HYECORP
PROPERTY GROUP

3TH November 2020

Christopher Nguyen
Development Assessment Officer
PO Box 57
Chatswood NSW 2057

CC: Ian Arnott, Ritu Shankar, Clare Woods

Dear Christopher,

RE: DA-2019/247: 26 CRABBES AVENUE AND 243-255 PENSHURST STREET. NORTH WILLOUGHBY, NSW (CLUB WILLOUGHBY)

This letter has been prepared to respond to the record of deferral letter issued by the Sydney North Planning Panel on 3rd November, 2020 specifically in the response to the following request by the panel:

"The Panel requires the applicant to provide details of the method, location, including above and below ground, and the likely impact of future drainage works to service the development. This information must be provided to Council within one month to allow an assessment in a timely manner and referral back to the panel"

To conclusively respond to this request, the following have been attached to this letter:

- **Stormwater options and cover letter prepared by IDC,**
- **Construction Methodology for Horizontal drilling, prepared by Bortec,**
- **Construction Methodology Review, prepared by NSPC,**
- **Addendum Arboricultural Impact Assessment Report (specifically the new section 7) prepared by Glenyss Laws,**
- **Environmental Planning Analysis prepared by Cityplan**

The attached Annexures outline both the method and likely impacts for three drainage work options.

Under all the three options, a drainage line would need to be constructed on private land that does not form part of the development site. There is no proposal for the development consent to for this development application to authorise the use of (or any works on) the adjacent private land. The works, and use of that land, would be the subject of a separate development application made (either once an agreement for an easement is place, or a Court-ordered easement is imposed). The details of the stormwater works options have been presented in the documentation solely so that the environmental impact of the development — including works that will inevitability be required (albeit to be approved under a separate development consent) — can be assessed by the consent authority on the determination of the current development application.

The key point to note is that the method for the works proposed is horizontal drilling. This is more costly alternative to the traditional method of drainage works, however it is our preferred method for works for this project as it reduces the potential for adverse impact to zero.

Horizontal drilling allows for the works to be carried out without any works above ground to any of the potential properties in the various options.

The accompanying annexures by the project consultant and works team as well as the project arborist confirm the methods and (lack of) likely impacts from the works.

Neighbour Discussions: Easement Acquisition

In addition to the above, Hyecorp has been in several discussions with some home owners on Summerville Crescent and Horsley Avenue regarding the granting of easements.

The Panel and Council can have confidence that an agreement with a neighbouring property owner is achievable. In any event, if agreement is not reached, there is an opportunity to obtain an easement by Court order. Nonetheless, we consider it unlikely that this would ultimately be necessary.

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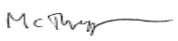
Concluding Comments:

It is believed that the documents and summary submitted above sufficiently addresses the requests by the SNPP and enables Council to prepare an addendum assessment to the SNPP. It is noted that the stormwater options submitted show that there are three discharge options for the site, which can be further detailed in a subsequent development application for those works and be the subject of a registered easement down the track. We envisage this could be addressed via the proposed deferred commencement. If you require any further clarification of the above matters, please do not hesitate to contact the undersigned. We welcome the opportunity to discuss the project at any time.

Yours faithfully.



Mark Thompson
Planning and Development Manager
Ph: 0499007374 (8045 8683)

Attachments and Relevance:

- Attachment A: Stormwater Options and Cover Letter prepared by IDC
- Attachment B: Construction Methodology for Horizontal Drilling prepared by Bortec
- Attachment C: Construction Methodology Review, prepared by NSPC
- Attachment D: Addendum Arboricultural Impact Assessment Report
- Attachment E: Environmental Planning Analysis, prepared by City Plan

Hyecorp Property Group
Heritage House
Suite 1, 256 Victoria Ave
Chatswood NSW 2067

Thursday, 3 December 2020

DA-2019/247 Easement Options Letter

Infrastructure & Development Consulting (IDC) have undertaken an assessment of three (3) different options to drain the proposed Club Willoughby development to the existing downstream public drainage system in accordance with Council requirements. These options are summarised below:

Option 1 – construct a new 675mm dia pipe and associated 2.5m wide easement along the same alignment as the existing 375mm dia pipe that currently drains the site through the downstream private property No. 15 Horsley Avenue. We note that this alignment is currently documented on the DA Plans supported by Council.

In accordance with Council's requirements, the 675mm dia pipe has been sized to allow for the entire post-developed Club Willoughby site to drain through undetained for the 1 in 100-year storm event. Therefore, even though the permitted site discharge from the OSD is approximately only 233L/s, this pipe has been sized for 1,010L/s (refer to the separate Water Management Plan prepared by IDC and submitted with the DA for reference). As such, the developments impact on the existing buildings within the downstream properties with respect to overland runoff will be minimal as site flows will be contained within the below ground network.

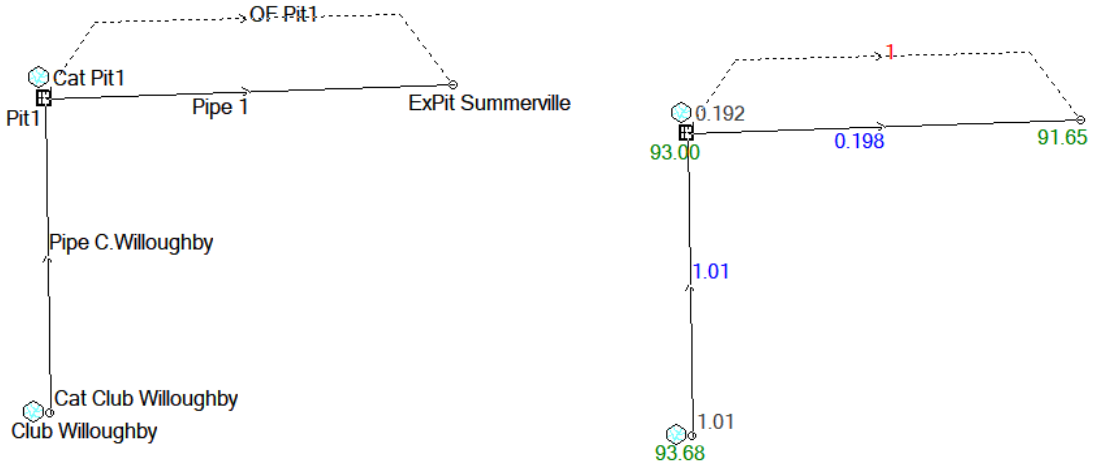
From here, the pipe will drain through the downstream property before connecting to the existing drainage system in Horsley Avenue which is 375mm dia. As such, a new surcharge pit is to be constructed in the street, with surcharge flows contained to the public road reserve.

Option 2 – maintain the same flow regime as defined above for Option 1 but adjust the location of the new 675dia pipe and associated 2.5m wide easement to drain along the western boundary of No. 15 Horsley Avenue within the existing side setback. We note that this option maintains the same hydraulic performance outcomes as Option 1 (which was previously assessed as part of the DA submission to Council) and is the preferred option; and

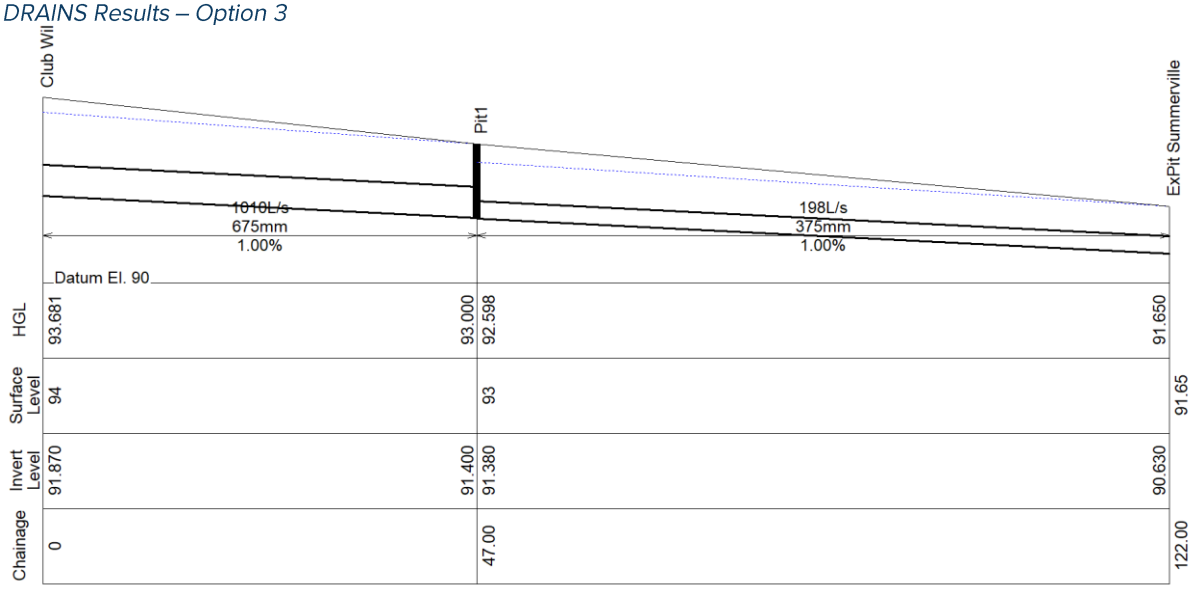
Option 3 – divert flows to drain to the north-east to Summerville Crescent via a new 675mm dia pipe / 2.5m wide easement along the existing side setback of No. 6 Summerville Crescent. From here, flows are to drain to a new surcharge pit to be constructed in the street before continuing downstream to the existing pit and pipe network at the intersection of Summerville Crescent / Horsley Avenue via a new 375mm dia connection.

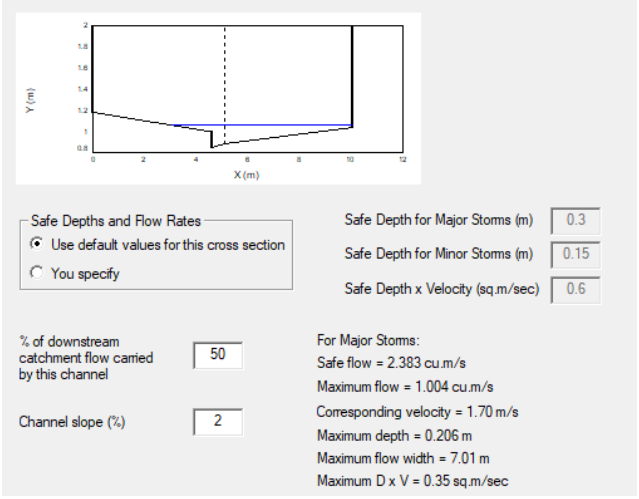
In order to assess the hydraulic performance of Option 3, a separate DRAINS model was created for this scenario, with results summarised below.

Figure 1 – Option 3 DRAINS Model



DRAINS Results – Option 3





Results of the DRAINS assessment for Option 3 indicate that Council's statutory requirements for hydraulic performance have been achieved as the proposed 675mm dia pipe sufficiently conveys 1 in 100 year undetained flows from the site to Summerville Crescent without surcharge in private property.

