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Coastal adaptation in Port Adelaide

*‘the long journey from evidence
to investment’*

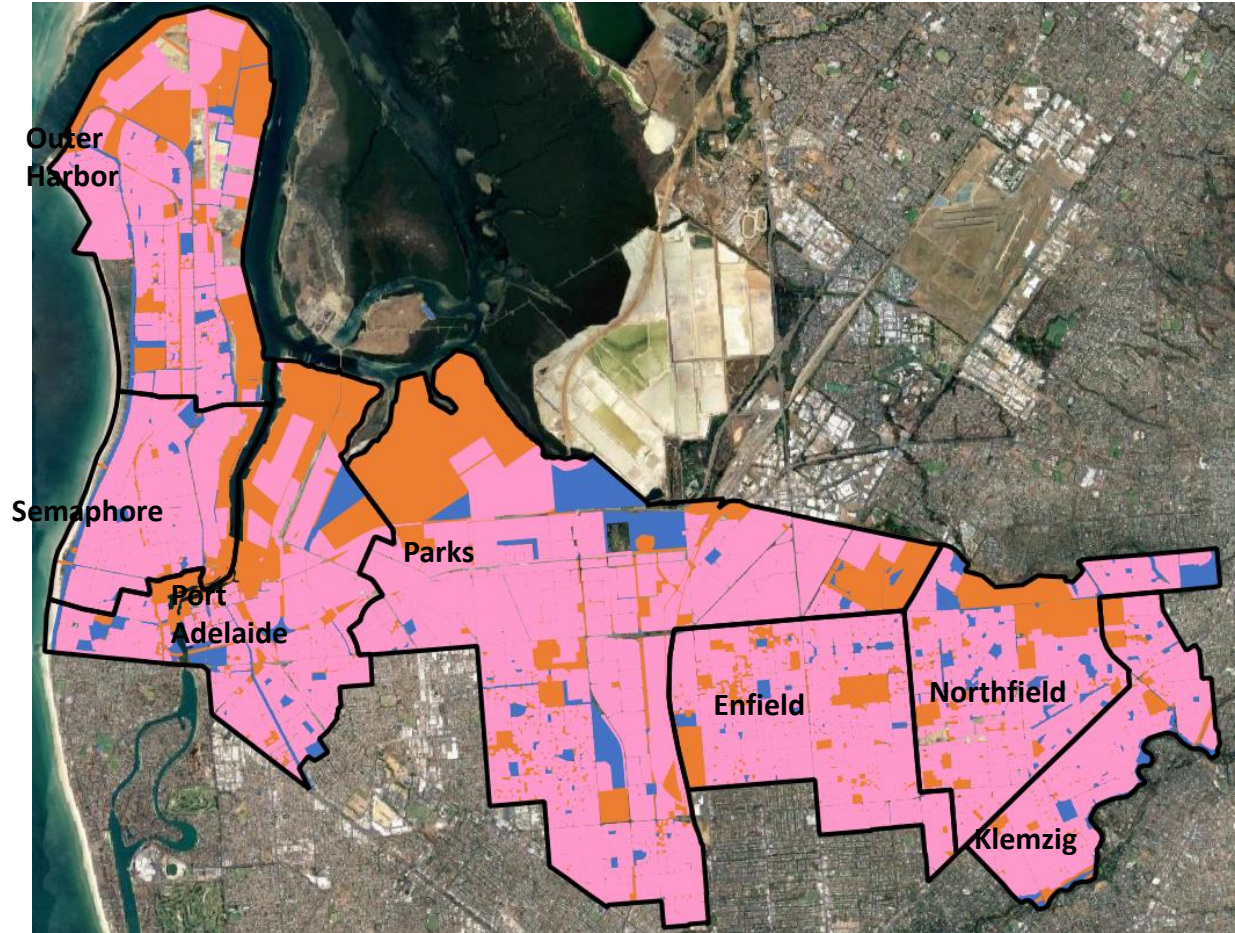
Presenter

Maggie Hine,

Team Leader Strategic Planning and Environment



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PORT ADELAIDE?
STRAIGHT ON
THREE KS AND
DOWN A COUPLE
OF FATHOMS!

PT ADELAIDE
SEA WALL
PROPOSED

WATER
WATER
EVERYWHERE

A. C. 2002



Strategic assets

- 3 power stations supplying SA electricity
- Key nationally linked natural gas pipeline
- Osborne defence facility (submarine and frigate)
- Birkenhead – fuel depots, Adelaide Brighton Cement
- Outer Harbor – international sea freight terminal
- Major commercial freight rail and road infrastructure
- Port Centre - Renewal of commercial and residential land

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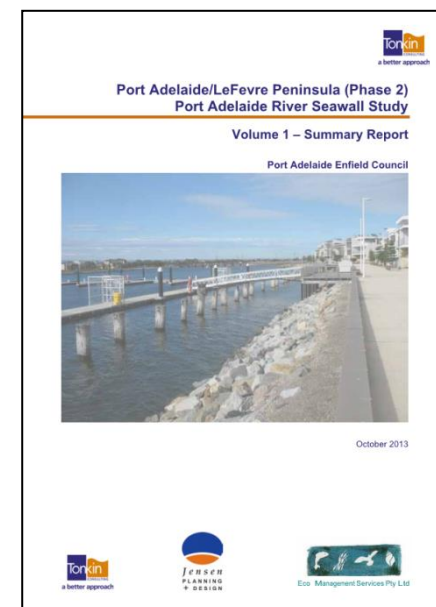
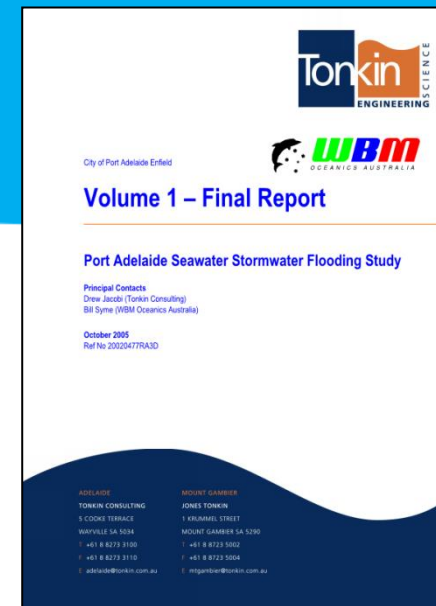
Existing studies

