Arboricultural Impact Assessment

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Contents

Summary

Leigh Brennan of Tree Management Strategies was commissioned by Adriano Pupilli Architects to provide an Arboricultural Impact Assessment for three trees at Newport Surf Life Saving Club.

This report aims to:

- Assess the health and vitality of three trees at the subject site.
- Calculate the impact the proposed development will have on three trees at the subject site.
- Suggest design modifications to retain high to medium value trees on the subject site.
- Suggest construction method modifications to retain high to medium value trees on the subject site.
- Suggest Tree Protection Measures to retain high to medium value trees on the subject site.

The Health, Condition, Retention Value and General data of Trees 1, 2 and 3 is displayed in (Section 3) Tree Data.

The Developmental Impact Zones are shown in the Tree Impact Plan (Appendix 1) and detailed in the Observation/Impacts (Section 4) of this report.

Conclusion

Tree 1

Given the close proximity of the seawall construction to the Structural Root Zone (SRZ) of Tree 1, it is advisable to investigate the size and number of roots that could be affected using vacuum excavation. Detailed design of the proposed building and coastal protection structures will need to be informed by this root mapping.

With the use of a no dig type paving/hardstand, the incursion to Tree 1 will be reduced to an acceptable level.

With root mapping, sensitive construction and tree protection measures adhered to, the impact to Tree 1 will be minimal and its health will remain viable into the future.

Tree 2

The impact to Tree 2 is acceptable considering sensitive construction methods, adequate tree protection measures and project arborist supervision throughout construction.

The seawall construction method will need to be sheet piling, this method creates the current root zone incursion calculation. If construction methods for the seawall are modified to anything other than sheet piling, the tree impacts may be increased and a review of the tree impact will be required.

Tree 3

The incursion to Tree 3 is considered minor with no adverse effects expected. Tree 3 will have will remain viable into the future.

Recommendations

- Undertake root mapping on Tree 1 to ensure the current seawall design will not affect its structural integrity.
- Adhere to the Tree Management Plan outlined in (Section 5) of this report to ensure the ongoing health of Tree 2.

1. Introduction

Leigh Brennan of Tree Management Strategies was commissioned by Adriano Pupilli Architects to provide an Arboricultural Impact Assessment for three trees at Newport Surf Life Saving Club, refer to (Figure 1).

Northern Beaches Council is the consenting authority for the proposed development.

The proposed development includes alterations and additions to the current building.

This report aims to:

- Assess the health and vitality of three trees at the subject site.
- Calculate the impact the proposed development will have on three trees at the subject site.
- Suggest design modifications to retain high to medium value trees on the subject site.
- Suggest construction method modifications to retain high to medium value trees on the subject site.
- Suggest Tree Protection Measures to retain high to medium value trees on the subject site.

Figure 1: Newport Surf Life Saving Club Highlighted in Red

2. Method

2.1 Site Assessment

From the ground, the following information was recorded and displayed in the Tree Data (Section 3) of this report.

- Tree genus and species.
- Approximate height spread if deemed applicable.
- Trunk diameter at breast height and above the buttress.
- Age class: young, semi mature, mature, over mature.
- Health.
- Condition.

Observations were recorded and photographed.

2.2 Research

The following legislation, documents or websites were reviewed:

- The Australian Standard for the Protection of Trees on Development Sites (AS 4970 – 2009).
- Northern Beaches Council Development Control Plan 2019.
- Northern Beaches Council Local Environmental Plan 2019.

2.3 Tree Schedule Method

Following the VTA, figures were used to add additional information to the Tree Data (Section 3) with the methods explained below:

Tree Health

Overall Health (Vigour/Vitality)	Tree vigour is exhibited by crown density, crown cover, leaf colour, leaf size, leaf texture, presence of epicormic growth, ability to withstand predation by pest and disease, resistance and degree of dieback.
Good (Excellent)	Good tree vigour exhibited by no decline in overall health and vigour, height and shape. The specimen is observed to be of excellent condition displaying characteristics that is known for that particular species (what would be the expected condition for that particular species of that age in that location), 0% dieback, full crown density, leaf health, no pest or disease present.
Fair	Fair tree vigour exhibited by moderate decline in overall health and vigour, height and shape. The specimen is observed to be of moderate condition by not displaying characteristics adequately that is known for that particular species (what would be expected for that particular species of that age in that location), less than 10% dieback, 90% of crown foliage density, more than 90% leaf health, acceptable level of pest or disease is evident for the assessing arborist (where it is considered the tree's overall health or condition will not be affected or lead to irreversible decline from pest or disease).
Fair/Poor	Fair to poor tree vigour exhibited by considerable decline in overall health and vigour, height and shape. The specimen is observed to be of less than acceptable condition by not displaying characteristics adequately that is known for that particular species (what would be expected for that particular species of that age in that location), 10-20% dieback, considerable foliage deficiencies, 70-90% foliage density, 70-90% leaf health, pest or disease infestation at acceptable thresholds for the assessing arborist (where it is considered the tree's overall health or condition will not be affected or lead to irreversible decline from pest or disease).
Poor	Poor vigour exhibited by substantial decline in overall health and vigour, height and shape. The specimen is observed to be of poor condition by not displaying characteristics adequately that is known for that particular species (what would be expected for that particular species of that age in that location), 20-30% dieback, considerable