Summary

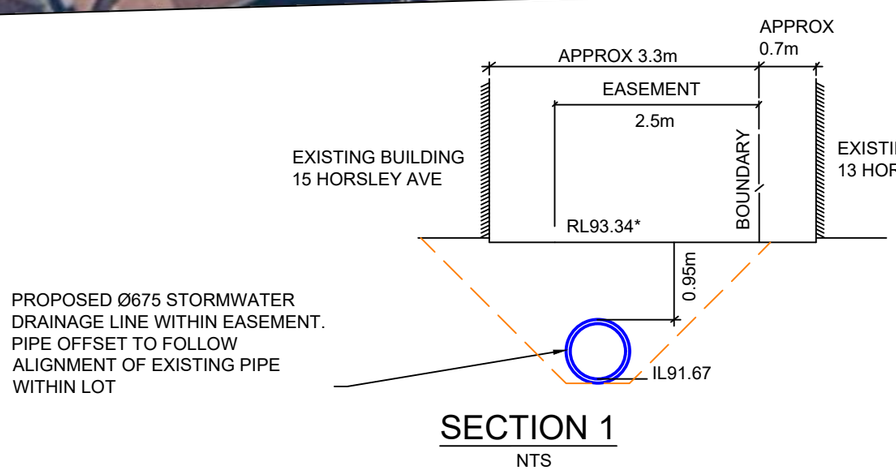
We note that there are several technical and environmentally viable options available to drain the proposed Club Willoughby development to the existing downstream public drainage network.

We confirm that Options 1, 2 & 3 each provide an acceptable drainage solution for the development site with no material impacts in terms of drainage management and achieve Council's statutory requirements for hydraulic performance, without surcharge in private property.

We understand that the selection of the final Option for the location of the discharge pipe and associated easement will be subject to future landowner negotiations.

Yours Sincerely,

infrastructure & development consulting
Chris Avis
Director



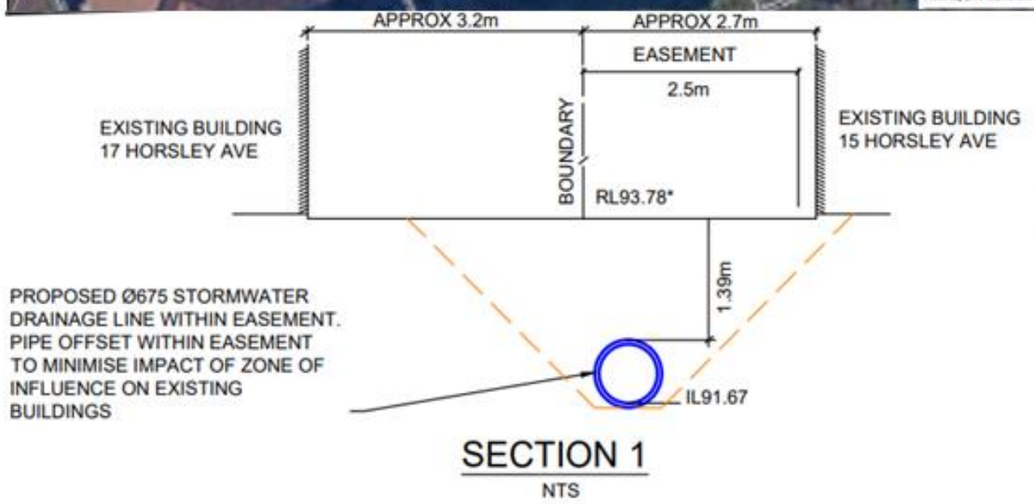
SECTION 1
NTS

PROPOSED 2.5m WIDE DRAINAGE EASEMENT

SW PROPOSED STORMWATER PIPE

APPROX EXTENT OF ZONE OF INFLUENCE OF PROPOSED STORMWATER PIPE

*NOTE:
EXISTING SURFACE LEVELS HAVE BEEN ESTIMATED FROM AERIAL LIDAR DATA AND WILL NEED TO BE CONFIRMED VIA ADDITIONAL DETAILED SITE SURVEY



SECTION 1
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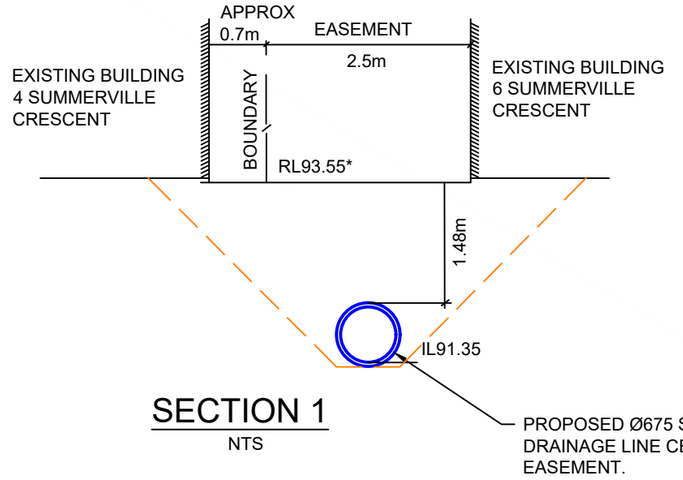

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PROPOSED 2.5m WIDE DRAINAGE EASEMENT

SW — PROPOSED STORMWATER PIPE

APPROX EXTENT OF ZONE OF INFLUENCE OF PROPOSED STORMWATER PIPE

4 Kibble Place Narellan. NSW
02 4653 1132
ABN: 86 619 636 841

Date: 24/11/2020
To: Development Assessment Officer
Willoughby Council
PO Box 57
Chatswood NSW 2057

Hi Council,

This letter has been prepared to explain the construction methodology for subsurface boring, linked to stormwater easement options presented for DA2019/247

Methodology:

I have prepared and attached a methodology. We suggest for this stormwater line, auger boring an 800mm steel sleeve for the installation of a stormwater main. It is our recommendation that you insert a 700mm GRP gravity pipe with an OD of 760mm into the 800mm steel sleeve. This will give added security of having minimal settlement around the GRP pipe. It would also be suggested that the annulus between the soil and steel sleeve and the steel sleeve and the GRP pipe be grout filled with a flowable fill to avoid and possible subsidence.

Suitability of boring near or under structures:

Bortec Laser Bore have completed many bores under or near structures and base the suitability to bore on the geotechnical reports supplied. In the case of the options put forward the supplied geotechnical reports indicate shaley/clay or clayey/shale soil. If the reports are a true indication of the soil structure for the proposed options put forward, then the risk of subsidence or structural damage would be almost non-existent.
For it to be almost non-existent the client would need to confirm the following:

1) No footings or concrete structures are on alignment of the bore.
2) No existing services are in the way of the bore.
3) No uncontrolled fill has been placed in the alignment of the bore (the geotechnical report is constant with the easement soil).
4) A full dilapidation report has been completed on the properties either side of the easement.
5) All other items mentioned in the methodology are enforced by either the client or Bortec Laser Bore Pty Ltd.

Photos:

Cutter head and horizontal steering head

Machine set up on rails

Steel sleeve entering ground

Programme:

Establishment -1 day
Bore 800mm in OTR - 18m per day
Removal augers – 1 day
Insert GRP pipe – 1 day
Demob – 1 day

Conclusion:

If council require any other information regarding auger boring and the methodology, I suggest organising a meeting so as Bortec can do a presentation on the horizontal boring process.

Regards,

Keiran Fetterplace
Director
0407657065

BORTEC
Laser Bore Pty Ltd

1. Introduction

This Technical Specification applies to the installation of pipelines, public utilities and plant underground structures using thrust boring or auger boring. Thrust or auger boring is typically performed by placing an auger equipped with a cutting head, with a steel pipe as a casing to facilitate trenchless excavation. The auger is then attached to the rotation shaft of a thrust boring machine to advance excavation and the steel pipe is jacked progressively.

2. Definition of terms

Annular space	The outer annular space between the thrust bore hole and the casing pipe installed. The inner annular space is the space between the casing pipe and the carrier pipe.
Backfill	Material placed in confined excavations for culverts, structures, conduits, pits, etc. or, in some instances, to fill excavations of Unsuitable Material.
Carrier Pipe	The inner pipe forming part of the permanent pipeline, installed within the casing pipe.
Casing / sleeve Pipe	Pipe installed by jacking behind the auger boring machine.
Confined excavation	An excavation for a culvert, pipe or conduit trench or for a structure, which requires the use of an excavator or similar machine fitted with a bucket.
Contingency plan	A plan to mitigate the risk of an activity. The plan usually allows for backup procedures, emergency response, and post-disaster recovery.
Entry & exit seal	Seals which are formed around the boring entry and exit pits / shafts to prevent pressurised ground and water rushing into the pits / shafts.
Launch pit or shaft	An excavation at the commencement point of a thrust section of pipeline, in which the thrusting structure and other equipment is installed and from which the thrusting operations are carried out.
Lift (shaft / pit)	The incremental construction height completed as the shaft / pit progresses downward.
Reception / retrieval pit / shaft	An excavation that is located at the end of a thrust boring section of pipeline
Sand	Natural or manufactured material with 100% passing 6.7 mm AS sieve and a low plasticity index.
Select backfill material	Backfill comprising gravel and/or loam materials with specified properties used for backfilling to trenches and structures.
Spoil	Material removed in the course of an excavation or drilling process. Material surplus to the Contract requirements which shall be disposed of on or off the Site.
Thrust/Auger boring	Thrust/Auger boring is a jack and bore drilling method
Thrust wall	A wall constructed normal to the proposed line of thrust designed to dissipate the reaction to the thrust into the surrounding ground.
Top soil	The top layer of existing soil on the Site which supports vegetation
Unsuitable material	All materials identified as unsuitable for use as foundation for earthworks or structures and / or for use as fill or backfill materials

3. Thrust boring and auger boring – Method statement

When carrying out trenchless excavation using thrust / auger boring method the contractor should undertake all preparatory measures including:

- Setting out thrust and receiving pits as per approved Standard Drawings ensuring that the location is free of obstruction and services. These pits are required on either side of the work area to accommodate the steel pipe and machinery used in the procedure.
- Appropriate barricades including warning signs are established and in place, to ensure the safety of the operating traffic, pedestrians and observers are taken in to consideration prior to commencement of excavation.
- Launch and receiving pits shall be excavated as per relevant approved Standard Drawings. Measures shall be in place to ensure that trench is free of water all times during the operations. Further to prevent potential flooding of the trench following cloudburst suitable dewatering pump shall always be ready and on standby, during the operations, if found necessary.
- Launch pit shall be levelled and compacted to provide a suitable working platform for the guiding tracks for proper alignment and level fixing at the required depth. A suitable concrete thrust blocks shall be firmly fixed in the excavated trench.
- Thrust boring machine shall be installed in launch pit. A suitable cradle guide system shall be installed to ensure correct line and level. The Guidance System shall be of a proven type and shall be setup and operated by personnel trained and experienced with this system.
- Prior to work commencement, level control points shall be established to keep level monitoring during Thrust/auger bore operation.
- During and at end of excavation (auger retracted from the driving pit side) all spoil shall be removed from pit by suitable means without compromising the pit stability.
- The carrier pipe or conduits shall be installed through the casing by suitable means. Where the carrier pipe must be installed to a certain grade suitable strapping to the pipe to help maintain grade shall be considered
- To backfill, any remaining annular space suitable and approved grout shall be used
- Once the installed pipe work is connected to existing or new infrastructure, both the entry and exit can be backfilled with approved fill materials, compacted and reinstated as per the contractor or regulatory requirements.

