QCoast 2100 Forum

Planning for Coastal Change in Townsville

Ashley Astorquia, Townsville City Council

Presentation Outline

- Townsville CHAS Pilot Study
- Current Study – Planning for Coastal Change in Townsville
  - Project Stages
    - Progress
    - Methodology and refinements to pilot study
  - Future project stages

Townsville CHAS Journey

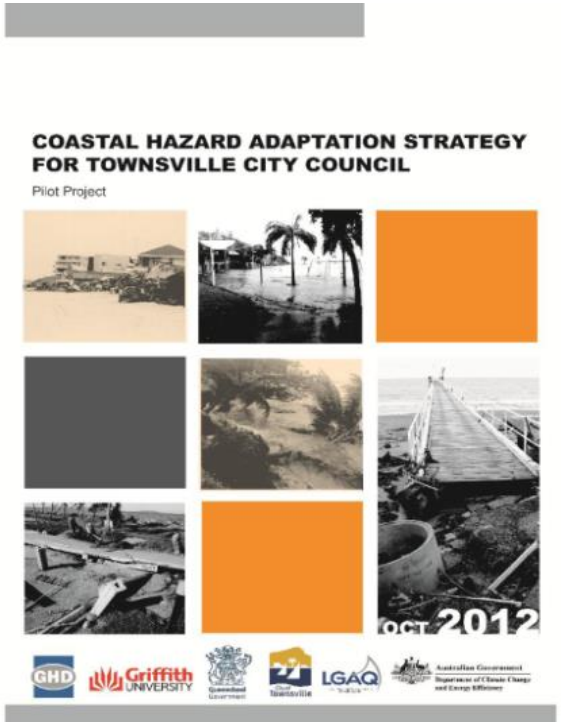
CHAS Pilot Study

- Pilot study based on requirement under previous Qld Coastal Plan (Oct 2012)
  - GHD collaborating with:
  - Local Government Association of Queensland
  - Queensland State Government
  - Townsville City Council
  - Griffith University
  - Commonwealth Department of Climate Change and Energy Efficiency

- High level technical study
  - Review impact of climate change on coastal hazards
  - Vulnerability and risk assessment
  - Identification site specific adaptation options
  - Evaluation of options

- Hazards considered included:
  - 1 in 100y Storm Tide event
    (0.8m SLR at 2100 & 10% intensification in cyclones)
  - Sea Level Rise - (0.8m SLR at 2100)
  - Erosion Prone Areas

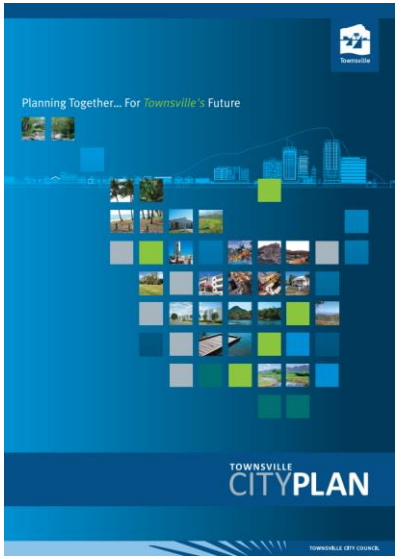
- Adaptation Options considered include:
  - Defend, Accommodate, Retreat , Maintain Status Quo



Townsville CHAS Journey

CHAS Pilot Study

- **Strategy not fully implemented, however Coastal Planning response included in Planning scheme**
  - Coastal Protection Overlay Mapping
  - Coastal protection Overlay Code
  - Defined Storm Tide Elevation
  - No intensification in Hazard Areas
    - Inner Suburbs area



- **Improvements identified**
  - Significant community engagement
  - Assess a range of event probabilities
  - Utilize surveyed floor levels
  - Update asset management plans and coastal hazard governance

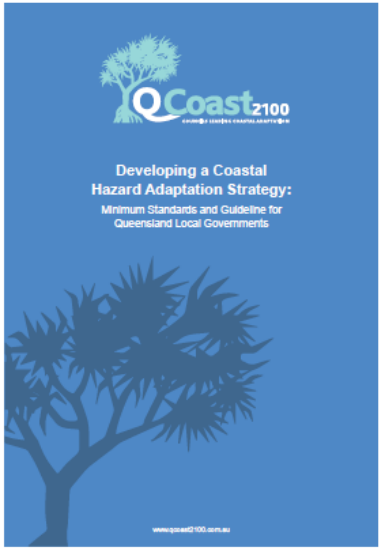
- **Current project aims to build on and refine pilot CHAS !**

