REPORT

Mid-North Coast Boating Investigations Package

MN-07 Hastings River Recreational Boating Needs Investigation

Client: Roads & Maritime Services
        on behalf of Port Macquarie-Hastings Council

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Author(s): Matthew Potter

Drafted by: Matthew Potter

Checked by: __________________________

Date / initials: ________________________

Approved by: _________________________

Date / initials: ________________________

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Royal HaskoningDHV (RHDHV) has been engaged by Roads and Maritime Services (RMS) on behalf of Port Macquarie-Hastings Council (Council) to investigate recreational boating needs on the Hastings River. The investigation has been proposed to address several issues on the lower Hastings River, including conflict between motorised craft and passive recreation activities, poor standard of boat launching facilities upstream of Settlement Shores Estate Canals, demand expected from proposed regional development, and limited opportunities for water skiing.

The objectives of the investigation are to:
- identify suitable site(s) for development of recreational boat launching facilities; and,
- assess the suitability of the site(s) for water skiing and jet skiing activities.

A review of the existing environment and existing boat facilities within a study area extending from the upstream extent of the site at Dennis Bridge to the downstream extent of the site at the entrance to Settlement Shores Estate canals identified two potential sites for development of recreational boat launching facilities. These comprised:
1. site of the existing Fernbank Creek boat ramps (Option 1); and,
2. large reserve area adjacent to the Hibbard Ferry crossing (Option 2).

Option 1 – Fernbank Creek Boat Ramp Facility

Key features of the potential Fernbank Creek boat ramp facility include:
- two lane boat ramp positioned at the site of the existing western ramp structure;
- on-ramp pontoon installed along the upstream side of the boat ramp for boat holding;
- overall ramp width of 12.5m to accommodate two 4m wide lanes, 1.5m wide on-ramp pontoon and a 3m width for vessel mooring alongside the pontoon;
- ramp grade at 1V:8H down to a toe level of -1.8m AHD, which is available within the natural bed levels at a distance of around 30m from the shoreline;
- formal parking facility could be established immediately opposite the ramp manoeuvring area but would require acquisition of a parcel of private land;
- subject to negotiations with the landowner, the parking facility could provide a total of 60 car and trailer spaces and 12 car only spaces;
- car parking spaces would be surfaced with asphalt or permeable/plantable pavement (e.g. Driveable Grass) while the trailer bays would be grassed to increase water infiltration, reduce runoff and maintain the rural aesthetics of the area;
- pedestrian access and traffic management would be facilitated by establishing a pedestrian crossings across Fernbank Creek Road on each side of the ramp manoeuvring area; and,
- signage would be provided to warn approaching vehicles of the presence of reversing trailers and pedestrian movement in the area.

Ancillary amenities that could also be provided include:
- lighting over the ramp manoeuvring area;
- garbage facilities at the boat ramp; and,
- pit toilet and garbage facilities within the parking area.

To the east of the proposed boat ramp, a narrow beach area could be established for use by boats and water skiers. This would require removal of existing vegetation, regrading of the shoreline, and placement...
of rounded river pebbles to create an attractive gravel beach area for water skiers to beach their boats and transfer skiers. Sheltered picnic tables could be provided within the adjacent reserve area to improve amenity for group and family activities. The existing eastern ramp would be retained to act as a groyne structure to retain the beach material within the embayment created up to the proposed new ramp.

Road upgrades to improve access to the boat ramp facility could be implemented as future development stages. These upgrades could address narrow road widths, unsealed road sections and elevation of road areas that are subject to periodic inundation.

Consideration of environmental factors associated with the proposed development identified the following potential issues:

- requirement to acquire private land for formalised parking, which would be subject to negotiations with the current landowner;
- rezoning of land to RE1 Public Recreation would be required;
- development site is located within a Floodway area and applicable development controls within Council’s Flood Policy would apply to the proposal;
- removal of riparian vegetation to construct the boat ramp and adjacent gravel beach area could be offset by the establishment of compensatory habitat elsewhere along the Hastings River (e.g. Blackmans Point mangrove planting);
- footprint of the proposed boat ramp and adjacent gravel beach area does not appear to be located within any significant beds of seagrass according to available mapping;
- boating activity in the vicinity of the boat ramp site is likely to result in the riverbank being subjected to increased energy from boat wash, the riverbank on the upstream side of the boat ramp at the entrance to Fernbank Creek would require rock protection to be applied;
- construction of the parking area would require consideration of stormwater management and water quality requirements associated with discharge of stormwater into the Hastings River; and,
- there is an existing residential dwelling on the private property on the landward side of Fernbank Creek Road, potential impacts on these residents could include decreased visual amenity and increased noise from operation of the boat ramp.

Option 2 – Hibbard Ferry Reserve Boat Ramp

Key features of the potential Hibbard Ferry Reserve boat ramp facility include:

- proposed development is located on private land and is subject to land acquisition and negotiations with the current landowner;
- two lane ramp positioned on the western side of the reserve area to minimise conflict with existing structures on the eastern side, which include a dinghy launching ramp, timber jetty/wharf and the Hibbard Ferry ramp and crossing;
- on-ramp pontoon provided down the centre of the ramp for boat holding;
- overall ramp width of 10.5m to accommodate two 4.5m wide lanes and central 1.5m wide on-ramp pontoon;
- ramp grade at 1V:9H down to a toe level of -1.8m AHD, this would require the ramp to be installed below the natural bed level. Dredging of an access channel to the ramp would be required to ensure suitable water depths at low tide;
- rigging and de-rigging bays would be positioned alongside the boat ramp entry and exit accessways to minimise prolonged occupation of the manoeuvring area;
- formal parking facility could be established in the reserve area and could provide a total of 57 car and trailer spaces, 14 car only spaces and 2 designated disabled car only parking spaces;
• car parking spaces would be surfaced with asphalt, while the trailer bays would be grassed to increase water infiltration, reduce runoff and maintain the aesthetics of the reserve area;
• access to the boat ramp would be provided via a two-way accessway from the southern end of Boundary Street, access to the entry/exit point would be maintained by establishing ‘keep clear’ zone with linemarking on the adjacent area of Boundary Street;
• option exists to install another exit along the proposed accessway that runs alongside Hastings River Drive, this would be a left hand turn only exit on to Hastings River Drive and may reduce traffic along Boundary Street; and,
• one-way traffic would be maintained within the proposed parking facility to improve traffic flow, give way signage would be installed to give priority to vehicles entering the facility and approaching the ramp.

Ancillary amenities that could also be provided include:

• lighting over the ramp manoeuvring area;
• fish cleaning table on the foreshore adjacent to the boat ramp;
• garbage facilities at the boat ramp;
• wash down facilities at the de-rigging bay; and,
• toilet block and garbage facilities within the parking area.

Consideration of environmental factors associated with the proposed development identified the following potential issues:

• requirement to acquire private land for development of the facility, which would be subject to negotiations with the current landowner;
• the proposed boat ramp facility is consistent with the objectives and permissible types of development under the current SP3 Tourist land zoning;
• development site is located partly within a Floodway area and primarily within a Flood Fringe area, applicable development controls within Council’s Flood Policy would apply to the proposal;
• adjacent foreshore areas are protected with an existing blockwork retaining wall (western side) or rock protection (eastern side) and are unlikely to be impacted by wash from increased boating activities;
• water depths within the embayment are limited and dredging an access channel is required, which would likely be subject to sedimentation and require periodic maintenance dredging;
• site is positioned on the outside of the river bend where higher flow velocities occur and there is an increased likelihood of physical impacts on structures (e.g. pontoons) by flood debris;
• construction of the parking area would require consideration of stormwater management and water quality requirements associated with discharge of stormwater into the Hastings River;
• significant beds of Zostera seagrass exist in the embayment, which would be impacted by the construction of the ramp, dredging and increased boating traffic;
• ramp is positioned within 100m of the Hibbard Ferry crossing which requires a speed limit of 4 knots to be clearly signposted at the ramp;
• increased boating activity in the area has the potential to impact on active oyster leases on both sides of the river, Riverside residents and existing boat moorings;
• a small number of private swing moorings would need to be relocated to provide safe navigation access from the ramp to the open waterway; and,
• dilapidated wharf structure located on the downstream side of the proposed boat ramp may also be considered for removal, subject to discussions with the owner.
1 Introduction

1.1 Background

Royal HaskoningDHV (RHDHV) has been engaged by Roads and Maritime Services (RMS) on behalf of Port Macquarie-Hastings Council (Council) to investigate recreational boating needs on the Hastings River. The investigation has been proposed to address several issues on the lower Hastings River, including conflicts between motorised craft and passive recreation activities, poor standard of boat launching facilities upstream of Settlement Shores Estate canals, demand expected from proposed regional development, and limited opportunities for water skiing.

Map 1 (refer Appendix A) provides a summary of the key features within the study area for the investigation.

1.2 Objectives

The objectives of the investigation are to:

- identify site(s) suitable for development as recreational boating launch site(s) with potential for required associated infrastructure; and,
- consideration of the suitability of the site(s) for water skiing and jet skiing activities.

1.3 Scope of Work

The scope of work completed as part of the investigation included the following main tasks:

- review of background information;
- initial consultation with Council, community and government agency stakeholders;
- appraisal of existing environmental conditions;
- assessment of boating demand, existing boating facilities and site requirements to meet future needs;
- identification of concept options for boating infrastructure development;
- identification and costing of further studies, design and construction associated with concept options;
- face-to-face consultation with community stakeholders; and,
- finalisation of concept plans.

1.4 Acknowledgements

We acknowledge the assistance provided by Council staff and RMS in facilitating access to background information and reviewing the deliverables for the investigation.

1.4.1 Consultation

A number of stakeholders were consulted as part of the investigation to establish current issues and demands and future needs for boating infrastructure, and to provide feedback on the development of concept options. These stakeholders are identified within the Stakeholder Engagement Plan (refer Appendix B) and their valuable contributions to the preparation of the concept plans are outlined within Section 4.4.1 and Section 5.3 of this report.
2 Review of Background Information

As part of the investigation a wide range of background information was reviewed to establish an understanding of the existing environment and opportunities and constraints associated with boating infrastructure. The information that was compiled as part of the investigation is listed below.

Council GIS data layers:
- cadastral boundaries
- Council Land, Council-managed Crown Land and Crown Land
- Land zoning
- SEPP14 wetland boundaries
- marine vegetation mapping
- heritage areas
- land contours
- stormwater drainage
- aerial photography

RMS GIS data layers:
- navigation aids
- navigation restrictions
- depth contours
- aquaculture lease boundaries

Mapping Data:
- Wauchope/Port Macquarie Acid Sulfate Soils Map (Dept. of Land and Water Conservation, 1997)
- Bathymetric survey plans from Hastings River Hydrographic Survey October 2000 (available on OEH website)
- Boating Map 5A for Hastings, Wilson and Maria Rivers and Port Macquarie Area (RMS, 2009)

Background Reports:
- Hastings Estuary Management Plan (Umwelt, 2001)
- A Decision Support Tool for Assessing the Impact of Boat Wake Waves on Inland Waterways (Glamore, 2005)
- Hastings River Flood Study (PBP, 2006)
- Benthic Habitat Mapping, Primary Productivity Measurements and Macrofauna Surveys in the Camden Haven and Hastings River Estuaries (Southern Cross University, 2007)
- Report Card 2012- Hastings Catchment (Northern Rivers Catchment Management Authority, 2012)
- Regional Boating Plan: Mid-North Coast Region (Transport for NSW, 2015)

Design Standards and Guidelines:
- AS3962-2001 Guidelines for Design of Marinas
- Coastal Engineering Manual (USACE, 2008)
- NSW Boat Ramp Facility Guidelines (RMS, 2015)
- Personal Watercraft Handbook (RMS, 2016)

Environmental, Recreation and Tourism Data:
- NSW Boat Ownership and Storage: Growth Forecasts to 2026 (NSW Maritime, 2010)
OEH NSW Tidal Planes Analysis: 1990-2010 Harmonic Analysis (MHL, 2012)
Tourism data within LGA Profile – Port Macquarie-Hastings (Destination NSW, 2014)
AHIMS Extensive Search – Site list report (OEH, 2016)
RMS Mooring Licence and Vessel Registration Data (RMS, 2016)
Bureau of Meteorology wind data from Port Macquarie Airport AWS Station No. 060139 (2016)

Council and State planning documents:
- Port Macquarie-Hastings Local Environment Plan 2011
- Port Macquarie-Hastings Development Control Plan 2013
- Draft Recreation Plan 2014 (Ross Planning, 2014)
- Recreation Action Plan 2015-2025 (PMHC, 2015a)
- Port Macquarie-Hastings Council Flood Policy (PMHC, 2015b)
- Draft North Coast Regional Plan (NSW Department of Planning & Environment, 2016)

Full reference listings for key documents are provided at Section 6.
3 Existing Environment

3.1 Planning Context

3.1.1 Land Ownership

As shown on Map 2.1, the land adjacent to the southern bank of the River is primarily occupied by private properties, some of these have absolute water frontage which limits public access to lengths of the shoreline. However, some foreshore areas fronting private properties are in public ownership. In the vicinity of the Birdon slipway facility a narrow strip of Crown Reserve exists. Further downstream a 35m width of Council owned and managed Community Land exists in the vicinity of the Oakes Crescent boat ramp. Downstream of Fernbank Creek a road reserve exists along Fernbank Creek Road, which is Crown Land under the care, control and management of Council. The open reserve area to the west of the Hibbard Ferry crossing is private land owned by the United Services Union, who also own the adjacent Aquatic Caravan Park and Aquatic Motel.

