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DA2019/1478
1 NARRABEEN PARK PARADE – NORTH NARRABEEN, NSW
MINOR LANDSCAPE ADDITIONS & ALTERATIONS
ARBORICULTURAL IMPACT ASSESSMENT REPORT
Ref No RTC-8420

INTRODUCTION

This report has been commissioned by Unity NSW Pty Limited C/- Mr. Peter Gurtner. The reason this report has been commissioned is to assess the likely impacts which may have occurred to three (3) Norfolk Island Pine trees situated within the road reserve adjacent Lot 1 of DP1005148 known as 1 Narrabeen Park Parade, NORTH NARRABEEN, NSW 2101.

The three trees have been subject to minor landscape works within 5m of a tree, or within specific tree protection zone radiuses as indicated within Appendix- C. Within this report information relating to likely impacts from previous works have been discussed with recommendations for minimising impacts to trees for additional works provided.

METHODOLOGY

In preparation for this report a tree and site inspection was conducted by the author on Friday 24th April 2020. Documentation reviewed and/or works conducted to assist in the preparation of this report include:

- Providing the three (3) trees with temporary tree numbers as identified within Appendix- C, where each tree is referred to by number throughout this report.
- Observing trees for tree vitality (health & condition) obtained by principles adopted from components of Mattheck *& Breloer* '*The Body Language of Trees*'1994. On completion of the Visual Tree Inspection (VTA) the retention value of the tree was summarized utilizing the Tree Assessment Checklist provided within Appendix- B.
- Measuring tree trunk diameters in accordance with AS4970-2009 to determine the estimated Structural Root Zone (SRZ) *the area required for tree stability*, and Tree Protection Zone (TPZ) radiuses.
- Soil probing with a steel probing tool to 250mm in depth in areas where new posts, footpath and timber edge retaining wall beams are located to detect resistance by tree root activity.

Documents reviewed

Northern Beaches Council - Landscape Referral Response dated 10.3.2020
O2 Architecture job No: 1610 - Floor Plan Dwg No: DA-02, rev B dated 12.6.2019
Grozier Geotechnical Consultants – Project 2016-092.1 Geotechnical Report dated December 2016

*Unless specified otherwise all development offsets within this report are taken from the centre of the tree.

CONTENT Brief **page**

SUMMARY OF ASSESSMENT

Determining tree protection zones

1. As shown within Figure 1 p3 the structural root zone (SRZ) radiuses have been identified which shows areas of previous and proposed works to be conducted adjacent the trees. Works within the SRZ is considered a Major encroachment under AS4970-2009 where existing surfaces have been upgraded to accommodate new landscape design. The SRZ is the primary area discussed within this report.

   A proportion of tree protection zone (TPZ) radiuses are occupied by existing paved and landscaped surfaces servicing the café and part outdoor café area. Given the confined area with previous landscape occupancy and usage within the TPZ the TPZ has been excluded from assessment within this report.

2. In determining impacts within the SRZ by previous additions and alterations the assessment conducted determined a negligible impact by design, however, no detailed tree root investigation by manual (exploratory hand root mapping) or pneumatic air spade inspection was conducted. The assessment concluded the likelihood of negligible impact due to the following discussions:

   i. Probing along retaining wall sleepers adjacent T3 & 2, and adjacent the new concrete footpath between T1 & 2 detected no root resistance at 250mm in depth. Soil type was considered very sandy and not compacted corresponding with Grozier Geotechnical Investigation report of deep sandy soils to the SSE of the site. Being sandy soils it is likely deep descending roots occur beyond the SRZ radius.

   ii. The new concrete access footpath to the cafe was constructed to finish above ground level, matching the existing raised level of the public verge pathway. It is likely minimal excavation was required to accommodate the construction of the path with no root resistance when soil probed at the path edge detected.

   iii. The four sleeper post vertical design supporting the steel table tops are cosmetic only with the exception of one (1) post located directly adjacent T3 at 0.7m (700mm) from the face of tree. It is unclear if tree roots were damaged during central post and footing placement.

   The remainder of the sleepers do not extend below ground level and are directly attached to existing copper log posts. Some minor alteration (straightening) and concrete footing work may have occurred, with the works occurring in the existing post footprint indicating a likely negligible impact by the design upgrade.

   iv. Timber sleeper path adjacent T2 is constructed to meet existing ground levels with minimal excavation to meet grade. The grated SW drain adjacent T3 is located outside of the SRZ radius with likely negligible root impact due to minor (<10%) excavation occupancy within the TPZ.

