of ocean beaches.
- Interruption of processes along the banks of the Mandurah channel may require management of sediment build-up. This and other impacts from diverting channel flow would have to be considered in the preliminary design phases of these projects.
- Channels crossing the banks of the Mandurah Channel may require management of sediment build-up to maintain navigability and associated maintenance costs.

7.0 SERVICES

7.1 DRAINAGE

There are currently a number of stormwater outlets that discharge into the Estuary and there is an opportunity to improve the water quality going into the Estuary. The City is retrofitting gross pollutant traps to its stormwater drainage network. No new stormwater outlets are allowed to discharge into the bay.

All new stormwater drainage will need to meet the requirements of the following:

- City of Mandurah
- Department of Environment (formerly the Department for Environmental Protection and Water and Rivers Commission)
- Peel Inlet Management Authority

7.2 WATER SUPPLY

The existing water supply is reaching the limit of its capacity.

There are two water mains that run on an alignment with the Mandurah Bridge and an unused water main that runs on an alignment with the Mandurah Bypass Bridge.

7.3 ELECTRICITY

There is an opportunity to enhance the area by undergrounding the power.

The existing electricity supply is reaching the limit of its capacity.

7.4 GAS AND TELECOMMUNICATIONS

There is gas reticulation throughout the study area, however, not all properties are connected. There is a gas main that runs on an alignment with the Mandurah Bridge and a high pressure line that runs on an alignment with the Mandurah Bypass Bridge.

There are no issues with telecommunications in the area.

7.5 SEWER

The existing sewer system is reaching the limit of its capacity.

There are two sewer pump stations within the study area, one in Precinct 8 and one in Precinct 9. In addition to these there is one in Marco Polo Drive, within the Marina. The pump stations are subject to a 50m odour buffer zone, within which the Water Corporation will not allow sensitive uses, e.g. residential development.

8.0 TOURISM & COMMERCIAL

8.1 TOURISM CHARACTERISTICS

8.1.1 Tourist/Recreation Facilities

In the past 15 years Mandurah has grown from a population of less than 30,000 to a City of almost 60,000, with planning forecasts predicting a resident base of 85,000 by year 2016. This significant growth has placed pressure on both the recreational and tourist infrastructure of the area, however in general the destination has managed to retain its largely relaxed holiday atmosphere. The expansion of residential canal developments has improved both access and use of the impressive waterways and fishing, crabbing and other recreational activities are enjoyed by residents and visitors alike in largely sheltered marine-based settings.

The area boasts a good number and range of facilities such as parks, rest areas and amenities and many of these are centred around foreshores and waterfront reserves reinforcing the focus upon the local waterway assets.

However, outside of Estuary-based fishing and crabbing, the Mandurah destination currently does not offer a large number of visitor-based attractions with high 'iconic' significance; that is, attractions that in their own right have the capacity to draw travellers to the area. There is an urgent need to improve the range and number of built visitor attractions that reinforce the family and upmarket active experience-based holiday positioning.

Overall, Mandurah boasts a strong tourism focus and is the winner of the years 2003 and 2004 'Top Tourism Town' which is awarded to destinations displaying a strong long term commitment to both tourism development and promotion.

8.1.2 Tourist Accommodation Demand & Growth

Mandurah is less than one hour's drive from the State's major population base, making it a popular day-tripper destination. The National Visitor Survey (NVS) estimated that in 2004 some 1.3 million day-trippers visited the Mandurah region, with the very large majority emanating from the Perth metropolitan region.

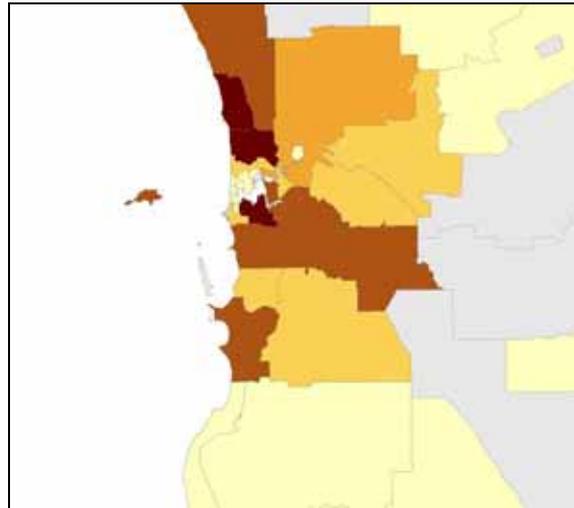


Figure 10.1 – Perth metropolitan day visitor source to Mandurah 7 year average

Mandurah also attracts a significant overnight visitation and in 2004 this totalled 340,500 overnight visitors generating some 817,000 visitor nights.

