STORM SURGE RISK

1. Citation

This Local Planning Policy has been prepared pursuant to Schedule 2 of the *Planning and Development (Local Planning Schemes) Regulations 2015* (Deemed Provisions). The policy may be cited as Local Planning Policy 19 – Storm Surge Risk (LPP 19).

2. Introduction

The purpose of this policy is to provide clear guidance on the application of the City of Karratha Local Planning Scheme No. 8 (Scheme) in relation to development on land identified as vulnerable to a 500-year Average Recurrence Interval (ARI) storm surge event. It establishes a locally responsive framework for risk management and adaptation, ensuring that development proposals adequately account for coastal hazards to protect life and property.

Coastal areas within the City of Karratha are susceptible to significant storm surge inundation, primarily driven by wind setup and atmospheric pressure during cyclonic events. The City has undertaken detailed mapping of the 500-year ARI event to inform decision-making in areas subject to development pressure.

While this policy provides current best-practice standards, it serves as an interim instrument while the City prepares a comprehensive Coastal Hazard Risk Management and Adaptation Plan (CHRMAP) as required by State Planning Policy 2.6 – Coastal Planning (SPP 2.6).

3. Objectives

3.1. The objectives of this policy are to:

(a) Establish procedures for the assessment of development applications on land identified as being vulnerable to a 500-year ARI storm surge event.

(b) Provide interim guidance for coastal risk and storm surge management pending the finalisation of the City's Coastal Hazard Risk Management and Adaption Plan (CHRMAP).

(c) Ensure that development proposals adequately account for coastal hazards to protect life and property.

4. Application of this Policy

4.1. Extent of Scope

4.1.1. This policy applies to all development proposals on land identified as being vulnerable to a 500-year ARI storm surge event as mapped and maintained by the City. Refer **Appendix B – Storm Surge Risk Mapping**.

4.1.2. This policy also applies to all development proposals on land identified as being 'potentially vulnerable' to a 500-year storm surge event, where vulnerability is confirmed by the relevant authority.

4.2. Relationship with State and Local Planning Framework

4.2.1. This policy is to be read in conjunction with the Scheme and the relevant state and local planning policies, specifically SPP 2.6. To the extent of any inconsistency between this policy and the Scheme or SPP 2.6, the Scheme and SPP 2.6 prevail.

4.3. Assessment Criteria

4.3.1. Development approval is required for any proposal on land identified as vulnerable to a 500-year ARI storm surge event to assess its acceptability against the provisions and objectives of this policy.

4.3.2. The City should exercise its discretion when considering the suitability of development in identified risk areas. The City should exercise its discretion by having regard to:

(a) The nature and suitability of the proposed development, given the identified risk.

(b) The adequacy of the proposed risk management and adaption measures to protect human life and property.

(c) The outcome of the proposed development as an outcome of the Risk Assessment Matrix (contained at **Appendix C** to this policy).

(d) The findings and recommendations of the Karratha Coastal Vulnerability Study.

(e) The precinct objectives for the subject site, as outlined in the Scheme, together with any other relevant and applicable Scheme provisions.

5. Policy Provisions

5.1. General Requirements

5.1.1. Where mapping is not available for a particular locality or land the City considers that the land could be vulnerable to storm surge but it is not identified by the mapping at **Appendix B**, the application may be referred to the relevant department to determine whether the site is likely to be vulnerable to a 500-year ARI storm surge event and, if so, the requirements of this policy apply.

5.1.2. The impact of stormwater events on land the subject of a development application is assessed and managed separately to the impact of a 500-year ARI storm surge event, which is the subject of this policy.

5.1.3. An application should be supported by a Stormwater Management Strategy / Plan, prepared by a suitably qualified consultant, to determine the impact of overland flooding on the site and to identify appropriate finished floor levels and / or drainage requirements. Where such advice is not submitted, the City will refer the application to the relevant agencies and authorities for comment.

5.2. Standard Design Responses

5.2.1. Where a site (or portion of the site) is identified as being vulnerable to a 500-year ARI storm surge event, the proponent should consider the following standard design responses to sufficiently address the level of risk:

(a) Elevating finished floor levels of habitable rooms and net lettable areas above the 500-year ARI storm surge event level, in accordance with **Table 1**; or

Table 1: Standard Design Responses for Storm Surge Risk.

Height of Storm Surge above Natural Ground Level	Standard Design Response
0 – 500mm	Raise finished floor level for all habitable rooms (dwellings) or net lettable areas (commercial / community buildings) above the identified storm surge level through filling of the land, structural / design (e.g. elevated stilt construction) or a combination of both.
500mm – 1 metre	Raise finished floor level for all habitable rooms (dwellings) or net lettable areas (commercial / community buildings) to the height of the identified storm surge level through filling of the land, structural design (e.g. elevated stilt construction) or a combination of both. Filling of the site between 500mm and 1 metre above natural ground level may be considered on a case-by-case basis where it does not detrimentally impact the adjoining amenity and complies with other relevant policy considerations.
1m – 2m +	Raise finished floor levels for all habitable rooms (dwellings) or net lettable areas (commercial / community buildings) above the identified storm surge level through structural design (e.g. elevated stilt construction) or a combination of fill/retaining (to a maximum of 0.5 metres) and structural design.

(b) Locating the development on a portion of the site that is not identified as vulnerable to a 500-year ARI storm surge event.

5.3. Performance Based Approach

5.3.1. Where the standard design responses set out in Section 5.2 are not proposed, a risk assessment should be submitted to define the level of risk and determine the appropriate mitigation measures.

5.3.2. The Risk Assessment should be prepared in accordance with the City's Risk Assessment Matrix and should demonstrate that the proposal achieves an acceptable level of risk to life and property. Refer **Appendix C – Risk Assessment Matrix.**

5.4. Mitigation Measures

5.4.1. The City may consider imposing a range of mitigating measures as conditions of development approval, including:

(a) Relocation of the proposed development to the least hazardous portion of the site.

(b) A storm surge protection wall or barrier.

(c) The registration of a Notification on Title (Section 70A of the *Transfer of Land Act 1893)* for the purpose of advising prospective purchasers that the land is identified as being vulnerable to storm surge inundation.

(d) The installation and maintenance of signage on public buildings advising of flood vulnerability.

(e) An Emergency Evacuation Plan where the scale or nature of the development warrants such a response.

(f) Where filling is proposed, plans prepared by a suitably qualified professional to demonstrate appropriate erosion control and foundation stabilisation.

5.5. Design Considerations

5.5.1. Building design should handle structural loads associated with storm surge flow, waves and debris impact.

5.5.2. Electrical infrastructure, including power point sockets, should be located above the modelled 500-year ARI storm surge level.

5.5.3. Effluent disposal vents and systems should be located so they are not by impacted by 500-year ARI storm surge inundation.

5.5.4. Proponents should avoid the enclosure of understorey areas to minimise the structural loads associated with water flow or wave impact.

6. Document Control

Version	Decision to Adopt / Amend
1.	18 July 2016 | Ordinary Council Meeting | Item 11.3
2.	26 October 2026 | Ordinary Council Meeting | Item 12.1
3.	
4.	

