

PORT MACQUARIE BREAKWALL

TREE IMPACT ASSESSMENT

SEPTEMBER 2022

PORT MACQUARIE BREAKWALL

TREE IMPACT ASSESSMENT

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REV	DESCRIPTION	DATE
A	ISSUE TO HASKONING AUSTRALIA	2022-09-23

1 INTRODUCTION

Terras Landscape Architects has been engaged by Haskoning Australia on behalf of Transport for NSW (TfNSW) to undertake an impact assessment of the proposed upgrade and widening of the Port Macquarie Breakwall.

Although Terras undertook a site inspection 9th April 2022, it was mainly intended as a site familiarisation exercise to assist in the development of the landscape works and to have input into urban design issues. It was only later in the project that Terras was asked to assist in determining the retention/removal of existing trees.

The details included in this report and impact assessment are mainly based on information contained in "Breakwall Initial Tree Summary", Port Tree Fella, December 2021.

Terras would like to acknowledge the assistance provided by Craig Luff, Senior Landscape Architect, Port Macquarie Hastings Council and Russell Chaplin, Capital Development Manager, NRMA Parks and Resorts.

2 ASSISTING ARBORIST

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QUALIFICATIONS:	B.Sc. (Arch.), B.Land.Arch. Registered Landscape Architect (No. 729) Hort.Cert., Dip.Hort.(Arboriculture) AQF Level 5/Certificate No. 6262394

3 CLIENT

CLIENT:	Transport for New South Wales
C/-:	Haskoning Australia
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FIGURE 1: AERIAL VIEW OF THE SITE SHOWING TREE LOCATIONS
[BASE AERIAL: NEARMAP - USED UNDER LICENCE]

4 METHODOLOGY

- The impact assessment took the data contained in the supplied arborist's report augmented by further investigations and calculated Tree Protection Zones (TPZs) and Structural Root Zones (SRZs) in accordance with the requirements of AS 4970-2009 *Protection of trees on development sites*.
- The TPZs and SRZs of each tree were then plotted onto the site survey and then the proposed development drawings were superimposed. (Refer Appendix A.)
- The amount of encroachment as a percentage of the TPZ was then calculated and an impact assessment carried to determine which trees could be retained and those that would not survive the proposed construction of the proposed works. (Refer Section 5.)

5 IMPACT ASSESSMENT

Below is a table showing the extent of encroachment for all the trees likely to be affected by the development.

ID	Botanical Name	Common Name	DBH	TPZ Radius	DAB	SRZ Radius	TPZ area	TPZ area impacted	Action
E --	---	---	---	---	---	---	---	---	Remove - Within development footprint
E701	Araucaria heterophylla	Norfolk Island Pine	500	6000	600	2670	113.1	67 (59%)	Remove - Within development footprint
E702	Araucaria columnaris	Cook Island Pine	500	6000	600	2670	113.1	31 (28%)	Retain
E346	Araucaria columnaris	Cook Island Pine	380	4560	456	2380	65.3	51 (78%)	Remove - Within development footprint
E347	Araucaria heterophylla	Norfolk Island Pine	290	3480	348	2124	38.0	32 (84%)	Remove - Within development footprint
E348	Araucaria heterophylla	Norfolk Island Pine	290	3480	348	2124	38.0	33 (87%)	Remove - Within development footprint
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E350	Araucaria heterophylla	Norfolk Island Pine	400	4800	480	2431	72.4	53 (74%)	Remove - Within development footprint
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E352	Casuarina glauca	Swamp She-oak	500	6000	600	2670	113.1	59 (52%)	Remove - Within development footprint
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E373	Araucaria heterophylla	Norfolk Island Pine	410	4920	540	2555	76.0	26 (32%)	Retain
E375	Casuarina glauca (group of 6)	Swamp She-oak	400	4800	480	2431	72.4	47 (64%)	Remove - Within development footprint
			0	0	0				

AS4970-2009 considers a major encroachment to be greater than 10% of the TPZ or inside the SRZ¹. For all major encroachments, the project arborist must be able to demonstrate that all affected trees would remain viable should the trees be retained both in the short term (structural stability) and in the long term (sustainability), including the allowance of successful mitigation practices. When undertaking an assessment the arborist would need to take into consideration such factors as: the location and distribution of roots; potential loss of root mass; type of tree and ability to tolerate root disturbance; age, vigour and size of tree; lean/stability of the tree; soil characteristics and volumes; presence of existing or past structures; and, design factors.

