

Russell Island, Rocky Point

Feasibility for barge/boat ramp

Prepared by Boating Infrastructure Unit – February 2019

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Executive summary

- The Rocky Point site is, through its natural attributes (in particular the rocky nature of the off-lying seabed), unsuited to the economic establishment of a barge/boat ramp.

Assumptions and terminology explanations

- A mid-sized barge, like those servicing the Southern Moreton Bay Islands, is assumed – that is, one having a hull length of about 37 metres and draught of about 1.6 metres. Note that barges operating in Moreton Bay range in length up to 68 metres with 2.0 metres draught.
- An acceptable slope for a barge/boat ramp is 1 in 8.
- The toe of a barge/boat ramp would be 0.9 metre below the level of Lowest Astronomical Tide (LAT, low water, or chart datum). This level equates to -2.0 metres on the datum of the attached survey (**Attachment 1**) – Australian Height Datum (AHD). AHD equates approximately to Mean Sea Level. For comparison, boat ramps are commonly constructed to 0.5 metre below LAT.
- On the face of the attached hydrographic survey (**Attachment 1**) a table is provided to show the relationships between datums. In particular, note that LAT is 1.1 metre below AHD – that is, the AHD depths need to be corrected by 1.1 metres for LAT depths.
- The top of a barge/boat ramp is assumed to be 0.5 metre above the level of Highest Astronomical Tide (HAT). 0.5m above HAT is the reference standard for construction of Transport and Main Roads (TMR) car-trailer parks. This level equates to +2.03 metres on the datum (AHD) of the attached survey (**Attachment 1**).
- The draught of a barge is assumed to be maximum towards its stern, and the draught forward is assumed to be less – therefore requiring less depth of water at the ramp toe than the barge’s maximum draught.
- Barges are assumed to require either clear/deep water off a ramp (like the High Street Russell Island barge ramp site), or a manoeuvring basin equating to approximately twice their length to safely go astern, swing, and otherwise manoeuvre the barge safely at low tide and in strong wind conditions without risking grounding.

- The master of a barge of 1.6 metre draught is assumed to require a minimum of 0.5 metre under keel clearance (UKC) to operate safely, noting the rocky nature of the seabed off Rocky Point. This is 2.1 metres (1.6 + 0.5) below the level of LAT. This equates to a depth on the datum (AHD) of the attached survey (**Attachment 1**) of 3.2 metres (2.1 + 1.1). An access channel and swing basin of minimum 2.1 metres depth below LAT (3.2 metres below AHD) are therefore assumed to be needed.
- An access channel for a 37 metres barge is assumed to need a minimum of 35 metres width for safe navigation. For comparison, the entrance channel to Manly Boat Harbour is 50 metres wide.
- Such an access channel would need to be marked by navigation aids at its outer and inner ends, as would the limits of any swing basin near the barge/boat ramp.
- A barge/boat ramp would require a suitable parking/waiting and vehicle manoeuvring area near the top of the ramp. Such an area would need to be constructed to sufficient load bearing capacity to withstand use by barge loads – for instance, trucks, semi-trailers, fire engines, 4WD wagons towing boats up to 9 metres. The reference standard for TMR two-lanes ramps is a manoeuvring area plus parking for 45 car-trailer units, and for single-lane ramps a manoeuvring area plus parking for 15 car-trailer units. A single-lane ramp with 15 car-trailer unit parking spaces plus manoeuvring/waiting area is assumed for this assessment.
- The access road to the barge/boat ramp would need to be built to a construction standard, and width, suitable for the above-mentioned traffic loads and areas. Councils provide such land-side facilities and infrastructure.

Assessment

- A hydrographic survey (**Attachment 1**) has been provided by TMR to facilitate this feasibility study. The attached survey is in PDF format and may be zoomed in to examine detail.
- On the next page is **Figure 1** – an annotated extract from the hydrographic survey. A scale is shown at the bottom. Annotations include:
 - a green line marking the limits of barge navigable depths (2.1 metre LAT, equals 3.2m AHD)
 - pink cross-hatching to emphasise the limits of the green line navigable areas – an isolated basin near Rocky Point – and the deeper waters of the north-south channel off-lying and west of Russell Island
 - a yellow line onshore at Rocky Point, marking 0.5 metre above HAT (2.03 metre above AHD)
 - a yellow line to mark the toe of a potential barge/boat ramp – at 0.9 metre below LAT (2.0 metres below AHD)
 - a blue 37-metre-length barge to assist with perception of scale
 - blue lines showing a 35-metre-wide access channel needed to be dredged/excavated to connect the deeper waters offshore to the swing basin near the toe of the barge/boat ramp
 - more blue lines to show the approximate limits of a dredged/excavated swing basin, noting that the central part of the swing basin is already deeper than 2.1 metres LAT
 - a black barge ramp of approximate width 5 metres and approximate length 34 metres.

