Tropical Cyclone Storm Tide Advice

Reference Guide

Queensland Government

Updated: December 2025

Document Approval and Control

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Document	Version	Amendment	Approved by	Date
Tropical Cyclone Storm Tide Advice Reference Guide	V.2	Updated to reflect Machinery of Government changes and subject matter updated provided by the Department of Environment, Tourism, Science and Innovation	Deputy Commissioner – Disaster & Emergency Management	12/25

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Acronyms

Bureau	Bureau of Meteorology
DDC	District Disaster Coordinator
DDMG	Disaster District Management Group
DDO	Declared Disaster Officer
DETSI	Department of Environment, Tourism, Science and Innovation
the Act	*Disaster Management Act 2003*
LDMG	Local Disaster Management Group
QDMA	Queensland Disaster Management Arrangements
QDMC	Queensland Disaster Management Committee
QPS	Queensland Police Service
SDC	State Disaster Coordinator
SDCC	State Disaster Coordination Centre
SEWS	Standard Emergency Warning Signal
TMST	Theoretical Maximum Storm Tide

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Tidal Levels

HAT	**Highest Astronomical Tide**	The highest water level that can be predicted to occur at a particular site under average weather conditions. This level may not be reached every year.
LAT	**Lowest Astronomical Tide**	The lowest water level that can be predicted to occur at a particular site under average weather conditions. This level may not be reached every year.
LWD	**Low Water Datum**	Low Water Datum was superseded by the Lowest Astronomical Tide Datum in 1994.
AHD	**Australian Height Datum**	Australia's vertical datum which approximates mean sea level.
PD	**Port Datum**	Predicted heights of the Astronomical Tide found in *Tide Tables* are referenced to Port Datum which is equivalent to LAT.
MSL	**Mean Sea Level**	The average level of the sea over a long period (preferably 18.6 years) or the level of the sea in the absence of tides.
MWL	**Mean Water Level**	The mean surface level as determined by averaging the heights of the water at equal intervals of time. At the shoreline this includes wave setup and storm surge.
SWL	**Still Water Level**	The surface of the water if all wave and wind action were to cease.

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1. Storm Surge, Storm Tide

The main threats from tropical cyclones come specifically from storm surge, high wind and torrential rain. Potentially the most dangerous of these phenomena is the 'storm surge'.

As a cyclone approaches the coast, high winds whip up the sea, generating currents which push a raised mound of seawater (referred to as a 'storm surge') onto the shore. The extent of the surge could be up to 50 kilometres or more along the coast, and up to several metres high.

It is important to understand that a storm surge is not merely a travelling wave of short duration but a massive three-dimensional movement of seawater that can last several hours. The storm surge comes across the shoreline like a rapidly rising tide. The danger lies in the fact that the sea level could exceed high water mark by some metres and flood coastal land.

The highest storm surges along Queensland's east coast usually occur on the immediate left hand side (relative to the direction of movement) of a land falling cyclone centre – just outside the eye and within the belt of strongest onshore winds. On Queensland's east coast, this is usually on the southern side of a land-falling cyclone. In the Gulf of Carpentaria this is usually on the eastern or northern side.

The storm surge height depends on a range of factors, including: (a) intensity and size of the cyclone – the stronger the winds the higher the surge; (b) shape of the seafloor – the more gentle the slope the greater the surge; and (c) speed and angle of approach of the cyclone to the coast. The height can be worsened by funnelling effects of bays and estuaries, and river and local flooding caused by torrential rain.

Of most significance is the wind stress on the ocean surface. This produces an elevation of seawater level in areas of onshore winds and a depression in areas of offshore winds. The low pressure in the cyclone has a smaller effect.

Records of Queensland storm surges are very incomplete. The Bathurst Bay cyclone of 1899 allegedly produced a storm surge over 10 metres, with 307 lives lost at sea. Note that some recent surveys question this. Other notable surges include 3.7 metres at Mackay (1918); 3.6 metres just north of Townsville (Althea 1971); 3.3 metres in Upstart Bay near Ayr (Aivu 1989); 3 metres in the Gulf of Carpentaria (Barry 1996); 2.3 metres at Clump Point (Larry 2006); and 5.3 metres at Cardwell (Yasi 2011).

Storm surges up to 7 metres have been recorded in the eastern Gulf of Carpentaria but could also occur (rarely) around most of the Gulf and in some east coastal areas with shallow, gently sloping seabeds and bays.

Elevated sea levels at the coast are also the result of wave action, which is caused by the onshore mass transport of seawater. Note that wave action can also have a battering effect on vulnerable structures near the shoreline.

The **storm tide** is the total water level obtained by adding the **storm surge** and **wave setup** to the height of the **astronomical tide** (refer Figure 1 and Figure 2 below).

The **Theoretical Maximum Storm Tide** is determined by considering the worst-case scenario of the maximum potential storm surge coinciding with Highest Astronomical Tide (HAT).

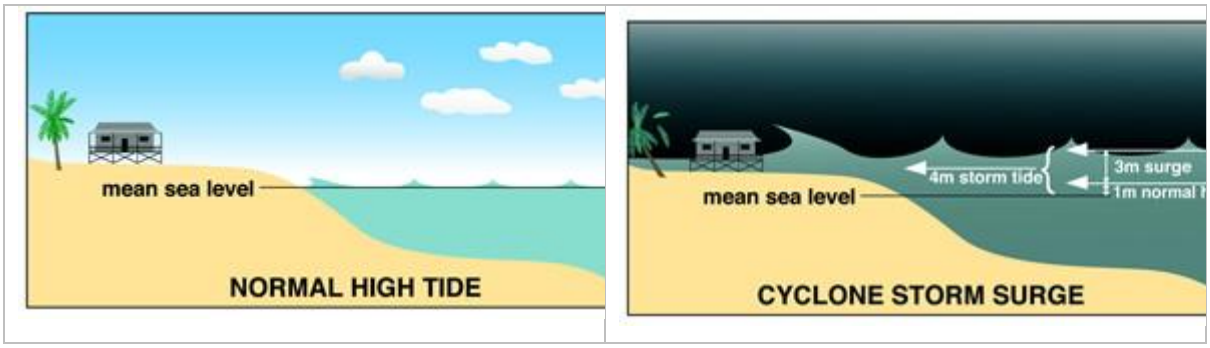

Figure 1: Depiction of 'normal' high tide, and storm tide[1]