Under normal circumstances, with some or all of the above factors working to favour a tree, it would be possible to allow for increased percentage encroachments, say up to 20%-30%. As can be seen in the above table, these values are exceeded almost each time.

¹ Page 11, Standards Australia, 2009

Of the 32 trees assessed (including a group of 6 Casuarinas – Tree E375), it has been determined that 29 trees will need to be removed based on the extent of the disturbance imposed by the proposed development.

It is considered that three trees (Trees E372, E373 and 302) can be retained. Due to the high percentage of encroachment, it will be necessary to prepare the trees prior to the works commencing and to monitor the trees for a period of 5 years to confirm that the trees have stabilised and will remain viable in the long term.

6 CONCLUSIONS & RECOMMENDATIONS

Conclusions

As noted above, 29 trees will need to be removed.

It is possible to retain 3 trees; however, they will need to be monitored for a period of 5 years to ensure their long term viability.

Recommendations

- Consideration be given to removing the 3 trees nominated for retention. This is suggested as their long-term survival cannot be guaranteed and to have them die at a later stage may not be understood by the community. Further, there would be benefit in having all trees planted at the same time for aesthetic reasons to provide a consistent appearance for the length of the boardwalk.
- Plant material should be pre-ordered prior to the letting of contracts to ensure the plant material is available when needed. This is especially important for the larger trees that may be difficult to obtain at short notice resulting in substitutions or the use of smaller and/or inferior stock
- All trees should comply with AS 2303-2018 Tree stock for landscape use.
- Ensure tree removal work is carried out by or supervised by a qualified tree worker (AQF Level 3 or equivalent) in accordance with the Guide to Managing Risks of Tree Trimming and Removal Work (Safe Work Australia, 2016).
- Tree remains to be mulched. Mulch can be used around remaining trees and within planter beds located elsewhere on site. If not practical to mulch fallen trees on site, the material can be disposed of in a legal manner off site and imported mulch used.

7 REFERENCES

Draper, D. & Richards, P.A.	<i>Dictionary for Managing Trees in Urban Environments.</i> CSIRO, Collingwood Vic, 2009.
Matheck, C. & Breloer, H.	<i>The Body Language of Trees: A Handbook for Failure Analysis.</i> TSO, London, England.
Safe Work Australia	<i>Guide to Managing Risks of Tree Trimming and Removal Work,</i> Australian Government, 2016.
Port Tree Fella	<i>Breakwall Initial Tree Summary,</i> December 20, 2021.
Standards Australia	<i>Australian Standard: AS 2303 Tree stock for landscape use</i> (December 2018).
Standards Australia	<i>Australian Standard, AS 4373 Pruning of amenity trees.</i> (March 2007)
Standards Australia	<i>Australian Standard: AS 4970 Protection of trees on development sites.</i> (August 2009)