Public Consultation	Not required – minor / administrative update		
WAPC Approval	Not required	**Approval Date**	Not applicable
Document Reference	Document Reference: LPP 19 Previous Policy Number: DP 19		
Next Review Date	26 October 2031		
Review Frequency	Every 5 years		

Related Documents	
Internal	**External**
City of Karratha Local Planning Scheme No. 8	State Planning Policy 2.6 – Coastal Planning State Planning Policy 3.4 – Natural Hazards and Disasters State Coastal Planning Policy Guidelines

Relevant Legislation

Planning and Development Act 2005

Planning and Development (Local Planning Schemes) Regulations 2015

State Administrative Tribunal Act 2004

Transfer of Land Act 1893

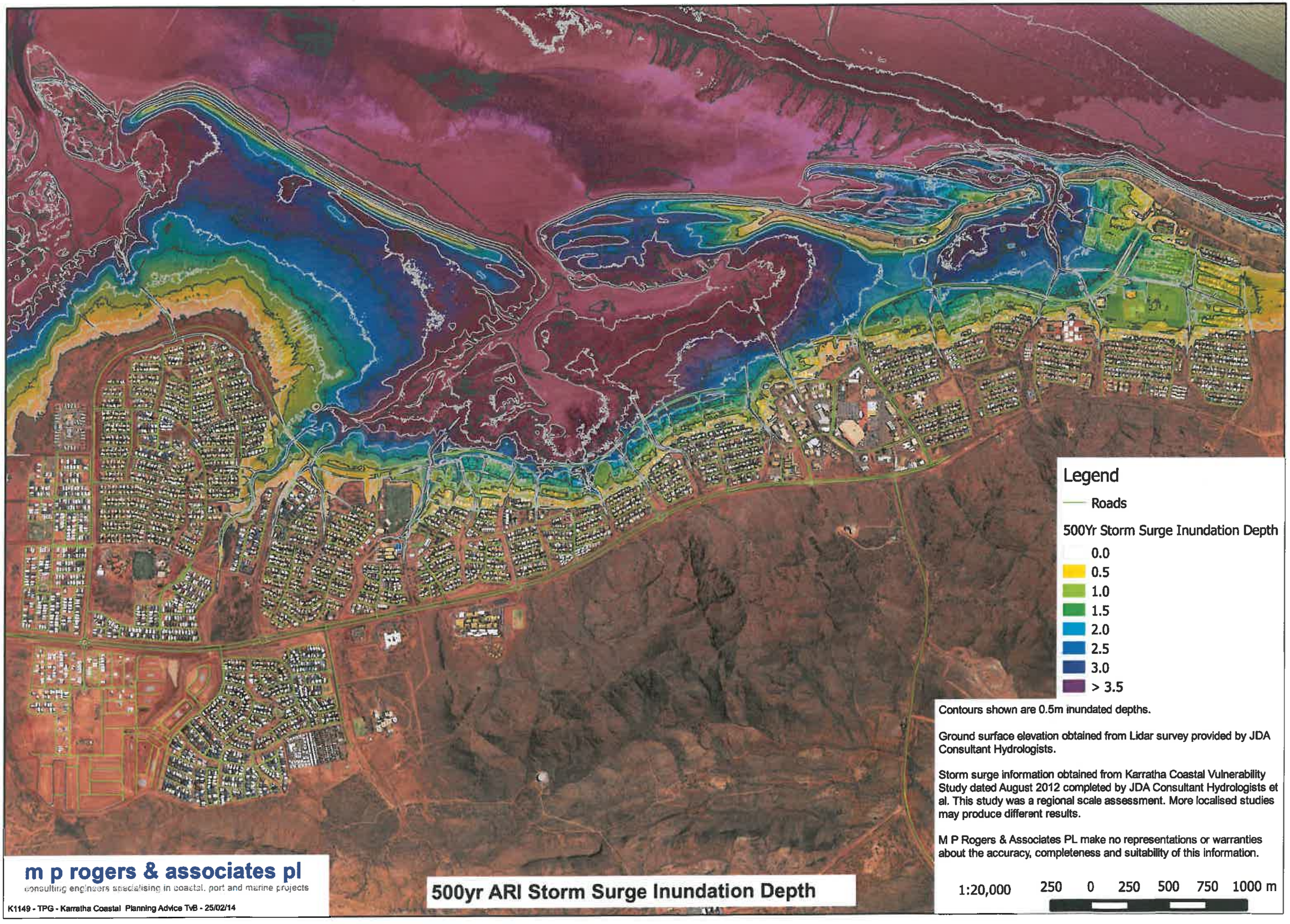
This policy takes effect from the date of adoption by Council and shall remain valid for a period of 5 years unless reviewed prior.

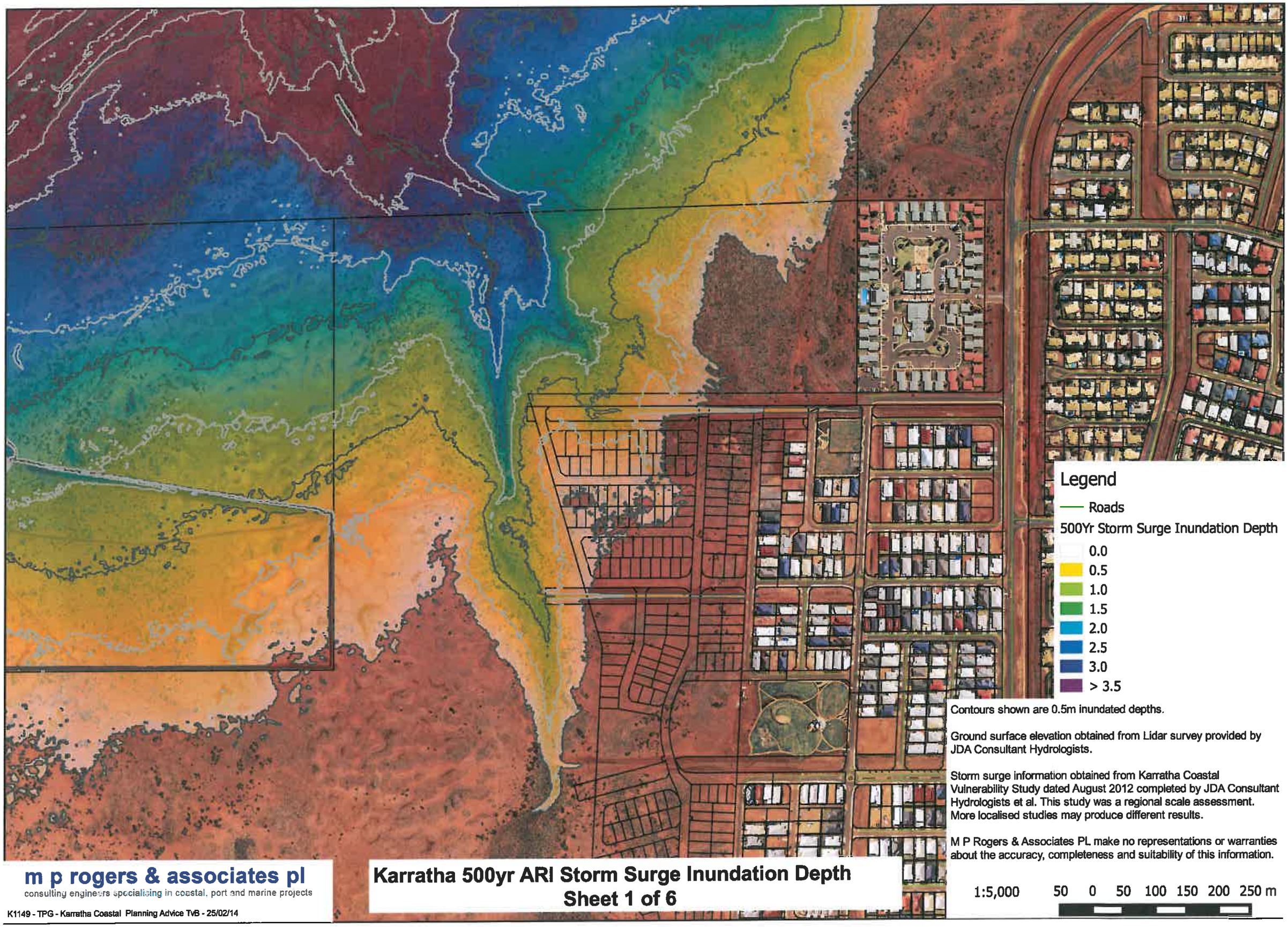
All records created or maintained under this document must be captured in the City's approved recordkeeping or business system. These records are to be retained and managed in accordance with the *State Records Act 2000*, *Privacy and Responsible Information Sharing Act 2024*, the City's Recordkeeping Plan and authorised disposal authorities.

