EARTHSCAPE HORTICULTURAL SERVICES
Arboricultural, Horticultural and Landscape Consultants

ABN 36 082 126 027

DEVELOPMENT IMPACT ASSESSMENT REPORT

PROPOSED COMMERCIAL DEVELOPMENT

CRONULLA SUTHERLAND LEAGUES CLUB
CAPTAIN COOK DRIVE, WOOLOOWARE

January 2013

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1 INTRODUCTION

1.1.1 This report was commissioned by Bluestone Property Solutions Pty Ltd to assess the health and condition of seventy-five (75) trees located within or immediately adjacent the Cronulla Sutherland Leagues Club. The report has been prepared to aid in the assessment of a Development Application (DA) for the construction of a new commercial development (integrated retail centre) within the property. The assessment has been limited to trees located within "Stage 1" of the overall development, as indicated in Figure 1.

1.1.2 The purpose of this report is to assess the potential impact of the proposed development on the subject trees, together with recommendations for amendments to the design or construction methodology where necessary to minimise any adverse impact. The report also provides recommended tree protection measures to ensure the long-term preservation of the trees to be retained where appropriate.

1.1.3 In the absence of any specific requirements of Sutherland Shire Council for the preparation of arborist's reports, this report has been prepared in accordance with Section 2.3 of the Australian Standard for Protection of Trees on Development Sites (AS4970:2009).

2 THE SITE

2.1.1 The subject property is known as Lot 11 in DP 526492, being the Cronulla Sutherland Leagues Club (also known as 'Sharkies' and Sharks Leagues Club), 461 Captain Cook Drive, Woolooware. For the purposes of this report, the subject allotment will be referred to as "the Site". The total area of the site is 5.934 hectares. The site contains an existing leagues club building located centrally within the site with an on-grade asphalt car park to the east, and a playing field with associated grandstands to the west. The site is relatively level and adjoins Woolooware Bay (forming part of the Georges River) to the north. The site contains a number of garden areas surrounding the main building, containing a mixture of non-local native and exotic trees and palms. The main car park also contains a number of small trees within narrow island garden strips.

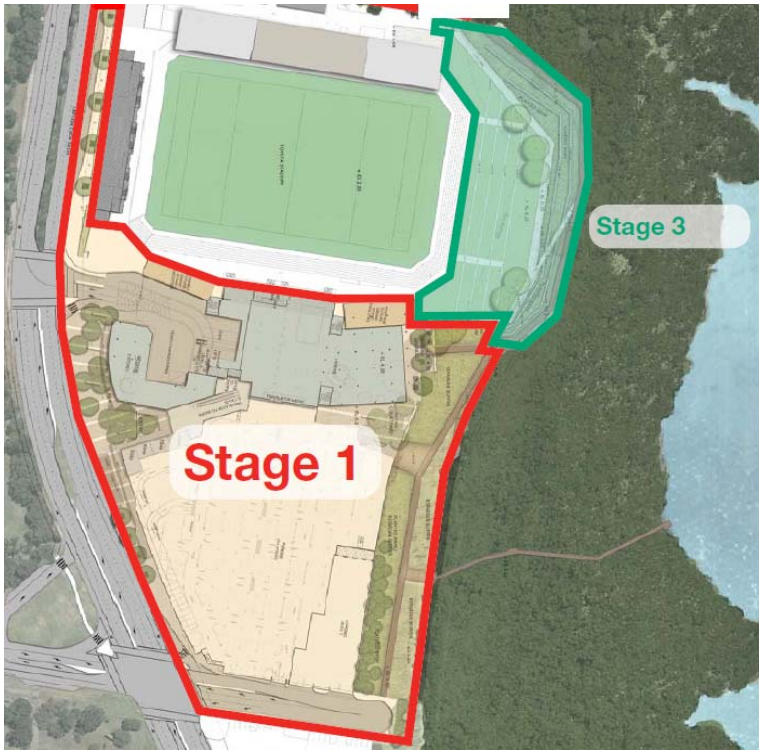


Figure 1 – Showing the Stage 1 area of the proposed development.

2.1.2 Soils of this area are variable and extensively disturbed by human activity. The site is located on reclaimed land originally tidal flats and mangrove swamps forming part of Woolooware Bay. The soil materials of this area consist primarily of imported fill material which may consist of dredged estuarine sand and mud, rubble and rock, mixed with local soil materials. Grassed areas are typically capped with up to 400mm of sandy loam.[1] The landscape generally consists of level to undulating terrain with slopes ranging usually less than 30% grade. The original soil materials of this area were typical of the Mangrove Creek Soil Landscape Group (as classified in the Soil Landscapes of the Wollongong-Port Hacking 1:100,000 Sheet), consisting of "deep (greater than 2000mm) waterlogged *Calcareous Sands, Solonchaks* and *Siliceous Sands* on Mangrove Flats and deep (greater than 2000mm) *Calcareous Sands, Solonchaks* and some *Siliceous Sands* and *Humic Gley Soils* on Saltmarsh and Forest Flats.[2]

2.1.3 Dominant locally indigenous tree species found in this area include *Casuarina glauca* (Swamp Oak), *Eucalyptus robusta* (Swamp Mahogany) and *Melaleuca quinquenervia* (Broadleaved Paperbark). Other species found in this association may include *Melaleuca liniariifolia* (Narrow-leaved Paperbark), *Melaleuca styphelioides* (Prickly Paperbark), *Cupaniopsis anarcardioides* (Tuckeroo), *Livistona australis* (Cabbage Tree Palm) and *Eucalyptus botryoides* (Bangalay). Areas subject to tidal inundation may include *Avicennia marina* (Grey Mangrove).

3 SUBJECT TREES

3.1.1 The subject trees were inspected by Earthscape Horticultural Services (EHS) on the 2nd January 2013. Each tree has been provided with an identification number for reference purposes denoted on the attached Tree Location Plan (**Appendix 6**), based on the survey prepared by Harrison Friedmann & Associates Pty Ltd, Dwg. Ref No. 40966DT dated 02/06/2011. The numbers used on this plan correlate with the Tree Assessment Schedule (**Appendix 4**). Tree No.s T9a,T12a, T12b, T12c, T12d, T12e, T12f, T12g, T12h, T18a, T19a, T21a, T21b, T24a, T28a, T35a, T42a, T44, T45a-e, T46a-d & T47a-d were not shown on the original survey and have been plotted on the drawing in their approximate positions.

4 HEALTH AND CONDITION ASSESSMENT

4.1 Methodology

4.1.1 An assessment of each tree was made using the Visual Tree Assessment (VTA) procedure.[3] All of the trees were assessed in view from the ground. No aerial inspection or diagnostic testing has been undertaken as part of this assessment.

4.1.2 The following information was collected for each tree:-

- Tree Species (Botanical & Common Name);
- Approximate height;
- Canopy spread; measured using a metric tape and an average taken.
- Trunk diameter (measured at 1.4 metres from ground level);
- Live Crown Size; (measured by subtracting the total height of the tree from the lowest point of the crown and multiplying by the average crown spread to give a value in square metres).
- Health & vigour; using foliage size, colour, extension growth, presence of disease or pest infestation, canopy density, presence of deadwood, dieback and epicormic growth as indicators,
- Condition; using visible evidence of structural defects, instability, evidence of previous pruning and physical damage as indicators.
- Suitability of the tree to the site and its existing location; in consideration of damage or potential damage to services or structures, available space for future development and nuisance issues.

This information is presented in a tabulated form in **Appendix 4.**

4.2 Safe Useful Life Expectancy (SULE)

4.2.1 The remaining Safe Useful Life Expectancy[4] of the tree is an estimate of the sustainability of the tree in the landscape, calculated based on an estimate of the average age of the species in an urban area in Sydney, less its estimated current age. The life expectancy of the tree has been further modified where necessary in consideration of its current health and vigour, condition and suitability to the site. The estimated SULE of each tree is shown in **Appendix 4.**

4.2.2 The following ranges have been allocated to each tree:-

- Greater than 40 years (Long)
- Between 15 and 40 years (Medium)
- Between 5 and 15 years (Short)
- Less than 5 years (Transient)
- Dead or immediately hazardous (defective or unstable)

5 LANDSCAPE SIGNIFICANCE

5.1 Methodology for Determining Landscape Significance

5.1.1 The significance of a tree in the landscape is a combination of its amenity, environmental and heritage values. Whilst these values may be fairly subjective and difficult to assess consistently, some measure is necessary to assist in determining the retention value of each tree. To ensure in a consistent approach, the assessment criterion shown in **Appendix 1** have been used in this assessment.

5.1.2 A rating has been applied to each tree to give an understanding of the relative significance of each tree in the landscape and to assist in determining priorities for retention, in accordance with the following categories:-

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

5.2 Environmental Significance

5.2.1 Tree Preservation Order

The Sutherland Shire Development Control Plan (DCP) 2006, made under Clause 56 of the Sutherland Shire Local Environment Plan (LEP) 2006, protects trees and bushland vegetation within the Shire. The DCP generally protects all trees with a trunk diameter of 100mm or greater measured at 0.5 metres above ground level, trees or other vegetation growing within 4 metres of a watercourse and bushland vegetation (including Mangroves) which is either remnant or representative of the structure and floristics of the original vegetation community. Some exemptions apply. The following species are scheduled as exempt (not protected) under the Clause 57 of Sutherland Shire LEP:-

Tree No.	Species	Exemption
T10, T24a, T26, T27, T28, T28a, T29 & T30	*Lophostemon confertus (Brushbox)*	Exempt Species

T13, T14, T15, T16, T37, T38, T39 & T40	*Syagrus romanzoffianum (Cocos Palm)*	Environmental Weed Species

5.2.2 The remainder of the trees are protected under Council's TPO.

5.2.3 Wildlife Habitat

Melaleuca liniariifolia (Narrow-leaved Paperbark) [T3, T4 & T5], *Ficus rubiginosa* (Port Jackson Fig) [T1], *Banksia integrifolia* (Coast Banksia) [T9a] and *Casuarina glauca* (Swamp Oak) [T21a & T21b] are all locally-indigenous species, representative of the original vegetation of the area and would be of benefit to native wildlife. However, none of the trees contain cavities suitable as nesting hollows for arboreal mammals or birds or other visible signs of wildlife habitation.

5.2.4 Noxious Plants & Environmental Weeds

None of the trees assessed are scheduled as Noxious Weeds under the meaning of *Noxious Weeds Act* (NSW) 1993.

5.2.5 Threatened Species & Ecological Communities

Syzygium paniculatum (Magenta Cherry or Lilly Pilly) {T12a, T12b, T12g & T12h) is listed as a Vulnerable Species on Schedule 2 of the *Threatened Species Conservation Act* 1995 (NSW) and a Nationally Vulnerable species under the *Environmental Protection and Biodiversity Conservation Act* 1999. Whilst this species is listed as vulnerable, it is a commonly planted ornamental tree and is not endemic to this area. As such, it has no ecological significance in the context of this site.

None of the other trees are listed as Threatened or Vulnerable Species or form part of Endangered Ecological Communities (EECs) under the provisions of the *Threatened Species Conservation Act* 1995 (NSW) or the *Environmental Protection and Biodiversity Conservation Act* 1999.

5.2.6 The site is indicated as a 'Support' Greenweb Area, containing ancillary habitat areas, secondary linkages between habitats or lands that form a buffer between developments adjacent key habitats and corridors. The adjoining Mangrove swamp to the north of the site fringing Woolooware Bay is indicated as a 'Core' Greenweb Area.

5.3 Heritage Significance

5.3.1 Heritage Items

The subject property is *not* listed as Heritage Item under Schedule 6 of the Sutherland Shire Local Environment Plan (LEP) 2006. There is no known or suspected historical significance of any of the planted trees within the site. The Cronulla Sutherland Leagues Club was formed c. 1967 and was established at Woolooware c. 1968. At this time the site was completely cleared to construct the stadium, club building and car park. The majority of the trees within the site appear to have been planted post-1980. Tree No.s T11, T12, T18 & T19 (all Washington Palms) may have been transplanted to the site as part of the original site development. These are planted symmetrically around the front entry to the main building.

The adjoining road reserve to the east (Woolooware Road North) is listed as Heritage Item (No. A005) under Schedule 6 of the Sutherland Shire Local Environment Plan (LEP) 2006. Tree No.s T9a (Coast Banksia) and T6, T7, T8 & T9 (River Oak) are all located within the road reserve. However, these trees are all relatively recent plantings and have no heritage significance.

5.3.2 Significant Tree Register

Sutherland Shire Council does not maintain a Register of Significant Trees

5.4 Amenity Value

5.4.1 Criteria for the assessment of amenity values are incorporated into **Appendix 1**. The amenity value of a tree is a measure of its live crown size, visual appearance (form, habit, crown density), visibility and position in the landscape and contribution to the visual character of an area. Generally the larger and more prominently located the tree, and the better its form and habit, the higher its amenity value.

6 TREE RETENTION VALUES

6.1.1 The Retention Values shown in **Appendix 4** and **Appendix 6** have been determined on the basis of the estimated longevity of the trees and their landscape significance rating, in accordance with **Table One**. Together with guidelines contained in **Section 7** (Tree Protection Zones) this information should be used to determine the most appropriate position of building footprints and other infrastructure within the site, with due consideration to other site constraints, to minimise the impact on trees considered worthy of preservation.

TABLE 1 – TREE RETENTION VALUES – ASSESSMENT METHODOLOGY

	Landscape Significance Rating						
Estimated Life Expectancy	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Long - Greater than 40 Years	High Retention Value						
Medium- 15 to 40 Years			Moderate Retention Value				
Short - 5 to 15 years				Low Ret. Value			
Transient - Less than 5 Years				Very Low Retention Value			
Dead or Potentially Hazardous							

7 TREE PROTECTION ZONES

7.1.1 The Tree Protection Zone (TPZ) is a radial distance measured from the centre of the trunk of the tree as specified in **Appendix 5**. These have been calculated in accordance with AS 4970-2009 (Protection of Trees on Development Sites).[5]

7.1.2 The intention of the TPZ is to ensure protection of the root system and canopy from the potential damage from construction works and ensure the long-term health and stability of each tree to be retained. Incursions to the root zone may occur due to excavations, changes in ground levels, (either lowering or raising the grade), trenching or other forms or soil disturbance such as ripping, grading or inverting the soil profile. Such works may cause damage or loss of part of the root system, leading to an adverse impact on the tree.

7.2 Structural Root Zone (SRZ)

7.2.1 The Structural Root Zone (SRZ) provides the bulk of mechanical support and anchorage for a tree. This is also a radial distance measured from the centre of the trunk as specified in **Appendix 5**. The SRZ has been calculated in accordance with AS 4970-2009 (Protection of Trees on Development Sites).

7.2.2 Incursions within the SRZ are not recommended as they are likely to result in the severance of woody roots which may compromise the stability of the tree or lead to its decline and demise.

7.3 Acceptable Incursions to the Tree Protection Zone.

7.3.1 Where encroachment to the TPZ is unavoidable, an incursion to the TPZ of not exceeding 10% of the area of the TPZ and outside the SRZ may be acceptable. Examples of acceptable incursions are shown in **Appendix 3**. Greater incursions to the TPZ may result in an adverse impact on the tree.

7.3.2 Where incursions greater than 10% of the TPZ are unavoidable, exploratory excavation using non-destructive methods may be required to evaluate the extent of the root system affected and determine whether or not the tree can remain viable.