4. Project preliminaries

4.1 Approvals

No work is to begin on site preparation or related to thrust / auger boring until all relevant permits and approvals have been gained and signed off by the relevant authority

4.2 Design requirements

Prior to any approval being granted or any work commences, the following aspects (as a minimum) of the design shall be submitted to the Regulator

- All temporary works associated with the construction, including but not limited to the pit / shaft support (including access ladders and pipe fixings), crane pads and access roads or laydown areas.
- Thrust / auger boring alignment
- Thrust / auger boring pits to accommodate all temporary and permanent works such as:
  a) support systems to withstand lateral earth pressures, ground loads, equipment loads, applicable traffic and construction loads, and other surcharge loads, and
  b) unrelieved hydrostatic pressures, bottom heave.
- Thrust support frame and shaft must be designed to withstand the maximum forces expected for the thrust system while ensuring that these forces are within the manufacturer's allowable jacking forces and deflection tolerances for the jacking pipe.
- Execution of the thrust / auger boring machine and processes.
- Confirmation that the cutter head will be no more than 600mm ahead of the casing pipe at any time of the boring operation
- Cutter head to be used and the associated cutter tools.
- Use of the guidance and steering system to achieve the design alignment both horizontally and vertically.
- Ensure the safe operation and use of plant, equipment and materials handling under all expected loadings such as ground pressure, superimposed loads and thrust forces
- Standard Drawings clearly identifying the impacts on natural watercourses, table drains, drainage structures and overland flow paths.
- Details of any geotechnical data relied upon in the design. As a minimum
- Take account of all potential impacts on all existing infrastructure, utilities, trees and underground features, including but not limited to: impacts from ground movement, clearance to features, settlement / heave and any changes in the groundwater table resulting from the works, either temporarily during construction or permanently as a result of the construction

4.3 Thrust and receiving pit

The sizes of all excavations shall conform to the following requirements:

- all pits shall be of the minimum possible size commensurate with safe working practices
- every face of any excavation that exceeds a depth of 1.0 m shall be supported or contained by appropriately designed shoring
- the shoring of the excavation shall be braced in accordance with the appropriate safety standards as the excavation progresses, and
- all necessary measures must be taken to ensure that excavations are left in a safe condition at the end of each workday. This should include the erection of suitable hard barricades, warning signs and hazard lights.

4.4 Casing / Sleeve Pipe

The design calculations showing the anticipated installation forces to be imposed on the pipe during thrust / auger boring should be provided. These calculations are required to consider the following but not limited to:

- jacking loads
- frictional forces
- ground conditions
- groundwater
- angular deflection
- any fluids used in the installation process.

The Contractor shall take all precautionary measures to avoid potential damage to the sleeve pipe during the installation process. In particular, the Contractor shall ensure that the magnitude of loadings

4.5 Carrier pipe

The details, including but not limited to, should be provided regarding the transportation, handling, storage, installation and testing of the carrier pipe.

4.6 Construction procedures

The construction procedure shall be submitted to the Administrator for approval at least four weeks prior to any planned works. The construction procedures must document at least the following critical aspects of the works:

- site establishment
- construction of access road and working platform if required
- pit construction and confined space entry
- selection of thrust / auger boring equipment – plant suitability and maintenance plan
- jacking wall / jacking support
- operation of thrust / auger boring and removal of spoil from pit
- welding / joining of pipes (enveloper and / or carrier pipe)
- monitoring of ground deformation and ground loss – settlement monitoring plan
- monitoring of as built alignment (survey) and thrust pipe deflection
- monitoring of thrust load
- risk and contingency management plan
- annulus grouting procedures
- the demobilisation of the equipment

4.7 Risk assessment and contingency plans

A comprehensive risk assessment (SEWMS) addressing the entire scope of the proposed work and contingency plan to deal with identified risks shall be provided for Approval. As a minimum, the Contractor is to have defined plans complete with equipment and materials on standby:

- Pit collapse
- Pit flooding
- Major thrust / auger boring mechanical failure
- Settlement or heave scenarios
- Serious safety or environment incidents
- High water inflows at the face of thrust boring
- Higher jacking forces than expected.

5. Project Execution / Construction

5.1 General

A site supervisor who has extensive knowledge with the use of thrust / auger boring equipment and procedures must always be present at the work site while boring and installation is underway.

5.2 Utility location

Prior to commencing any excavation or thrust / auger, dial-before-you-dig (DBYD) searches shall be carried out to locate any underground utilities (i.e. gas, sewer, water, fuel, electrical, etc.,) in the work area. Once the utilities have been located the Contractor shall physically identify the exact location of the utilities by vacuum or hand excavation, when possible, in order to determine the actual location and path of any underground utilities which might be within thrust / auger boring path. Contractor shall not commence excavation or boring operations until the location of all underground utilities within the work area have been verified and the verification details to be submitted to the Regulator.

5.3 Dilapidation reports

The Principal Contractor is responsible for all pre-construction and post-construction property assessments. These assessments shall be a means of determining whether, and to what extent, damage has resulted from the Contractor's operations during the Works. Moreover, damaged identified shall be made good at the Contractor's expense. As a minimum, the dilapidation reports shall capture:

- all work sites and any surrounding area likely to be impacted by the construction activities
- a minimum distance of three times the depth of any shaft measured radially form its perimeter
- a minimum distance of two times the depth to invert level each side of the centreline of any thrust / auger boring alignment
- any area within the settlement trough or zone of influence as defined by the Contractors prediction of ground settlement

- the report must capture the condition of all aspects of the natural and built environment within the nominated areas, including but not limited to inside buildings, public utilities and plant, roadways and landscaping.

5.4 Overcut Allowance

The external diameter of the thrust / auger bore shall be designed to produce minimum overcut and the necessary clearance between the outside of the casing pipe and excavated ground. The overcut shall not exceed 50 mm or more than 2% of the pipe OD (whichever is smaller). The Contractor shall ensure the leading edge of the casing pipe is protected when connected to the thrust / auger boring machine.

5.5 Grouting

If outer annulus grouting is deemed necessary, then grout used shall obtain a minimum strength of 1MPa at 48 hrs. Previous performance of the grout mix design shall be demonstrated before use. The outer annulus grouting is to be pumped until one of the following conditions is met:

- the installed grout volume has equalled the theoretical annulus volume between grout ports, and
- the installed grout pressure exceeds the theoretical hydrostatic ground pressure plus 0.5 bar

The space between the casing pipe and carrier pipe shall be completely filled with a cementitious grout unless otherwise approved by the Regulator. Approval to not grout this space will only be approved if all of the following conditions are met:

- the casing pipe is designed to provide permanent ground support for entire design life
- the casing pipe has a grade of at least 1:200 to facilitate natural draining of any water
- the casing pipe does not alter the existing flow path of ground water
- the casing pipe is either suitably sealed at each end to prevent unauthorised access or is fill with sand
- failure of the carrier pipe will not cause any damage to the roadway or adjacent embankment.

NORTH SHORE PROPERTY CONSTRUCTION

ABN 85 146 011 903

Heritage House, Suite 1, 256 Victoria Ave,
Chatswood NSW 2067

PO BOX 779
Artarmon NSW 1570

Phone: +61 2 9967 9910
Fax: +61 2 9967 9930
Email: info@nspconstruction.com.au
Web: www.nspconstruction.com.au

Wednesday, 25 November 2020

Hyecorp Property Group
256 Victoria Ave
Chatswood NSW 2067

Dear Stephen,

RE: Installation of stormwater pipes within the easement
Ppty: 26 Crabbes Avenue, Willoughby

Thank you for engaging North Shore Property Construction (NSPC) to conduct a study to investigate the feasibility of constructing a 675mm stormwater line through 15 Horsley Avenue (See Option 1 in Figure 1.1). This stormwater line will connect the development site - 26 Crabbes Avenue, Willoughby - to the Council storm water system on Horsley Avenue. NSPC understands that Hyecorp Property Group is pursuing a solution that avoids any disturbance to the property located at 15 Horsley Avenue and other adjacent houses. In our opinion this is readily achievable for the subject site without the need for any trenching or demolition by means of Horizontal Auger Boring (See Figure 1.3 for more information). This option will also have minimum to no impact on vegetation or trees (See Figure 1.4 for more information). We do note that this method is considerably more expensive as compared to a conventional stormwater easement, and should only be considered if alternatives pipe routes (where surface trenching is permissible) are exhausted.

A Preliminary desktop study has indicated that the site is underlain by a uniform and continuous clay layer which is suitable for drilling and a clear unimpeded path is available for the stormwater line to cross underneath 15 Horsley Avenue. A detailed survey and ground scanning shall be conducted prior to any works, to verify that the path for the drainage pipe will be clear of any other underground services, structures or foundations. The cutter head will be laser guided along a predetermined surveyed path to ensure precise gradient and positioning is maintained. The process will require temporary excavation at the pipe entry at the Eastern corner of 26 Crabbes Avenue and exit point on the Council road reserve outside the Eastern corner of 15 Horsley Avenue. At the time of boring, the sleeve will be lined with a steel casing to maintain its integrity until such time that the PVC storm water pipes can be pulled through for their final connection.

The technology and methods NSPC proposes have been routinely carried out in similar scenarios and are proven and safe. The method outlined here can also be implemented on other neighbouring properties depending on the preferred available routing option (See Figure 1.2 Option 2 and Option 3). NSPC believes the works could be completed in around 5 working days, including establishment, and will pose minimal impact or disruption to the property at 15 Horsley Avenue or any properties described in the alternative design options (Fig 1.2)

Kind Regards,

Gleb Zinger BEng(Civil)
Design Manager
Email: gleb@nspconstruction.com.au
Mob: +61 432 124 591

