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Tree Consultancy

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Construction Impact & Management Statement for soon to be Lodged Development Application

August 2018

Site:	**Lot 1001963 in DP** **638 Pittwater Road** **BROOKVALE, NSW**
Client:	**Anthony Chirillo** **c/ Freeman & Chirillo** **PO Box 7380** **WARRINGAH MALL 2100** **Phone: 61 412 652 559** **Email: tony@freemanchirillo.com.au**
Author:	Kyle A Hill Registered (Arb Aus #1884) Practising & Consulting Arborist Post Graduate Certificate in Arboriculture, Uni of Melb Diploma of Horticulture–Arboriculture TAFE, Grow SA Certificate of Horticulture, TAFE Certificate Advanced Tree Care TAFE Founder -Growing My Way Tree Services (1977) Member of International Society of Arboriculture Member of Arboriculture Australia

1 Summary

Anthony Chirillo (representing the developer consortium) has commissioned the Growing My Way Tree Consultancy (GMW) to prepare a *Construction Impact & Plan of Management Statement* to be linked to the soon to be lodged *Development Application Submission for demolition of existing infrastructure & construction of mixed use development comprising of commercial premises, residential & SOHO unit & basement parking. The proposal also includes self-storage units within basement Level B1.*

The subject site is known as 638 Pittwater Road, Brookvale (*the subject site from herein*).

The *Development Application* relative to tree management requires trees greater than five (5.00m) meters tall within the subject site & adjoining sites to be discussed. Fourteen (14) trees are determined as being required to be discussed.

All discussed trees are confirmed as being within five meters (5.00m) of proposed works. Most discussed trees are Australian Native species. One (1) tree is not protected by LGA provisions regardless of any development proposal. All discussed trees are likely to be planted or bird sown.

The subject site & two (2) common boundary sites are developed to contain commercial enterprises.

Motor vehicle access is presently only via Orchard Road. Pedestrian access is also only via Pittwater Road or Orchard Road.

The sole consent authority is the *Northern Beaches Council, (from herein NBC).*

Information related to the discussed tree was gathered by onsite data collection with cross referencing to:

- *Site Survey by CitiSurv Pty Ltd, Consulting Surveyors, (2 sheets) dated 7 August 2017;*
- *Plans, Sections & Elevations, by Barry Rush & Associates Architects Pty Ltd, Drawing numbers A01-A014, dated 26 June 2018;*
- *Landscape Concept by Conzept Landscape Architects, Sheets 3 & 5, August 2018;*
- *NBC "Tree Management Provisions"*
- *SEPP 'Vegetation in Non-Rural Areas' (25 August 2017) &*
- *NBC Heritage Conservation Area & Land Zoning LEP Maps.*

The aim of this report is:

1. *To confirm' the viability of the discussed trees, relating to their health, vigour & condition considering any impact foreseen by the proposed development.*
2. *Provide Australian Standard (AS4970-2009 Protection of trees on development sites) compliant site specific "Tree Plan of Management" for the discussed trees supported to be retained & managed.*
3. *Provide a list of site specific suitable replacement species for trees required to be removed*

This document supports (relative to tree management) the proposal for development: as per the information provided by Anthony Chirillo.

Kyle A Hill (AQF level 5 & 8 *Practicing/Consulting Arborist* has prepared this report based on "*Visual Tree Assessment" (VTA)* undertaken on Thursday, 23 August, 2018.

Table of Contents

2 Introduction

This report contains observations & recommendations intended to assist in the management of the fourteen (14) trees confirmed as necessary to be discussed.

Trees within five (5.00m) of the proposed works are discussed individually (or as a group) considering their calculated *Tree Protection Zone* (from herein *TPZ*) & *Structural Root Zone* (from herein *SRZ*) radial distances relative to the proposed development.

We acknowledge & confirm to be familiar with the *NBC "Tree Management Provisions"*, specifically the *old* document; *Warringah Shire Council "Development Control Plan 2011", Part E, section E1 & SEPP "Vegetation in Non Rural Areas, 25 August 2017".*

The sole consent authority is *NBC.*

The site is NOT within a *NBC* designated "*Heritage Conservation Area*". The subject site is Land Zoned B2 'Business Development'.

The discussed trees *are not within a recognised "wildlife corridor"* nor are they listed on any known *"significant tree register"*.

Information related to the discussed trees was gathered by onsite data collection with cross referencing to:

- *Site Survey by CitiSurv Pty Ltd, Consulting Surveyors, (2 sheets) dated 7 August 2017;*
- *Plans, Sections & Elevations, by Barry Rush & Associates Architects Pty Ltd, Drawing numbers A01-A14, dated 26 June 2018;*
- *Landscape Concept by Conzept Landscape Architects, Sheets 3 & 5, August 2018;*
- *NBC "Tree Management Provisions"*
- *SEPP 'Vegetation in Non–Rural Areas' (25 August 2017) &*
- *NBC Heritage Conservation Area & Land Zoning LEP Maps.*

This document includes a Site Specific "Plan of Tree Management".

3 Methodology

Assessment of the trees has been from ground level by eye, using *Visual Tree Assessment* * *(VTA)* techniques developed by Claus Mattheck. The principles of *VTA* are explained in his widely-used reference book *"The Body Language of Trees (1994)"*.

Assessment includes:

- Tree's current condition & likely future health. Species tolerance to root disturbance &/or development
- Likely future hazard potential to persons & property
- Tree's amenity value, such as significance, screening & habitat.

No root analysis, soil testing, 'Resistograph'® drilling or aerial canopy inspection was undertaken. See the following Appendices for further information:

- Appendix A Glossary of Common Arboreal terms
- Appendix B Site Survey, Plans, Sections & Elevations
- Appendix C Tree Management & Protection Prior to & During Construction

* ***VTA*–Visual Tree Assessment,** as referenced is a systematic inspection of a tree for indicators of structural defects that may pose a risk due to failure. Stage 1 is made from ground level (i.e. no aerial inspection is undertaken). An aerial inspection (Stage 2) is undertaken when there are easily identified visual indicators that suggest such an inspection is merited. Visual indicators are outlined within *The Body Language of Trees (Mattheck & Breloer, 1994). VTA* is a broadly used relatively standardised approach. More complex (can be invasive) diagnostic fault detection equipment may be recommended once visual indicators of potential defects are confirmed.

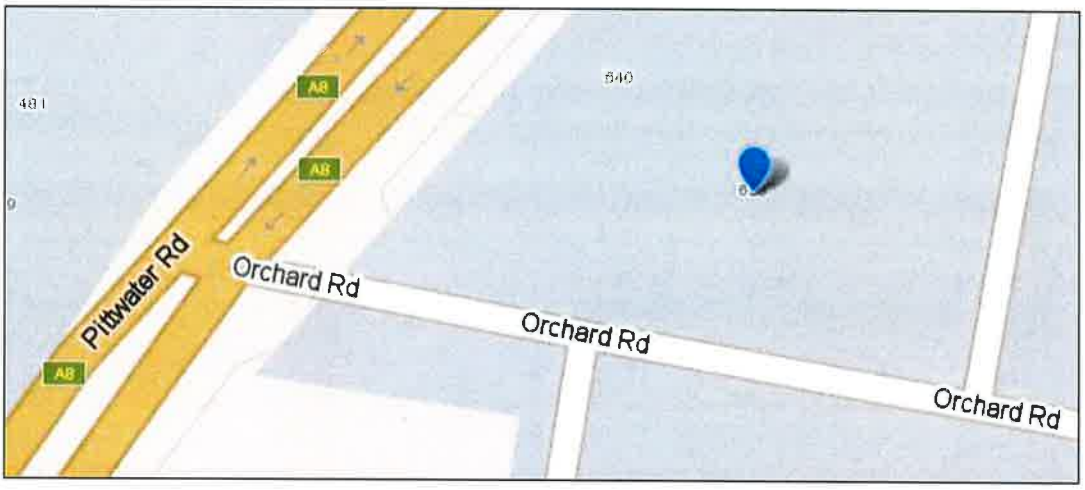
4 Observations

4.1 The Site

The report discusses trees within the subject site & one (1) tree within the Redman Road Roadside reserve. The site is 2662.00m^2 (as per site survey) in size. The site is linked to two (2) public road, one (1) public laneway & two (2) common boundary commercial lots.

