



Fraser Coast Coastal Hazard Adaptation Strategy (CHAS)

Coastal Futures: Planning Our Changing Coastline

Phase 3 – Erosion Prone Area Refinement Technical
Memorandum

Reference: M.B23628.002.02
Date: November 2019
Confidential



Queensland
Government





BMT Commercial Australia Pty Ltd
Level 8, 200 Creek Street
Brisbane Qld 4000
Australia
PO Box 203, Spring Hill 4004

Tel: +61 7 3831 6744
Fax: + 61 7 3832 3627

ABN 54 010 830 421

www.bmt.org

Technical Memorandum

From: Katrina O'Malley-Jones & Matthew Barnes To: Jasmine Butler
Date: 8 November 2019 CC: Cameron Sonter
Subject: Coastal Hazard Mapping Used for FCRC CHAS Asset Assessment

Dear Jasmine,

The purpose of this memorandum is to document the coastal erosion hazard mapping layers to be used in the assessment of impacted assets for the Coastal Futures project.

The mapping has leveraged outputs produced for the Shoreline Erosion Management Plan (Cardno 2012) with refinements to align with:

- The objectives of the Coastal Futures projects;
- The requirements of the QCoast₂₁₀₀ Minimum Standards and Guidelines; and
- The State's approach to defining the Erosion Prone Area.

The potentially vulnerable hazard extent for the entire local government area for the present-day (2019 to 2030), 2050 and 2100 planning horizons has been produced.

This updated memorandum also addresses comments and clarifications requested by DES

I look forward to discussing this work with you. Please don't hesitate to contact me if you have any initial questions or concerns.

Yours Faithfully

Dr Matthew Barnes
Principal, Coastal Team Leader
BMT

1 Erosion Prone Area Summary

1.1 Existing Erosion Prone Area Mapping

Mapping of the erosion prone area (EPA) was prepared as part of the Fraser Coast Shoreline Erosion Management Options Assessment (Cardno, 2012), the so-called SEMP project. This mapping covered the open coast from Burrum Heads to Urangan, and developed areas along Great Sandy Strait, specifically:

- Urangan to River Heads
- Maaroom
- Boonooroo
- Tuan
- Poona
- Tinnanbar.

The SEMP report states that the EPA's were based on the State's published open coast erosion prone areas for the year 2100 planning horizon. Mapping for intermediate planning horizons (namely present day to 2030, 2050 and 2070) was derived from the State layers, with appropriate adjustments for erosion due to long term processes and sea level rise. On the Great Sandy Strait coastline, a default distance of 40 m landward of present-day HAT was used. HAT was increased by an appropriate allowance for sea level rise for each planning horizon.

No assessment or mapping of erosion prone areas was undertaken for Fraser Island or other estuarine areas (including tidal waterways and undeveloped areas along Great Sandy Strait).

Examination of the erosion mapping layers developed for the SEMP identifies that while the open coast 2100 extent is consistent with the State definition, it significantly overestimates the erosion extent within Great Sandy Strait, and does not align with the stated methodology of 40 m landward of HAT for the planning horizons of interest. For example, Figure 1 shows that on the Great Sandy Strait frontage of Urangan, the SEMP 2100 EPA is nearly 50 m landward of the State 2100 EPA.

We are of the opinion that the EPA mapping for Great Sandy Strait developed for the SEMP is inconsistent with the State definition. This issue and proposed solution are discussed further below.



Figure 1 Example erosion prone area mapping, Urangan

1.1.1 Erosion Prone Area Definition

The general approach adopted for QCoast₂₁₀₀-funded CHAS projects is to determine erosion prone areas in accordance with the DEHP (2013)¹ definition, where the erosion prone area along the coast is the greater of:

- (1) The calculated open coast erosion area;
- (2) The nominated buffer distance inland of the line of highest astronomical tide (HAT) (wave action/tidal flow erosion buffer); and
- (3) The plan position of projected sea level rise above the elevation of HAT (sea level rise erosion).

In estuarine areas, the erosion prone area has been determined as being the greater of:

- (1) The nominated buffer distance inland of the line of highest astronomical tide (HAT) (wave action/tidal flow erosion buffer); and
- (2) The plan position of projected sea level rise above the elevation of HAT (sea level rise erosion).

For the Coastal Futures project, the allowances adopted for the buffer distance and sea level rise at the various planning horizons is set out in Table 1.

¹ DEHP, 2013. Coastal Hazard Technical Guide: Determining Coastal Hazard Areas.

Table 1 Estuarine Erosion Prone Area Allowances

Allowance	Present day (2019-2030)	2050	2100
Buffer (m)	10	20	40
Sea level rise (m)	0.0	0.3	0.8

1.1.2 Issues with Existing Mapping for the SEMP

The stated SEMP methodology (Cardno, 2012) for the Great Sandy Strait appears to have incorrectly interpreted that allowances for both elements in Table 1 are to be included, rather than adopting the greater extent of the two elements. This presents an overly conservative approach and is inconsistent with the DEHP (2013) definition and approach adopted for other CHAS projects in Queensland.

The SEMP EPA mapping for Great Sandy Strait does not appear to align with either the approach stated in the report (Cardno 2012), or with the State's official 2100 EPA mapping layer, as shown in Figure 1. The SEMP mapping for intervening time periods appears to have been prepared in the same way as the 2100 mapping.

For these reasons, the SEMP mapping for Great Sandy Strait will not be used for the Coastal Futures project, and we will instead adopt new mapping for erosion prone areas for the intermediate (i.e. '2019 to 2030' and 2050) planning horizons that is in accordance with DEHP (2013) for estuarine areas, i.e. for the planning horizons in Table 1 the erosion prone area is the greater of:

- (1) The nominated buffer distance inland of the line of highest astronomical tide (HAT) (wave action/tidal flow erosion buffer); and
- (2) The plan position of projected sea level rise above the elevation of HAT (sea level rise erosion).

The refined EPA mapping will also be adopted for estuarine areas elsewhere within the local government area that are presently unmapped for the intermediate planning horizons, e.g. Mary River, Susan River, Burrum River, local creeks etc.

Mapping for the intermediate planning horizons for the ocean frontage of Fraser Island has also been prepared. The State's open coast calculated 2100 EPA widths were used to complete the understanding of the open coast erosion hazard. For the present day (2019 to 2030) and 2050 planning periods, the contributions in the declared 2100 EPA widths for long-term erosion and sea level rise were reduced to reflect the shortened time periods and corresponding sea level rise allowance respectively. This approach is consistent with the method adopted for the SEMP and the open coast between Burrum Heads and Urangan.

1.2 Sea Level Rise

Sea level rise hazard mapping has been developed for the 2050 and 2100 planning horizons using the allowances set out in Table 1. As discussed above, the hazard area is defined by the plan position of projected sea level rise above the elevation of HAT.

The elevation of HAT throughout the local government area for the present day, 2050 and 2100 planning horizons align with the HAT levels derived in the CHAS Phase 3 storm tide study (BMT & SEA, 2019).

1.3 Erosion Prone Area Mapping

The EPA mapping for the Coastal Futures project is provided in Attachment A. This mapping combines the three components of the State's EPA definition, applied to the State's 2015 and 2009 LiDAR elevation data.