*Note: Storm Tide level does not include wave run-up

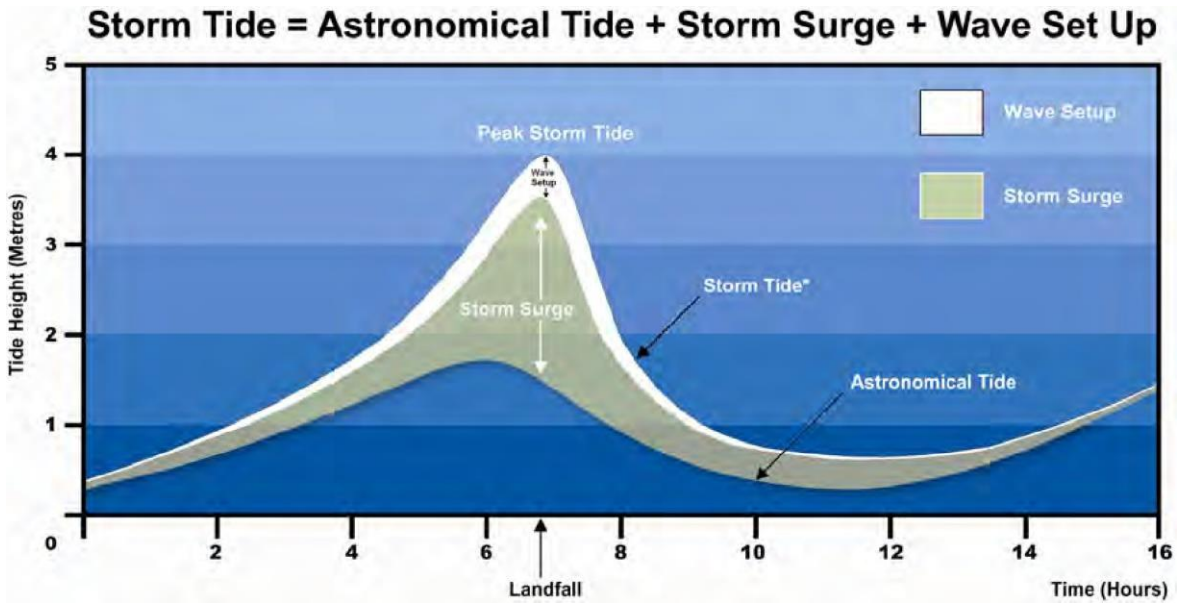

Figure 2: Time series of a typical storm tide

[1] Source: https://media.bom.gov.au/social/blog/24/from-sea-to-shore-a-story-of-storm-surges-in-australia/.

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2. Agency Responsibilities related to Storm Tide Advice and Response

The **Bureau of Meteorology (the Bureau)** is a Commonwealth agency responsible for:

- Provision of forecasts, warnings, and long term outlooks on environmental phenomena that affect the safety, prosperity and resilience of Australians
- Monitoring the progress of tropical cyclones and issuing Tropical Cyclone Advice and Storm Tide Advice as necessary
- Being available to provide technical warning advice to the local, district and State groups before and during a storm tide event.

Further information on services can be found on the Bureau's website at http://www.bom.gov.au/cyclone/tropical-cyclone-knowledge-centre/warnings/, including the Tropical Cyclone Service Level Specification.

The **Department of Environment Tourism, Science and Innovation (DETSI)** is responsible for:

- Monitoring water levels using a network of storm tide gauges
- Monitoring wave conditions using a network of wave buoys
- Liaising with the Bureau to confirm information in Storm Tide Advice
- Being available to provide technical advice on storm tide to the local, district and State groups before and during a storm tide event that is expected to exceed HAT
- Managing the Storm Tide Reference Landmarks mapping tool.

The **Queensland Police Service (QPS)** responsibilities include, but are not limited to:

- Directed evacuation operations
- Issuing warnings in support of local and district groups
- Gazette Disaster Declarations
- Notifying key emergency management stakeholders as per the State Disaster Coordination Centre (SDCC) Notification Matrix
- Manage the registration of directed evacuees and work in partnership with LDMGs and Australian Red Cross
- Traffic management including assistance with road closures and maintenance of road blocks
- Coordination of search and rescue operations
- Disaster Victim Identification.

Additional disaster management roles and responsibilities are outlined in the State Disaster Management Plan.

Roles During a Storm Tide Response

The three operational phases of the Storm Tide Advice System include:

1. Initial Storm Tide Advice
2. Subsequent Storm Tide Advice
3. Final Storm Tide Advice.

The operational roles required from various entities and positions during these stages are detailed over the next page.