7.1 Acceptable Incursions to the Canopy.

7.1.1 The removal of a small portion of the crown (foliage and branches) is generally tolerable provided that the extent of pruning required is less than 10% of the total foliage volume of the tree and the removal of branches does not create large wounds or disfigure the natural form and habit of the tree. All pruning cuts must be undertaken in accordance with AS 4373:2007. This generally involves reduction of the affected branches back to the nearest branch collar at the junction with the parent branch, rather than at an intermediate point. The latter is referred to as "lopping" and is no longer an acceptable arboricultural practice. Generally speaking, the minimum pruning as required to accommodate any proposed works is desirable. Extensive pruning can result in a detrimental impact on tree health and may lead to exposure of remaining branches to wind forces that they were previously sheltered from, leading to a greater risk of branch failure.

7.1.2 Clearance to between the building line and canopy should take into account any projecting structures, such as balconies, awnings and the roofline and any requirement for temporary scaffolding to be erected during construction (typically 1-1.5 metres wide). High structures should preferably be located outside the canopy dripline (as shown indicatively on the attached plans) in order to avoid or minimise canopy pruning.

8 PROPOSED DEVELOPMENT

8.1.1 The proposed development includes the demolition of the existing car park and construction of a new integrated retail centre within the site, together with alterations and additions to the existing leagues club building and facilities.

9 IMPACT ASSESSMENT

9.1.1 The intention of this assessment is to determine the incursions to the root zones and canopies created by the proposed development and evaluate the likely impact of the proposed works on the subject trees. Details shown on the following plans were used in this assessment:-

Title	Author	Dwg No.	Date
Planting Strategy	Aspect Studios	11017-EA07 C	May 2012

9.1.2 A summary of the impact of the proposed development on each tree within the site is shown in **Appendix 5**. The following criteria have been examined as part of this assessment:-

- Existing Relative Levels (R.L.);
- Tree Protection Zone (TPZ);
- Structural Root Zone (SRZ);
- Footprint and envelope of the proposed development and temporary structures (scaffolding, hoardings etc);
- Incursions to the TPZ & SRZ, including estimated cut & fill beyond the building footprint;

- Incursions to the tree canopy from the building envelope and temporary structures; and
- Assessment of the likely impact of the works on existing trees.

9.1.3 The proposed development will necessitate the removal of forty (40) trees of low and very low retention value. These include Tree No.s T42, T42a, T43 & T44 (Willow Bottlebrush), T41 (Weeping Bottlebrush), T21a & T21b (Swamp Oak), T46a-d & T47a-d (Spotted Gum), T34 (Mahogany), T13, T14, T15, T16, T37, T38, T39 & T40 (Cocos Palm), T10, T24a, T26, T27, T28, T28a, T29 & T30 (Brushbox), T3, T4 & T5 (Narrow-leaved Paperbark) and T19a, T22, T23, T23a & T36 (Washington Palm). None of these trees are considered significant or worthy of special measures to ensure their preservation. It should be noted that sixteen (16) of these trees (tree No.s T10, T13, T14, T15, T16, T24a, T26, T27, T28, T28a, T29, T30, T37, T38, T39 & T40) are exempt from Council's Tree Preservation Order (refer to Section 5.2.1).

9.1.4 The proposed development will necessitate the removal of a further twenty-six (26) trees of moderate retention value. These include Tree No.s T1 (Port Jackson Fig), T17 & T22a (Cook Pine), T9a (Coast Banksia), T6, T7, T8 & T9 (River Oak), T25 (Lemon-scented Gum), T45a-e (Spotted Gum), T33 (Mugga Ironbark), T12c-f (Kentia Palm), T2 (Norfolk Island Hibiscus), T12a, T12b, T12g & T12h (Magenta Cherry), and T18a & T24 (Washington Palm). These trees are not considered significant, but are in good health and condition and make a fair contribution to the amenity of the site and surrounding properties. It should be noted that five (5) of these trees (tree No.s T1, T6, T7, T8 & T9) are located within the adjoining road reserves.

9.1.5 The proposed development will also necessitate the removal of nine (9) trees of high retention value. These include Tree No.s T11, T12, T18, T19, T20 & T21 (Washington Palm) and T31, T32 & T35 (Red Mahogany). These trees have no special ecological or heritage significance, but are in good health and condition and make a positive contribution to the amenity of the site and surrounding properties.

9.1.6 No other trees will be adversely affected by the proposed development.

10 CONCLUSIONS

10.1.1 A total of seventy-five (75) trees stand within the site and in close proximity to the boundaries on adjoining properties. These are a mix of locally-indigenous, native and exotic species in fair to good health and condition. None of the trees have any special ecological or heritage significance. However, a number of the trees make a positive contribution to the amenity of the site and surrounding properties and are considered to be of moderate or high Retention Value

10.1.2 The proposed development will necessitate the removal of forty (40) trees of low and very low retention value, including T3, T4, T5, T10, T13, T14, T15, T16, T19a, T21a, T21b, T22, T23, T23a, T24a, T26, T27, T28, T28a, T29, T30, T34, T36, T37, T38, T39, T40, T41, T42, T42a, T43, T44, T46a-d & T47a-d. It should be noted that sixteen (16) of these trees are exempt (not protected) under Council's TPO.

10.1.3 The proposed development will necessitate the removal of a further twenty-six (26) trees of moderate retention value, including T1, T2, T6, T7, T8, T9, T9a, T12a-h, T17, T18a, T22a, T24, T25, T33 and T45a-e. It should be noted that five (5) of these trees are located within the adjoining road reserves.

10.1.4 The proposed development will also necessitate the removal of nine (9) trees of high retention value, including T11, T12, T18, T19, T20, T21, T31, T32 & T35. These trees have no special ecological or heritage significance, but are in good health and condition and make a positive contribution to the amenity of the site and surrounding properties.

11 RECOMMENDATIONS

11.1.1 The following Tree Protection Measures (**Appendix 2**) should be implemented to ensure the long term survival of all trees within the site to be retained as part of the development.

11.1.2 In order to compensate for loss of amenity resulting from the removal of trees to accommodate the proposed development, a minimum of thirty (30) new trees capable of attaining a height of twelve (12) metres at maturity should be planted within the allotment.

11.1.3 Consideration should be given to the transplanting of T1 (Port Jackson Fig) elsewhere within the site or the road reserve where space permits.

Andrew Morton
EARTHSCAPE HORTICULTURAL SERVICES
4th January 2012

REFERENCES:-

[1] GA Chapman & CL Murphy (1989)
Soil Landscapes of the Sydney 1:100,000 Sheet
Soil Conservation Service of NSW. Sydney

[2] GA Chapman & CL Murphy (1989)
Soil Landscapes of the Sydney 1:100,000 Sheet
Soil Conservation Service of NSW. Sydney

[3] Mattheck, Dr. Claus & Breloer, Helge (1994) – Sixth Edition (2001)
The Body Language of Trees – A Handbook for Failure Analysis
The Stationery Office, London, England

[4] Barrell, Jeremy (1996)
Pre-development Tree Assessment
Proceedings of the International Conference on Trees and Building Sites (Chicago)
International Society of arboriculture, Illinois, USA

[5] Council of Standards Australia (August 2009)
AS 4970 – 2009 – Protection of Trees on Development Sites
Standards Australia, Sydney

APPENDIX 1 - CRITERIA FOR ASSESSMENT OF LANDSCAPE SIGNIFICANCE

RATING	HERITAGE VALUE	ECOLOGICAL VALUE	AMENITY VALUE
1. SIGNIFICANT	The subject tree is listed as a Heritage Item under the Local Environment Plan (LEP) with a local, state or national level of significance or is listed on Council's Significant Tree Register	The subject tree is scheduled as a Threatened Species as defined under the Threatened Species Conservation Act 1995 (NSW) or the Environmental Protection and Biodiversity Conservation Act 1999	The subject tree has a very large live crown size exceeding 300m² with normal to dense foliage cover, is located in a visually prominent position in the landscape, exhibits very good form and habit typical of the species
	The subject tree forms part of the curtilage of a Heritage Item (building /structure /artefact as defined under the LEP) and has a known or documented association with that item	The tree is a locally indigenous species, representative of the original vegetation of the area and is known as an important food, shelter or nesting tree for endangered or threatened fauna species	The subject tree makes a significant contribution to the amenity and visual character of the area by creating a sense of place or creating a sense of identity
	The subject tree is a Commemorative Planting having been planted by an important historical person (s) or to commemorate an important historical event	The subject tree is a Remnant Tree, being a tree in existence prior to development of the area	The tree is visually prominent in view from surrounding areas, being a landmark or visible from a considerable distance.
2. VERY HIGH	The tree has a strong historical association with a heritage item (building/structure/artefact/garden etc) within or adjacent the property and/or exemplifies a particular era or style of landscape design associated with the original development of the site.	The tree is a locally-indigenous species, representative of the original vegetation of the area and is a dominant or associated canopy species of an Endangered Ecological Community (EEC) formerly occurring in the area occupied by the site.	The subject tree has a very large live crown size exceeding 200m²; a crown density exceeding 70% (normal-dense), is a very good representative of the species in terms of its form and branching habit or is aesthetically distinctive and makes a positive contribution to the visual character and the amenity of the area
3. HIGH	The tree has a suspected historical association with a heritage item or landscape supported by anecdotal or visual evidence	The tree is a locally-indigenous species and representative of the original vegetation of the area and the tree is located within a defined Vegetation Link / Wildlife Corridor or has known wildlife habitat value	The subject tree has a large live crown size exceeding 100m²; The tree is a good representative of the species in terms of its form and branching habit with minor deviations from normal (e.g. crown distortion/suppression) with a crown density of at least 70% (normal); The subject tree is visible from the street and surrounding properties and makes a positive contribution to the visual character and the amenity of the area
4. MODERATE	The tree has no known or suspected historical association, but does not detract or diminish the value of the item and is sympathetic to the original era of planting.	The subject tree is a non-local native or exotic species that is protected under the provisions of this DCP.	The subject tree has a medium live crown size exceeding 40m²;The tree is a fair representative of the species, exhibiting moderate deviations from typical form (distortion/suppression etc) with a crown density of more than 50% (thinning to normal); and The tree is visible from surrounding properties, but is not visually prominent – view may be partially obscured by other vegetation or built forms. The tree makes a fair contribution to the visual character and amenity of the area.
5. LOW	The subject tree detracts from heritage values or diminishes the value of a heritage item	The subject tree is scheduled as exempt (not protected) under the provisions of this DCP due to its species, nuisance or position relative to buildings or other structures.	The subject tree has a small live crown size of less than 40m² and can be replaced within the short term (5-10 years) with new tree planting
6. VERY LOW	The subject tree is causing significant damage to a heritage item.	The subject tree is listed as an Environment Weed Species in the Leichhardt Local Government Area, being invasive, or is a known nuisance species.	The subject tree is not visible from surrounding properties (visibility obscured) and makes a negligible contribution or has a negative impact on the amenity and visual character of the area. The tree is a poor representative of the species, showing significant deviations from the typical form and branching habit with a crown density of less than 50% (sparse).
7. INSIGNIFICANT	The tree is completely dead and has no visible habitat value	The tree is a declared Noxious Weed under the Noxious Weeds Act (NSW) 1993 within the relevant Local Government Area.	The tree is completely dead and represents a potential hazard.

12 APPENDIX 2 - TREE PROTECTION MEASURES

12.1 Tree Protection Zones

12.1.1 The Tree Protection Zones are recommended for all trees within the site to be retained shall be equivalent to the Tree Protection Zone as specified in Appendix 5. This is a radial distance measured from the centre of the trunk of the subject tree.

12.1.2 The following activities should be avoided within specified Tree Protection Zones:-

- Excavations and trenching (with exception of the approved foundations and underground services);
- Ripping or cultivation of soil;
- Mechanical removal of vegetation;
- Soil disturbance or movement of natural rock;
- Soil level changes including the placement of fill material (excluding any suspended floor or slab);
- Movement and storage of plant, equipment & vehicles;
- Erection of site sheds;
- Affixing of signage or hoardings to trees;
- Storage of building materials, waste and waste receptacles;
- Disposal of waste materials and chemicals including paint, solvents, cement slurry, fuel, oil and other toxic liquids;
- Other physical damage to the trunk or root system; and
- Any other activity likely to cause damage to the tree.

12.2 Tree Protection Fencing

12.2.1 All trees within the site to be retained shall be protected prior to and during construction from all activities that may result in detrimental impact by erecting a suitable protective fence beneath the canopy to the full extent of the Tree Protection Zone (excluding the footprint of the proposed works and areas within adjoining properties). As a minimum the fence should consist temporary chain wire panels 1.8 metres in height, supported by steel stakes as required and fastened together and supported to prevent sideways movement. The fence shall be erected prior to the commencement of any work on-site and shall be maintained in good condition for the duration of construction. Where tree protection zones merge together a single fence encompassing the area is deemed to be adequate.

12.2.2 Appropriate signage shall be installed on the fencing to prevent unauthorised movement of plant and equipment or entry to the Tree Protection Zone.

12.2.3 A 50mm layer of woodchip mulch shall be installed to the full extent of the Tree Protection Zone of all trees to be retained. Mulch shall be installed and spread by hand to avoid soil disturbance and compaction within the root zone.

12.3 Trunk Protection

12.3.1 Where provision of tree protection fencing is in impractical due to its proximity to the proposed building envelope, trunk protection shall be erected around the tree to avoid accidental damage. As a minimum, the trunk protection shall consist of two metre lengths of hardwood timbers (100 x 50mm) spaced at 100-150mm centres secured together with 2mm galvanised wire. These shall be strapped around the trunk (not fixed in any way) to avoid mechanical injury or damage. Trunk protection should be installed prior to any site works and maintained in good condition for the duration of the construction period.

12.4 Tree Damage

12.4.1 In the event of any tree becoming damaged for any reason during the construction period a consulting arborist shall be engaged to inspect and provide advice on any remedial action to minimise any adverse impact. Such remedial action shall be implemented as soon as practicable and certified by the arborist.

12.5 Demolition Works within Tree Protection Zones

12.5.1 Demolition of pathways and paved areas within the Tree Protection Zone of trees to be retained shall be undertaken under the supervision of the Site Arborist. The pavement surface and sub-base shall be stripped-off in layers of no greater than 50mm thick using a small rubber tracked excavator or alternative approved method to avoid damage to underlying roots and minimise soil disturbance. The machine shall work within

the footprint of the existing pathway to avoid compaction of the adjacent soil. The final layer of sub-base material shall be removed using hand tools were required to avoid compaction of the underlying soil profile and damage to woody roots.

12.5.2 Following removal of the pavement surface and sub-base, clean, friable topsoil shall be used to fill in the excavated area and bring flush with surrounding levels. Soil shall only be imported and spread when the underlying soil conditions are dry to avoid compaction of the soil profile.

12.5.3 Demolition of low masonry walls within the Tree Protection Zone of trees to be retained shall be undertaken under the supervision of the Site Arborist. The walls shall be demolished using equipment on the street side of the wall. Care shall be taken to avoid the root systems, trunks and lower branches of trees in the vicinity of the existing walls.

12.6 Excavations within Tree Protection Zones

12.6.1 Excavations within the Tree Protection Zone of any tree to be retained shall be avoided wherever possible.

12.6.2 Excavations for foundations and pavement sub-grade within the Tree Protection Zone of any tree to be retained shall be undertaken by hand or using an Air-spade® device to locate and expose roots along the perimeter of the foundation or pavement prior to any mechanical excavation. All care shall be undertaken to preserve root systems intact and undamaged. Any roots less than 50mm in diameter shall be cleanly severed with clean sharp pruning implements at the face of the excavation. The root zone in the vicinity of the excavation shall be kept moist following excavation for the duration of construction to minimise stress on the tree.

12.6.3 Where large woody roots (greater than 50mm diameter) are encountered during excavations, further advice from a qualified arborist shall be sought prior to severance. Where necessary, (to avoid severing large woody roots) consideration should be given to the installation of an elevated structure (e.g. pier and beam footing, suspended slab or floor on piers, cantilevered slab, etc) in preference to structures requiring a deep edge beam or continuous perimeter strip footing. The beam section of any pier and beam footing should be placed **above** grade to avoid excavation within the SRZ.