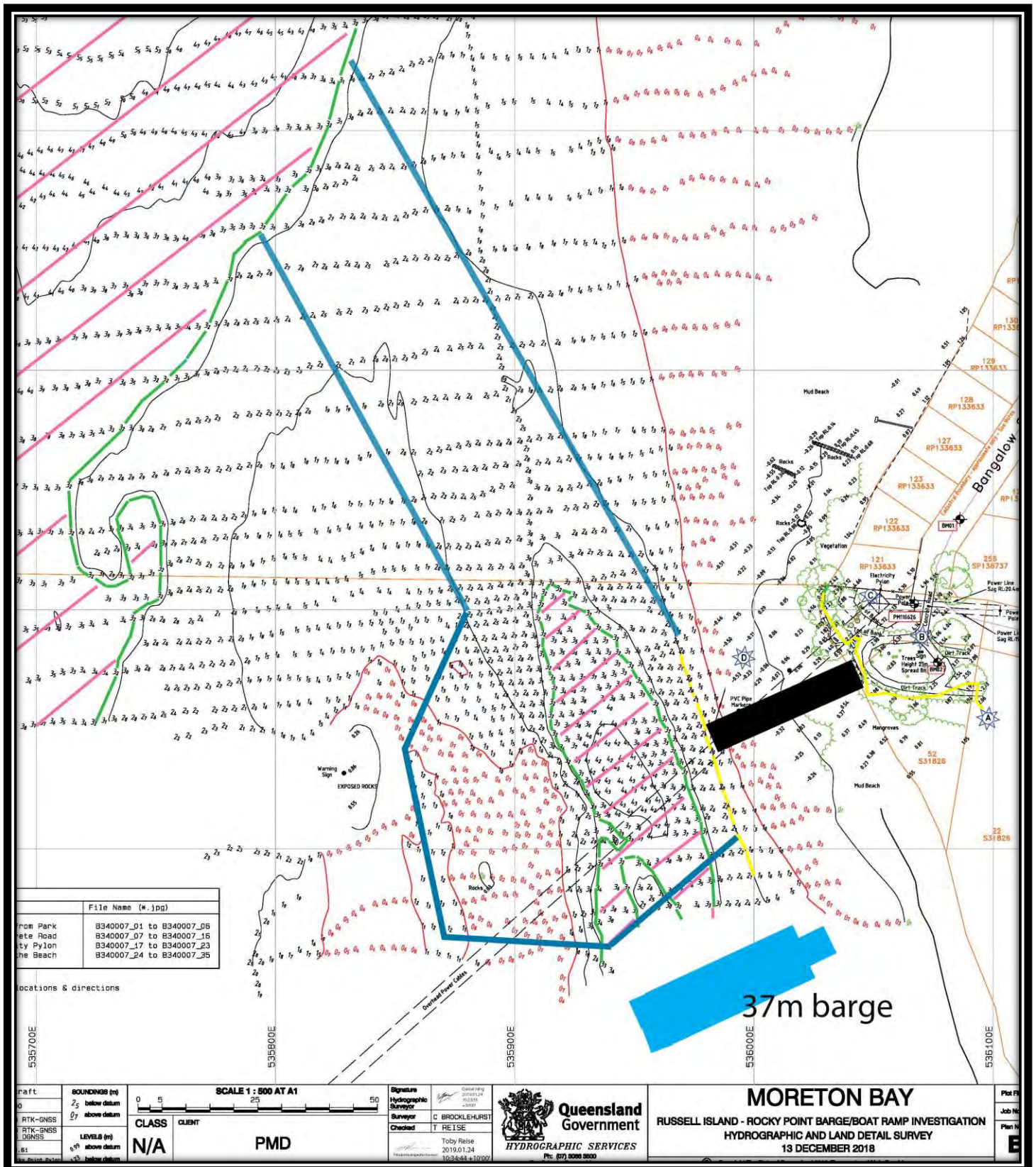


Figure 1

- The distance between the two yellow lines is approximately 34 metres. With the upper line (car-park) at 2.03 metres above AHD and the ramp toe 2.0 metres below AHD, the average slope of the foreshore is 1 in 8.4 (34/4.03). This indicates a barge/boat ramp of slope 1:8 could be constructed in the position shown.