Figure 1, showing landscape works within SRZ radiuses

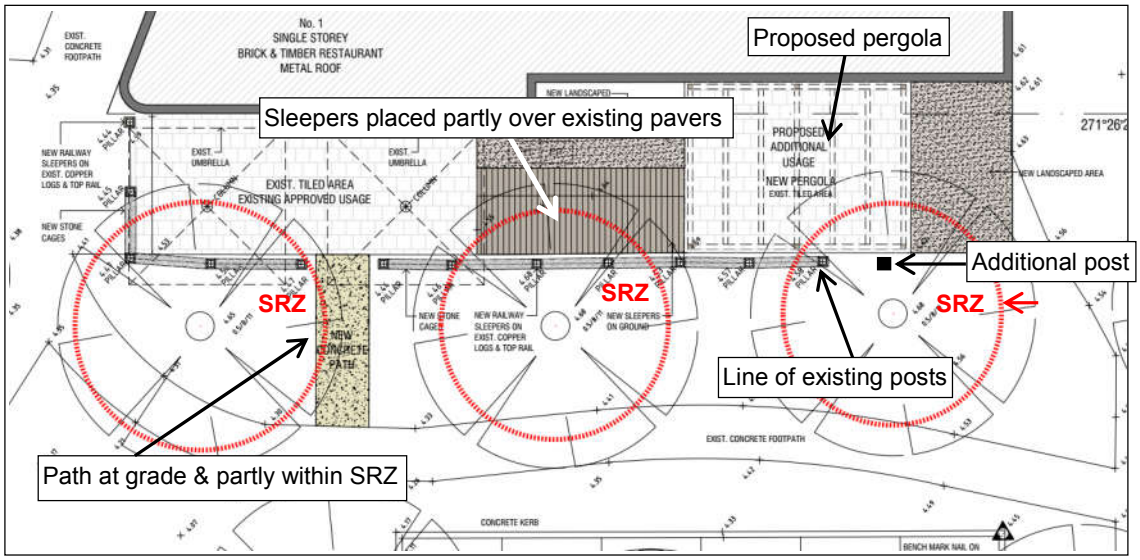
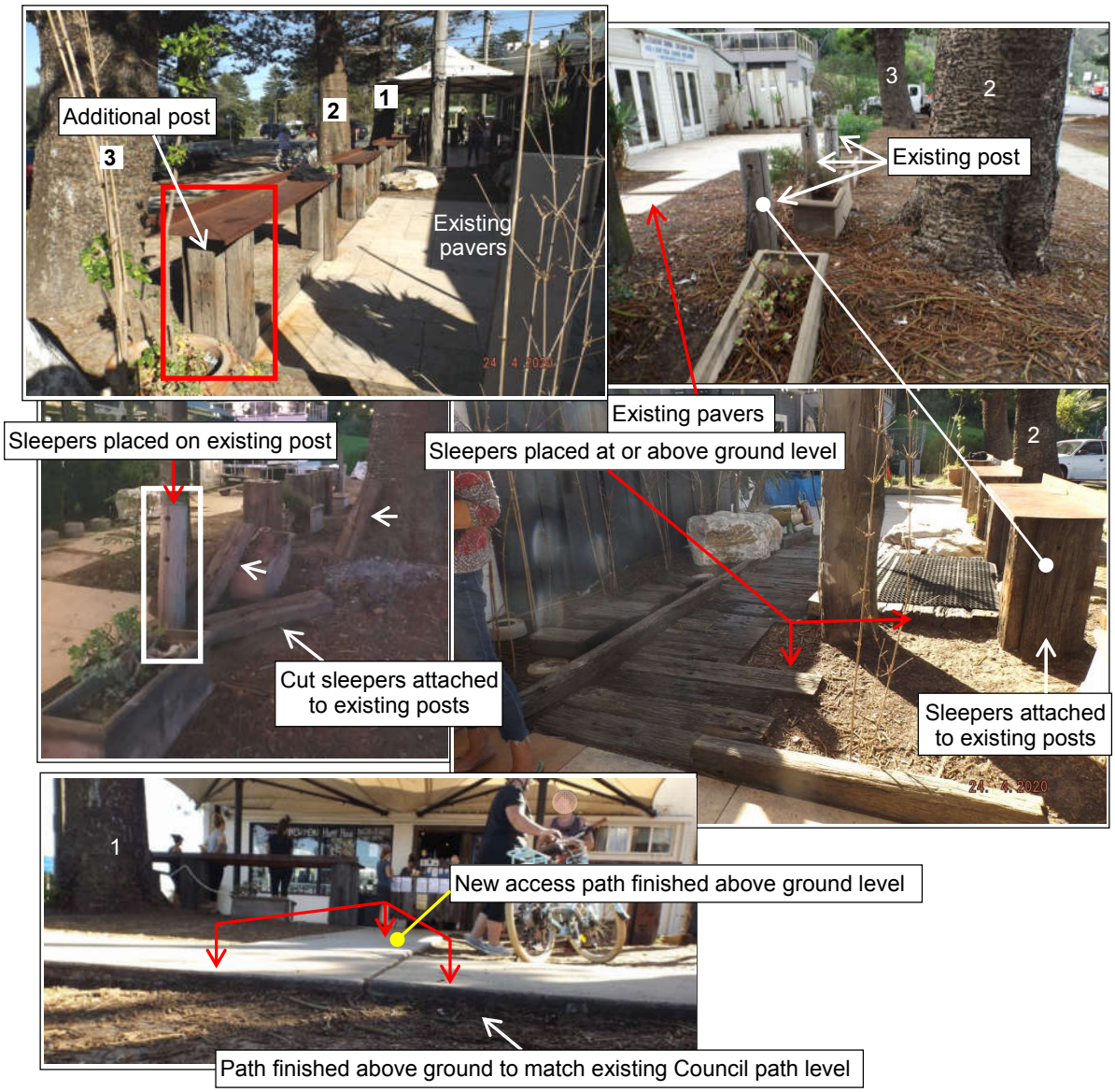