12.6.4 For masonry walls or fences it may be acceptable to delete continuous concrete strip footings and replace with suspended in-fill panels (eg steel or timber pickets, lattice etc) fixed to pillars.

12.6.5 For paved areas, consideration should be given to raising the proposed pavement level and using a porous fill material in preference to excavation.

12.7 Underground Services

12.7.1 All proposed stormwater lines and other underground services should be located as far away as practicable, or suspended beneath the floor of the building where possible, to avoid excavation within the Tree Protection Zone of trees to be retained.

12.7.2 For underground services, where the incursion to the Root Zone is less than 20% of the total TPZ (i.e. beyond the Minimum Setback Distance), a chain trenching device may be used. A backhoe or skid steer loader is unacceptable due to the potential for excessive compaction and root damage. Where large woody roots (greater than 50mm in diameter) are encountered during excavation or trenching, these shall be retained intact wherever possible (eg by sub-surface boring beneath roots or re-routing the service etc).

12.7.3 Excavations required for underground services within the Structural Root Zone of any tree to be retained should only be undertaken by sub-surface boring. The Invert Level of the pipe, plus the pipe diameter, must be lower than the estimated root zone depth as specified. This will depend on the soil conditions at the site. Where this is not practical and root pruning is the only alternative, proposed root pruning should be assessed by the arborist to determine continued health and stability of the subject tree.

12.7.4 If trees show signs of stress or deterioration, remedial action shall be taken to improve the health and vigour of the subject tree (s) in accordance with best practice arboricultural principles

12.8 Pavements

12.8.1 Pavements should be avoided within the Tree Protection Zone of trees to be retained where possible. Proposed paved areas within the Tree Protection Zone of trees to be retained should be placed above grade to minimise excavations within the root zone and avoid root severance and damage. Pavement sub-base material should be as per Section 12.9.

12.9 Fill Material

12.9.1 Placement of fill material within the Tree Protection Zone of trees to be retained should be avoided where possible. Where placement of fill cannot be avoided, the material should be a coarse, gap-graded material such as 20 – 50mm crushed basalt (Blue Metal) or equivalent to provide some aeration to the root zone. Note that Roadbase or crushed sandstone or other material containing a high percentage of fines is unacceptable for this purpose. The fill material should be consolidated with a non-vibrating roller to minimise compaction of the underlying soil. A permeable geotextile may be used beneath the sub-base to prevent migration of the stone into the sub-grade. No fill material should be placed in direct contact with the trunk.

12.10 Canopy & Root Pruning

12.10.1 All pruning work required shall be carried out in accordance with Australian Standard No 4373-2007 – Pruning of Amenity Trees. Written approval from Council may be required under the Tree Preservation Order prior to undertaking this work. All pruning work shall be carried out by a qualified and experienced arborist or tree surgeon in accordance with the NSW WorkCover Code of Practice for the Amenity Tree Industry (1998).

12.10.2 Care shall be taken when operating cranes, drilling rigs and similar equipment near trees to avoid damage to tree canopies (foliage and branches). Under no circumstances shall branches be torn-off by construction equipment. Where there is potential conflict between tree canopy and construction activities, the advice of the Site Arborist must be sought.

12.10.3 Where root pruning is required, roots shall be severed with clean, sharp pruning implements and retained in a moist condition during the construction phase using Hessian material or mulch where practical. Severed roots shall be treated with a suitable root growth hormone containing the active constituents Indol-3-yl-Butric Acid (IBA) and 1-Naphthylacetic Acid (NAA) to stimulate rapid regeneration of the root system.

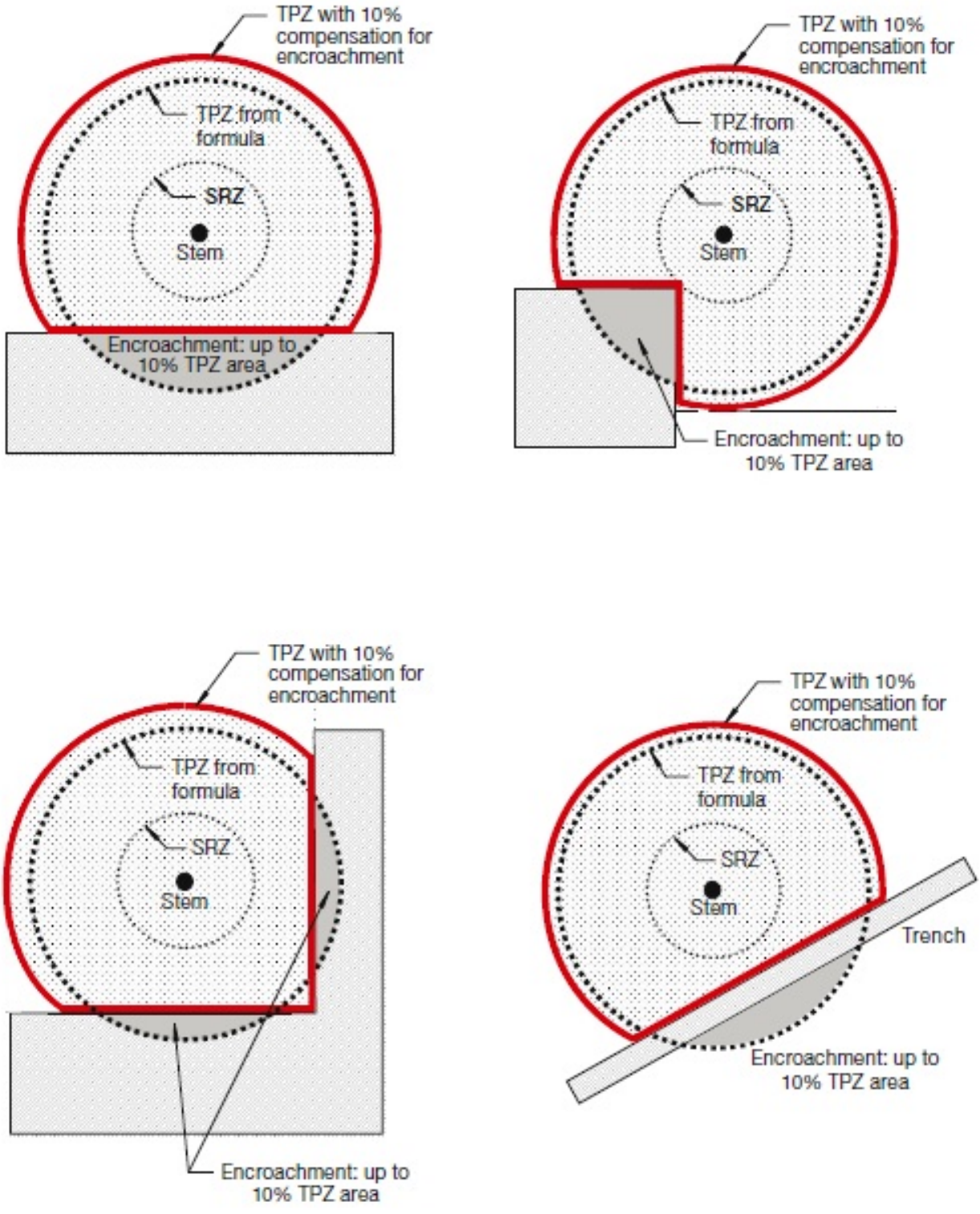
12.11 Tree Removal

12.11.1 The approval of Sutherland Shire Council shall be obtained prior to the removal or pruning of any tree protected under the Tree Preservation Order.

12.11.2 Tree removal work shall be carried out by an experienced tree surgeon in accordance with the NSW WorkCover Code of Practice for the Amenity Tree Industry (1998). Care shall be taken to avoid damage to other trees during the felling operation.

12.11.3 Stumps shall be grubbed-out where required using a mechanical stump grinder without damage to the root system of other trees. Where trees to be removed are in close proximity to trees to be retained, consideration should be given to cutting the stump close to ground level and retaining the root crown intact. Stumps within the Tree Protection Zone of other trees to be retained should **not** be removed using excavation equipment or similar.

APPENDIX 3 – ACCEPTABLE INCURSIONS TO THE TREE PROTECTION ZONE (TPZ)



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

REF:- Council of Standards Australia (August 2009)
AS 4970 – 2009 – Protection of Trees on Development Sites
Standards Australia, Sydney

APPENDIX 4 - TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE

Tree Identification No.	Species	Height (m)	Spread (m)	Trunk Diameter (mm)	Live Crown Size (m^2)	Maturity Class	Condition	Previous Pruning	Health		Remaining Safe Useful Life Expectancy (SULE)	Landscape Significance Rating	Retention Value	Location
									Vigour	Pest & Disease				
1	***Ficus rubiginosa*** (Port Jackson Fig)	5	8	300	32	SM	Appears stable with sound branching structure. Located within roundabout island.	No Evidence	Very Good	No Evidence	Long - more than 40 years	4	**Moderate**	Road reserve
2	***Lagunaria patersonia*** (Norfolk Island Hibiscus)	12	12	500x2	144	M	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Long - more than 40 years	4	**Moderate**	On-site
3	***Melaleuca liniariifolia*** (Narrow-leaved Paperbark)	6	8	200x5	32	M	Appears stable with fair branching structure. Exhibits multiple co-dominant primary limbs at 1-2 metres with low bark inclusions.Some interior crown dieback with 15% deadwood.	No Evidence	Fair with thinning crown	No Evidence	Medium 15-40 Years	5	**Low**	On-site
4	***Melaleuca liniariifolia*** (Narrow-leaved Paperbark)	5	7	200x5	21	M	Appears stable with fair branching structure. Exhibits multiple co-dominant primary limbs at 1-2 metres with low bark inclusions.Some interior crown dieback with 15% deadwood.	No Evidence	Fair with thinning crown	No Evidence	Medium 15-40 Years	5	**Low**	On-site
5	***Melaleuca liniariifolia*** (Narrow-leaved Paperbark)	4.5	5	200x5	12.5	M	Appears stable with fair branching structure. Exhibits multiple co-dominant primary limbs at 1-2 metres with low bark inclusions.Some interior crown dieback with 15% deadwood.	No Evidence	Fair with thinning crown	No Evidence	Medium 15-40 Years	5	**Low**	On-site
6	***Casuarina cunninghamiana*** (River Oak)	6	7	404	28	SM	Appears stable with sound branching structure. Located within narrow planter bed.	Crown lifted to 3 metres	Good	No Evidence	Medium 15-40 Years	4	**Moderate**	Adjoining property
7	***Casuarina cunninghamiana*** (River Oak)	7	6	309	30	SM	Appears stable with sound branching structure. Located within narrow planter bed.	Crown lifted to 3 metres	Good	No Evidence	Medium 15-40 Years	4	**Moderate**	Adjoining property
8	***Casuarina cunninghamiana*** (River Oak)	8	6	293	36	SM	Appears stable with sound branching structure. Located within narrow planter bed.	Crown lifted to 3 metres	Good	No Evidence	Medium 15-40 Years	4	**Moderate**	Adjoining property
9	***Casuarina cunninghamiana*** (River Oak)	7	8	363	40	SM	Appears stable with sound branching structure. Located within narrow planter bed.	Crown lifted to 3 metres	Good	No Evidence	Medium 15-40 Years	4	**Moderate**	Adjoining property

APPENDIX 4 - TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE

Tree Identification No.	Species	Height (m)	Spread (m)	Trunk Diameter (mm)	Live Crown Size (m^2)	Maturity Class	Condition	Previous Pruning	Health		Remaining Safe Useful Life Expectancy (SULE)	Landscape Significance Rating	Retention Value	Location
									Vigour	Pest & Disease				
9a	***Banksia integrifolia*** (Coast Banksia)	5	4	120	20	I	Appears stable with sound branching structure.	No Evidence	Very Good	No Evidence	Long - more than 40 years	5	**Moderate**	On-site
10	***Lophostemon confertus*** (Brushbox)	7	5	220	27.5	SM	Appears stable with sound branching structure. Located within small traffic island.	No Evidence	Good	No Evidence	Medium 15-40 Years	6	**Low**	On-site
11	***Washingtonia robusta*** (Washington Palm)	13	4	338	16	M	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Long - more than 40 years	3	**High**	On-site
12	***Washingtonia robusta*** (Washington Palm)	13	4	331	16	M	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Long - more than 40 years	3	**High**	On-site
12a	***Syzygium paniculatum*** (Magenta Cherry)	14	8	180x5	96	M	Appears stable with fair branching structure. Planted in a clump of 5 at close spacing.	Crown lifted to 4 metres	Very Good	Moderate foliar insect infestation (Psyllids)	Long - more than 40 years	4	**Moderate**	On-site
12b	***Syzygium paniculatum*** (Magenta Cherry)	14	8	200x3	96	M	Appears stable with fair branching structure. Planted in a clump of 3 at close spacing.	Crown lifted to 4 metres	Very Good	Moderate foliar insect infestation (Psyllids)	Long - more than 40 years	4	**Moderate**	On-site
12c	***Howea fosteriana*** (Kentia Palm)	9	4	146	12	M	Appears stable with sound branching structure.	No Evidence	Good	Moderate Palm Rust infection	Medium 15-40 Years	4	**Moderate**	On-site
12d	***Howea fosteriana*** (Kentia Palm)	6	4	169	12	M	Appears stable with sound branching structure. Crown suppressed on the south side due to crowding	No Evidence	Good	Low Palm Rust infection	Long - more than 40 years	4	**Moderate**	On-site
12e	***Howea fosteriana*** (Kentia Palm)	7	4	156	20	M	Appears stable with sound branching structure.	No Evidence	Good	Low Palm Rust infection	Long - more than 40 years	4	**Moderate**	On-site
12f	***Howea fosteriana*** (Kentia Palm)	7	4	169	20	M	Appears stable with sound branching structure.	No Evidence	Good	Low Palm Rust infection	Long - more than 40 years	4	**Moderate**	On-site
12g	***Syzygium paniculatum*** (Magenta Cherry)	13	9	180x7	81	M	Appears stable with fair branching structure. Planted in a clump of 7 at close spacing. Old guy wires embedded in trunk.	Crown lifted to 4 metres	Very Good	Moderate foliar insect infestation (Psyllids)	Long - more than 40 years	4	**Moderate**	On-site

APPENDIX 4 - TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE

Tree Identification No.	Species	Height (m)	Spread (m)	Trunk Diameter (mm)	Live Crown Size (m^2)	Maturity Class	Condition	Previous Pruning	Health		Remaining Safe Useful Life Expectancy (SULE)	Landscape Significance Rating	Retention Value	Location
									Vigour	Pest & Disease				
12h	***Syzygium paniculatum*** (Magenta Cherry)	13	8	180x7	72	M	Appears stable with fair branching structure. Planted in a clump of 7 at close spacing. Old guy wires embedded in trunk.	Crown lifted to 4 metres	Very Good	Moderate foliar insect infestation (Psyllids)	Long - more than 40 years	4	**Moderate**	On-site
13	***Syagrus romanzoffianum*** (Cocos Palm)	10	6	264	30	M	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Long - more than 40 years	6	**Low**	On-site
14	***Syagrus romanzoffianum*** (Cocos Palm)	10	6	248	30	M	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Long - more than 40 years	6	**Low**	On-site
15	***Syagrus romanzoffianum*** (Cocos Palm)	12	6	334	42	M	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Long - more than 40 years	6	**Low**	On-site
16	***Syagrus romanzoffianum*** (Cocos Palm)	8	6	229	18	M	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Long - more than 40 years	6	**Low**	On-site
17	***Araucaria columnaris*** (Cook's Pine)	11	5	310	50	SM	Appears stable with sound branching structure. Exhibits a prominent lean to the NE (self-corrected).	No Evidence	Very Good	No Evidence	Long - more than 40 years	4	**Moderate**	On-site
18	***Washingtonia robusta*** (Washington Palm)	14	3	338	12	M	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Long - more than 40 years	3	**High**	On-site
18a	***Washingtonia robusta*** (Washington Palm)	10	4	400	12	SM	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Long - more than 40 years	4	**Moderate**	On-site
19	***Washingtonia robusta*** (Washington Palm)	12	4	350	20	M	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Long - more than 40 years	3	**High**	On-site
19a	***Washingtonia robusta*** (Washington Palm)	5	4	400	16	I	Appears stable with sound branching structure. Located within narrow traffic island	No Evidence	Good	No Evidence	Short 5-15 Years	5	**Low**	On-site
20	***Washingtonia robusta*** (Washington Palm)	13	4	417	20	M	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Long - more than 40 years	3	**High**	On-site