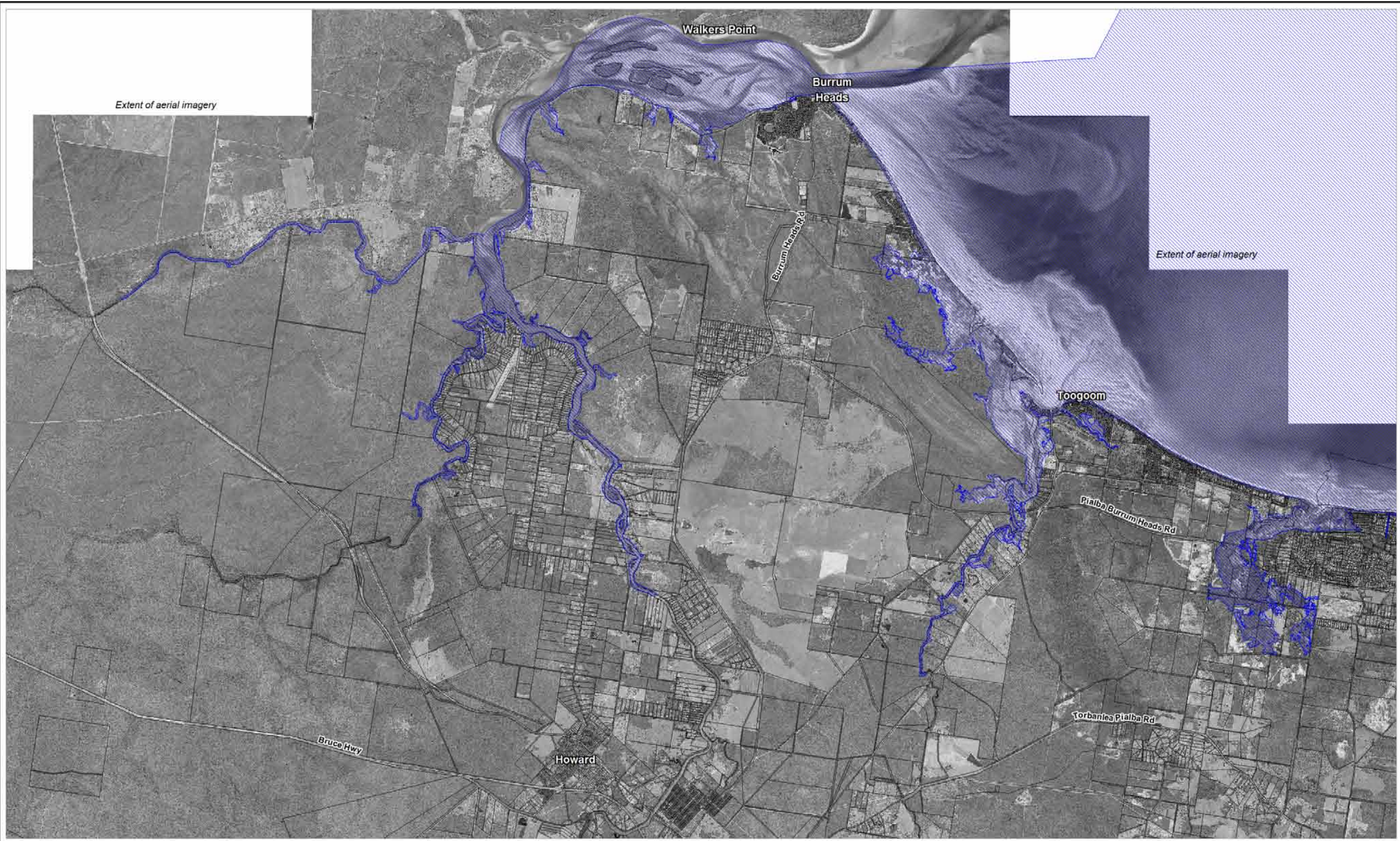
2 References

BMT & SEA (2019). Fraser Coast CHAS Phase 3 – Storm Tide Hazard Assessment and Mapping Technical Report, prepared for Fraser Coast Regional Council.



Cardno (2012). Fraser Coast Shoreline Erosion Management: Management Options Assessment, prepared for Fraser Coast Regional Council.

DEHP (2013) Coastal hazard technical guide, Determining coastal hazard areas, prepared by Environmental Planning, Queensland Department of Environment and Heritage Protection, April 2013.

Attachment A



LEGEND

-  Cadastral Boundaries
-  Erosion Prone Area (all components)

Title:

Erosion Prone Area (all components) Present Day

Figure:

Rev:

A



BMT endeavours to ensure that the information provided in this map is correct at the time of publication. BMT does not warrant, guarantee or make representations regarding the currency and accuracy of information contained in this map.



Filepath: I:\B23628_i_jgc_FCRC_CHAS_Phase3to8_mpb\DRG\COA_130_190920_Zone1_EPA_2019 WOR



LEGEND

-  Cadastral Boundaries
-  Erosion Prone Area (all components)

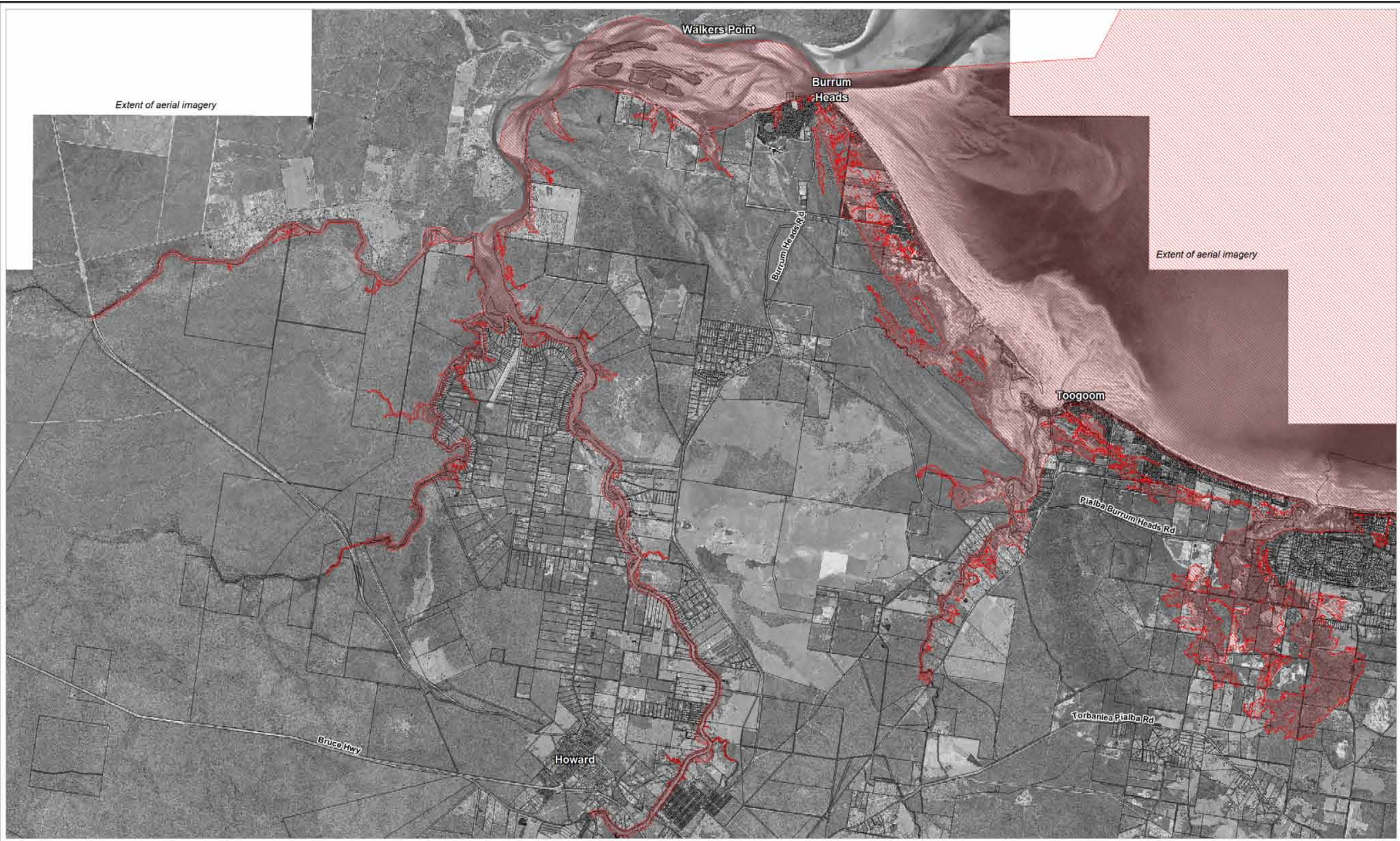
Title:
Erosion Prone Area (all components) 2050