Planning for Coastal Change in Townsville

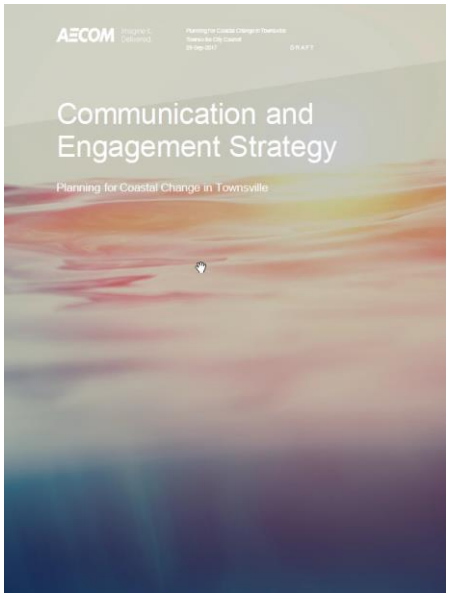
Current Project being undertaken in five stages:

1. **Communication and Stakeholder Engagement Strategy –** draft strategy complete
2. **Revision of Hazard Mapping** - complete
3. **Revision of Adaptation Options** – about to commence
4. **Townsville Inner Suburbs Feasibility Assessment**
5. **Council Implementation**

QCoast2100 Phases	CHAS Pilot	PFCCT
1. Plan for life-of-project stakeholder communication and engagment	x	1
2. Scoping coastal hazard issues for area of interest	✓	
3. Identify areas exposed to current and future hazards	✓	2
4. Identify key assets potentially impacted	✓	3
5. Risk Assessment of key assets in coastal hazard areas	✓	3
6. Identify potential Adpatation Options	✓	3,4
7. Socio-economic appraisal of adaptation options	✓	3,4
8. Stretgey Develepment implementation and review	x	3,4,5



1. Communication and Engagement Strategy



- **Specialist Consultant has been engaged to drive the community and stakeholder engagement**

Goals:

- Improve general understanding of climate change and coastal hazards
- Gather community input to inform adaptation option decision-making
- Broaden awareness of mitigation options, implications and costs
- Foster public support or acceptance of the adaptation strategies

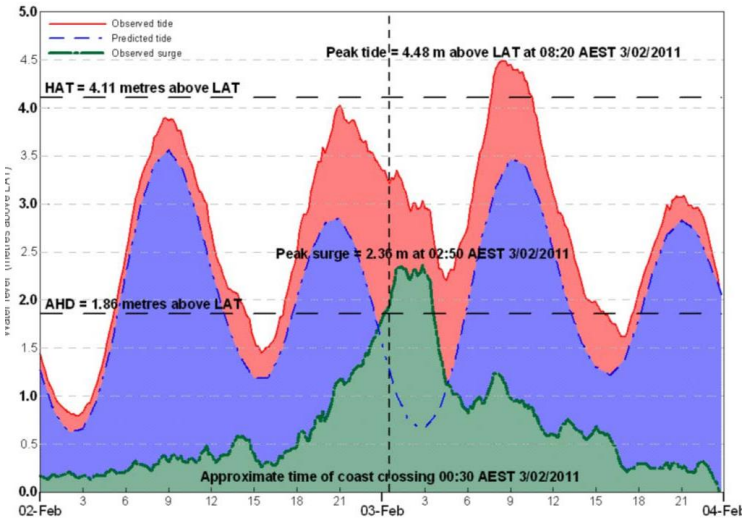
- **Strategy and implementation plan has been developed**

1. Communication and Engagement Strategy

- **Project reference point - website, dedicated email, customer service briefing**
  - **Encourage participation and generate project awareness**
    - **Media release**
    - **Static displays**
    - **Social media and Website links**
- **Community Survey – Online and Phone**
  - **Hazard Awareness and Lived Values**
- **Engage with community and stakeholders on adaptation options**
  - **Workshops with community and other key stakeholders**
- **Public consultation on Adaptation Strategy**