	foliage deficiencies, 50-70% leaf health, pest or disease infestation at unacceptable infestation level that exceeds thresholds for the assessing arborist (where it is considered the tree's overall health or condition will be affected or lead to irreversible decline from pest or disease).
Very Poor	Very poor vigour exhibited by irreversible decline in overall health and vigour, height and shape. The specimen is observed to be of less than acceptable condition by not displaying characteristics adequately that is known for that particular species (what would be expected for that particular species of that age in that location), 15-50% dieback; severe foliage deficiencies; 30-50% density; 30-50% leaf health; pest or disease infestation at severe infestation level that exceeds thresholds for the assessing arborist (where it is considered the tree's overall health or condition will be affected or lead to irreversible decline from pest or disease).
Dead	Dead tree vigour exhibited by complete decline in overall health and vigour, height and shape. The specimen is observed to be dead by not displaying any characteristics adequately that is known for that particular species (what would be expected for that particular species of that age in that location), tree holds less than 15% foliage; branching is dead throughout canopy, pest or disease infestation at severe infestation level that exceeds thresholds for the assessing arborist (where it is considered the tree's overall health or condition will be affected or lead to irreversible decline from pest or disease).

Tree Condition

Overall Condition (Structure/Stability)	The tree condition as identified by the arborist in regard to defects in structure and stability.
Good (Exceptional specimen)	No damage or decay observed to the root plate, visible basal and /or root flare, stable in ground, well tapered branches with sound open unions. All characteristics within thresholds for the assessing arborist.
Fair (Standard tree – no observable major defects to suggest that there is an increased likelihood of tree or part of tree failure)	Minor damage or decay observed to root plate, trunk or primary branches or branch unions (1st or 2nd branch order or scaffolding branch), well-formed branch unions, minor branch end weight or over-extensions within thresholds for the assessing arborist.
Fair/Poor	Moderate damage or decay observed to root plate, trunk or primary branches or branch unions (1st or 2nd branch order or scaffolding branch); minimal basal/root flare; acute branch; past branch failure(s); moderate branch end-weight or over-extension approaching thresholds for the assessing arborist.
Poor	Major damage or decay observed to root plate, trunk or primary branches or branch unions (1st or 2nd branch order or scaffolding branch) no observable basal and /or root flare; acute branch unions starting to include bark; major branch end-weight or over-extension at or exceeds thresholds for the assessing arborist.
Very Poor	Excessive damage or decay observed to root plate, trunk, primary branch or branch unions (1st or 2nd branch order or scaffolding branch), excessive decay or hollows compromising the structural integrity, unstable in ground, excessive branch end-weight, included-bark unions, exceeding thresholds for assessing arborist. Failure probable.
Failed	Failure of root plate or trunk or primary branch or branch unions (1st or 2nd branch order or scaffolding branch) or active split between branch unions or severe damage to primary tree structure.

2.4 Tree Retention Value Method

IACA Significance of a Tree, Assessment Rating System (STARS) © (IACA 2010) ©

In the development of this document IACA acknowledges the contribution and original concept of the Footprint Green Tree Significance & Retention Value Matrix, developed by Footprint Green Pty Ltd in June 2001.

The landscape significance of a tree is an essential criterion to establish the importance that a particular tree may have on a site. However, rating the significance of a tree becomes subjective and difficult to ascertain in a consistent and repetitive fashion due to assessor bias. It is therefore necessary to have a rating system utilising structured qualitative criteria to assist in determining the retention value for a tree. To assist this process all definitions for terms used in the Tree Significance - Assessment Criteria and Tree Retention Value - Priority Matrix, are taken from the IACA Dictionary for Managing Trees in Urban Environments 2009.

This rating system will assist in the planning processes for proposed works, above and below ground where trees are to be retained on or adjacent a development site. The system uses a scale of High, Medium and Low significance in the landscape. Once the landscape significance of an individual tree has been defined, the retention value can be determined.

Tree Significance - Assessment Criteria

High Significance in landscape

- The tree is in good condition and good vigour. The tree has a form typical for the species.
- The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age.
- The tree is listed as a Heritage Item, Threatened Species or part of an Endangered Ecological Community or listed on a council's Significant Tree Register.
- The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity.
- The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values.
- The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa in situ - tree is appropriate to the site conditions.

Medium Significance in landscape

- The tree is in fair-good condition and good or low vigour.
- The tree has form typical or atypical of the species.
- The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area.
- The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street.
- The tree provides a fair contribution to the visual character and amenity of the local area.
- The tree's growth is moderately restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa in situ.