APPENDIX 4 - TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE

Tree Identification No.	Species	Height (m)	Spread (m)	Trunk Diameter (mm)	Live Crown Size (m^2)	Maturity Class	Condition	Previous Pruning	Health		Remaining Safe Useful Life Expectancy (SULE)	Landscape Significance Rating	Retention Value	Location
									Vigour	Pest & Disease				
21	***Washingtonia robusta*** (Washington Palm)	13	4	417	20	M	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Long - more than 40 years	3	**High**	On-site
21a	***Casuarina glauca*** (Swamp Oak)	8	5	200	30	SM	Appears stable with sound branching structure. Located in narrow traffic island	Crown lifted to 1.5 metres	Good	No Evidence	Medium 15-40 Years	5	**Low**	On-site
21b	***Casuarina glauca*** (Swamp Oak)	8	5	200	30	SM	Appears stable with sound branching structure. Located in narrow traffic island	Crown lifted to 1.5 metres	Good	No Evidence	Medium 15-40 Years	5	**Low**	On-site
22	***Washingtonia robusta*** (Washington Palm)	5	3	350	12	I	Appears stable with sound branching structure. Located within a narrow planter bed - limited soil volume & space for future growth & development.	No Evidence	Very Good	No Evidence	Short 5-15 Years	5	**Low**	On-site
22a	***Araucaria columnaris*** (Cook's Pine)	12	6	340	72	SM	Appears stable with sound branching structure. Exhibits a prominent lean to the north (self-corrected)	No Evidence	Very Good	No Evidence	Long - more than 40 years	4	**Moderate**	On-site
23	***Washingtonia robusta*** (Washington Palm)	5	3	350	12	I	Appears stable with sound branching structure. Located within a narrow planter bed - limited soil volume & space for future growth & development.	No Evidence	Very Good	No Evidence	Short 5-15 Years	5	**Low**	On-site
23a	***Washingtonia robusta*** (Washington Palm)	5	3	350	12	I	Appears stable with sound branching structure. Located within a narrow planter bed - limited soil volume & space for future growth & development.	No Evidence	Very Good	No Evidence	Short 5-15 Years	5	**Low**	On-site
24	***Washingtonia robusta*** (Washington Palm)	8	2	389	4	SM	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Long - more than 40 years	4	**Moderate**	On-site
24a	***Lophostemon confertus*** (Brushbox)	6	3	172	13.5	I	Appears stable with sound branching structure. Located in narrow traffic island	Crown lifted to 1.5 metres	Good	No Evidence	Medium 15-40 Years	6	**Low**	On-site
25	***Corymbia citriodora*** (Lemon-scented Gum)	12	11	331	66	M	Appears stable with sound branching structure. Exhibits a small wound due branch loss (storm damage) to secondary branch.	No Evidence	Good	No Evidence	Long - more than 40 years	4	**Moderate**	On-site

APPENDIX 4 - TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE

Tree Identification No.	Species	Height (m)	Spread (m)	Trunk Diameter (mm)	Live Crown Size (m^2)	Maturity Class	Condition	Previous Pruning	Health		Remaining Safe Useful Life Expectancy (SULE)	Landscape Significance Rating	Retention Value	Location
									Vigour	Pest & Disease				
26	***Lophostemon confertus*** (Brushbox)	5.5	5	226	17.5	SM	Appears stable with sound branching structure. Located in narrow traffic island	Crown lifted to 2 metres	Good	No Evidence	Medium 15-40 Years	6	**Low**	On-site
27	***Lophostemon confertus*** (Brushbox)	7	5	245	25	SM	Appears stable with fair branching structure. Located in narrow traffic island. Moderate bark inclusion at 1.5 metres.	Crown lifted to 1.5 metres	Good	No Evidence	Medium 15-40 Years	6	**Low**	On-site
28	***Lophostemon confertus*** (Brushbox)	10	7	357	56	SM	Appears stable with sound branching structure. Located in narrow traffic island	Crown lifted to 2 metres	Very Good	No Evidence	Medium 15-40 Years	6	**Low**	On-site
28a	***Lophostemon confertus*** (Brushbox)	3	3	96	4.5	I	Appears stable with sound branching structure. Exhibits a very prominent lean to the west. Small wound at 1.5 metres due to borer damage. Located in narrow traffic island	No Evidence	Very Good	No Evidence	Short 5-15 Years	6	**Very low**	On-site
29	***Lophostemon confertus*** (Brushbox)	7	5	293	25	SM	Appears stable with sound branching structure. Located in narrow traffic island	Crown lifted to 2 metres	Very Good	No Evidence	Medium 15-40 Years	6	**Low**	On-site
30	***Lophostemon confertus*** (Brushbox)	8	6	271	36	SM	Appears stable with sound branching structure. Located in narrow traffic island	Crown lifted to 2 metres	Good	No Evidence	Medium 15-40 Years	6	**Low**	On-site
31	***Eucalyptus resinifera*** (Red Mahogany)	22	14	697	238	M	Appears stable with sound branching structure. Exhibits multiple small wounds at 15 metres due to previous branch loss (storm damage).	No Evidence	Very Good	No Evidence	Long - more than 40 years	3	**High**	On-site
32	***Eucalyptus resinifera*** (Red Mahogany)	20	14	761	252	M	Appears stable with sound branching structure. Exhibits multiple co-dominant leaders at 3.5 metres. Multiple small wounds at 8 metres due to previous branch loss (possible storm damage).	Appears to have been previously topped at 3.5 metres	Good	No Evidence	Long - more than 40 years	3	**High**	On-site
33	***Eucalyptus sideroxylon*** (Mugga Ironbark)	20	12	557	204	M	Appears stable with fair branching structure. Co-dominant leaders at 2 metres with moderate bark inclusion. Crown suppressed on south side due to crowding.	Crown lifted to 6 metres on west side.	Good	No Evidence	Medium 15-40 Years	3	**Moderate**	On-site

APPENDIX 4 - TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE

Tree Identification No.	Species	Height (m)	Spread (m)	Trunk Diameter (mm)	Live Crown Size (m^2)	Maturity Class	Condition	Previous Pruning	Health		Remaining Safe Useful Life Expectancy (SULE)	Landscape Significance Rating	Retention Value	Location
									Vigour	Pest & Disease				
34	***Eucalyptus sp.*** (Mahogany)	16	9	436	99	M	Appears stable with poor branching structure. Exibits a moderate wound at 6 metres due branch loss (storm damage). Multiple co-dominant leaders at 5 metres.	Previously topped at 5 metres	Good	No Evidence	Short 5-15 Years	4	**Low**	On-site
35	***Eucalyptus resinifera*** (Red Mahogany)	18	9	510	99	M	Appears stable with sound branching structure. Exhibits a small wound on primary limb at 7 metres due branch loss (storm daamge).	Crown lifted to 6 metres	Good	No Evidence	Long - more than 40 years	3	**High**	On-site
36	***Washingtonia robusta*** (Washington Palm)	4	4	350	12	I	Appears stable with sound branching structure. Located within a narrow planter bed - limited soil volume & space for future growth & development.	No Evidence	Very Good	No Evidence	Short 5-15 Years	5	**Low**	On-site
37	Group of 3 x ***Syagrus romanzoffianum*** (Cocos Palm)	8 to 11	3 to 6	150 to 250	20	SM	Appears stable with sound branching structure. Located within a confined planter box - cracking & lifting masonry walls	No Evidence	Good	No Evidence	Short 5-15 Years	6	**Very low**	On-site
38	***Syagrus romanzoffianum*** (Cocos Palm)	12	6	318	30	M	Appears stable with sound branching structure. Located within a confined planter box	No Evidence	Good	No Evidence	Medium 15-40 Years	6	**Low**	On-site
39	***Syagrus romanzoffianum*** (Cocos Palm)	10	7	280	35	M	Appears stable with sound branching structure. Located within a confined planter box	No Evidence	Good	No Evidence	Medium 15-40 Years	6	**Low**	On-site
40	***Syagrus romanzoffianum*** (Cocos Palm)	8	5	248	15	M	Appears stable with sound branching structure. Located within a confined planter box	No Evidence	Good	No Evidence	Medium 15-40 Years	6	**Low**	On-site
41	***Callistemon viminalis*** (Weeping Bottlebrush)	7	10	330 + 270	50	M	Appears stable with poor branching structure. Exhibits a high bark inclusion at ground level Moderate wound at 1.5 metres due to branch loss (included bark). Exhibits some dieback with 5% deadwood	Crown lifted to 2 metres	Fair with slightly thinning crown	No Evidence	Short 5-15 Years	4	**Low**	On-site
42	***Callistemon salignus*** (Willow Bottlebrush)	5.5	5	264	22.5	M	Appears stable with fair branching structure. Exhibits a high bark inclusion at 1.5-2 metres. Moderate wound at 3 metres due to previous branch loss with multiple elite epicormics.	No Evidence	Good	No Evidence	Medium 15-40 Years	5	**Low**	On-site

APPENDIX 4 - TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE

Tree Identification No.	Species	Height (m)	Spread (m)	Trunk Diameter (mm)	Live Crown Size (m^2)	Maturity Class	Condition	Previous Pruning	Health		Remaining Safe Useful Life Expectancy (SULE)	Landscape Significance Rating	Retention Value	Location
									Vigour	Pest & Disease				
42a	***Callistemon salignus*** (Willow Bottlebrush)	7.5	5	252	17.5	M	Appears stable with sound branching structure. Exhibits some dieback with 5% deadwood.	No Evidence	Fair with thinning crown	No Evidence	Short 5-15 Years	4	**Low**	On-site
43	***Callistemon salignus*** (Willow Bottlebrush)	6.5	5	248	27.5	SM	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Medium 15-40 Years	5	**Low**	On-site
44	***Callistemon salignus*** (Willow Bottlebrush)	7	6	312	33	M	Appears stable with fair branching structure. Exhibits a severe bark inclusion at 1 metre.	No Evidence	Good	No Evidence	Medium 15-40 Years	5	**Low**	On-site
45a	***Corymbia maculata*** (Spotted Gum)	9	4	175	28	SM	Appears stable with fair branching structure. Located close to existing building.	Previously lopped at 4-5 metres to clear powerlines.	Good	Moderate borer infestation	Long - more than 40 years	5	**Moderate**	On-site
45b	***Corymbia maculata*** (Spotted Gum)	10	4	166	32	SM	Appears stable with fair branching structure. Located close to existing building.	Previously lopped at 4-5 metres to clear powerlines.	Good	Moderate borer infestation	Long - more than 40 years	5	**Moderate**	On-site
45c	***Corymbia maculata*** (Spotted Gum)	9	3	146	21	SM	Appears stable with sound branching structure. Located close to existing building.	No Evidence	Good	No Evidence	Long - more than 40 years	5	**Moderate**	On-site
45d	***Corymbia maculata*** (Spotted Gum)	12	5	185	50	SM	Appears stable with sound branching structure. Located close to existing building.	No Evidence	Good	No Evidence	Long - more than 40 years	5	**Moderate**	On-site
45e	***Corymbia maculata*** (Spotted Gum)	12	5	182	50	SM	Appears stable with sound branching structure. Located close to existing building.	No Evidence	Good	No Evidence	Long - more than 40 years	5	**Moderate**	On-site
46a	***Corymbia maculata*** (Spotted Gum)	13	5	185	55	SM	Appears stable with poor branching structure. Located close to existing blade wall.	Previously topped at 5-6 metres to clear powerlines	Good	No Evidence	Short 5-15 Years	4	**Low**	On-site
46b	***Corymbia maculata*** (Spotted Gum)	13	4	182	44	SM	Appears stable with poor branching structure. Located close to existing blade wall.	Previously topped at 5-6 metres to clear powerlines	Good	No Evidence	Short 5-15 Years	4	**Low**	On-site
46c	***Corymbia maculata*** (Spotted Gum)	11	4	172	36	SM	Appears stable with poor branching structure. Located close to existing blade wall.	Previously topped at 5-6 metres to clear powerlines	Good	No Evidence	Short 5-15 Years	4	**Low**	On-site

APPENDIX 4 - TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE

Tree Identification No.	Species	Height (m)	Spread (m)	Trunk Diameter (mm)	Live Crown Size (m^2)	Maturity Class	Condition	Previous Pruning	Health		Remaining Safe Useful Life Expectancy (SULE)	Landscape Significance Rating	Retention Value	Location
									Vigour	Pest & Disease				
46d	***Corymbia maculata*** (Spotted Gum)	10	5	169	40	SM	Appears stable with poor branching structure. Located close to existing blade wall.	Previously topped at 5-6 metres to clear powerlines	Good	No Evidence	Short 5-15 Years	4	**Low**	On-site
47a	***Corymbia maculata*** (Spotted Gum)	8	3	121	12	I	Appears stable with sound branching structure. Located within paved forecourt area.	Crown lifted to 4 metres	Good	No Evidence	Medium 15-40 Years	5	**Low**	On-site
47b	***Corymbia maculata*** (Spotted Gum)	8	2	115	8	I	Appears stable with sound branching structure. Located within paved forecourt area.	Crown lifted to 4 metres	Good	No Evidence	Medium 15-40 Years	5	**Low**	On-site
47c	***Corymbia maculata*** (Spotted Gum)	9	2	124	10	I	Appears stable with sound branching structure. Located within paved forecourt area.	Crown lifted to 4 metres	Good	No Evidence	Medium 15-40 Years	5	**Low**	On-site
47d	***Corymbia maculata*** (Spotted Gum)	8	3	124	12	I	Appears stable with sound branching structure. Located within paved forecourt area.	Crown lifted to 4 metres	Good	No Evidence	Medium 15-40 Years	5	**Low**	On-site

APPENDIX 5 - IMPACT ASSESSMENT SCHEDULE

Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	TPZ (m^2)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
1	***Ficus rubiginosa*** (Port Jackson Fig)	M	4.5	2.0	63.6	Located within proposed road works	Proposed works will necessitate removal.	Consider relocating (transplanting) elsewhere within the site is space permits
2	***Lagunaria patersonia*** (Norfolk Island Hibiscus)	M	9.0	2.9	254.3	Located within footprint of proposed retail centre.	Proposed works will necessitate removal.	Undertake replacement planting elsewhere within the site to compensate for loss of amenity.
3	***Melaleuca liniariifolia*** (Narrow-leaved Paperbark)	M	4.8	2.3	72.3	Located within footprint of proposed retail centre.	Proposed works will necessitate removal.	Remove tree
4	***Melaleuca liniariifolia*** (Narrow-leaved Paperbark)	M	4.8	2.3	72.3	Located within footprint of proposed retail centre.	Proposed works will necessitate removal.	Remove tree
5	***Melaleuca liniariifolia*** (Narrow-leaved Paperbark)	M	4.8	2.3	72.3	Located within footprint of proposed retail centre.	Proposed works will necessitate removal.	Remove tree
6	***Casuarina cunninghamiana*** (River Oak)	M	4.9	2.3	74.0	Located within proposed road works	Proposed works will necessitate removal.	Undertake replacement planting elsewhere within the site to compensate for loss of amenity.
7	***Casuarina cunninghamiana*** (River Oak)	M	3.7	2.0	43.1	Located within proposed road works	Proposed works will necessitate removal.	Undertake replacement planting elsewhere within the site to compensate for loss of amenity.
8	***Casuarina cunninghamiana*** (River Oak)	M	3.5	2.0	38.8	Located within proposed road works	Proposed works will necessitate removal.	Undertake replacement planting elsewhere within the site to compensate for loss of amenity.
9	***Casuarina cunninghamiana*** (River Oak)	M	4.4	2.2	59.6	Located within proposed road works	Proposed works will necessitate removal.	Undertake replacement planting elsewhere within the site to compensate for loss of amenity.