Several parcels of Community Land with water frontage exist in the Hibbard and Settlement Shores Estate canal area. These land parcels have generally been maintained as open reserve areas for public recreation.

The land adjacent to the northern bank of the River is also generally occupied by private properties, with a number of properties having absolute water frontage in the Riverside township. From the Dennis Bridge, a narrow strip of Crown Reserve exists in front of private property up to where Blackmans Point Road runs along the shoreline. A road reserve occupies the shoreline along the road access out to Blackmans Point, where an area of Crown Reserve exists in the vicinity of the Blackmans Point boat ramp. A narrow strip of Crown Reserve exists in front of private property at the upstream end of the Riverside township, otherwise the residents further downstream have absolute water frontage. Downstream of the Riverside township a road reserve exists along Riverside Drive, which provides access along the shoreline to the Hibbard Ferry crossing.

The adjacent waterway below the mean high water mark is Crown Land. Any works proposed to be undertaken on Crown Land or Crown Reserve would require landowners consent and a licence for the use of Crown Land from the NSW Land and Property Management Authority (LPMA). It is evident that areas of public land with water access are limited to relatively narrow strips of Crown Reserve or road reserve that are positioned in front of private properties. As such, it is likely that the development of a boat launching ramp site in the study area would require acquisition of private land.

3.1.2 Local Government

Under the Port Macquarie-Hastings Local Environment Plan 2011 (LEP 2011) most of the private land in the study area is zoned RU1 Primary Production (refer Map 2.2). This zoning also extends into the road reserve along the foreshore road access provided by Blackmans Point Road, Riverside Drive and the portion of Fernbank Creek road in the vicinity of the boat ramps.

Narrow strips of publicly owned foreshore land and the low lying wetland areas adjacent to Fernbank Creek and Hibbard Creek are zoned E2 Environmental Conservation.

Under LEP 2011, RU1 and E2 zoning does not currently allow for boating infrastructure development. As such, rezoning of foreshore land to an appropriate zoning, such as RE1 Public Recreation, would be required as part of any boat launching ramp proposal.
All foreshore land within the study area is within the Flood Planning Area defined in LEP 2011 mapping. As such, the Port Macquarie-Hastings Council Flood Policy (PMHC, 2015b) would apply to any boat launching ramp proposal. According to flood study mapping (PBP, 2006), the foreshore within the study area could fall within Floodway, Flood Storage or Flood Fringe areas (refer Figure 1). It is noted that the existing Oakes Crescent, Fernbank Creek and Blackmans Point boat ramp site all fall within Floodway areas, with adjoining land behind the ramp at Blackmans Point being within a Flood Storage area.

Council's Flood Policy notes that development within Floodway areas is generally not supported, however it is noted that there may be circumstances in which certain types of limited or Minor Development could proceed, subject to a range of considerations. Relevant development controls that would apply to boat launching ramp facilities (including car parking areas) sited within Floodway areas include:

- carparks will generally not be supported within Floodways, however Council may consider temporary carparks constructed with a gravel surface, appropriate signage is to be installed to warn the public or potential flood risk associated with using the carpark;
- filling of land within Floodways will not be supported, unless a Flood Impact Assessment can demonstrate minimal impact on peak flood levels and velocities over a full range of flood events up to the 200 year ARI flood;
- continuous fencing (e.g. paling, colourbond) is not permissible, open type fencing is acceptable;
- special purpose facilities may be considered in Floodway areas if they cannot be feasibly located elsewhere, and the following relevant requirements need to be met:
  - development sited so that it will not restrict/block the flow of flood waters; and,
  - floor level must be above the 20 year ARI flood level (refer Section 3.2.4), however if it can be demonstrated that a lower operational floor level is required, this must be no less than 1.2m AHD.

The following development controls would apply to boat launching ramp facilities (including car parking areas) sited within Flood Storage areas:
- carparks will be supported if it can be demonstrated that the potential damage to motor vehicles is minimised and that motor vehicles do not become moving debris during floods;
- filling must have a minimal impact on the 100 year ARI flood level and velocities and will not be supported below the 100 year ARI flood level (including climate change allowance) unless it can be demonstrated with a Flood Impact Assessment that:
  - there will be no detrimental impact on flood behaviour upon adjoining properties;
  - cumulative impact of similar development in the area would have no detrimental impact on flood behaviour anywhere on the floodplain (not considered applicable for boat launching facilities); and,
  - there will be no detrimental impact on local drainage patterns.
- filling on rural zoned land (applicable in study area) may be permissible without the need for a Flood Impact Assessment if:
  - the fill footprint is less than 20% of the total site area or 500m$^2$, whichever is less; and,
  - a minimum distance of 20 metres is maintained between the fill platform and the upstream and lateral property boundaries, measured at the bottom-of-batter.
- continuous fencing must allow a gap of at least 100mm from the ground to the base of the fence, open type fencing is acceptable;
- special purpose facilities are permissible with the following conditions:
  - floor level must be above the 20 year ARI flood level (refer Section 3.2.4), however if it can be demonstrated that a lower operational floor level is required, this must be no less than 1.2m AHD;
  - development sited so that it will not detrimentally affect flood risk of neighbouring properties;
  - minimum 8 hours Effective Warning Time and Safe Reliable Evacuation route that has an access road no lower than the 20 year ARI flood level and that grades upwards towards land above the Probable Maximum Flood (PMF) level (not considered to be applicable to boat launching ramp facilities as occupation of the site would be episodic and associated with boat launching and retrieval activities).

### 3.1.3 State Environmental Planning Policies

Under State Environmental Planning Policy (Infrastructure) 2007, consent is not required for development of wharf or boating facilities carried out by or on behalf of a public authority on any land. Furthermore, Division 25, Clause 25 of SEPP (Infrastructure) 2007 - Waterway or foreshore management activities states that “development for the purpose of waterway or foreshore management activities may be carried out by or on behalf of a public authority without consent on any land”. This includes construction works (including dredging and land reclamation, if it is required for the construction of facilities) and routine maintenance works.

Large sections of the study area are designated as Coastal Wetlands under SEPP 14 – Coastal Wetlands (refer Map 2.1). However, this does not include the foreshore areas where existing boating infrastructure is located. Nevertheless, the provisions of SEPP 14 would need to be considered as part of an environmental assessment for any proposed developments in the study area to ensure that the values of coastal wetlands are protected. For example, SEPP 14 – Coastal Wetlands does not permit clearing, draining or filling of wetlands.

It should be noted that SEPP 14 - Coastal Wetlands prevail over SEPP (Infrastructure) 2007 in the event of any inconsistencies (Clause 8 SEPP Infrastructure). Council consent and the Department of Planning and Environment Director’s concurrence are required for works such as clearing and filling which affect mapped coastal wetlands. Considerations include the environmental effects of the works and consistency with conservation goals.
3.1.4 State and Federal Legislation

The vegetation mapping (Map 2.3) indicates that the study area includes endangered ecological communities (EECs) including coastal wetlands. These and any other threatened or endangered species listed under the Threatened Species Conservation Act 1995 (TSC Act) would require assessment in accordance with the requirements of the Environmental Planning and Assessment Act 1979 (EP&A Act) as part of any proposed developments in the study area. EECs are shown to exist adjacent to the Oakes Crescent boat ramp.

Zostera seagrass beds occur at discrete locations along the southern bank of the River. However, seagrass is not mapped at the location of existing boat ramps at Oakes Crescent, Fernbank Creek and Blackmans Point. Any proposals that involve disturbance or removal of marine vegetation, or activities involving dredging and reclamation work, would require a permit from DPI Fisheries in accordance with the Fisheries Management Act 1994 (FM Act).

3.2 Estuarine Processes

3.2.1 Wind Climate

The wind climate within Port Macquarie is best represented by the Bureau of Meteorology (BoM) weather station at Port Macquarie Airport (Station No. 060139). A review of monthly wind roses available on the BoM website (accessed 11 July 2016, refer Figure 2 and Figure 3) indicates that winds are seasonal and follow a typical coastal trend of stronger southerly and south-westerly winds in Winter and north-easterly winds in Summer. The Autumn and Spring months are characterised by north-easterly and southerly winds.
Figure 2: Summer wind rose at Port Macquarie Airport weather station
Rose of Wind direction versus Wind speed in km/h (26 Jul 1995 to 30 Sep 2010)

Custom times selected, refer to attached note for details.

PORT MACQUARIE AIRPORT AWS
Site No: 000129 - Opened Jun 1995 - Still Open - Latitude: -31°43’50” - Longitude: 152°05’55” - Elevation 4 m.

An asterisk (*) indicates that calm is less than 0.5%. Other important info about this analysis is available in the accompanying notes.

3 pm Jul
457 Total Observations

Calm 1%

Figure 3: Winter wind rose at Port Macquarie weather station
3.2.2 Water Depths

Water depths within the study area are best represented by the hydrographic survey plans available on the NSW Office of Environment and Heritage (OEH) website and is dated October 2000. This information is shown on Map 2.4 and all depths indicated are relative to Australian Height Datum (AHD).  

These surveys indicate that a relatively deep navigation channel exists on the northern side of the Hastings River downstream of the Dennis Bridge (Pacific Highway road crossing). The channel bed levels in this area vary from 7.5m below AHD (-7.5m AHD) to -5m AHD opposite Oakes Crescent. Port buoys are positioned to mark the shallower area on the southern side of the River, where bed levels are above -2m AHD. The water depths in the vicinity of the existing boat ramp at Oakes Crescent are relatively shallow with bed levels at -0.5m AHD adjacent to the river bank and a flat gradient extending out towards the navigation channel. Bed levels shallower than -2m AHD exist for a distance of around 200m offshore from the shoreline.  

The water depths in the vicinity of the boat ramps downstream of Fernbank Creek are suitable for boat launching with bed levels of -2m AHD at a distance of around 30m from the shoreline. The navigable area of the River broadens at this location and is no longer marked with buoys. Bed levels in the centre of the River are around -5 to -6m AHD.  

The entrance to the Maria River is characterised by shallow bars on its western bank and in the centre of the river mouth. A narrow upstream navigation route through these shoals is marked by port and starboard buoys. Water depths deepen downstream of the confluence with the Maria River and are up to -8m AHD on the northern side of the Hastings River, near Hibbard Creek. Downstream of this point the River widens and bed levels are generally deeper than -5m AHD to Boundary Street, where the Hibbard Ferry crossing is located.  

The water depths in the vicinity of the Hibbard Ferry ramp are relatively deep with bed levels of around -9m AHD in the centre of the River. Immediately adjacent to the ferry ramp, bed levels are around -2m AHD. Further downstream to the entrance to the Settlement Shores Estate canals, the river is deepest along the southern side with bed levels of around -10m AHD. Shallower water depths exist on the inside of the river bend (northern side).

3.2.3 Shoreline Morphology

Southern River Bank

The shoreline at the Oakes Crescent boat ramp consists of a relatively steep bank that is vegetated with a narrow band of dense riparian vegetation (refer Figure 4) fronting large areas of cleared farmland. Mature mangroves are also growing in the shallow nearshore area as shown on Figure 5.

---

1 Australian Height Datum (AHD) is approximately 0.75-0.77m above Indian Springs Low Water (ISLW) between Dennis Bridge and Settlement Point. ISLW is typically used on nautical charts for plotting of water depths at the lowest tide.
The shoreline around the Fernbank Creek ramps is similar with fringing mature mangrove vegetation existing on the river side of Fernbank Creek Road (refer Figure 6) and level areas of cleared grassy
farmland existing on the landward side (refer Figure 7). There is some evidence of riverbank undercutting at the site (refer Figure 8).

Figure 6: Mature mangroves adjacent to Fernbank Creek boat ramps

Figure 7: Farmland on landward side of Fernbank Creek Road at Fernbank Creek boat ramps
Figure 8: Riverbank undercutting adjacent to Fernbank Creek boat ramp.

Approximately 300m downstream of the boat ramps, Fernbank Creek Road runs along the edge of the foreshore, which is rock lined adjacent to a culvert outlet and headwall structure (refer Figure 9).
The width of fringing mangrove vegetation adjacent to Fernbank Creek Road increases to 30m further downstream where the road passes through a low-lying wetland area. The wetland is drained by Partridge Creek and Hibbard Creek and extends downstream to Tuffins Lane.

Between Hibbard Creek and the Whalebone Wharf Seafood Restaurant a number of oyster leases exist along the shallow nearshore areas on the southern side of the River. A narrow fringe of mangrove vegetation exists on the river side of Hastings River Drive to the Aquatic Caravan Park.