Phase 1 Port Adelaide Seawater and Stormwater Flooding Study (2005)

- Aim :
- Determine the impact of sea level rise and land subsidence
 - undertake modelling and mapping
- Output :
- Need planning controls – eg. Finished floor level, surface level, type of development
 - Physical mitigation options - Seawall

Phase 2 - Port Adelaide River Seawall Study (2013)

- Options for seawall construction
- Highlighted that Council does not own any of the foreshore/promenade area



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Phase 3: Gillman Study (part of Western Region Coastal and Inundation Modelling)

Build on work done under the Port Seawater Stormwater project to determine the potential effects on the western region

Extrapolate the effects of sea level rise modelled in the Port Seawater Stormwater Study to determine the impact on the Western Adelaide Region

- Take account of increased rainfall intensity since the 2005 study
- Model the impact of vulnerable stormwater networks





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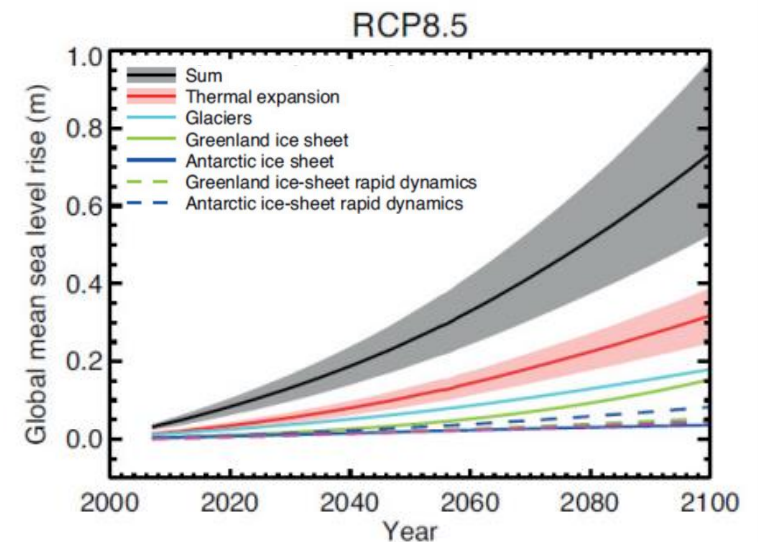
Sea Level Rise Scenario

Predicted Sea Level Rise to 2100 and Land Subsidence

Sea level rise predictions (IPCC – 3rd Assessment Rpt)

- 300mm to 2050
- 500mm to 2070
- 1000mm to 2100

Predicted land subsidence 2.1mm/yr



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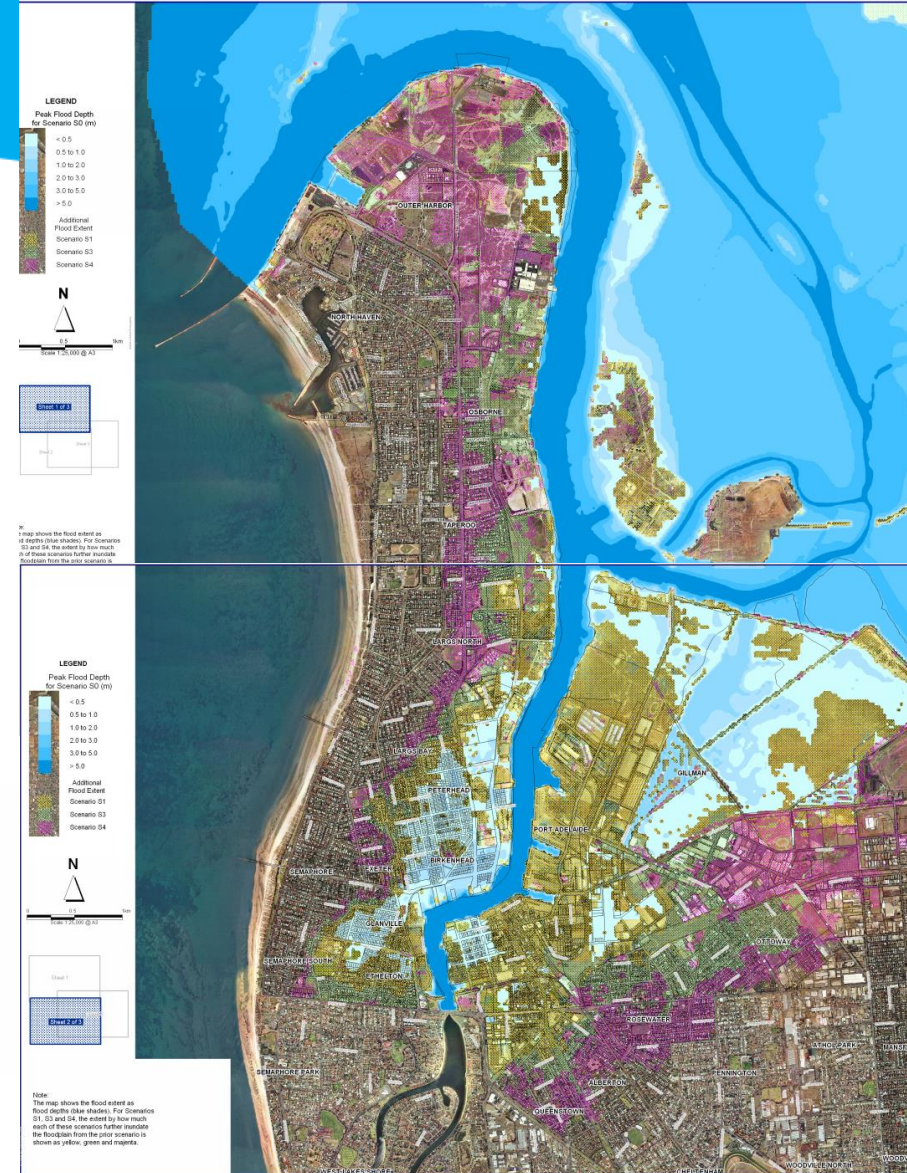
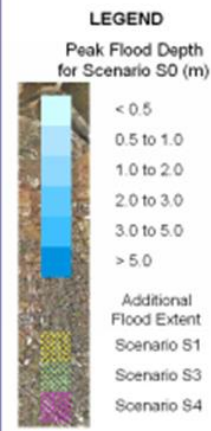


