Climate Change Information for Decision Making

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THE PURPOSE OF THIS DOCUMENT

This document summarises key climate indices useful to operational council staff. The climate indices were selected in direct consultation with council personnel and reflect the operational, tactical and strategic climate information needs for decision makers within all of the local councils of northern Tasmania.

This document expands upon previously produced *local profiles* and has been developed to support decision making across Launceston's strategic, operational, service, adaptation and emergency management planning functions.

BACKGROUND

The Climate Change Information for Decision Making - Launceston has been developed using outputs from the *Climate Futures for Tasmania Project* and the *Climate Futures Australasian Projections 2019 data archive*, developed by the University of Tasmania's Climate Futures Programme.

All values are based on the projections generated by the Climate Futures Programme, using previously published results. Descriptive documentation and supporting reports can be found here: http://climatefutures.org.au. This document is to be reviewed and updated when more up-to-date information becomes available, or at 5-yearly intervals. It should be considered in conjunction with Launceston's policies and strategies, alongside technical and industry standards.

Values given are the multi-model mean from an ensemble of six downscaled global climate models based on the *business as usual* high emissions scenario RCP8.5 (the scenario human society is currently most closely following). Averaging across the ensemble smooths out the inter-annual variability, revealing the forced climate response. For most variables, the range between climate models is not large relative to the percent change projected into the future.

In order to capture the regional variability, the data were separated into *cool* ($< 25^{th}$ percentile), *average* (between the 25^{th} and 75^{th} percentile) or *warm* ($> 75^{th}$ percentile) grid cells, based on average temperature during the baseline period, 1961–1990. These three groups of values were then analysed and presented separately. This provides councils with greater utility when managing a diverse landscape (NB: municipalities with small spatial extents have limited differences captured across the municipality at $10km^2$ resolution). It is the responsibility of the user to determine which values may be most appropriate for a given application. For example, if building a new road up to Ben Lomond, it would be more useful to apply values from the cooler table, whereas for estimating future high intensity rainfall within St Helens, values from the warmer table would be more appropriate.

CURRENT CLIMATE AND RECENT TRENDS

All Tasmanian municipalities have a temperate, maritime climate with relatively mild winters at low elevations, transitioning towards warm alpine winters at higher elevations. Long-term average temperatures have risen in the decades since the 1950s at a rate of up to 0.1 °C per decade, with this rate expected to increase from 2020 onwards.

Despite covering small geographic areas all municipalities experience marked rainfall gradients, with average annual rainfall from about 600 mm per year at lower elevations and about 1500 mm per year at higher elevations. There has been a decline in average annual rainfall since the mid 1970s, and this decline has been strongest in autumn and enhanced over higher elevation regions.

EXTREME EVENTS

The changes in climate that are most likely to impact upon the each municipality's infrastructure, roads, the local community and the environment are an increase in intensity of extreme events. Potential impacts by 2100 are as follows (following the *business as usual* high emissions scenario RCP8.5):

- Increased evaporation and longer dry periods coupled with more extreme temperatures are likely to enhance the occurrence and intensity of bushfires.
- The frequency of extremely hot days (> 40°C) is projected to increase. Heat wave frequency is projected to remain stable, but will increase in intensity (warmer days and nights).
- The Annual Exceedance Probability (AEP) is a measure of the rarity of an event. Rainfall AEPs are expressed as the probability that a given rainfall total accumulated over a given duration will be exceeded in any one year. Heavier rainfall events are expected within a warmer climate. High daily runoff events are likely to increase, including those that may lead to erosion or flooding.
- Inundation along all coastal frontage will increase due to sea level rise. This means the coastal inundation AEP values for all probability events will increase in intensity. The current 100-year coastal inundation event may become a 50-year event by 2030, and a 5-year event by 2090.

Table 1: **Launceston local government area: *Cool subregions***
Projected changes in selected climate variables for each 20-year time period from 2001 to 2100 relative to the baseline period 1961–1990. All values are reported following the RCP8.5 emissions scenario. Changes are reported relative to the 1961-1990 baseline period. NA values for percentage change are when values are very large due to very low initial values.