Figure:
B

BMT endeavours to ensure that the information provided in this map is correct at the time of publication. BMT does not warrant, guarantee or make representations regarding the currency and accuracy of information contained in this map.



Filepath: I:\B23628_I_jgc_FCRC_CHAS_Phase3to8_mpb\DRG\COA_134_190920_Zone1_EPA_2050.WOR

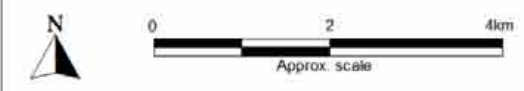


- LEGEND**
-  Cadastral Boundaries
 -  Erosion Prone Area (all components)

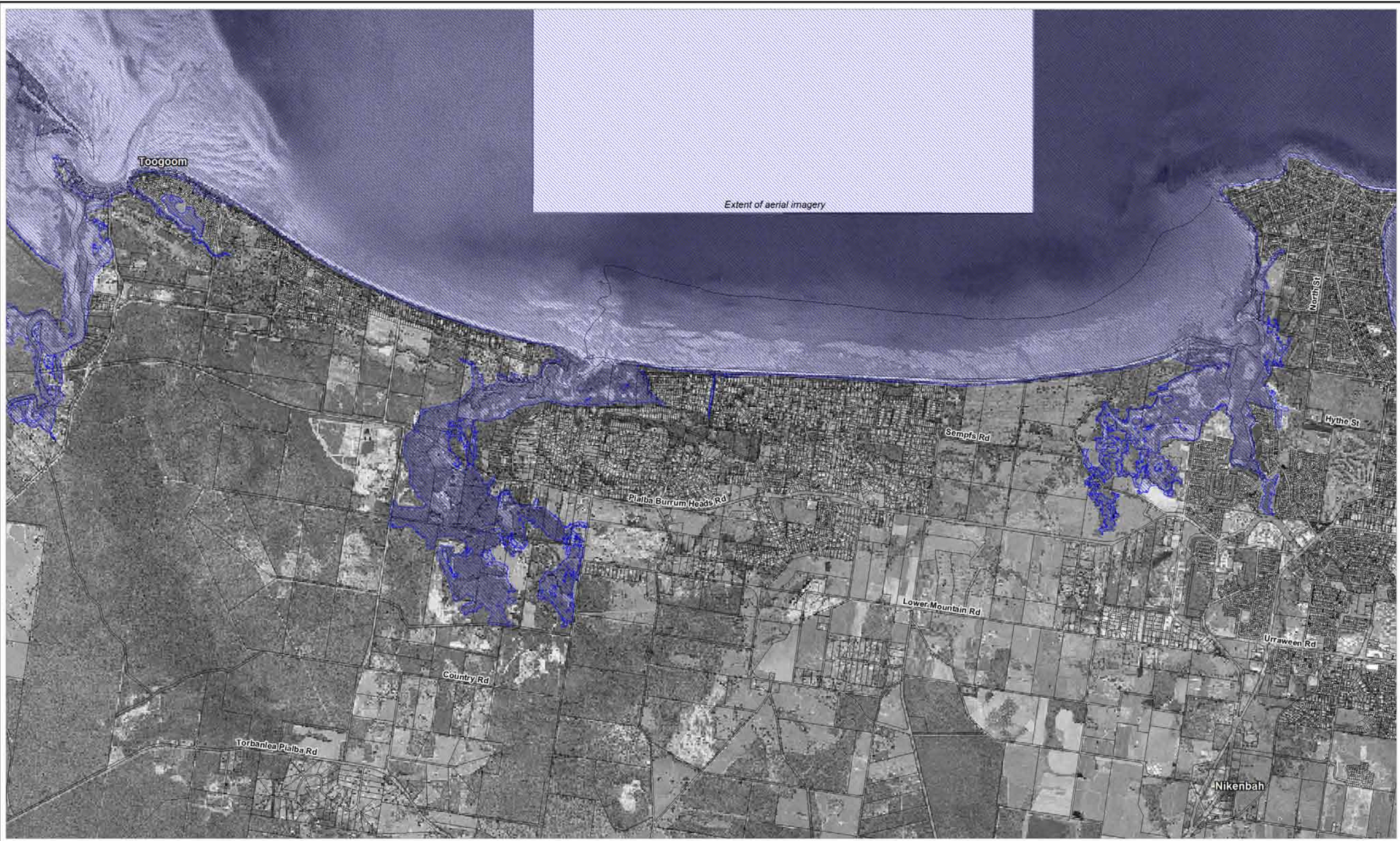
Title:
Erosion Prone Area (all components) 2100

Figure:
B



BMT endeavours to ensure that the information provided in this map is correct at the time of publication. BMT does not warrant, guarantee or make representations regarding the currency and accuracy of information contained in this map.



Filepath: I:\B23628_i_jgc_FCRC_CHAS_Phase3to8_mpb\DRG\COA_144_190920_Zone1_EPA_2100 WOR



LEGEND

-  Cadastral Boundaries
-  Erosion Prone Area (all components)

Title:

Erosion Prone Area (all components) Present Day

Figure:

Rev:

A

BMT endeavours to ensure that the information provided in this map is correct at the time of publication. BMT does not warrant, guarantee or make representations regarding the currency and accuracy of information contained in this map.



Filepath: I:\B23628_i_jgc_FCRC_CHAS_Phase3to8_mpb\DRG\COA_129_190920_Zone2_EPA_2019.WOR



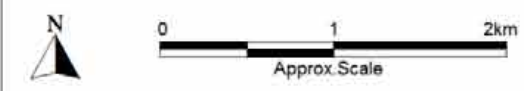
LEGEND

-  Cadastral Boundaries
-  Erosion Prone Area (all components)

Title:
Erosion Prone Area (all components) 2050

Figure:
B

BMT endeavours to ensure that the information provided in this map is correct at the time of publication. BMT does not warrant, guarantee or make representations regarding the currency and accuracy of information contained in this map.





Filepath: I:\B23628_I_jgc_FCRC_CHAS_Phase3to8_mpb\DRG\COA_135_190920_Zone2_EPA_2050.WOR



Extent of aerial imagery



- LEGEND**
-  Cadastral Boundaries
 -  Erosion Prone Area (all components)

Title:
Erosion Prone Area (all components) 2100

Figure:
B

BMT endeavours to ensure that the information provided in this map is correct at the time of publication. BMT does not warrant, guarantee or make representations regarding the currency and accuracy of information contained in this map.