APPENDIX 5 - IMPACT ASSESSMENT SCHEDULE

Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	TPZ (m^2)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
9a	***Banksia integrifolia*** (Coast Banksia)	M	2.0	1.4	12.6	Located within proposed road works	Proposed works will necessitate removal.	Undertake replacement planting elsewhere within the site to compensate for loss of amenity.
10	***Lophostemon confertus*** (Brushbox)	M	2.6	1.8	21.9	Located within footprint of proposed retail centre.	Proposed works will necessitate removal.	Remove tree
11	***Washingtonia robusta*** (Washington Palm)	G	4.1	2.1	51.5	Located within footprint of proposed retail centre.	Proposed works will necessitate removal (high retention value).	Undertake replacement planting elsewhere within the site to compensate for loss of amenity.
12	***Washingtonia robusta*** (Washington Palm)	G	4.0	2.1	49.6	Located within footprint of proposed retail centre.	Proposed works will necessitate removal (high retention value).	Undertake replacement planting elsewhere within the site to compensate for loss of amenity.
12a	***Syzygium paniculatum*** (Magenta Cherry)	M	4.3	2.2	58.6	Located within footprint of proposed retail centre.	Proposed works will necessitate removal.	Undertake replacement planting elsewhere within the site to compensate for loss of amenity.
12b	***Syzygium paniculatum*** (Magenta Cherry)	M	4.8	2.3	72.3	Located within footprint of proposed retail centre.	Proposed works will necessitate removal.	Undertake replacement planting elsewhere within the site to compensate for loss of amenity.
12c	***Howea fosteriana*** (Kentia Palm)	G	2.2	1.5	15.2	Located within footprint of proposed retail centre.	Proposed works will necessitate removal.	Undertake replacement planting elsewhere within the site to compensate for loss of amenity.
12d	***Howea fosteriana*** (Kentia Palm)	G	2.5	1.6	20.1	Located within footprint of proposed retail centre.	Proposed works will necessitate removal.	Undertake replacement planting elsewhere within the site to compensate for loss of amenity.
12e	***Howea fosteriana*** (Kentia Palm)	G	2.3	1.5	17.2	Located within footprint of proposed retail centre.	Proposed works will necessitate removal.	Undertake replacement planting elsewhere within the site to compensate for loss of amenity.
12f	***Howea fosteriana*** (Kentia Palm)	G	2.5	1.6	20.1	Located within footprint of proposed retail centre.	Proposed works will necessitate removal.	Undertake replacement planting elsewhere within the site to compensate for loss of amenity.
12g	***Syzygium paniculatum*** (Magenta Cherry)	M	4.8	2.3	72.3	Located within footprint of proposed retail centre.	Proposed works will necessitate removal.	Undertake replacement planting elsewhere within the site to compensate for loss of amenity.

APPENDIX 5 - IMPACT ASSESSMENT SCHEDULE

Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	TPZ (m^2)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
12h	***Syzygium paniculatum*** (Magenta Cherry)	M	4.8	2.3	72.3	Located within footprint of proposed retail centre.	Proposed works will necessitate removal.	Undertake replacement planting elsewhere within the site to compensate for loss of amenity.
13	***Syagrus romanzoffianum*** (Cocos Palm)	G	3.5	1.9	38.5	Located within footprint of proposed medical centre.	Proposed works will necessitate removal.	Remove tree
14	***Syagrus romanzoffianum*** (Cocos Palm)	G	3.5	1.8	38.5	Located within footprint of proposed medical centre.	Proposed works will necessitate removal.	Remove tree
15	***Syagrus romanzoffianum*** (Cocos Palm)	G	4.0	2.1	50.6	Located within footprint of proposed medical centre.	Proposed works will necessitate removal.	Remove tree
16	***Syagrus romanzoffianum*** (Cocos Palm)	G	3.5	1.8	38.5	Located within footprint of proposed medical centre.	Proposed works will necessitate removal.	Remove tree
17	***Araucaria columnaris*** (Cook's Pine)	M	3.7	2.0	43.5	Located within footprint of proposed retail centre.	Proposed works will necessitate removal.	Undertake replacement planting elsewhere within the site to compensate for loss of amenity.
18	***Washingtonia robusta*** (Washington Palm)	G	4.1	2.1	51.5	Located within footprint of proposed retail centre.	Proposed works will necessitate removal (high retention value).	Undertake replacement planting elsewhere within the site to compensate for loss of amenity.
18a	***Washingtonia robusta*** (Washington Palm)	G	4.8	2.3	72.3	Located within footprint of proposed retail centre.	Proposed works will necessitate removal.	Undertake replacement planting elsewhere within the site to compensate for loss of amenity.
19	***Washingtonia robusta*** (Washington Palm)	G	4.2	2.1	55.4	Located within footprint of proposed retail centre.	Proposed works will necessitate removal (high retention value).	Undertake replacement planting elsewhere within the site to compensate for loss of amenity.
19a	***Washingtonia robusta*** (Washington Palm)	G	4.8	2.3	72.3	Located within footprint of proposed retail centre.	Proposed works will necessitate removal.	Remove tree
20	***Washingtonia robusta*** (Washington Palm)	G	5.0	2.3	78.7	Located within footprint of proposed retail centre.	Proposed works will necessitate removal (high retention value).	Undertake replacement planting elsewhere within the site to compensate for loss of amenity.

APPENDIX 5 - IMPACT ASSESSMENT SCHEDULE

Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	TPZ (m^2)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
21	***Washingtonia robusta*** (Washington Palm)	G	5.0	2.3	78.7	Located within footprint of proposed retail centre.	Proposed works will necessitate removal (high retention value).	Undertake replacement planting elsewhere within the site to compensate for loss of amenity.
21a	***Casuarina glauca*** (Swamp Oak)	M	3.0	1.7	28.3	Located within footprint of proposed retail centre.	Proposed works will necessitate removal.	Remove tree
21b	***Casuarina glauca*** (Swamp Oak)	M	3.0	1.7	28.3	Located within footprint of proposed retail centre.	Proposed works will necessitate removal.	Remove tree
22	***Washingtonia robusta*** (Washington Palm)	G	3.2	2.1	31.2	Located within footprint of proposed retail courtyard.	Proposed works will necessitate removal.	Remove tree
22a	***Araucaria columnaris*** (Cook's Pine)	M	4.1	2.1	52.3	Located within footprint of proposed retail centre.	Proposed works will necessitate removal.	Undertake replacement planting elsewhere within the site to compensate for loss of amenity.
23	***Washingtonia robusta*** (Washington Palm)	G	4.2	2.1	55.4	Located within footprint of proposed additions to Leagues Club building.	Proposed works will necessitate removal.	Remove tree
23a	***Washingtonia robusta*** (Washington Palm)	G	4.2	2.1	55.4	Located within footprint of proposed additions to Leagues Club building.	Proposed works will necessitate removal.	Remove tree
24	***Washingtonia robusta*** (Washington Palm)	G	4.7	2.2	68.3	Located within footprint of proposed retail centre.	Proposed works will necessitate removal.	Undertake replacement planting elsewhere within the site to compensate for loss of amenity.
24a	***Lophostemon confertus*** (Brushbox)	M	2.1	1.6	13.4	Located within footprint of proposed retail centre.	Proposed works will necessitate removal.	Remove tree
25	***Corymbia citriodora*** (Lemon-scented Gum)	P	6.0	2.1	113.0	Located within footprint of proposed retail centre.	Proposed works will necessitate removal.	Undertake replacement planting elsewhere within the site to compensate for loss of amenity.

APPENDIX 5 - IMPACT ASSESSMENT SCHEDULE

Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	TPZ (m^2)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
26	***Lophostemon confertus*** (Brushbox)	M	2.7	1.8	23.1	Located within footprint of proposed retail courtyard.	Proposed works will necessitate removal.	Remove tree
27	***Lophostemon confertus*** (Brushbox)	M	2.9	1.8	27.2	Located within footprint of proposed riparian buffer.	Proposed works will necessitate removal.	Remove tree
28	***Lophostemon confertus*** (Brushbox)	M	4.3	2.1	57.5	Located within footprint of proposed retail courtyard.	Proposed works will necessitate removal.	Remove tree
28a	***Lophostemon confertus*** (Brushbox)	M	1.5	1.2	7.1	Located within footprint of proposed additions to Leagues Club building.	Proposed works will necessitate removal.	Remove tree
29	***Lophostemon confertus*** (Brushbox)	M	3.5	2.0	38.8	Located within footprint of proposed additions to Leagues Club building.	Proposed works will necessitate removal.	Remove tree
30	***Lophostemon confertus*** (Brushbox)	M	3.2	1.9	33.1	Located within footprint of proposed additions to Leagues Club building.	Proposed works will necessitate removal.	Remove tree
31	***Eucalyptus resinifera*** (Red Mahogany)	P	8.4	2.8	219.9	Located within footprint of proposed additions to Leagues Club building.	Proposed works will necessitate removal (high retention value).	Undertake replacement planting elsewhere within the site to compensate for loss of amenity.
32	***Eucalyptus resinifera*** (Red Mahogany)	P	9.1	3.0	262.0	Located within footprint of proposed Leisure Breakout Area.	Proposed works will necessitate removal (high retention value).	Undertake replacement planting elsewhere within the site to compensate for loss of amenity.
33	***Eucalyptus sideroxylon*** (Mugga Ironbark)	P	6.7	2.6	140.4	Located within footprint of proposed Leisure Breakout Area.	Proposed works will necessitate removal.	Undertake replacement planting elsewhere within the site to compensate for loss of amenity.

APPENDIX 5 - IMPACT ASSESSMENT SCHEDULE

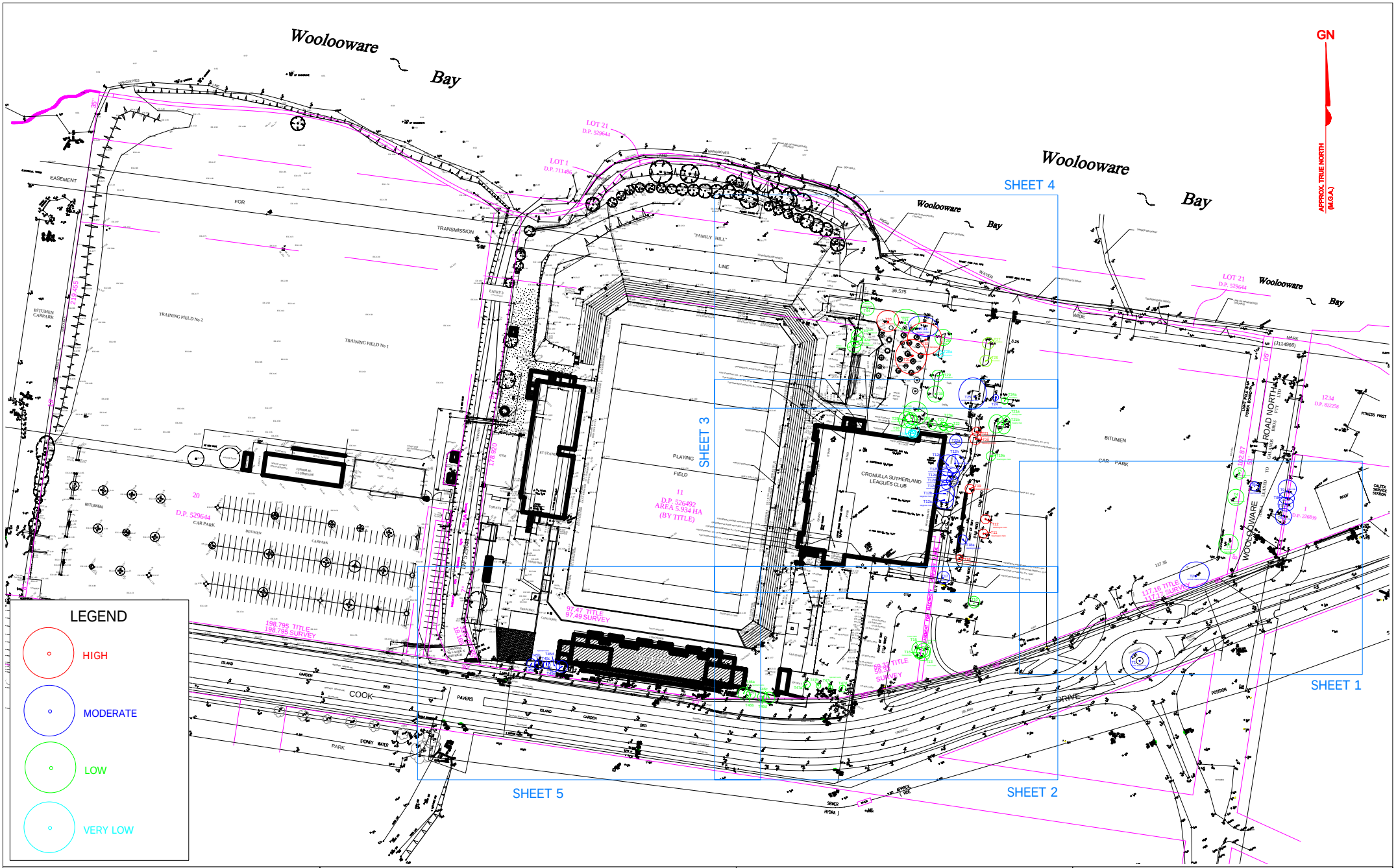
Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	TPZ (m^2)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
34	***Eucalyptus sp.*** (Mahogany)	P	5.2	2.3	86.1	Located within footprint of proposed Leisure Breakout Area.	Proposed works will necessitate removal.	Remove tree
35	***Eucalyptus resinifera*** (Red Mahogany)	P	6.1	2.5	117.4	Located within footprint of proposed Leisure Breakout Area.	Proposed works will necessitate removal (high retention value).	Undertake replacement planting elsewhere within the site to compensate for loss of amenity.
36	***Washingtonia robusta*** (Washington Palm)	G	4.2	2.1	55.4	Located within footprint of proposed additions to Leagues Club building.	Proposed works will necessitate removal.	Remove tree
37	Group of 3 x ***Syagrus romanzoffianum*** (Cocos Palm)	G	3.8	1.8	44.2	Located within footprint of proposed additions to Leagues Club building.	Proposed works will necessitate removal.	Remove tree
38	***Syagrus romanzoffianum*** (Cocos Palm)	G	3.8	2.0	45.9	Located within footprint of proposed additions to Leagues Club building.	Proposed works will necessitate removal.	Remove tree
39	***Syagrus romanzoffianum*** (Cocos Palm)	G	3.4	1.9	35.5	Located within footprint of proposed additions to Leagues Club building.	Proposed works will necessitate removal.	Remove tree
40	***Syagrus romanzoffianum*** (Cocos Palm)	G	3.0	1.8	27.9	Located within footprint of proposed additions to Leagues Club building.	Proposed works will necessitate removal.	Remove tree
41	***Callistemon viminalis*** (Weeping Bottlebrush)	M	5.4	2.4	91.6	Located within footprint of proposed additions to Leagues Club building.	Proposed works will necessitate removal.	Remove tree
42	***Callistemon salignus*** (Willow Bottlebrush)	M	3.2	1.9	31.6	Located within footprint of proposed Leisure Breakout Area.	Proposed works will necessitate removal.	Remove tree