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Phase 1 Study

Flooding due to Sea Level Rise

- The PAE study assessed the risks associated with sea level rises of 0.10m, 0.30m, 0.50m and 0.88m.
- Scenario 1 is 2050 predictions – 300mm sea level rise and 50 years of land subsidence
- Scenario 4 is 2100 predictions – 880mm sea level rise and 100 years of land subsidence



Tonkin
ENGINEERING
CONSULTING

Project: Port Adelaide
Client: City of Port Adelaide Enfield
Date: 15/06/2015

MAP DETAILS
Projection: Transverse Mercator, GDA 84
Datum: GDA 84
Units: Metres
Scale: 1:5000
Drawing Date: 15/06/2015
Drawing Number: 10000
Drawing Title: PREDICTED 100 YEAR STORM TIDE INUNDATION FOR SCENARIOS S0, S1, S3 AND S4
Drawing Author: J. Smith
Drawing Checker: J. Smith
Drawing Approver: J. Smith
Drawing Date: 15/06/2015

ABR
485 Upper Edward Street
Geelong VIC 3220
Australia, 4000

PREDICTED 100 YEAR STORM TIDE INUNDATION FOR SCENARIOS S0, S1, S3 AND S4

LEGEND

Peak Flood Depth
for Scenario S0 (m)