APPENDIX A
DEFINITIONS

Average Recurrence Interval (ARI)	Means a statistical measurement of the likelihood of an event (such as a flood, storm surge or river discharge) occurring, typically based on historic data denoting the average interval between events of a given magnitude over an extended period. and It is used for risk analysis, including determining whether a project should proceed in an area of given risk or the standard to which a structure should be designed.
Habitable Room	Has the same meaning as in the Residential Design Codes.
Net Lettable Area	Means the area of all floors within the internal finished surfaces of permanent walls, excluding: - Stairs, toilets, cleaners' cupboards, lift shafts motor rooms, escalators, team rooms, and plant rooms, and other service areas; - Lobbies between lifts facing other lifts serving the same floor; - Areas set aside as public space or thoroughfares and not for the exclusive use of occupiers of the floor or building; and - Areas set aside for facilities or services to the floor or building not for the exclusive use of occupiers of the floor or building.
Outbuilding	Means an enclosed non-habitable structure that is detached from any dwelling, but not a garage.
Risk Assessment	Means the overall process or method for evaluating risks associated with a specific coastal hazard and including risk identification, analysis and evaluation, undertaken in accordance with the City's Risk Assessment Matrix contained in the City of Karratha Coastal Hazard Risk Management Adaptation Plan.
Storm Surge	Means the increase in water level at the shoreline due to the forcing of winds (wind-setup) and atmospheric pressure.
Temporary Structure	Means a non-habitable structure with an expected useful lifespan of less than 30 years or a non-habitable mobile structure.
Vulnerable	Means land identified in the mapping contained at Appendix B to this policy as being exposed to the risk of a 500-year ARI storm surge event.

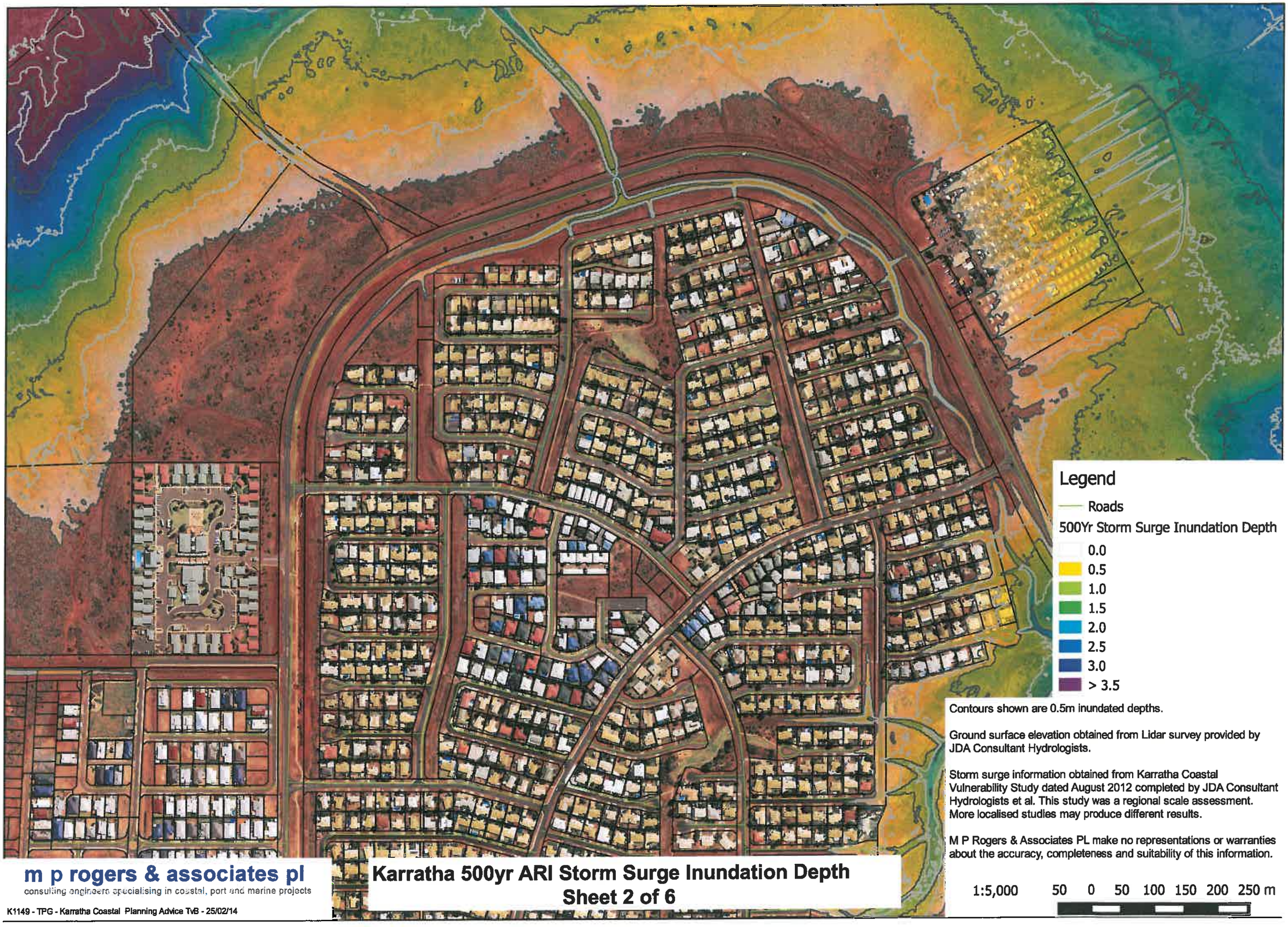
APPENDIX B
STORM SURGE RISK AREA MAPPING


Legend
Roads
500Yr Storm Surge Inundation Depth
0.0
0.5
1.0
1.5
2.0
2.5
3.0
> 3.5
Contours shown are 0.5m inundated depths.
Ground surface elevation obtained from Lidar survey provided by JDA Consultant Hydrologists.
Storm surge information obtained from Karratha Coastal Vulnerability Study dated August 2012 completed by JDA Consultant Hydrologists et al. This study was a regional scale assessment. More localised studies may produce different results.
M P Rogers & Associates PL make no representations or warranties about the accuracy, completeness and suitability of this information.
1:20,000
250 0 250 500 750 1000 m
m p rogers & associates pl
consulting engineers specialising in coastal, port and marine projects
K1149 - TPG - Karratha Coastal Planning Advice TvB - 25/02/14
500yr ARI Storm Surge Inundation Depth



Karratha 500yr ARI Storm Surge Inundation Depth
Sheet 1 of 6

m p rogers & associates pl
consulting engineers specialising in coastal, port and marine projects



Karratha 500yr ARI Storm Surge Inundation Depth
Sheet 2 of 6

m p rogers & associates pl
consulting engineers specialising in coastal, port and marine projects



Contours shown are 0.5m inundated depths.

Ground surface elevation obtained from Lidar survey provided by JDA Consultant Hydrologists.

Storm surge information obtained from Karratha Coastal Vulnerability Study dated August 2012 completed by JDA Consultant Hydrologists et al. This study was a regional scale assessment. More localised studies may produce different results.