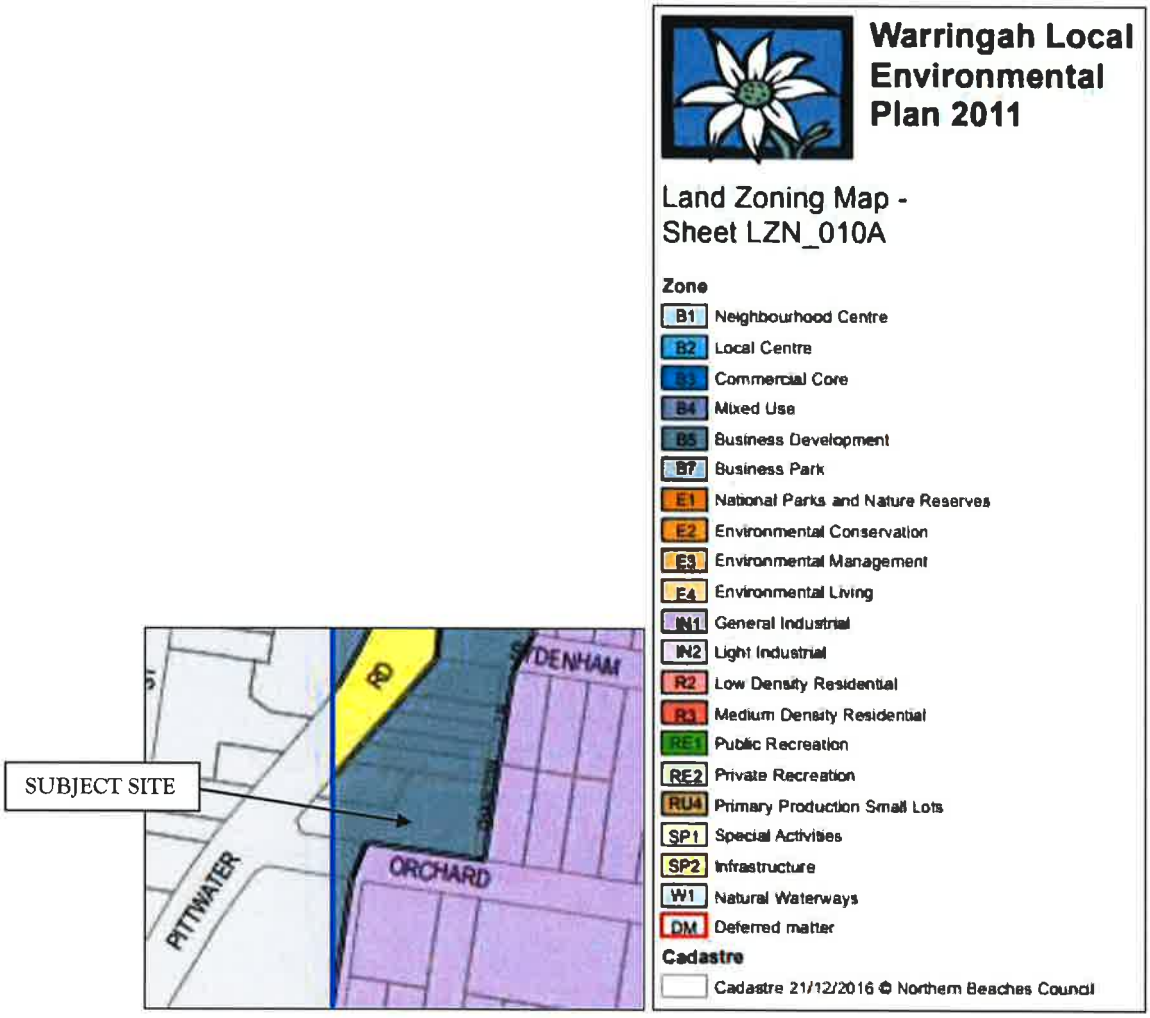
No Geotechnical issues are known to exist.

All surrounding properties are developed & contain dwelling residences.

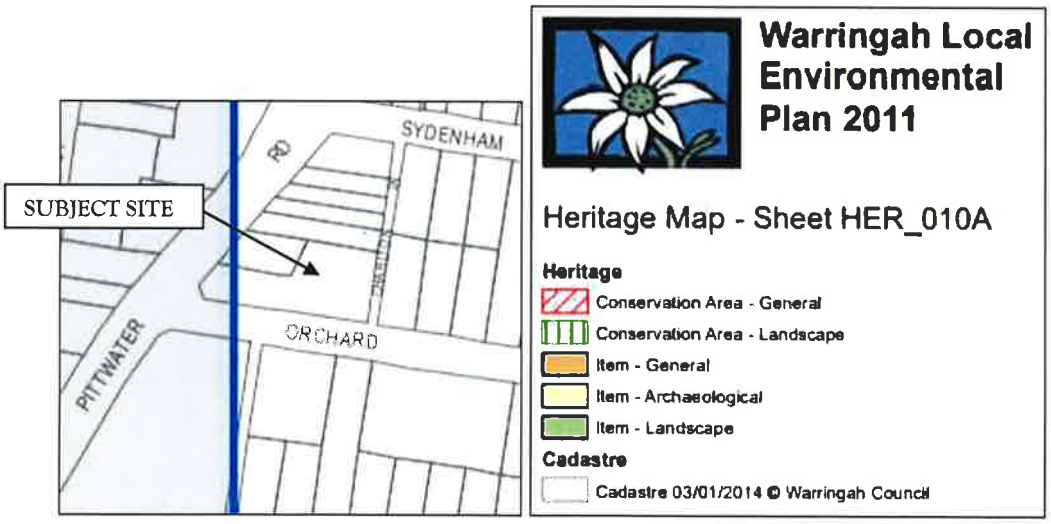


Map & Aerial photographs courtesy of Whereis.com & NSW Dept of Lands (six maps website tool)

The subject site is Zoned B5 Business Development. See below.