Filepath: I:\B23628_i_jgc_FCRC_CHAS_Phase3to8_mpb\DRG\COA_145_190920_Zone2_EPA_2100.WOR



Extent of aerial imagery



- LEGEND**
-  Cadastral Boundaries
 -  Erosion Prone Area (all components)

Title:
Erosion Prone Area (all components) Present Day

Figure: Rev: **A**

BMT endeavours to ensure that the information provided in this map is correct at the time of publication. BMT does not warrant, guarantee or make representations regarding the currency and accuracy of information contained in this map.





Filepath: I:\B23628_i_jgc_FCRC_CHAS_Phase3to8_mpb\DRG\COA_128_190920_Zone3_EPA_2019.WOR



Extent of aerial imagery



LEGEND

-  Cadastral Boundaries
-  Erosion Prone Area (all components)

Title:

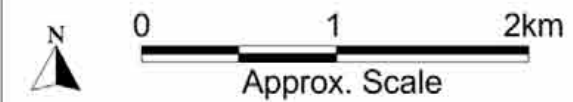
Erosion Prone Area (all components) 2050

Figure:

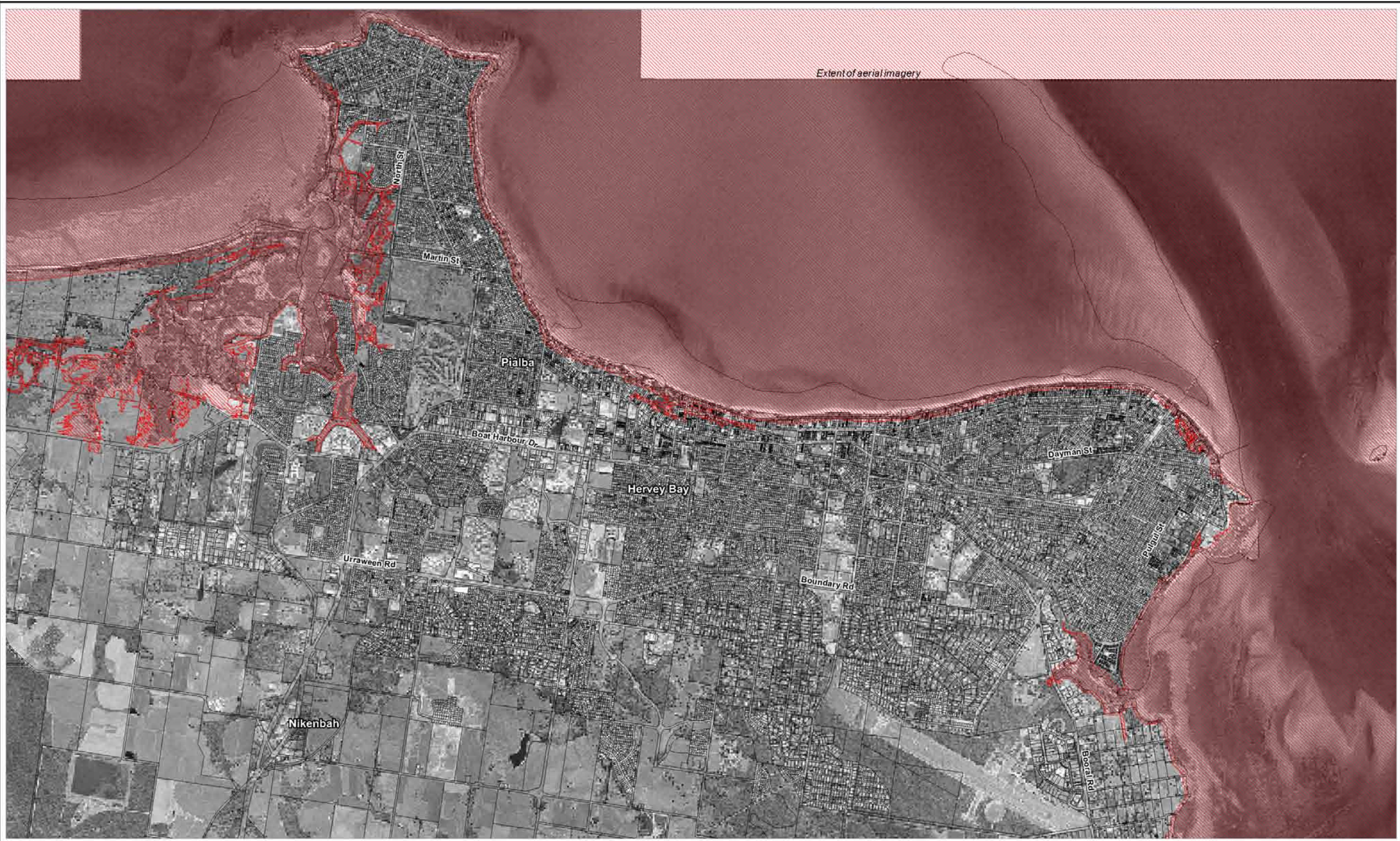
Rev:

B



BMT endeavours to ensure that the information provided in this map is correct at the time of publication. BMT does not warrant, guarantee or make representations regarding the currency and accuracy of information contained in this map.



Filepath: I:\B23628_i_jgc_FCRC_CHAS_Phase3to8_mpb\DRG\COA_136_190920_Zone3_EPA_2050.WOR



LEGEND

-  Cadastral Boundaries
-  Erosion Prone Area (all components)

Title:

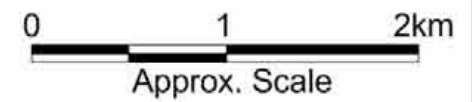
Erosion Prone Area (all components) 2100

Figure:

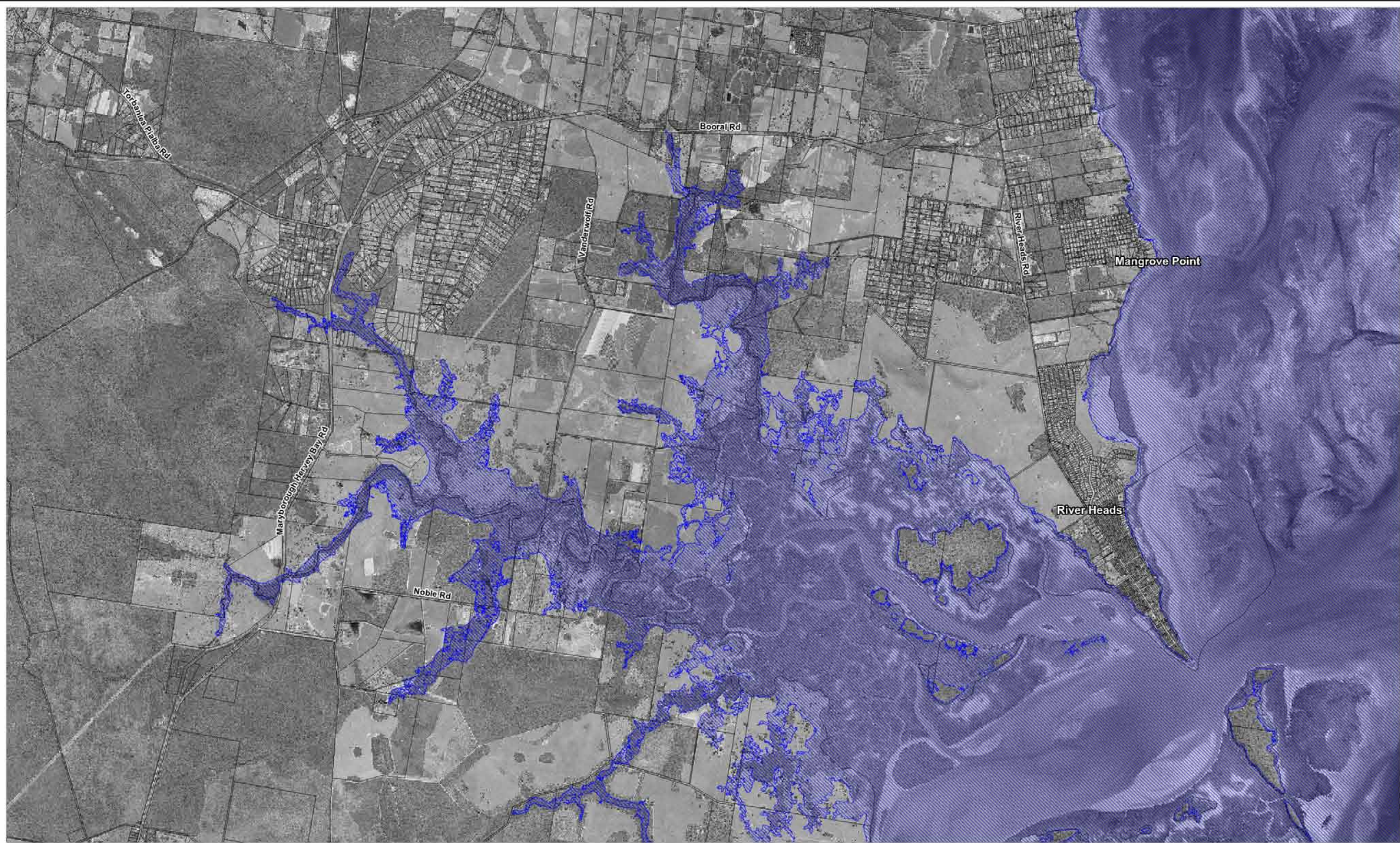
Rev:

B



BMT endeavours to ensure that the information provided in this map is correct at the time of publication. BMT does not warrant, guarantee or make representations regarding the currency and accuracy of information contained in this map.



Filepath: I:\B23628_i_jgc_FCRC_CHAS_Phase3to8_mpb\DRG\COA_143_190920_Zone3_EPA_2100.WOR



LEGEND

-  Cadastral Boundaries
-  Erosion Prone Area (all components)

Title:

Erosion Prone Area (all components) Present Day

Figure:

Rev:

A



BMT endeavours to ensure that the information provided in this map is correct at the time of publication. BMT does not warrant, guarantee or make representations regarding the currency and accuracy of information contained in this map.



Filepath: I:\B23628_i_jgc_FCRC_CHAS_Phase3to8_mpb\DRG\COA_131_190920_Zone4_EPA_2019.wor



LEGEND

-  Cadastral Boundaries
-  Erosion Prone Area (all components)

Title:

Erosion Prone Area (all components) 2050

Figure:

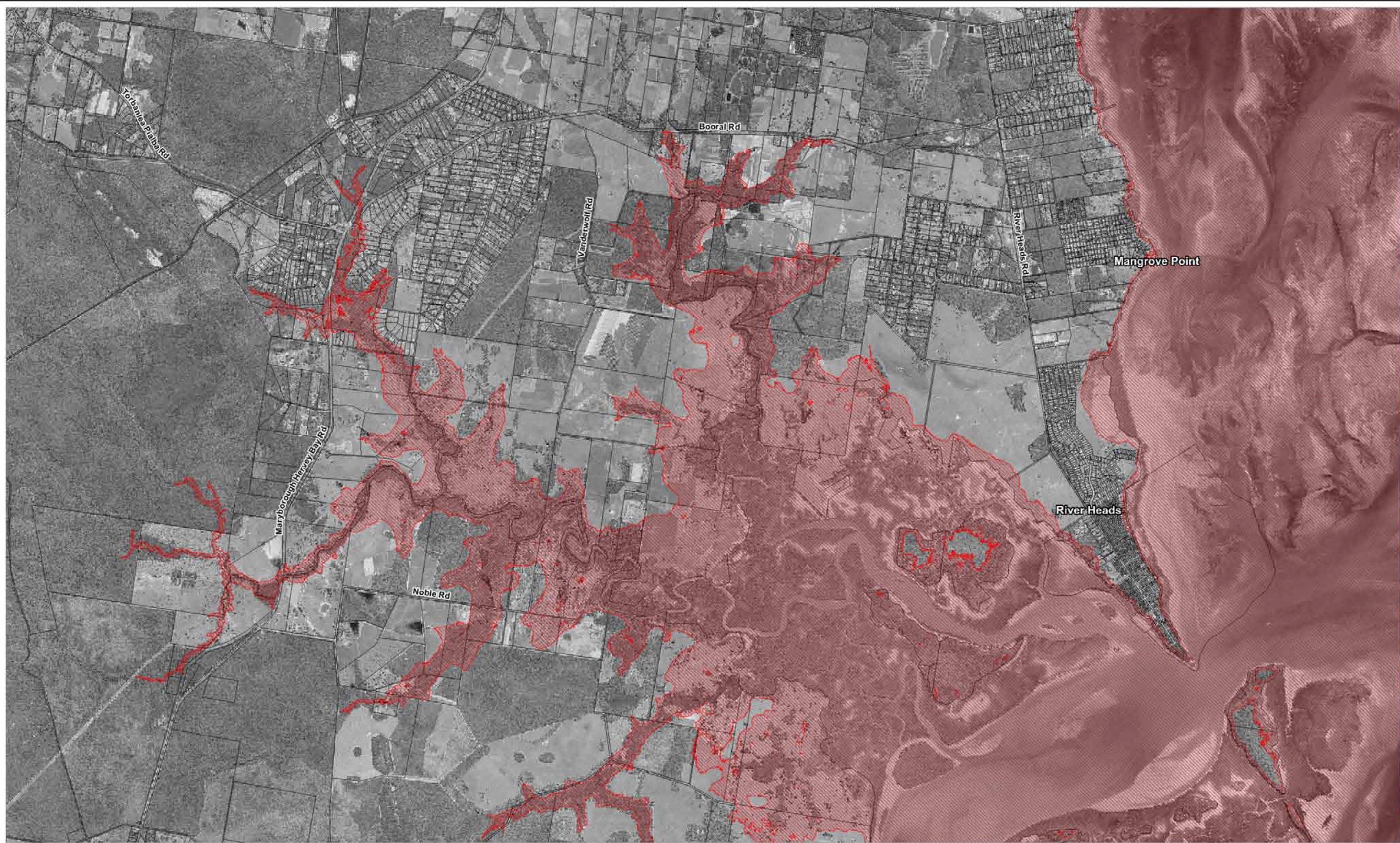
Rev:

B



BMT endeavours to ensure that the information provided in this map is correct at the time of publication. BMT does not warrant, guarantee or make representations regarding the currency and accuracy of information contained in this map.