Low Significance in landscape

- The tree is in fair-poor condition and good or low vigour.
- The tree has form atypical of the species.
- The tree is not visible or is partly visible from surrounding properties as obstructed by other vegetation or buildings.
- The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area.
- The tree is a young specimen which may or may not have reached dimension to be protected by local Tree Preservation orders or similar protection mechanisms and can easily be replaced with a suitable specimen.
- The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa in situ - tree is inappropriate to the site conditions.
- The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms.
- The tree has a wound or defect that has potential to become structurally unsound.
- Environmental Pest/Noxious Weed Species.
- The tree is an Environmental Pest Species due to its invasiveness or poisonous/allergenic properties.
- The tree is a declared noxious weed by legislation.
- Hazardous and or Irreversible Decline.
- The tree is structurally unsound and/or unstable and is considered potentially dangerous.
- The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or part in the immediate to short term.

The tree is to have a minimum of three (3) criteria in a category to be classified in that group.

Note: The assessment criteria are for individual trees only, however, can be applied to a mono-cultural stand in entirety.

Useful Life Expectancy (ULE)

Useful life expectancy (SULE) is a measure of a trees remaining lifespan regarding its health, condition and locality ULE categories were measured as:

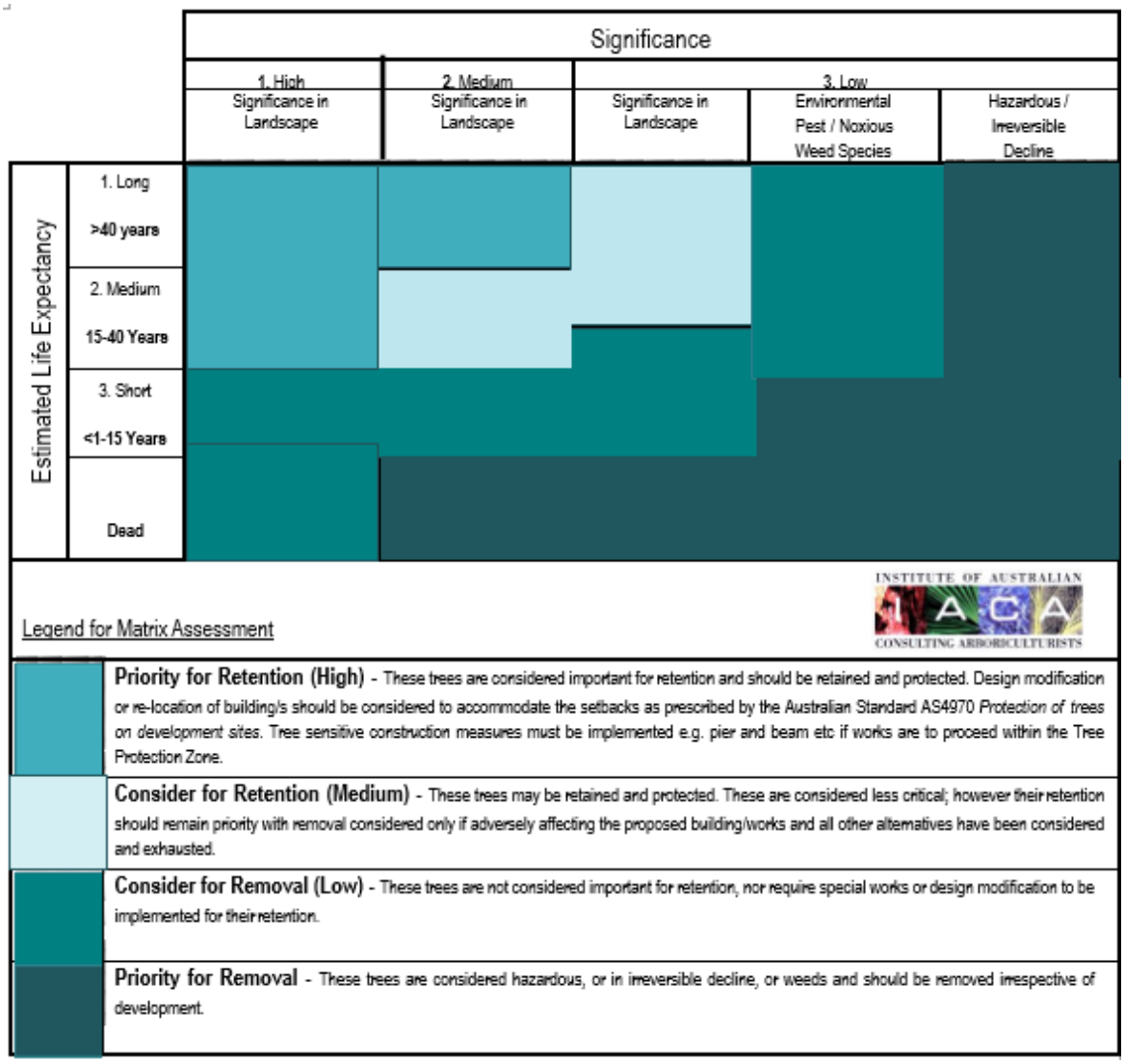
a) Long (greater than 40 years)

b) Medium (between 15 and 40 years)

c) Short (between 1 and 15 years)

d) Dead

Tree Retention Value - Priority Matrix



REFERENCES

Australia ICOMOS Inc. 1999, *The Burra Charter – The Australian ICOMOS Charter for Places of Cultural Significance*, International Council of Monuments and Sites, www.icomos.org/australia

Draper BD and Richards PA 2009, *Dictionary for Managing Trees in Urban Environments*, Institute of Australian Consulting Arboriculturist (IACA), CSIRO Publishing, Collingwood, Victoria, Australia.