FIGURE 1.1 – SATELLITE OVERLAY

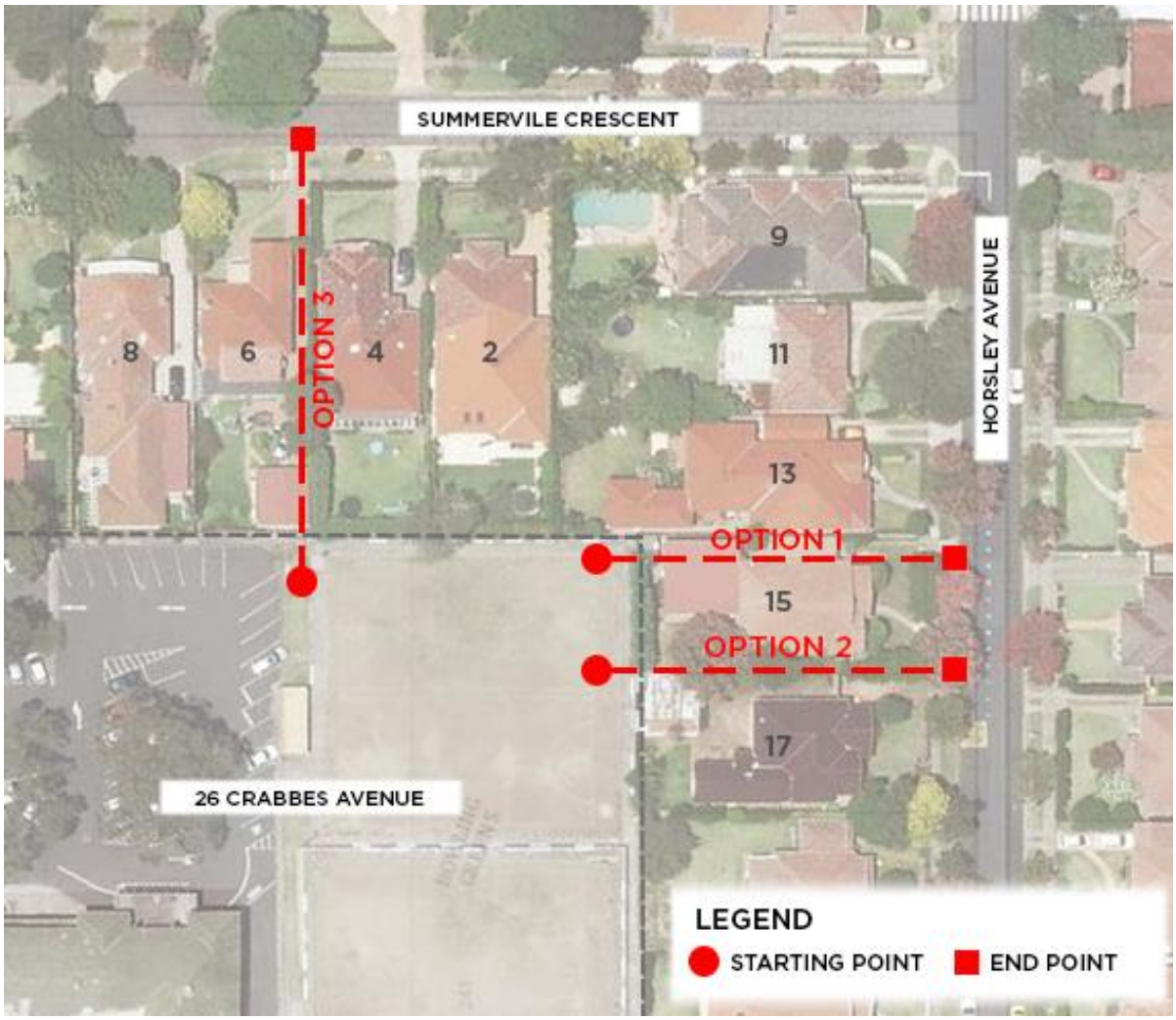
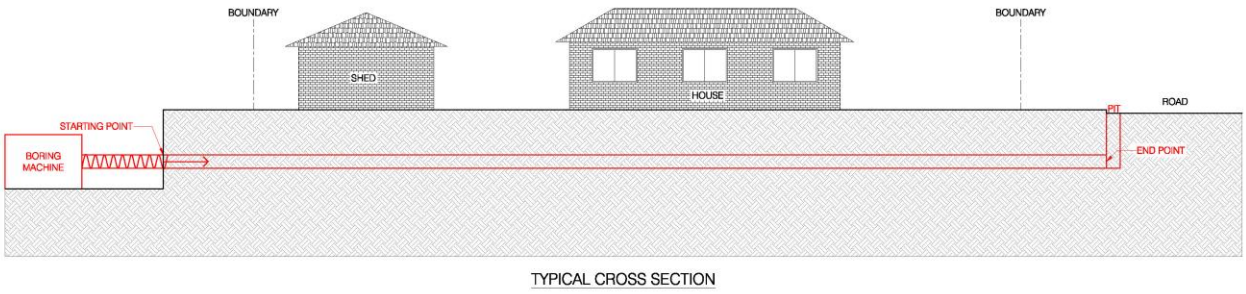


FIGURE 1.2 – REFERENCE IMAGES OF ‘BORTEC’ BORING MACHINE

FIGURE 1.3 – TYPICAL CROSS SECTION FOR BORING MACHINE



TYPICAL CROSS SECTION

FIGURE 1.4 – EFFECTS OF EXCAVATION VS BORING

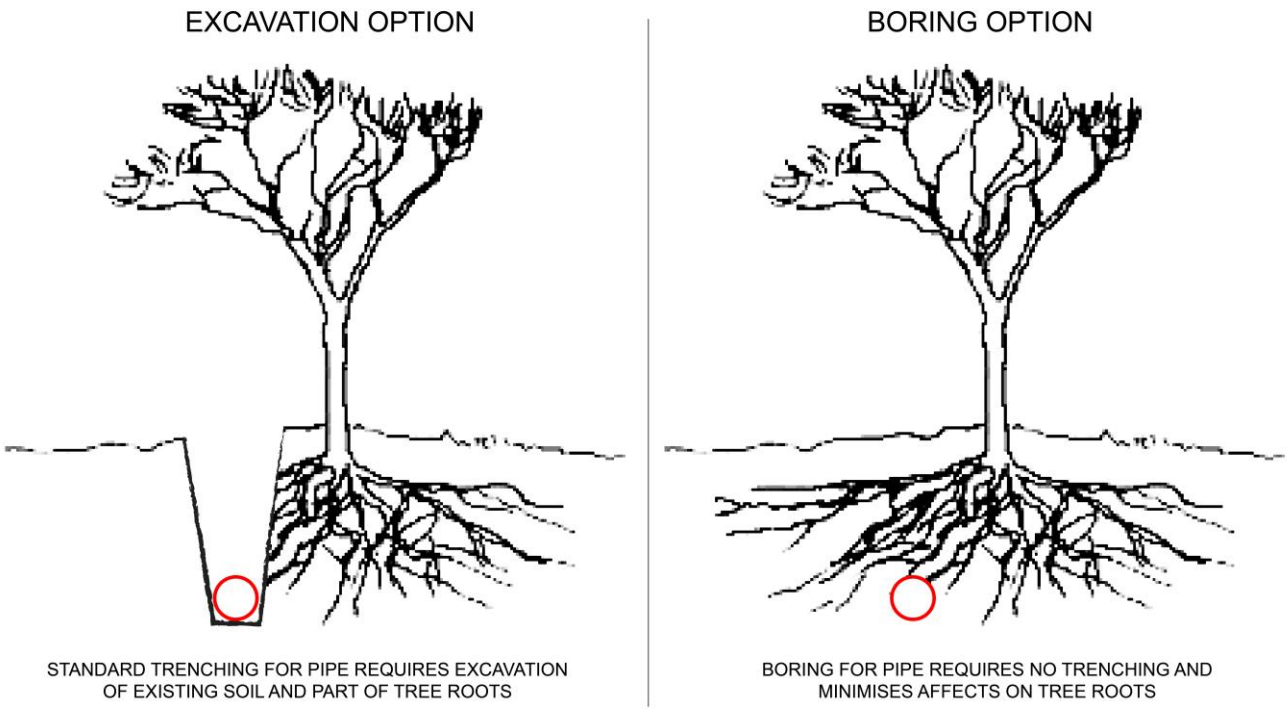


FIGURE 1.5 – CONDITIONS FOR BORE EXCAVATION WORKS

a) Launch pit 10m x 3m x 0.6m below centre line of bore

b) Receive pit 1.5m x 1.5m unless agreed to otherwise

2) Bortec Laser Bore assumes we will have full and unrestricted access to the Site, and that all works to be carried out by the Contractor or other parties as set out in the scope are completed on time without any delay. If we encounter delays, then Bortec Laser Bore may charge for lost time at mentioned standby rate.

3) Supply of 20mm stone (150mm thick) or concrete (Approx. 4m3) for launch pit base

4) Supply shoring, suitable pit access, site fencing, sediment and erosion control

5) Traffic control to complete works safely

6) Safety equipment, emergency plan and rescue equipment

7) Locate and pothole all existing utility services.

8) Removal of spoil from pit during boring

9) Loading and grouting of carrier pipe

10) Survey set out for alignment and depth of bore. (centre of bore alignment)

11) All dewatering as required

12) Supply and manage all water

13) Design and suitability of trenchless method of works

14) Supply excavator with operator with capabilities of lifting 3.5t where ground or site conditions are unsuitable for the safe operation of the crane truck

15) Supply excavator with operator on all bore locations

16) Supply of Spider Clamps or Centralisers unless noted

17) Supply and installation of grout unless noted

18) Restoration of excavation and site

19) Rates are based on normal hours. Mon -Fri 7.00am – 6.00pm Sat 8.00am - 1.00pm

20) Rates are exclusive of GST unless noted

Glenyss Laws
Consulting Arborist

Arboricultural Impact Assessment Report

Prepared for
Hyecorp Property Group

Site
Club Willoughby
26 Crabbes Avenue
North Willoughby

Date
23 November 2020
Revision B

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Beecroft NSW 2119
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1 Introduction

1.1 The following arboricultural impact assessment report was commissioned by Hyecorp Property Group. The report provides an assessment of forty-four (44) trees or hedges, within or on neighbouring properties to Club Willoughby, 26 Crabbes Avenue, North Willoughby.

1.2 The aim of the report is to determine the tree's landscape significance, condition and vigour, assess the impacts of the proposal and provide an arboricultural method statement to ensure the protection of retained trees during construction works.

1.3 The proposal entails demolition of existing structures and construction of a new club, seniors housing development and associated facilities.

1.4 The architectural and landscape plans indicate twenty-two (22) trees protected under Willoughby Council's Tree Management Controls are proposed for removal. However, the design is a major encroachment and will significantly reduce the life expectancy of an additional eleven (11) trees which are marked for retention. Tree removal will be amply compensated by planting over two hundred (200) advanced trees achieving mature heights between 5 to 25m as part of the Landscape Masterplan. Of the forty-four (44) trees assessed, eleven (11) high retention specimens can be retained and protected during construction.

1.5 I have been asked to evaluate the arboricultural impacts of three alternative options for a drainage line through private land that is adjacent to (and does not form part of) the development site. Section 7 of the report relates to creating a stormwater drainage easement using trenchless technology opening from the subject site to Horsley St or Summerville Cres and the impacts of the proposed underground boring on nearby vegetation.

2 Methodology

2.1 The trees were visually inspected from ground level to determine the crown condition, class, structural defects, decay, signs of stress, epicormic growth and dieback (refer Appendix A & B)

2.2 Useful Life Expectancy (ULE) was determined. A ULE rating provides an estimate of a tree's expected remaining life span and considers the age, life span of the species and considers the current condition, vigour and major defects (refer Appendix B).

2.3 A Significance of a Tree Assessment Rating System (STARS) was determined. A STARS rating establishes the contribution a tree has to the overall landscape, amenity qualities or importance due to species, size, historical/cultural planting or significance to the site (refer Appendix C).

2.4 No root exploration, internal probing or aerial inspection was performed.

2.5 Tree height was measured with a Nikon Forestry Pro and rounded to the nearest metre. Canopy spread, and tree age were estimated, while Diameter at Breast Height (DBH) and Diameter Above Root Buttress (DRB) was measured.

2.6 The comments and recommendations in this report are based on findings from a site inspection on 11 April 2018 and preliminary arboricultural assessment report dated 12 April 2018.

2.7 A list of literature used in the preparation of this report is provided in the bibliography section.

2.8 Plans viewed in preparing the report include:

- A detail and level plan dated 4/3/17 by C.M.S Surveyors Pty Ltd
- Landscape Drawing Nos C100, 100, 101 – 110, 301 – 306, 401 – 406 Issue C dated 21/6/19 by Site Image Landscape Architects
- Stormwater Management Plans 19013-DA-C01, Sheets 1 & 2 Rev A undated by IDC
- Drawing Nos DA-DP, DA2.01 - DA2.09, DA3.01 – 3.06 Rev A dated 14/6/19 by Hyecorp Property Group in collaboration with Amglen Pty Ltd.