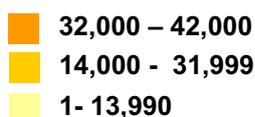
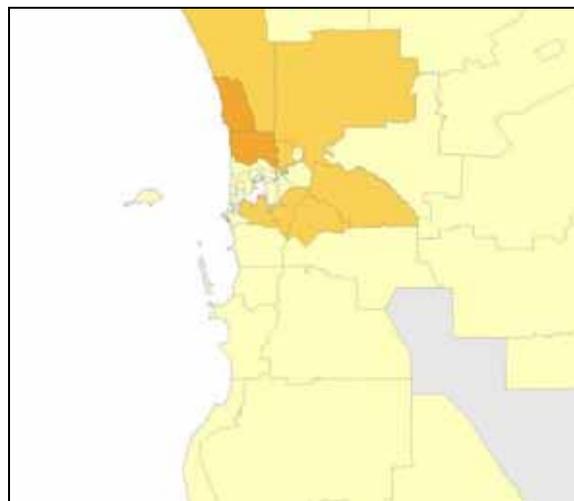


Figure 10.2 – Perth metropolitan overnight visitor source to Mandurah 7 year average

International and interstate travel to the Mandurah and Peel region remains relatively low with only 9.7% of overnight travellers to the Peel visiting from outside of Western Australia. Visitor demand resides predominantly from intrastate markets and more specifically from the Perth metropolitan region.

The same research revealed that both day-trippers and overnight visitors were attracted to the region for either holiday purposes or to visit friends and relatives. Business travel represented only a small proportion of total visitation levels. Around half of the overnight visitors stayed at the homes of friends or relatives with around 30% staying in commercial accommodation.

In terms of current commercial accommodation, there are several resort operations ranging from 3-star family-oriented to more upmarket 4½-star operations with a combined room/apartment capacity of around 350 units (sources: Mandurah Visitor Centre and AAA Tourist Guide 2004/5). The majority of this standard of accommodation is apartment and or fully self-contained styles and again this reflects the strong demand of holiday visitor types. Considering the impressive natural attributes of the area, the extensive waterways and strong holiday focus there is substantial opportunity to develop the Mandurah area into a higher yield tourist destination. The existing Quest Mandurah Apartments and Seashells Resort Mandurah (under construction) operations are excellent examples of the type and format of accommodation required for the destination.

Available research indicates a strongly held perception of Mandurah as a popular water-based holiday destination for families and the active 18-39-year old visitor markets. The standard and styles of visitor-based facilities being proposed in the Mandurah Foreshore 2020 project should therefore strongly reflect these market needs. That is, a range of facilities and experiences that provides both affordable family-oriented holidays and also caters to the higher yield, more upmarket and active traveller types.

8.1.3 Opportunities & Constraints

The natural waterways are world-class and high quality development opportunities to maximise both resident and tourist use, and enjoyment of the destination should be pursued. The Mandurah Ocean Marina development is an excellent example of what can be achieved with a vibrant mix of waterfront restaurants, retail, residential and tourist accommodation facilities.

In particular, there is strong and growing demand for boating enthusiast visitors wanting short-stay holiday accommodation with easy access to their owned moored vessels. The extensive Mandurah waterways offer this potential.

Linking the precincts via a pedestrian/cycle pathway along the foreshore is also considered a critical aspect of the overall Mandurah Foreshore 2020 project. Whilst the waterways of Mandurah are its major strength, they also create a number of logistical issues for recreational access and enjoyment of the foreshore areas. An uninterrupted pedestrian and cycle network would provide local residents and visitors alike a unique opportunity to undertake leisure activities along the Mandurah foreshore and would be a major attraction and visitor selling point in its own right.