The foreshore fronting the Rivermark Café, Aquatic Caravan Park and Aquatic Motel is protected by a blockwork retaining wall (refer Figure 10), which incorporates a private boat ramp and wharf structure owned by the Aquatic Caravan Park. The retaining wall extends along the open grassed reserve area adjacent to the Hibbard Ferry ramp.
The shoreline in the vicinity of the ferry ramp consists of a low-level bank with little to no riparian vegetation. On the upstream side of the ferry ramp, a rock wall extends along the bank up the blockwork retaining wall (refer Figure 11). The rock wall extends downstream from the ferry ramp along the water frontage of the Hibbard Slipway & Boat Building Yard (refer Figure 12).
Figure 11: Foreshore immediately upstream of Hibbard Ferry ramp

Figure 12: Foreshore immediately downstream of Hibbard Ferry ramp
The foreshore further downstream to the entrance to Settlement Shores Estate canals (limit of the study area) is primarily occupied by the private residences. Most of these properties have private jetty and pontoon structures.

The area of Council owned Community Land on the upstream side of the canal entrance is partly occupied by the Port Macquarie Rowing Club. The rowing club uses a large clubhouse off Hibbard Drive and two groyne structures have been built along the shoreline to retain a gravel (10-15mm blue metal) beach area for launching.

Figure 13: Groyne structure along foreshore fronting Port Macquarie Rowing Club

Northern River Bank

At the Dennis Bridge cleared farmland extends to the riverbank where a single line of trees exists. The river bank immediately downstream of the Dennis Bridge is rock lined.

A Crown Reserve area extends along the river side of Macmillan Drive to the Dennis Bridge (refer Figure 14). The river bank adjacent to Macmillan Drive was observed to be subject to erosion and remnants of a timber log protective structure (understood to have been previously installed by Landcare groups) exists along the base of the bank (refer Figure 15).
At the Riverlodge Tourist Village, the foreshore land is relatively flat and appears to have been cleared. However, the area is grassed and trees are scattered throughout this reserve area, which is mapped as Crown Land. The shoreline along the water frontage of the Riverlodge Tourist Village is rock lined.
From the Riverlodge Tourist Village, Blackmans Point Road runs along the shoreline, which comprises a low-level bank that is vegetated with a narrow band of grasses, reeds, shrubs and trees adjacent to the road. Cleared farmland exists on the landward side of the road. The width and density of riparian vegetation improves at a point around 500m upstream from Blackmans Point, and extends to the point where Blackmans Point Road diverts further inland. However, the riparian vegetation is sparse from this point to the Blackmans Point boat ramp and the river bank is rock lined.

Approximately 50m upstream of the Blackmans Point boat ramp, mangroves have been planted behind a protective rock berm to restore riparian vegetation along the river bank (refer Figure 16). Similar restoration works have previously been completed to address bank erosion on the northern river bank adjacent to the Dennis Bridge (upstream side). These works were undertaken in a collaborative effort between the private landowner, Council, Northern Rivers Catchment Management Authority and volunteers from Conservation Volunteers Australia.

Further evidence of bank erosion problems around Blackmans Point is indicated by armour rock strewn over the shoreline immediately upstream of the boat ramp (refer Figure 17) and ad hoc bank protection comprising a wall construction from rubber tyres and mass concrete immediately downstream of the ramp (refer Figure 18). These erosion issues are consistent with the position of Blackmans Point on the outside of the river bend where higher velocities occur from river flows, and the area is also exposed to significant wind fetches from the west south west and south east (refer Section 3.2.5).
In the areas where residential dwellings occupy waterfront lots along Riverside Drive, the riverbank steepens and relatively deep water exists close to the foreshore. A number of dwellings have built
retaining structures along their water frontage as well as private jetty structures. The river bank is rock lined from the Riverside township to the Hibbard Ferry crossing. Riverside Drive runs along the shoreline downstream of the township and has cleared farmland on its landward side.

The foreshore around the ferry crossing comprises a shallow and flat beach area that is backed by a bank vegetated with grasses and shrubs with some trees existing on the river side of Riverside Drive. Several oyster leases exist around 30m off the river bank and extend from Shoreline Drive to downstream of the ferry crossing. The river bank downstream of the ferry crossing is protected by the growth of mangroves and other riparian vegetation.

The northern bank of the Hastings River opposite Settlement Point is occupied by intertidal mangrove communities at the entrance to Big Bay. This land has low relief and transitions into cleared farmland areas in the vicinity of the Hibbard Ferry crossing.

3.2.4 Water Levels

Water levels within the Hastings River vary primarily in response to astronomical tides, although storm surge (barometric and wind set-up) and freshwater flooding may also influence water levels from time to time. Sea level rise will have a long-term effect on water levels. Council’s Flood Policy refers to the previous sea level rise benchmarks provided in the NSW Government’s Sea Level Rise Policy Statement (2009), which were an increase in mean sea level (1990 mean sea level) of 0.4m by 2050 and 0.9m by 2100.

The study area is subject to semi-diurnal tides (i.e. two high tides and two low tides per day) that propagate through the Hastings River entrance. An analysis of data collected from the tide gauges at Dennis Bridge and Settlement Point between 1990 and 2010 was carried out by Manly Hydraulics Laboratory (MHL, 2012). The tidal planes determined from this analysis are summarised in Table 1.

<table>
<thead>
<tr>
<th>Tidal Plane</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dennis Bridge Downstream Water Level (m AHD)</td>
</tr>
<tr>
<td>High High Water Solstice Springs (HHWSS)</td>
<td>0.917</td>
</tr>
<tr>
<td>Mean High Water Springs (MHWS)</td>
<td>0.557</td>
</tr>
<tr>
<td>Mean High Water (MHW)</td>
<td>0.458</td>
</tr>
<tr>
<td>Mean High Water Neaps (MHWN)</td>
<td>0.360</td>
</tr>
<tr>
<td>Mean Sea Level (MSL)</td>
<td>0.024</td>
</tr>
<tr>
<td>Mean Low Water Neaps (MLWN)</td>
<td>-0.323</td>
</tr>
<tr>
<td>Mean Low Water (MLW)</td>
<td>-0.424</td>
</tr>
<tr>
<td>Mean Low Water Springs (MLWS)</td>
<td>-0.526</td>
</tr>
<tr>
<td>Indian Springs Low Water (ISLW)</td>
<td>-0.771</td>
</tr>
</tbody>
</table>

The 100 year flood extent developed for the Hastings River Flood Study (PBP, 2006) is shown on Figure 19 and demonstrates that the majority of the river bank (including the study area) is predicted to be inundated. The predicted flood levels are given in Table 2 with the flood levels given between Dennis Bridge and Hibbard Creek being most relevant for the study area.
Figure 19: 100 Year Flood Extent (PBP, 2006)

Table 2: Predicted Peak Design Flood Levels Along the Hastings River (PBP, 2006)

<table>
<thead>
<tr>
<th>Description of Location</th>
<th>Probable Maximum Flood</th>
<th>200 Year Recurrence Event</th>
<th>100 Year Recurrence Event</th>
<th>50 Year Recurrence Event</th>
<th>20 Year Recurrence Event</th>
<th>5 Year Recurrence Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bains Bridge</td>
<td>19.7</td>
<td>14.1</td>
<td>13.2</td>
<td>12.3</td>
<td>11.1</td>
<td>Not provided</td>
</tr>
<tr>
<td>Wauchope Railway Bridge</td>
<td>12.4</td>
<td>9.4</td>
<td>8.7</td>
<td>7.9</td>
<td>6.9</td>
<td>Not provided</td>
</tr>
<tr>
<td>Rocks Ferry Bridge</td>
<td>10.8</td>
<td>7.9</td>
<td>7.4</td>
<td>6.8</td>
<td>6.1</td>
<td>Not provided</td>
</tr>
<tr>
<td>Sandy Point</td>
<td>11.0</td>
<td>7.6</td>
<td>7.1</td>
<td>6.5</td>
<td>5.8</td>
<td>Not provided</td>
</tr>
<tr>
<td>Rawdon Island Bridge</td>
<td>8.0</td>
<td>5.2</td>
<td>4.8</td>
<td>4.3</td>
<td>3.8</td>
<td>Not provided</td>
</tr>
<tr>
<td>Dennis Bridge</td>
<td>7.0</td>
<td>4.2</td>
<td>3.8</td>
<td>3.5</td>
<td>3.0</td>
<td>2.5</td>
</tr>
<tr>
<td>Confluence of Hastings and Maria Rivers</td>
<td>6.8</td>
<td>3.9</td>
<td>3.5</td>
<td>3.1</td>
<td>2.7</td>
<td>2.3</td>
</tr>
<tr>
<td>Hibbard Ferry</td>
<td>6.4</td>
<td>3.4</td>
<td>3.1</td>
<td>2.7</td>
<td>2.4</td>
<td>2.3</td>
</tr>
<tr>
<td>Confluence of Limeburners Creek and Hastings River</td>
<td>6.2</td>
<td>3.1</td>
<td>2.8</td>
<td>2.5</td>
<td>2.3</td>
<td>Not provided</td>
</tr>
<tr>
<td>Kings Point</td>
<td>6.2</td>
<td>3.1</td>
<td>2.8</td>
<td>2.5</td>
<td>2.3</td>
<td>Not provided</td>
</tr>
<tr>
<td>Settlement Point Ferry</td>
<td>6.2</td>
<td>3.0</td>
<td>2.7</td>
<td>2.5</td>
<td>2.3</td>
<td>Not provided</td>
</tr>
<tr>
<td>Pelican Point</td>
<td>3.2</td>
<td>2.2</td>
<td>2.2</td>
<td>2.2</td>
<td>2.2</td>
<td>Not provided</td>
</tr>
</tbody>
</table>
3.2.5 Wave Action

The study area for the Hastings River is located around 6km upstream of the river entrance. As such, the study area is not subjected to swell and waves are generated by local winds and boat wake.

Wind waves that are generated from winds blowing over the surface of the waterway are generally small in height (relative to swell waves) and have a relatively short period (usually between 2 and 4 seconds). The wave height experienced at a particular site depends on fetch length (waterway distance over which the wind blows), water depth, and the wind conditions (speed, direction and duration).

Predicted wind waves at key sites along the river including the Hibbard Ferry ramp, Fernbank Creek boat ramps, Blackmans Point boat ramp and Oakes Crescent boat ramp are summarised in Table 3, Table 4, Table 5 and Table 6 respectively.

Table 3: Predicted wind waves at Hibbard Ferry ramp

<table>
<thead>
<tr>
<th>Direction</th>
<th>Wind Fetch (m)</th>
<th>Wave Height (m) 1 year</th>
<th>Wave Height (m) 5 year</th>
<th>Wave Height (m) 50 year</th>
<th>Wave Period (sec) 1 year</th>
<th>Wave Period (sec) 5 year</th>
<th>Wave Period (sec) 50 year</th>
</tr>
</thead>
<tbody>
<tr>
<td>North West</td>
<td>2800</td>
<td>0.56</td>
<td>0.60</td>
<td>0.76</td>
<td>2.1</td>
<td>2.2</td>
<td>2.4</td>
</tr>
<tr>
<td>North East</td>
<td>500</td>
<td>0.20</td>
<td>0.21</td>
<td>0.27</td>
<td>1.1</td>
<td>1.1</td>
<td>1.3</td>
</tr>
<tr>
<td>East North East</td>
<td>2000</td>
<td>0.38</td>
<td>0.42</td>
<td>0.53</td>
<td>1.8</td>
<td>1.8</td>
<td>2.0</td>
</tr>
</tbody>
</table>

Table 4: Predicted wind waves at Fernbank Creek boat ramps

<table>
<thead>
<tr>
<th>Direction</th>
<th>Wind Fetch (m)</th>
<th>Wave Height (m) 1 year</th>
<th>Wave Height (m) 5 year</th>
<th>Wave Height (m) 50 year</th>
<th>Wave Period (sec) 1 year</th>
<th>Wave Period (sec) 5 year</th>
<th>Wave Period (sec) 50 year</th>
</tr>
</thead>
<tbody>
<tr>
<td>North West</td>
<td>700</td>
<td>0.29</td>
<td>0.31</td>
<td>0.39</td>
<td>1.4</td>
<td>1.4</td>
<td>1.5</td>
</tr>
<tr>
<td>West North West</td>
<td>1300</td>
<td>0.41</td>
<td>0.44</td>
<td>0.56</td>
<td>1.7</td>
<td>1.7</td>
<td>1.9</td>
</tr>
<tr>
<td>North East</td>
<td>350</td>
<td>0.17</td>
<td>0.18</td>
<td>0.23</td>
<td>1.0</td>
<td>1.0</td>
<td>1.1</td>
</tr>
<tr>
<td>East</td>
<td>750</td>
<td>0.24</td>
<td>0.26</td>
<td>0.33</td>
<td>1.3</td>
<td>1.3</td>
<td>1.4</td>
</tr>
</tbody>
</table>