Footprint Green Pty Ltd 2001, *Footprint Green Tree Significance & Retention Value Matrix*, Avalon, NSW Australia, www.footprintgreen.com.au

2.5 Tree Protection Zone and Structural Root Zone Method

Following the VTA, figures were used to add additional important information to the Tree Data (Section 3) with the methods explained below:

The Structural Root Zone (SRZ) is the area around the base of a tree required for its stability. The woody root growth and soil cohesion in this area are necessary to hold the tree upright; therefore, there are no variations to its size. The SRZ is normally circular with the trunk at its centre and is expressed by its radius in metres (AS – 4970). Due to the potential of causing instability of a tree, it is highly recommended that no roots within its SRZ are pruned or removed. SRZ, which is the area required for tree stability, was calculated as follows: SRZ radius = (D x 50) 0.42 x 0.64.

The Tree Protection Zone (TPZ) is the principle means of protecting trees on development sites. The TPZ is a combination of the root area and crown area that requires protection. It is an area isolated from construction disturbance, so that the tree remains viable (AS – 4970). The radius of the TPZ is calculated for each tree by multiplying its DBH x 12. TPZ = DBH x 12 (DBH = trunk diameter measured at 1.4m above ground level). The radius of the TPZ is measured from COT (Centre of the trunk).

Variations to the Tree Protection Zone (TPZ)

General
It may be possible to encroach into or make variations to the standard TPZ. Encroachment Includes excavation, compacted fill and machine trenching.

Minor encroachment
If the proposed encroachment is less than 10% of the area of the TPZ and is outside the SRZ, detailed root investigations should not be required. The area lost to this encroachment should be compensated for elsewhere and contiguous with the TPZ. Variations must be made by the project arborist considering relevant factors. The figures in (Appendix 2) demonstrate some examples of possible encroachment into the TPZ up to 10% of the area.

Major encroachment
If the proposed encroachment is greater than 10% of the TPZ or inside the SRZ the project arborist must demonstrate that the tree(s) would remain viable. The area lost to this encroachment should be compensated for elsewhere and contiguous with the TPZ. This may require root investigation by non-destructive methods and consideration of relevant factors listed in the Clause.

3. Tree Data

Tree No	1
Genus-Species	*Araucaria heterophylla*
Common name	Norfolk Island Pine
Age	Mature
Retention value	High
Landscape Significance	High
Useful Life Expectancy	Medium
Condition	Fair/Poor
Health	Fair/Poor

General Measurements			
DAB metres (radius) Above buttress	2.06	**Height (Metres)**	16
DBH metres (radius) Breast Ht	1.01		
Canopy Spread (Metres)			
North	6.00	**South**	6.00
East	6.00	**West**	6.00
SRZ Measurements			
SRZ area (Square Metres)	Refer to the Tree Impact Plan	**SRZ radius (Metres)**	4.48
SRZ Incursion (Square Metres)	Refer to the Tree Impact Plan	**SRZ Incursion %**	Refer to the Tree Impact Plan
TPZ Measurements			
TPZ area (Square Metres)	Refer to the Tree Impact Plan	**TPZ radius (Metres)**	12.12
TPZ Incursion (Square Metres)	Refer to the Tree Impact Plan	**TPZ Incursion %**	Refer to the Tree Impact Plan
Observations / Comments			
Basal Wound observed, basal swelling indicates reaction wood with potential decay. Minor amount of deadwood observed.			

Tree No	2
Genus-Species	*Araucaria heterophylla*
Common name	Norfolk Island Pine
Age	Mature
Retention value	High
Landscape Significance	High
Useful Life Expectancy	High
Condition	Fair
Health	Fair

General Measurements			
DAB metres (radius)	1.28	**Height**	25.00
DBH metres (radius)	1.06		
Canopy Spread (Metres)			
North	7.00	**South**	7.00
East	7.00	**West**	7.00
SRZ Measurements			
SRZ area (Square Metres)	Refer to the Tree Impact Plan Impact Plan	**SRZ radius (Metres)**	3.67
SRZ Incursion (Square Metres)	Refer to the Tree Impact Plan	**SRZ Incursion %**	Refer to the Tree Impact Plan
TPZ Measurements			
TPZ area (Square Metres)	Refer to the Tree Impact Plan	**TPZ radius (Metres)**	12.72
TPZ Incursion (Square Metres)	Refer to the Tree Impact Plan	**TPZ Incursion %**	Refer to the Tree Impact Plan
Observations / Comments			
Tree in good health and condition			