3 Observations

3.1 The Site

3.1.1 The subject site is known as Club Willoughby and identified as Lots 4 – 11, Sec C, DP 6291, Lot 1, DP 950651, Lots 1 & 2, DP 950652, Lots A & B, DP 438684 and Lot B, DP 364487, 26 Crabbes Ave and 243-245 Penshurst St, Willoughby. The property is located on the southern side of Crabbes Ave and is bordered by retail properties to the west, and residential properties to the south and east (refer Figure 1).

Figure 1. Location 26 Crabbes Ave, Willoughby (Source Google Earth Image dated 12/3/18)

3.2 The Trees

3.2.1 Thirty-nine (39) individual trees and five (5) hedges were assessed. Details of the trees, their dimensions, condition, Useful Life Expectancy (ULE) and landscape significance (STARS) are attached in Appendix A.

4 Discussion

4.1 Tree Protection, Ecological and Heritage Significance

4.1.1 Tree Management Controls for Willoughby Council apply under section C.9 of Willoughby Council's DCP (WDCP) and SEPP2017 Trees in Non-Rural Areas. The controls protect most trees exceeding 4m in height or a trunk girth exceeding 600mm measured at 1.2m or a tree exceeding 3m in canopy spread, some exemptions apply. In addition, the controls protect all trees regardless of dimensions listed as;

- Vulnerable or Threatened or a component of a Threatened Ecological Community or the removal of which would constitute a key threatening process listed under the Threatened Species Conservation Act 1995,
- All trees listed as items under the Willoughby Natural Heritage Register,
- Native bushland vegetation regardless of dimensions on private property,
- All trees (regardless of dimensions) listed as items under the Willoughby Natural Heritage Register.

4.1.2 The property is not listed as an item of heritage nor does the property fall within a heritage conservation area under WLEP 2012.

4.1.3 All trees assessed are a mix of planted exotic and native species. No trees form part of an ecological community listed as vulnerable, endangered or critically endangered under the NSW Biodiversity Conservation Act 2016. In addition, no trees are listed within Council's Natural Heritage Register.

4.1.4 Applying the above all trees assessed are protected under the terms of Willoughby Council's Tree Management Controls.

4.2 Tree Retention Value and Landscape Significance

4.2.1 It is possible to determine a tree's significance and retention value based upon several factors including size, condition and maturity coupled with the methodologies STARS and ULE.

4.2.2 Generally trees identified as having a medium to long ULE, of high landscape value and neighbouring trees are given a high priority for retention in the design process.

Trees 6, 13, 15, 16, 19, 20, 25, 27, 31, 32, 33*, 34*, 35*, 36*, 37*, 38*, 39*, 40*, 41*, 42* & 43* meet this criteria

***** Indicates street trees and trees or hedges on neighbouring properties, all endeavours must be pursued to ensure the appropriate Tree Protection Zones in Table 1 are accommodated.

4.2.3 Trees of high landscape significance with a short ULE should not be given importance for preservation, as these trees are, at best considered to be short term prospects only.

Trees 5, 14 & 17 meet this criteria

4.2.4 Trees identified with a medium landscape value together with a medium ULE and are less critical and may be marked for retention when design options to retain the tree have been exhausted.

Tree 2, 3, 4, 7, 9, 11, 12, 18, 21, 26 & 29 meet this criteria

4.2.5 Trees assessed with a short ULE and a medium to low STARS value are unsuitable for retention and should be removed. Council or the tree owner's approval must be sought prior to tree removal.

Trees 1, 8, 10, 22, 23, 24, 28 & 30 meet this criteria

4.3 Appropriate Development Setbacks

4.3.1 Australian Standard 4970-2009, Protection of trees on development sites, was established to provide appropriate guidelines to ensure the long-term viability and integrity of trees to be retained on development sites.

4.3.2 Tree Protection Zones (TPZ) are based on the diameter of the tree measured at 1.4 metres above ground level x 12 (refer Table 1 for calculated TPZ's). The TPZ is measured from the centre of the tree's trunk to the proposed edge of excavation/development works. The recommended setback is declared a TPZ where construction, trenching, soil level changes and use of machinery should be excluded.

4.3.3 The Structural Root Zone (SRZ) is the area required for stability, a far larger area is necessary to maintain a viable tree. Therefore, no excavation or construction shall encroach within the SRZ (refer Table 1 for calculated SRZ's). The SRZ is determined adopting the formula from AS4970-2009 where the SRZ radius = $(D \times 50)^{0.42} \times 0.64$. Where D = trunk diameter, in m, measured above the root buttress.

4.3.4 Under AS4970-2009 a minor encroachment of 10% of the area is allowable, provided this is compensated for elsewhere and contiguous to the TPZ. Should more than a 10% encroachment occur then the Project Arborist must demonstrate the tree can be protected and remain in a viable state.

4.3.5 Appropriate TPZ's for a monocotyledon, including palms, cycads and tree ferns should not be less than 1m outside the crown projection.

4.3.6 When determining the impacts of an encroachment into the TPZ, some consideration may be given to the following;

- The potential loss of root mass resulting from the encroachment determined by root mapping (number, size and percentage)
- Species tolerance to root disturbance
- Age and vigour of the trees
- The presence of existing or past structures (with solid footings) or obstacles which may affect root growth.

4.3.7 Tree sensitive construction techniques such as pier and beam, suspended slab systems or discontinuous footings can minimise the impact upon a tree's root system and must be adopted should a major encroachment into the TPZ be contemplated. A major encroachment is considered between 15 - 35% of the root zone impacted.

Tree No	Dripline of moncots Radius (m)	Total DBH (cm)	DRB (cm)	TPZ Radius (m)	TPZ Area (m²)	SRZ Radius (m)
2	-	22	27	2.6	22	2.0
3	-	20	25	2.4	18	1.9
4	-	29	43	3.5	38	2.4
6	-	34	53	4.1	52	2.6
7	-	21	28	2.5	20	2.0
9	-	50	60	6.0	113	2.7
11	-	43	61	5.2	84	2.7
12	-	54	53	6.5	132	2.6
13	-	46	60	5.5	96	2.7
15	-	49	64	5.9	109	2.8
16	-	42	62	5.0	80	2.8
18	-	60	77	7.2	163	3.0
19	-	75	82	9.0	254	3.1
20	-	59	68	7.0	157	2.9
21	-	49	70	5.9	109	2.9
25	-	58	78	7.0	152	3.0
26	-	32	40	3.8	46	2.3
27	-	59	73	7.1	157	2.9
29	-	36	56	4.3	59	2.6
31	-	47	59	5.6	100	2.7
32	-	51	62	6.1	118	2.8
33*	-	50	60	6.0	113	2.7
34*	-	10	15	2.0	7	2.0
35*	-	20	22	2.4	18	1.8
36*	-	20	22	2.4	18	1.8
37*	-	40	46	4.8	72	2.4
38*	-	54	55	6.5	132	2.6
39*	-	14	16	2.0	9	2.0
40*	-	52	59	6.2	122	2.7
41*	-	38	46	4.6	65	2.4
42*	-	9	12	2.0	7	2.0
43*	-	53	59	6.4	127	2.7
44*	2.5	-	-	3.5	-	Nil to apply

Table 1 Calculated Tree Protection & Structural Root Zones.
* Indicates street trees and trees or hedges on neighbouring properties.

4.4 Proposed Development Impacts

4.4.1 **Trees 1 – 19 & 21 – 24** fall within the footprint of the proposed development, these trees cannot be retained under the current proposal.

4.4.2 **Tree 20** works proposed within the 7m TPZ include demolition of the existing low retaining walls, a set of stairs and pedestrian access to Crabbes Ave offset approx. 3.5m and the basement carpark offset at approx. 5.5m, the proposal is a major encroachment of > 25% of the TPZ. Perry (1982) states the majority of structural roots (roots > 30mm in diameter) are located within the top 30cm of the soil profile. Subsequently the removal of the existing planter bed/low retaining wall is likely to result in stability issues (refer Appendix D). The tree cannot be retained under the current proposal.

4.4.3 **Tree 25** works within the TPZ and SRZ include demolition of the existing kerb and bitumen paving, basement carpark offset at ~ 5.5m and ripping the sub grade by 100mm for the proposed landscaping. The buttress of the subject tree overhangs the existing kerb (refer Appendix D). Due to the existing bitumen it is expected most structural roots will be located close to the soil surface. The removal of the kerb, bitumen and ripping of the sub grade falls within the SRZ and is a major encroachment under clause 3.3.3 of AS4970. The extent of root disturbance will significantly reduce the trees useful life expectancy.

4.4.4 **Trees 26, 27, 29, & 31 & 32** works within the TPZ and SRZ include demolition of the existing kerb, bitumen carpark and ripping the sub grade to facilitate new plantings. Fine or feeder roots, which are responsible for water and nutrient absorption, occur primarily within the upper 10 – 20cm of the soil profile. Therefore, lowering the grade even by a few centimetres will cause extensive root damage and a progressive decline over a period of several months to several years. In addition, pruning to achieve hoarding clearances is likely to be required to Tree 32. The demolition of the kerb, bitumen and ripping of the sub grade falls within the SRZ and is a major encroachment of > 40% of the TPZ. The proposed works will significantly reduce the trees life expectancy.

4.4.5 **Tree 33** a 6m TPZ is estimated. Excavation is proposed offset at 6.0m and a combined rainwater and OSD tank is proposed offset at ~4.5m, equating to a minor and acceptable encroachment under Clause 3.3.2 of AS4970 of 6.5%. The tree can be retained, and it root system protected during construction.

4.4.6 **Trees 34 – 35** are neighbouring trees to be retained and protected, the stormwater detention pit is offset at ~ 4.5m, no encroachment of the TPZ is proposed.

4.4.7 **Tree 36** is a hedge of several X *Cupressocyparis leylandii* located on the neighbouring property, a 2.4m TPZ is estimated. Stairs are proposed to the basement carpark offset at approx. 3.0m which do not encroach within the TPZ. However, stormwater drainage lines are proposed which run through the neighbouring property to Horsley Ave. The proposal will require with the removal of the two most eastern specimens of the hedge to facilitate the proposal, alternatively directional boring methods directed at a dept of 0.8m should be pursued. If tree removal is sought the tree owner and Council's approval to remove will be required.

4.4.8 **Tree 37**, stormwater drainage lines are proposed offset at ~ 5.5m, no encroachment of the 4.8m TPZ is proposed. The tree can be retained, and its root zone protected.

4.4.9 **Tree 38** a 6.5m TPZ is estimated. Stormwater drainage lines are planned offset at ~ 5.5m. The proposal is a minor and acceptable encroachment of ~ 4% under clause 3.3.2 of AS4970. The tree can be retained, and its root zone protected.

4.4.10 **Tree 39** is a neighbouring hedge with an estimated 2.0m, no encroachment of the stormwater drainage is proposed. The hedge can be retained and it rootzone protected during the construction and landscape works.

4.4.11 **Tree 40** no works are proposed within the 6.2m TPZ. The street tree can be retained and protected.

4.4.12 **Tree 41** works within the 4.6m TPZ include excavation for the basement carparking offset at ~ 3.0m. The proposal is a marginal encroachment of ~ 12% of the TPZ.