Table 5: Predicted wind waves at Blackmans Point boat ramp

<table>
<thead>
<tr>
<th>Direction</th>
<th>Wind Fetch (m)</th>
<th>Wave Height (m) 1 year</th>
<th>Wave Height (m) 5 year</th>
<th>Wave Height (m) 50 year</th>
<th>Wave Period (sec) 1 year</th>
<th>Wave Period (sec) 5 year</th>
<th>Wave Period (sec) 50 year</th>
</tr>
</thead>
<tbody>
<tr>
<td>West South West</td>
<td>3000</td>
<td>0.61</td>
<td>0.66</td>
<td>0.84</td>
<td>2.2</td>
<td>2.3</td>
<td>2.5</td>
</tr>
<tr>
<td>South East</td>
<td>2000</td>
<td>0.47</td>
<td>0.51</td>
<td>0.65</td>
<td>1.9</td>
<td>2.0</td>
<td>2.1</td>
</tr>
</tbody>
</table>

Table 6: Predicted wind waves at Oakes Crescent boat ramp

<table>
<thead>
<tr>
<th>Direction</th>
<th>Wind Fetch (m)</th>
<th>Wave Height (m) 1 year</th>
<th>Wave Height (m) 5 year</th>
<th>Wave Height (m) 50 year</th>
<th>Wave Period (sec) 1 year</th>
<th>Wave Period (sec) 5 year</th>
<th>Wave Period (sec) 50 year</th>
</tr>
</thead>
<tbody>
<tr>
<td>North</td>
<td>500</td>
<td>0.20</td>
<td>0.21</td>
<td>0.27</td>
<td>1.1</td>
<td>1.2</td>
<td>1.3</td>
</tr>
<tr>
<td>North East</td>
<td>850</td>
<td>0.25</td>
<td>0.28</td>
<td>0.35</td>
<td>1.4</td>
<td>1.4</td>
<td>1.5</td>
</tr>
<tr>
<td>East North East</td>
<td>1500</td>
<td>0.33</td>
<td>0.36</td>
<td>0.46</td>
<td>1.6</td>
<td>1.7</td>
<td>1.8</td>
</tr>
</tbody>
</table>

Boat wake may also produce waves of a similar magnitude and period as large cruisers travelling at low speeds may generate boat wake with a wave height of up to 0.5m with short wave periods of 2 to 3 seconds. According to the Mid North Coast Regional Boating Plan (Transport for NSW, 2015) one of the main complaints received by RMS within the Port Macquarie region was irregular riding of personal water craft (PWC), which includes wash and vessels not observing correct ‘distance off’.
Numerous studies have been conducted on the maximum wave height produced by water-skiing and wakeboarding vessels and the effect of the waves on foreshore erosion. Field testing was undertaken by Glamore (2005), which assessed 6 wakeboarding vessels and 5 water-skiing vessels under 8 different speed and towing conditions. The maximum wave height at operating conditions (30 knots for a water-skiing vessel and 19 knots for a wakeboarding vessel) were assessed and the maximum wave height ($H_{\text{max}}$) at any speed was determined. These results are presented in Table 7.

<table>
<thead>
<tr>
<th>Vessel type and length</th>
<th>Vessel Velocity</th>
<th>$H_{\text{max}}$ (m)</th>
<th>$T_{\text{peak}}$ (s)</th>
<th>Energy $H_{\text{max}}$ (joules/m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water-skiing, 6.1m</td>
<td>8 knots</td>
<td>0.35</td>
<td>1.73</td>
<td>701</td>
</tr>
<tr>
<td></td>
<td>30 knots</td>
<td>0.12</td>
<td>1.50</td>
<td>62</td>
</tr>
<tr>
<td>Wakeboarding, 6.1m</td>
<td>8 knots</td>
<td>0.33</td>
<td>1.86</td>
<td>700</td>
</tr>
<tr>
<td></td>
<td>19 knots</td>
<td>0.25</td>
<td>1.57</td>
<td>293</td>
</tr>
</tbody>
</table>

However, attenuation of boat wake waves as they move away from the sailing line is such that the maximum wave heights of around 0.35m noted above would reduce to less than 0.2m within 120m of the sailing line. This wave height is comparable or less than waves generated from wind action.

### 3.2.6 Currents

A tidal survey within the Hastings River was completed in 1998 by Manly Hydraulics Laboratory (MHL, 1999) and relevant results are provided as Figure 20 and Figure 21. The maximum tidal discharge in the Hastings River opposite Fernbank Creek was measured at approximately 700m$^3$/s on the flood tide. The maximum tidal discharge within the Hastings River on the western side of Settlement Point was measured at 1200m$^3$/s. This indicates that there is a significant reduction in tidal discharge (and corresponding tidal velocities since the river sectional areas are comparable) in upstream areas.

Measured tidal velocities within the Hastings River were noted to be 0.2m/s at Settlement Point, 0.5m/s upstream of Hibbard Creek and 0.2m/s upstream of Fernbank Creek within the Hastings Estuary Management Plan (Umwelt, 2001) (refer Figure 23).
Modelled 100 year recurrence flood velocities and water depths from the *Hastings River Flood Study* (PBP, 2006) are shown on Figure 22. These results indicate overland flow velocities of around 0.5m/s in the vicinity of the Hibbard Ferry ramp, which was reported to be typical across floodplains in the lower
Hastings River (downstream of Sandy Point). The main river channel has higher peak flood velocities in the order of 1.5m/s. Similar peak velocities were modelled within the main channel further upstream. The flood study noted that a localised 100 year flood velocity of 4.7m/s was estimated at the Dennis Bridge constriction.

![Figure 22: 100 year recurrence flood velocity and water depths in lower Hastings River (PBP, 2006)](image)

3.2.7 Sediments and Sediment Transport

The Hastings Estuary Management Plan (Umwelt, 2001) presented mapping of the extent and location of sediments within the Hastings River, which is reproduced as Figure 23. This demonstrates that the upper river system (Wauchope) is dominated by fluvial gravels, sands and muds. Downstream of Rawdon Island and past Dennis Bridge, including Oakes Crescent boat ramp, the river bed consists of fluvial sands and muds. Downstream of Fernbank Creek to the limit of the study area at the Settlement Shores Estate canal entrance, river bed materials comprise mixed reworked coastal sands and fluvial sediment.
River bank erosion is a major feature of the river with erosion evident on the outside of meander bends in the main river channel and tributaries. Main sources of river bank erosion are reported to be:

- current scour;
- channel migration;
- floodplain dissection; and,
- wave attack.

As shown on Figure 23, eroding bank areas are distributed primarily along the lower and central areas of the River that are comprised of fluvo-estuarine and reworked coastal sands. It is noted that bank erosion is indicated to be prevalent within the majority of the study area foreshore, with most of the northern river bank and sections of the southern river bank being identified as bank erosion areas in Figure 23. The erosion areas are most prevalent on the outside of bends in the river. Rates of bank retreat have been stated to be more than 0.3m/year and bank erosion is contributing to shoaling with areas at the entrance to the Maria River and Munns Channel (refer Figure 23 for location) requiring dredging (Umwelt, 2001).

The Hastings River foreshore is particularly susceptible to river bank erosion in some areas due to lack of riparian vegetation. Within the study area a narrow band of riparian vegetation typically exists in front of cleared farmland. In more developed areas, owners of waterfront dwellings have constructed vertical retaining walls or rock walls to protect their properties and to facilitate boating access from private ramps and jetty structures.
The southern river bank within the study area is naturally protected from erosive action to some degree by a band of fringing mangroves that extend from Fernbank Creek to the Rivermark Café, and are also present in a narrow band upstream of Fernbank Creek. No such protection is provided along the northern river bank.

### 3.2.8 Water and Sediment Quality

In 2012, a report was commissioned into the condition of the Hastings River catchment (Northern Rivers Catchment Management Authority, 2012) which assessed five indicators of estuarine health including:

1. Water quality - oxygen level, salinity, acidity, turbidity and nutrients.
3. Riparian vegetation - bank condition, habitat and occurrence of weeds.
4. Fish community results - type and number of fish.
5. Zooplankton - type and number of small organisms.

The report gave the catchment an overall grade of “B-“. It concluded that the Hastings River and tributaries possessed good water quality, fair riparian condition and waterbug diversity. The report concluded that generally the estuarine regions were in worse condition than the observed freshwater sites. Water quality issues with low oxygen and low pH were noted in the Maria River and at the tidal limit of the Hastings River. The report also stated that the riparian condition in the lower estuary was in “poor to very poor” condition due to bank erosion and weed infestations.

The Port Macquarie-Hastings local government area has 57 drainage systems that produce acid discharge and 21,737 hectares of acid sulfate soils (ASS) exist in the Hastings and Camden Haven floodplains (PMHC, 2016). The Wauchope/Port Macquarie acid sulfate soils risk map (refer Figure 24) indicates that:

- at the Hibbard Ferry ramp foreshore there is a low probability of ASS 1-3m below ground level;
- at the Fernbank Creek boat ramps foreshore there is a high probability of ASS 1m below ground level;
- at the Blackmans Point boat ramp foreshore there is a low probability of ASS 1-3m below ground level;
- at the Oakes Crescent boat ramp foreshore there is a high probability of ASS 1-3m below ground level; and,
- bottom sediments within the Hastings River are considered to have a high probability of being ASS.

It is noted that if encountered in excavations, excavated ASS can be neutralised with blending of lime into stockpiled material and exposure of the excavated surface can be managed by dusting with lime and capping with clean (non-ASS) material.
## Map Class Description

<table>
<thead>
<tr>
<th>HIGH PROBABILITY</th>
<th>Depth to Acid Sulfate Soil Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>High probability of occurrence of acid sulfate soil materials within the soil profile.</td>
<td>Below water level: Bottom sediments. At or near the ground surface. Within 1 metre of the ground surface. Between 1 and 3 metres below the ground surface. Greater than 3 metres below the ground surface.</td>
</tr>
<tr>
<td>The environment of deposition has been suitable for the formation of acid sulfate soil materials. Acid sulfate soil materials are widespread or sporadic and may be buried by alluvium or windblown sediments.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LOW PROBABILITY</th>
<th>Depth to Acid Sulfate Soil Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low probability of occurrence of acid sulfate soil materials within the soil profile.</td>
<td>Below water level: Bottom sediments. At or near the ground surface. Within 1 metre of the ground surface. Between 1 and 3 metres below the ground surface. Greater than 3 metres below the ground surface.</td>
</tr>
<tr>
<td>The environment of deposition has generally not been suitable for the formation of acid sulfate soil materials. Soil materials are often Pleistocene in age. Acid sulfate soil materials, if present, are sporadic and may be buried by alluvium or windblown sediments.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NO KNOWN OCCURRENCE</th>
<th>Depth to Acid Sulfate Soil Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acid sulfate soils are not known or expected to occur in these environments.</td>
<td>No known occurrences of acid sulfate soil materials.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DISTURBED TERRAIN</th>
<th>Depth to Acid Sulfate Soil Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disturbed terrain may include filled areas, which often occur development or construction of dams or levees. Soil in these areas can be highly contaminated with arsenic.</td>
<td>No known occurrences of acid sulfate soil materials.</td>
</tr>
</tbody>
</table>

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**Figure 24:** Acid Sulfate Soils Risk Map (DLWC, 1997)
3.3 Navigation

Navigation in the Hastings River is facilitated by the main river channel, which extends from the estuary entrance to upstream of the Dennis Bridge. The channel is marked with navigation aids in several areas (refer Figure 25 and Figure 26 and Map 2.4) including:

- starboard buoys off the shoreline at Kings Point;
- port buoy adjacent to the oyster leases south of Hibbard Creek;
- starboard and port buoys marking the access channel through the entrance of the Maria River;
- port buoys marking the channel on the northern side of the river between Fernbank Creek and Dennis Bridge, these buoys are primarily for safe navigation of the Island Trader supply vessel which regularly delivers cargo to Lord Howe Island (approximately 600km east of Port Macquarie) and is moored at the Birdon slipway facility; and,
- lit port and starboard beacons marking the entrance to Settlement Shores Estate canals.

Restrictions to navigation in the vicinity of the study area include:

- 7.4m clearance under Dennis Bridge;
- 4 knot zone within Settlement Shores Estate canals;
- no wash zone adjacent to the Riverlodge Tourist Village, RMS is planning to install additional no wash signs along the northern bank to address wash complaints received by local residents;
- no wash zone and no skiing or aquaplaning in the lower reaches of Maria River in the vicinity of Boomerang Island;
- 4 knot speed limit within 100m of ferry crossings;
- no wash zone within the Hastings River between the entrances to the Settlement Shores Estate canals and Broadwater canals;
- prohibition of power vessels inshore of special marker buoys at McInherney Park;
- no skiing or aquaplaning downstream of the Settlement Point Ferry crossing; and,
- a personal water craft (PWC) hire craft area has been established within an area delineated with marker buoys to the south of Pelican Island and located outside of the main navigation channel.

Notes on the RMS boating map indicates that rowers use the waterway in the vicinity of Hibbard (where the Port Macquarie Rowing Club is based), and that boaters are to avoid creating unnecessary wash.

The Hastings River has a substantial commercial oyster farming industry. A significant area of oyster leases exists within Big Bay and in Limeburners Creek, where 4 knot speed limitations and no wash zones exist to limit damage to oyster farms. Oyster leases also exist within the Maria River and alongside the banks of the Hastings River. Oyster leases within the Hastings River study area are located (refer Map 2.4):

- along the southern bank between Hibbard Creek and Whalebone Wharf Seafood Restaurant;
- along the southern bank upstream of Fernbank Creek; and,
- along the northern bank from Riverside to Kings Point.