< 0.5
0.5 to 1.0
1.0 to 2.0
2.0 to 3.0
3.0 to 5.0
> 5.0

Additional
Flood Extent
Scenario S1
Scenario S3
Scenario S4

N



0 0.5 1km
Scale 1:25,000 @ A3

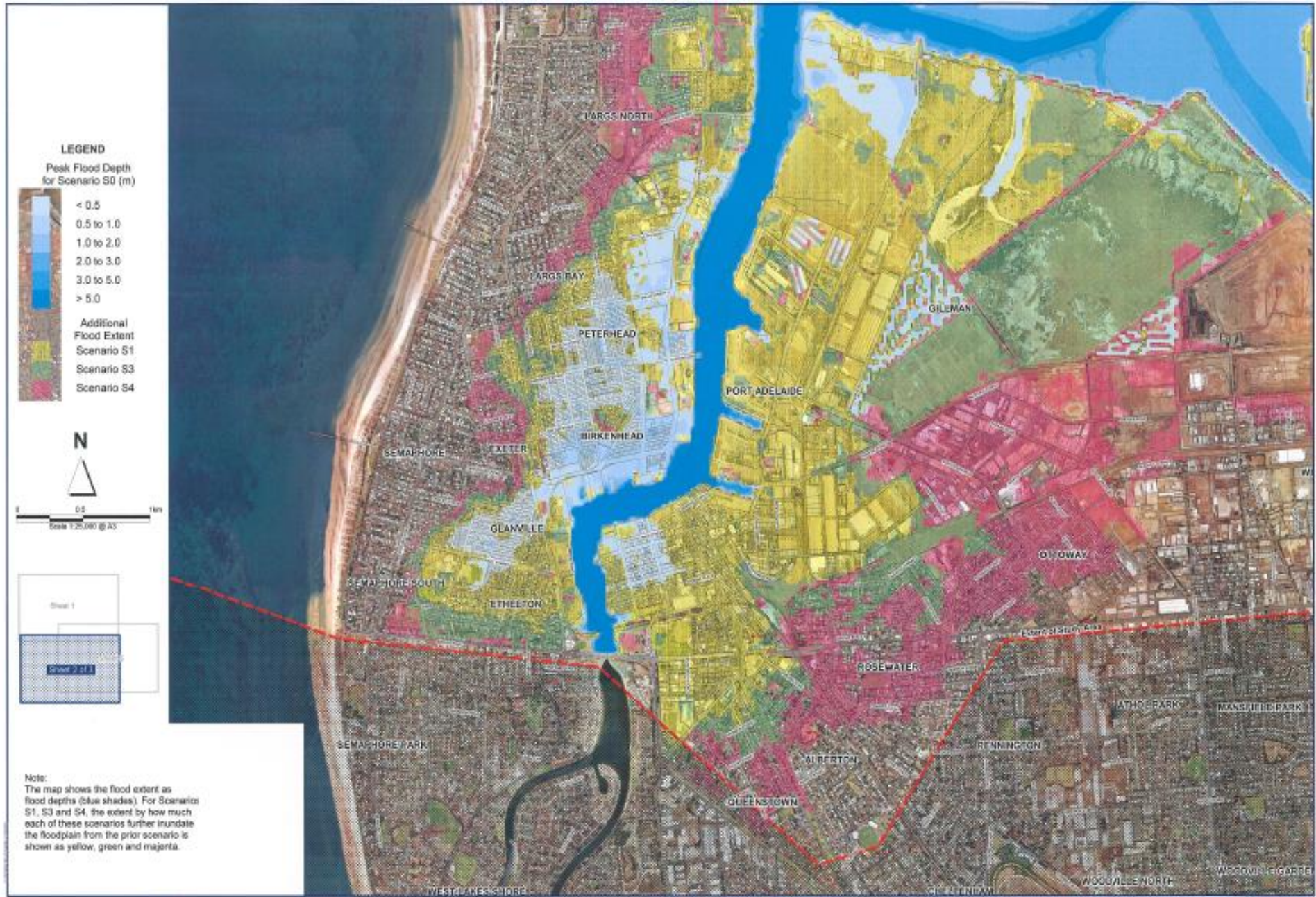


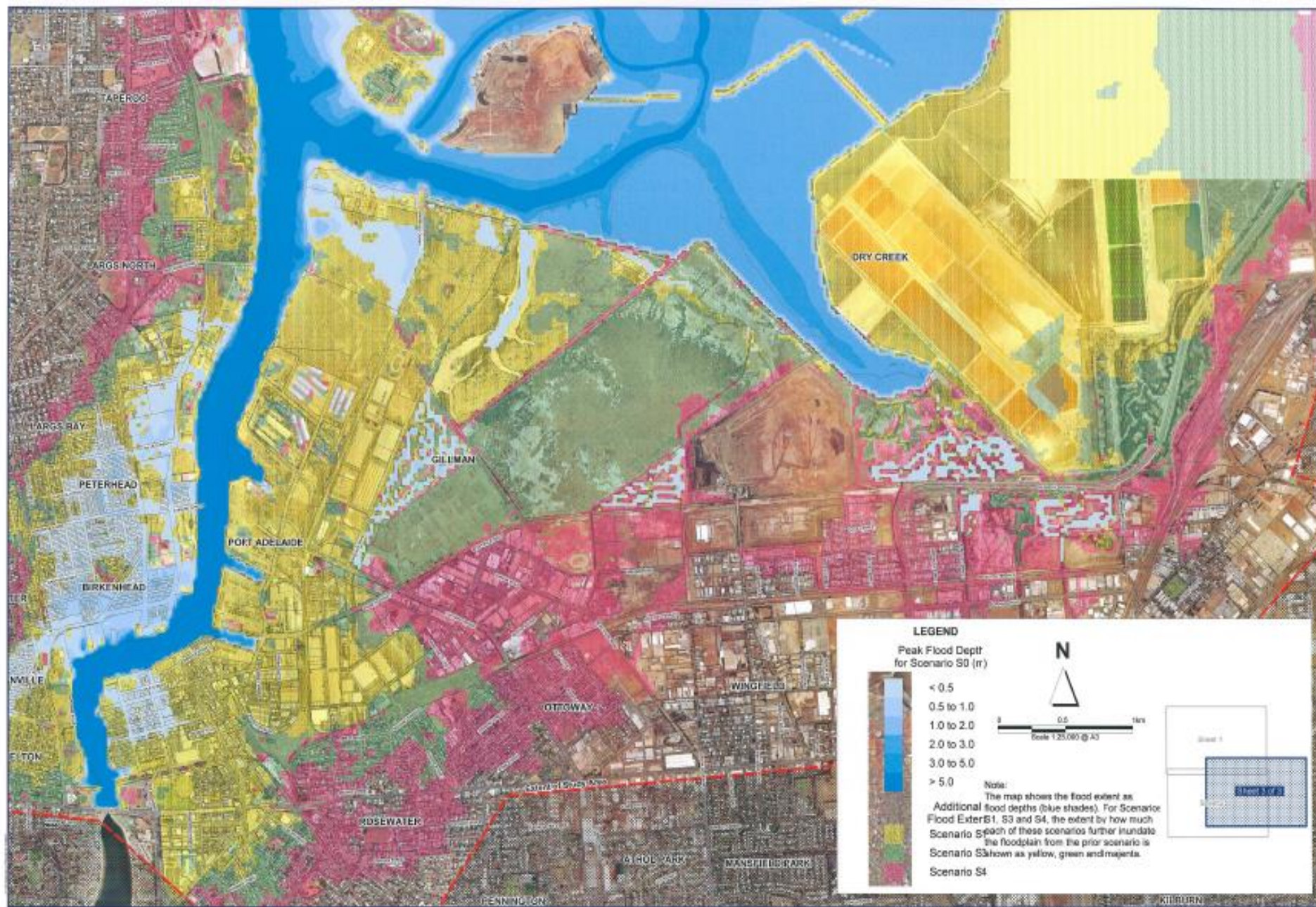
Note:

The map shows the flood extent as flood depths (blue shades). For Scenario S1, S3 and S4, the extent by how much each of these scenarios further inundate the floodplain from the prior scenario is shown as yellow, green and magenta.



MAP DETAILS







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Phase 2 - Seawall Study

- Mitigation strategies developed as part of Stage 2, in particular seawalls, living shorelines, levee banks, considered constraints including -
 - the need for access for port related activities
 - highly sensitive environmental regions such as mangrove areas
 - constraints within heritage areas