1. Initial Storm Tide Advice	
Local Disaster Coordinator	• Receive a copy of the advice from the Bureau. • Review relevant disaster plans including the local evacuation plan. • Liaise with DDC regarding specific high risk areas that may need voluntary / directed evacuation, detailed in the local evacuation plan. • Advise LDMG members, advisers, and other relevant staff as required, for example engineers.
District Disaster Coordinator	• Receive a copy of the advice from both the Bureau and the SDCC via the Watch Desk. • Alert and liaise with DDMG members. • Liaise with the relevant LDC(s). • If appropriate, liaise with the State Disaster Coordinator (SDC), via the SDCC, for any strategic advice on disaster response operations.
Specific functions within the State Disaster Coordination Centre	• The Watch Desk to liaise with and alert key emergency management stakeholders that a Storm Tide Advice has been issued and recommend required actions. • The Watch Desk to alert affected DDCs in cyclone watch and warning zones. • Contact DETSI to have a Storm Tide Adviser available to provide assistance at the SDCC.
2. Subsequent Storm Tide Advice	
Local Disaster Coordinator	• Receive a copy of the advice from the Bureau. • Liaise with the Chair of the LDMG and convene a meeting. • Liaise, if necessary, with the Bureau's Meteorologists and DETSI Storm Tide Advisers. • Consider the potential impacts of the storm tide occurring and undertaking planning to manage the consequences of these impact for example, directed or voluntary evacuation. • If necessary, liaise with LDMG members, advisers, and other relevant staff as required (eg, engineers), on the need for evacuation. Refer to the Evacuation Manual for more information.
District Disaster Coordinator	• Receive a copy of the advice from both the Bureau and the SDCC via the Watch Desk. • Alert relevant LDC(s) of advice. • Convene a meeting of the DDMG and consult with the engineer, other advisers, and LDC(s) on the need for evacuation. • Consider if a Disaster Declaration is required, and if so, declare the disaster in accordance with the *Disaster Management Act 2003*. • Liaise with the LDC regarding the issue of Voluntary Evacuation Advice (without releasing SEWS), for specific high risk areas. • Liaise with, and seek advice from, the SDCC (Operations Capability) regarding planned evacuations and inform of areas already evacuated. • Make preliminary arrangements with the local media to broadcast a 'Directed evacuation' (with SEWS) to the public • Receive approval to declare a Disaster Situation from the Minister and/or the District Disaster Coordinator and notify LDC(s) when to

	proceed with directed evacuation of specific areas. • Issue a Directed Evacuation Order – and update as necessary.
Specific functions within the State Disaster Coordination Centre	• Alert SDC and DDCs in the threatened zone. • Consult with Bureau meteorologists and DETSI Storm Tide Advisers on the DDCs recommendation to conduct directed evacuation operations and/or other required response activities. • Notify DDC, Police Communications Centres, the Bureau and DETSI of the decision reached. • Relay the Minister's approval to the DDC so a Disaster Situation can be declared. • Notification that a Disaster Declaration has been gazetted.
3. Final Storm Tide Advice	
Local Disaster Coordinator	• Receive a copy of the advice from the Bureau, signalling there is a reduced risk from the hazard.
District Disaster Coordinator	• Receive a copy of the final storm tide advice from both Bureau and the SDCC. • Alert and liaise with the relevant LDC(s) regarding the final warning.
Specific functions within the State Disaster Coordination Centre	• Advise SDC, DDCs and verify receipt.

3. Storm Tide Advice Response System

The Storm Tide Advice Response System is activated if it is anticipated that a storm tide could occur which would result in a total water level in excess of the HAT in the area under threat. Estimates of the storm tide associated with the forecast cyclone track are provided for agreed locations. In addition, advice provides estimates of storm tide under the 'worst case' assumption defined as the total water level value that has a 2% probability of being exceeded.

The Storm Tide Advice Response System is linked directly to the Tropical Cyclone Response System. Refer to Figure 3 for a diagram of the Storm Tide Advice Response System and its linkage to the Tropical Cyclone Warning System.

During the Cyclone Information phase and prior to the declaration of a Cyclone Watch Zone, if the forecast track map or text products show a cyclone crossing the coast, verbal briefings will be held with the SDC and DETSI Storm Tide Advisers. No additional storm tide products will be issued at this stage.

During a Cyclone Watch phase, if the forecast track shows a cyclone crossing the coast, verbal briefings will continue as in the Cyclone Information phase until a Storm Tide Advice is issued by the Bureau. If the forecast track shows a tropical cyclone crossing the coast and there is a possibility that HAT will be exceeded, Storm Tide Advice will be provided to the SDCC and to the DETSI Storm Tide Adviser at 6 hourly intervals as defined in the Bureau's Tropical Cyclone Service Specification.

The products provided by the Bureau, including the timing of products, is defined in the Bureau's Tropical Cyclone Service Level Specification. These include Tropical Cyclone Advice, Storm Tide Advice, Tropical Cyclone Forecast Track Map, and Graphical Storm Tide Advice.

Storm Tide Advice will, where possible, be issued at least 24 hours prior to the forecast onset of 100 km/h wind gusts affecting coastal and island communities. This will enable decision makers to issue Evacuation Orders during daylight hours where possible/required.

Storm Tide Warning - Response System

Storm Tide = Storm Surge + Normal Tide + Wave Setup

Although the warning issue timeline is based on the forecast onset of 100 km/h wind gusts, a more flexible approach is adopted in practice to avoid conducting directed evacuations at night.