8 APPENDICES

- APPENDIX A - TREE ASSESSMENT DIAGRAMS
- APPENDIX B – TREE ASSESSMENT SUMMARY

APPENDIX A – TREE IMPACT ASSESSMENT DIAGRAMS

TREE DIAGRAM 001 | L401

PORT MACQUARIE SOUTHERN BREAKWATER UPGRADE



B	20/9/22	ARBOCULTURAL ASSESSMENT
A	2/9/22	ISSUED FOR INFORMATION
REV	DATE	COMMENTS

PROJECT:
PORT MACQUARIE SOUTHERN BREAKWATER UPGRADE

SITE:
MUNSTER STREET PORT MACQUARIE

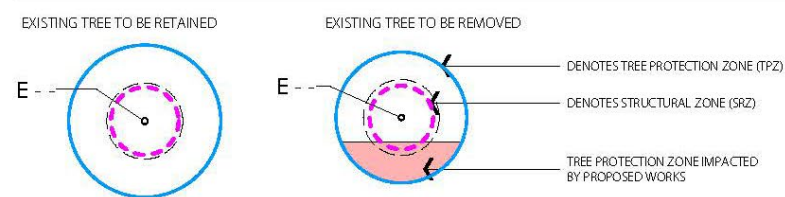
CLIENT:
TRANSPORT FOR NEW SOUTH WALES

14242.5 PMS 2022-09-20 192 UPDR IED ERI.wrk 21/9/22

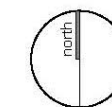
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JOB NUMBER:	14242.5	PHASE:	WD	DWG No:	L401
REV:	B				

1 ARB 001
L401 Scale: 1:500

LEGEND

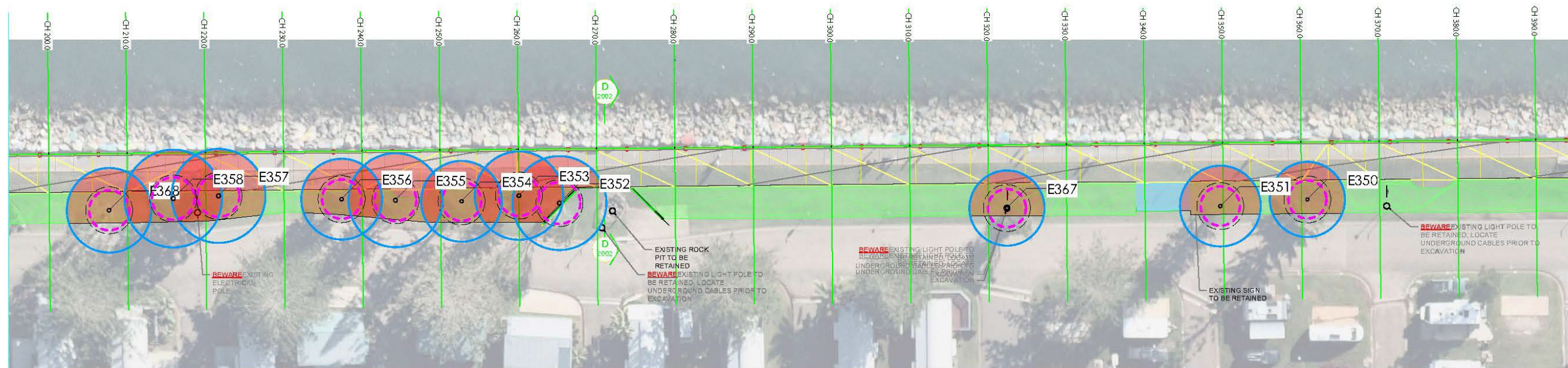


NOTE:
TPZ AND SRZ CALCULATIONS ARE BASED ON THIRD PARTY DATA SUPPLIED AND HAS NOT BEEN VERIFIED BY TERRAS LANDSCAPE ARCHITECTS



TREE DIAGRAM 002 | L402

PORT MACQUARIE SOUTHERN BREAKWATER UPGRADE



1 ABR 002
L402 Scale: 1:500

B	20/9/22	ARBORICULTURAL ASSESSMENT
A	2/9/22	ISSUED FOR INFORMATION
REV	DATE	CONTRIBUTOR

PROJECT:
PORT MACQUARIE SOUTHERN BREAKWATER UPGRADE

SITE:
MUNSTER STREET PORT MACQUARIE

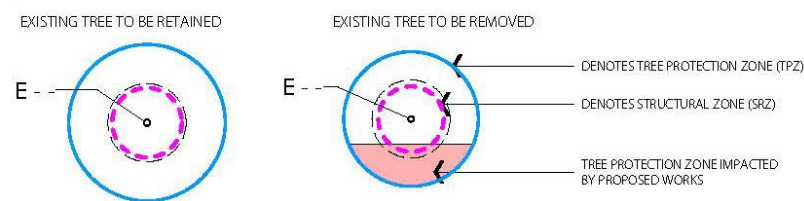
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TRANSPORT FOR NEW SOUTH WALES