Townsville Coastal Hazards

- Coastal Hazards impacting Townsville region
  - Sea level rise and coastal erosion
    - Smaller beach communities susceptible to coastal erosion
    - Inner suburb areas low-lying and more susceptible to SLR inundation
  - Storm tide
    - Althea (1971), Charlotte (2009), Yasi (2011)
- Comprehensive storm tide study of Townsville LGA previously undertaken (GHD, 2007)
- Pilot CHAS largely based 100yr storm tide surface
- Storm tide mapping revised as part of PFCCT

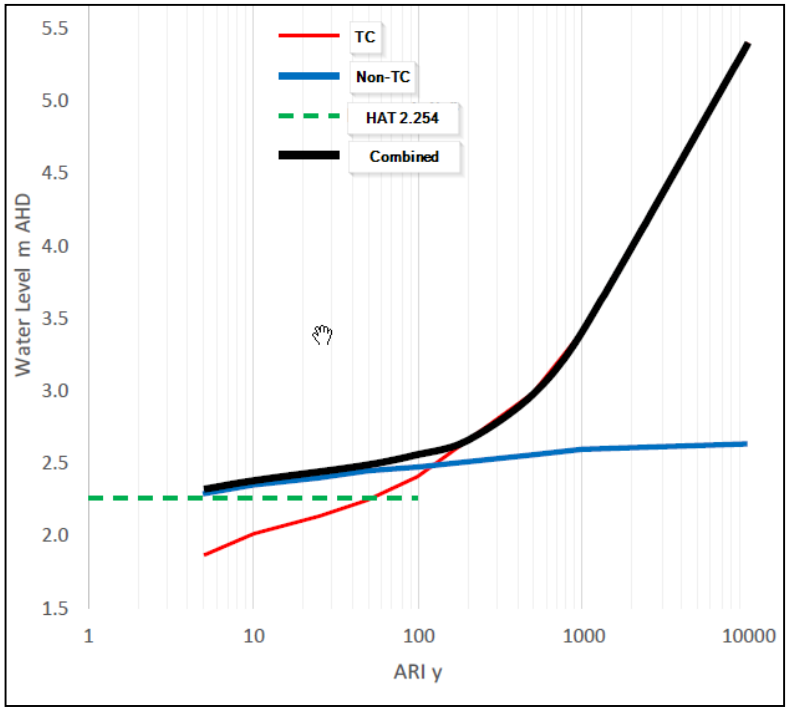


2. Revision of Storm Tide Hazard

- **Storm tide inundation modelling has been revised using consistent approach to previous study. Revision has included:**
  - **A range of probabilities for storm tide inundation**
    - **50, 100, 500, 1000 and 10,000 year events**
  - **Recent LiDAR topographic data and development areas**
  - **Updated assessment of non-cyclonic contributions to storm tide**

- **Inclusion of non-cyclonic events impacts storm tide levels for design events up to 100 year level**