Historically, Mandurah has been a strong day-tripper destination as well as a popular holiday venue for travellers utilising caravan parks and other budget-style accommodation. This mix resulted in a relatively low visitor expenditure profile for the region and a widely held perception of Mandurah as a low-cost visitor destination. The significant expansion of homesite canals and substantial increases in residential investment over the past decade has worked to shift the profile of Mandurah to a more upmarket visitor destination. Additional large scale investment in quality tourism infrastructure is now required to support this market positioning and is considered a key driver of the Mandurah Foreshore 2020 project.

9.0 COMMERCIAL DEVELOPMENT

9.1 MANDURAH REGION COMMENTARY

The Perth metropolitan area has been divided into seven sectors by the Western Australian Planning Commission (WAPC). The Peel sector comprises the southernmost section of the Perth metropolitan region and is made up of the Shire of Murray and City of Mandurah local authorities. In 2001 the Peel sector represented around 4.1% of the total resident population of the Perth metropolitan region.

Australian Bureau of Statistics (ABS) Data indicates the total estimated resident population of the Peel sector as at June 2004 was 70,418. This comprised 58,587 people within the City of Mandurah and 11,831 people within the Shire of Murray. This infers that population growth within the Peel sector has occurred at a rate of 5.4% per annum between the periods 2001 to 2004.

Much of the development activity in the Peel sector has occurred within Mandurah. In fact, ABS statistics indicate that between 30 June 1998 and 30 June 2003 the resident population of Mandurah grew by an average of 4.02% per annum, which made it the fastest growing district within Australia over that time period.

It is suggested by WAPC within the Metropolitan Development Program (MDP) Urban Release Plan that the Peel sector is projected to grow by almost 11,000 persons at an average growth rate of 2.8% between 2004 and 2009, which would make it the fastest growing sector in the MDP area. Much of this growth is expected to be within the over-55 age group.

One of the main contributors to this future growth will be the major State Government infrastructure projects that are currently underway and/or planned, including:

- **Mandurah Ocean Marina:** A \$58 million project, construction of which commenced in 2000. The development consists of a man-made marina located adjacent to the Mandurah town centre which, once fully complete, will provide residential, commercial, retail, café, restaurant and tourist based uses and now provides a new 500 boat marina facility, professional fisherman's wharf area and sea rescue facility. Since its inception, sales of residential and commercial development sites within this project area have been met with outstanding success, with the area already exuding a level of vibrancy. This project is expected to create more than 600 full-time jobs and generate around \$900 million in economic activity in the Peel region over a 20-year time frame.

- **South West Metropolitan Railway Project :** The largest public transport infrastructure project ever undertaken in Western Australia, with a budgeted cost of \$1.5 billion. It consists of a fast rail service linking the Perth CBD to Mandurah, with an anticipated total travel time of 48 minutes. Completion of this project is expected by April 2007.
- **Perth to Bunbury Highway (Kwinana Freeway Extension and Peel Deviation) :** The State Government announced a commitment of \$170 million towards this project in September 2004. It is intended to divert traffic travelling to Bunbury around the Peel Inlet via a continuation of the Kwinana Freeway. Construction is anticipated to start in 2007, with the link expected to be completed in 2009. The Federal Government has announced its intention to allocate \$170 million towards this project.

Apart from the above, the 'seachange' phenomenon that has emerged in Australia, whereby the nation's population seems to be gravitating towards the coastlines, has and will continue to be an influence on population growth within the Peel Region.

Mandurah, and its surrounds, has always been a popular holiday destination and has enjoyed a healthy level of local tourist numbers. Many people residing in Perth or rural areas of Western Australia have had a holiday home within Mandurah used mainly as a getaway over the weekends or at holiday times. However, it appears over recent times the area has seen a shift from a short-term holidaymaker population to a more permanent population that works and resides within Mandurah.

Arguably, Mandurah is viewed more as an extension of the Perth metropolitan area than a seaside country town and holidaymakers within WA have shifted further south to more popular destinations such as Margaret River, Dunsborough, Albany and Busselton. For holidaymakers, Mandurah is being visited more frequently by day-trippers on their way to other destinations.

Mandurah's coastal location and the Peel Inlet/ Mandurah Estuary are the main natural drawcards to the area, for both tourists and new residents. The sporting and leisure activities provided by these attributes make for an appealing lifestyle.