Climate Variable	1961–1990	2001–2020			2021–2040			2041–2060			2061–2080			2081–2100		
	value	value	change	% change	value	change	% change	value	change	% change	value	change	% change	value	change	% change
Average annual daily mean (°C)	8.9	9.4	0.5	6.1	10	1.1	12.4	10.7	1.8	20.6	11.5	2.6	29.7	12.2	3.4	37.9
Average daily maximum temperature (°C)	13.5	14.1	0.6	4.3	14.7	1.2	9	15.5	2	15	16.5	3	21.9	17.3	3.8	28
Average daily minimum temperature (°C)	4.2	4.7	0.5	11.9	5.2	1	23.2	5.9	1.6	38.2	6.6	2.3	54.8	7.2	2.9	69.2
Hottest daily temperature of the year (°C)	30	30.8	0.8	2.7	31.5	1.6	5.2	33	3	10	33.9	3.9	13.1	35.1	5.1	17.1
Temperature of warmest days [99^{th} percentile] (°C)	26.6	27.3	0.8	2.9	28.1	1.5	5.8	29.2	2.6	9.7	30.3	3.7	14	31.2	4.6	17.2
Temperature of warmest nights [99^{th} percentile] (°C)	13.7	14.3	0.6	4.6	14.9	1.2	8.8	15.6	2	14.5	16.5	2.9	21.1	17.1	3.4	25.1
Temperature of coldest nights [1^{st} percentile] (°C)	-3.7	-3.3	0.4	11.4	-3	0.7	19.3	-2.5	1.2	33.3	-1.9	1.8	49.6	-1.2	2.5	67.9
Average annual frost risk days (<2°C)	110.7	95.7	-15	-13.5	84.3	-26.4	-23.8	68.9	-41.8	-37.7	53.2	-57.5	-51.9	41.3	-69.5	-62.7
Average annual freeze risk days (<0°C)	55.3	45.5	-9.8	-17.7	37.8	-17.5	-31.6	28.1	-27.2	-49.2	19.2	-36.1	-65.3	12.4	-42.9	-77.6
Average annual summer days (>25°C)	7.2	8.9	1.7	23.8	12.2	5	70.3	16.4	9.2	128.8	22.6	15.4	214.3	30.4	23.2	323.2
Average annual hot days (>30°C)	0.7	1	0.3	38.1	1.5	0.8	115.3	2.6	1.9	271.1	4.5	3.8	532.8	6.9	6.2	869.7
Average annual extreme heat days (>40°C)	<0.1	<0.1	<0.1	NA	<0.1	<0.1	NA	<0.1	<0.1	NA	<0.1	<0.1	NA	<0.1	<0.1	NA
Mean Minimum Asphalt Critical Viscosity	43200	52800	9600	22.2	63800	20600	47.7	81000	37800	87.5	107200	64000	148.1	134400	91200	211.1
Average annual evaporation (mm)	828.7	842.5	13.7	1.7	875.9	47.2	5.7	923.4	94.7	11.4	971.9	143.1	17.3	1051.8	223.1	26.9
Average annual rainfall (mm)	1306.4	1221.3	-85.1	-6.5	1173.6	-132.8	-10.2	1117.5	-188.9	-14.5	1092.3	-214.2	-16.4	1088.9	-217.5	-16.6
Seasonal rainfall - Winter (mm)	579.2	532.4	-46.8	-8.1	511.7	-67.6	-11.7	492.8	-86.4	-14.9	480.9	-98.3	-17	466.4	-112.8	-19.5
Seasonal rainfall - Spring (mm)	292	274.5	-17.6	-6	236.5	-55.6	-19	228.2	-63.9	-21.9	233.8	-58.3	-20	200.6	-91.4	-31.3
Seasonal rainfall - Summer (mm)	175.7	169.7	-6	-3.4	190	14.3	8.1	182.4	6.7	3.8	173.3	-2.4	-1.4	192.3	16.6	9.5
Seasonal rainfall - Autumn (mm)	277.8	269.4	-8.4	-3	259.1	-18.8	-6.8	236.2	-41.6	-15	226.2	-51.6	-18.6	242.2	-35.6	-12.8
Annual maximum daily rainfall (mm)	99.6	100.5	1	1	107.9	8.3	8.3	102.3	2.8	2.8	107.2	7.6	7.6	114.3	14.7	14.8
Rainfall Extreme - 24hr 10% AEP (mm)[a]	134.2	137.9	3.8	2.8	141.8	7.6	5.7	146.8	12.6	9.4	152.4	18.2	13.6	157.4	23.2	17.3
Rainfall Extreme - 24hr 5% AEP (mm)[a]	157	161.3	4.4	2.8	165.9	8.9	5.7	171.7	14.7	9.4	178.2	21.3	13.6	184.1	27.1	17.3
Rainfall Extreme - 24hr 1% AEP (mm)[a]	206.1	211.9	5.8	2.8	217.8	11.7	5.7	225.5	19.3	9.4	234.1	28	13.6	241.7	35.6	17.3
Rainfall Extreme - 24hr 0.5% AEP (mm)[a]	230.7	237.1	6.5	2.8	243.8	13.1	5.7	252.3	21.6	9.4	262	31.3	13.6	270.6	39.9	17.3
Rainfall Extreme - 48hr 10% AEP (mm)[a]	173.1	178	4.8	2.8	182.9	9.8	5.7	189.4	16.2	9.4	196.6	23.5	13.6	203	29.9	17.3
Rainfall Extreme - 48hr 5% AEP (mm)[a]	196.1	201.6	5.5	2.8	207.3	11.1	5.7	214.6	18.4	9.4	222.8	26.6	13.6	230	33.9	17.3
Rainfall Extreme - 48hr 1% AEP (mm)[a]	254.7	261.8	7.1	2.8	269.1	14.4	5.7	278.6	23.9	9.4	289.2	34.6	13.6	298.7	44	17.3
Rainfall Extreme - 48hr 0.5% AEP (mm)[a]	283.1	291	7.9	2.8	299.1	16.1	5.7	309.6	26.6	9.4	321.5	38.4	13.6	332	48.9	17.3
Average annual cummulative Forest Fire Danger Index	409.7	423.9	14.2	3.5	448	38.3	9.3	488.6	78.9	19.3	559.5	149.8	36.6	644	234.3	57.2
Sea level - 1% AEP with Freeboard (m)[b]	2.38	2.45	0.07	2.9	2.53	0.15	6.3	2.6	0.22	9.2	2.84	0.46	19.3	3.2	0.82	34.5