- **Revised storm tide depth and inundation maps produced**



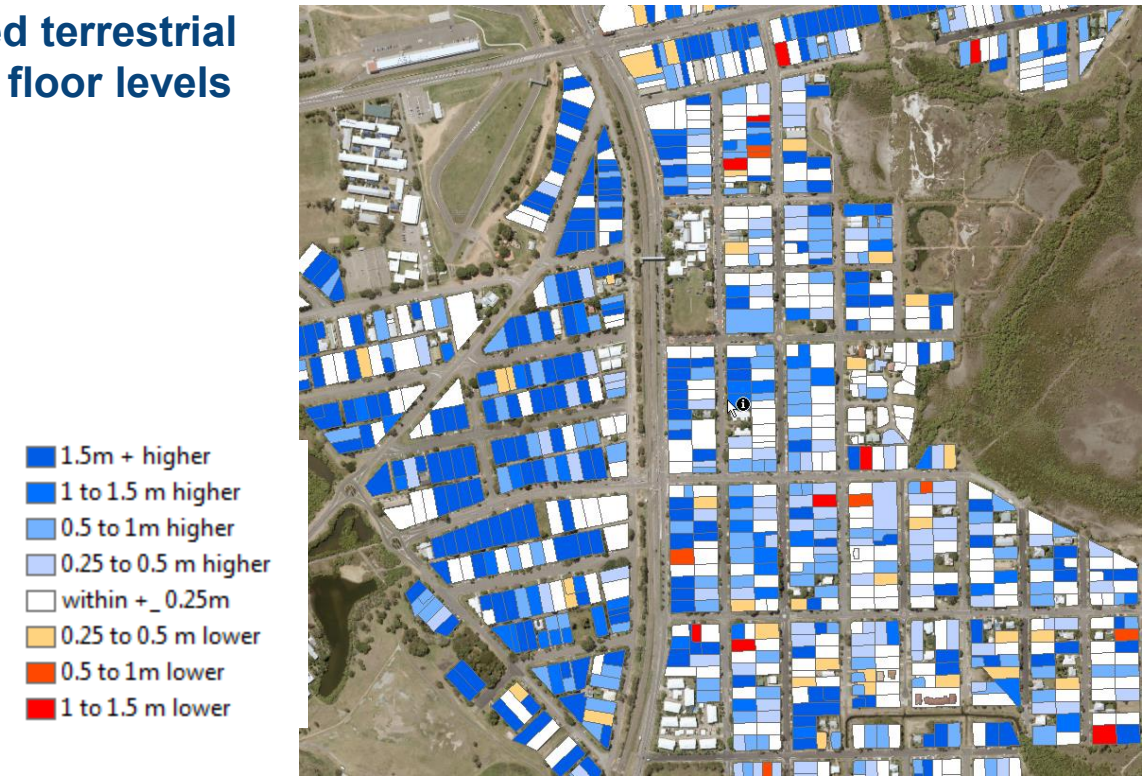
3. Revision of Adaptation Options

- **Review identified assets impacted by coastal hazard**
- **Build on the work undertaken as part of the pilot study**
  - **Significant mapping program**
    - **Councils GIS database**
    - **Environmental overlays**
  - **Stakeholder and Community Inputs**
    - **Engage with owners of significant assets**
      - **Port, Defence, Airport**
    - **Community survey**

Feature	Data Source
Port, Marinas	TCC
Open Space Facilities	TCC
Emergency Routes & Centres	TCC/GHD
Airport	TCC/GHD
Defence	TCC and GHD
Major Industry	TCC and GHD
Transport Depots	TCC
Telephone Exchanges	GoogleMaps
Rail	TCC
Waste Water infrastructure and Mains	TCC
Water Infrastructure and Mains	TCC
Evacuation Centres	TCC
Emergency Health Centres	TCC
Emergency Centres	TCC
Council Buildings	TCC
Other Centres (shopping, education)	TCC

3. Revision of Adaptation Options

- Revise vulnerability and risk assessment for properties and infrastructure
- Floor levels fundamental to defining vulnerability of an asset
- Pilot study vulnerability assessment included development of floor level database
- Council has recently captured terrestrial LiDAR survey to establish floor levels



3. Revision of Adaptation Options

- **Risk thresholds developed for pilot study**
  - **Acceptable**
  - **Tolerable**
  - **Unacceptable**

Risk to Property

Event Range	Residential Buildings - Above floor flooding	Commercial/ Industrial Buildings – Above floor flooding	Open Space/ Rural-Other
100 yr ARI			

Permanent Sea Level	Residential Property	Commercial/ Industrial Property	Open Space/ Rural-Other
>5% of block inundated			
<5% of block inundated			

Risk to Infrastructure

Infrastructure Type	Within infrastructure categorisation					
Water Supply		Trunk mains	Reservoirs/ Towers	Water Treatment Plant processing infrastructure		Source (e.g. weir)
Electricity					Transmission lines	275/110 kV substation
Telecommunications					Telephone exchanges	
Emergency Services				Minor Evacuation Centre	Station (Police/Fire brigade/Ambulance/SES)	Major Evacuation Centre
Cultural Heritage Facilities				Cemetery		Strand
Transport/Freight			Main Roads	Rail Lines	Transport Depots, Highway/Motorway	Evacuation Routes, Sea Ports/Airports/Marinas
Sewage and waste		Scour Pipe		Sewage pump stations, gravity pipes		Sewage Treatment Plant
Health services						Regional Public Hospitals Private Hospitals and aged care facilities Local Public Hospitals
100 year ARI						
Permanent Sea Level (>1% of block inundated)						