4.4.13 **Tree 42** no works are proposed within the 2.0m TPZ, the tree can be retained and protected.

4.4.14 **Tree 43** works within the 6.4m TPZ and 2.7m SRZ include excavation for the basement car park offset at ~2.5m. The excavation is a major encroachment of approx. 27%. The long-term viability of the street tree cannot be maintained under the current proposal.

4.4.15 **Tree 44** no works are proposed within the 3.5m TPZ.

5 Conclusions/Recommendations

5.1 Forty-four (44) trees or hedges were assessed. The proposal seeks the demolish the existing structures and construct a new club, seniors living complex and associated facilities.

5.2 The supplied plans indicate twenty-two (22) trees protected under the terms of Council's Tree Management Controls are proposed for removal. This includes five (5) trees with a high retention value, eight (8) trees less critical for retention and nine (9) trees allocated a low retention value.

High Retention	Less Critical for Retention	Low Retention
6, 13, 15, 16 & 19	2, 3, 4, 9, 11, 12, 18 & 21	1, 5, 8 x 15, 10, 14, 17, 22, 23 & 24

Table 2. Trees listed within plans to be removed

5.3 The proposal is a major encroachment and will significantly reduce the life expectancy of the following eleven (11) trees marked for retention within the architectural and landscape plans.

High Retention	Less Critical for Retention	Low Retention
20, 25, 27,32, 36* x 2 & 43*	26, 29 & 31	28 & 30

Table 3. Trees indicated for retention with a major encroachment

5.4 To compensate the loss of amenity and achieve a positive outcome, two hundred and six (206) exotic and native advanced trees ranging in height from 5 – 25m have been incorporated within the Landscape Plans.

5.5 The plans indicate eleven (11) trees of high landscape significance can be retained and protected as part of the proposal.

High Retention	Consider for Removal	Low Retention
33*, 34*, 35*, 36*, 37*, 38*, 39*, 40*, 41*, 42* & 44*	-	-

Table 4. Trees to be retained and protected

5.7 All trees to be retained shall be protected in accordance with the following Arboricultural Method Statement.

6 Arboricultural Method Statement

6.1 Pre-commencement and Arboricultural Hold Points

6.1.1 Prior to demolition and construction works, a Project Arborist shall be appointed to supervise all tree protection procedures detailed in this statement. The Project Arborist shall have a minimum level 5 AQF qualification in Arboriculture.

6.1.2 A pre-commencement site meeting shall take place between the Site Supervisor and the Project Arborist, the meeting is to take place before any development activity to determine specific arboricultural inspections and required tree protection.

6.1.3 Development Stage, this stage is subject to site monitoring by the Project Arborist at intervals as agreed at the pre-commencement site meeting. These visits are to ensure the protection measures are maintained in good order and works within the Tree Protection Zone (TPZ) meet with this Arboricultural Method Statement and AS4970.

6.1.4 It is the responsibility of the developer/site supervisor to provide a minimum 3 days' notice to the Project Arborist for the pre-determined witness points.

6.1.5 Any breaches to the Arboricultural Method Statement shall be reported immediately.

6.1.6 The following pre-determined stages are hold points and requires the attendance of the Project Arborist to document the works and demonstrate an inspection has taken place.

Hold Point	Action	Project Arborist Supervision
Tree Protection	The Site Arborist shall inspect the Tree Protection Fencing and any necessary Ground Protection complies with Table 1 Tree Protection Zones and Figure 3, page 16 AS4970. Trunk protection shall be installed to all street trees fronting the site.	Inspected, documented & certified by Project Arborist
Demolition Works	The Site Arborist shall be in attendance during the removal of any existing structures within the TPZ of retained trees.	Inspected, documented & certified by Project Arborist
Earth Works	The Site Arborist to monitor any earthworks within the TPZ's. **Note** these works must be undertaken by hand or with an air knife.	Inspected, documented & certified by Project Arborist
Practical Completion	The Site Arborist to inspect and assess the trees condition and provide certification of tree protection at all the above-mentioned Hold Points.	Inspected, documented & certified by Project Arborist

Table 5. Hold Points for Project Arborist Inspections

6.2 Tree Protection – to be installed prior to commencement of works

6.2.1 Trunk Protection shall be installed to the street trees on the Penshurst St frontage and Tree Protection Fencing shall be installed prior to commencement of works and be maintained in a good condition during the construction processes.

6.2.2 Trunk Protection shall be achieved by strapping hessian or carpet underlay around the trunk followed by placing 1.5 – 2.0m lengths of timbers (100 x 50mm) spaced at 100mm intervals and secured together with galvanised wire. The timber slats shall be strapped around the trunk to avoid mechanical injury or damage. No wire/nails or securing devices shall damage or contact the trunk.

6.2.3 Tree Protection shall consist of a 1.8m high chain link temporary fencing erected at the distances nominated in Table 1.

6.2.4 Weatherproof signage indicating the area is a Tree Protection Zone (TPZ) shall be displayed on the fence line at 10m intervals.

6.2.5 Signage shall be a minimum A4 and shall state No Access – Tree Protection Zone and include the contact details of the Site Foreman and Project Arborist.

6.2.6 Once erected, the TPF shall be regarded as sacrosanct and shall not be removed or altered without prior agreement of the project arborist.

6.2.7 Attention shall be given to ensuring the TPZ remains rigid and complete and excludes all construction activity and storage of materials.

6.2.8 If works are to occur within the TPZ the Project Arborist shall determine if appropriate ground protection is required. Should ground protection be necessary then the ground surface within the TPZ shall be protected with a geotextile overlaying the existing mulch. Thick recycled railway ballast shall be placed over the geotextile in accordance with Figure 4 of AS4970.

6.2.9 Mulch shall be spread within the TPZ's of the retained trees or as instructed by the project Arborist. The mulch shall consist of mixed leaf and fine woodchip mulch as certified to AS4454:2012 Composts, Soil Conditioners and Mulches. Mulch shall be spread to a depth of 75mm and maintained at this depth for the duration of works.

6.3 Restricted Activities

6.3.1 The following activities are restricted within the Tree Protection Zone;

- Parking of vehicles or plant
- Installation of temporary site offices or amenities.
- Wash down areas
- No mechanical excavation
- Preparation of chemicals including paint, cement or mortar.
- Vehicular movement
- Pedestrian access
- Excavation, trenching or tunnelling unless under the supervision of the Project Arborist
- No ground level changes are permitted

6.4 Installation of Services

6.4.1 Where feasible, all underground services will be routed & installed beyond the identified TPZ's. Where it is impossible to divert services beyond the TPZ's, detailed plans showing the proposed routing will be drawn in conjunction with advice from an AQF Level 5 Arborist.

6.4.2 The method for trenching within a TPZ shall either be by hand methods e.g. hand digging with a spade or trowel or an air spade. Trenchless technology such as directional underground boring shall be considered in the first instance.

6.4.3 Topsoil and subsoil excavated from the trench shall be deposited into separate piles and kept apart and covered until required for backfilling.

6.4.4 No roots > 30mm in diameter are to be severed without prior agreement with the Project Arborist.

6.4.5 In cases of extreme heat or unless the trench is to be backfilled within the same day, all exposed roots > 30mm in diameter shall be wrapped with damp hessian to prevent drying out.

6.4.6 Where is it necessary to sever any woody roots, they shall be clean cut with secateurs or a pruning saw.

6.4.7 The underground services shall be positioned below the network of protected roots without causing damage to roots > 30mm in diameter. The hessian shall be removed prior to backfilling.

6.5 Back filling

6.5.1 Once works have been completed, backfilling shall be undertaken by hand using the subsoil first. The subsoil shall be filled into the trench in layers of no > 20cm and each layer shall be gently consolidated. Once the subsoil has reached the level of the existing subsoil, the topsoil shall be placed on top until the original levels are reached.

6.6 Construction of masonry fences or retaining walls

6.6.1 Where retaining walls or masonry fences are proposed, exploratory hand excavation to a depth of 600mm will determine the presence of any woody roots > 30mm in diameter. Exploratory trenching shall be under the supervision of and documented by the Project Arborist.

6.6.2 In cases of extreme heat or unless the footings are to be backfilled within the same day, then the exposed roots shall be covered in damp hessian until back filling takes place.

6.6.3 Backfill shall be undertaken in accordance with section 6.5 of the method statement.

6.7 Soft and Hard Landscaping

6.7.1 Installation of soft or hard landscaping including paving, turf or plant material within the TPZ shall be undertaken by hand.

6.7.2 Planting holes are to be hand dug with a shovel or garden trowel.

6.8 Breach of tree protection

6.8.1 Any above or below ground damage (including soil compaction) to a protected tree shall be reported to the Project Arborist immediately.

6.8.2 Where activities occur which breach the tree protection measures, the Project Arborist shall be advised immediately and work within the TPZ be halted until an assessment has been made and any mitigation measures deemed necessary have been undertaken.

7.0 Addendum

7.1 Horizontal Directional Drilling

7.1.1 I have been asked to assess the arboricultural impacts of three alternative options for a drainage line through private land that is adjacent to (and does not form part of) the development site. While the construction and use of the drainage line over this land will not be approved by any development consent, I understand that it is necessary that the impacts of all three options be assessed as part of the determination of this development application.

7.1.2 The three options for the stormwater easement employs trenchless technology to create a 2.5m easement from the subject site, beneath 15 Horsley Ave or 6 Summerville Cres.

7.1.3 Clause 4.5.5 of AS4970-2009 recommends any directional drilling be diverted to at least 600mm in depth and the Project Arborist should evaluate the likely impacts of the bore pits on retained trees.

7.1.4 **Option 1** runs close to the eastern boundary of 15 Horsley Ave and shows the bore will be diverted 0.95m below ground level, the bore depth is in accordance with Clause 4.5.5 of AS4970 (refer Figure 2). Tree 36 is a hedgerow of *Cupressocyparis leylandii* (Leyland Cypress), the stormwater pit shown in Option 1 is likely to fall within the footprint of the most eastern two trees which forms part of the hedge. The species is exempt under Appendix 1, Section C9 of Willoughby Council's Vegetation Management Policy WDCP 2012. The hedge or part thereof can be removed provided consent is obtained by the property/tree owner.

7.1.5 **Option 2**, the bore will be diverted 1.39m below ground level and is in accordance with Clause 4.5.5 of AS4970 (refer Figure 3). Option 2 shows a stormwater drainage pit offset ~2.0m to the most western tree of the hedgerow identified as Tree 36. The proposal is a minor and acceptable encroachment under Clause 3.3.2 of AS4970 and equates to < 4%. No trees or shrubs will require removal as part of Option 2.

7.1.6 **Option 3**, the bore will be diverted 1.48m below ground level in accordance with Clause 4.5.5 of AS4970 (refer Figure 4). The proposed stormwater line connecting to the easement running to the west of 4 & 6 Summerville Cres is a major TPZ/SRZ encroachment to Trees 33 & 34. Provided trenchless technology is adopted to install both the stormwater drainage and easement, then there will be no conflict or encroachment to the root system of vegetation on the neighbouring properties 4 & 6 Summerville Cres (refer Figure 3). Aerial images of the site confirms a tree on southern boundary of 6 Summerville Cres, this tree is sufficiently setback from the stormwater and bore pit. As the drilling will be directed to a depth of 1.48m there will be no conflict between the unidentified trees root system and the drilling/easement.