[a] *Based on recommendations from Australian Rainfall and Runoff, Book 1 Scope And Philosophy, Chapter 6 Climate Change Considerations, version last updated 14^{th} May 2019.*

[b] *Based on recommendations from Tasmanian Government Department of Premier and Cabinet, Coast Hazards Report, December 2015.*
For exact details reference (from theList): Sea Level Rise Planning Allowances; or Coastal Risk Hazard Bands.

Table 2: **Launceston local government area:** ***Average subregions***
Projected changes in selected climate variables for each 20-year time period from 2001 to 2100 relative to the baseline period 1961–1990. All values are reported following the RCP8.5 emissions scenario. Changes are reported relative to the 1961-1990 baseline period. NA values for percentage change are when values are very large due to very low initial values.

Climate Variable	1961–1990	2001–2020			2021–2040			2041–2060			2061–2080			2081–2100		
	value	value	change	% change	value	change	% change	value	change	% change	value	change	% change	value	change	% change
Average annual daily mean (°C)	11	11.5	0.5	4.8	12.1	1.1	9.6	12.8	1.8	16.1	13.6	2.6	23.2	14.3	3.3	29.6
Average daily maximum temperature (°C)	15.9	16.5	0.5	3.4	17.1	1.1	7.1	17.9	1.9	12	18.7	2.8	17.3	19.5	3.5	22.2
Average daily minimum temperature (°C)	6.1	6.6	0.5	8.5	7.1	1	16.3	7.7	1.6	26.8	8.4	2.4	38.6	9.1	3	48.9
Hottest daily temperature of the year (°C)	32.3	33	0.8	2.4	33.8	1.5	4.8	34.9	2.7	8.3	35.6	3.4	10.4	36.6	4.4	13.5
Temperature of warmest days [99^{th} percentile] (°C)	27.9	28.7	0.7	2.6	29.2	1.3	4.5	30.1	2.2	7.7	30.9	3	10.7	31.6	3.6	13
Temperature of warmest nights [99^{th} percentile] (°C)	15.5	16.1	0.6	3.8	16.7	1.1	7.2	17.4	1.9	12.1	18.3	2.7	17.4	18.7	3.1	20
Temperature of coldest nights [1^{st} percentile] (°C)	-2.6	-2.2	0.4	15	-1.9	0.7	26.4	-1.4	1.2	46.9	-0.8	1.8	69.5	0	2.5	98.4
Average annual frost risk days (<2°C)	65.5	55	-10.5	-16	47	-18.5	-28.2	36.7	-28.7	-43.9	26.7	-38.8	-59.2	18.9	-46.6	-71.2
Average annual freeze risk days (<0°C)	26.8	21.1	-5.7	-21.1	16.9	-9.9	-36.8	11.6	-15.2	-56.8	7.3	-19.4	-72.6	4.2	-22.6	-84.4
Average annual summer days (>25°C)	13	15.6	2.6	19.8	19.7	6.7	51.8	25.7	12.7	97.9	33.2	20.2	155.2	42.8	29.8	229.5
Average annual hot days (>30°C)	1.5	2	0.5	31.1	2.9	1.4	88.9	4.4	2.8	183.5	6.6	5.1	328	9.5	8	515.9