M P Rogers & Associates PL make no representations or warranties about the accuracy, completeness and suitability of this information.

1:5,000 50 0 50 100 150 200 250 m

m p rogers & associates pl
consulting engineers specialising in coastal, port and marine projects

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Karratha 500yr ARI Storm Surge Inundation Depth
Sheet 3 of 6

Legend

Roads

500Yr Storm Surge Inundation Depth

- 0.0
- 0.5
- 1.0
- 1.5
- 2.0
- 2.5
- 3.0
- > 3.5

Contours shown are 0.5m inundated depths.

Ground surface elevation obtained from Lidar survey provided by JDA Consultant Hydrologists.

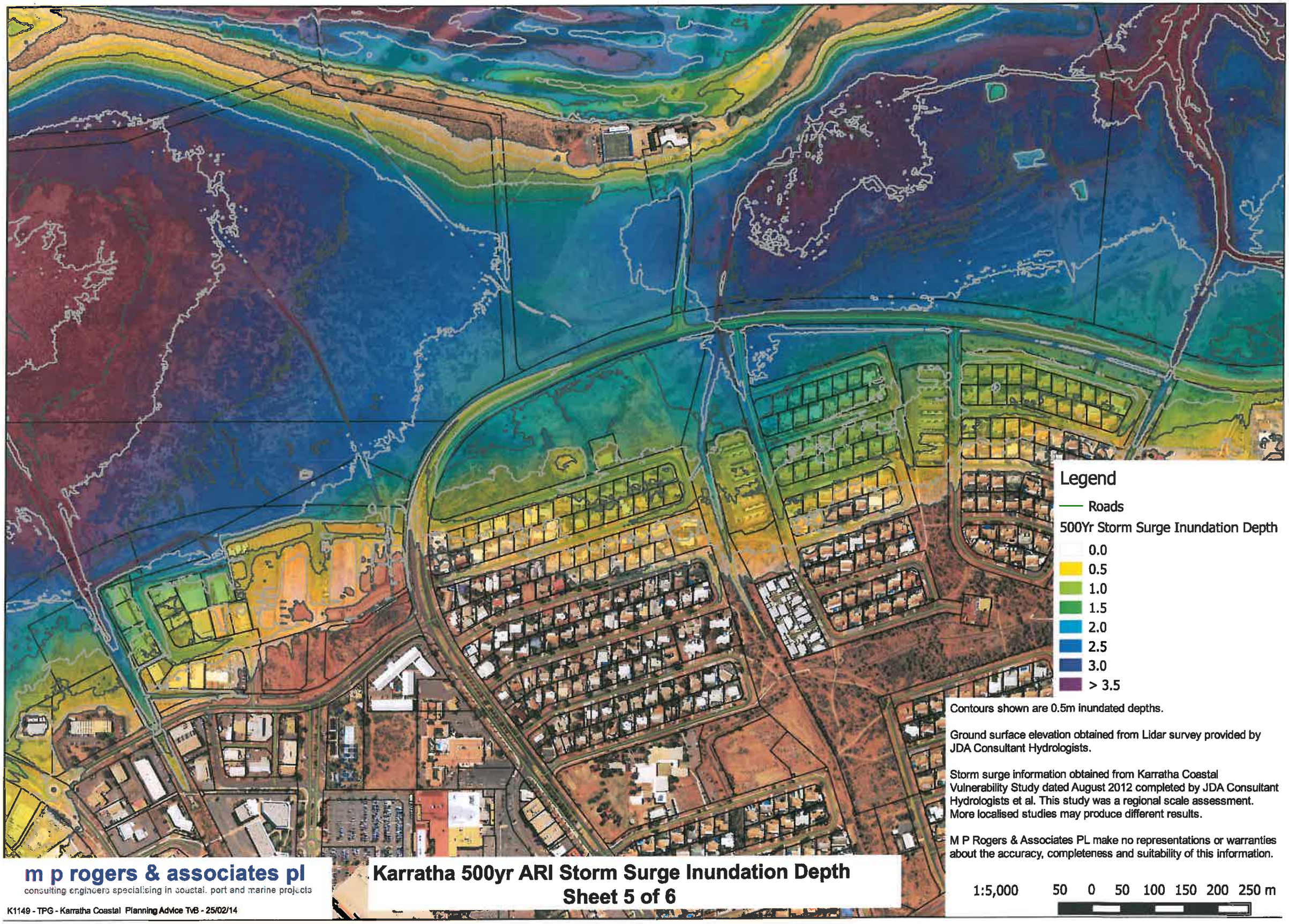
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1:5,000 50 0 50 100 150 200 250 m

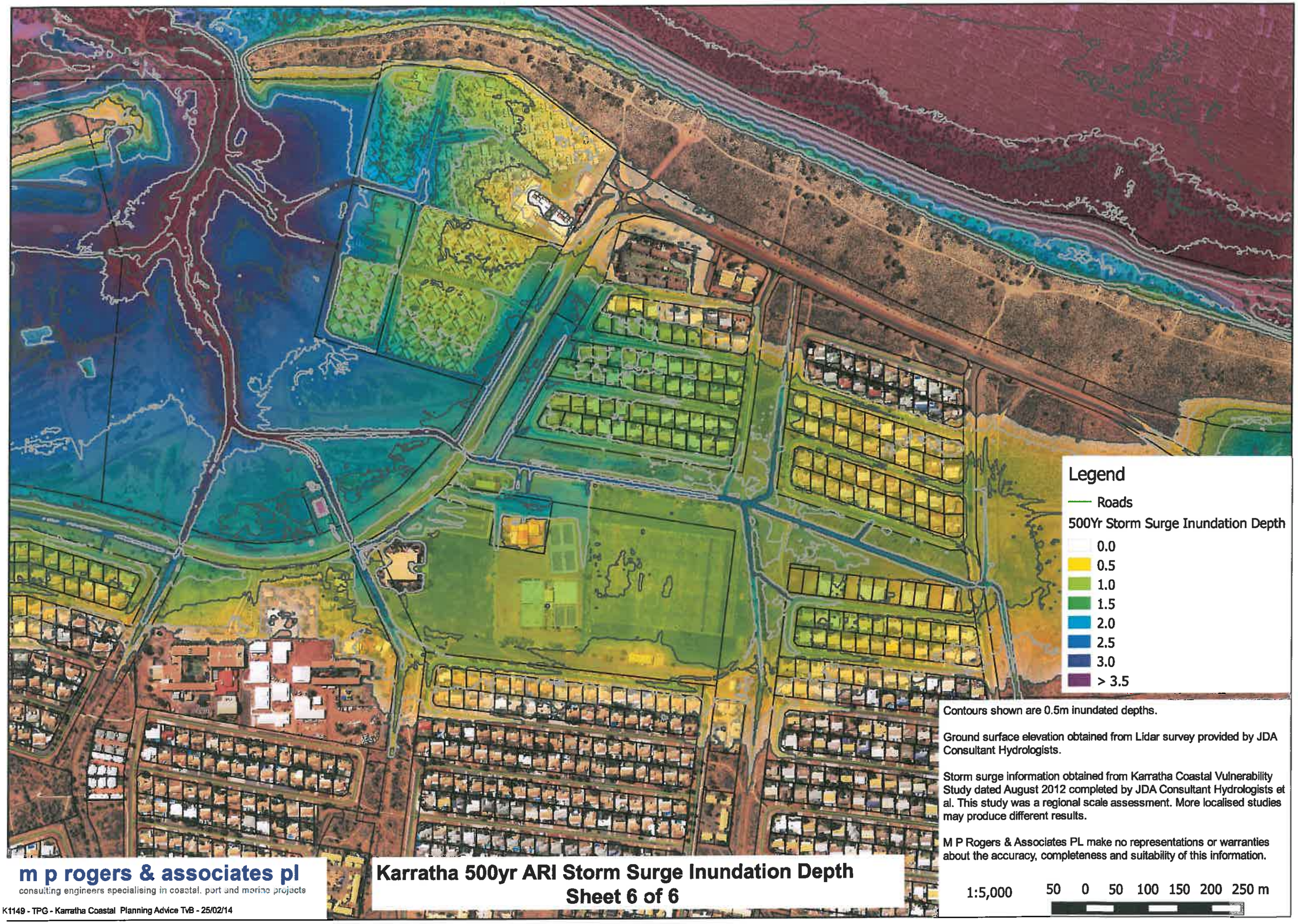
Karratha 500yr ARI Storm Surge Inundation Depth
Sheet 4 of 6

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Karratha 500yr ARI Storm Surge Inundation Depth
Sheet 5 of 6

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Contours shown are 0.5m inundated depths.