The attraction of Mandurah as a residential locality is demonstrated by REIWA statistics which show that over the five years between December 1999 and December 2004, the median established residential dwelling price increased from \$120,000 to \$250,000, at an average annual rate of 15.8%. This is in comparison to price movement in the Perth metropolitan area which, over the same period, equated to an average annual growth rate of 11.3%. The Mandurah residential property market has, therefore, outstripped the overall Perth market over the last five years.

Given the current and anticipated future levels of development activity, population growth and infrastructure spending within Mandurah, there exists great opportunity to create increased vibrancy around the shores of the Mandurah Estuary by a combination of redevelopment and enhancement projects to create a number of residential, tourist, commercial, retail, civic and cultural uses.

9.2 MANDURAH FORESHORE FOCUS 2020 – PRECINCT ANALYSIS

The analysis of each of the ten precincts and the various commercial/property opportunities and constraints are discussed in the following sub-sections.

PRECINCT 1

General Description

This precinct is made up of 3 areas, i.e.:

- Area 1: Roberts Point;
- Area 2: Gallop Street Reserve; and
- Area 3: Halls Head Beach.

Areas 1 and 3 comprise coastal foreshore with relatively narrow beaches. Private dwellings ranging from older style 'beach shacks' to new executive dwellings are located directly opposite. Bitumen parking areas, barbeque facilities and toilets are already provided and are in a fair condition. Toilet facilities may need upgrading in the future.

Area 2 is a flat land parcel comprising a grassed public open space quadrangle with minor children's play equipment that is in a fair condition. Surrounding development comprises single detached residences ranging from older style 'beach shacks' to more modern (1990s) dwellings on larger lots, most of which are single-storey. Surrounding roads are bitumen paved with no concrete kerbing to the land's frontage and no storm water drainage.

Opportunities

Areas 1 and 3

- None evident.

Area 2

- Residential development with densities up to R20 in keeping with the surrounding streetscape, including possible retention of a portion for parklands.

Constraints

Areas 1 and 3

- Narrow beaches mean there is very little opportunity for development of this land.
- The Crown Land tenure would require a lengthy approval process for any proposed development.

Area 3

- Opposition from private residents located directly opposite and within the immediate locale due to loss of parkland vistas and general amenity.

PRECINCT 2

General Description

This precinct is made up of the Old Yacht Club and Victor Adam Park.

A very gently undulating land tract that lines the Estuary foreshore and extends from Halls Head Beach (entrance of the Mandurah Estuary). The land is punctuated by Mary Street Lagoon, which is a man made marina.

Surrounding land uses comprise predominantly single detached residential dwellings of varying age and construction to the west and south.

These areas comprise the northernmost portions of the land at the entrance of the Mandurah Estuary. The Old Yacht Club area contains a north-facing beach being predominantly unimproved with the exception of the old yacht club. This brick and iron building was constructed circa 1985 and is utilised for functions on a casual basis. This area is directly opposite the new Mandurah Ocean Marina development on the other side of the Mandurah Estuary.

Opportunities

- Demolition of old yacht club building to make way for new development which may include hotel or tourist resort.
- Retention of existing old yacht club building and expansion of facilities to cater for larger private events.
- Low to medium density residential development.
- Utilisation of old yacht club building for water sport club premises.
- Conversion of old yacht club building to restaurant/café and upgrade of land immediately surrounding.
- Theme/water park development.

Constraints

- Public opposition to any built form development due to loss of water views and lifestyle amenity.
- Existing sand bypassing operations issues limits development on this land.

- Existing tenures and zoning mean that a lengthy planning process will be required for developments such as hotels, resorts or residential development.
- Exposure to the elements and geotechnical issues limiting development.

PRECINCT 3

General Description

This precinct covers Henry Sutton Grove, Mary Cooper Reserve, Mary Street Lagoon and Kingsley Fairbridge Reserve.

Mary Street Lagoon comprises a 56-pen marina with three boat launching ramps enclosed by limestone and concrete marina walls. The boat launching ramps are concrete paved with timber jetties to each. Bitumen paved parking and a brick toilet block is provided to the marina.

There are three boat pens sizes being 36m², 45 m² and 54 m². Fees for all pens are in the order of \$17 per square metre per annum inclusive of GST. The boat pens are leased on an annual basis with one-year options at expiry. The Mary Street Lagoon is currently fully occupied and we have been advised that there is an extensive waiting list.