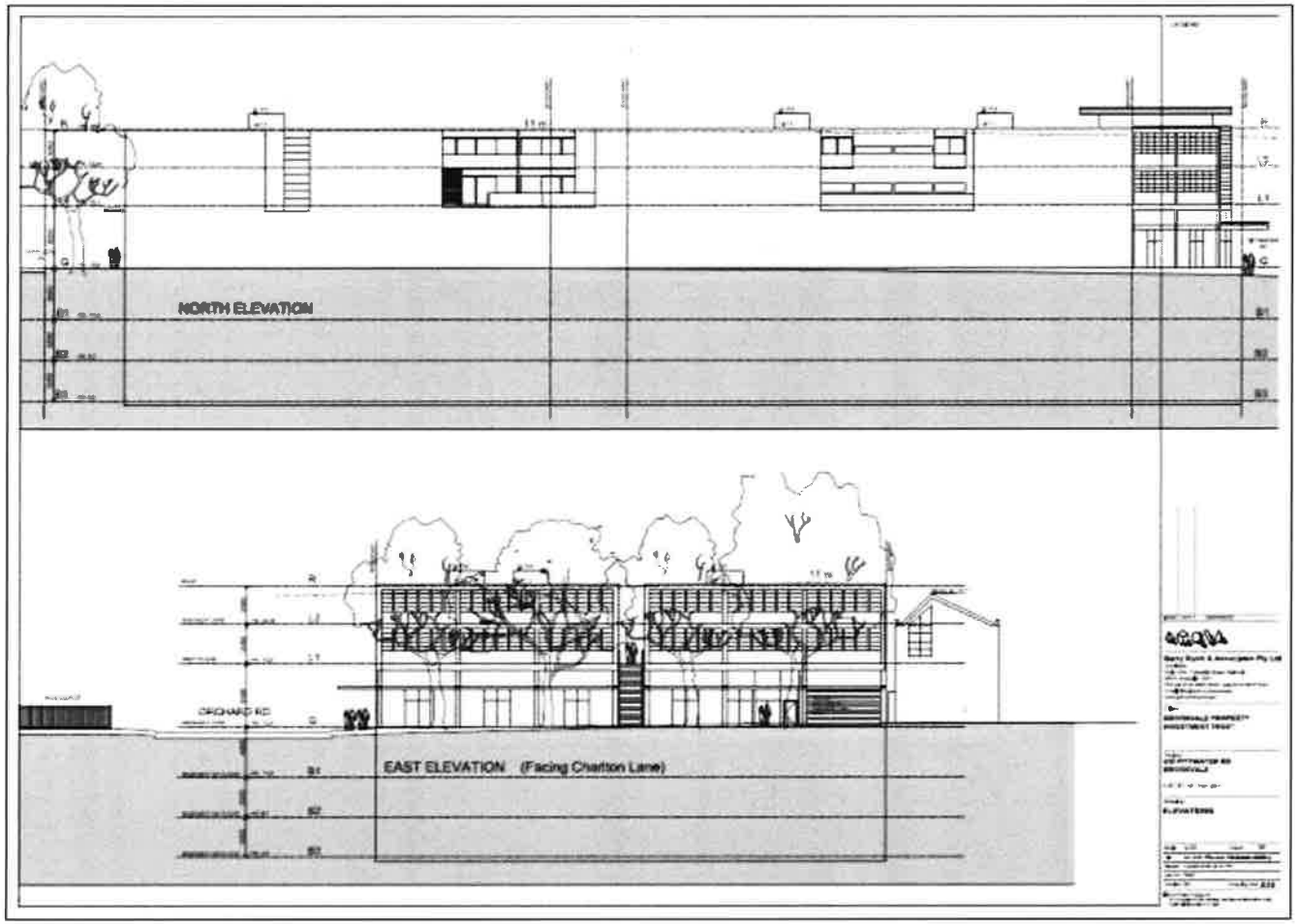


The site is NOT within a MC designated "*Heritage Conservation Area*". It is acknowledged to be near multiple listed "*Heritage Items*". See below.



4.2 The Proposal

The soon to be lodged *Development Application (DA) relative to tree management* is for: *for demolition of existing infrastructure & construction of mixed use development comprising of commercial premises, residential & SOHO unit & basement parking. The proposal also includes self-storage units within basement Level B1.* Fourteen (14) individual *NBC* mostly protected trees are confirmed to be within five (5.00m) metres of the proposed works.



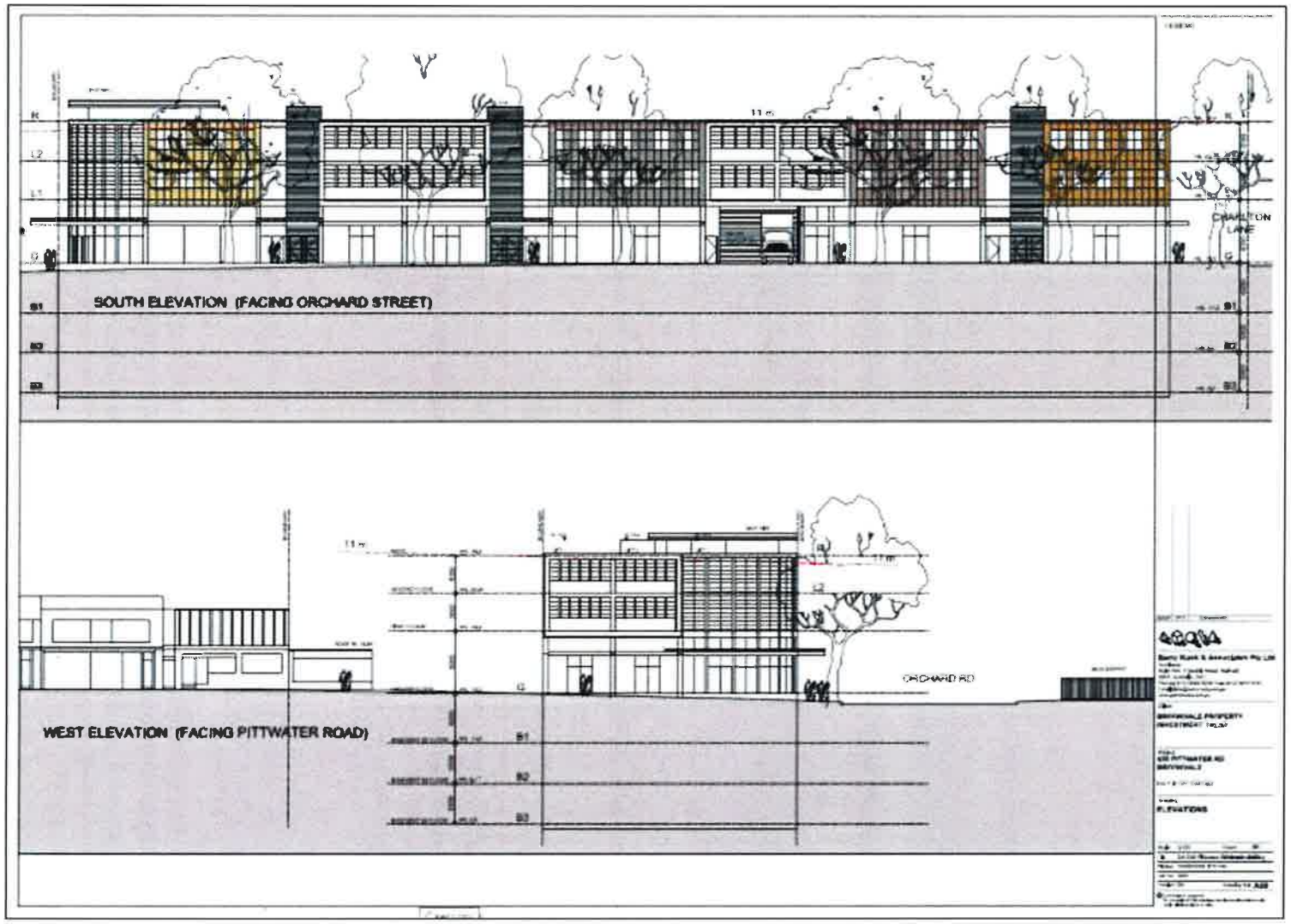


Figure 1: Illustrates proposed Development Elevations.

4.3 Tree Locations & Site Images

Figure 2: Illustrates location of Pittwater Road frontage discussed trees.

Figure 3: Illustrates location & condition of Orchard Road roadside reserve discussed tree (Tree #14).