Filepath: I:\B23628_i_jgc_FCRC_CHAS_Phase3to8_mpb\DRG\COA_137_190920_Zone4_EPA_2050.wor



LEGEND

-  Cadastral Boundaries
-  Erosion Prone Area (all components)

Title:

Erosion Prone Area (all components) 2100

Figure:

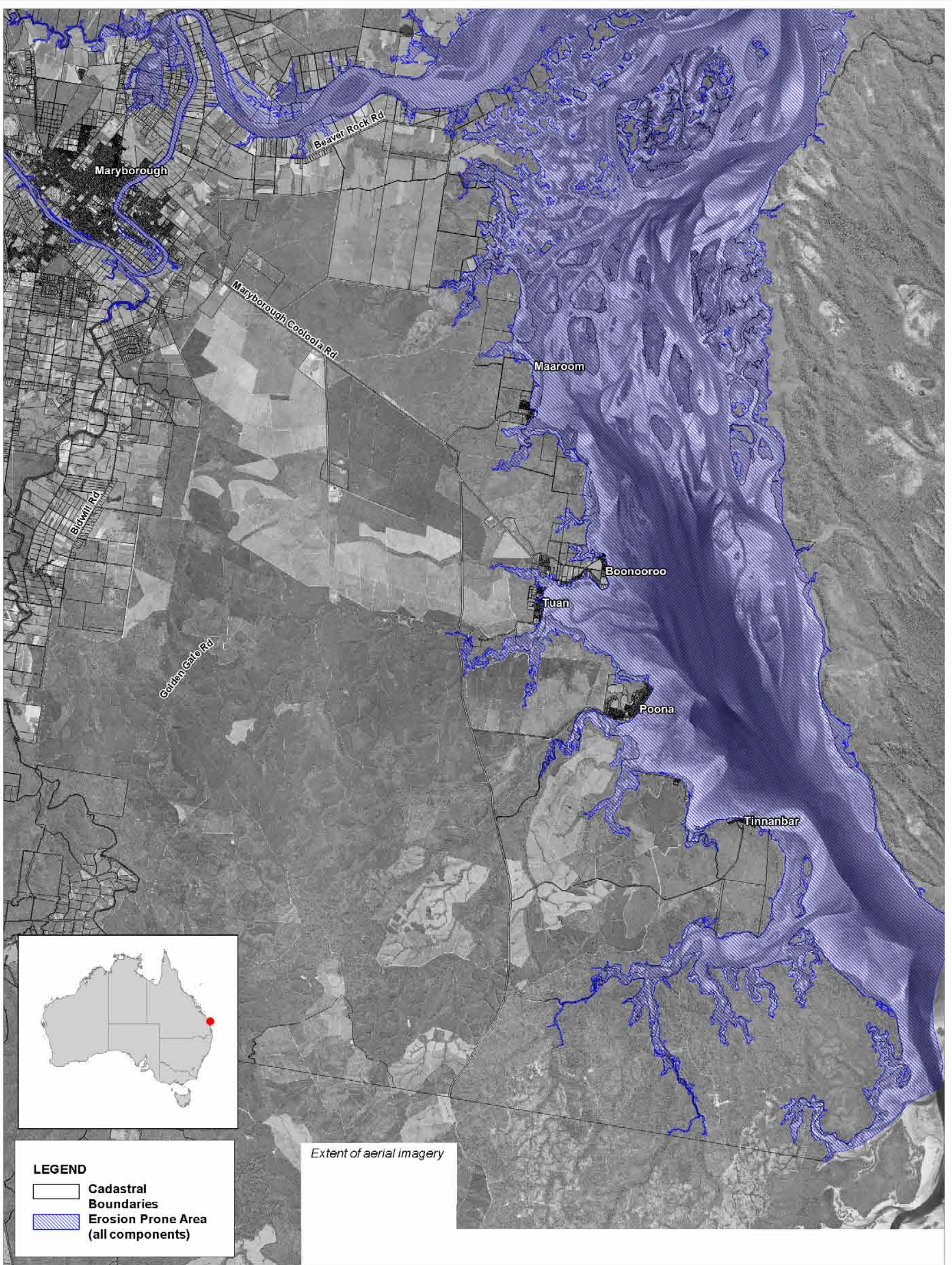
Rev:

B

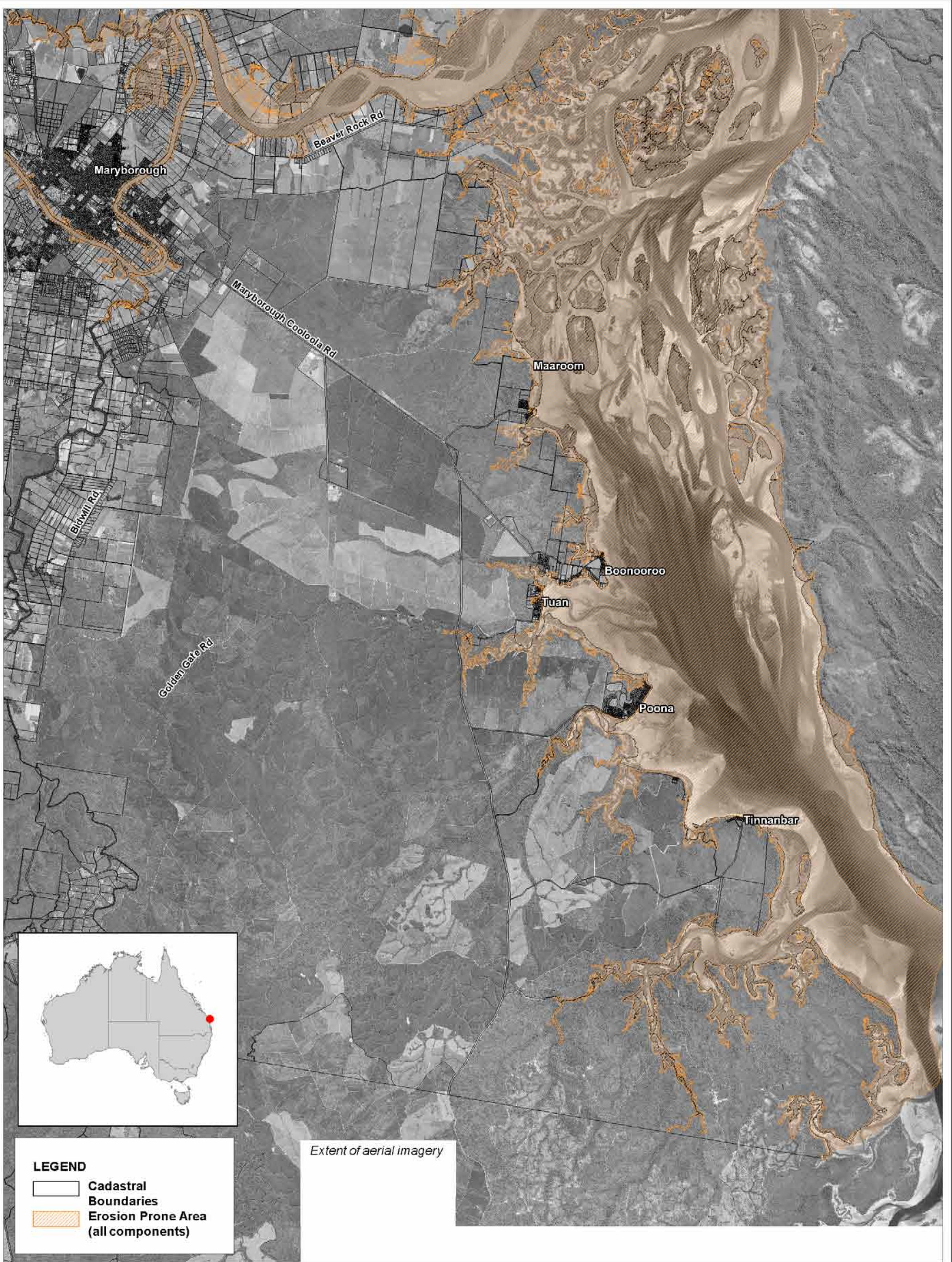
BMT endeavours to ensure that the information provided in this map is correct at the time of publication. BMT does not warrant, guarantee or make representations regarding the currency and accuracy of information contained in this map.