Tree No	3
Genus-Species	*Banksia integrifolia*
Common name	Coast Banksia
Age	Semi-Mature
Retention value	Medium
Landscape Significance	Medium
Useful Life Expectancy	Medium
Condition	Fair
Health	Fair

General Measurements			
DAB metres (radius) Above buttress	0.30	**Height (Metres)**	8.00
DBH metres (radius) Breast Ht	0.24		
Canopy Spread (Metres)			
North	3.00	**South**	3.00
East	3.00	**West**	3.00
SRZ Measurements			
SRZ area (Square Metres)		**SRZ radius (Metres)**	2.00
SRZ Incursion (Square Metres)		**SRZ Incursion %**	
TPZ Measurements			
TPZ area (Square Metres)	26.06	**TPZ radius (Metres)**	2.88
TPZ Incursion (Square Metres)	0.43	**TPZ Incursion %**	1.65
Observations / Comments			

4. Observations/Impacts

The Health, Condition, Retention Value and General data of Trees 1 to 3 is displayed in (Section 3) Tree Data of this report.

The Developmental Impact Zones are shown in the Tree Impact Plan (Appendix 1) and detailed below.

Tree 1

Tree 1 is given a high retention value due to its age, health, condition and position in the landscape. Tree 1 has an acceptable incursion of 8.79% to its TPZ by the proposed new building envelope.

Tree 1 has an additional incursion of 6.94% by the proposed sea-wall construction. The construction footprint is within close proximity to the SRZ of Tree 1, refer to the Tree Impact Plan (Appendix 1).

The total combined incursion to Tree 1 is 15.73%, refer to the Tree Impact Plan (Appendix 1).

Tree 1 also has a potential impact to its TPZ by the new paving/hardstand alignment. To minimise this incursion and ensure Tree 1's ongoing health, the below tree sensitive construction methods and tree protection measures are recommended.

Tree Sensitive construction:

<u>New Paving/Hardstand</u>

To minimise root damage to Tree 1, a no dig type hardstand paving construction method is recommended within the TPZ, refer to the Tree Management Plan (Section 5) of this report.

Tree Protection measures:

A tree protection fence is recommended for Tree 1 as shown on the Tree Impact Plan (Appendix 1) and detailed in the Tree Management Plan (Section 5) of this report.

Conclusion:

Given the close proximity of seawall construction to the SRZ of Tree 1, it is advisable to map the roots to assess the size and number of roots that could be affected. This will help ensure the long-term structural integrity of Tree 1.

With the use of a no dig type paving/hardstand, the incursion to Tree 1 will be reduced to an acceptable level.

With root mapping, sensitive construction and tree protection measures adhered to, the impact to Tree 1 will be minimal and its health will remain viable into the future.

Tree 2

Tree 2 is given a high retention value due to its age, health, condition and position in the landscape. Tree 2 has a major incursion of 17.81% to its TPZ by the proposed sea-wall design, refer to the Tree Impact Plan (Appendix 1). The theoretical TPZ of Tree 2 currently extends onto the beach area shown in (Figure 2). Although roots are theoretically in this area, my professional opinion is the number of roots will be reduced due to the lack of water and nutrients in this area and therefore the incursion would be reduced. The main root mass is thought to be in the area to the west of the trunk, refer to (Figure 2). The current root zone incursion calculation is based on sheet piling, to ensure no excavation occurs beyond the extent shown in the Tree Impact Plan. Alternate minimally invasive construction methods may be considered with the approval of the arborist.

Tree 2 also has a potential impact to its TPZ by the new paving/hardstand alignment. To minimise this incursion and ensure Tree 2's ongoing health, the below tree sensitive construction methods and tree protection measures are recommended.

Figure 2: Tree 2

Tree Sensitive construction:

To minimise root damage to Tree 2, a no dig type paving/hardstand construction method is recommended within the TPZ, refer to the Tree Management Plan (Section 5) of this report.

Tree Protection measures:

To minimise the potential root loss incurred from the seawall construction, a temporary irrigation system and soil conditioner application is recommended, refer to the Tree Management Plan (Section 5) of this report.

A Project Arborist should be onsite for the excavation of the proposed seawall to ensure roots are pruned with a final cut to undamaged wood.

A tree protection fence is recommended for Tree 2 as shown on the Tree Impact Plan (Appendix 1) and detailed in the Tree Management Plan (Section 5) of this report.

Conclusion:

The impact to Tree 2 is acceptable considering sensitive construction methods, adequate tree protection measures and project arborist supervision throughout construction.

Tree 3

Tree 3 is given a medium retention value as per IACA Significance of a Tree, Assessment Rating System (STARS) © (IACA 2010) ©. Tree 3 has a minor incursion of 1.65% by the landscape wall and paving/hardstand, refer to the Tree Impact Plan (Appendix 1).

Tree Sensitive construction:

N/A

Tree Protection measures:

N/A

Conclusion:

The incursion to Tree 3 is considered minor with no adverse effects expected. Tree 3 will have will remain viable into the future.