Average annual extreme heat days (>40°C)	<0.1	<0.1	<0.1	NA	<0.1	<0.1	NA	<0.1	<0.1	NA	<0.1	<0.1	NA	<0.1	<0.1	NA
Mean Minimum Asphalt Critical Viscosity	86900	106500	19600	22.6	128700	41800	48.1	163900	77000	88.6	218100	131200	151	275200	188300	216.7
Average annual evaporation (mm)	1013.4	1027.4	14	1.4	1060.3	46.9	4.6	1114	100.6	9.9	1167.6	154.2	15.2	1258	244.6	24.1
Average annual rainfall (mm)	956.7	908.8	-47.9	-5	876	-80.8	-8.4	835.6	-121.2	-12.7	829.4	-127.4	-13.3	833	-123.7	-12.9
Seasonal rainfall - Winter (mm)	399	369.1	-29.9	-7.5	357.8	-41.2	-10.3	342.9	-56	-14	338.2	-60.8	-15.2	333	-65.9	-16.5
Seasonal rainfall - Spring (mm)	217	209	-8.1	-3.7	182.7	-34.3	-15.8	177.4	-39.6	-18.3	183.4	-33.6	-15.5	158	-59	-27.2
Seasonal rainfall - Summer (mm)	143.1	138.7	-4.4	-3	150.3	7.2	5.1	145.6	2.5	1.7	140.1	-3	-2.1	157.3	14.2	9.9
Seasonal rainfall - Autumn (mm)	211.5	211.1	-0.4	-0.2	203.6	-7.9	-3.7	187	-24.5	-11.6	185.3	-26.2	-12.4	194.9	-16.6	-7.8
Annual maximum daily rainfall (mm)	99.6	100.5	1	1	107.9	8.3	8.3	102.3	2.8	2.8	107.2	7.6	7.6	114.3	14.7	14.8
Rainfall Extreme - 24hr 10% AEP (mm)[a]	134.3	137.9	3.7	2.7	141.6	7.3	5.5	146.5	12.2	9.1	151.9	17.6	13.1	156.7	22.4	16.7
Rainfall Extreme - 24hr 5% AEP (mm)[a]	157	161.3	4.3	2.7	165.6	8.6	5.5	171.3	14.3	9.1	177.7	20.6	13.1	183.3	26.3	16.7
Rainfall Extreme - 24hr 1% AEP (mm)[a]	206.2	211.9	5.6	2.7	217.5	11.3	5.5	225	18.8	9.1	233.3	27.1	13.1	240.7	34.5	16.7
Rainfall Extreme - 24hr 0.5% AEP (mm)[a]	230.8	237.1	6.3	2.7	243.4	12.6	5.5	251.8	21	9.1	261.1	30.3	13.1	269.4	38.6	16.7
Rainfall Extreme - 48hr 10% AEP (mm)[a]	173.2	178	4.7	2.7	182.7	9.5	5.5	189	15.8	9.1	196	22.7	13.1	202.2	29	16.7
Rainfall Extreme - 48hr 5% AEP (mm)[a]	196.3	201.6	5.4	2.7	207	10.7	5.5	214.1	17.9	9.1	222	25.8	13.1	229.1	32.8	16.7
Rainfall Extreme - 48hr 1% AEP (mm)[a]	254.8	261.8	7	2.7	268.7	13.9	5.5	278	23.2	9.1	288.3	33.4	13.1	297.4	42.6	16.7
Rainfall Extreme - 48hr 0.5% AEP (mm)[a]	283.3	291	7.7	2.7	298.7	15.5	5.5	309	25.8	9.1	320.4	37.2	13.1	330.6	47.4	16.7
Average annual cummulative Forest Fire Danger Index	827.4	850	22.6	2.7	894.6	67.2	8.1	971.1	143.7	17.4	1058.2	230.8	27.9	1188.1	360.7	43.6
Sea level - 1% AEP with Freeboard (m)[b]	2.38	2.45	0.07	2.9	2.53	0.15	6.3	2.6	0.22	9.2	2.84	0.46	19.3	3.2	0.82	34.5