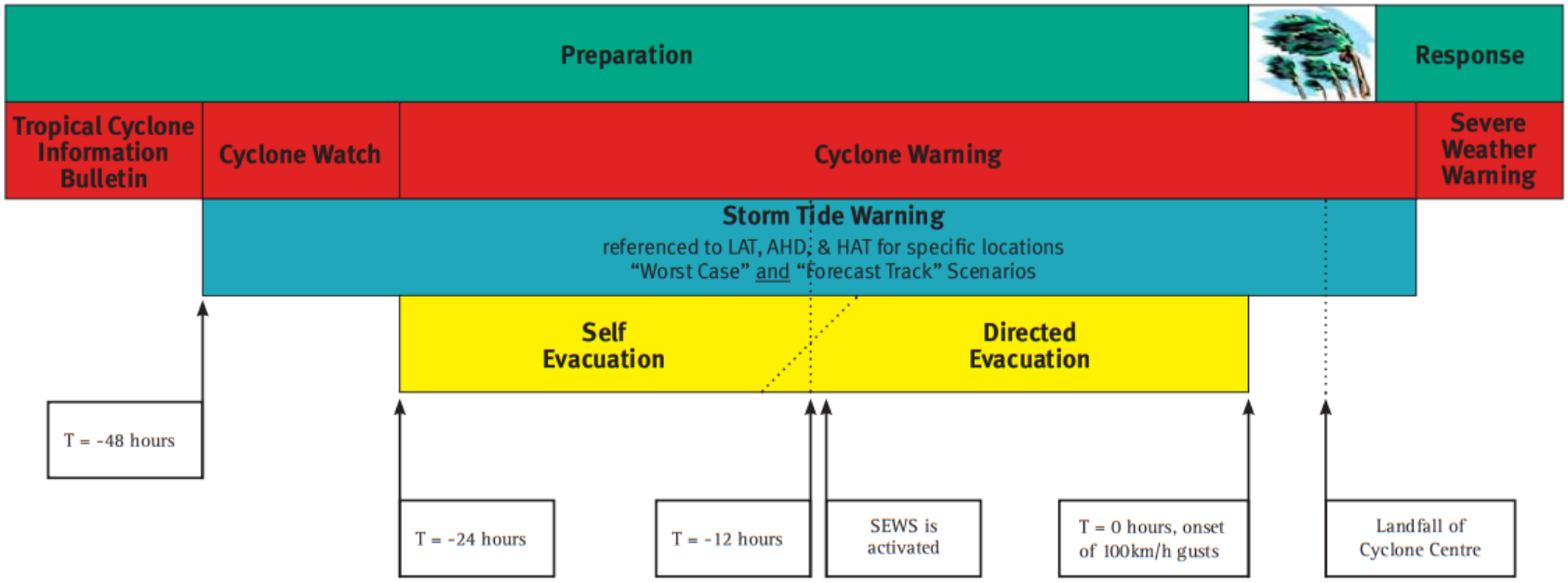

Figure 3: Storm Tide Advice Response System Timeline

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Tropical Cyclone Service Level Specification

Each year, the Bureau publish a Tropical Cyclone Service Level Specification to document the tropical cyclone forecast and warning services provided.

The Service Level Specification details what the Bureau does and when it does it, in order to provide tropical cyclone services.

Storm Tide Advice

A **STORM TIDE ADVICE** is issued by the Bureau to emergency management authorities for agreed locations (as detailed in Appendix 1: Storm Tide Advice Locations of the Service Level Specification) to enable them to manage risks associated with elevated sea levels at the coast.

Storm Tide Advices provide key forecast values for coastal sea level effects associated with the tropical cyclone. Storm Tide refers to the total water level at the coast as a result of tides, surge and wave setup, but does not address inundation or landward extent of flooding.

Content

- Situation – coastal crossing location and approximate time of crossing.
- Storm tide forecast:
  - Worst case scenario (for up to 10 locations)
  - Forecast track scenario (for up to 10 locations)
- Onset of damaging winds
- Next advice time.

Graphical examples of a Storm Tide Advice is provided below in Figure 4 as well as in Appendix 2, s 8.7 and s 8.8 of the Service Level Specification, These products pictorially compare seawater level heights at a location with the elevation of known landmarks in the vicinity.

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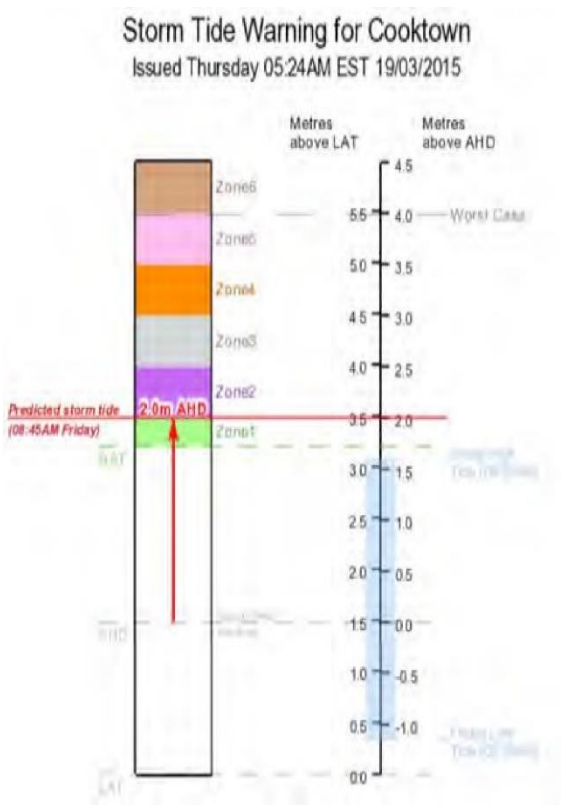

Figure 4: Example Storm Tide Advice Graphic

Issue criteria and schedule

A Storm Tide Advice will always be issued with the first issue of a Tropical Cyclone Advice regardless of whether there is a risk of the Total Water Level exceeding the Highest Astronomical Tide. Subsequently, Storm Tide Advices will continue to be issued when the Total Water Level is expected to exceed the Highest Astronomical Tide (HAT) in the area under threat from a tropical cyclone. **Notes**

- Storm Tide Advices may be provided for up to 10 locations that are situated within the Watch or Warning zones on the Tropical Cyclone Forecast Track Map.
- Storm tide heights in the warnings are referenced to Australian Height Datum (AHD), Lowest Astronomical Tide (LAT), and Highest Astronomical Tide (HAT).
- The "Worst Case Scenario" is defined as the Total Water Level value for which there remains 1 in 98 chance (2% exceedance) of storm tide going even higher.

Further information on issuing warnings can be found in the Queensland Warnings Manual.

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Technical Considerations and Local Effects

The storm tide height given in official advice is based on outputs from the Bureau's TC ROMS model. TC ROMS is a hydrodynamic probabilistic storm tide modelling system for tropical cyclones using the open-source Regional Ocean Modelling System (ROMS) as its coastal model. An ensemble of storm surge model runs is initiated with each update to the official TC forecast track.