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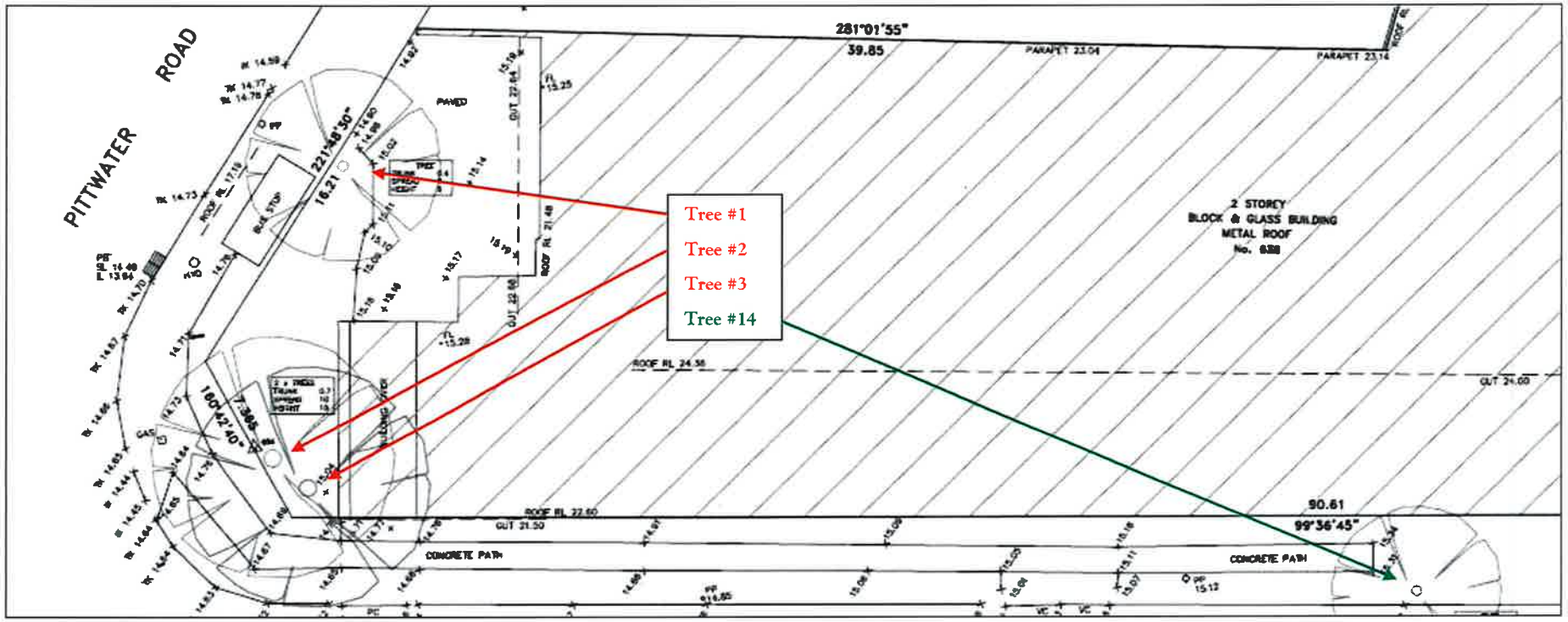
Figure 4: Above & previous 2 pages illustrates location & condition of the discussed trees within the rear of the subject site.


PITTWATER ROAD
281°01'55"
39.85
PARAPET 23.04
PARAPET 23.14
2 STOREY
BLOCK & GLASS BUILDING
METAL ROOF
No. 638
Tree #1
Tree #2
Tree #3
Tree #14
ROOF RL 24.56
CUT 24.00
90.61
99°36'45"
ROOF RL 22.60
CUT 21.50
CONCRETE PATH
CONCRETE PATH
PAVED
16.21
7.305

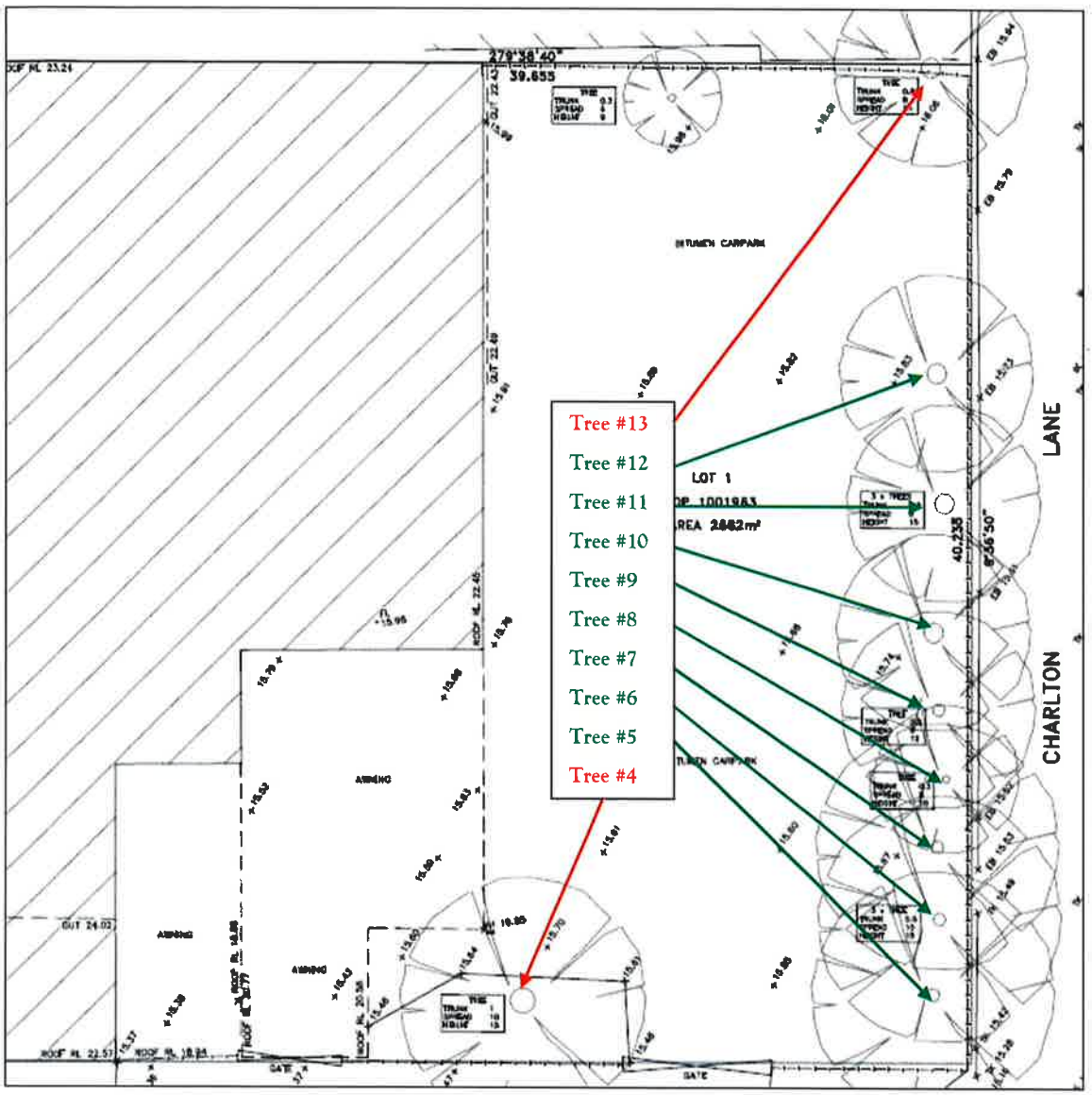


Figure 5: Above & previous page illustrates tree locations as viewed at time of onsite data collection process.