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1:5,000 50 0 50 100 150 200 250 m

Karratha 500yr ARI Storm Surge Inundation Depth
Sheet 6 of 6

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Data Source: GEMSURGE Modelling 2011

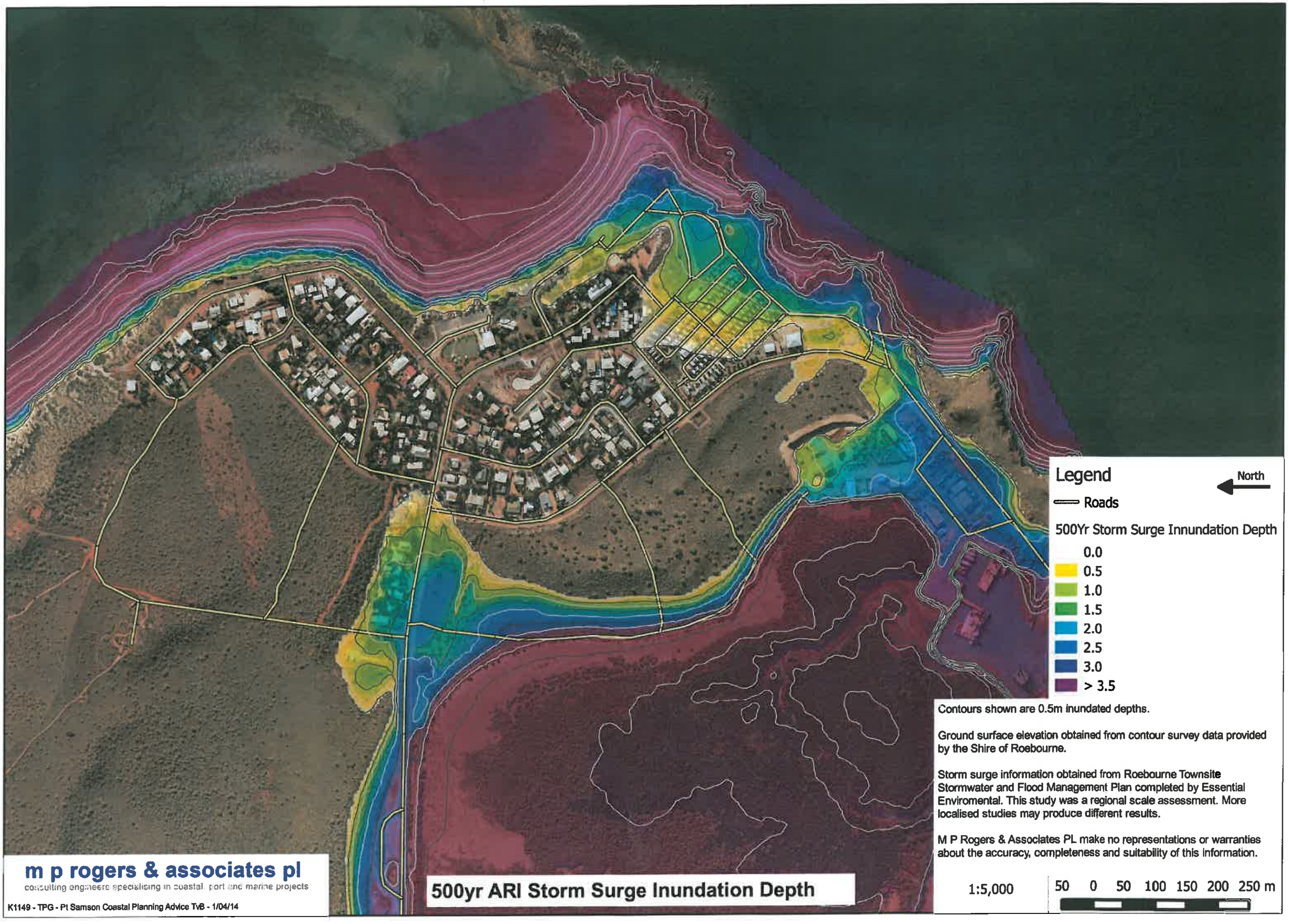
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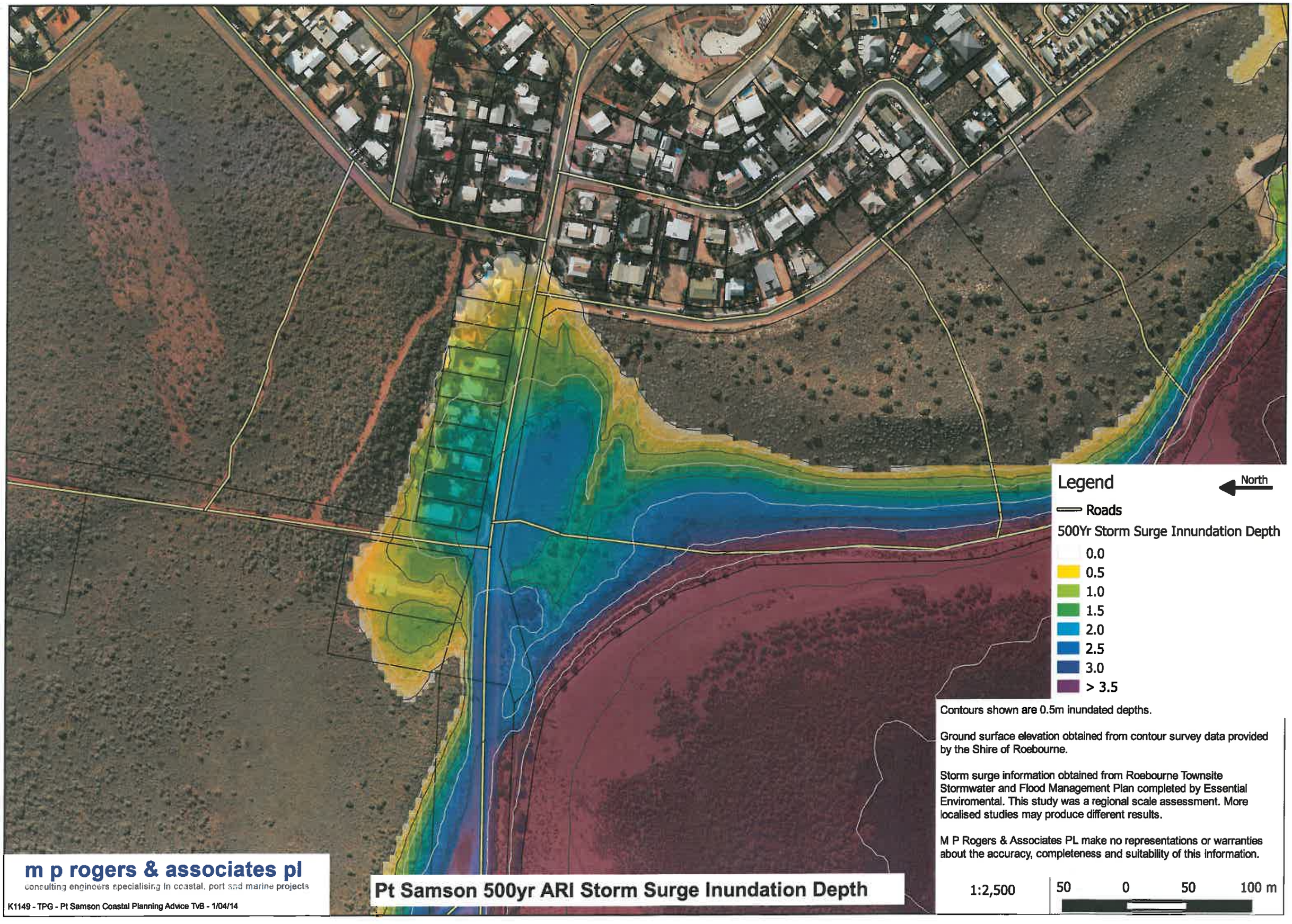
0 0.5 1 1.5 2 Kilometers