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DRAWN: >> / >> DATE: >> SCALE: @A3

JOB NUMBER: 14242.5 PHASE: WD DWG No: L402 REV: B

LEGEND

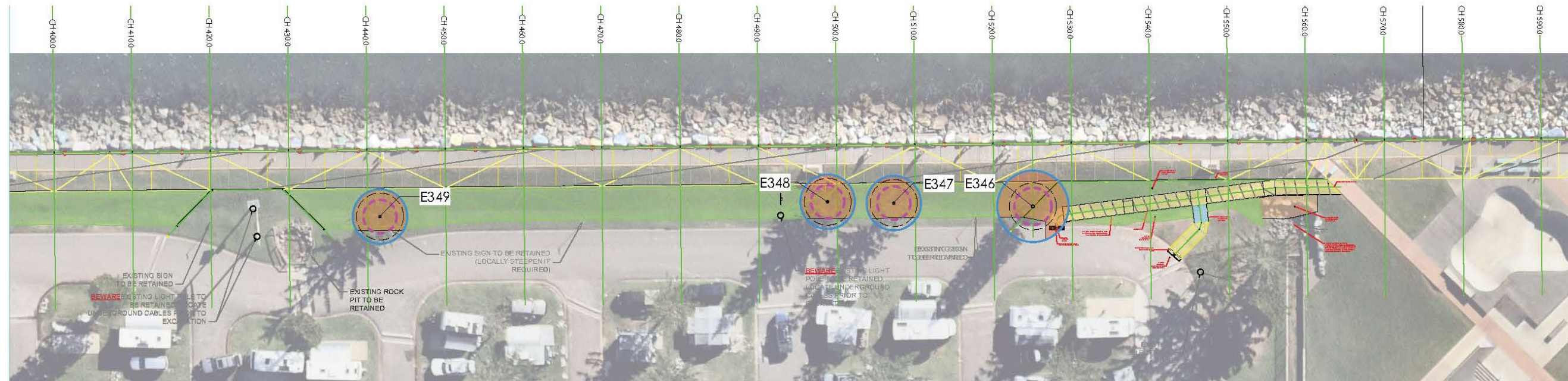


NOTE:
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TREE DIAGRAM 003 | L403

PORT MACQUARIE SOUTHERN BREAKWATER UPGRADE



1 ABR 003
L403 Scale: 1:500

B	20/9/22	ARBORICULTURAL ASSESSMENT
A	2/9/22	ISSUED FOR INFORMATION
REV	DATE	COMMENTS

PROJECT:
**PORT MACQUARIE SOUTHERN
BREAKWATER UPGRADE**

SITE:
**MUNSTER STREET PORT
MACQUARIE**

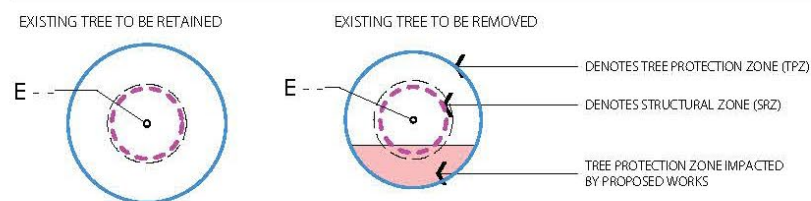
CLIENT:
**TRANSPORT FOR NEW SOUTH
WALES**