3. Revision of Adaptation Options

- Vulnerability and risk assessment will be revised to account for revised hazard data and updated asset information including floor level survey
- Revise and identify any additional adaptation options for localities and refine detail of options to provide input into options appraisal
- Revise socio-economic assessment of options
  - Multi-Criteria Analysis
  - Cost Benefit Assessment
    - Stage – damage curves
    - Community and stakeholder input
- Identify Preferred Adaptation Options and potential interim measures that align with strategy

4. Townsville Inner Suburbs

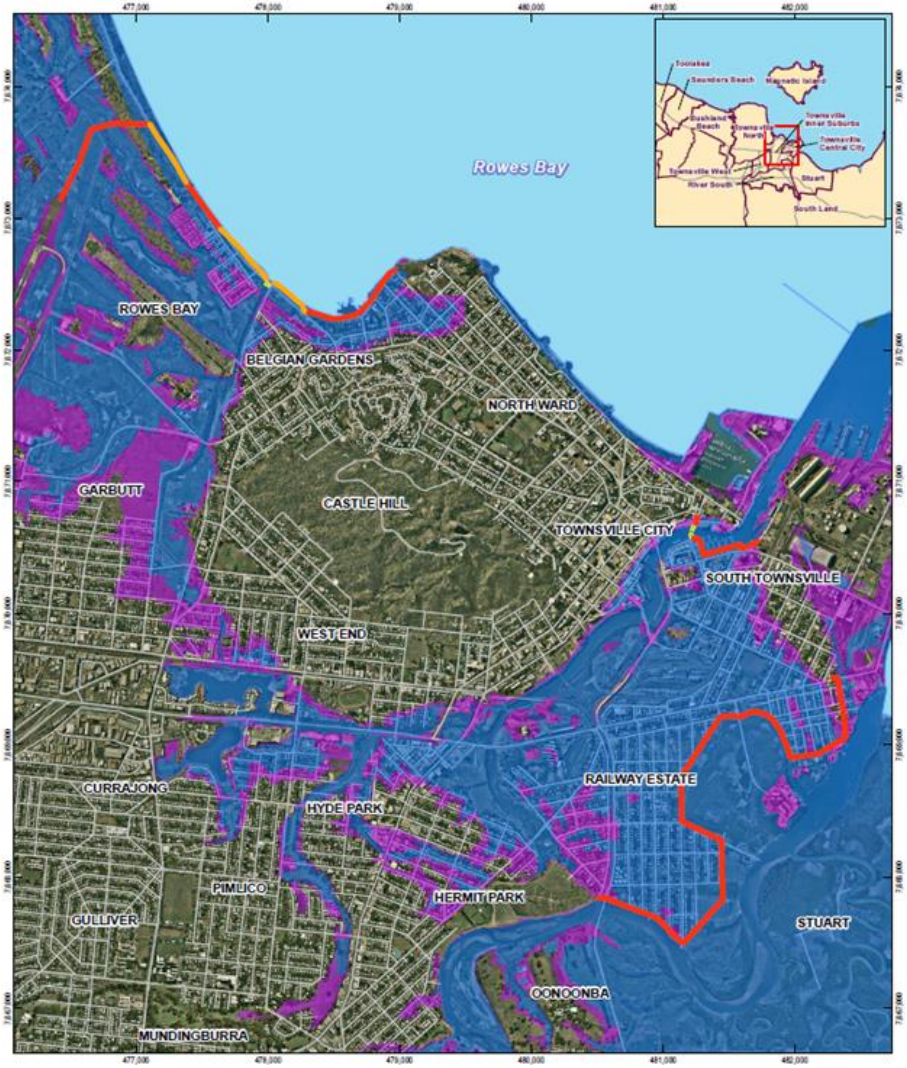
Feasibility Assessment

Additional detail required:

- Covers a substantial proportion of the City
- Defence measures in three key areas
- Planning scheme allows intensification in CBD

More focused and detailed assessment required:

- Revised hazards and risk assessment
- Option development
- Constraints and opportunities
- Concept design and costings
- Required Approvals
- Option Assessment
- Preferred option



Strategy Development and Implementation

- **Develop Strategy Document, including**
  - **Preferred adaptation options**
  - **Short, Medium, Long Term and post-disaster implementation actions**
  - **Relevant sea-level / coast-line recession triggers for implementation actions**

- **Council Implementation of Strategy**
  - **Council asset adaptation through updated Asset Management Plans**
  - **Coastal Hazards Adaptation Governance**