The oyster leases within the study area typically comprise oyster racks established on floating raft structures and are therefore sensitive to wave action.
Figure 25: RMS Boating Map covering the study area

Figure 26: RMS Boating Map covering Hibbard and Settlement Point areas
3.4 Shoreline Structures
Numerous shoreline structures exist in the vicinity of the study area to facilitate public and private boating access along the southern shoreline of the Hastings River, including:

- paddle board/canoe and boat hire business at Settlement Point, adjacent to the Settlement Point Ferry crossing;
- numerous private boat ramps, jetties and pontoons within the Broadwater and Settlement Shores Estate canal systems;
- Jordans Boating Centre and Holiday Park on McNherney Close provides hire boats;
- public boat ramp and pontoon facility at McNherney Park;
- beach area created between groyne structures at the Port Macquarie Rowing Club;
- numerous private boat ramps jetties exist along the foreshore off Hibbard Drive, River Boat Drive and Narimba Close;
- L-shaped jetty extending from the foreshore reserve adjacent to Hibbard Ferry crossing;
- dinghy launching ramp within the foreshore reserve adjacent to Hibbard Ferry crossing;
- swing moorings located along the southern shoreline from the Hibbard Ferry crossing to Whalebone Wharf Seafood Restaurant;
- Aquatic Caravan Park boat ramps and jetty;
- Whalebone Wharf Seafood Restaurant jetty and pontoon;
- two private jetties immediately upstream of Whalebone Wharf Seafood Restaurant;
- The Big Oyster Seafood and Café jetty and pontoon;
- Fernbank Creek boat ramps;
- private jetty/wharf structure upstream of Fernbank Creek associated with oyster farming;
- Oakes Crescent boat ramp; and,
- Birdon slipway facility located immediately downstream of Dennis Bridge.

On the northern shoreline of the Hastings River there is less development within the study area. Notable shoreline structures include:

- public boat ramp at the end of Blackmans Point Road;
- private jetty structures and retaining walls along the water frontage of residential dwellings along Riverside Drive;
- private jetty/wharf structure immediately downstream of the Hibbard Ferry crossing associated with oyster farming; and,
- redundant ferry ramp on downstream side of Settlement Point Ferry crossing

3.5 Services
Essential services (power, water, sewer etc.) are all readily available at the Settlement Shores Estate canals and Hibbard Ferry area waterfront due to existing residential and commercial development.

Dial Before You Dig searches were completed within the study area along Oakes Crescent, Hastings River Drive, Fernbank Creek Road and Blackmans Point Road. These searches indicated that town water and sewer services were not available. However, power is supplied by Essential Energy via overhead power lines:

- along Oakes Crescent;
- along the foreshore between Oakes Crescent and Fernbank Creek;
- along Fernbank Creek Road, both alongside Fernbank Creek and the Hastings River; and,
- along Blackmans Point Road.

3.6 Ecology

The Hastings catchment area supports a range of highly valued aquatic habitats, including seagrass, saltmarsh and mangrove communities (refer Map 2.3). In the lower estuary, riparian vegetation is constricted to a single row of trees along the bank due to urban development. Further upstream, bank conditions and riparian vegetation are improved due to establishment of reserves such as the Rawdon Creek Nature Reserve, Lake Innes Nature Reserve and Limeburners Creek Nature Reserve. These areas are characterised by coastal wetlands and littoral rainforest. The lower estuary has been identified as providing habitat for 12 threatened species including several waders species, oyster catchers, lesser sand plovers, osprey and several species of stork among others (Umwelt, 2001).

Large areas of seagrass exist in the lower estuary, primarily within Big Bay, Limeburners Creek and Maria River. Seagrass also exists in shallow nearshore areas along the southern bank of the Hasting River:
- from the Hibbard Ferry ramp to Hibbard Creek; and,
- between the Oakes Crescent boat ramp and Dennis Bridge.

A narrow strip of seagrass is mapped close to the shoreline along most of the southern bank upstream of Partridge Creek. The shoreline along the northern bank has little or no seagrass coverage.

Seagrass mapping completed by Southern Cross University (2007) (refer Figure 27) indicates similar seagrass coverage to that shown on Map 2.3 (which is based on 2005 DPI data).
Mangrove communities grow extensively throughout the lower river estuary. Mangroves are present within the study area predominantly along the southern river bank. A band of mangroves exist on the river side of Hasting Creek Drive and Fernbank Creek Road and extends along the foreshore from the Rivermark Café to the upstream limit of the large wetland area drained by Partridge Creek and Hibbard Creek. Further upstream, mangrove growth is patchy other than the large stand of mangroves immediately adjacent to the Birdon slipway facility.

Several areas of SEPP14 wetlands have been identified (refer Map 2.1) within the study area, including:

- low-lying area landward of the northern river bank from Shoreline Drive to Kings Point;
- large wetland area drained by Partridge Creek and Hibbard Creek along the southern river bank; and,
- low-lying area on the landward side of waterfront properties and Riverside Drive along the northern river bank.
Available mapping also indicates that a number of Endangered Ecological Communities (EECs) exist along the shoreline. These areas include:

- riparian vegetation around the Oakes Crescent boat ramp;
- riparian vegetation around Fernbank Creek;
- extensive areas within the SEPP14 wetland drained by Partridge Creek and Hibbard Creek;
- riparian vegetation at Kings Point; and,
- riparian vegetation within the Crown Land foreshore reserve area (and also adjoining inland areas) established between Riverlodge Tourist Village and the Dennis Bridge.

3.7 Heritage

An extensive Aboriginal Heritage Information System (AHIMS) search was conducted for the study area which returned 24 potential aboriginal sites/artefacts.

Several Aboriginal heritage items exist at the mouth of Fernbank Creek with artefacts also located further upstream along the southern river bank. An existing Aboriginal Land Claim applies to the Fernbank Creek foreshore below the Mean High Water Mark and does not affect the road reserve.

There are aboriginal artefacts recorded within several hundred metres of Oakes Creek boat ramp.

The foreshore at the entrance to the Maria River is Aboriginal heritage land with a major conflict occurring in this location. An area of land at Blackmans Point is under an existing Aboriginal Land Claim.

European heritage items within the study area include the slipway adjacent to the Hibbard Ferry ramp and a site located 200m further downstream within the Council foreshore reserve area off Hibbard Drive (refer Map 2.1).

3.8 Foreshore Access and Traffic

Public foreshore access along the southern river bank is limited upstream of Fernbank Creek due to the presence of private farmland areas along the waterfront. Public access is provided to the existing boat ramp via Oakes Crescent, which comprises a sealed road off Hastings River Drive which transitions into an unsealed road closer to the river bank.

Fernbank Creek Road runs off Hastings River Drive and along Fernbank Creek and continues along the shoreline of the Hastings River. It provides public road access to the existing boat ramps immediately downstream of Fernbank Creek. The road is low lying, relatively narrow and unsealed alongside Fernbank Creek, is sealed along the Hastings River shoreline, and links back to Hastings River Drive further downstream. Beyond this point, Hastings River Drive runs along the river shoreline to the Rivermark Café.

Public access to the shoreline is available through the reserve area immediately upstream of the Hibbard Ferry ramp. Downstream of the ferry ramp, another public foreshore reserve exists off Hibbard Drive and around the Port Macquarie Rowing Club. In other areas, the existence of private waterfront property along Hibbard Drive prevents public foreshore access.

Along the northern river bank, foreshore access is available from McMillan Drive which runs along an area of Crown Land upstream of Riverlodge Tourist Village. Downstream of Riverlodge Tourist Village, Blackmans Point Road provides vehicular access to the shoreline up to Blackmans Point boat ramp.
Public foreshore access is prevented by private waterfront property along most of Riverside Drive. However, several parcels of Community Land exist along the shoreline in amongst private properties at the entrance to the Maria River and between No.19 and No.25 Riverside Drive (refer Map 2.1). Further downstream towards Kings Point, Riverside Drive runs alongside the river foreshore. However, beyond the Hibbard Ferry ramp, gates prevent vehicular access into private property extending along the river to Kings Point.
4 Options Assessment

4.1 Boating Demand Assessment

The demand for boating infrastructure in the Port Macquarie-Hastings area is being driven by population growth, planned urban area expansion and residential development, dependence of the township on tourism for business and growth, and trends in regional boat ownership.

According to population forecasts by Forecast.id (2014) for Port Macquarie-Hastings Council the current (2016) population was predicted to be 79,000 and was forecast to grow to 103,000 by 2036. This represents a projected increase of 30% over the next 20 years.

The above forecasts are supported by the Draft North Coast Regional Plan prepared by the NSW Department of Planning & Environment (2016). This states that the Port Macquarie-Hastings area is experiencing one of the fastest population and economic growth rates in the region and Port Macquarie is identified as a ‘regional city’ alongside Tweed Heads and Coffs Harbour. The population of Port Macquarie-Hastings is estimated to be around 95,000 in 2036, according to Australia Bureau of Statistics and NSW Department of Planning & Environment projections. This population growth is proposed to be supported by existing and proposed urban release areas (refer Figure 28), which are predominantly located along the Oxley Highway and Pacific Highway. The existing Thrumster Urban Release Area has the capacity to accommodate 4,250 dwellings, or about 10,000 people. Council has advised that it anticipates that population growth along the Oxley Highway spine to be 15,000-20,000 in 20 to 30 years’ time. These urban growth areas would receive the most benefit from boat launching facilities located within the study area, which would alleviate future pressure on existing facilities (refer Section 4.3).
Due to Port Macquarie's coastal location and ease of river access, it is a popular area for tourism, especially in the summer months. Available tourism data from Destination NSW (2014) indicates that the four year rolling annual average for the number of visitors to the Port Macquarie's LGA was 1,453,000. The tourism generated from overnight and domestic daytrips was estimated to represent an annual spend of $423 million. As such, it is evident that businesses within the Port Macquarie area benefit significantly from tourism revenue.
Based on boat registration data provided by RMS (dated April 2016) for postcodes in the areas surrounding the Hastings River (i.e. 2446, 2441, 2444, 2439, 2445, 2443), there are 6,391 boats with a current, expired or pending registration. It is also important to consider the surrounding regions of Port Macquarie, as during certain times of the year these regions would add considerably to the boating demand.

The regions of the Mid North Coast have a combined 42,000 boat licence holders, which represents 8% of all boating licences in NSW. There are 20,000 registered recreational vessels, with open runabouts comprising 70% of registered vessels. The majority of vessels are between 2-6m in length and are therefore classed as trailable vehicles. This places further pressure on existing boat launching ramps and trailer parking spaces. (Transport for NSW, 2015)

According to the NSW Boat Ownership and Storage: Growth Forecasts to 2026 (NSW Maritime, 2010) a growth trend of 2.9% annually for registration of recreational vessels is expected in NSW. The report also identified that the North Coast region (inclusive of Port Macquarie) would have a 4% growth rate. This is above the state wide growth rate of vessel ownership. It was also forecast that the North Coast would have greater growth in trailable vessels, further increasing the demand for boat launching facilities.

Within the Draft Recreation Plan 2014 (Ross Planning, 2014), it was recommended that investigations are undertaken to identify additional water based recreation infrastructure sites upriver from Westport Park, with potential sites chosen based on the following factors:

- topography allows for water access;
- level of land in already public ownership/management;
- direct access to the ocean; and,
- level of existing demand for water access (existing use).

The above recommendation is also reflected within Council’s Recreation Action Plan 2015-2025 (PMHC, 2015a). An action to identify a site for future development as a specific boating facility within the Hastings River is included within Year 2 (2016/2017) of the Recreation Action Plan.
4.3 Existing Boating Facilities

4.3.1 General

According to the RMS Boat Ramp Locator there are currently 7 public boat ramps in the Hastings River, downstream of Dennis Bridge.

These include 3 boat ramps in the Port Macquarie town area, located at the Fish Co-op (Short Street), Marine Rescue Base (Buller Street) and at Westport Park. The Westport park ramp is largest facility in town, comprising 3 lanes with an on-ramp pontoon, separate gangway for passenger loading/unloading, fish cleaning table, rubbish bins, lighting and large adjoining parking area. The facility has recently been upgraded to a 4 lane ramp with an additional on-ramp pontoon (facility now has 2 on-ramp pontoons) and some upgrades to parking. The area experiences heavy congestion due to high usage and other competing uses of Westport Park as a major events hub (e.g. community markets, iron man events etc.). Council have advised that concept plans for the upgrade of Kooloonbung Harbour have been development and adopted by Crown Lands and Council. When this plan is implemented, the Short Street boat ramp will be removed.

A redundant ferry ramp exists along the northern river bank, on the downstream side of the Settlement Point Ferry crossing. This ramp is reported to be used occasional for boat launching and retrieval and the structure is understood to be in poor condition.

Further upstream beyond Settlement Point, there are 4 public boat ramps located outside of the main town area including:

- McInherney Park Boat Ramp;
- Fernbank Creek Boat Ramps;
- Blackmans Point Boat Ramp; and,
- Oakes Crescent Boat Ramp.