The possible increase of the storm tide in smaller bays and estuaries, and the effect of local flooding, will generally not be included in the storm tide height estimate because of inadequate information on what the impacts might be in particular cases.

Because the height of the storm tide depends upon the intensity of the cyclone, its forward velocity and the time and place of landfall, errors in estimating any of these parameters may result in errors in the forecast storm tide height.

The height of the storm tide is very much dependent on the phase of the astronomical tide and, therefore, on the time of landfall of the cyclone. In Queensland, tides are mainly semi-diurnal, and tidal range can be quite large. This tidal range means a difference of a few hours in the time of landfall which can have a major influence on the storm tide height.

The accuracy of the forecast time of landfall is usually the most significant uncertainty and may vary by as much as 6 hours when a cyclone centre is still 12 to 24 hours from the coastline. To provide a realistic safety margin, the Bureau provides storm tide predictions based on both the 'worst case' scenario and 'forecast track' scenario. If possible, the forecast storm tide height is refined with every issue of the Storm Tide Advice.

Individual waves associated with the cyclone may run up the foreshore slope to levels well above the mean waterline. This swash 'wave run-up' depends on the wave height, wave period, beach slope and the nature of the foreshore and can locally increase water levels periodically by up to several metres near the shoreline above the storm tide level.

Storm tides will penetrate the coast to different extents in different locations depending on the depth of inundation, the obstruction to flow by buildings, vegetation and other factors. Storm Tide Inundation / Evacuation Zone Maps assume the storm tide water level remains horizontal. Of particular concern is the damage potential of both wave action and a significant backwash as the water retreats. Channelling of seawater through canal developments may further exaggerate the impact. Shoaling of navigational channels may impede vessel traffic and hamper harbour operations.

4. Disaster Management Response

The storm tide advice will indicate the coastal zones, which may be affected, the approximate time of occurrence of the storm tide, and the estimated storm tide height above each of LAT, AHD, and HAT.

Based on the information provided in the Storm Tide Advice, a Local Disaster Coordinator (LDC), after consultation with the District Disaster Coordinator (DDC), may advise people in threatened areas to undertake a voluntary evacuation[2] while consideration is being given to whether directed evacuation[3] is required.

Following a declaration of a disaster situation the DDC or Declared Disaster Officer (DDO) may direct persons to evacuate (a directed evacuation) from the declared area in accordance with Section 77 (c) of the *Disaster Management Act 2003*.

Bureau Meteorologists and DETSI Storm Tide Advisers will be available for predicted storm tide consultation. DDCs and LDCs can dial the access numbers provided in the Storm Tide Advice.

[2] Self Evacuation: Individuals proactively make their own decision to evacuate prior to any direction from authorities.

[3] Directed Evacuation: The planned movement of persons from an unsafe or potentially unsafe location to a safer location and their eventual return.

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Evacuation Planning for Storm Tide

Some important considerations when developing local evacuation plans for storm tide include:

- **Accuracy of predictions:** In the early stages of a storm tide event, storm tide estimates are a rough approximation due to the limitations of the science behind predicting these events. As the cyclone moves closer to the coast, it is possible to obtain a higher degree of precision in predicting the storm tide. As the forecast accuracy increases, the time available to evacuate diminishes rapidly.
- **Time available:** Any evacuation should be completed before wind conditions prohibit outside movement (eg, gale force winds up with wind gusts to 90 kilometres per hour). For planning purposes, the winds reaching this threshold are most likely to occur 3 to 12 hours before the cyclone centre crosses the coast, though earlier onsets are possible depending on the size and speed of the cyclone. For a particular cyclone, the Tropical Cyclone Forecast Track Maps shows the distance of 90 kilometre per hour wind gusts from coastal centres.
- **Associated Flooding:** Coincidental river flooding may increase the height and extent of tidal penetration in some localities.

Local Disaster Management Groups (LDMGs) can assist local communities to prepare by providing evacuation maps, with identified evacuation zones in a central location such as a disaster dashboard.

Low offshore islands may be completely inundated. The short prediction lead-time for storm tides may eliminate the ability to evacuate these locations in the face of a cyclone. The decision to evacuate such islands should be based on public Tropical Cyclone Advice rather than Storm Tide Advice.

For further information on evacuation planning consult the Queensland Evacuation Guidelines.

5. Emergency Response Maps

Most local governments that are at risk from storm tide inundation provide a public facing disaster dashboard using Geographic Information Systems (GIS) which provides the community an opportunity to view exposure and vulnerability data for storm tide evacuation zones. It is encouraged that this information aligns to the National Storm Tide Mapping Model Zones within the Development of Evacuation Zones, that are relevant to their area of responsibility.

Additionally, the public facing Storm Tide Evacuation Zones for Queensland web application. The application outlines Queensland's evacuation zones, whilst overlaying storm tide marker locations to further understand risk.

This data also provides the opportunity for the community to further educate and make informed decisions relevant to life and property.

Members of the ArcGIS Online Queensland Disaster Management Arrangements (QDMA) Data Sharing Group have access to evacuation zones in .5m metre increments from HAT up to an extreme event. These zones are an indication of potential storm tide inundation for particular events using the bathtub approach. This approach assumes water levels remain horizontal and for many communities, local governments may have better information based on detailed modelling techniques. This information is available via the State Disaster Coordination Centre (SDCC) 'Situational Awareness Platform' (SAP) where a username and password is required.

6. Examples of Storm Tide Markers

Physical storm tide markers are considered a potentially effective, low-cost tool for increasing public awareness of coastal hazards. Unlike predictive models, these markers provide a tangible visual reference of historical and/or potential storm tide heights, helping communities understand the real-world impact of extreme weather events. The following outlines real-world examples where physical storm tide markers are in place. These examples may assist disaster managers when considering options for their communities to provide physical storm tide markers. It is noted that similar approaches have been used in Queensland to demonstrate historical flood heights across impacted communities.