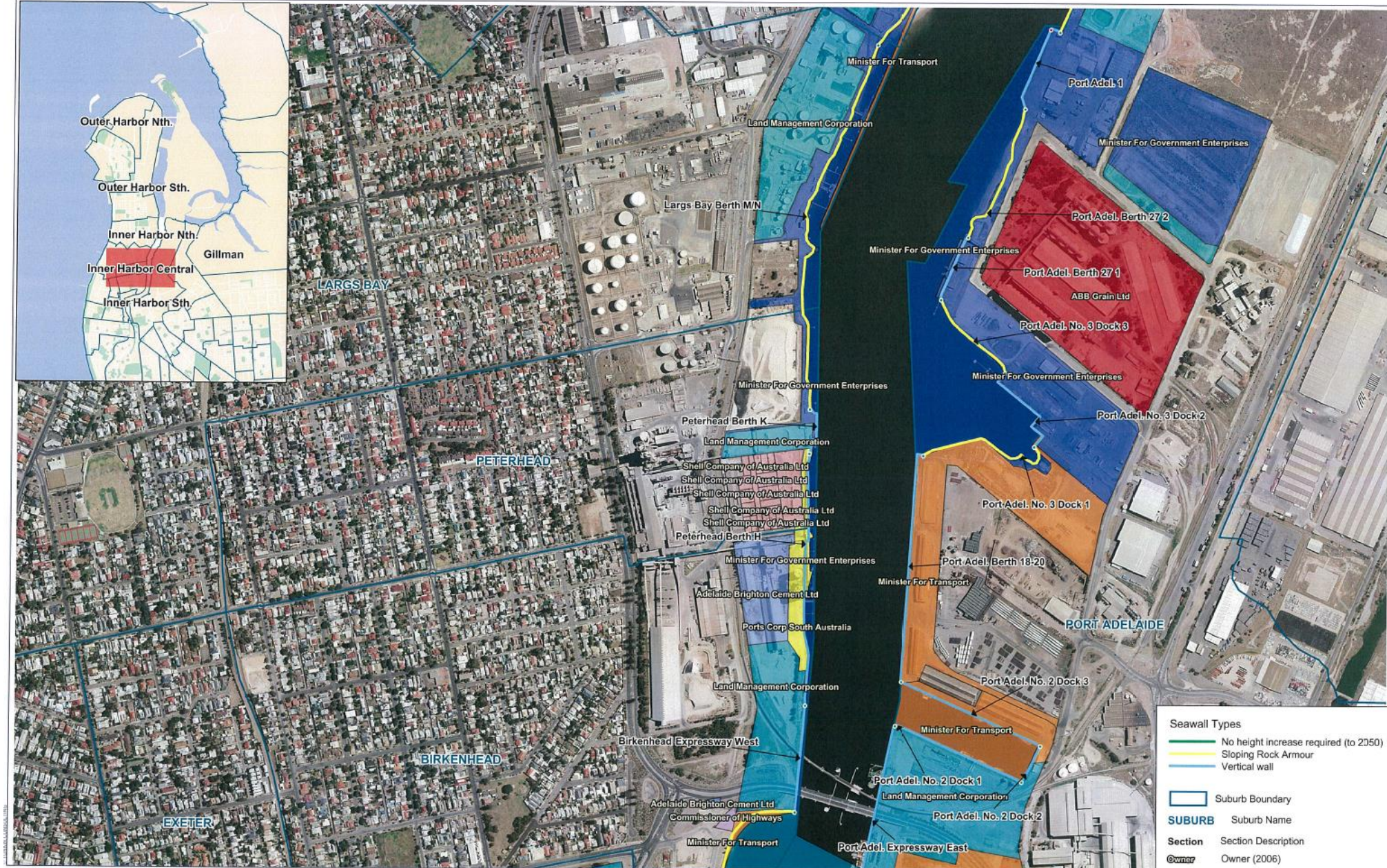
a better approach

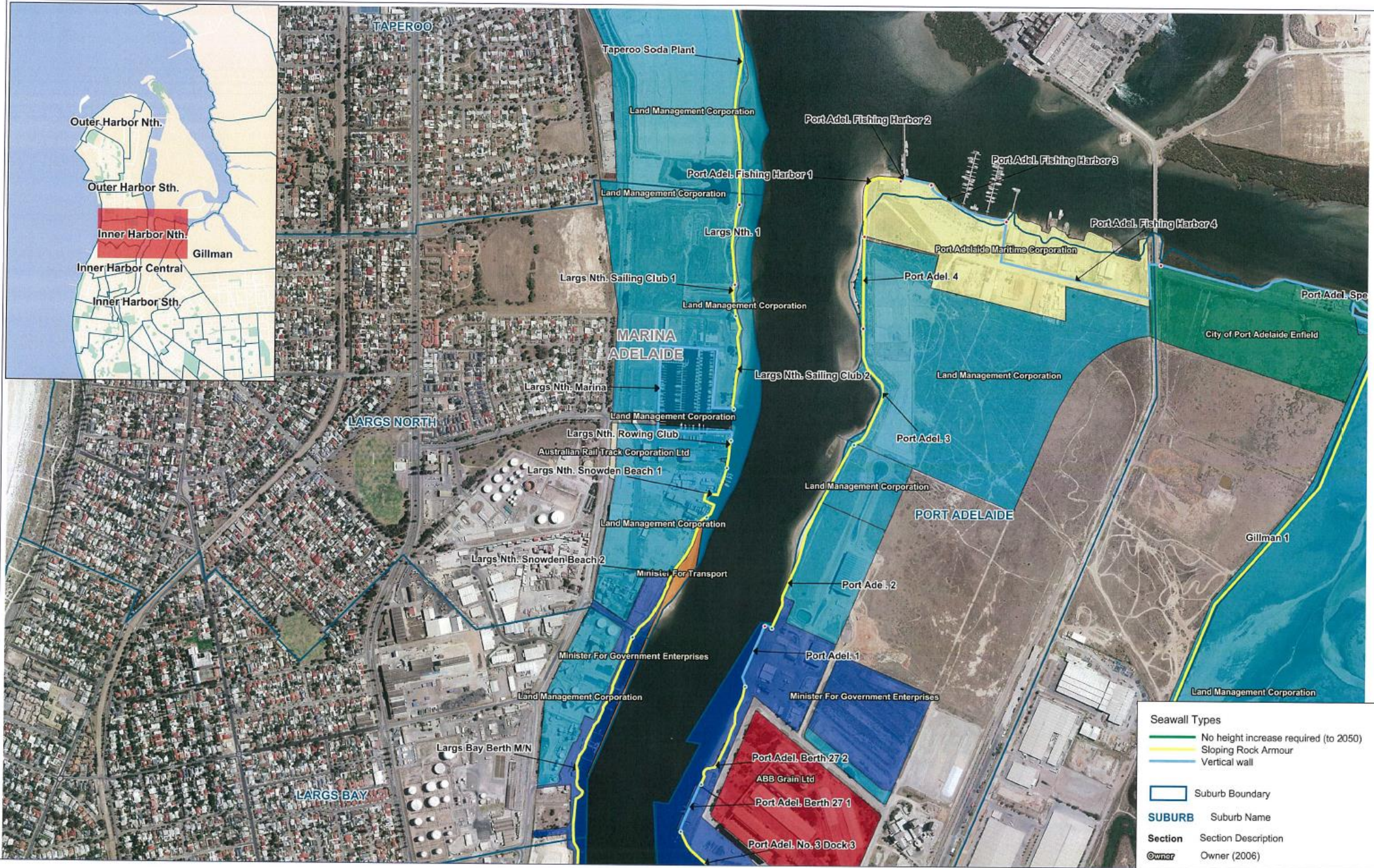
Section Descriptor	Existing Infrastructure	Condition	Approximate Existing Wall Height (m AHD)	Constraints/Issues	Recommended Upgrade	Priority Number
				undeveloped land used as informal car parking. Part of proposed Newport Quays Development		
Newport Naval Yard	Vertical sheet pile/slip facilities	Good	1.7	Some corrosion visible. Large buildings located in close proximity to the top of wall. Part of proposed Newport Quays Development	Vertical wall to 3.4 m AHD	2
Newport Fletcher Dock	Vertical sheet pile/sloping rock armour/slip facility	Serviceable	2.0	Some corrosion visible. A large building is located in close proximity to the top of wall. Part of proposed Newport Quays Development	Vertical wall to 3.4 m AHD	1
Newport 1	Vertical timber wallings	Poor	2.4	Some holes through timber. Part of proposed Newport Quays Development	Vertical wall/Rock armour	1
Newport 2	Sloping rock armour	Good	2.3	Some minor slip. Part of existing Marina Cove section of Newport Quays Development	Vertical wall to 3.4 m AHD	1
Port Adelaide Harbourside Quay	Sloping rock armour	Excellent	2.0	Shared path directly behind seawall. Residential area very close to seawall	Vertical wall to 3.4 m AHD	1 (due to close proximity of residential area)
Port Adelaide North Parade Wharf	Vertical sheet pile	Good	2.5	Spalling of concrete along top of sheet pile wall. Area behind wall used for car parking and pedestrian access. A section of this area is proposed to form part of the proposed Newport Quays Development	Vertical wall to 3.4 m AHD. Consider raising pavement as part of Newport Quays development.	2
Port Adelaide Queens Wharf	Vertical concrete wall	Good	2.6	Spalling observed on previously repaired area. Area behind wall used for pedestrian access. Access to the Dolphin Explorer from this area, may require localised raised pavement behind wall	Vertical wall to 3.4 m AHD	2