APPENDIX 5 - IMPACT ASSESSMENT SCHEDULE

Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	TPZ (m^2)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
42a	***Callistemon salignus*** (Willow Bottlebrush)	M	3.0	1.9	28.6	Located within footprint of proposed Leisure Breakout Area.	Proposed works will necessitate removal.	Remove tree
43	***Callistemon salignus*** (Willow Bottlebrush)	M	3.0	1.8	27.9	Located within footprint of proposed Leisure Breakout Area.	Proposed works will necessitate removal.	Remove tree
44	***Callistemon salignus*** (Willow Bottlebrush)	M	3.7	2.0	44.0	Located within footprint of proposed Leisure Breakout Area.	Proposed works will necessitate removal.	Remove tree
45a	***Corymbia maculata*** (Spotted Gum)	P	2.1	1.6	13.9	Located within proposed new streetscape area.	Proposed works will necessitate removal.	Undertake replacement planting elsewhere within the site to compensate for loss of amenity.
45b	***Corymbia maculata*** (Spotted Gum)	P	2.0	1.6	12.4	Located within proposed new streetscape area.	Proposed works will necessitate removal.	Undertake replacement planting elsewhere within the site to compensate for loss of amenity.
45c	***Corymbia maculata*** (Spotted Gum)	P	1.8	1.5	9.7	Located within proposed new streetscape area.	Proposed works will necessitate removal.	Undertake replacement planting elsewhere within the site to compensate for loss of amenity.
45d	***Corymbia maculata*** (Spotted Gum)	P	2.8	1.6	24.1	Located within proposed new streetscape area.	Proposed works will necessitate removal.	Undertake replacement planting elsewhere within the site to compensate for loss of amenity.
45e	***Corymbia maculata*** (Spotted Gum)	P	2.7	1.6	23.3	Located within proposed new streetscape area.	Proposed works will necessitate removal.	Undertake replacement planting elsewhere within the site to compensate for loss of amenity.
46a	***Corymbia maculata*** (Spotted Gum)	P	2.8	1.6	24.1	Located within proposed new streetscape area.	Proposed works will necessitate removal.	Remove tree
46b	***Corymbia maculata*** (Spotted Gum)	P	2.7	1.6	23.3	Located within proposed new streetscape area.	Proposed works will necessitate removal.	Remove tree
46c	***Corymbia maculata*** (Spotted Gum)	P	2.6	1.6	20.9	Located within proposed new streetscape area.	Proposed works will necessitate removal.	Remove tree

APPENDIX 5 - IMPACT ASSESSMENT SCHEDULE

Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	TPZ (m^2)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
46d	***Corymbia maculata*** (Spotted Gum)	P	2.5	1.6	20.1	Located within proposed new streetscape area.	Proposed works will necessitate removal.	Remove tree
47a	***Corymbia maculata*** (Spotted Gum)	P	1.8	1.4	10.3	Located within proposed new streetscape area.	Proposed works will necessitate removal.	Remove tree
47b	***Corymbia maculata*** (Spotted Gum)	P	1.7	1.3	9.3	Located within proposed new streetscape area.	Proposed works will necessitate removal.	Remove tree
47c	***Corymbia maculata*** (Spotted Gum)	P	1.9	1.4	10.9	Located within proposed new streetscape area.	Proposed works will necessitate removal.	Remove tree
47d	***Corymbia maculata*** (Spotted Gum)	P	1.9	1.4	10.9	Located within proposed new streetscape area.	Proposed works will necessitate removal.	Remove tree



APPENDIX 6
TREE LOCATION PLAN SHOWING
TREE RETENTION VALUES
Cronulla Sutherland Leagues Club
Captain Cook Drive, WOOLOOWARE

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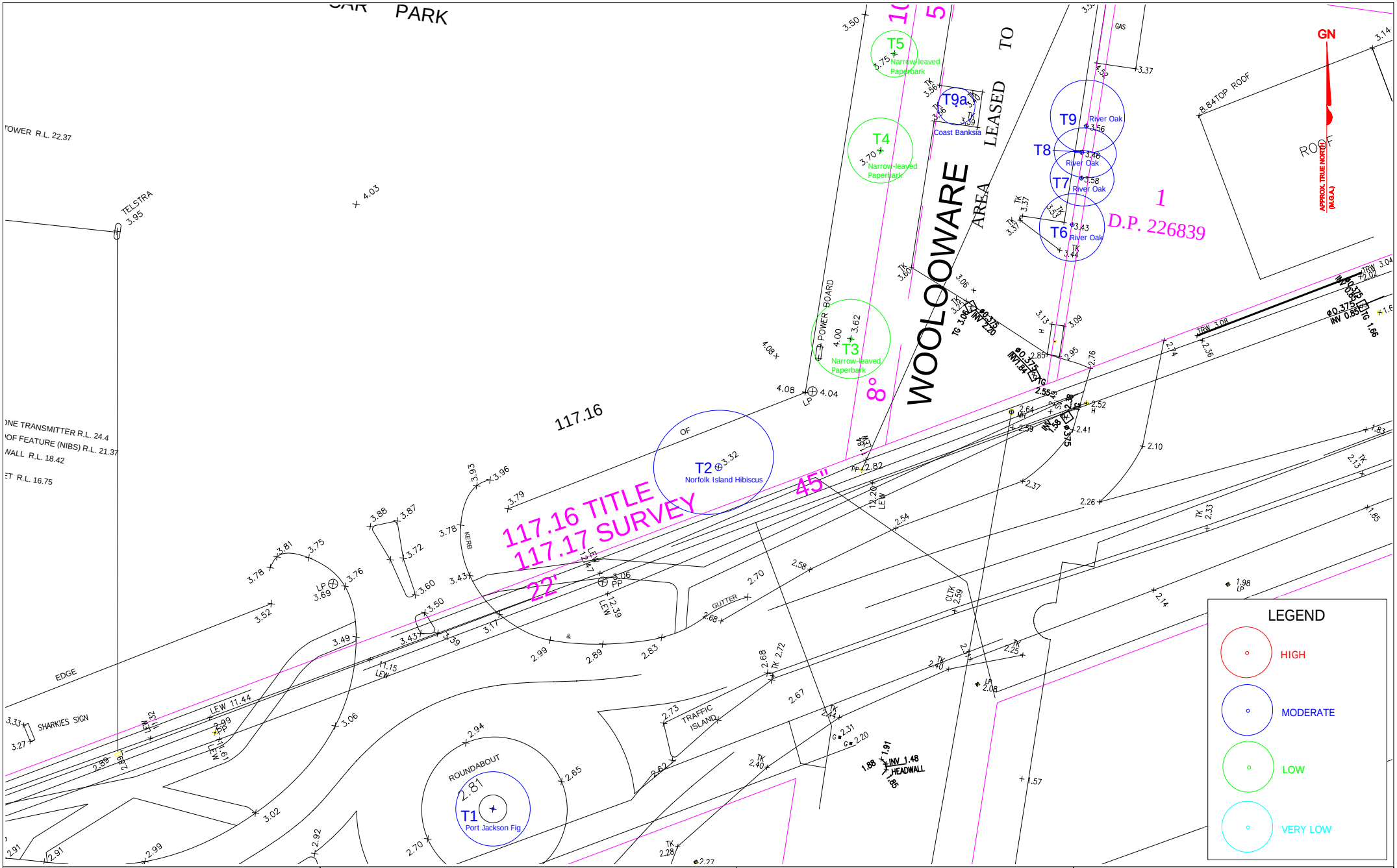
Based on the Survey Drawing
prepared by Harrison Friedmann & Associates Pty Ltd
Dwg Ref No. 40966DT
Dated 02/06/2011

DWG No. T13-01031 KEY PLAN

DATE: 03/01/2013



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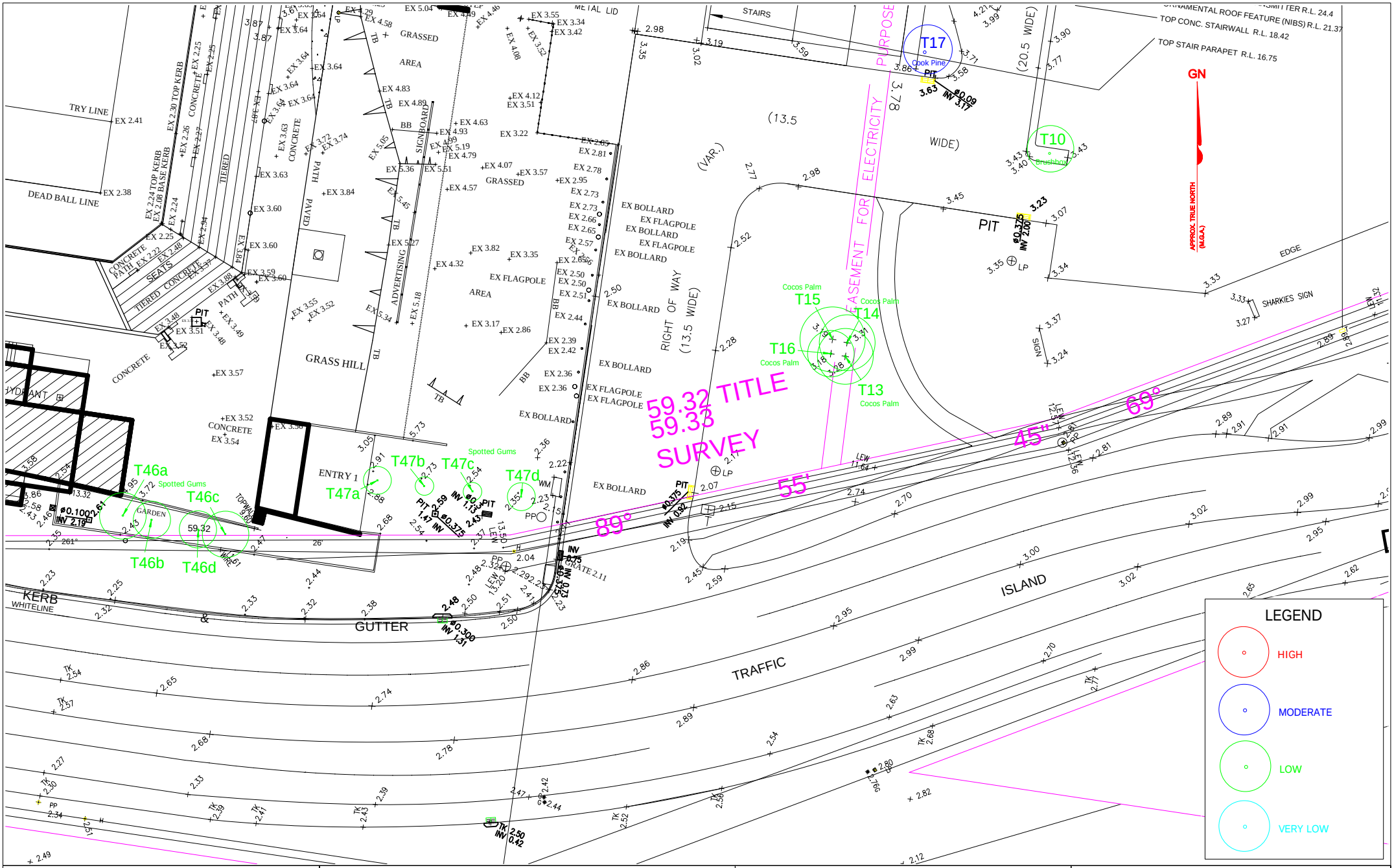

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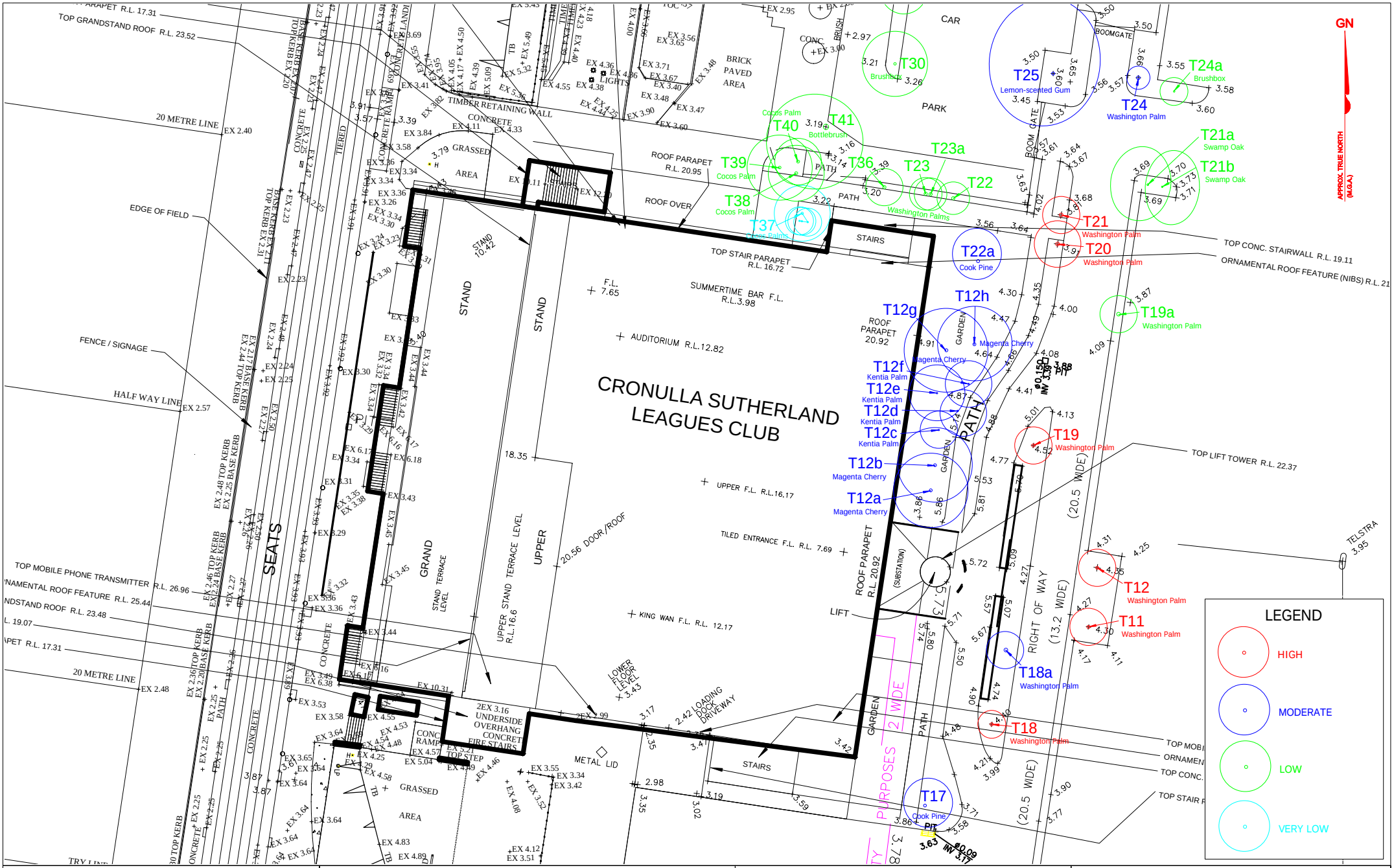