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United States – Wrightsville Beach, North Carolina

A community-driven project installed a wooden post behind the local history museum, marking surge heights from eight historical hurricanes, including Hazel (1954) and Florence (2018). This initiative demonstrates how local action can preserve hazard memory (Strange Carolinas).

Tybee Island, Georgia

A colour-coded storm surge elevation marker illustrates potential surge heights for hurricanes of varying categories. Positioned in a public area, it serves as a clear visual guide for residents and visitors (Live Simple Now).

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Japan – Tsunami Stones

Ancient stone monuments along the Sanriku coast warn future generations not to build below certain elevations. These markers, some centuries old, successfully conveyed life-saving messages during the 2011 Tōhoku tsunami (Atlas Obscura).

7. Further Information

Contact your local Emergency Management Coordinator or District Disaster Management Group Executive Officer for more information.

8. Related Links

Further supporting documentation can be found in the following locations:

- *Disaster Management Act 2003*
- Disaster Management Strategic Policy Framework
- Australian Bureau of Meteorology – Tropical Cyclone Advice and Track Maps
- Australian Bureau of Meteorology – Storm Surge Preparedness and Safety
- Australian Bureau of Meteorology – Tropical Cyclone Tracking Map
- Queensland Evacuation Manual
- Queensland Climate Change and Community Vulnerability to Tropical Cyclones report series (2004)
- Storm Tide Gauge Network – Department of the Environment, Tourism, Science and Innovation – http://www.qld.gov.au/tides
- Wave monitoring – Department of the Environment, Tourism, Science and Innovation – http://www.qld.gov.au/waves
- Storm Tide Reference Landmarks mapping tool – Department of the Environment, Tourism, Science and Innovation – https://www.data.qld.gov.au/dataset/storm-tide-reference-landmarks.

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Appendix A: Tidal Planes

Extracted from The Queensland Tide Tables. Online at http://www.msq.qld.gov.au/Tides.aspx.

The form of the tide changes along the Queensland coast. For places south from Lindeman Island (latitude 20 degrees 28 minutes south) refer to the section semidiurnal tidal planes. For places in the Torres Strait and the Gulf of Carpentaria refer to the diurnal tidal planes section. When seeking information for places between Lindeman and Torres Strait where the classification may be either semidiurnal or diurnal it is necessary to refer to both the semidiurnal and diurnal tables.

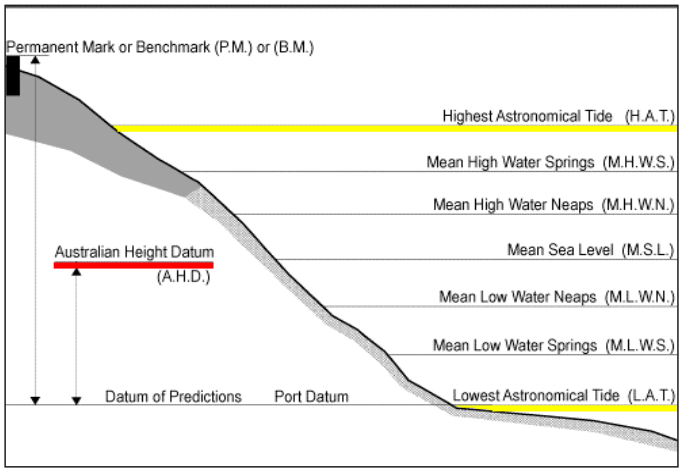

Figure 5: Semidiurnal tidal planes

Semidiurnal tidal planes

The term 'semidiurnal' refers to a tide which has a period or cycle of approximately half of one tidal day (about 12.5 hours). Semidiurnal tides usually have two high and two low tides each day. The tides at Brisbane Bar are a typical example of semidiurnal tides.

Diurnal tidal planes

The term 'diurnal' refers to a tide which has a period or cycle of approximately one tidal day (about 25 hours). Diurnal tides usually have one high and one low tide each day. The tides at Karumba are a typical example of diurnal tides.

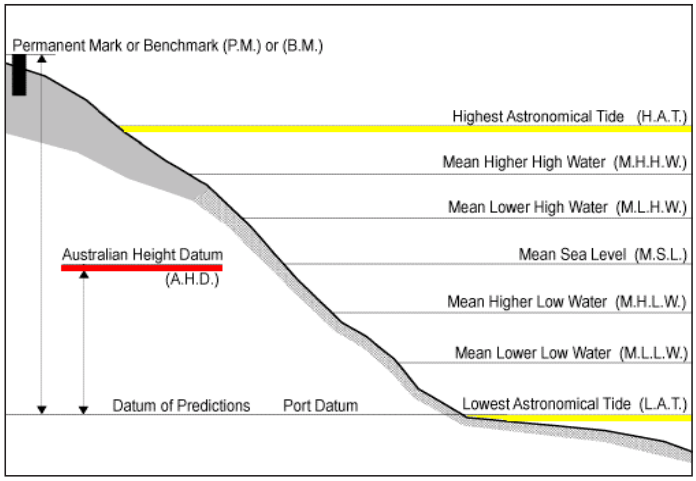

Figure 6: Diurnal tidal planes

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Appendix B: Storm Tide Gauge Network

DETSI operates a network of storm tide gauges along the Queensland coastline. Information from these gauges is provided on the DETSI's storm tide web pages at: http://www.qld.gov.au/tides.

The Bureau uses the data to enhance its predictions whilst DETSI advises the SDCG on seawater levels, storm tide inundation and probable impacts on evacuation procedures. On request, DETSI will provide advice to relevant DDCs, Local Groups and their specialist engineers.