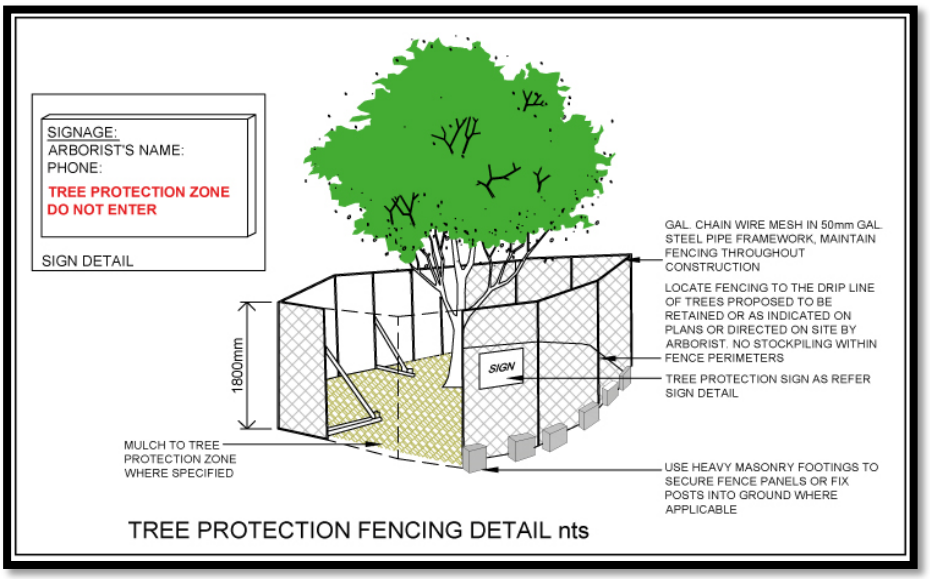
5. Tree Management Plan

The Tree Management Plan is designed to offer detailed design modifications or sensitive construction methods and a step-by-step timeline for Tree Protection Measures (CSA 2009).

Step 1: Tree Protection Fencing

As nominated on the Tree Impact Plan (Appendix 1) a tree protection fence is to be erected around Tree 1 and 2. The fence detailed in (Figure 3) needs to be in place throughout construction and may be dismantled when landscaping begins. The Project Arborist must certify the protection measures are in the correct location and to specifications prior to commencement of construction.

Figure 3: Tree Protection Fence Detail



Step 2: Root Mapping Tree 1

Given the proximity of seawall construction to the SRZ of Tree 1, it is advisable to map the roots to assess the size and number of roots that could be affected. This will help ensure the long-term structural integrity of Tree 1.

Vacuum excavation is recommended along the line of seawall excavation. The soil is vacuumed to a minimum depth of 600mm exposing roots potentially impacted by the proposed development.

An AQF Level 5 arborist will assess the size and quantity of exposed roots and advise whether the current development is acceptable and will not have a negative effect on Tree 1.

Step 3: Hardstand Paving

As shown in the Tree Impact Plan (Appendix 1) the paving encroaches into the TPZ of Tree 1 and 2. To reduce the impact to an acceptable level a no dig type construction is recommended for the removal of existing concrete path and installation of the proposed paving within the TPZ of Tree 1 and 2. The detailed design should ensure no excavation is required and work within the TPZ is done by hand.

A project arborist should be onsite to supervise the demolition and construction within the TPZ of Tree 1 and 2.

Step 4: Seawall Excavation

A Project Arborist should be onsite for the excavation of the proposed seawall within the TPZ of Tree 2. Where the Project Arborist identifies roots to be pruned within or at the outer edge of the TPZ, they should be pruned with a final cut to undamaged wood. Pruning cuts should be made with sharp tools such as secateurs, pruners, handsaws or chainsaws. Pruning wounds should not be treated with dressings or paints. It is not acceptable for roots within the TPZ to be 'pruned' with machinery such as backhoes or excavators (CSA 2009).

Step 5: Temporary Irrigation and Soil Conditioner

To ensure no adverse effects occur by the minor incursion to Trees 1 and 2, a temporary Irrigation system should be installed before construction commences.

The temporary irrigation system is to be installed within the Tree Protection zone prior to demolition to combat the root loss of Tree 2. The supervising Arborist will nominate irrigation scheduling and certify its installation.

Step 6: General Exclusions within the TPZ

The following activities shall be excluded within the TPZ:

- Excavation, compaction or disturbance of the existing soil.
- The movement or storage of materials, waste or fill.
- Soil level changes.
- Disposal and runoff of waste materials and chemicals including paint, solvents, cement slurry, fuel and oil.
- Other toxic liquids.
- Movement or storage of plant, machinery, equipment or vehicles.
- Any activity likely to damage the trunk, crown or root system of the trees.

The Project Arborist must be notified in the event any disturbance within the TPZ of trees to be retained is required.

Step 7: Monitoring

The Project Arborist should inspect Tree 1, 2 and 3 bi-monthly to ensure tree protection measures are being adhered to and the health of the tree is not being adversely affected (CSA 2009).