- The natural basin out from the toe of the barge/boat ramp, shown edged green and cross-hatched pink in Figure 1, is insufficient to safely float a barge of 37 metres length with an adequate safety margin astern. Nor is the natural basin adequate for a 37-metre barge to safely navigate to and swing onto the barge/boat ramp on arrival. Nor is the natural basin sufficiently adequate in size for a 37-metre barge to retract astern and swing safely on departure, particularly in strong wind conditions.
- There is an extensive area of hard (rocky) seabed material within the swing basin – shown in red soundings and by “rocks” annotation. This is consistent with the site being named Rocky Point.
- A 35-metre-wide access channel would need to be dredged in part (soft material) and excavated in part (hard/rocky material).
- Initial capital dredging/excavation would need to be followed by periodic maintenance dredging into the long-term future. This is because sedimentation would occur through nature responding to man-made intervention by returning the seabed to its natural state. This is the reason for all dredged areas (including ports) requiring periodic maintenance dredging.
- Six navigation aids would need to be established to mark the entrance channel and limits of the swing basin.
- Rocky Point is exposed, especially at high tides, to a considerable fetch (distance over water the wind can blow to increase wave heights). This is particularly so for strong north-westerly, westerly, and south-westerly winds.
- Reports of the site being used for access by smaller trading vessels (like the historic ‘Dawn’) appear reasonable, as such vessels are/were of much shallower draught, beam and length compared to mid-sized barges.

Conclusion

- The Rocky Point site is, by its natural attributes (in particular the rocky nature of the off-lying seabed), unsuited to the economic establishment of a barge/boat ramp.
- The site is potentially suitable for establishment of a jetty with fixed stage landings. It would not be wheelchair accessible. Its use would be limited to times when strong winds were not blowing from the north-west, west, or south-west.
- The site is unsuitable for a pontoon, owing to exposure to wave action, unless it were a major jetty/pontoon structure like the multi-million dollar ferry terminal at Coochiemudlo Island.