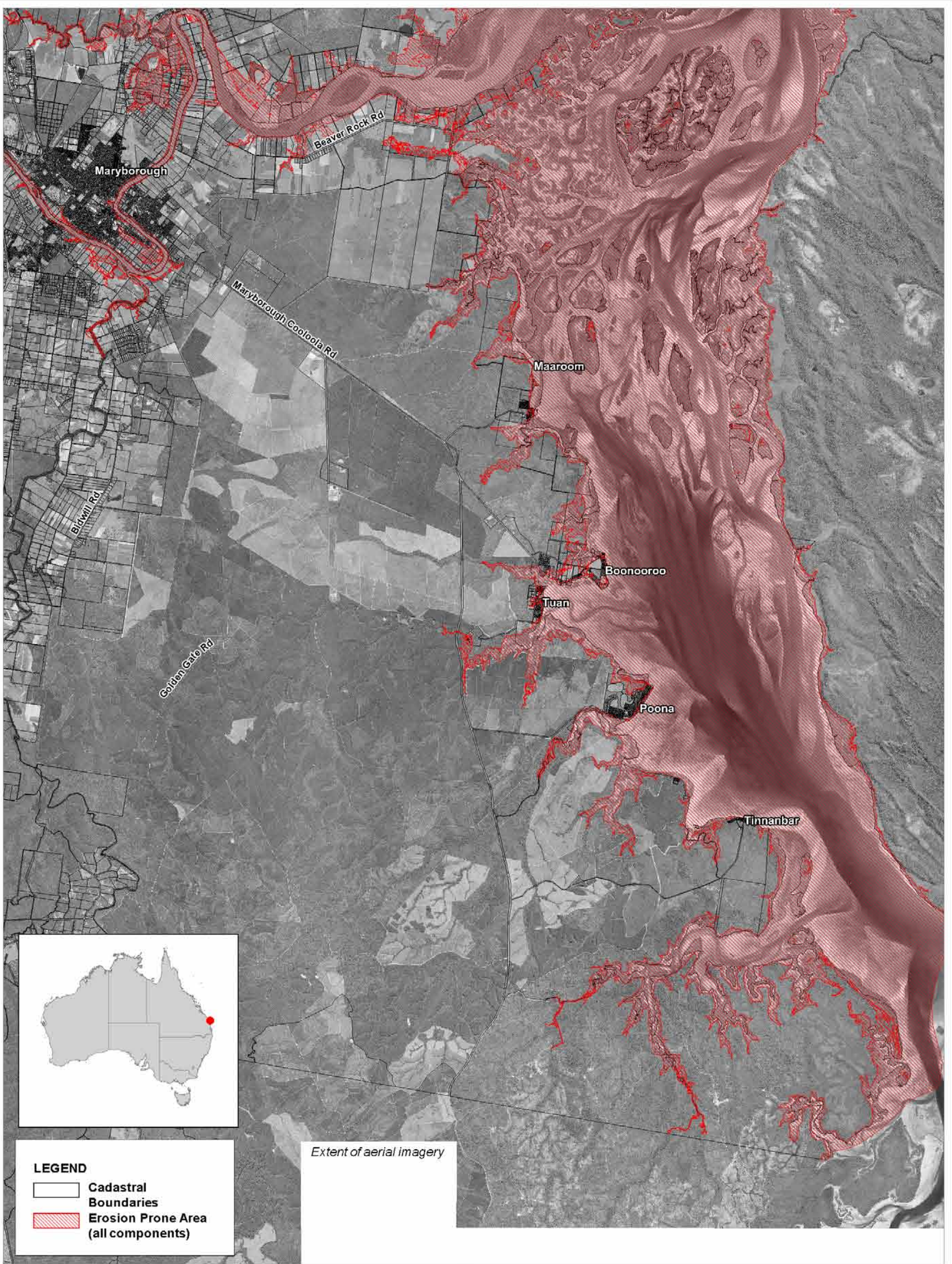
Filepath: I:\B23628_i_jgc_FCRC_CHAS_Phase3to8_mpb\DRG\COA_142_190920_Zone4_EPA_2100.wor



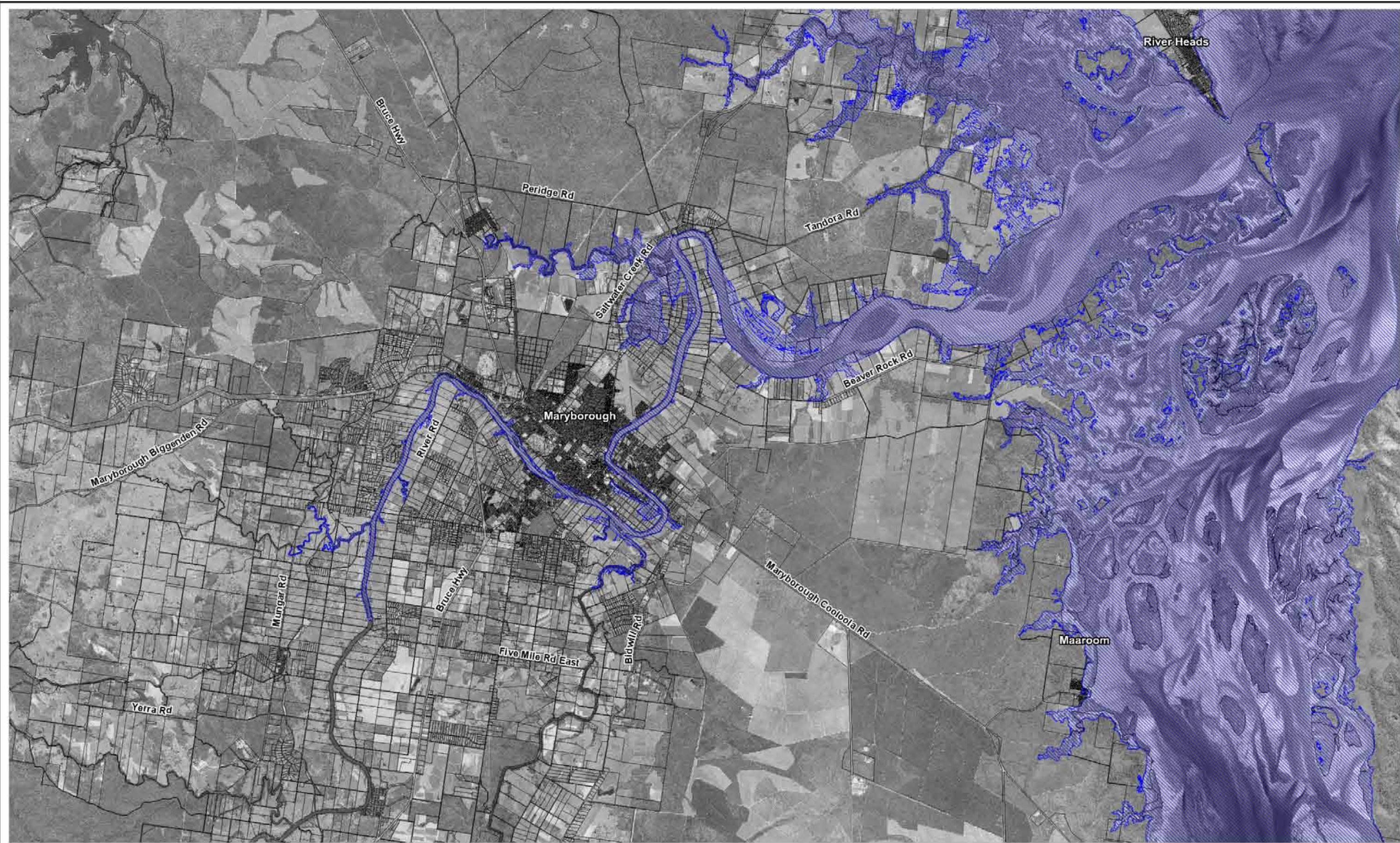
Title: Erosion Prone Area (all components) Present Day		Figure:	Rev: A
BMT endeavours to ensure that the information provided in this map is correct at the time of publication. BMT does not warrant, guarantee or make representations regarding the currency and accuracy of information contained in this map.	<p>Approx. Scale</p>		
Filepath: I:\B23628_i_jgc_FCRC_CHAS_Phase3to8_mpb\DRG\COA_132_190923_Zone5_EPA_2019.WOR			