Step 8: Final Certification:

Upon completion of construction the Project Arborist will certify that the condition of Trees 1, 2 and 3 has not been affected by the development (CSA 2009).

6. Referenced Documents

Plans that were referred to for this report include:

Plan Title	Drawing Number	Consultant	Revision
Site Plan	SITE PLAN BASE PLAN	Adriano Pupilli Architects	17-07-2024
Tree Impact Plan	NSLSC.Tip.01	Tree Management Strategies	17-07-2024

7. Conclusions & Recommendations

Conclusion

Tree 1

Given the close proximity of the seawall construction to the Structural Root Zone (SRZ) of Tree 1, it is advisable to investigate the size and number of roots that could be affected using vacuum excavation. Detailed design of the proposed building and coastal protection structures will need to be informed by this root mapping.

With the use of a no dig type paving/hardstand, the incursion to Tree 1 will be reduced to an acceptable level.

With root mapping, sensitive construction and tree protection measures adhered to, the impact to Tree 1 will be minimal and its health will remain viable into the future.

Tree 2

The impact to Tree 2 is acceptable considering sensitive construction methods, adequate tree protection measures and project arborist supervision throughout construction.

The seawall construction method will need to be sheet piling, or similar minimally invasive construction method with the approval of the arborist. If construction methods for the seawall are modified to anything other than sheet piling, the tree impacts may be increased, and a review of the Tree Impact Plan will be required.

Tree 3

The incursion to Tree 3 is considered minor with no adverse effects expected. Tree 3 will have will remain viable into the future.

Recommendations

- Undertake root mapping on Tree 1 to ensure the current seawall design will not affect its structural integrity.
- Adhere to the Tree Management Plan outlined in (Section 5) of this report to ensure the ongoing health of Tree 2.

8. References

Shigo, A., 1986, A New Tree Biology and Dictionary: facts, photos, and philosophies on trees and their problems and proper care, Snohomish, WA

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The Australian Standard for the Protection of Trees on Development Sites (AS 4970 – 2009).

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IACA, 2010, IACA Significance of a Tree, Assessment Rating System (STARS), Institute of Australian Consulting Arboriculturists, Australia, www.iaca.org.au

9. Appendices

Appendix 1: Tree Impact Plan

Appendix 1

Legend

- Canopy Line
- TPZ - Tree Protection Zone
- SRZ - Structural Root Zone
- Seawall Incursion Zone
- Building Incursion Zone
- Paving/Hardstand Incursion Zone
  Sensitive Construction
- Paving Hardstand on Grade
- Tree Protection Fence

Retention Value

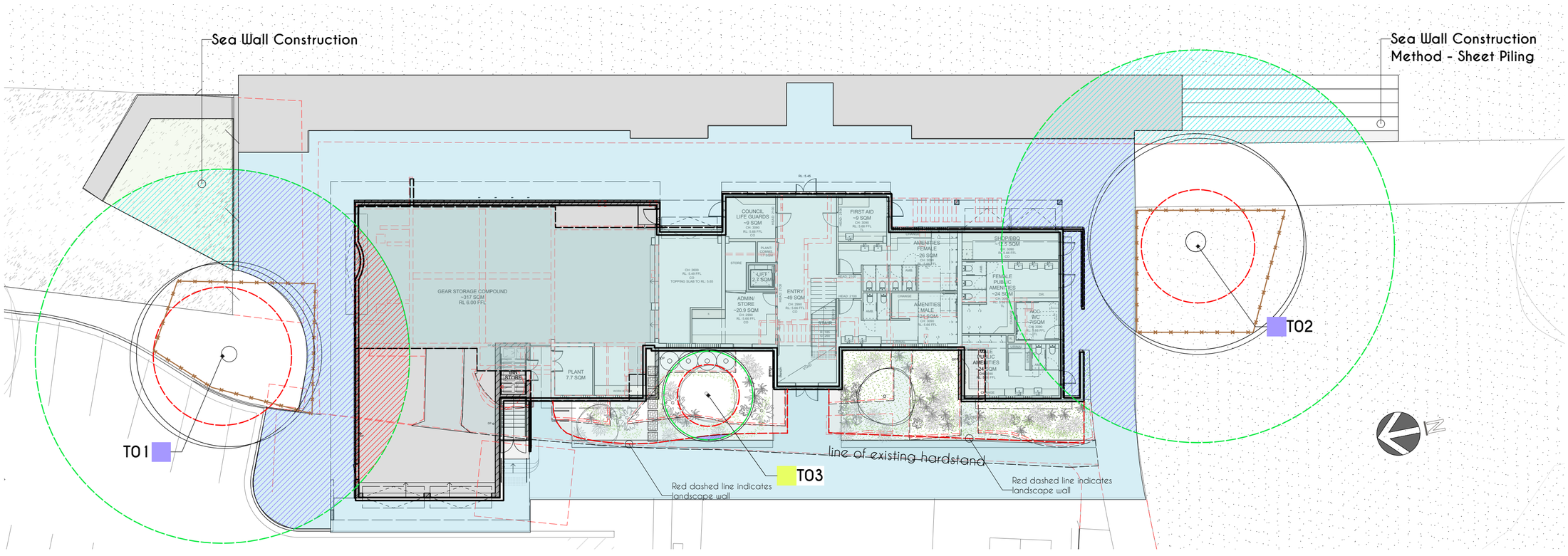
- High
- Medium
- Low

Incursion

T01
SRZ = No Incursion
TPZ = 461.48sqm
Building Incursion Zone 41.41sqm
Incursion = 8.79%
Seawall Incursion Zone 32.01sqm
Incursion = 6.94%