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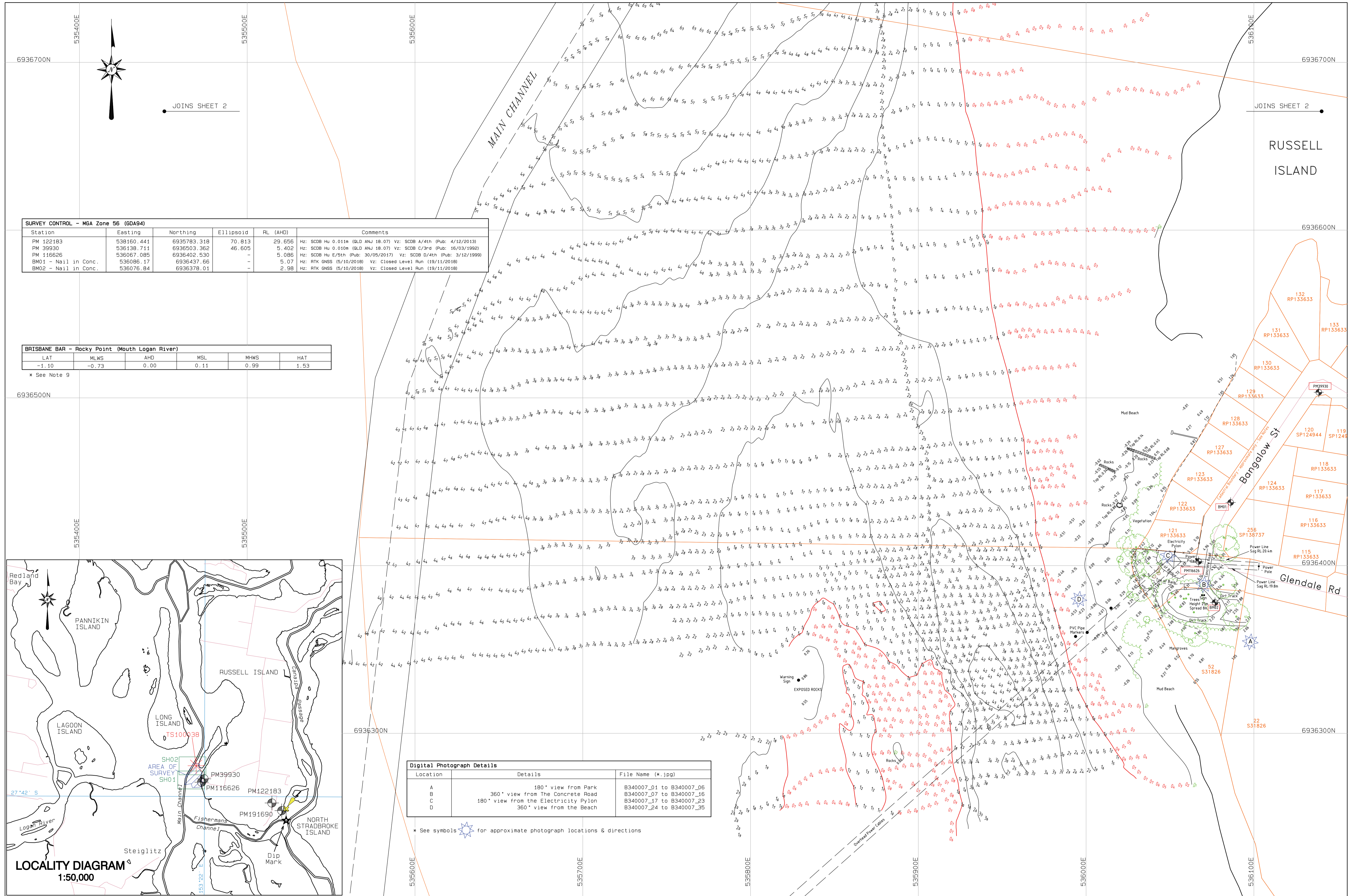
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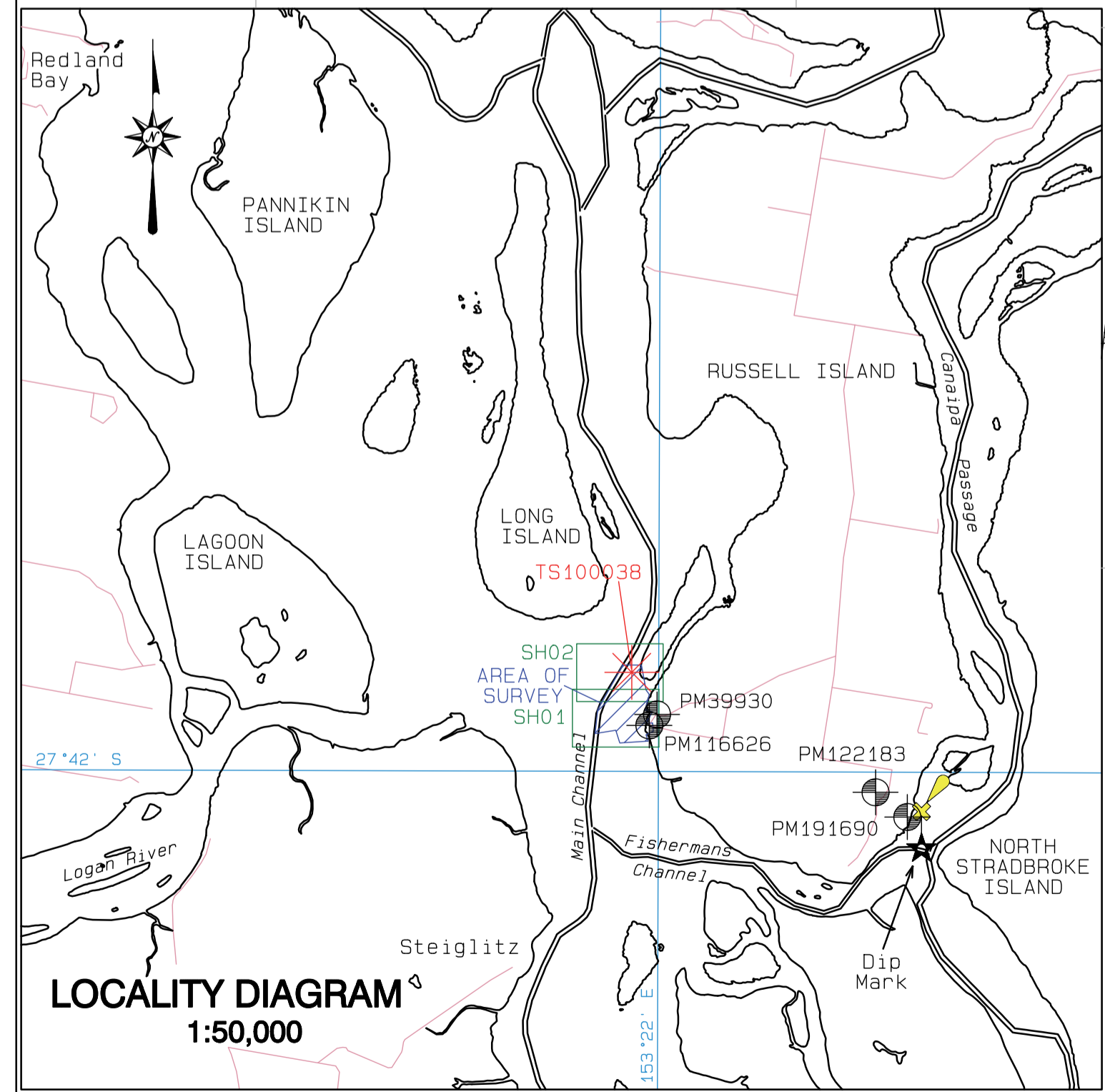
SURVEY CONTROL - MGA Zone 56 (GDA94)