Figure 2, showing works within 5m of trees



Additional works within tree protection zones

3. Additional works to complete the landscape upgrade design proposal consist of an additional usage area and pergola adjacent T3 with line of stone wall cages under outdoor bar table tops. Works are located within SRZ setbacks with the following recommendations provided to minimise impacts to trees by design:
    i. There is to be no excavation within SRZ radiuses without prior root mapping or investigation works to determine impact on critical underlying tree roots, refer SRZ & TPZ distance column Appendix- C. The SRZ should be considered a development exclusion zone with no works occurring within the SRZ without prior arborist advice and certification.
    ii. All root investigation works are to be conducted by a minimum suitably qualified AQF Level 4 certified arborist with root mapping plan and/or certification report provided prior to obtaining a Construction Certificate (CC).
    iii. In specific detailed root mapping or exploratory root investigations should occur for pergola pier footling locations adjacent T3.
    iv. *Stone cage wall proposal*: construction methodology for the stone cage wall proposal should be more clearly detailed within construction drawings. In specific there should be no excavation or compaction to accommodate the wall proposal within the SRZ. Where the wall is proposed on natural ground level within the SRZ root mapping should occur to provide more information on the location, distribution and effect of works on critical underlying tree roots. Tree sensitive design such as placing the wall directly on top of or spanning the wall above ground level over the SRZ may be achievable pending the results of exploratory root investigations.
    v. All tree roots at or >30mm(Ø) are to be retained. Should such roots require pruning all works are to be conducted by the site arborist, clean cutting and/or protecting encountered roots in accordance with AS4970-2009 – section 4.5.4 *Root protection during works within the TPZ*. Should there be any uncertainty with root management requirements a minimum AQF Level 5 project arborist is to be consulted.
    vi. There is to be no compaction or additional excavation i.e. SW / hydraulics or electrical service trenching within the TPZ radius without prior arborist advice.
    vii. *Arborist certification:* final certification is to consist of photographic evidence of excavation activities, root management (pruned & covered / protected roots from contamination), time of works and summary of activities conducted to manage tree roots within the tree protection zone.

    Prior to works

    viii. The trunk of trees are to be protected with timber beam trunk protection as detailed within Item 3 of Appendix- C. Timber beams should be no less than 2m in height and installed without causing injury to the tree.