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TREE LOCATION PLAN SHOWING
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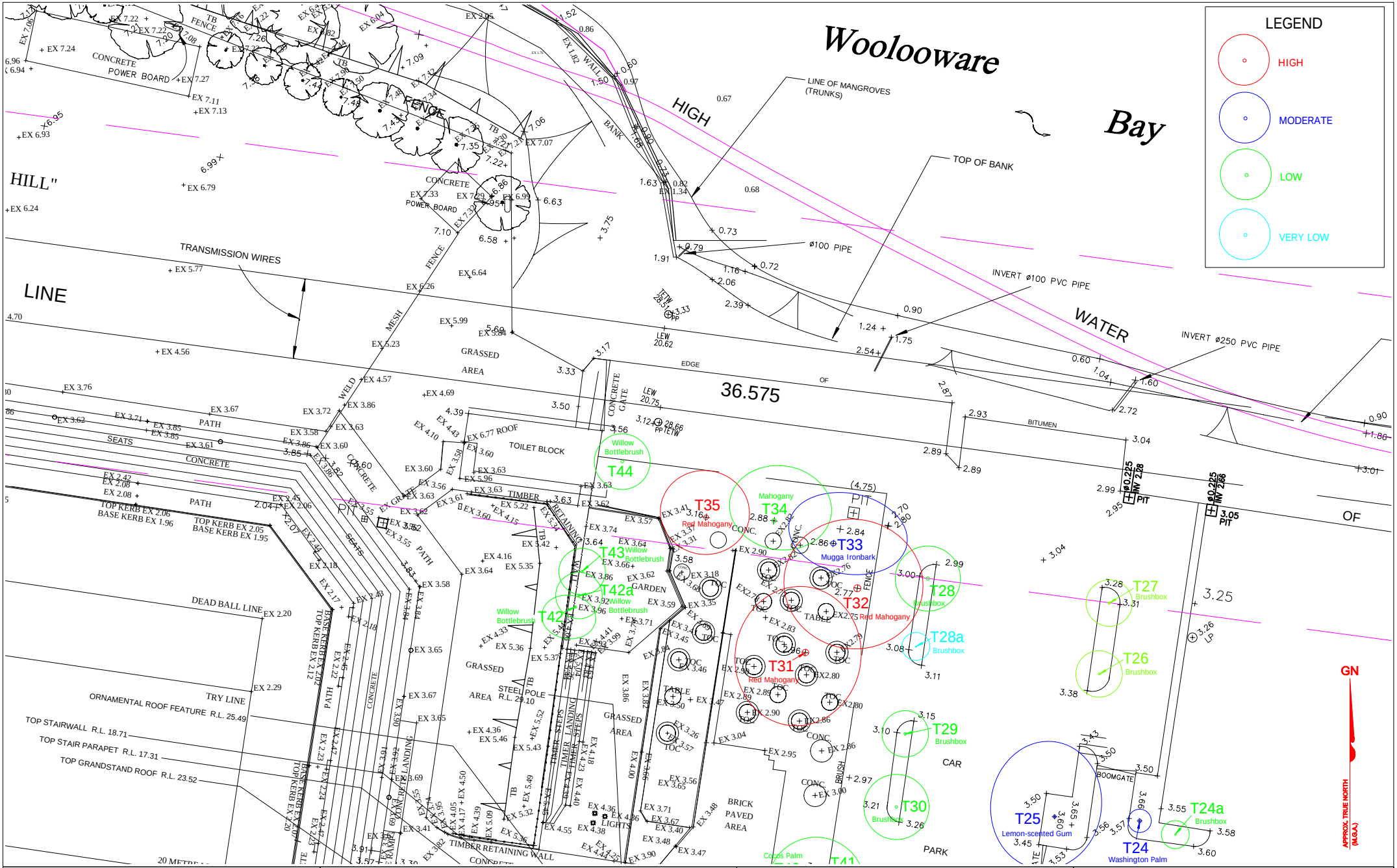

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TREE RETENTION VALUES
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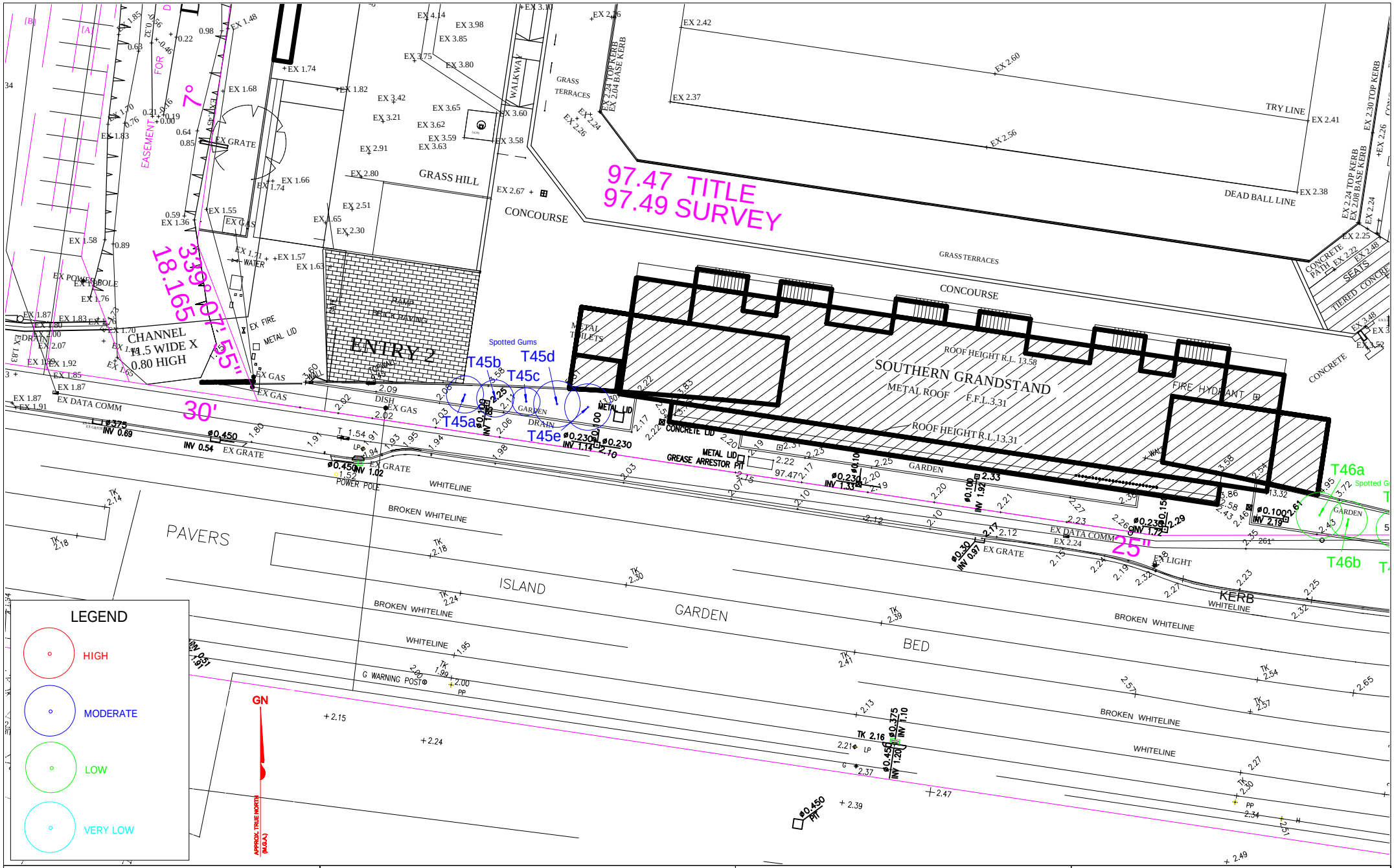

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TREE RETENTION VALUES
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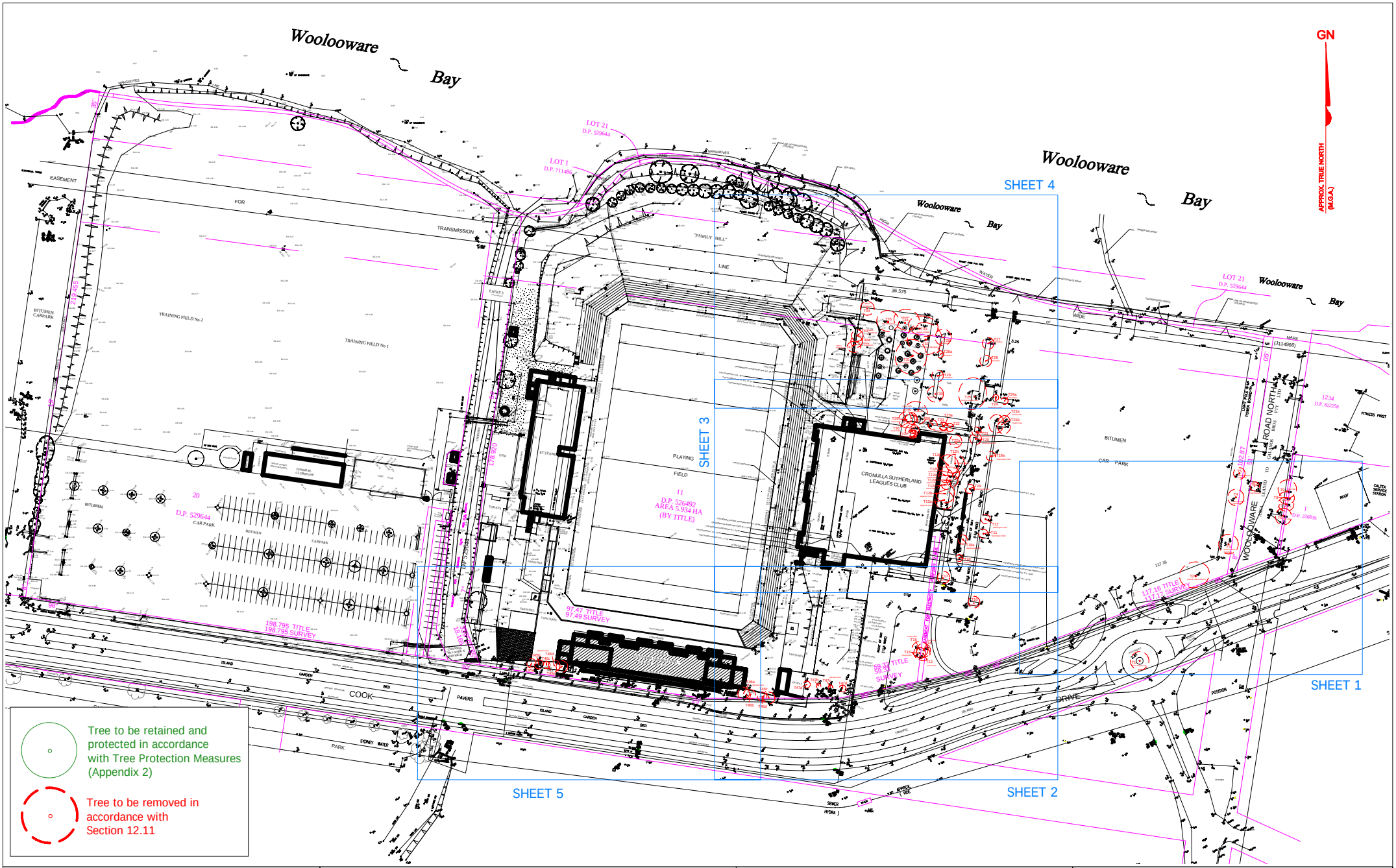

APPENDIX 7
TREE REMOVAL & RETENTION PLAN

Cronulla Sutherland Leagues Club
Captain Cook Drive, WOOLOOWARE

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DWG No. T13-01032 KEY PLAN

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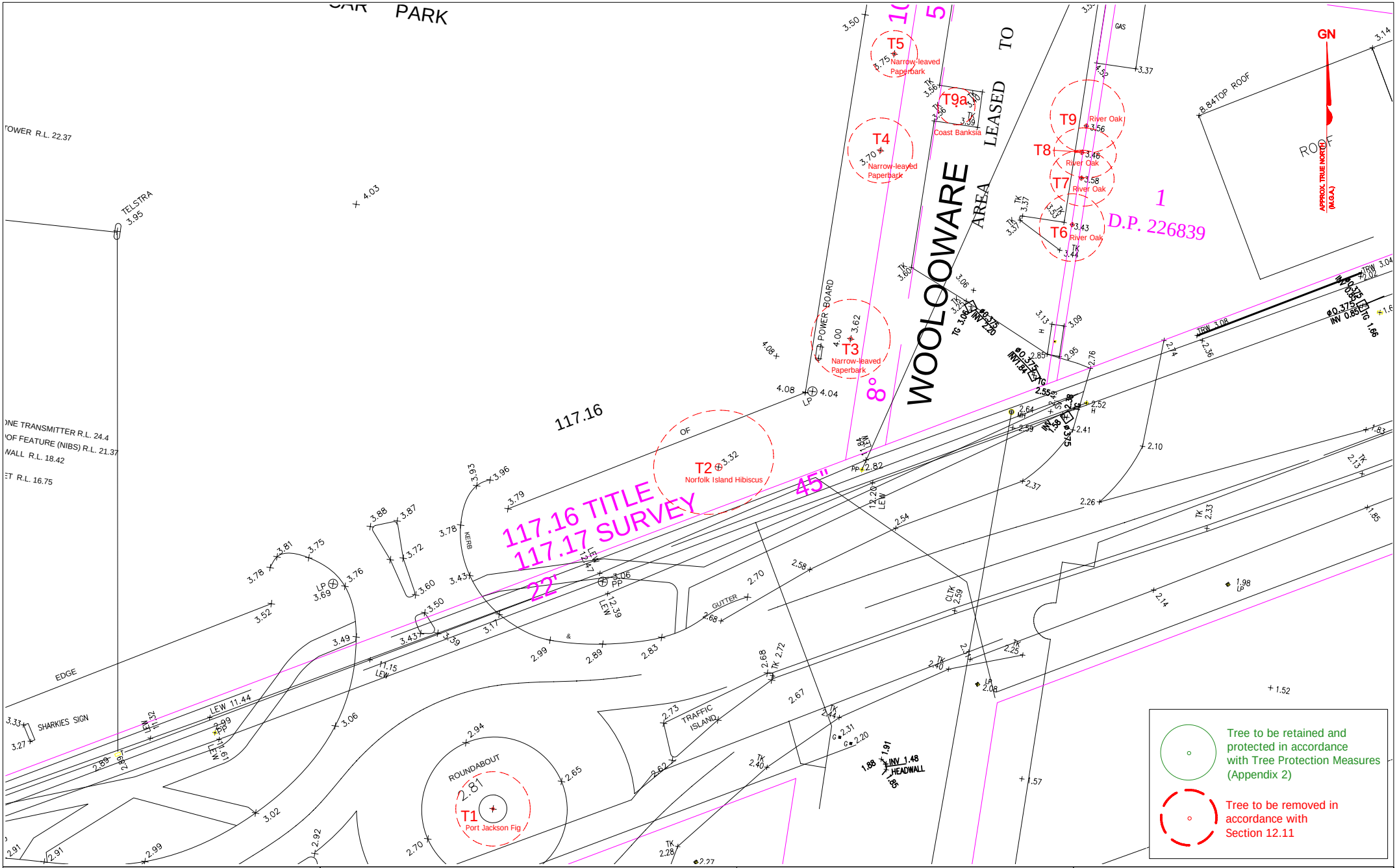

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TREE REMOVAL & RETENTION PLAN