Kingsley Fairbridge Reserve adjoins the marina to the south and comprises landscaped parkland with only minor barbeque facilities and children's play equipment.

The Henry Sutton Grove area is generally level land extending from the Port Mandurah canals entry to the Estuary northwards and with the Estuary and canal waterways located either side. Development is predominantly private single residential dwellings with the exception of Henry Sutton Grove which forms the main focus of this precinct. The park is landscaped with barbeque facilities, brick toilets, gazebos, children's play equipment and bituminised parking and driveway areas. A number of indigenous trees have been retained in this public open space area.

Surrounding development comprises single detached dwellings, most of which are older style in the older sections, although with new executive double-storey dwellings located along the canals.

Opportunities

Henry Sutton Grove

- Low to medium density residential development, hotel/resort or short stay/non-residential caravan parks.
- Possible café/restaurant location.
- Outdoor cinema.

Mary Street Lagoon

- Extension of lagoon to create more pens, which are in high demand – subject to cost/benefit feasibility.
- Possible development of restaurant/café facilities around the existing marina or relocation of old yacht club to this area.

Kingsley Fairbridge Reserve

- Extension of existing low density residential development with possibly some medium density included.

Constraints

- Local community opposition to built form development due to loss of views and/or lifestyle amenity.
- Establishment of an outdoor cinema would require removal of trees and more parking facilities.
- Potential for costs to extend Mary Street Lagoon marina outweighing increased revenue from rental of new berths.
- Opposition from local residents towards extension of marina due to increased boat traffic.

PRECINCT 4

General Description

This precinct is made up of five areas - the War Memorial; King Carnival; the skate boarding facility; and Hall Park.

The land is generally of an even contour. Uses from the north to the south include the Mandurah War Memorial, King Carnival and a skateboard facility, all of which are located along the Estuary foreshore. The remainder of the land is landscaped public open space area, with bitumen paved parking and concrete pathways. Gazebos, barbeque facilities and a leased diner are all located within this area.

Area 13 comprises the Mandurah Bridge.

Surrounding development to the west comprises modern executive dwellings that surround the Port Mandurah canals.

Opportunities

War Memorial

- Construction of a café adjoining the War Memorial with an outlook to the entrance of the canal or the estuary.

King Carnival, Skate Board Facility and Hall Park.

- Enhancement and expansion of existing tourists' facilities in this area to create a large recognised 'point of destination' tourist precinct which could include any or all of the following uses: night markets; outdoor cinema; cafés; restaurants; theme park; water slides.
- Potential to link this precinct with the town centre via possible uses along the bridge including food stalls, cafés, restaurants, markets, etc.
- Hotel/resort.
- Low to medium density residential development.
- More canal or marina development.
- Relocation of King Carnival to a less prime area, although still within this precinct.
- Concert arena.

Constraints

- Local community opposition to built form development such as hotels, resorts and residential due to loss of views and/or lifestyle amenity.
- Sentimental connection to King Carnival requiring a sensitive approach to redevelopment.
- Logistical complications with putting restaurant/café/retail/market uses along the bridge.

PRECINCT 5

General Description

The land is generally level within this precinct, which contains the Mandurah Marina development: private, executive, modern residential dwellings surrounding a man-made marina. The main focus of this area for this project is a strip of wetland that lines the Mandurah Estuary foreshore.

Opportunities

- None identified.

Constraints

- Low-lying marshy land that would prohibit any type of development.
- Difficult to access and a narrow strip which also prohibits development.

PRECINCT 6

General Description

The precinct largely comprises wetlands located immediately east of the Port Mandurah (leeward) canal development and north of the Estuary Bridge. The land also adjoins the Castle Fun Park site which is earmarked for future redevelopment.

Opportunities

- Eco-tourist resort development with bungalows linked to boardwalks.
- Water-bird watch area.

Constraints

- Likely mosquito breeding area.
- Existing Crown Land tenure prohibiting any development of a resort nature.
- Volatile conservation and wetland areas which create a sensitive environment for any development.
- Community opposition to any development over this sensitive area.

PRECINCT 7

General Description

The Waterside Park area is generally a flat landholding that comprises landscaped public open space with barbeque facilities. Directly opposite are single, detached, mostly double-storey residential dwellings ranging from 10-20 years old that line the older canal development of Waterside Canals.