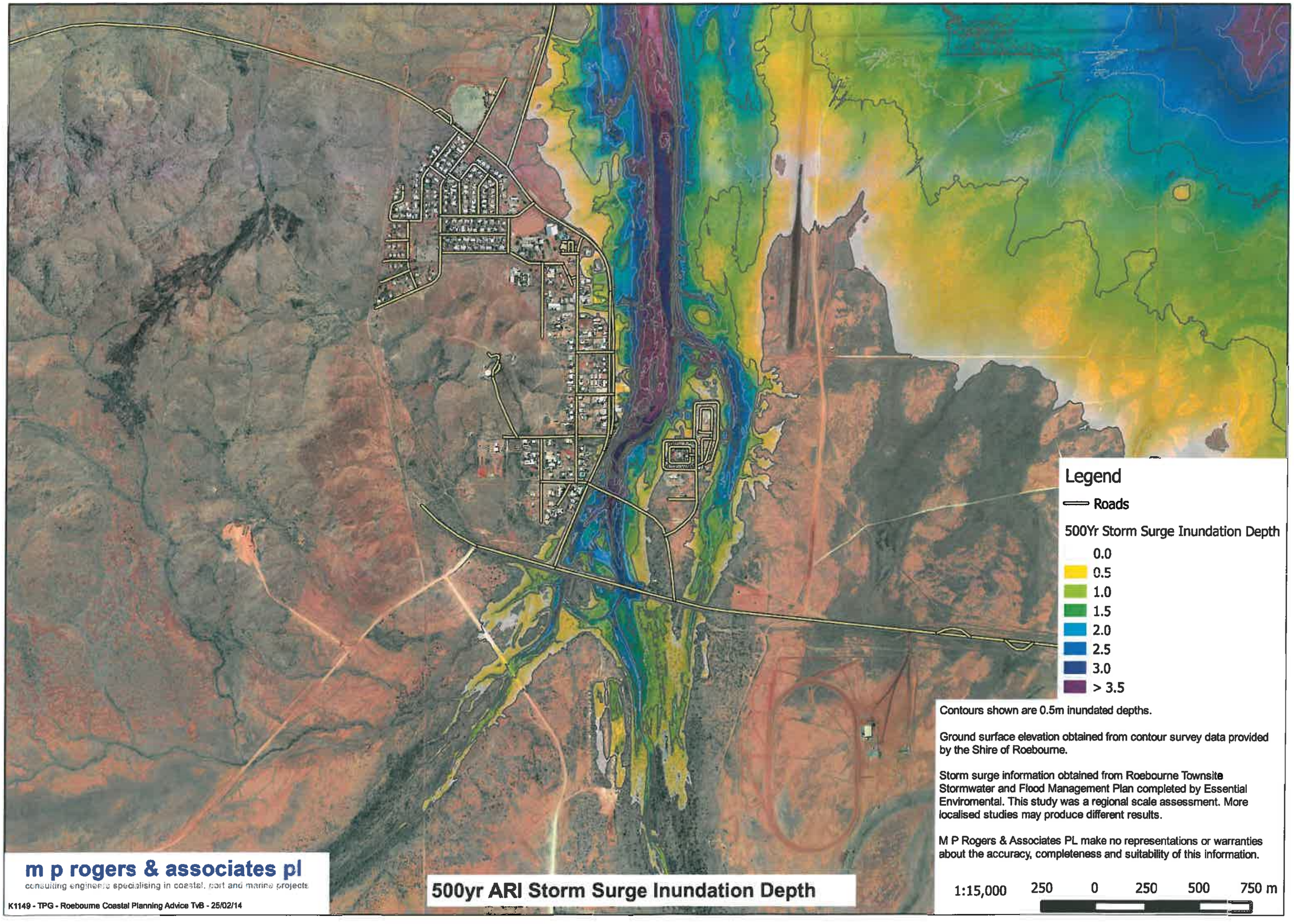
© COPYRIGHT GEMS PTY. LTD. 2011

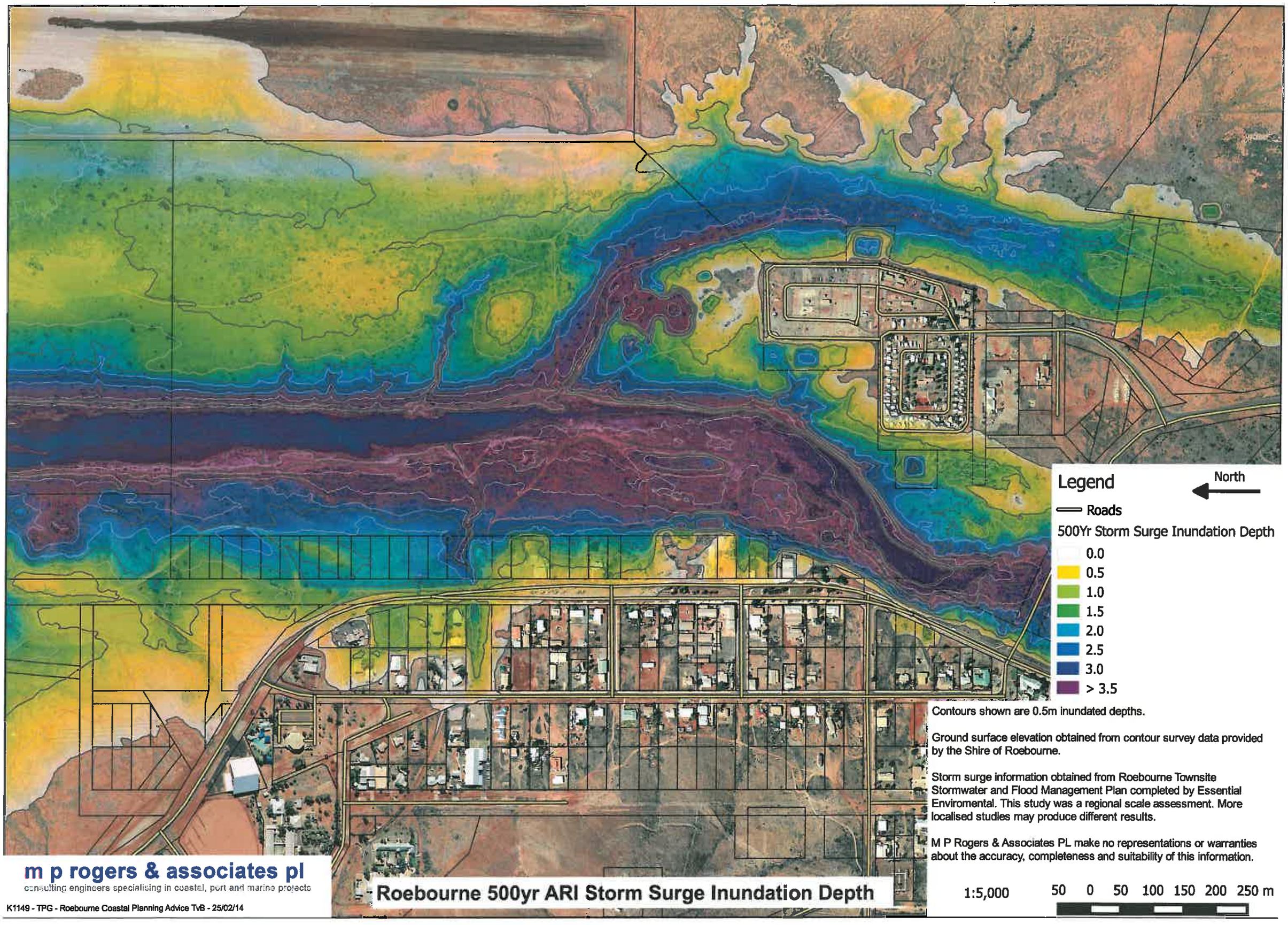
LandCorp
Dampier Coastal Vulnerability Study Report III: Storm Surge