Station	Easting	Northing	Ellipsoid	RL (AHD)	Comments
PM 122183	536160.441	6935783.318	70.813	29.656	HZ: SCDB Hu 0.011m (GLD ANJ 18.07) VZ: SCDB A/4th (Pub: 4/12/2013)
PM 39930	536138.711	6936503.362	46.605	5.402	HZ: SCDB Hu 0.010m (GLD ANJ 18.07) VZ: SCDB C/3rd (Pub: 16/03/1992)
PM 116626	536067.085	6936402.530	-	5.086	HZ: SCDB Hu E/5th (Pub: 30/05/2017) VZ: SCDB D/4th (Pub: 3/12/1999)
BM01 - Nail in Conc.	536086.17	6936437.66	-	5.07	HZ: RTK GNSS (5/10/2018) VZ: Closed Level Run (19/11/2018)
BM02 - Nail in Conc.	536076.84	6936378.01	-	2.98	HZ: RTK GNSS (5/10/2018) VZ: Closed Level Run (19/11/2018)

BRISBANE BAR - Rocky Point (Mouth Logan River)

LAT	MLWS	AHD	MSL	MHS	HAT
-1.10	-0.73	0.00	0.11	0.99	1.53

* See Note 9



Digital Photograph Details

Location	Details	File Name (*.jpg)
A	180° view from Park	B340007_01 to B340007_06
B	360° view from The Concrete Road	B340007_07 to B340007_16
C	180° view from the Electricity Pylon	B340007_17 to B340007_23
D	360° view from the Beach	B340007_24 to B340007_35

* See symbols for approximate photograph locations & directions

NOTES:

- Contours are computer generated to Hydrographic Standard (inclusive)
- Soundings coloured to -1m AHD for clearance purposes
- Classline digitised from aerial photography, it approximate only
- RTK-GNSS and SmartNetAus differential corrections used for horizontal and vertical positioning
- Position and height check performed over PM 122183 (4/12/2013)
- Ellipsoid to AHD separation value of 41.153 was used, based on the Ellipsoid to AHD value from PM122183 form 0 (GLD ANJ 18.07)
- Water level checks carried out from a dip mark on the Special Marker Beach.
- Capestral Boundaries are taken from the (Spatial) digital cadastre database and are indicative only and are not to be used for the purposes of reinstatement.
- Consult a licensed surveyor for actual property boundaries
- The semi-diurnal, tidal plane for Logan River - Rocky Point (Mouth Logan River) was taken from "Queensland Tide Tables 2018".

Horizontal Datum	MGA Zone 56 (GDA94)	Vessel	Boab Polycraft	SOUNDINGS (m)	0 5 25 50	SCALE 1 : 500 AT A1	Signature	Queensland Government	MORETON BAY	Plot File: B340007P1.PDF
Base Station	SmartNetAus RTK-GNSS Corrections (MAC Solution)	Echo Sounder	CEESCOPE 100	2.5 below datum			Hydrographic Surveyor	Hydrographic Services	RUSSELL ISLAND - ROCKY POINT BARGE/BOAT RAMP INVESTIGATION	Job No.: MS02003B
Vertical Datum	AHD based on PM 122183 (RL 29.656m)	Heave/trimmer	Novate1 628 RTK-GNSS	0.7 above datum			Surveyor	HYDROGRAPHIC AND LAND DETAIL SURVEY	13 DECEMBER 2018	Plan No.:
Tide Notes		Horizontal Positioning	Novate1 628 RTK-GNSS SmartNetAus DGNS	LEVELS (m)	CLASS	CLIENT	Checked	HYDROGRAPHIC SERVICES	SHEET 1 OF 2	
		Data Collection/Processing	HYPACK 2017 Terramove1 10.61	0.9 above datum	N/A	PMD	T REISE	Hydrographic Services		
Depth Tolerance	0.2m	Horizontal Tolerance	1.5m	0.3 below datum				Hydrographic Services		
Weather	10-15 knots SE	Tidal Reference Station	TS 0010196 - Rocky Point Pylon St Stradbroke Island					Hydrographic Services		

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