4.4 The Tree – Summary Table

Read this table in conjunction with Appendix A–Common Arboreal Terms

Trees Recommended for removal	Trees Recommended for retention
Exempt species	Trees retainable but of low amenity

	Identification	Height (m)	Crown (m)	DBH (m)	TPZ (m)	SRZ (m)	Age	Health/ Vigour	Retention/ Significance Values	Form/Habit	Comments
1	*Callistemon viminalis* *Weeping Bottlebrush*	<7.50	<6.00	0.27	3.25	2.00	Established	Good & Good	Moderate/ Moderate	Typical	**Remove & Replace: Tree is too close to line of excavation for underground carparking.**
2	*Melaleuca quinquenervia* *Broadleaf Paperbark*	<9.00	<8.00	0.63	7.60	2.90	Established	Good & Good	Moderate/ Moderate	Typical	**Remove & Replace: Tree is too close to line of excavation for underground carparking.**
3	*Melaleuca quinquenervia* *Broadleaf Paperbark*	<9.00	<8.00	0.35	4.20	2.20	Established	Good & Good	Moderate/ Moderate	Typical	**Remove & Replace: Tree is too close to line of excavation for underground carparking.**
4	*Eucalyptus microcorys* *Tallowood Gum*	<22.00	<18.00	1.12	13.45	3.70	Established	Good & Good	High/ High	Typical	**Remove & Replace: Tree is too close to line of excavation for underground carparking.**
5	*Eucalyptus punctata* *Grey Gum*	<18.00	<13.00	0.62	7.50	2.80	Established	Fair & Fair	Moderate/ Moderate	Typical	**Retain, Manage & Protect: Tree is considered easily able to be managed.**
6	*Eucalyptus punctata* *Grey Gum*	<18.00	<9.00	0.52	6.30	2.60	Established	Fair & Fair	Moderate/ Moderate	Typical	**Retain, Manage & Protect: Tree is considered able to be managed.**

	Identification	Height (m)	Crown (m)	DBH (m)	TPZ (m)	SRZ (m)	Age	Health/ Vigour	Retention/ Significance Values	Form/Habit	Comments
7	*Eucalyptus punctata* Grey Gum	<18.00	0.60 Canopies are Linking	0.51	6.25	2.55	Established	Good & Good	High/ High	Typical	**Retain, Manage & Protect: Tree is considered able to be managed.**
8	*Lophostemon confertus* Brush Box	<14.00	<6.50 Canopies are Linking	0.20	2.40	1.70	Established	Good & Good	High/ High	Typical	**Retain, Manage & Protect: Tree is considered able to be managed.**
9	*Lophostemon confertus* Brush Box	<17.00	<13.50 Canopies are Linking	0.60	7.20	2.70	Established	Good & Good	High/ High	Typical	**Retain, Manage & Protect: Tree is considered able to be managed.**
10	*Eucalyptus punctata* Grey Gum	<21.00	<16.00 Canopies are Linking	0.67	8.10	2.90	Established	Good & Good	High/ High	Typical	**Retain, Manage & Protect: Tree is considered able to be managed.**
11	*Lophostemon confertus* Brush Box	<19.00	<14.00 Canopies are Linking	0.60	7.20	2.70	Established	Good & Good	High/ High	Typical	**Retain, Manage & Protect: Tree is considered able to be managed.**
12	*Lophostemon confertus* Brush Box	<15.00	<14.50 Canopies are Linking	0.69	8.30	2.90	Established				**Retain, Manage & Protect: Tree is considered able to be managed.**
13	*Cinnamomum camphora* Camphor Laurel										**Remove & Replace: Exempt from protection tree species. Tree root system will be compromised by driveway ramp excavation.**
14	*Lophostemon confertus* Brush Box	<5.50	<7.00	0.55	6.60	2.60	Established	Fair & Fair	Moderate/ Moderate	Atypical	**Retain, Manage & Protect: Tree is considered able to be managed.**

5 Discussion

The proposal for development includes three (3) basement levels. B3 & B2 are totally devoted to residential & commercial tenant/client parking. B1 includes commercial tenant/client parking plus commercial storage units.

Resident/tenant/client parking is proposed to be accessed via Carlton Lane. The proposed service vehicle access is via Orchard Road.

The discussed trees are confirmed to be located within the subject site & the Orchard Road roadside reserve (Tree #14).

All discussed trees to varying degrees contribute to private & communal '*landscape amenity*'. As such most have been given at least medium retention & significance values.

Trees #1 thru #3 & Tree #4 are all assessed as being required to be replaced as a consequence of proposed excavation for basement levels.

Trees #5 thru #12 are considered to be manageable, although all will be subjected to Tree Protection Zone (from herein TPZ) radial distance breaches as per the definitions within the *Australian Standard (AS49760-2009 Protection of trees on development sites)*.

Trees #5 & #6 display 'symptoms of stress', i.e. dead/dying branches up to large diameter (>50mm Ø).

SEE *CHAPTERS 3, 4 & 5 OF AS4970-2009* FOR DETAILED EXPLANATIO OF THE REQUIREMENTS FOR TREE PROTECTION ON DEVELOPMENT SITES.

The line of excavation proposed for the basement levels/new built form above ground structure will be specified to be isolated by installation of 'temporary metal mesh fencing panels' supported by above ground plastic/concrete footings. The fencing panels are to be instated as far from tree trunk centres as the site/DA determination permits.

'Line of Excavation'; the required excavation must be completed 'manually' to a minimum depth of one (1) meter (or to bedrock). Any 'live woody root' exposed less than fifty millimetres in diameter (<50mm Ø) can be cleanly severed/pruned without the direct input of the sites retained Practicing/Consulting Arborist. (These roots are not defined as being of a 'significant diameter'.) The completed excavation must be documented with supporting photographic evidence confirming that no 'significant diameter live woody roots' have been damaged. With the approval of the appointed Principle Certifying Authority (from herein the PCA) this process can be undertaken by the site manager.

Any 'significant diameter live woody root' greater than fifty millimetres in diameter (>50mm Ø) must be managed by the sites retained Practicing/Consulting Arborist. It is this person's responsibility to create, implement & then document in writing with photographic evidence the strategy adopted for its management. This documentation must also be provided to the appointed PCA.

Tree #13 is confirmed to be exempt by species from NBC 'Tree management Provisions'.

Relative to proposed works Tree #14 is assessed as being easily retained. This tree will also be specified to be isolated from the proposed works by installation of temporary metal mesh fencing, (as per above).

Trees supported to be replaced are specified to be sourced from a grower/supplier able to certify the trees meet the production benchmarks defined within the Australian Standard (AS2303-2015 Tree stock for landscape use). New trees are additionally specified to be professionally planted & then maintained for at least one (1) full coastal Sydney active growing season, i.e. Mid August thru early June).

6 Site Specific "Tree Plan of Management"

- **NBC protected Tree #1 is assessed as being required to be replaced.**
- **NBC protected Tree #2 is assessed as being required to be replaced.**
- **NBC protected Tree #3 is assessed as being required to be replaced.**
- **NBC protected Tree #4 is assessed as being required to be replaced.**
- **NBC Protected Tree #5 is to be Retained, Managed (as part of a group) & Protected. Protection will be in the form of temporary meatal mesh fencing isolating (as a group) this tree. Management of 'live woody tree roots' requires manual excavation to a depth of one (1.00m) along the required line of excavation for establishment of basement levels (x3). As per the previous pages specifications any 'live woody tree root' exposed must be managed by the sites retained Practicing/Consulting Arborist.**
- **NBC Protected Tree #6 is to be Retained, Managed (as part of a group) & Protected. Protection will be in the form of temporary meatal mesh fencing isolating (as a group) this tree. Management of 'live woody tree roots' requires manual excavation to a depth of one (1.00m) along the required line of excavation for establishment of basement levels (x3). As per the previous pages specifications any 'live woody tree root' exposed must be managed by the sites retained Practicing/Consulting Arborist.**
- **NBC Protected Tree #7 is to be Retained, Managed (as part of a group) & Protected. Protection will be in the form of temporary meatal mesh fencing isolating (as a group) this tree.**
- **NBC Protected Tree #8 is to be Retained, Managed (as part of a group) & Protected. Protection will be in the form of temporary meatal mesh fencing isolating (as a group) this tree. Management of 'live woody tree roots' requires manual excavation to a depth of one (1.00m) along the required line of excavation for establishment of basement levels (x3). As per the previous pages specifications any 'live woody tree root' exposed must be managed by the sites retained Practicing/Consulting Arborist.**
- **NBC Protected Tree #9 is to be Retained, Managed (as part of a group) & Protected. Protection will be in the form of temporary meatal mesh fencing isolating (as a group) this tree. Management of 'live woody tree roots' requires manual excavation to a depth of one (1.00m) along the required line of excavation for establishment of basement levels (x3). As**

per the previous pages specifications any 'live woody tree root' exposed must be managed by the sites retained Practicing/Consulting Arborist.