7.1.7 **Options 2 & 3** are acceptable in arboricultural terms and will have minimal to no effect on the neighbouring trees and large shrubs.

7.1.8 **Option 1** will require the removal of the most eastern two trees which form part of the hedge identified as Tree 36. Tree 36 is an exempt species under Willoughby Council's Vegetation Management Policy and the hedge or part thereof can be removed provided consent is obtained by the property/tree owner.

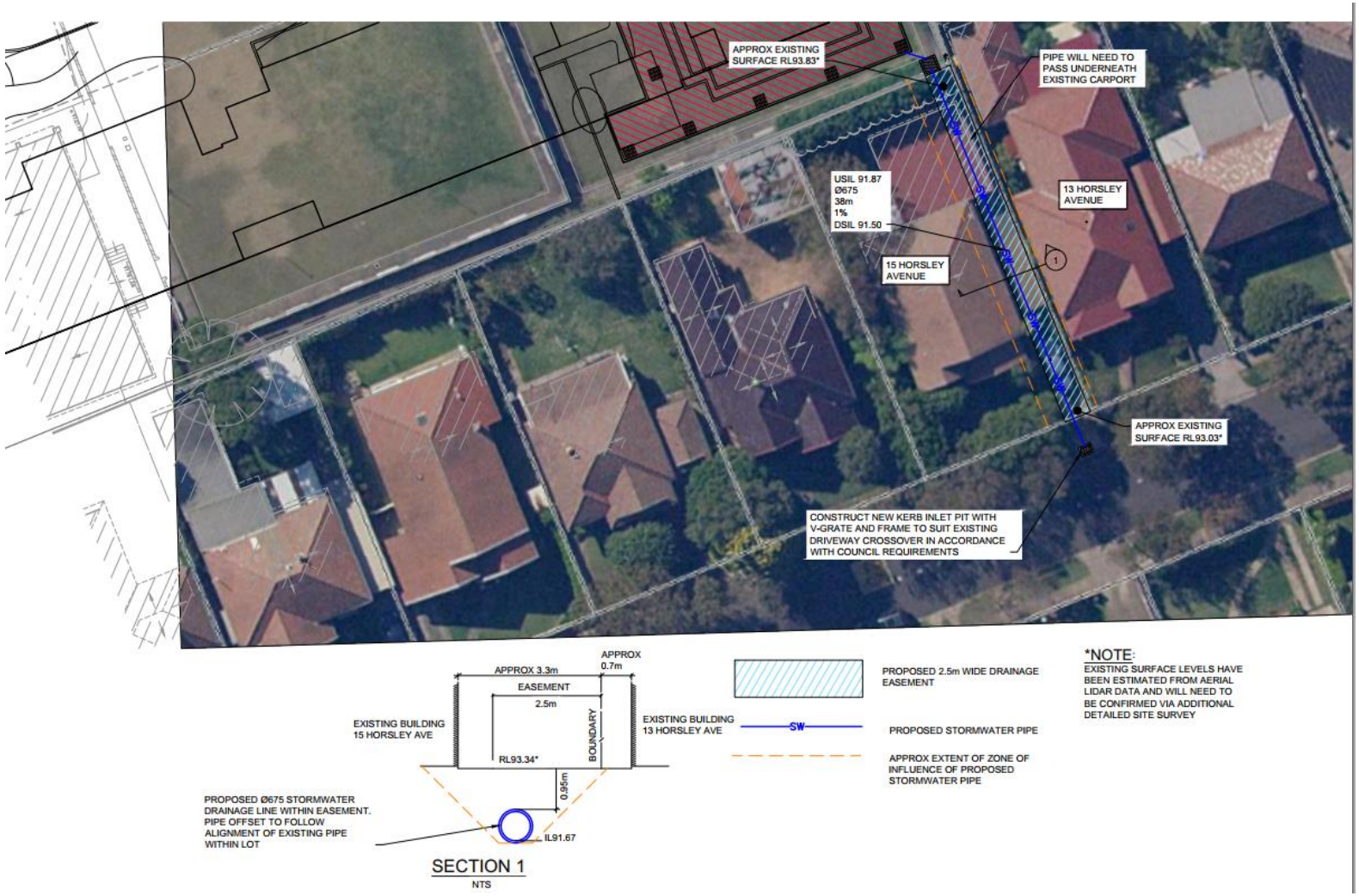


Figure 2. Option 1 Stormwater easement design

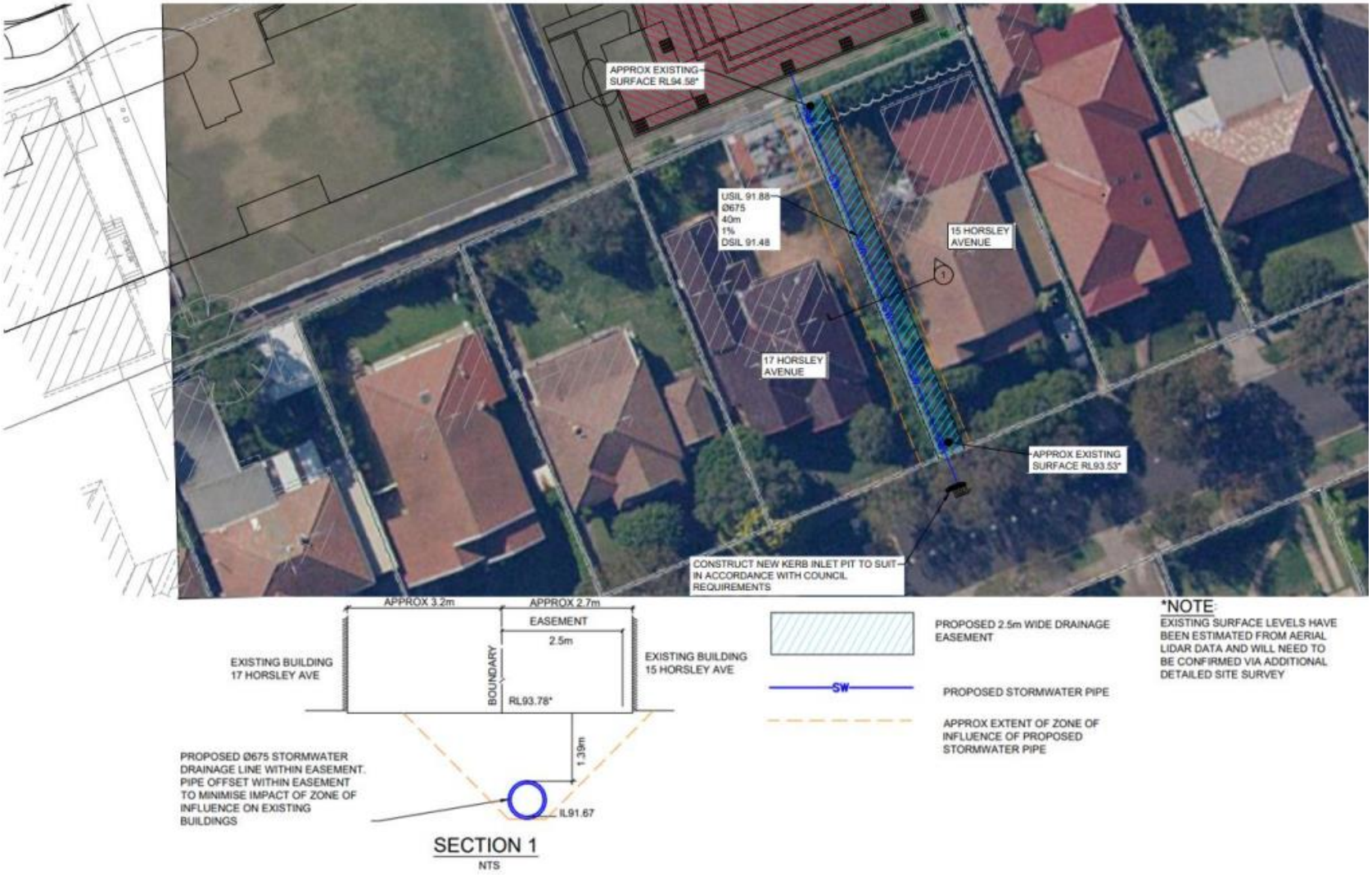


Figure 3. Option 2 Stormwater easement design

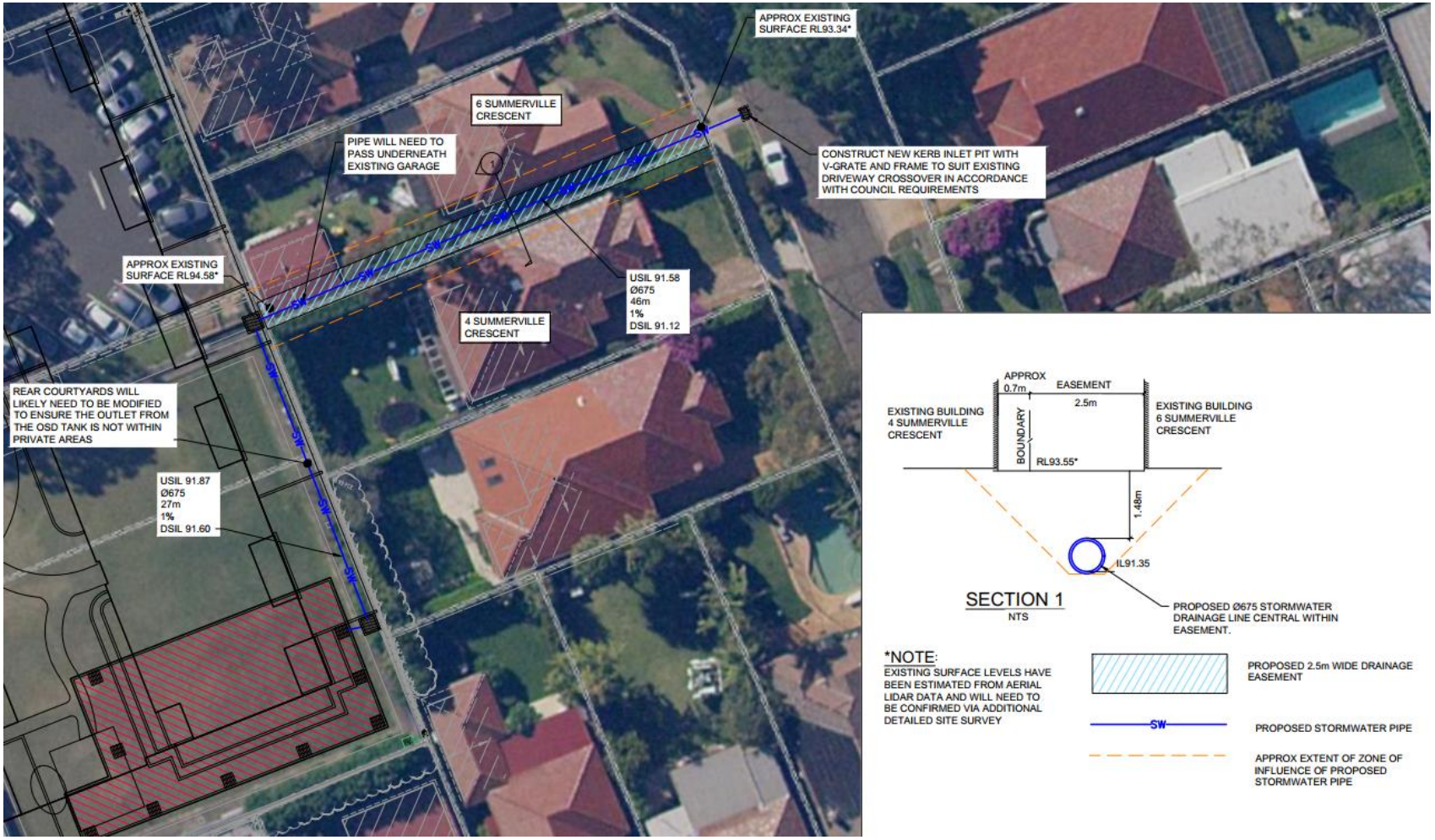
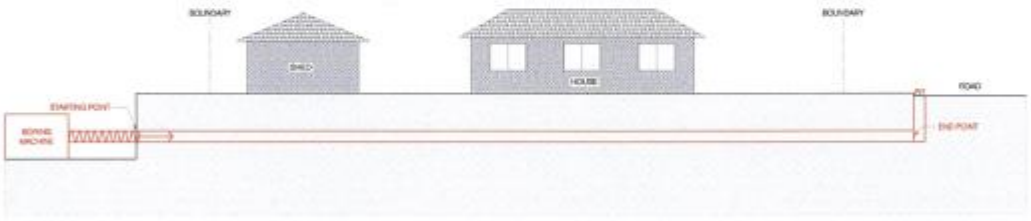