[a] *Based on recommendations from Australian Rainfall and Runoff, Book 1 Scope And Philosophy, Chapter 6 Climate Change Considerations, version last updated* 14^{th} *May 2019.*

[b] *Based on recommendations from Tasmanian Government Department of Premier and Cabinet, Coast Hazards Report, December 2015. For exact details reference (from theList): Sea Level Rise Planning Allowances; or Coastal Risk Hazard Bands.*

Table 3: **Launceston local government area: *Warm subregions***
Projected changes in selected climate variables for each 20-year time period from 2001 to 2100 relative to the baseline period 1961–1990. All values are reported following the RCP8.5 emissions scenario. Changes are reported relative to the 1961-1990 baseline period. NA values for percentage change are when values are very large due to very low initial values.

Climate Variable	1961–1990	2001–2020			2021–2040			2041–2060			2061–2080			2081–2100		
	value	value	change	% change	value	change	% change	value	change	% change	value	change	% change	value	change	% change
Average annual daily mean (°C)	12.1	12.6	0.5	4.3	13.1	1	8.4	13.8	1.7	14.1	14.6	2.5	20.3	15.3	3.2	26
Average daily maximum temperature (°C)	17.2	17.7	0.5	3	18.2	1.1	6.3	19	1.8	10.6	19.8	2.6	15.3	20.5	3.4	19.6
Average daily minimum temperature (°C)	7.1	7.6	0.5	7.2	8.1	1	13.6	8.7	1.6	22.5	9.4	2.3	32.6	10.1	2.9	41.5
Hottest daily temperature of the year (°C)	32.4	33.2	0.7	2.2	33.8	1.4	4.3	35	2.6	8.1	35.6	3.1	9.6	36.5	4.1	12.5
Temperature of warmest days [99^{th} percentile] (°C)	28.6	29.2	0.6	2.2	29.7	1.1	3.8	30.6	2	6.9	31.2	2.6	9.1	31.8	3.2	11.3
Temperature of warmest nights [99^{th} percentile] (°C)	16.4	17	0.6	3.8	17.4	1.1	6.7	18.2	1.9	11.5	19	2.6	16	19.4	3	18.6
Temperature of coldest nights [1^{st} percentile] (°C)	-1.8	-1.5	0.3	17.7	-1.3	0.6	30.5	-0.7	1.1	58.6	-0.2	1.6	86.2	0.4	2.2	120.7
Average annual frost risk days (<2°C)	45.5	38.3	-7.2	-15.7	32.6	-12.8	-28.2	25.5	-20	-43.9	18.7	-26.8	-58.9	13.6	-31.8	-70.1
Average annual freeze risk days (<0°C)	16.4	12.9	-3.6	-21.8	10.6	-5.9	-35.7	7.4	-9.1	-55.1	4.8	-11.7	-70.8	2.9	-13.6	-82.6
Average annual summer days (>25°C)	17.4	20.6	3.2	18.4	25.1	7.7	44	31.8	14.3	82.2	39.7	22.3	127.7	49.1	31.7	181.8
Average annual hot days (>30°C)	2	2.7	0.6	31.9	3.6	1.6	76.7	5.2	3.2	156.6	7.3	5.3	261.6	10.4	8.4	413.9
Average annual extreme heat days (>40°C)	<0.1	<0.1	<0.1	NA	<0.1	<0.1	NA	<0.1	<0.1	NA	<0.1	<0.1	NA	<0.1	<0.1	NA
Mean Minimum Asphalt Critical Viscosity	128100	156400	28300	22.1	187900	59800	46.7	238800	110700	86.4	317500	189400	147.9	402900	274800	214.5