Should you require further liaisons in this matter please contact me direct on 0419 250 248

Yours sincerely

Mark A Kokot

AQF Level 5 consulting arborist

Diploma of Hort/Arboriculture (AQF5), Associate Diploma Parks Management (AQF4)
Certified Arborist / Tree Surgeon (AQF3), ISA Tree Risk Assessment Qualified 6/2024
Member: ISA, Arboriculture Australia & IACA, Working With Children No: WWC0144637E

ATTACHMENT- A: Terminology, notes & references

Age classes: (I) Immature refers to a well established but juvenile tree. (ESM) refers to an early semi mature tree not of juvenile appearance. (SM) Semi-mature refers to a tree at growth stages advancing into maturity and full size. (LSM) Late Semi- Mature, refers to a tree between semi-mature and close to mature. (EM) refers to a tree at the first stages of maturity. (M) Mature refers to a full size tree with some capacity for future growth. **Vitality** – the state of being strong & active, capacity for survival or for the continuation of a meaningful or purposeful existence which includes ***Health*****:** refers to a trees vigor exhibited by the crown density, leaf colour, presence of epicormic shoots, ability to withstand disease invasion and the degree of dieback & ***Condition*****:** refering to the tree's form and growth habit, as modified by its environment (aspect, suppression by other trees, soils) and the state of the scaffold (i.e. Trunk and major branches), including structural defects such as cavities, crooked trunks or week trunk / branch junctions. These are not directly connected with health and it is possible for a tree to be healthy but in poor condition. **Decay:** (*N*) – an area of wood that is undergoing decomposition. (*V*) – decomposition of an area of wood by fungi or bacteria. **Decline:** Is the response of a tree to a reduction of energy levels resulting from stress. Recovery from decline is difficult and slow; is usually irreversible. **Defect:** A identifiable fault in a tree. **Footprint:** The area occupied by site structures, including the dwelling driveways and hard surfaces. **Hazard:** When a tree failure hazard is present when a tree has potential to cause harm to people or property. (A source of potential harm). **Order of branches:** First order being those that are the first to extend from the main trunk or codominant limbs, second order branches extend from the first order and third order branches extend from the second order. **Probability:** The likelihood of some event happening. **Risk:** Is the probability of something adverse happening. **Wound:** Damage inflicted upon a tree through injury to its living cells, may continue to develop further weakening of the structure compromising structural integrity.

NOTES: This report acknowledges the current Australian Standards 'Protection of Trees on Development Sites' AS 4970 – 2009 with reference to the Tree Protection Zone (TPZ): being a combination of the root and crown area requiring protection. The TPZ takes into consideration the Structural Root Zone (SRZ): The area required for tree stability. Determined by AS4970 - 2009 Figure 1, Table of determining the SRZ, section 3.3.5 of the standards. The standard states where a greater than 10% encroachment occurs the arborist is to take into consideration the schedule of determining impacts as set within AS4970 s. 3.3.4. Encroachments are referred to within this report as major or minor encroachments (AS4970 s. 3.3.2 & 3.3.3). Given the existing site conditions both the SRZ & TPZ cannot be accurately determined

Development encroachments are referred to as No impact (0%) incursion, Low impact (<10%) of minor consequence, Medium impact (<20%) incursion where the project arborist is to demonstrate the tree/s remain viable by tree sensitive construction techniques, and High level impact (>20%) where design changes or further information is required to manage tree vitality.

Care has been taken to obtain information from reliable sources. All data has been verified as far as possible, however, I can neither guarantee nor be responsible for the accuracy of information provided by others.

SELECTED REFERENCES:

Barrell J. 1993, 'Preplanning Tree Surveys: Safe useful Life expectancy (SULE) is the Natural Progression", Arboricultural Journal 17: 1, February 1993, pp. 33-46.
Matheny N. & Clark J. 1998, Trees & Development *'A Technical Guide to Preservation of Trees During Land Development'* International Society of Arboriculture, Champaign USA.
Standards Australia 2009, *Australian Standards 4970 Protection of Trees on Development Sites* - Standards Australia, Sydney, Australia.
Standards Australia 2007, *Australian Standards 4373 Pruning of Amenity Trees* - Standards Australia, Sydney, Australia.

ATTACHMENT- B: Visual Tree Inspection Checklist

VTA i) Landscape Significance (LS): The significance of a tree in the landscape is a combination of its amenity, environmental and heritage values.
Values may be subjective however, are based after IACA Sustainable Retention Index Value (SRVI) which offer a visual understanding of the relative importance of the tree to the environment. The Landscape Significance for this assessment is described in seven categories to assist in determining the retention value of trees.