Figure 22: 500yr ARI Coastal Inundation - 2110 Climate Scenario


Legend
North
Roads
500Yr Storm Surge Innundation Depth
0.0
0.5
1.0
1.5
2.0
2.5
3.0
> 3.5
Contours shown are 0.5m inundated depths.
Ground surface elevation obtained from contour survey data provided by the Shire of Roebourne.
Storm surge information obtained from Roebourne Townsite Stormwater and Flood Management Plan completed by Essential Enviromental. This study was a regional scale assessment. More localised studies may produce different results.
M P Rogers & Associates PL make no representations or warranties about the accuracy, completeness and suitability of this information.
1:5,000
50 0 50 100 150 200 250 m
m p rogers & associates pl
consulting engineers specialising in coastal, port and marine projects
K1149 - TPG - Pt Samson Coastal Planning Advice TvB - 1/04/14
500yr ARI Storm Surge Inundation Depth


Legend
North
Roads
500Yr Storm Surge Innundation Depth
0.0
0.5
1.0
1.5
2.0
2.5
3.0
> 3.5
Contours shown are 0.5m inundated depths.
Ground surface elevation obtained from contour survey data provided by the Shire of Roebourne.
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M P Rogers & Associates PL make no representations or warranties about the accuracy, completeness and suitability of this information.
1:2,500
50 0 50 100 m
m p rogers & associates pl
consulting engineers specialising in coastal, port and marine projects
K1149 - TPG - Pt Samson Coastal Planning Advice TvB - 1/04/14
Pt Samson 500yr ARI Storm Surge Inundation Depth


Legend
Roads
500Yr Storm Surge Inundation Depth
0.0
0.5
1.0
1.5
2.0
2.5
3.0
> 3.5
Contours shown are 0.5m inundated depths.
Ground surface elevation obtained from contour survey data provided by the Shire of Roebourne.
Storm surge information obtained from Roebourne Townsite Stormwater and Flood Management Plan completed by Essential Enviromental. This study was a regional scale assessment. More localised studies may produce different results.
M P Rogers & Associates PL make no representations or warranties about the accuracy, completeness and suitability of this information.
1:15,000
250 0 250 500 750 m
m p rogers & associates pl
consulting engineers specialising in coastal, port and marine projects
K1149 - TPG - Roebourne Coastal Planning Advice TvB - 25/02/14
500yr ARI Storm Surge Inundation Depth



Contours shown are 0.5m inundated depths.

Ground surface elevation obtained from contour survey data provided by the Shire of Roebourne.

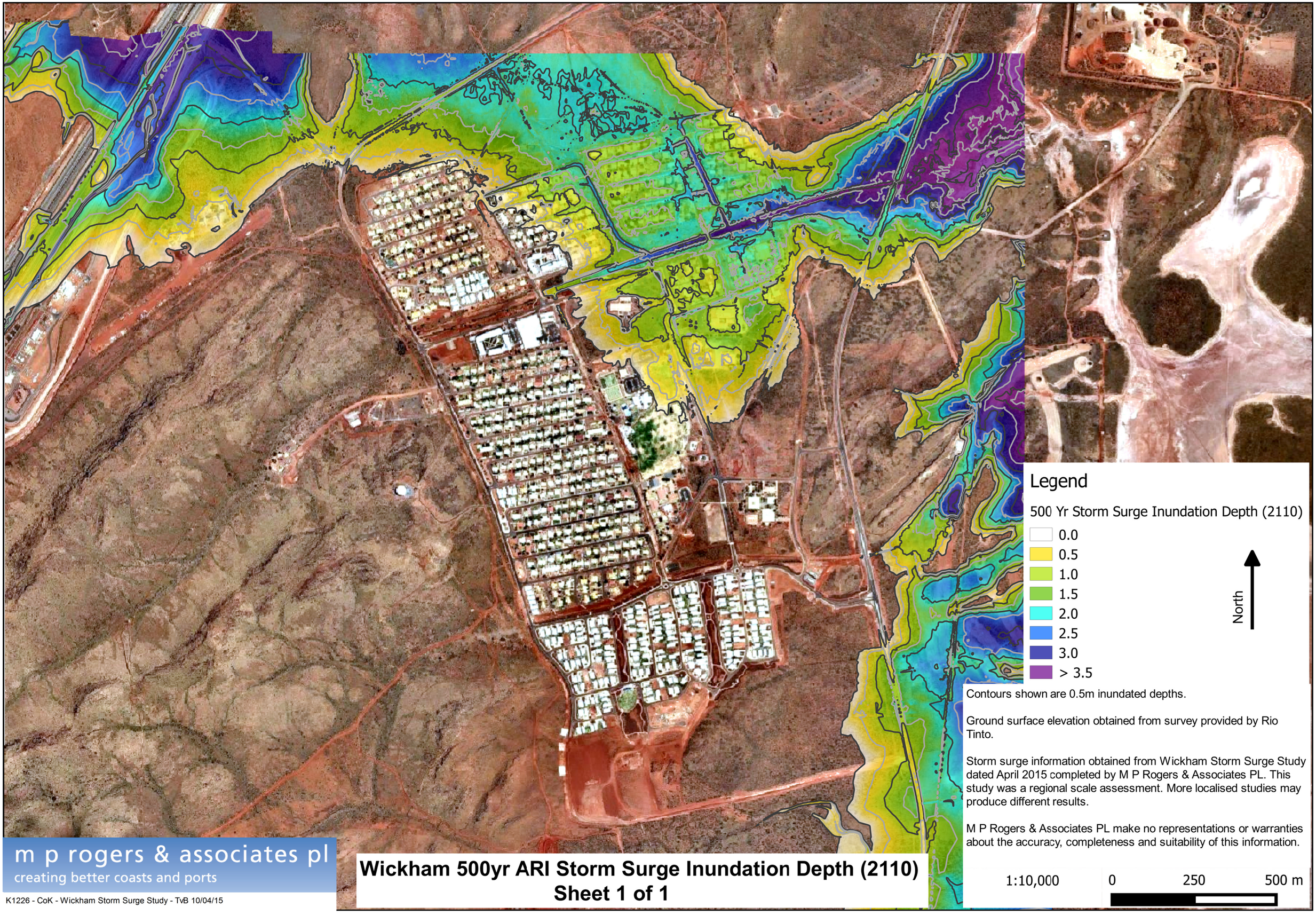
Storm surge information obtained from Roebourne Townsite Stormwater and Flood Management Plan completed by Essential Enviromental. This study was a regional scale assessment. More localised studies may produce different results.