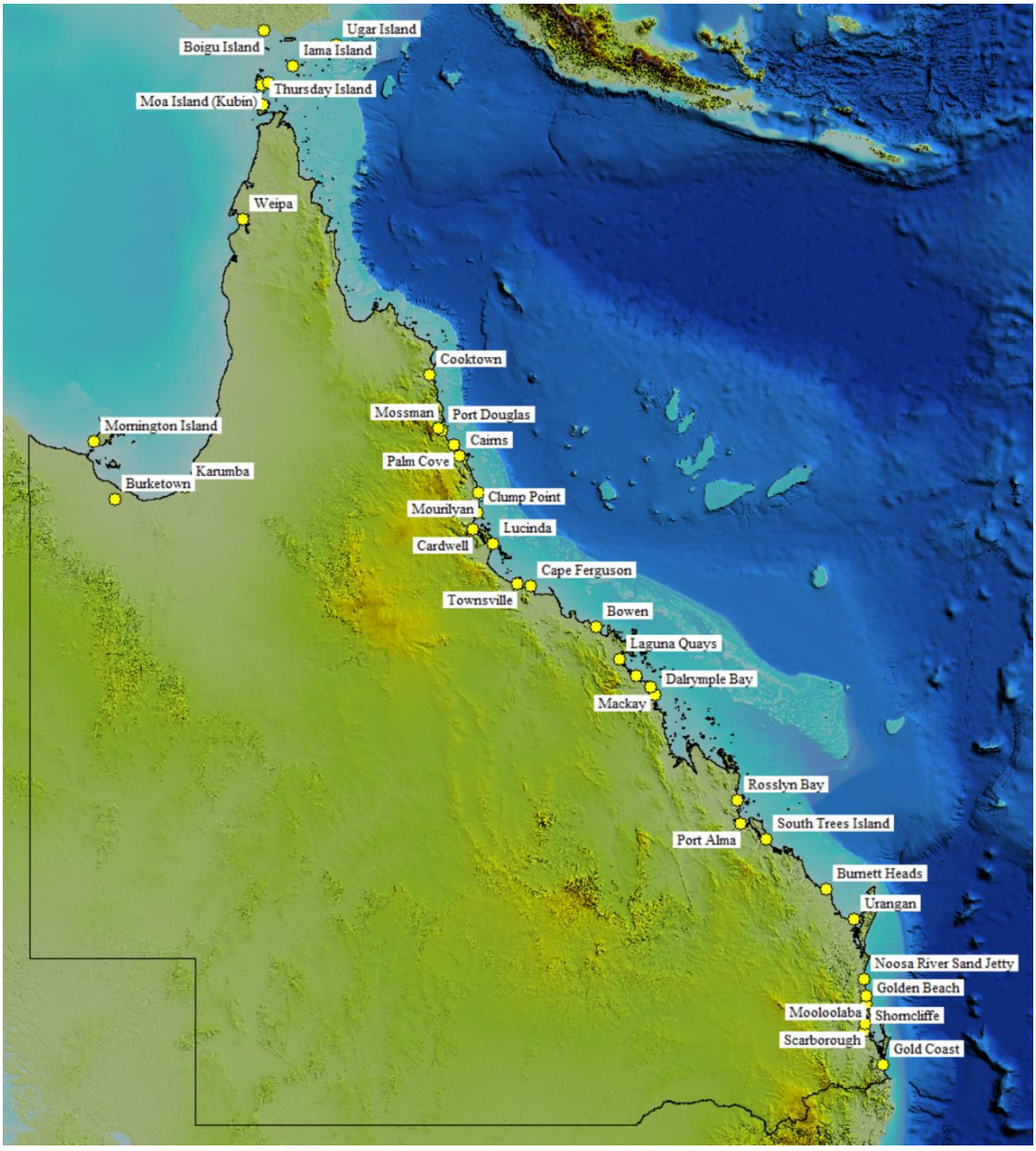

Figure 7: DETSI Storm Tide Monitoring Network

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DETSI also operates a network of wave buoys along the Queensland coastline. Information from these buoys is provided on the DETSI's wave monitoring web pages at: http://www.qld.gov.au/waves.