1	Significant	2	Very High	3	High	4	Moderate	5	Low	6	Very Low	7	Insignificant

ii) Visual Tree Assessment (VTA)

0	If appropriate to VTA - **exempt* trees from Local Government Authority (LGA) Tree Management or Preservation Orders (TPO)	2E	Trees location likely to be affected by infrastructure restricting root growth potential, or tree has potential to cause infrastructure damage where risk mitigation or rectification works may likely compromise tree anchorage
0A	Noxious or invasive species located within heritage conservation area		
1	Trees that are dead, significantly declining >75% volume or obviously hazardous	3	This rating incorporates trees that may require further investigation of defects such as pathogen activity, cavities or symptoms indicating internal decay of an extent that cannot be quantified under visual examination. Further inspections may be in the way of arborist climbing inspection within the canopy, root crown investigation and/or drill penetrating or Picus Sonic Tomograph ultrasound testing procedures to determine percentage of internal decay.
2	Trees that are structurally damaged. Have poor structure or weak & detrimental large stem inclusions capable or failure opposed to 2B. Tree also may be affected by extensive borer damage, fungal pathogens (wood rot) or viruses. Some symptoms may be reversible, remediated or controlled give appropriate management.		
2A	Tree damage specific to basal and/or root plate damage, very shallow soils or steep topography resulting in poor anchorage where condition may become problematic in near future / may include trees with included bark splits to ground level	4	Trees which appear specifically environmentally stressed by drought, poor soil or site conditions. Symptoms may be reversible given appropriate management
2B	Defect specific to stem inclusions development (weak branch attachments) where the condition may not be immediately detrimental however, require annual to biannual monitoring with control to prevent stem failure by installing slings, cable or bracing. Tree may also contain multi stems or codominant twin stems	5	Trees that would benefit from crown maintenance pruning as identified within the Australian Standards AS 4373 – 2007 Pruning of Amenity Trees
		5A	Trees that require little or no maintenance at time of inspection other than close monitoring
2C	Tree may contain minor wounds, pest or minor pathogen activity, altered by minor pruning or storm damaged that is not considered immediately detrimental - may also display average form. Likely to require close annual monitoring or minor corrective pruning	6	Trees may be typical for species type, of good form and visual condition for age class May have suppressed one sided canopies or are low risk trees
2D	Trees significantly altered by recent storm or over pruning events resulting in sudden exposure or poor form which may reduce retention values, - or tree extensively pruned for power line clearance modifying form increasing risk of limb bending stress by exposure	7	VTA restricted by canopy or plant material vine or ivy covering tree parts, or site conditions which do not allow access- fences to neighbouring sites

iii) Retention Value (RV): [1] Low risk - tree fee of visual defects & viable for retention, [2] Medium – low risk - viable for retention with minor faults which may reduce ULE, [3] Medium risk - trees which containing issues or faults that are likely to become problematic in the near future, [4] M/High risk - trees to be considered for removal due to poor condition.

1	High retention	2	Medium retention	3	Low retention	4	Consider removal

iv) U.L.E. categories Useful Life Expectancy (after *Barrell* 1996, modified by the author) A trees U.L.E. category is the life expectancy of the tree modified first by its age, health, condition, safety and location. U.L.E. assessments are not static but may be modified as dictated by changes in trees health and environment. The five categories of U.L.E. are as follows:
1. Long U.L.E. - Appear retainable at the time of assessment for over 40 years with an acceptable degree of risk assuming reasonable maintenance.
2. Medium U.L.E. - Appear to be retainable at the time of assessment for 15 to 40 years with an acceptable degree of risk assuming reasonable maintenance.
3. Short U.L.E. - Trees appear to be retainable at the time of assessment for 5 to15 years with an acceptable degree of risk assuming reasonable maintenance.
4. Very short - Removal- Trees which should be scheduled for removal within the very short term or as specified within this report.
5. Small, young or regularly pruned – Trees under 5m in height that can be easily moved or replaced, includes screen plantings or hedge lines.