M P Rogers & Associates PL make no representations or warranties about the accuracy, completeness and suitability of this information.

1:5,000 50 0 50 100 150 200 250 m

Roebourne 500yr ARI Storm Surge Inundation Depth

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creating better coasts and ports

Wickham 500yr ARI Storm Surge Inundation Depth (2110)
Sheet 1 of 1

K1226 - CoK - Wickham Storm Surge Study - TvB 10/04/15

APPENDIX C
RISK ASSESSMENT MATRIX

Risk Category	Risk Description	Applicable?	500-Year ARI Storm Surge			Treatment Options
			Consequence	Likelihood	Level of Risk	
Public Safety: Emergency Response	Storm surge flooding comprises emergency response and recovery capacity, resulting in harm to the public.	☐		1		Maintain and continually improve evacuation plans. Encourage development above the 500-year ARI storm surge level, wherever practicable. Apply construction standards suitable to withstand the forces of a 500-year ARI storm surge event. Implement suitable controls on electricity supply to prevent electrocution during a 500-year ARI event.
Public Safety: Access and Egress	Storm surge flooding restricts access to, and egress from, residential lots resulting in harm to the public.	☐		1		Maintain and continually improve evacuation plans. Encourage development above the 500-year ARI storm surge level, wherever practicable Apply construction standards suitable to withstand the forces of a 500-year ARI storm surge event, Implement Suitable controls on electricity supply to prevent electrocution during a 500-year ARI event.
Private Property: Residential	Storm surge flooding causes damage to residential property.	☐		1		Encourage development above the 500-year ARI storm surge level, wherever practicable. Apply construction standards suitable to withstand the forces of a 500-year ARI storm surge event.
Private Property: Commercial	Storm surge and stormwater flooding damages commercial property, including accommodation, retail, service stations and industrial premises, and may result in the uncontrolled release of waste.	☐		1		Encourage development above the 500-year ARI storm surge level, wherever practicable. Apply construction standards suitable to withstand the forces of a 500-year ARI storm surge event.
Private Property: Landscaping / Streetscaping	The proposed development may be affected by the modelled storm surge event, with consequential impacts on City-maintained landscaping and streetscaping adjacent to the site.	☐		1		Consider the potential loss of landscaping to storm surge when planning landscaping in storm surge affected area.

Public Infrastructure: Roads and Transport	Storm surge flooding impacts road and transport infrastructure adjacent to, or proposed as part of, the development.	☐		1		Identify alternative emergency access arrangements for properties within the 500-year ARI storm surge affected area. Formalise interim access arrangements as soon as practicable where roads have been damaged. Install protective measures, where necessary, to safeguard roads and other infrastructure at risk from coastal processes.
Public Infrastructure: Drainage	Storm surge flooding may impact the capability and/or capacity of drainage infrastructure proposed as part of the development.	☐		1		Ensure drains are regularly inspected and cleaned. Identify elements of drainage network requiring improvement. Schedule upgrades to the drainage infrastructure most critical to network performance.
Public Infrastructure: Effluent Ponds / Tanks	Storm surge flooding impacts recycled effluent irrigation ponds and tanks.	☐		1		Tanks constructed within the 500-year ARI storm surge affected area should be designed having regard to the potential of such an event, incorporating mitigation measures.
Public Infrastructure: Emergency Management Infrastructure	Storm surge flooding impacts community emergency management infrastructure.	☐		1		Ensure sufficient capacity of emergency management infrastructure and services to accommodate evacuated households.
Environmental: Contamination from Development	Flooding may result in contamination arising from the proposed development on-site (e.g. industrial storage, effluent treatment).	☐		1		Ensure identified environmental and contamination issues are addressed in development application, having regard to storm surge risk.
Environmental: Other Exposed Factors	The proposed development may expose other environmental factors to storm surge risk (e.g. asbestos, acid sulphate soils).	☐		1		Ensure identified environmental and contamination issues are addressed in development application, having regard to storm surge risk.
Community: Heritage	Storm surge flooding impacts locally registered heritage sites and other important heritage places on the property.	☐		1		Have regard to infrastructure within the 500-year ARI storm surge affected area when planning development at local heritage sites. Minimise financial losses arising from a 500-year ARI storm surge event.
TOTAL ASSESSED RISK (Total score)						

TOTAL ASSESSED RISK PER CATEGORY
(Being the highest rated risk in each of the relevant categories)

Public Safety			
Private Property			
Public Infrastructure			
Environmental			
Community			

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It is subject to change and uncontrolled when printed.

Instructions for Completing Risk Assessment Matrix
▪ Select the risk row(s) applicable to the proposal.
▪ Assign a consequence rating of 1 – 5, where 1 is Insignificant and 5 is Catastrophic.
▪ The likelihood rating is at 1 (Low) reflecting the low probability of a 1 in 500-year ARI storm surge event.
▪ Level of risk = Consequence x Likelihood.
▪ Where an application involves more than one risk category, the higher risk consequence rating applies.

Measures of Financial Consequences	
1. INSIGNIFICANT	Less than $10,000
2. MINOR	$10,000 - $100,000
3. MODERATE	$100,000 - $2,000,000
4. MAJOR	$2,000,000 - $5,000,000
5. CATASTROPHIC	More than $5,000,000

APPENDIX D
APPLICANT STORM SURGE RISK CHECKLIST

Q	Risk Assessment Question	Check
1.	Does the development propose a habitable room or net lettable floor area with a finished floor level below the identified 500-year event storm surge event level?	☐
2.	To what depth would the finished floor level of this room/development be below the 500-year ARI storm surge event level?	
	▪ Between 0m and 250mm?	☐
	▪ Between 250mm and 500mm?	☐
	▪ Between 500mm and 1 metre?	☐
	▪ Greater than 1 metre?	☐
3.	Following the completion of the City's Risk Assessment Matrix, the Applicant has assessed the risk to the proposed development as:	
	▪ Insignificant to Minor	☐
	▪ Moderate	☐
	▪ Major to Catastrophic	☐
4.	Is the landowner/applicant prepared to accept the level of risk of damage to the proposed development in the event of a 500-year ARI storm surge event?	☐
5.	Is the landowner/applicant prepared to place a Section 70A notification on title, notifying prospective purchasers of the risk of damage to the property in the event of a 500-year ARI storm surge event?	☐
6.	What mitigation measures, if any, are proposed to address the risk of storm surge?	
	▪ The development has been located on the least hazardous portion of the site.	☐
	▪ A storm surge protection wall/barrier is proposed to protect the development from storm surge.	☐
	▪ An emergency evacuation plan has been prepared by a suitably qualified consultant.	☐
	▪ The proposed development is deemed to be a low-value (cost) asset.	☐
	▪ Structures below the identified storm surge flood level are constructed of flood-resistant materials and designed to withstand water forces, as determined by a suitably qualified structural engineer.	☐
	▪ The proposal involves a temporary or relocatable structure that could be readily repaired or reinstated at low-cost following the impacts of the identified 500-year ARI storm surge event.	☐
7.	Other. (Please specify)	

Landowner Signature _____ Dated _____

Applicant Signature _____ Dated _____

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