Opportunities

- Low to medium density residential development.
- Caravan park.
- Café/restaurant over a small portion.
- Outdoor cinema.

Constraints

- Significant opposition expected from local community due to loss of water views and/or lifestyle amenity.
- Current zonings and land tenure meaning a lengthy approval process for any type of built form development.

PRECINCT 8 – SOLDIERS COVE

General Description

This precinct is focussed on two areas: Soldiers Cove and Dalrymple Park.

Mostly low-lying wetlands with a strip of public open space area along the Estuary foreshore which is landscaped with concrete paths and contains a waste water pump station and a number of private timber jetties. Residential development in the form of older style dwellings, in addition to more modern double-storey dwellings (approximately 10-20 years old) are located directly opposite the strip of public open space. There are a number of indigenous trees that have been retained in the public open space area.

Opportunities

Wetland Areas

- Eco-tourist resort development with bungalows linked to boardwalks.
- Waterbird watch area.

Public Open Space

- Opportunities to construct more jetties for lease.

Constraints

Wetland Areas

- Likely mosquito breeding area.
- Existing Crown Land tenure prohibiting any development of a resort nature.
- Volatile conservation and wetland areas which create a sensitive environment for any development.
- Community opposition to any development over this sensitive area.

Public Open Space

- This is a narrow strip of land with no development potential.

PRECINCT 9

General Description

This precinct is focussed on four areas, i.e.:

- Area 19: Eastern Foreshore;
- Area 20: Administration Bay;
- Area 21: Mandjar Bay; and
- Area 22: Stingray Point

The area is generally the area that surrounds Mandjar Bay.

The eastern foreshore is a narrow strip of public open space area that is extensively improved with pathways, children's play equipment, gazebos, barbeque areas and toilets. These improvements are modern and in good condition.

Administration Bay includes a mix of retail, civic and cultural uses including the Boardwalk Precinct, comprising a number of developments, the first of which is a retail development that is owned and leased by the State Government to tenants including Cicerellos, Mirage Souvenir and Gift Shop, Amalfi Café, Dome café and Simmo's Icecream. The new Mandurah Performing Arts Centre and a cinema complex are also located within this area.

Civic uses include the City of Mandurah offices and the Visitor Centre. A mooring facility located off the main boardwalk services a number of boat cruise businesses including Mandjar Ferry Cruises, Dolphin Discoverer and Encore ferry services. The Mandurah Senior Citizens' Centre and the Mandurah Community and Health Development Centre are also located around Administration Bay, most of which are single level buildings being around 20-30 years old. The Mandurah Council offices have been expanded in the form of a modern, double storey, good quality extension at the rear of the single level existing 20-year old building.

The Mandurah Boardwalk is currently leased to 5 tenancies on ground rental agreements with lease terms ranging between 20 to 40 years and lease commencements between 1997 and 1998.

There is also an area of public open space located directly opposite the retail uses of the town centre. Surrounding the boardwalk precinct and the civic community uses to the north and west is the Atrium Hotel development, the Endeavour commercial complex and residential development ranging from older style 'beach shacks' to newer modern dwellings, with the Mandurah Ocean Marina located further west.

The old Peninsula Hotel is being demolished and redeveloped. There are also a number of jetties servicing a boat hire business in this area. This area also includes a freehold parcel of land owned by City of Mandurah adjoining the Hotel Peninsula site.

Opportunities

Eastern Foreshore

- Market stalls.

Administration Bay

- Additional civic retail and cultural uses.
- Relocation of Senior Citizens and Community Health and Development Centre and redevelopment with medium to high density residential.
- Retail/commercial style development opposite the Hotel Peninsula site on the small portion of Local Reserve land.

Stingray Point

- Sale of freehold land owned by City of Mandurah adjoining Hotel Peninsula site to Mirvac Fini for expansion of Hotel Peninsula development.
- Normal residential development over the freehold land owned by the City of Mandurah adjoining the Hotel Peninsula site (medium to high density).

Constraints

Eastern Foreshore

- A narrow strip of land with limited development potential.

- Creation of markets in this area will need to address traffic congestion issues.