Port Adelaide No. 1 Dock 1	Vertical concrete wall	Good	2.5	Spalling observed on previously repaired area. Area behind wall used for pedestrian access. This area forms part of the proposed Newport Quays Development	Vertical wall to 3.4 m AHD. Consider raising pavement as part of Newport Quays development.	2
Port Adelaide No. 1 Dock 2	Vertical sheet pile	Good	2.5	Some corrosion visible. Pedestrian access to a pontoon from this area. Part of proposed Newport Quays Development	Vertical wall to 3.4 m AHD. Consider raising pavement as part of Newport Quays development.	2
Port Adelaide No. 1 Dock 3	Vertical concrete wall	Good	2.6	Isolated spalling, exposed reinforcement in areas. Vessels accessed from existing platform. Pavement may need to be raised to continue operations. Part of the proposed Newport Quays development	Vertical wall to 3.4 m AHD. Consider raising pavement as part of Newport Quays development.	2
Port Adelaide Expressway East	Vertical concrete wall	Serviceable	2.6	Isolated spalling, exposed reinforcement in areas. Vessels accessed from existing platform. Pavement may need to be raised to continue	Vertical wall to 3.4 m AHD. Consider raising pavement as part of Newport Quays development. Existing seawall may require repairs	1

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Seawall Types

- No height increase required (to 2050)
- Sloping Rock Armour
- Vertical wall

Suburb Boundary

SUBURB Suburb Name

Section Section Description

Owner Owner (2006)



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Phase 3 - Western Region Coastal & Inundation Modelling

Vulnerable stormwater networks :

- Gillman (City of PAE)
- West Lakes (City of Charles Sturt)
- Patawalonga (City of West Torrens)

Magazine Creek/Range/Gillman System:

Targeted this area for the following reasons:

- Low lying land (subject to inundation)
- Tidal gates control the outflow of stormwater and inflow of seawater
- Outlet for major stormwater catchment (TRDA)
- SA Government Development