14242.5 PMB 2022-09-20 192 UPDATED 6/8.wrk 21/9/22

DRAWN: >> / >> DATE: >> SCALE: @A3

JOB NUMBER: 14242.5 PHASE: WD DWG No: L403 REV: B

LEGEND



NOTE:
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EXISTING TREE SCHEDULE | L404

PORT MACQUARIE SOUTHERN BREAKWATER UPGRADE

EXISTING TREE SCHEDULE

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B	20/9/22	ARBOCULTURAL ASSESSMENT
A	2/9/22	ISSUED FOR INFORMATION
REV	DATE	COMMENTS

PROJECT:
**PORT MACQUARIE SOUTHERN
BREAKWATER UPGRADE**

SITE:
**MUNSTER STREET PORT
MACQUARIE**

CLIENT:
**TRANSPORT FOR NEW SOUTH
WALES**

14242.5 PMB 2022 09 20 TPZ UPD (ED 16R) v04 21/9/22

DRAWN: >>> DATE: >> SCALE: @A3
JOB NUMBER: 14242.5 PHASE: DWG No: WDL404 B REV: B

NOTE:
TPZ AND SRZ CALCULATIONS ARE BASED ON THIRD PARTY DATA SUPPLIED AND HAS NOT BEEN VERIFIED BY TERRAS LANDSCAPE ARCHITECTS



APPENDIX B – TREE ASSESSMENT SUMMARY

TREE FACT	DESCRIPTION
Existing Tree Numbers	Approximately 180 significant trees within the caravan park property boundary.
Number of Trees impacted by proposed works	The current proposed landscape plan indicates removal of 29 trees along the edge of the proposed breakwater crest accessway, with a species breakdown of; 6 Norfolk Island Pines (<i>Araucaria heterophylla</i>), 12 Cook Island Pines (<i>Araucaria columnaris</i>), and 11 Swamp She-Oaks (<i>Casuarina glauca</i>)
Health of Trees impacted	Typically, the Swamp She-Oaks are reported by arborist to be in poor health with a Useful Life Expectancy (ULE) of less than 10 years (and in most cases less than 5 years) and Low retention value The Norfolk Island and Cook Island Pines are reported by arborist to be in fair or good health with a ULE of 20 - 40 years and High retention value
Age of Trees impacted	The Norfolk and Cook Island Pines are estimated to be 15-25 years old
Reason of Impact	It has been assessed that the construction of the proposed widened breakwater crest accessway will impact on the Tree Protection Zone (TPZ), considered necessary for continued good health of the 30 trees noted. Furthermore, the trees show signs of already being limited by the existing rock breakwater structure which underlies the current footpath and landward slope. Reinstatement with new trees with suitable offset from proposed pathway and adequate growing medium for continued good tree health for the lifespan of the tree considered the best long-term strategy to maintain tree amenity over the life of the project.
Number of Trees to be reinstated following proposed works	The current proposed landscape plan indicates planting of 43 replacement trees along the edge of the proposed accessway, with a species breakdown of; 39 Cook Island Pines (<i>Araucaria columnaris</i>), and 4 Norfolk Island Pines (<i>Araucaria heterophylla</i>).
Size of Trees to be reinstated following proposed works	500L trees which would have an install size of 3 - 4m. These would offer the optimum balance between maximising installation height and successful establishment in the conditions at the site. Inquiries have been made and the plants are currently available; however, it is recommended that that be pre-purchased prior to letting the contract to ensure that the plant material is available when needed
Further Landscaping	The landscape batter is proposed to be mass planted with hardy Australian native grass and ground cover species, Mat Rush (<i>Lomandra longifolia</i>), Creeping Boobiala (<i>Myoporum parvifolium</i>) and Coastal Moon Flower (<i>Carpobrotus glaucesens</i>). Accent planting of Gymea Lilies (<i>Doryanthes excelsa</i>) will also be incorporated into the planting scheme. It is anticipated there will be over 3000 plantings to improve

	the amenity of both users of the breakwall pathway and from within the caravan park.
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