- NBC Protected Tree #10 is to be Retained, Managed (as part of a group) & Protected. Protection will be in the form of temporary meatal mesh fencing isolating (as a group) this tree. Management of 'live woody tree roots' requires manual excavation to a depth of one (1.00m) along the required line of excavation for establishment of basement levels (x3). As per the previous page16 specifications any 'live woody tree root' exposed must be managed by the sites retained Practicing/Consulting Arborist.
- NBC Protected Tree #11 is to be Retained, Managed (as part of a group) & Protected. Protection will be in the form of temporary meatal mesh fencing isolating (as a group) this tree. Management of 'live woody tree roots' requires manual excavation to a depth of one (1.00m) along the required line of excavation for establishment of basement levels (x3). As per the previous page16 specifications any 'live woody tree root' exposed must be managed by the sites retained Practicing/Consulting Arborist.
- NBC Protected Tree #12 is to be Retained, Managed (as part of a group) & Protected. Protection will be in the form of temporary meatal mesh fencing isolating (as a group) this tree. Management of 'live woody tree roots' requires manual excavation to a depth of one (1.00m) along the required line of excavation for establishment of basement levels (x3). As per the previous page16 specifications any 'live woody tree root' exposed must be managed by the sites retained Practicing/Consulting Arborist.
- Tree #13 is exempt from 'NBC Tree Protection Provisions'. This tree is specified to be replaced.
- Tree #14 is to be Retained, Managed & Protected. Protection will be in the form of temporary 'tree trunk guard". See Appendix C.

For Tree #5 thru Tree #12; compliance with the Australian Standard (*AS4970–2009 Protection of trees on development sites)* requires an '***exclusion zone' to be created by installation of 'temporary metal mesh' boundary fencing supported by above ground plastic or concrete feet. This is to be established as close to the calculated line of excavation (approximately 6.00m from boundary fence) for below ground basement levels (x3). The proposed line of excavation required for the below ground basement levels (x3)*** does not breach any individual trees Structural Root Zone (from herein SRZ) radial distance. (Tree #10 & Tree #12 both have the greatest SRZ radial distances of 2.90m.) See page 16 'Line of Excavation' specifications.

Tree #12 has the greatest TPZ radial distance (8.90m), Tree #8 has the smallest TPZ radial distance (2.40m). Tree #7 has the second lowest TPZ radial distance of 6.25m. For Tree #12 this equates to an approximate 14.10% TPZ total surface area breach, i.e. 30.55m^2 of 216.40 m^2. A 14.10% breach is just below the middle of the scale that equates to a 'major encroachment' by AS4970-2009 definitions. The Tree #8 TPZ radial distance is not breached by the proposal. Tree #7 has the next lowest TPZ radial distance breach, it presents with a TPZ radial distance breach of <5.2% (i.e. 4.50m^2 of 113.00m^2).

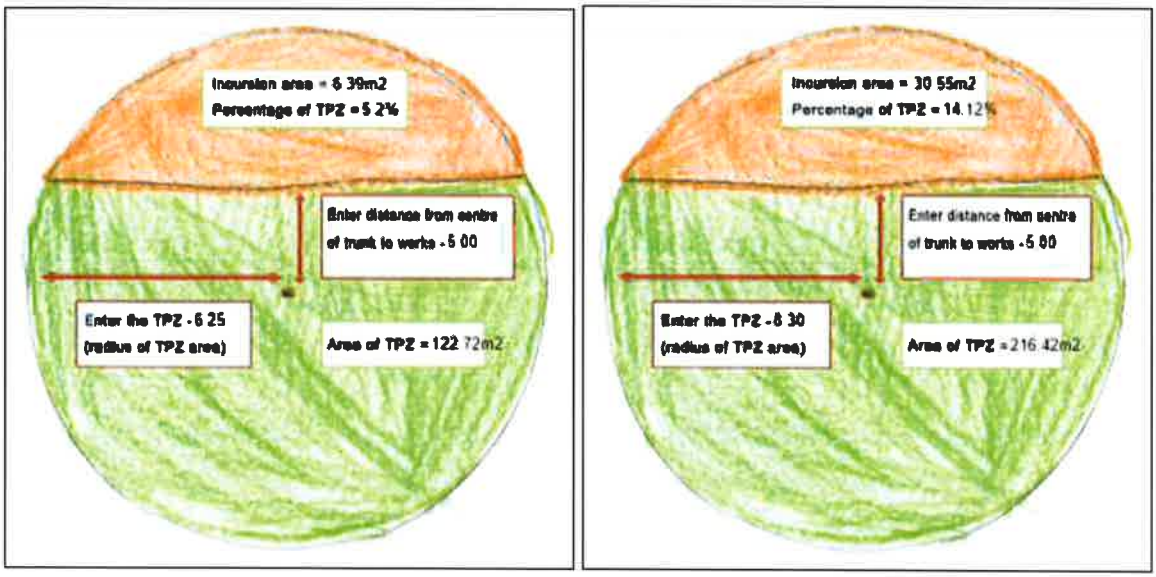


Figure 6: Confirms TPZ smallest breach of 5.2% (left illustration above) for Tree #7) & a 14.1% breach for Tree #12 the greatest breach (above right).

No building materials of any description can legally be stored within the calculated TPZ radial distance. See the document *AS4970–2009, Section 4, clauses 4.1 thru 4.6 & Section 5, clauses 5.1 thru 5.5 (pages 15 thru 23) for exact specifications/definitions required to be addressed.*

Canopy pruning required must be completed in compliance with the Australian Standard (*AS4373–2007 Pruning of amenity trees***). See Section 7 Pruning Classes, sub section 7.1 General & 7.2, Crown maintenance, specifically clauses 7.2.1 General & 7.2.4 Selective pruning. These works must be completed by suitably qualified & experienced tree pruning practitioners.**

Tree removal must be undertaken in compliance with the *WorkCover NSW 'Amenity Tree Industry Code of Practice, 1998'.*

7 Recommendations

- **Relative to the** *DA* **information as presented the** *GMW consultancy* **recommends the** *DA* **be lodged for determination as has been presented in documentation supplied by Anthony Chirillo (the developer consortium) & other consultants.**

If you have any questions relating to this report or implementation of recommendations, please contact Kyle Hill on 0412-221-962.

Yours faithfully,

Kyle A. Hill

[AQF level 5 & AQF level 8 Registered with Arboriculture Australia (Reg #1884) Practicing & Consulting Arborist]

8 Limitations on the use of this report

This report is to be utilised in its entirety only. Any written or verbal submission, report or presentation that includes statements taken from the findings, discussions, conclusions or recommendations made in this report, may only be used where the whole of the original report (or a copy) is referenced in, & directly attached to that submission, report or presentation.

9 Assumptions

Care has been taken to obtain information from reliable resources. All data has been verified insofar as possible; however, Growing My Way Tree Services, can neither guarantee nor be responsible for the accuracy of information provided by others.

Unless stated otherwise:

Information contained in this report covers only the trees that were examined & reflects the condition of the trees at the time of inspection.

The inspection was limited to visual examination of the subject trees without dissection, excavation, probing or coring. There is no warranty or guarantee, expressed or implied, that problems or deficiencies of the subject trees may not arise in the future.

10 Recommended References

Barrell, J. 1993. '*Preplanning Tree Surveys: Safe Useful Life Expectancy (SULE) is the Natural Progression*', Arboricultural Journal 17:1, February 1993, pp.