The McInherney Park Boat Ramp comprises a 2 lane concrete ramp in good condition, an on-ramp pontoon, fish cleaning table, rubbish bins, lighting and a small parking area. The adjoining park to the east of the boat ramp is shared with other groups using non-motorised craft, including Sailability, Port Macquarie Sailing Club and Port Macquarie Sea Scouts (who have a boatshed for canoes and sail boats). Sandy embayments have been created along the park foreshore for launching of non-motorised craft and buoys delineate a prohibited area for motorised craft. A current project is the provision of a dedicated gangway and accessible pontoon which includes provision for a lifting hoist.

The remaining 3 ramps further upstream are within the study area and are in fair (Oakes Crescent) to poor (Fernbank Creek and Blackmans Point) condition and are relatively under developed in comparison to ramps within town and at McInherney Park. As such, they have been considered as potential development sites for improved boating access in the area.

4.3.2 Fernbank Creek Boat Ramps

The Fernbank Creek facility comprises 2 single lane ramps that are positioned at separate access locations along the shoreline. Both ramps are former punt crossings as evidenced by the steel rails which protrude through the ramp surface.

The western ramp is located at the entrance to Fernbank Creek and is shown on Figure 29. The ramp surface comprises an in situ concrete slab that has grooved and incorporates metal rails indicating its
previous use as a ferry punt ramp providing access to Blackmans Point. The ramp slab is in poor condition with cracking and cavities evident in a number of locations. The river bank around the ramp has signs of instability with ad hoc mass concrete infill, placement of building rubble and rock protection evident adjacent to the ramp. The approach to the ramp (refer Figure 30) provides small turning area and around 20m of paved surfacing up to the crest of the concrete ramp surface.

The eastern ramp (refer Figure 31) is of similar construction to the western ramp but is in better condition. Mass concrete infill and undercutting of vegetation is also evident in adjacent bank areas. The approach to the eastern ramp comprises a 10m long paved area off the side of Fernbank Creek Road with no turning area.

Water depth at the ramps is reported to be “shallow at times” within the RMS Boat Ramp Locator database. Available survey indicates that the toe level at both ramps is likely to be above -1m AHD, which may result in poor water depths for launching at low tides.

Parking around both ramps is limited to the informal grassed area available between the ramps, which is around 10m wide alongside Fernbank Creek Road (refer Figure 32). A single rubbish bin is provided at each ramp.

Road access to the facility is provided from the east along the sealed portion of Fernbank Creek Road. Fernbank Creek Road transitions to an unsealed road to the west of the boat ramp and remains unsealed until the intersection with Hastings River Drive.

Water and sewer services are not provided at the ramp site. However, power is available via power poles running along Fernbank Creek Road and through adjacent private properties.

A large area of cleared private farmland exists opposite the boat ramp site. Expansion of the facility is not possible without acquisition of private land.
Figure 29: Fernbank Creek western boat ramp surface

Figure 30: Fernbank Creek western boat ramp approach area

Figure 31: Fernbank Creek eastern boat ramp surface
4.3.3 Blackmans Point Boat Ramp

The Blackmans Point facility is located at the eastern end of Blackmans Point Road and comprises a single lane concrete ramp in relatively poor condition (refer Figure 33 and Figure 34). Also a former punt crossing, two rubbish bins are provided at the ramp.

A small turning area (refer Figure 35) is provided at the end of the road and informal parking is limited to the grassed area on the roadside (refer Figure 36).
Figure 33: Blackmans Point boat ramp approach

Figure 34: Blackmans Point boat ramp surface (looking upstream)
Figure 35: Blackmans Point boat ramp turning circle (looking downstream)

Figure 36: Blackmans Point boat ramp informal roadside parking areas (looking upstream)
Water depth at the ramp is reported to be “shallow at times” within the RMS Boat Ramp Locator database. Available survey indicates that bed levels lower than -2m AHD are available adjacent to the river bank at the ramp location. However, the ramp may not extend out to access these depths.

Areas of cleared private farmland exist along the landward side of Blackmans Point Road, which runs along the crest of the river bank in the vicinity of Blackmans Point. A parcel of Crown Land is mapped (refer Map 2.1) immediately landward of the boat ramp which could be utilised for expansion of the facility. However, the area is in close proximity to existing residential dwellings (refer Figure 37). Furthermore, this parcel of land, referred to as Lot 1 DP 927028 (approximately 0.22 ha), is under Aboriginal Land Claim 18092 (lodged on 30 June 2009). Any development on the land would need to be consented to by the Birpai Local Aboriginal Land Council (LALC).

The reserve area at the tip of Blackmans Point is delineated by timber bollards and includes picnic tables positioned in amongst trees offering a shaded area with attractive views across the confluence between the Maria River and Hasting River (refer Figure 38). Three stones are positioned within the reserve and incorporate a plaque to acknowledge the significance of the land for Aboriginal people (refer Figure 39).
Access to the ramp from population centres on the southern side of the Hastings River is problematic as this involves crossing the river via the Pacific Highway and doubling back along Blackmans Point Road.

Water and sewer services are not provided at the ramp site. However, power supply is provided via power poles running along Blackmans Point Road.
4.3.4 Oakes Crescent Boat Ramp

This facility is located at the end of Oakes Crescent which is the only road providing public access to the southern shoreline between Fernbank Creek and Dennis Bridge. Oakes Crescent is a two-way sealed road off Hastings River Drive and transitions into a narrow unsealed road over a length of around 170m to provide access to the boat ramp (refer Figure 40).

![Figure 40: Oakes Crescent boat ramp approach](image)

The single lane boat ramp comprises an in situ concrete slab without grooves (refer Figure 41) and was slippery in its lower portion. Site measurements indicated that the ramp was 3.65m wide and had a slope ranging from 5 degrees (1V:11.5H) at the waterline and 7 degrees near the crest (1V:8H). The ramp surface was considered to be in fair condition. However, a crack across the width and through the thickness of the ramp was observed midway along its length.
Figure 41: Oakes Crescent boat ramp surface

Figure 42: Oakes Crescent boat ramp crack
Water depth at the ramp is reported to be “shallow at times” within the RMS Boat Ramp Locator database. Available survey indicates that the toe level at the ramp is around -0.5m AHD, which would result in poor water depths for launching at low tides.

The area behind the crest of the ramp is space constrained due to the presence of residential property on both sides of the ramp. The width available in the approach immediately behind the ramp crest is around 10m to the low-level log barriers (refer Figure 43) that are assumed to delineate the western private property boundary. An additional 8m of width (total 18m width) is available to the fence line of the eastern property (refer Figure 44). Cleared grassed areas in the approach to the ramp are currently used for informal trailer parking. Further away from the ramp approach, the access road narrows to the extent that two-way vehicle passing is difficult without care (refer Figure 45).

Water and sewer services are not provided at the ramp site. However, power supply is provided via power poles running along Oakes Crescent and through adjacent private properties.

Expansion of the facility is not possible without substantial clearing of vegetation currently providing screening to adjacent residential dwellings, significant roadworks and acquisition of private land.

Figure 43: Oakes Crescent approach area looking back from ramp crest towards western property boundary
Figure 44: Oakes Crescent approach area looking towards ramp and eastern property boundary

Figure 45: Narrow unsealed access road to Oakes Crescent boat ramp
4.4 Site Requirements to Meet Future Needs

4.4.1 General

An understanding of site requirements was gained from initial discussions with a range of stakeholders including Council, riverside business owners, water-based recreation groups, recreational boat owners representatives, Marine Rescue and RMS staff. This relates to existing and desired future waterway usage and is summarised in the following points:

- passive recreation activities involving use of non-motorised craft (e.g. canoeing, sailing, dragonboating, rowing, paddle boarding) are concentrated around McInherney Park, the Rowing Club Reserve at the end of Hibbard Drive, Settlement Point (where a paddle board/canoe hire and reserve area with sandy beach exists), and the Back Channel (between the Settlement Point and Pelican Island).
- water skiing is prohibited downstream of the Settlement Point Ferry crossing, however conflicts are reported to occur between water skiers and other waterway users between the Settlement Point and Hibbard ferry crossings;
- it is preferred that boat launching facilities and water skiing and jet ski activities are not sited in close proximity to areas used by passive recreation craft;
- the designation of water skiing areas is currently unclear and both Marine Rescue and the RMS Boating Safety Officers are often approached by water skiers asking where they are allowed to ski;
- major events at Westport Park can close or cause significant congestion at the boat ramp. Boaters use McInherney Park ramp as an alternative, however parking is limited at the facility and cannot be expanded due to surrounding residential dwellings;
- Marine Rescue would support the development of a boat launching ramp further upstream along Fernbank Creek Road to assist with rescue activities in the area which are problematic due to shallow water depth at existing ramps, and the facility would need to have a floating pontoon to aid transfer of injured people to an ambulance onshore; and,
- since professional fishing ceased in the Hastings River, mud crabbing has become popular with suitable areas starting at Blackmans Point and extending upstream (including up the Maria River). There would be large demand from these users for a boat ramp in the area.

It was also noted by stakeholders that water skiing activities at Telegraph Point would be impacted by the current highway duplication works. These involve the construction of another bridge crossing that extends over the downstream tip of Dalhunty Island, Wilson River. This will have an impact on the water skiing circuit that was previously enjoyed around Dalhunty Island by water skiers attracted to the area by the Stoney Point water skiing park facility. It was considered that an opportunity exists to provide a new boat launching facility further downstream within the Maria River (upstream of The Hatch) as a compensatory measure for water skiers that have been affected by the highway duplication works.

4.4.2 Boat Launching Ramp Sites

It is considered that boat launching ramp sites would ideally have the following characteristics and features in order to service future boating needs:

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\(^2\) Marine Rescue reported that complaints relating to water skiers are received from people hiring boats from Jordans Boating Centre (refer Map 1) and Settlement Point.
located away from existing areas used by passive recreation craft, such as the areas around McInherney Park, entrance to Settlement Shores Estate canals and Hibbard;

located away from oyster lease areas that may be damaged by waves generated from vessels coming ‘off the plane’ on approach to the shore;

existing public vehicular access (e.g. road access);

have access to existing utilities including power/water supply and sewer mains;

nearshore access to suitable water depths for boat launching/retrieval;

have some level of existing public land ownership;

adequate land area behind the boat ramp for manoeuvring of boat trailers;

land area available for provision of car/trailer parking adjacent to the boat ramp;

include a floating pontoon for boat holding and emergency transfer of injured people by Marine Rescue;

relatively close proximity to the Port Macquarie town area and existing/future urban release areas (e.g. Thrumster);

not be located within sensitive environmental habitats (e.g. SEPP14 wetlands, Endangered Ecological Communities, or significant areas of seagrass, mangroves or salt marsh);

not be located within or in close proximity to heritage areas (e.g. Aboriginal heritage sites); and,

not be located in close proximity to existing residential dwellings.

4.4.3 Water Skiing and Jet Skiing Areas

Water skiing or aquaplaning is currently prohibited downstream of the Settlement Point Ferry crossing and within the lower reaches of the Maria River (where a no wash zone has also been applied).

Upstream of the Settlement Point Ferry crossing, the Hastings River is relatively broad with bank to bank widths between 300m to 500m. Although there is sufficient waterway area to safely water ski between the Settlement Point and Hibbard ferry crossings, conflicts have been reported with other user groups as the area is used by boat hire customers, sailing and rowing clubs, and other non-motorised craft.

The beach and adjacent grassed foreshore reserve (refer Figure 46) at McInherney Park was previously popular with water skiers who would use the area as a base to beach their boats and transfer skiers whilst groups picnicked on the foreshore. However, the establishment of a buoyed power boat prohibition area at McInherney Park has discouraged water skiing in this reach of the river and has preserved the area for passive recreation activities. It is considered that the establishment of a similar beach area in another reach of the Hastings River would be highly attractive to water skiers.
From discussions with RMS, it is understood that due to the meandering nature of the river alignment, waterway areas used by water skiers are subject to prevailing wind conditions. For example, the river reach from Fernbank Creek to the Dennis Bridge is relatively protected from northerly winds but would be exposed to westerly winds. Whereas the river reach from Fernbank Creek to the Hibbard Ferry crossing would be relatively protected from westerly winds but exposed to northerly and southerly winds.

It is considered that designation of a specific reach of the river for water skiing would result in reduced amenity for water skiers during unfavourable wind conditions. It would also concentrate boating activities in specific areas, and the associated higher frequency of boat passes may result in an increased impact of boat wash on adjacent shorelines. Along most of the study area, shorelines that are sensitive to boat wash exist on either the northern or southern river banks. These shoreline areas include:

- northern river bank from Dennis Bridge to Riverlodge Tourist Village, where mangrove planting has previously been undertaken, rock protection has been applied and failed timber log protective structures exist in front of an eroded bank face;
- northern river bank upstream of Blackmans Point, where minimal riparian vegetation exists, mangrove planting has previously been undertaken, and ad hoc bank protection exists at the boat ramp;
- northern river bank at the Riverside township, where a number of boats are moored alongside jetty and pontoon structures, reports of boat wash resulting in children falling off pontoons have been received by RMS, and bank erosion problems exist due to river currents running through the deep channel located close to the shoreline;
- northern river bank downstream of the Riverside township to the Hibbard Ferry crossing, where minimal riparian vegetation exists, and oyster leases including floating raft structures are located off the river bank;
- southern river bank immediately upstream of Fernbank Creek, where minimal riparian vegetation exists, an eroded bank face fronts farmland, and oyster leases including floating raft structures are located off the river bank;
- southern river bank downstream of Fernbank Creek to the upstream boundary of the SEPP14 wetland, where minimal riparian vegetation exists, and rock protection has been applied to protect Fernbank Creek Road from being undermined by bank erosion;
- southern river bank from Hibbard Creek to Whalebone Wharf Seafood Restaurant, where oyster leases including floating raft structures are located off the river bank; and,
- southern river bank downstream of the Hibbard Ferry crossing, where a number of boats are moored alongside jetty and pontoon structures.