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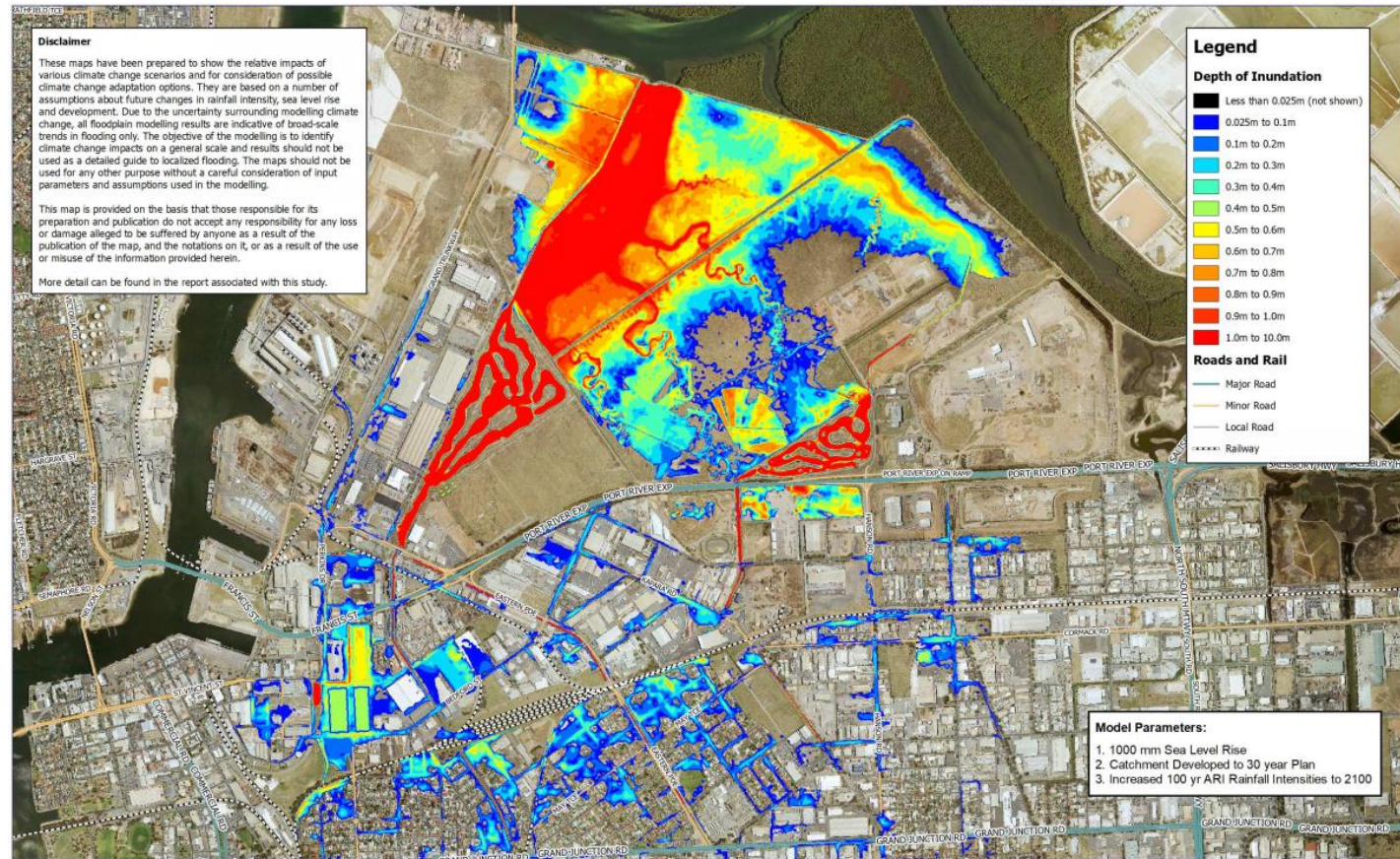


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Western Region Coastal & Inundation Modelling

Modelling

- Worst case for Gillman area is 100yr storm with MHWS tide plus 1metre sea level rise
- Minor increase in flooding in industrial and residential areas as the wetland is low lying and high tide currently chokes the outflow from the wetland
- Large ponding area north east of wetland provides additional storage space to minimise flooding upstream



0 250 500 750 1000 m
Job Number: 2014.0320
Filename: 2014.0320\0011_GillmanMapping_02
Revision: C
Date: 20/10/2014

Data Acknowledgement:
Aerial Photography from Metrolip, 2017
Road and Rail data by PBE, 2014

City of Charles Sturt / City of Port Adelaide Enfield / City of West Torrens
Western Adelaide Region Climate Change Adaptation Plan
Gillman Inundation Map - 100 yr ARI Flood Interaction With MHWS Tide
(1000 mm Sea Level Rise - 2100)

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UNHaRMED mitigation and planning exercise 2019

- <https://www.bnhcrc.com.au/hazardnotes/86>

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HAZARD NOTE



ISSUE 86 DECEMBER 2020

TOPICS IN THIS EDITION | EXPOSURE | FLOOD | MITIGATION

IMPROVING RISK MITIGATION THROUGH BETTER SCENARIO MODELLING: A COASTAL INUNDATION CASE STUDY

ABOUT THIS PROJECT

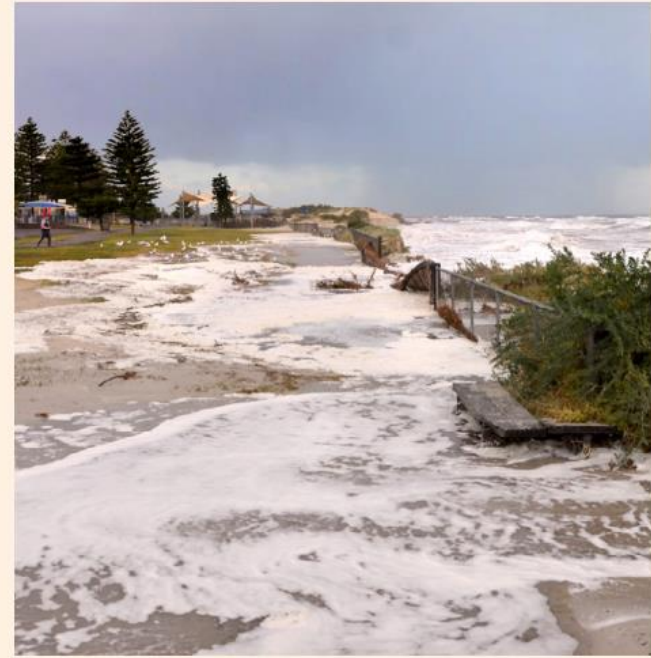
This research was conducted as part of the Bushfire and Natural Hazards CRC's *Improved decision support for natural hazard risk reduction* project, part of the economics and strategic decisions cluster.