T02
SRZ = No Incursion
TPZ = 508.31sqm
Seawall Incursion Zone 90.55sqm
Incursion = 17.81%

T03
SRZ = No Incursion
TPZ = 26.06sqm
Paving and Landscape Wall
Incursion = 0.43sqm
Incursion = 1.65%



Tree Management Strategies

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CLIENT: Newport SLSC

ADDRESS: Northern Beaches Council

PLAN TITLE: Tree Impact Plan

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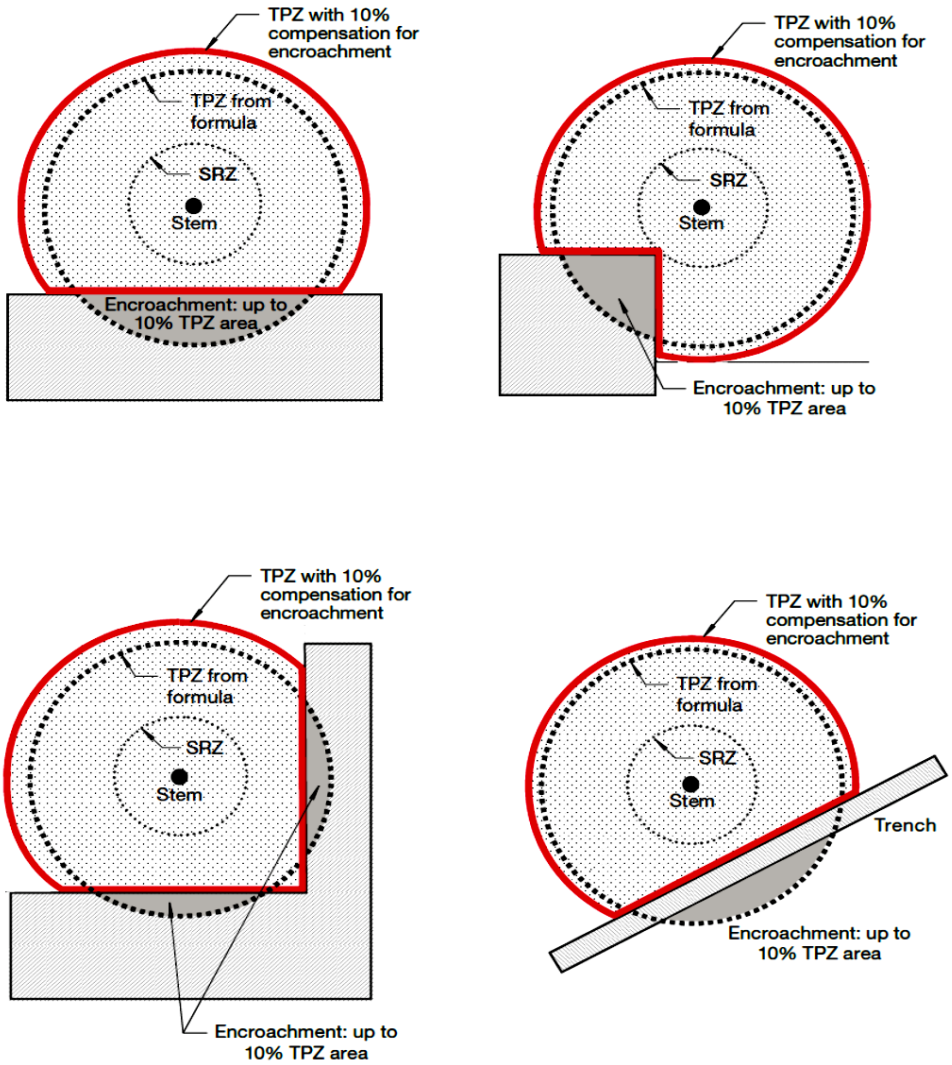
Appendix 2: Encroachment Examples

ENCROACHMENT INTO TREE PROTECTION ZONE

(Informative)

Encroachment into the tree protection zone (TPZ) is sometimes unavoidable. Figure D1 provides examples of TPZ encroachment by area, to assist in reducing the impact of such incursions.



NOTE: Less than 10% TPZ area and outside SRZ. Any loss of TPZ compensated for elsewhere.

FIGURE D1 EXAMPLES OF MINOR ENCROACHMENT INTO TPZ