Barrell, J. 1995, '*Pre-development Tree Assessments*', in Trees & Building Sites, Proceedings of n International Conference Held in the Interest of Developing a Scientific Basis for Managing Trees in Proximity to Buildings, International Society of Arboriculture, Illinois

Dr. G. Watson & Dr. D. Neely, '*Trees & Building Sites*', LSA Illinois USA 1995

Dr. N. Matheny & Dr. J.R. Clark, '*Trees & Development*', ISA Illinois USA 1998

Phillip J. Craul, '*Urban Soil in Landscape Design*', J. Wiley & Sons, New York USA 1992

11 Selected Bibliography

Hitchmough, J.D. 1994. '*Urban Landscape Management*', Inkata Press, Sydney.

Mattheck, C. & Breloar, H. 1994 '*Body Language of Trees*', The Stationery Office, London.

AS 4373:2007, '*Pruning of Amenity Trees*', Standards Australia.

AS 4970:2009, 'Protection of Trees on Development Sites", Standards Australia.

BS 5837:2005, '*Guide for Trees in Relation to Construction*', Standards Board, UK.

Appendix A – Glossary

Glossary of common Arboreal terms

Age: **I** *Immature* refers to a refers to a well-established but juvenile tree

SM *Semi-mature* refers to a tree at growth stages between immaturity & full size

M *Mature* refers to a full sized tree with some capacity for further growth

LM *Late Mature* refers to a full sized tree with little capacity for growth that is not yet about to enter decline

OM *Over-mature* refers to a tree about to enter decline or already declining

LS *Live Stag* refers to a tree in a significant state of decline. This is the last life stage of a tree prior to death

Hth & Vig Health & Vigour

Health refers to the tree's form & growth habit, as modified by its environment (aspect, suppression by other tree, soils) & the state of the scaffold (ie. trunk & major branches), including structural defects such as cavities, crooked trunks or weak trunk/branch junctions. These are not directly connected with health & it is possible for a tree to be healthy but in poor condition/vigour. **Classes are:**

Excellent (E), V. Good (VG), Good (G), Fair (F), Declining (D), Poor (P), Very Poor (VP)

Vigour refers to the tree's growth rate/condition as exhibited by the crown density, leaf colour, presence of epicormic shoots, ability to withstand disease invasion & the degree of dieback. **Classes are:**

Excellent (E), V. Good (VG), Good (G), Fair (F), Declining (D), Poor (P), Very Poor (VP)

Useful Life Expectancy (ULE) refers to any individual tree specimen's potential life

expectancy (viability) based on VTA assessment, three groups are described,

Short = Less than Fifteen years

Medium = Fifteen – Twenty-five years

Long = more than Twenty-five years

Significant diameter roots are defined as those being greater than 0.05m/50mm in diameter.

Diameter at Breast Height (DBH) refers to the tree trunk diameter at breast height (1.4 metres above ground level)

Structural Root Zone (SRZ) refers to a radial offset which relates to tree stability. This zone is presumed to be main location of the tree's structural support roots. It is calculated using the formula *SRZ radius= $(D \times 50)^{0.42} \times 0.64$.*

Primary Root Zone (PRZ) refers to a radial offset of ten (10) times the trunk DBH measured from the centre of the trunk. This zone often contains a significant amount of (but by no means all of a tree's) fine, non-woody roots required for uptake of nutrients, oxygen & water.

Tree Protection Zone (TPZ) is ideally a "No Go Zone" surrounding a tree to aid in its ability to cope with disturbances associated with construction works. **TPZ = DBH x 12.** Tree protection involves minimising root damage that is caused by activities such as construction. Tree protection also reduces the chance of a tree's decline in health or death & the possibly damage to structural stability of the tree from root damage.

To limit damage to the tree, protection within a specified distance of the tree's trunk must be maintained throughout the proposed development works. No excavation, stockpiling of building materials or the use of machinery is permitted within the TPZ.

A TPZ is required for each tree or group of trees within five metres (unless otherwise specified) of building envelopes.

Stem/bark inclusion refers to a genetic fault in the tree's structure. This fault is located at the point where the stems/branches meet. In the case of an inclusion this point of attachment is potentially weak due to bark obstructing healthy tissue from joining together to strengthen the joint.

Decay refers to the break down tissues within the tree. There are numerous types of decay that affect different types of tissues, spread at different rates & have different affect on both the tree's health & structural integrity.

Point of Attachment refers to the point at which a stem/branch etc join.

Dead wood refers to any whole limb that no longer contains living tissues (eg live leaves &/or bark). Some dead wood is common in a number of tree species.

Die back refers to the death of growth tips/shoots & partial limbs. Die back is often an indicator of stress & tree health.

One dimensional crown refers to branching habits & leaves that extend/grow in One direction only. There are many causes for this growth habit such as competition & pruning.

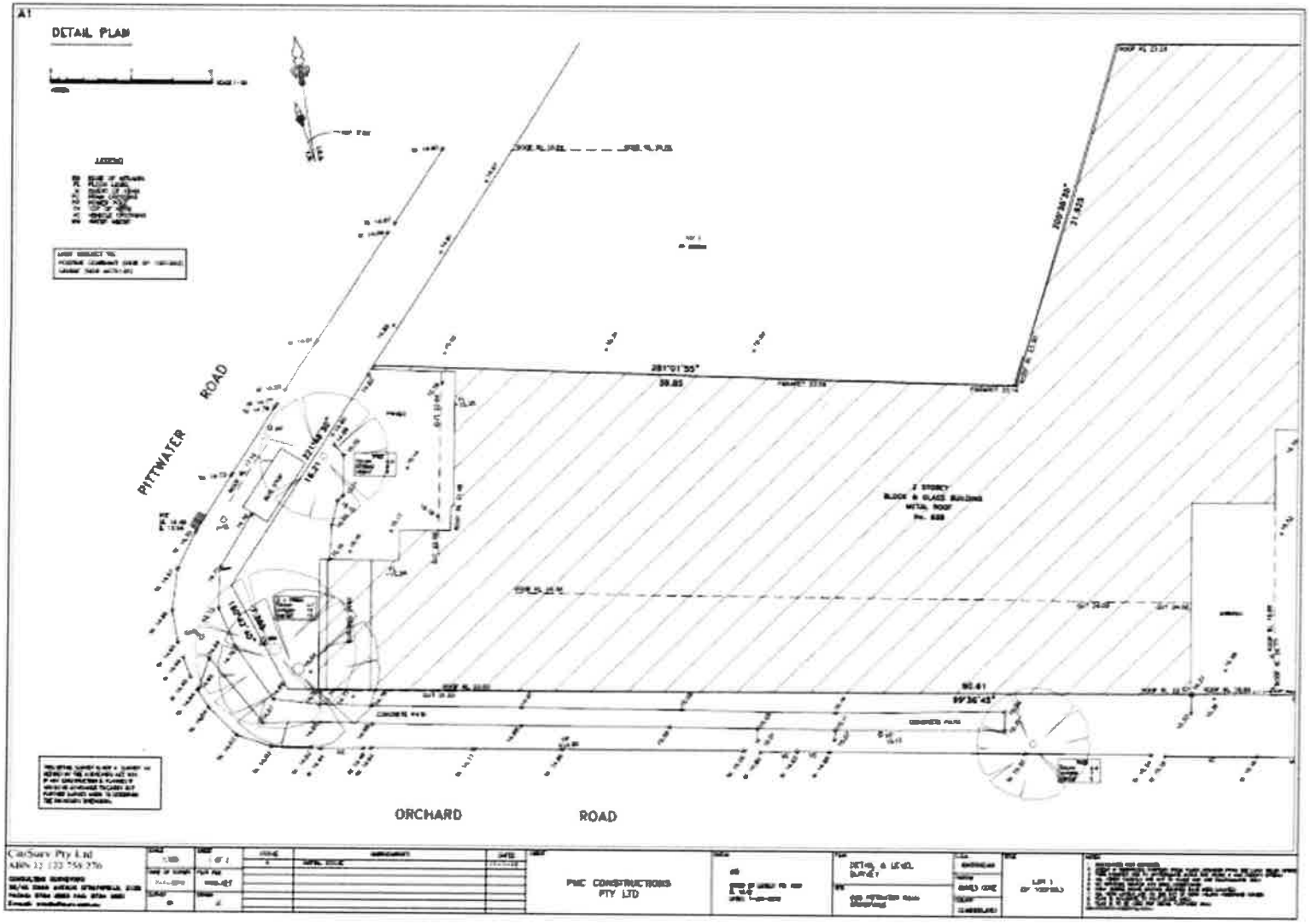
Crown Foliage Density of Potential (CFDP) refers to the density of a tree's crown in relation to the expected density of a healthy specimen of the same species. CFDP is measured as a percentage.