Administration Bay

- Current land tenure and zoning would make development into medium to high density residential a difficult process, notwithstanding the likely community opposition to this type of development.
- Expansion of retail and commercial activities would need to consider existing competition from Mandurah town centre and uses within Mandurah Ocean Marina that are both located nearby.

PRECINCT 10 – WESTERN MARINA EDGE

General Description

This precinct comprises land associated with the Mandurah Ocean Marina that will be developed in the future with medium density residential in addition to the car parking and marina facilities that exist in the northern sections. Much of this land is the product of a reclamation process. A narrow strip of foreshore land, together with a man made pier, forms the main focus of this precinct in terms of the current Mandurah Foreshore Focus Study.

Opportunities

- A possible marina expansion on the northern side of Breakwater Parade to provide additional boat moorings would require commercial development to assist with the feasibility of the marina construction. Such development should include opportunity for tourist accommodation, residential, a small amount of retail, restaurants and cafes.

Constraints

- The cost of development will be substantial.
- Construction of parking areas will need to be examined closely given that land will need to be created to accommodate development.
- Narrow land that essentially comprises a seawall and a pier.

10.0 SUMMARY OF KEY CONSIDERATIONS

10.1 GENERAL

The preceding examination has given rise to a number of detailed issues which need to be addressed when formulating the Masterplan for the study area.

A summary of broad-level key issues is set out below.

10.2 LAND USE

The following key land use issues are evident within the study area:

- The creation of a critical mass of activity in key nodes is important for the economic sustainability of individual developments and the Masterplan overall.
- Planning for the long-term leisure needs of residents and visitors will require a small proportion of the foreshore area to contain commercial development.
- There is a prevailing desire to facilitate the upgrading and improvement to the quality of commercial uses and facilities within the study area.
- Accommodating the growth or tourism can be accommodated in a mix of private redevelopment and new foreshore-based commercial developments.
- With respect to proper planning, it is desirable to intensify land uses (commercial and residential) within the town centre and in strategic areas around the foreshore as part of private redevelopment.
- Some mixing of residential and commercial uses is acceptable, however the relationship with incompatible commercial uses should be managed.

10.3 MOVEMENT

The following key movement issues are evident within the study area:

- The circulation and legibility of the movement network should be improved.
- The personal safety and amenity of pedestrians within the town centre and other areas where there is vehicle movement should be improved. The Masterplan should promote safer public spaces for pedestrians (night and day).
- Convenient parking within the study area should be maintained.

- Pedestrian and cycle access within the study area should be improved.
- Existing pedestrian malls/laneways should be rationalised/ improved to ensure pedestrian safety and amenity.
- Improved opportunities should be provided for bus, rail and taxi integration within the study area.
- The Mandurah Bridge will require replacement.
- Maintain connections with activity centres outside of the study area such as Centro Mandurah shopping centre and the proposed Halls Head District Shopping Centre.

10.4 PUBLIC SPACES AND ENVIRONMENT

The following key public space issues are evident in the study area:

- Cultural heritage within the study area requires recognition.
- The public spaces in the study area are poorly integrated and disjointed to each other. Stronger connections between public open spaces are required.
- Public open space improvement is required to cater for a variety of active and passive recreation types in the area.
- Streetscaping requires improvement generally and should have regard to the nature and function of that street.
- Mandurah Terrace and the narrow strip of Eastern Foreshore is recognised by the community as a landmark and requires recognition.
- The upgrading of streets and pedestrian verges as vibrant public spaces should be promoted.

Particular emphasis of thresholds and gateways as unique places defining the edges of the Town Centre should be considered.

The protection of the natural foreshores and adjacent bushland reserves is integral to ensuring the intrinsic values of waterways are maintained for the whole community for both the short and long term. Such measures can also sustain long term high value, low impact eco-tourism and recreation activities.

Samphire Salt Marshes located within study area have a high environmental value and will be a key consideration of this report.

10.5 BUILT FORM

The following key built form issues are evident within the study area:

- Building heights within and surrounding the foreshore area need to be considered in terms of impacts on views from existing residences and from within the foreshore itself.
- There should be emphasis on nodes and landmarks within the study area to establish both visual and physical connections, as well as a sense of place.
- The heritage and cultural qualities of built form within the study area should be conserved and promoted.
- A mixture of modern built form as part of private redevelopment within the study area should not be discouraged, but sensitive design to respect the existing context should be encouraged.

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