Title: Erosion Prone Area (all components) 2050		Figure:	Rev: B
BMT endeavours to ensure that the information provided in this map is correct at the time of publication. BMT does not warrant, guarantee or make representations regarding the currency and accuracy of information contained in this map.			
Filepath: I:\B23628_i_jgc_FCRC_CHAS_Phase3to8_mpb\DRG\COA_138_190923_Zone5_EPA_2050.WOR		 www.bmt.org	



Title: Erosion Prone Area (all components) 2100		Figure:	Rev: B
BMT endeavours to ensure that the information provided in this map is correct at the time of publication. BMT does not warrant, guarantee or make representations regarding the currency and accuracy of information contained in this map.		<p>Approx. Scale</p>	
Filepath: I:\B23628_i_jgc_FCRC_CHAS_Phase3to8_mpb\DRG\COA_141_190923_Zone5_EPA_2100.WOR		<p>www.bmt.org</p>	



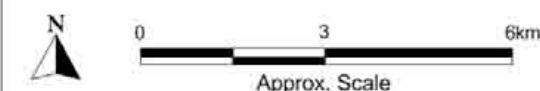
LEGEND

-  Cadastral Boundaries
-  Erosion Prone Area (all components)

Title:
Erosion Prone Area (all components) Present Day

Figure:
A

BMT endeavours to ensure that the information provided in this map is correct at the time of publication. BMT does not warrant, guarantee or make representations regarding the currency and accuracy of information contained in this map.



Filepath: I:\B23628_i_jgc_FCRC_CHAS_Phase3to8_mpb\DRG\COA_133_190923_Zone6_EPA_2019.WOR

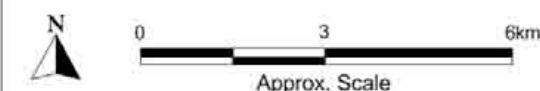


- LEGEND**
-  Cadastral Boundaries
 -  Erosion Prone Area (all components)

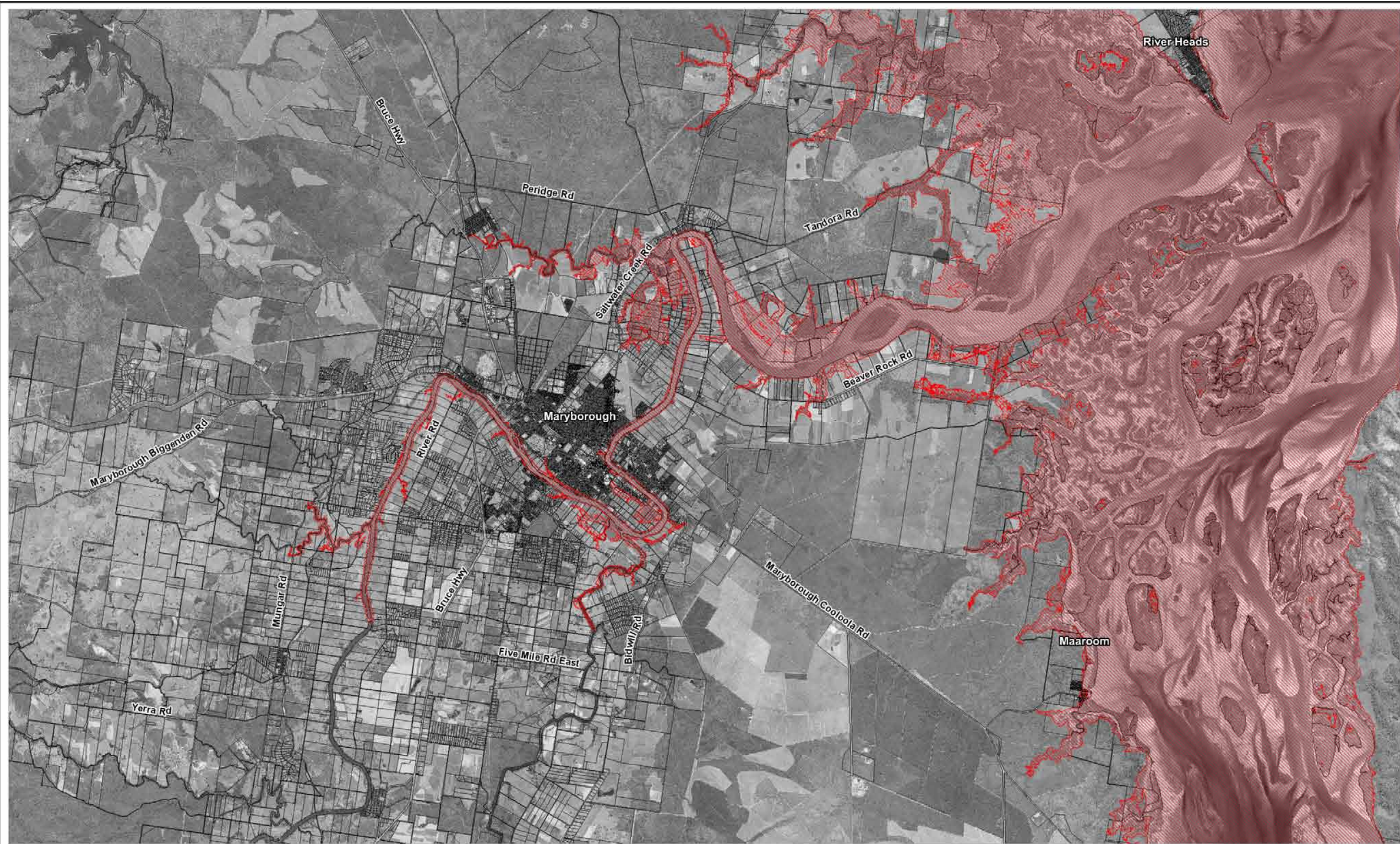
Title:
Erosion Prone Area (all components) 2050

Figure:
B



BMT endeavours to ensure that the information provided in this map is correct at the time of publication. BMT does not warrant, guarantee or make representations regarding the currency and accuracy of information contained in this map.



Filepath: I:\B23628_i_jgc_FCRC_CHAS_Phase3to8_mpb\DRG\COA_139_190923_Zone6_EPA_2050.WOR



LEGEND

-  Cadastral Boundaries
-  Erosion Prone Area (all components)

Title:
Erosion Prone Area (all components) 2100

Figure:
B

BMT endeavours to ensure that the information provided in this map is correct at the time of publication. BMT does not warrant, guarantee or make representations regarding the currency and accuracy of information contained in this map.



Filepath: I:\B23628_i_jgc_FCRC_CHAS_Phase3to8_mpb\DRG\COA_140_190923_Zone6_EPA_2100.WOR