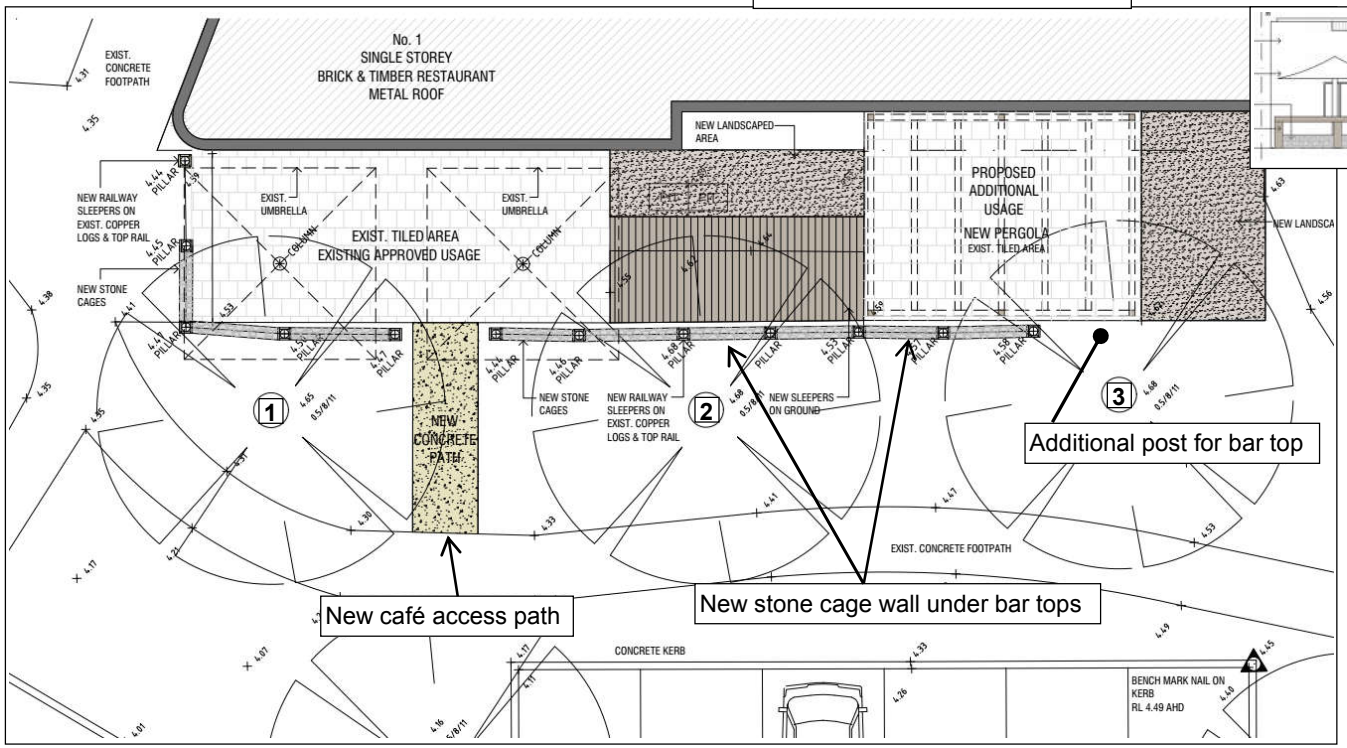
ATTACHMENT- C: Tree schedule & development impact discussions – *general*

Tree Assessment Schedule *Refer VTA Checklist Attachment- B*

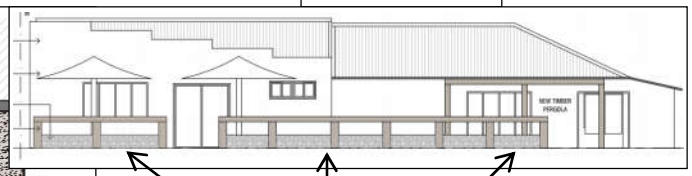
Tree No:	Species	Height x Span	DBH mm	SRZ / TPZ	Age	Tree vitality	Significance	VTA	RV	ULE	Comments
1	*Araucaria heterphylla* Norfolk Island Pine	28 x 14	1050	3.5 / 12.6	M	Good	2 – very high	6	1	2	Tree with no significant visual faults, no significant decline in canopy evident
2	*Araucaria heterphylla* Norfolk Island Pine	28 x 13	900	3.2 / 10.8	M	Good	2 – very high	6	1	2	Tree with no significant visual faults, no significant decline in canopy evident
3	*Araucaria heterphylla* Norfolk Island Pine	27 x 13	850	3.1 / 10.2	M	Good	2 – very high	2C	2	2	Tree with no significant visual faults, minor wound at base S side, no significant decline in canopy evident

Development area & tree location plan

Item- 1 Tee Location & Floor Plan



Item- 2 Elevation



Item- 3 Trunk protection detail