AUTHORS

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Dr Graeme Riddell and Prof Holger Maier, University of Adelaide.
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SUMMARY

This project trialled the application of decision support software developed by the research team, called UNHaRMED - Unified Natural Hazard Risk Mitigation Exploratory Decision system - in a mitigation and planning exercise. The exercise, conducted in August and September 2019, brought together a diverse multi-agency team to explore future coastal inundation risk at the City of Port Adelaide Enfield in South Australia. The trial explored the ways in which the likelihood and consequence of coastal inundation risk at the port could change in future decades. UNHaRMED was crucial in focusing attention on the key policy issues to be addressed and resolved to mitigate future risk.

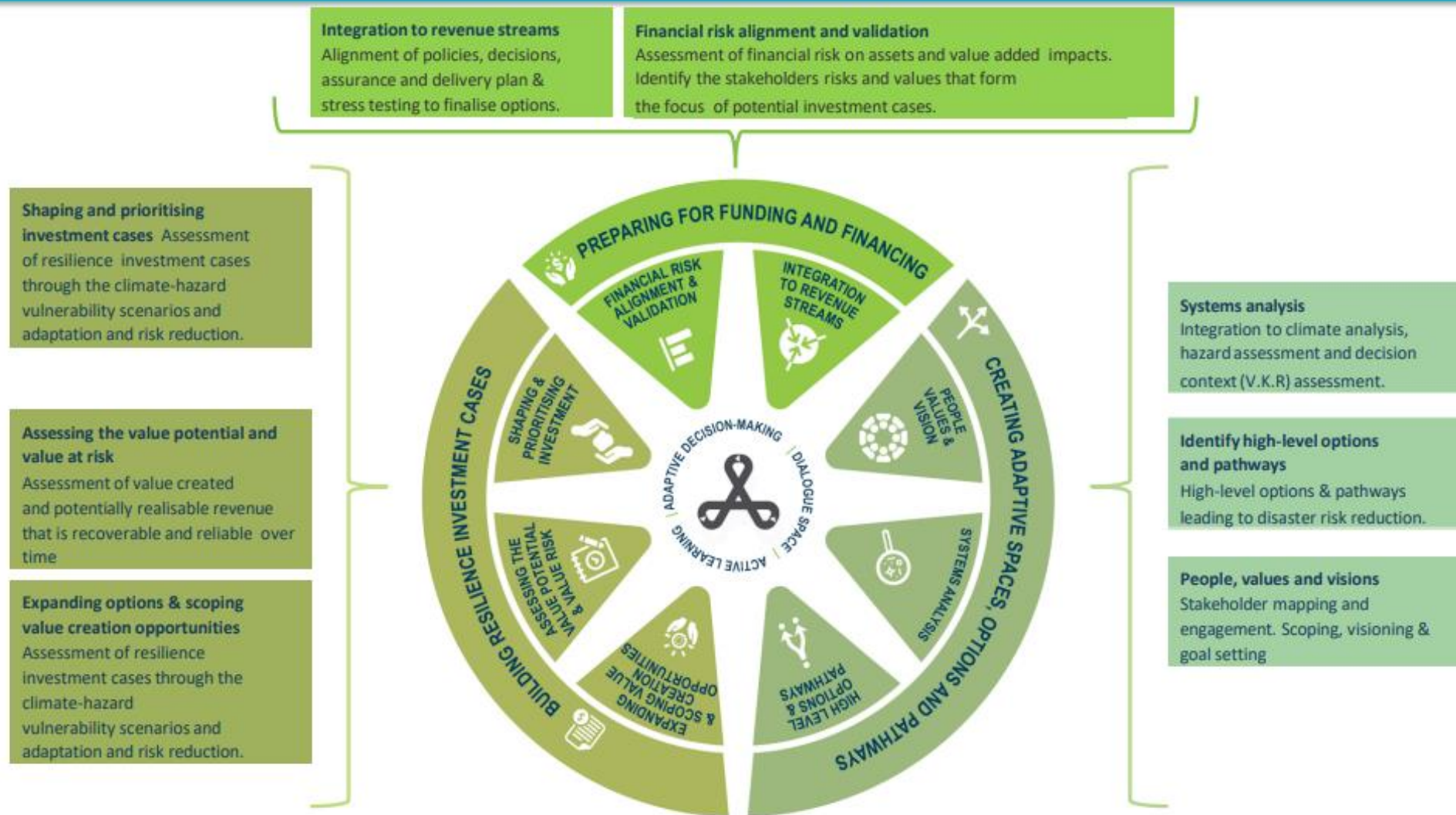


▲ Above: THIS RESEARCH EXPLORED WAYS IN WHICH THE LIKELIHOOD AND CONSEQUENCE OF COASTAL INUNDATION RISK WILL CHANGE IN FUTURE DECADES AND WHAT CAN BE DONE TO MITIGATE THE CHANGING RISK. PHOTO: ANTHONY VIRAG, COASTAL MANAGEMENT BRANCH, SOUTH AUSTRALIAN DEPARTMENT OF ENVIRONMENT AND WATER

Developing Resilience Investment Cases

- Port Adelaide region one of two national cases studies – PAE Flood Hazard, Bega Bushfire Hazard to test methodology to develop resilience investment cases
- Outcomes to inform work of new National Recovery and Resilience Agency
- CSIRO and Value Advisory Partners led project
- PAE case study:
 - used modelling and mapping data from prior studies
 - Focused on government stakeholders
 - Focused on identify opportunities for mitigation of hazards, beneficiaries, value creation, funding mechanisms and investment pathways

Overview: Enabling Resilience Investment Framework





Sept 2021 – State Government/PAE made submission to Infrastructure Australia to have Port Adelaide listed on national priority list for investment in coastal adaptation infrastructure:

- business case development
- integrating current and future climate change risks

Dec 21 – council report on CSIRO/VAP project outcomes

Dec 20/Jan 2022 - R&D Project (DEW funding) – Coastal Adaptation Governance Framework for Port River

Current - Exploring funding options under new National Recovery and Resilience Agency funding program with CSIRO/VAP and State Government

Current - Review of coastal hazard overlays in new Planning Design Code

Where we are now

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Thank you for listening

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