The siting of a boating launching facility with an adjacent beaching area in the river reach upstream of the Hibbard area would encourage water skiers to use waterway areas that do not cause conflict with other users (as noted to exist above). Existing navigation restrictions, including the no wash zone upstream of Blackmans Point, speed limits around ferry crossings, the motorised vessel exclusion zone at McInherney Park, would also influence waterway use by water skiers. RMS may also consider implementing additional no wash zones to protect sensitive river bank areas in the future, which would be subject to observation of waterway usage and boating behaviour once the upstream boat launching facility is operational.

Jet skiing or use of Personal Water Craft (PWCs) is controlled by RMS rules, which are documented in the Personal Watercraft Handbook (RMS, 2016). These rules state that PWCs are not permitted be driven in an ‘irregular manner’ in:

- a PWC Restriction Zone; or,
- elsewhere within 200 metres of the shoreline where one or more dwellings are located within 200m of the shoreline and visible from the water.

According to the Personal Watercraft Handbook, driving in an ‘irregular manner’ includes:

- driving in a circle or other pattern;
- weaving or diverting;
- surfing down or jumping over or across any swell, wave or wash.

As such, in areas where dwellings exist on the shoreline PWC activities are limited to driving in a straight line within 200m of the shoreline which significantly limits the ability for users to enjoy operating these craft. Within the study area, the Hastings River is 300m to 500m wide and shoreline dwellings are generally visible on both river banks. As such, irregular driving of PWCs would generally not be permitted throughout the study area as the river is not wide enough to accommodate the required 200m distance off. PWC users observed to be driving in an irregular manner would be fined $250, under the current RMS rules. These restrictions and potential fines for irregular riding would discourage the use of PWCs in the study area, particularly if these rules were supported with on-water policing by RMS.
4.5 **Recommended Sites**

It is considered that the site of the existing Fernbank Creek boat ramps would be the most suitable site for development of a boating launching facility that could be linked with water skiing activity. This site has a number of advantages including:

- proximity and existing road access to both future urban expansion areas and the Port Macquarie township;
- land area behind the existing western boat ramp for trailer manoeuvring;
- nearest residential dwelling is over 200m away from the ramp site;
- availability of a shoreline area and adjacent reserve for establishment of a beaching area (noted to be attractive for water skiers above);
- existing cleared sections in riparian vegetation, which facilitates water access from land and minimises the clearing of vegetation required for the development proposal;
- large area of cleared farmland located landward of the ramp site (requires land acquisition);
- suitable launching depths available at a reasonable distance from the shoreline;
- adjacent waterway area is favourable for water skiing due to its position away from popular areas for passive recreation and oyster leases around the Hibbard and Settlement Point area;
- position on the inside of the river bend where lower flow velocities and reduced likelihood of physical impact on structures (e.g. pontoons) by flood debris occur; and,
- position near the confluence with the Maria River to provide ready access to popular areas for recreational fishing, including mud crabbing up the Maria River.

Other sites that were considered included the Blackmans Point boat ramp. However, there are a number of disadvantages associated with development of this site including:

- location on the northern side of the Hastings River requires additional travel to cross the river via the Pacific Highway Bridge and is further away from future urban expansion areas and the Port Macquarie township;
- close proximity of residential dwellings;
- existing bank erosion issues at Blackmans Point and site of existing mangrove restoration activities;
- exposure of the site to significant wind fetches from the west south west and south east;
- land area behind the boat ramp site is under an existing Aboriginal Land Claim;
- Blackmans Point is the site of historical conflict and has significant Aboriginal heritage value; and,
- position on the outside of the river bend where higher flow velocities and increased likelihood of physical impacts on structures (e.g. pontoons) by flood debris occur.

The Oakes Crescent boat ramp site was not considered to be suitable for development due to the following factors:

- sufficient water depths for boat launching at all tides are not available adjacent to the shoreline;
- close proximity of residential dwellings;
- existing vehicular access is poor and comprises a narrow unsealed accessway that does not accommodate two-way passing;
- shoreline vegetation adjacent to the existing boat ramp includes mapped Endangered Ecological Communities;
- significant works are required to upgrade vehicular access to the site and loss of screening vegetation would have an impact on adjacent residents; and,
ability to provide a ramp manoeuvring area and car and trailer parking is constrained by the presence of residential property on both side of the ramp site.

In addition to development of sites with existing boating facilities, an opportunity has been identified to develop a ‘greenfield’ site located within the reserve area adjacent to the Hibbard Ferry crossing. This would require acquisition of private land (owned by the United Services Union). However, the land parcel is flood prone and within Floodway and Flood Fringe areas (refer Figure 1). As such, it has low private development potential and may be better suited for public recreation facilities. Although the site is positioned in a reach of the Hastings River that is less suitable for water skiing, it has a number of advantages if developed as a regional facility to service other user groups and future demand from urban expansions areas. These advantages include:

- access to suitable water depths for boat launching;
- existing 4 knot zone in the vicinity of the Hibbard Ferry crossing improves navigation safety on approach to the area;
- large adjacent cleared land area for access roads and car parking;
- well developed road linkage provided by Boundary Street and Hastings River Drive;
- development for boating would be in keeping with surrounding boating infrastructure, including swing moorings, jetties, Hibbard Ferry crossing and the Hibbard Slipway & Boat Building Yard; and,
- part of the foreshore is protected with an existing seawall.

Two boat ramp development options have been identified for concept design and further consideration. These are discussed further in Section 5 and are referred to as:

- Option 1 – Fernbank Creek Boat Ramp; and,
- Option 2 – Hibbard Ferry Reserve Boat Ramp.
5 Facility Concept Plans

5.1 Option 1 – Fernbank Creek Boat Ramp

5.1.1 Description of Concept Facility

The initial concept plan for the proposed boat launching facility at Fernbank Creek is shown on Map 3.1 (refer Appendix A).

The proposed boat ramp would be positioned at the site of the existing western ramp structure to take advantage of the manouvring area available between the shoreline and the existing road. The boat ramp would comprise two 4m wide lanes. The ramp crest would be at 1.5m AHD, which is around the level of the surrounding foreshore reserve and is approximately 0.5m above HHWSS (0.917m AHD downstream of Dennis Bridge). The ramp would have a grade of 1V:8H down to a toe level of -1.8m AHD, which is approximately 1m below ISLW (-0.771m AHD downstream of Dennis Bridge). This toe depth is available at a distance of around 30m from the shoreline. The upper portion of the boat ramp would comprise a grooved in situ concrete slab and the lower portion below mean water level would be constructed from precast concrete planks. Partial demolition of the existing ramp slab would be required to prepare the foundation for the new boat ramp and rock protection would be provided around the edges of the ramp to prevent scour from tidal and flood currents.

An on-ramp pontoon would be installed along the upstream side of the ramp to provide a structure for boat holding. To accommodate the footprint of a 1.5m wide pontoon and a 3m width to allow vessel mooring without blocking a launching lane, the overall width of the boat ramp would need to be 12.5m. The pontoon would need to extend beyond the ramp toe to provide a usable berth length at the Design Low Water Level (ISLW) of 1.5 times the length of the design vessel in accordance with the NSW Boat Ramp Facility Guidelines (RMS, 2015).

A formal parking facility could be established immediately opposite the ramp manouvring area. However, this would require acquisition of a parcel of private land and is subject to negotiations with the landowner. A boat launching facility at the site is likely to be implemented in a staged manner following initial construction of the boat ramp. It is proposed that a total of 60 car and trailer parking spaces be provided for consistency with the NSW Boat Ramp Facility Guidelines (RMS, 2015), which recommends approximately 25 to 30 spaces per lane. These would be provided as 60 degree angled spaces with a width of 3m and length of 12.5m in accordance with the Guidelines. Vehicle access throughout the parking area would be one-way with a central accessway provided opposite the boat ramp manouvring area and two exits to Fernbank Creek Road to the west and east. A total of 12 car only spaces would be provided within the facility.

Car parking spaces would be surfaced with asphalt or permeable/plantable pavement (e.g. Driveable Grass) while the trailer bays would be grassed. Grassed areas and permeable paving are preferred to increase water infiltration, reduce runoff and maintain the rural aesthetics of the area. Timber bollards would be installed at the rear of all parking bays to prevent vehicles driving into the adjacent land or across pedestrian footpaths.

Pedestrian access and traffic management would be facilitated by establishment of pedestrian crossings across Fernbank Creek Road on each side of the ramp manouvring area. Signage would be provided to warn approaching vehicles of the presence of reversing trailers and pedestrian movement in the area.

Ancillary amenities that could also be provided include:
- lighting over the ramp manoeuvring area;
- garbage facilities at the boat ramp; and,
- pit toilet and garbage facilities within the parking area.

To the east of the proposed boat ramp, a narrow beach area could be established for use by boats and water skiers. As noted previously, the beach area at McInherney Park was very popular for water skiers prior to the establishment of the buoyed power vessel prohibition area. A similar facility could be created at Fernbank Creek along the 50m length of foreshore area between the proposed ramp and existing eastern ramp. This would require removal of existing vegetation, regrading of the shoreline, and placement of rounded river pebbles to create an attractive gravel beach area for water skiers to beach their boats and transfer skiers. Sheltered picnic tables could be provided within the adjacent reserve area to improve amenity for group and family activity. The existing eastern ramp would be retained to act as a groyne structure to retain the beach material within the embayment created up to the proposed new ramp.

The section of Fernbank Creek Road to the south of the boat ramps is currently a narrow (around 5m wide) unsealed road, which runs along the bank of Fernbank Creek to its intersection with Hastings River Drive. To the south of this intersection Fernbank Creek Road continues to the south as a narrow sealed road to where it insects with the Pacific Highway near Sovereign Hills and Thrumster. To improve the connectivity of the boat ramp facility with urban release areas to the south, Fernbank Creek Road could be sealed and widened to a minimum width of 6m between the proposed ramp and Hastings River Drive. This section of road is also understood to be flood prone and raising of the road could be investigated as part of the works to improve the reliability of southern road access. Any roadworks could be staged as in the meantime less direct access to the facility could be achieved by the route along the Pacific Highway, Hastings River Drive and turning on to the eastern end of Fernbank Creek Road.

The eastern approach along Fernbank Creek Road is also understood to be flood prone and periodically inundated during small flood events and ‘king tides’. Future staging of road improvements could also consider raising of existing low points along the road to prevent nuisance inundation in small flood events (say 1 year ARI). This would improve the reliability of eastern road access from the Hibbard area and Port Macquarie township. The eastern approach along Fernbank Creek is also relatively narrow for vehicle passing at around 4.5m to 5m. Future road improvements should also consider widening to a minimum width of 6m to improve the ease of passing for vehicles with boat trailers (maximum legal trailer width is 2.5m, however larger boats can also overhang).

**5.1.2 Consideration of Environmental Factors**

The land-based portion of the proposed boat ramp development would be partially located within the road reserve, which is Crown Land under the care, control and management of Council. The proposed parking area is also located with private property on the landward side of Fernbank Creek Road. As such, negotiation with the current landowner is required to establish the feasibility of acquiring a portion of land for development purposes. The boat ramp, on-ramp pontoon and gravel beach would be located within the waterway area, which is Crown Land and would require landowners consent and a licence for the use of Crown Land from DPI-Lands.

The land area at the site of the proposed development is currently zoned RU1 Primary Production. Under LEP 2011, RU1 zoning does not currently allow for boating infrastructure development. As such, rezoning of foreshore land to an appropriate zoning, such as RE1 Public Recreation, would be required as part of the boat launching ramp proposal. It is understood from discussions with Council that purchase of private property and rezoning for this type of activity is feasible and that Council has numerous such proposals in the pipeline at any one time.
According to flood study mapping (PBP, 2006), the site of the proposed development is located within a Floodway area. As such, the Port Macquarie-Hastings Council Flood Policy (PMHC, 2015b) would apply to any boat launching ramp proposal. Council’s Flood Policy notes that development within Floodway areas is generally not supported, however it is noted that there may be circumstances in which certain types of limited or Minor Development could proceed, subject to a range of considerations. Relevant development controls that would apply to boat launching ramp facilities (including car parking areas) sited within Floodway areas include:

- carparks will generally not be supported within Floodways, however Council may consider temporary carparks constructed with a gravel surface, appropriate signage is to be installed to warn the public or potential flood risk associated with using the carpark;
- filling of land within Floodways will not be supported, unless a Flood Impact Assessment can demonstrate minimal impact on peak flood levels and velocities over a full range of flood events up to the 200 year ARI flood;
- continuous fencing (e.g. paling, colourbond) is not permissible, open type fencing is acceptable;
- special purpose facilities may be considered in Floodway areas if they cannot be feasibility located elsewhere, and the following relevant requirements need to be met:
  - development sited so that it will not restrict/block the flow of flood waters; and,
  - floor level must be above the 20 year ARI flood level (refer Section 3.2.4), however if it can be demonstrated that a lower operational floor level is required, this must be no less than 1.2m AHD.