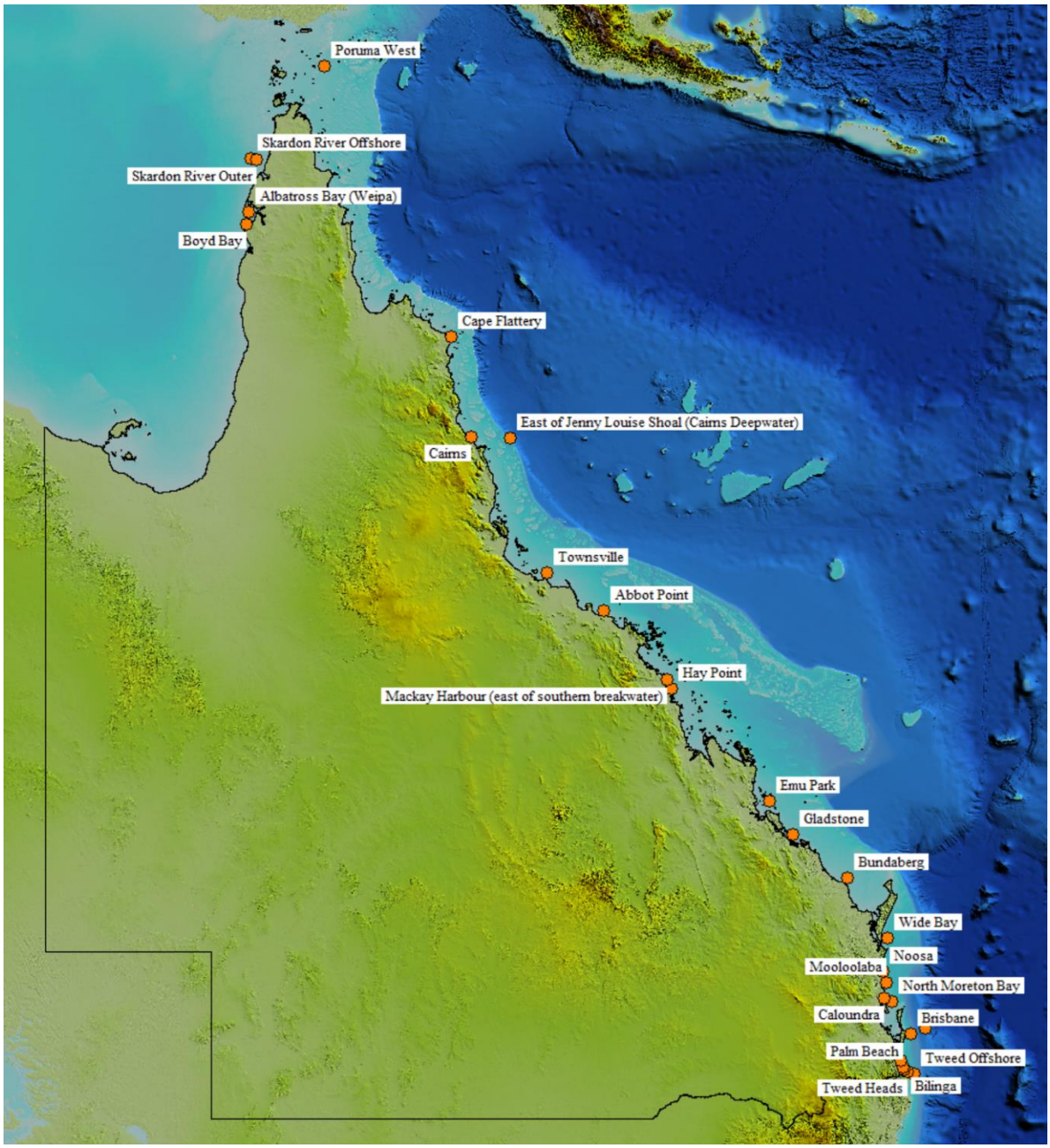

Figure 8: DES Storm Tide Gauge Network and Wave Buoy Locations

Access to Information on Cyclones and Storm Surge

Telephone 1300 659 212

(for recorded public Tropical Cyclone Advice with state-wide access for the cost of a local call)

Web http://www.bom.gov.au/cyclone (Tropical Cyclone Advice and Track Maps)
http://www.qld.gov.au/tides (DETSI storm tide web pages)
http://www.qld.gov.au/waves (DETSI wave monitoring web pages)

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Appendix C: Storm Tide Reference Landmarks

The Storm Tide Reference Landmark Project is a joint initiative of the Australian Government and the Queensland Government and is available at https://www.data.qld.gov.au/dataset/storm-tide-reference-landmarks.

This interactive mapping tool helps relate elevations provided by the Bureau's Storm Tide Advice to easily recognisable landmarks and geographic features. This tool has been created in order to aid understanding and communicating information through Storm Tide Advice Graphics.

For 64 sites, Storm Tide Advice Graphics, also known as Totem Poles, have been generated showing the relative heights of each identified feature, as well as an image indicating the exact reference point to which is being referred.

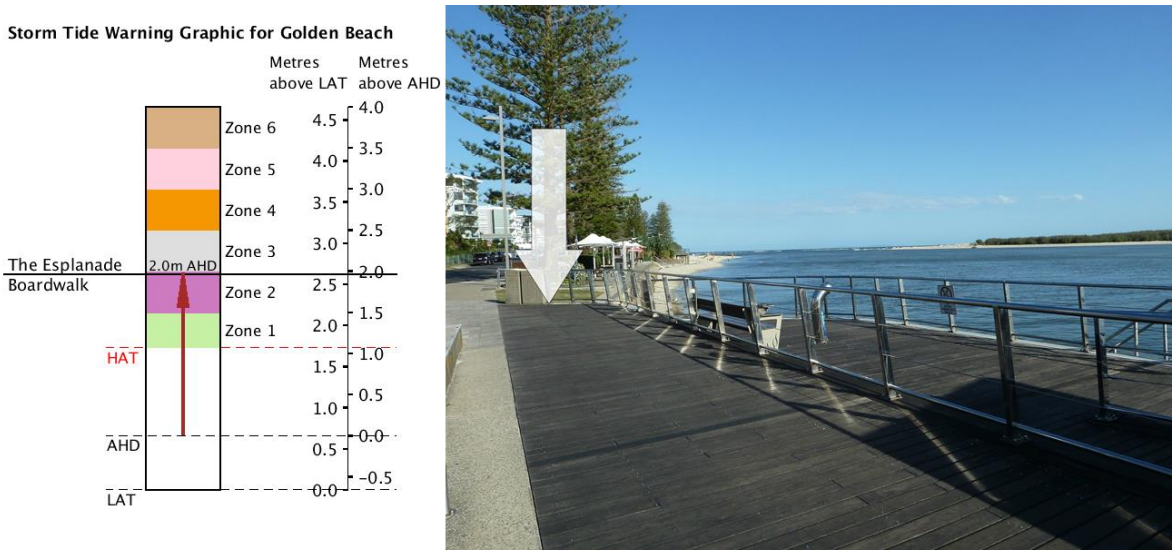

Figure 9: Output from Landmarks tool for Golden Beach

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Appendix D: Storm Tide Warning and Graphic Locations

A list of Storm Tide Advice locations can be found in Appendix 1 of the Tropical Cyclone Service Level Specification.

Indicative Theoretical Maximum Storm Tide (TMST) values provided are based on the nearest and highest TMST point value identified within the Natural Disaster Resilience Program Storm Tide Hazard Interpolation Study, 2014. Highest Astronomical tide (HAT) levels are given relative to Australian Height Datum (AHD). HAT values marked with an asterisk are identified in the Service Level Specification as being below the values identified in the Landmarks project. Balgal Beach and Toolakea Beach north of Townsville are not included in the Queensland landmark report and not associated with a standard tide table.