Average annual evaporation (mm)	1107.3	1120.1	12.8	1.2	1152.6	45.3	4.1	1209.7	102.4	9.3	1266.2	158.9	14.3	1364.8	257.5	23.3
Average annual rainfall (mm)	780.8	749.2	-31.7	-4.1	719.4	-61.4	-7.9	690.8	-90.1	-11.5	688.7	-92.1	-11.8	683.3	-97.5	-12.5
Seasonal rainfall - Winter (mm)	300.5	280.9	-19.7	-6.5	268	-32.6	-10.8	257.8	-42.8	-14.2	254.8	-45.8	-15.2	248.3	-52.3	-17.4
Seasonal rainfall - Spring (mm)	180.7	174	-6.7	-3.7	153.5	-27.2	-15.1	149.9	-30.8	-17.1	155.4	-25.3	-14	131.5	-49.2	-27.2
Seasonal rainfall - Summer (mm)	129.5	128.5	-1	-0.7	139.8	10.3	8	133.7	4.2	3.2	131.1	1.6	1.2	142.8	13.3	10.3
Seasonal rainfall - Autumn (mm)	181.8	182	0.2	0.1	173.7	-8.1	-4.5	164.4	-17.4	-9.5	162.6	-19.2	-10.5	169.8	-12	-6.6
Annual maximum daily rainfall (mm)	99.6	100.5	1	1	107.9	8.3	8.3	102.3	2.8	2.8	107.2	7.6	7.6	114.3	14.7	14.8
Rainfall Extreme - 24hr 10% AEP (mm)[a]	134.4	137.9	3.6	2.6	141.4	7	5.2	146.2	11.8	8.8	151.4	17	12.7	156.1	21.8	16.2
Rainfall Extreme - 24hr 5% AEP (mm)[a]	157.2	161.3	4.2	2.6	165.4	8.2	5.2	171	13.8	8.8	177.1	19.9	12.7	182.6	25.4	16.2
Rainfall Extreme - 24hr 1% AEP (mm)[a]	206.4	211.9	5.5	2.6	217.2	10.8	5.2	224.6	18.1	8.8	232.6	26.1	12.7	239.8	33.4	16.2
Rainfall Extreme - 24hr 0.5% AEP (mm)[a]	231	237.1	6.1	2.6	243.1	12.1	5.2	251.3	20.3	8.8	260.3	29.2	12.7	268.4	37.4	16.2
Rainfall Extreme - 48hr 10% AEP (mm)[a]	173.4	178	4.6	2.6	182.5	9.1	5.2	188.6	15.2	8.8	195.3	21.9	12.7	201.4	28.1	16.2
Rainfall Extreme - 48hr 5% AEP (mm)[a]	196.4	201.6	5.2	2.6	206.7	10.3	5.2	213.7	17.3	8.8	221.3	24.9	12.7	228.2	31.8	16.2
Rainfall Extreme - 48hr 1% AEP (mm)[a]	255	261.8	6.8	2.6	268.4	13.3	5.2	277.5	22.4	8.8	287.3	32.3	12.7	296.3	41.3	16.2
Rainfall Extreme - 48hr 0.5% AEP (mm)[a]	283.5	291	7.5	2.6	298.3	14.8	5.2	308.4	24.9	8.8	319.4	35.9	12.7	329.4	45.9	16.2
Average annual cummulative Forest Fire Danger Index	1266.9	1290.7	23.8	1.9	1356.3	89.5	7.1	1472.9	206.1	16.3	1577.5	310.6	24.5	1788	521.2	41.1
Sea level - 1% AEP with Freeboard (m)[b]	2.38	2.45	0.07	2.9	2.53	0.15	6.3	2.6	0.22	9.2	2.84	0.46	19.3	3.2	0.82	34.5

[a] *Based on recommendations from Australian Rainfall and Runoff, Book 1 Scope And Philosophy, Chapter 6 Climate Change Considerations, version last updated 14^{th} May 2019.*

[b] *Based on recommendations from Tasmanian Government Department of Premier and Cabinet, Coast Hazards Report, December 2015.*
For exact details reference (from theList): Sea Level Rise Planning Allowances; or Coastal Risk Hazard Bands.

Climate Change Information for Decision Making - Launceston

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