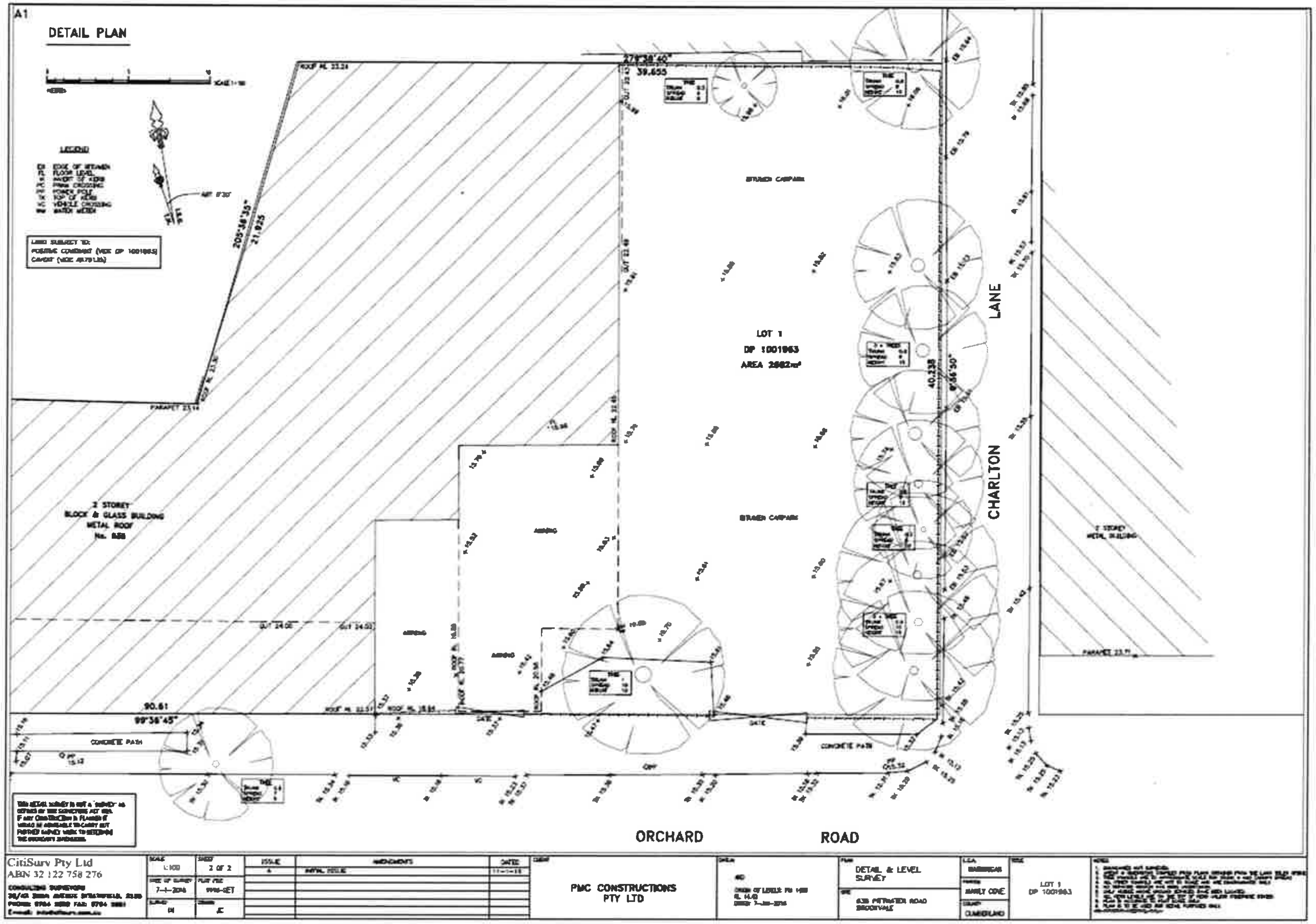
Epicormic growth/shoots refers to growth/shoots that are/have sprouted from axillary buds within the bark. Epicormic growth/shoots are a survival mechanism that often indicates the presence of a current or past stress even such as fire, pruning, drought etc.

Over Head Powerlines (OHP) Over head electricity wiring.

LVOHP	Low Voltage Over head Powerlines
HVOHP	High Voltage Over head Powerlines
ABC	Aerial Bundled Cable

Appendix B – Site Survey




A1
DETAIL PLAN
LEGEND
2 STOREY
BLOCK & GLASS BUILDING
METAL ROOF
No. 658
LOT 1
DP 1001963
AREA 2982m²
279°38'40"
39.655
205°38'35"
21.925
90.61
99°38'45"
40.238
CONCRETE PATH
LANE
CHARLTON
ORCHARD
ROAD
CitiSurv Pty Ltd
ABN 32 122 758 276
PMC CONSTRUCTIONS
PTY LTD
DETAIL & LEVEL
SURVEY
LOT 1
DP 1001963

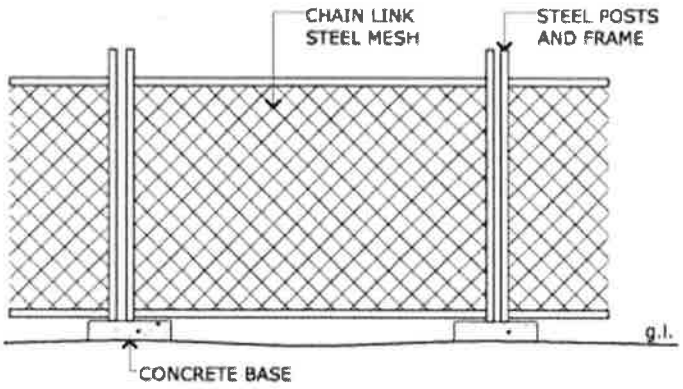
Appendix C – Tree Protection/Management Prior to & During Construction

The installation of Tree Protection Zone (TPZ) fencing is to be carried out prior to commencement of all works. The most suitable fencing material is 1.8m tall chain link mesh with 50mm metal pole supports, see **detail 1: tree protection fencing**.

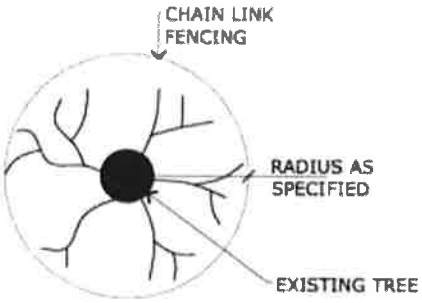
A mulch layer of composted leaf & woodchip to a depth of 75mm is required within the TPZ to aid in retention of soil moisture & to protect soil from contaminants. Water is to be applied by hand held or soaker/leaky hose within TPZ as required & in Accordance with Stage 3 Water Restrictions. Watering is to be carried out by either an Arborist or is to form part of the Builder's/Contractor's contract, with recommended monthly checks by an Arborist.

There is to be no stock piling of building material (including waste), machinery or any other item within TPZ of any retained tree. Access to personnel & machinery, & storage of fuel, chemicals, cement or site sheds is prohibited

Regular monitoring of protected trees during development works for unforeseen changes or decline, will aid in the success & longevity of the retained trees.



ELEVATION



PLAN