The construction of the boat ramp and adjacent gravel beach area would require removal of existing riparian vegetation. However, there are no mapped endangered ecological communities (EECs) in the vicinity of the site. It is considered that the loss of riparian vegetation could be offset by the establishment of compensatory habitat elsewhere along the Hastings River. A potential example of this could be the planting of mangroves behind protective rock berms in a similar manner to mangrove restoration works undertaken at Blackmans Point.

The footprint of the proposed boat ramp and adjacent gravel beach area does not appear to be located within any significant beds of seagrass according to available mapping (DPI, 2005). However, Zostera seagrass beds are mapped in the nearshore areas upstream and downstream of the boat ramp site and it is possible that an updated ecology survey would identify seagrass in the development area. Any proposals that involve disturbance or removal of marine vegetation, or activities involving dredging and reclamation work, would require a permit from DPI Fisheries in accordance with the Fisheries Management Act 1994 (FM Act).

Boating activity in the vicinity of the boat ramp site is likely to result in the riverbank being subjected to increased energy from boat wake waves, particularly as boats decelerate and come ‘off the plane’ on approach to the boat ramp or gravel beach area. The construction of the gravel beach would provide riverbank protection on the downstream side of the boat ramp. The riverbank on the upstream side of the boat ramp at the entrance to Fernbank Creek would require rock protection to be applied, although the presence of the on-ramp pontoon would assist in attenuating boat wake energy from certain approach angles.

The construction of the parking area would require consideration of stormwater management and water quality requirements associated with discharge of stormwater into the Hastings River. Surfacing the area with asphalt would necessitate the provision of a formalised drainage system of inlet pits, pipes and some form of water treatment prior to discharge into the Hastings River. The use of permeable paving would reduce stormwater runoff discharge by facilitating infiltration and can improve water quality by the filtering
action of porous subsurface material (e.g. sand/gravel). Permeable paving would also maintain the rural aesthetics of the area surrounding the development site.

There is an existing residential dwelling on the private property on the landward side of Fernbank Creek Road. This dwelling is positioned around 160m landward of the road and around 150m from the footprint of the proposed parking area. Potential impacts on these residents could include decreased visual amenity and increased noise from operation of the boat ramp. The visual amenity of the parking facility could be improved by the use of permeable paving and installation of landscaping features, including planting of screening vegetation around the landward perimeter of the facility. Noise impacts could be reduced by discouraging night time use by minimising lighting or restricting operational hours by the use of locked gates. A vegetation screen would also reduce noise transmission. Gating of the parking area may also be necessary to prevent anti-social behaviour (e.g. car burnouts) at night time due to the remote location of the site and lack of passive surveillance. Signage could also be erected at the boat ramp and parking area advising users of the proximity of residents and to minimise noise.

5.2 Option 2 – Hibbard Ferry Reserve Boat Ramp

5.2.1 Description of Concept Facility

The initial concept plan for the proposed boat launching facility at the Hibbard Ferry reserve is shown on Map 4.1 (refer Appendix A).

The proposed boat ramp would be positioned on the western side of the reserve to minimise conflict with existing structures on the eastern side of the reserve, which include a dinghy launching ramp, timber jetty/wharf and the Hibbard Ferry ramp and crossing. The boat ramp would comprise two 4.5m wide lanes with a central 1.5m wide on-ramp pontoon for boat holding, resulting in an overall ramp width of 10.5m. The pontoon would need to extend beyond the ramp toe to provide a usable berth length at the Design Low Water Level (ISLW) of 1.5 times the length of the design vessel in accordance with the NSW Boat Ramp Facility Guidelines (RMS, 2015).

The ramp crest would be at 1.5m AHD, which is around the level of the surrounding foreshore reserve and is approximately 0.5m above HHWSS (0.849m AHD at Settlement Point). The ramp would have a grade of 1V:9H down to a toe level of -1.8m AHD, which is approximately 1m below ISLW (-0.747m AHD at Settlement Point). A ramp grade corresponding to the flatter limit of the recommended range of 1V:9H to 1V:7H has been adopted to extend the ramp further offshore to maximise available natural water depths. However, the proposed 30m long ramp would terminate below the natural bed level, which is around 1.0m AHD at the proposed toe location. As such, installation and navigation access to the ramp would need to be established by dredging of a channel out to the location of the -1.8m AHD contour (as a minimum), which is located approximately 65m offshore from the crest of the proposed ramp.

The upper portion of the boat ramp would comprise a grooved in situ concrete slab and the lower portion below mean water level would be constructed from precast concrete planks. Rock protection would be provided around the edges of the ramp to prevent scour from tidal and flood currents. However, rock protection would not be provided alongside the lower section of the ramp that is depressed below the natural bed level (within the dredged channel area) as this may be problematic for any future maintenance dredging activities.

Access to the boat ramp would be provided via a two-way accessway from the southern end of Boundary Street. The entry to the boat ramp accessway has been positioned immediately to the north of the existing dwellings in the south-eastern corner of the block. This would minimise the potential for vehicles blocking the entry/exit point if they are queuing for the car ferry along Boundary Street during peak times.
Access to the entry/exit point would also be maintained by establishing a ‘keep clear’ zone with linemarking on the adjacent area of Boundary Street.

An option exists to install another exit along the proposed accessway that runs alongside Hastings River Drive. This would be a left hand turn only exit and may reduce traffic along Boundary Street, as boaters travelling eastbound to the Port Macquarie township would use this as a more convenient exit point. Boaters travelling westbound would use the exit on Boundary Street and the existing traffic lights at the intersection would facilitate a controlled right hand turn on to Hastings River Drive.

One-way traffic would be maintained within the proposed parking facility to improve traffic flow. Give way signage and linemarking would be installed at the intersection of internal one-way accessways with the main entry/exit accessway to give priority to vehicles entering the facility and approaching the ramp.

A total of 57 car and trailer parking spaces would be provided within the facility, which is consistent with the recommendation of 25 to 30 spaces per lane in the *NSW Boat Ramp Facility Guidelines* (RMS, 2015). These would be provided as 45 degree angled spaces with a width of 3m and length of 12.5m in accordance with the Guidelines. A total of 14 car only spaces would be provided within the facility. Two designated disabled car only parking spaces, positioned close to the ramp and toilet facilities, would also be provided.

Car parking spaces would be surfaced with asphalt, while the trailer bays would be grassed. Grassed areas are preferred to increase water infiltration, reduce runoff and maintain the aesthetics of the area.

Rigging and de-rigging bays would be positioned alongside the boat ramp approach and exit accessways. Rigging and de-rigging bays improve the amenity of the boat ramp by providing off-road space for vehicles waiting to use the ramp and reducing congestion in the manoeuvring area.

Ancillary amenities that could also be provided include:

- lighting over the ramp manoeuvring area;
- fish cleaning table on the foreshore adjacent to the boat ramp;
- garbage facilities at the boat ramp;
- wash down facilities at the de-rigging bay; and,
- toilet block and garbage facilities within the parking area.

### 5.2.2 Consideration of Environmental Factors

The land-based portion of the proposed boat ramp development would be located on private land owned by the United Services Union. As such, negotiation with the current landowner is required to establish the feasibility of acquiring a portion of land for development purposes. The boat ramp and on-ramp pontoon would be located within the waterway area, which is Crown Land and would require landowners consent and a licence for the use of Crown Land from DPI-Lands.

The land area at the site of the proposed development is currently zoned SP3 Tourist. Under LEP 2011, SP3 zoning has the objective to “provide for a variety of tourist-orientated development and related uses” and permits the following types of boating-related development with consent:

- charter and tourism boating facilities;
- marinas;
As such, it is considered that the proposed boat ramp facility would be consistent with the current land zoning.

According to flood study mapping (PBP, 2006), the site of the proposed development is located within Floodway and Flood Fringe areas. As such, the Port Macquarie-Hastings Council Flood Policy (PMHC, 2015b) would apply to any boat launching facility proposal. As outlined for the Fernbank Creek proposal, development within Floodway areas is generally not supported, however it is noted that there may be circumstances in which certain types of limited or Minor Development could proceed, subject to a range of considerations and development controls. Most of the land-based portion of the proposed boat ramp development is located within a Flood Fringe area, which are generally locations (within the 100 year flood extent) which will have little effect on the downstream conveyance of floodwaters and in which filling will result in no measurable impact on peak flood levels. Council’s Flood Policy notes that car parks and carparking are permissible in Flood Fringe areas as is filling and installation of continuous or open type fencing. Public amenities blocks must have floor levels at or above the 20 year ARI flood level (refer Section 3.2.4).

Boating activity in the vicinity of the boat ramp site is likely to result in the riverbank being subjected to increased energy from boat wash, particularly as boats decelerate and come ‘off the plane’ on approach to the boat ramp. However, the adjacent foreshore areas are protected with an existing blockwork retaining wall (western side) or rock protection (eastern side) and are unlikely to be impacted. It is noted that the hard foreshore in the vicinity of the ramp location prevents beaching of boats and use of the foreshore reserve as a base for picnicking and water-based activities (e.g. water skiing).

As noted above, water depths within the embayment are limited and are likely to require dredging of a channel to facilitate installation of the ramp and safe launching/retrieval of vessels at all states of the tide. It has been reported that Maritime Museum vessels moored at the jetty/wharf on the upstream side of the Hibbard Ferry crossing have less than 1m water depth at low tide. The dredged channel is likely to be subject to sedimentation and require periodic maintenance dredging.

The proposed boat ramp is positioned on the outside of the river bend where higher flow velocities occur and there is an increased likelihood of physical impacts on structures (e.g. pontoons) by flood debris.

The construction of the parking area would require consideration of stormwater management and water quality requirements associated with discharge of stormwater into the Hastings River. Surfacing the area with asphalt would necessitate the provision of a formalised drainage system of inlet pits, pipes and some form of water treatment prior to discharge into the Hastings River.

Removal of mature trees within the area would be minimised by the proposed layout of the parking facility. There is no existing riparian vegetation in the vicinity of the proposed boat ramp location. However, significant beds of Zostera seagrass exist in the embayment and would be impacted by the construction of the ramp, dredging and increased boating traffic. Any proposal that involves disturbance or removal of marine vegetation, or activities involving dredging and reclamation work, would require a permit from DPI Fisheries in accordance with the Fisheries Management Act 1994 (FM Act).

The proposed ramp is positioned within 100m of the Hibbard Ferry crossing. In accordance with boating restrictions noted on the RMS Boating Map for the area, “a speed limit of 4 knots must be observed when within 100 metres of any dredge, floating plant, ferry or punt working with chains and wires”. As such,
boats launching and retrieving at the ramp would be required to adhere to a 4 knot speed limit which would reduce the impacts of boat wash in the immediate vicinity of the ramp. This speed limitation would need to be clearly signposted at the ramp.

Immediately upstream of the proposed boat ramp location, active oyster leases exist on both sides of the river. These include floating raft structures that would be sensitive to boat wash caused by an increase in boating activity. Increased boating activity in this reach of the river may also have an impact on Riverside residents as vessels launching from the ramp travel upstream to access the Maria River or water ski in the river reach between Blackmans Point and the Dennis Bridge. As noted in Section 4.4.3, boat wash complaints from Riverside residents have previously been received as the area has a number of boats moored alongside jetty and pontoon structures. The amenity of Riverside residents may also be adversely affected by the noise impacts associated with increased boating traffic. The area is currently subject to a low level of ambient noise due to its position away from the popular recreational boating areas further downstream at Hibbard and Settlement Point.

A number of swing moorings are located along the approach to the proposed boat ramp. A small number of these private moorings would need to be relocated to provide safe navigation access from the ramp to the open waterway. Mooring licencees may also be concerned about increased boat wash and navigation of boat traffic to and from the boat ramp in close quarters to moored vessels and mooring apparatus.

The dilapidated wharf structure located on the downstream side of the proposed boat ramp may also be considered for removal, subject to discussions with the owner.

Development of the site would require consultation with a wide range of stakeholders including adjacent business owners, surrounding residents, aquaculture industry workers, mooring licencees and the Hibbard Ferry operator.

5.3 Summary of Consultation Feedback
To be completed following consultation.

5.4 Final Concept Plan
To be completed following consultation and selection of preferred site.

5.5 Estimate of Cost
To be completed following consultation and selection of preferred site.
6 References


NSW Department of Planning & Environment (2016), *Draft North Coast Regional Plan*, March.

NSW Maritime (2010), *NSW Boat Ownership and Storage: Growth Forecasts to 2026*, July.


Appendix A: Maps
Appendix B: Stakeholder Engagement Plan
Appendix C: Stakeholder Meeting Minutes
Appendix D: Cost Estimate