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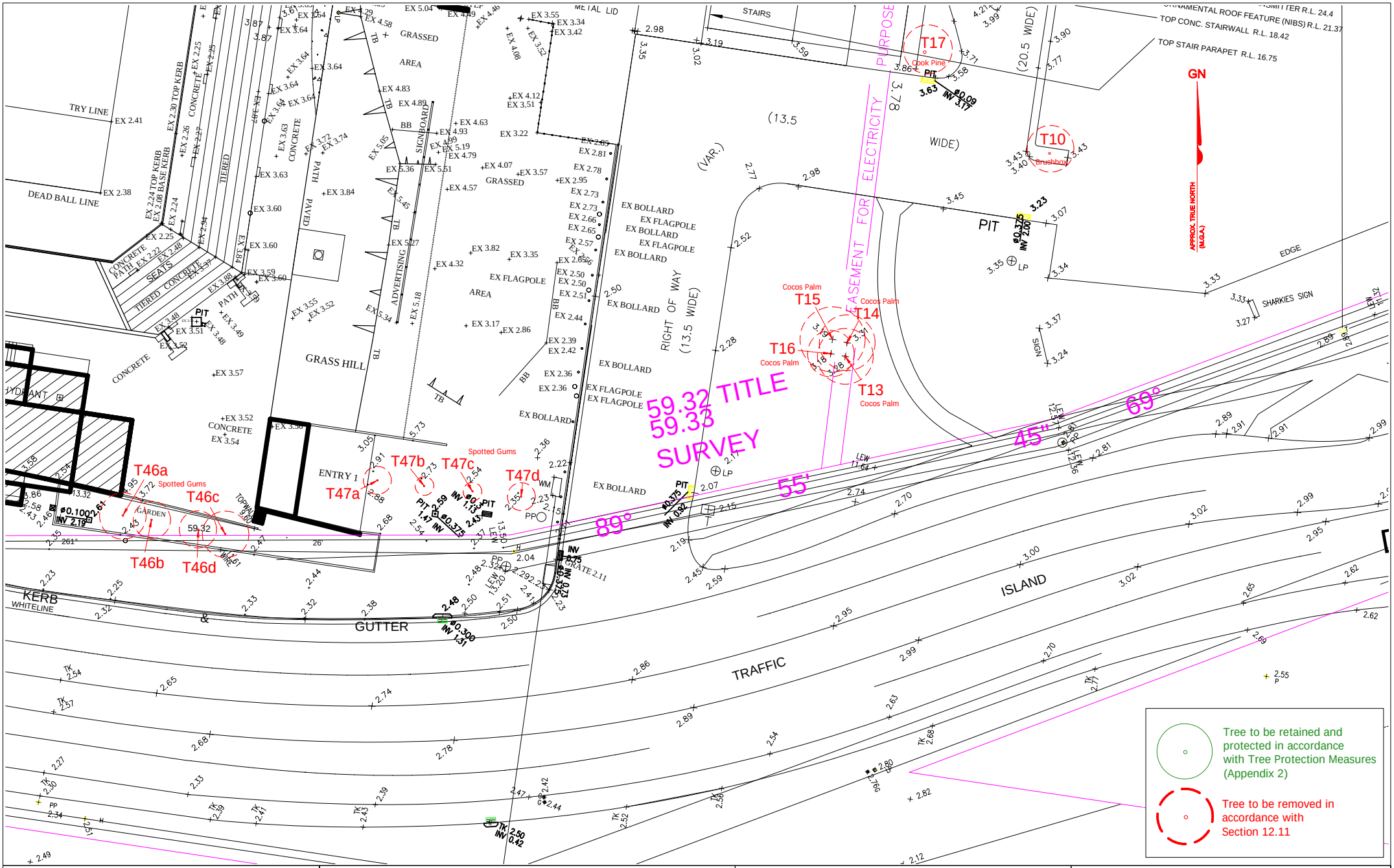
DWG No. T13-01032 SHEET 1

DATE: 03/01/2013



APPENDIX 7
TREE REMOVAL & RETENTION PLAN

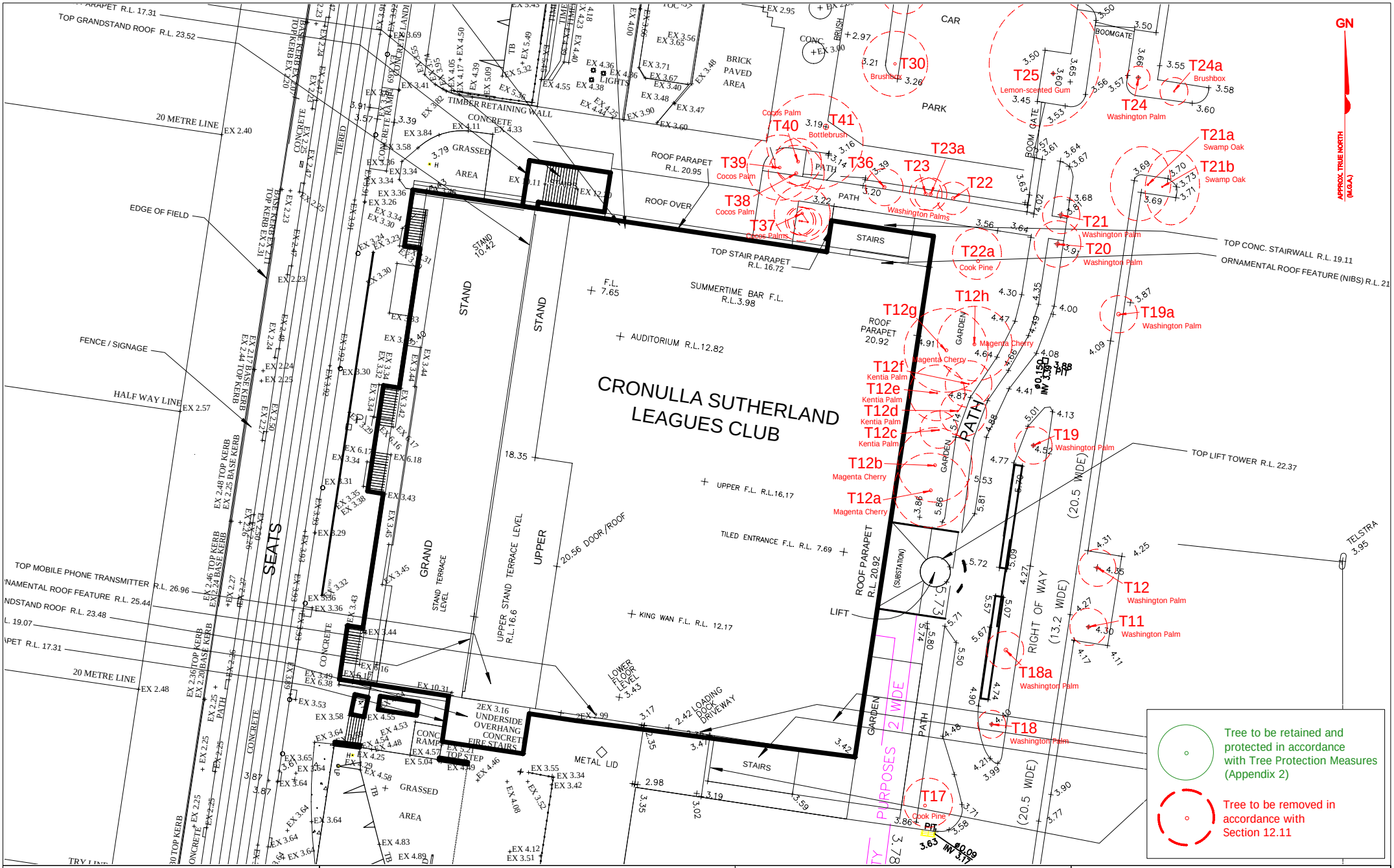
Cronulla Sutherland Leagues Club
Captain Cook Drive, WOOLOOWARE

Earthscape Horticultural Services
Arboricultural and Horticultural Consultants
PO Box 364
BEROWRA NSW 2081
Ph: 02 9456 4787
Fax: 02 9456 5757 e: earthscape@iinet.net.au

Based on the Survey Drawing
prepared by Harrison Friedmann & Associates Pty Ltd
Dwg Ref No. 40966DT
Dated 02/06/2011

DWG No. T13-01032 SHEET 2

DATE: 03/01/2013



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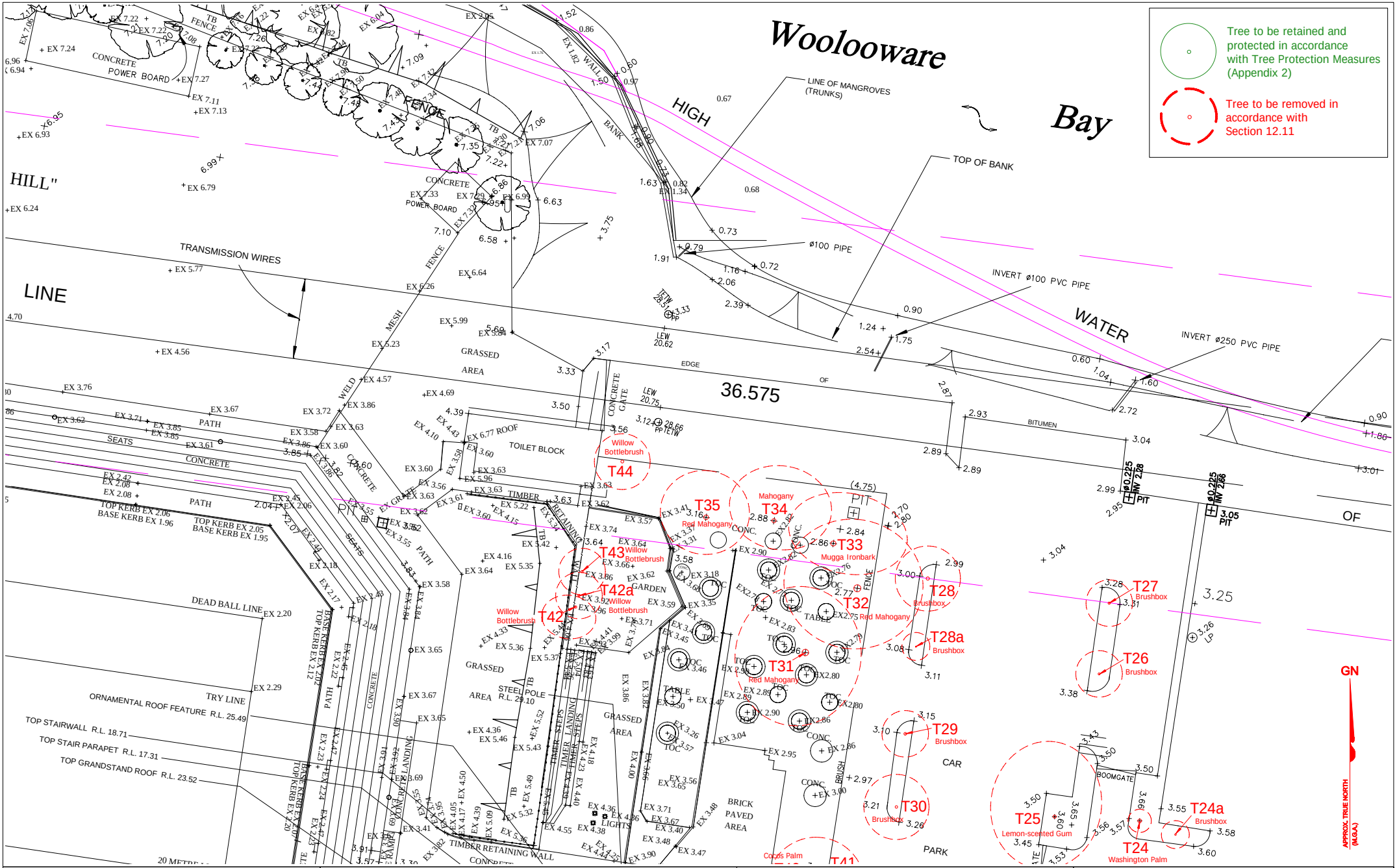
DWG No. T13-01032 SHEET 3

DATE: 03/01/2013



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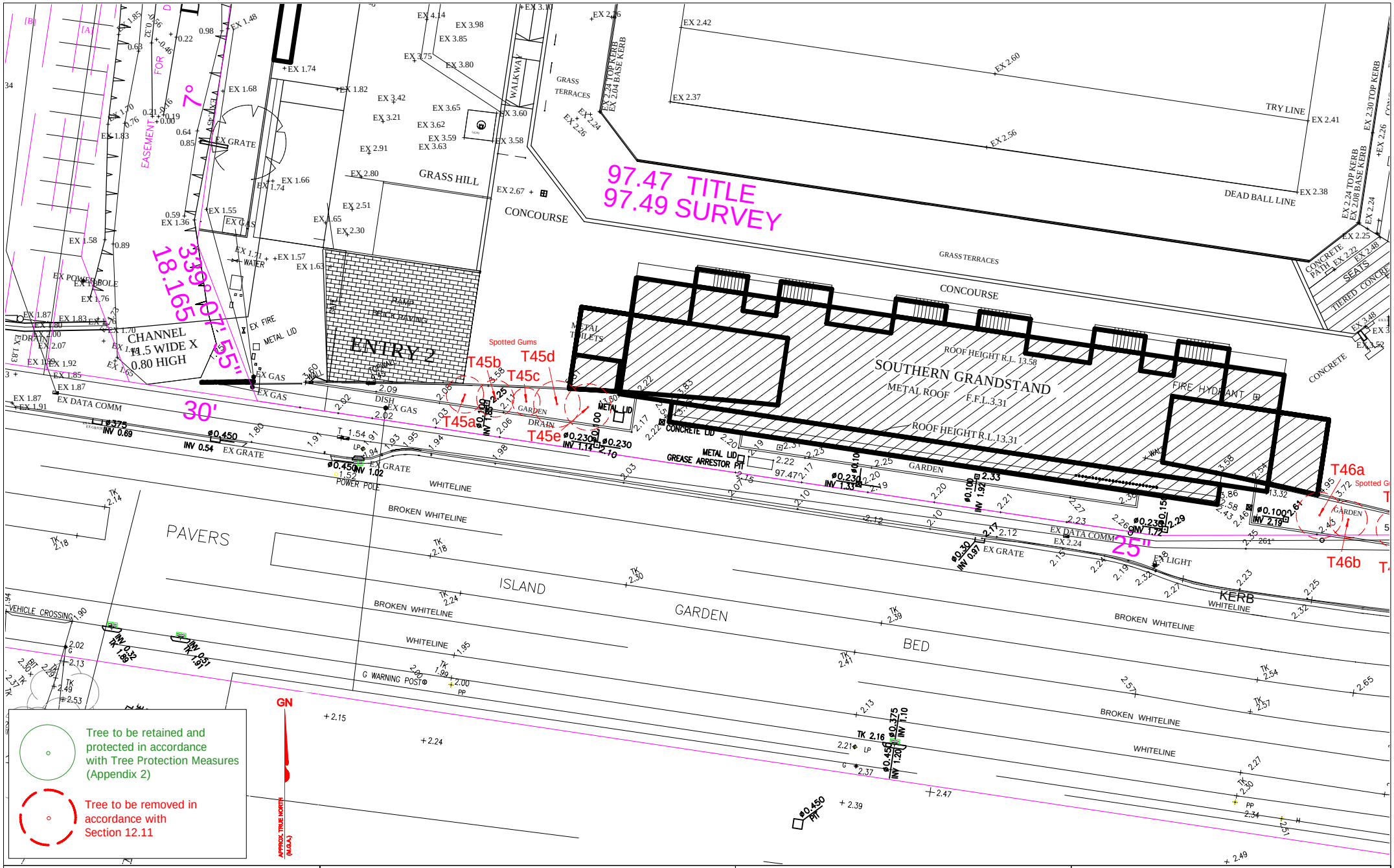
DWG No. T13-01032 SHEET 4

DATE: 03/01/2013



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