Figure 4. Option 3 stormwater easement design

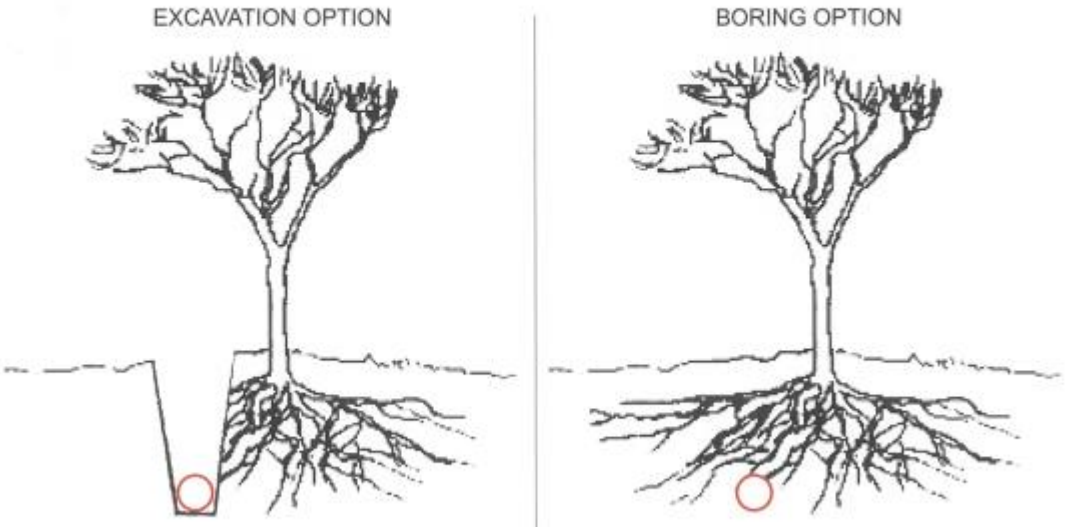
NS PC NORTH SHORE PROPERTY CONSTRUCTION

FIGURE 1.3 – TYPICAL CROSS SECTION FOR BORING MACHINE



TYPICAL CROSS SECTION

FIGURE 1.4 – AFFECTS OF EXCAVATION VS BORING



STANDARD TRENCHING FOR PIPE REQUIRES EXCAVATION OF EXISTING SOIL AND PART OF TREE ROOTS

BORING FOR PIPE REQUIRES NO TRENCHING AND MINIMISES AFFECTS ON TREE ROOTS

Any questions relating to this report should be addressed to the undersigned

Glenyss Laws
Graduate Certificate in Arboriculture, The University of Melbourne (AQF Level 8)
Diploma of Horticulture (Arboriculture) TAFE NSW (AQF Level 5)
Assoc Diploma Applied Science (Landscape) TAFE NSW
ISA Tree Risk Assessment Qualified Assessor (2014)
Member I.A.C.A, A.I.H & I.S.A
Qualified and Practicing Arborist/Horticulturist.
Since 1997

Assumptions/Disclaimer

Care has been taken to obtain all information from reliable sources. All data has been verified as far as possible. However, Glenyss Laws – Consulting Arborist 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 and reflects the condition of the trees at the time of inspection: and
- The inspection was limited to visual examination of the subject trees without dissection, probing or coring.
- No risk assessment was commissioned or carried out as part of the investigation.
- Trees are living organisms whose health and condition can change rapidly. Any changes to the soil surrounds e.g. excavation or construction works or extreme weather events will invalidate this report.
- There is no warranty or guarantee, expressed or implied, that problems or deficiencies of the subject trees may not arise in the future.
- Any tree, whether it has a visible weakness or not, will fail if the forces applied exceed the strength of the tree or its parts.

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ACCREDITED MEMBER™

MEMBER
INTERNATIONAL SOCIETY OF ARBORICULTURE
ISA

BIBLIOGRAPHY/REFERENCES

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Perry, TO (1982) The Ecology of Tree Roots and The Practical Significance Thereof. Journal of Arboriculture 8. International Society of Arboriculture Champaign IL

Standards Australia (2009), AS4970-2009 Protection of trees on development sites.

APPENDIX A

Site Notes

Tree No	Tree Species	Age Class	DBH (mm)	DRB (mm)	Tree Height (M)	Crown Width (M)	Crown Condition	Crown Class	STARS	ULE	Root Zone/ Defects/ Services	Comments
1	*Cupressus macrocarpa* (Monterey Cypress)	O	260	300	7.5	4	2	S	3	4	Ga/-/-	Over mature, suppressed specimen. Past substantial pruning of lowest 1st order branches.
2	*Corymbia gummifera* (Red Bloodwood)	M	220	270	10	6	3	C	2	2	Ga/-/-	
3	*Eucalyptus species* (Gum)	S	200	250	13	4	4	C	2	2	Ga, Rt/-/-	
4	*Callistemon viminalis* (Bottlebrush)	M	150, 150, 170 & 80	430	7	5	4	C	2	2	Ga/-/-	
5	*Eucalyptus tereticornis* (Forest Red Gum)	M	490	590	15	8	3	D	1	3	Ga/D/-	Wound & associated decay in basal region to the south extends into root collar & encompasses ~ 1/3 of root collar. Sounding with an acoustic mallet produced a good resonance. Stressed specimen.
6	*Eucalyptus botryoides* (Bangalay)	M	340	530	13	10	3	C	1	2	Ga, Rt/-/-	Lerp infestation, common to the species. On a slight lean to the south.
7	*Eucalyptus botryoides* (Bangalay)	S	210	280	10	5	3	I	2	2	Ga, Rt/-/-	Lerp infestation, common to the species
8 x 16	*Callistemon viminalis* (Bottlebrush)	M	Ave 220	Ave 250	4 – 5	2 - 3	4	C	2	5	Rt/-/O	This is a hedge comprised of 16 x *Callistemon viminalis* planted at close intervals. Electricity substation within proximity to northern specimens.
9	*Jacaranda mimosifolia* (Jacaranda)	M	Est 500	600	14	12	4	D	2	2	Pa/-/-	Not plotted within survey plan approx. location only. Access to adjoining property limited & therefore VTA limited.
10	*Melaleuca quinquenervia* (Paperbark)	O	90, 130 & 100	310	5	4	2	D	3	3	Pa/-/-	Over mature specimen

Tree No	Tree Species	Age Class	DBH (mm)	DRB (mm)	Tree Height (M)	Crown Width (M)	Crown Condition	Crown Class	STARS	ULE	Root Zone/ Defects/ Services	Comments
11	*Melaleuca quinquenervia* (Paperbark)	M	220, 310 & 200	610	9	5	3	D	2	2	Pa/O/-	Fire damage to lower trunk
12	*Lophostemon confertus (Brush Box)*	M	@ 1.0m 540	530	10	10	3	I	2	2	Pa/O/-	Trunk has grown around star picket which was installed at time of planting as tree support
13	*Casuarina glauca* (Swamp Oak)	M	460	600	15	7	4	C	1	1	Pa/-/-	Crossed & rubbing lower branches. Forms codominant leaders at 3.5m union appears sound.
14	*Casuarina glauca* (Swamp Oak)	M	370	460	18	8	4	C	1	3	Pa/D/-	Forms codominant leaders at 2.5m union appears sound. Decay at point of old 1st order pruning cut, 2nd leader arises from point of decay.
15	*Casuarina glauca* (Swamp Oak)	M	490	640	16	7	4	C	1	1	Pa/-/-	Forms codominant leaders at 2.5m union appears sound.
16	*Casuarina glauca* (Swamp Oak)	M	420	620	17	6	4	C	1	1	Pa/-/-	On slight lean to the west - no contributing factors.
17	*Eucalyptus species* (Gum)	M	480	530	15	16	3	D	1	3	Pa/D/-	Decay in lower trunk to the north measuring 60cm x 15cm. The decay contains the stub of an of old wood decaying bracket fungus. Sounding area with an acoustic mallet produced a dull resonance.
18	*Corymbia citriodora* (Lemon-scented Gum)	M	600	770	16	15	4	D	2	2	Pa/F/-	Possible past storm damage or leader failure specimen forms 3 leaders at 4m.
19	*Eucalyptus camaldulensis* (River Red Gum)	M	750	820	18	18	3	D	1	2	Pa/-/-	Specimen has been crown raised at some point in the past with the pruning to collar of 13 x lowest 1st order branches between 100 – 250mm in diameter.
20	*Eucalyptus botryoides* (Bangalay)	M	590	680	19	14	4	D	1	2	Pa, Rt/T, B/-	Mudding in lower trunk attributed to past termite or borer activity.

Tree No	Tree Species	Age Class	DBH (mm)	DRB (mm)	Tree Height (M)	Crown Width (M)	Crown Condition	Crown Class	STARS	ULE	Root Zone/ Defects/ Services	Comments
21	*Casuarina cunninghamiana* (She-Oak)	M	490	700	17	10	4	D	2	2	Pa/-/-	Included bark in lowest 1st order branch attachment approx. 200mm in diameter at 5m from ground level
22	*Casuarina cunninghamiana* (She-Oak)	O	470	550	15	10	2	C	3	4	Pa/-/-	Specimen in irreversible decline
23	*Casuarina glauca* (Swamp Oak)	O	430	520	15	6	1	C	3	4	Pa/-/-	Specimen in irreversible decline
24	*Casuarina glauca* (Swamp Oak)	O	210 & 300		14	5	1	C	3	4	Pa/-/-	Specimen in irreversible decline
25	*Casuarina cunninghamiana* (She-Oak)	M	580	780	19	8	4	C	1	1	Pa/-/-	Lowest eastern 1st order branches substantially pruned to prevent leaf drop onto neighbour's roofline. Forms an asymmetrically biased canopy to the west as a result of pruning.
26	*Casuarina cunninghamiana* (She-Oak)	M	320	400	17	3	3	C	2	2	Pa/-/-	Substantial pruning of lowest eastern 1st order branches to prevent leaf drop onto neighbour's roofline
27	*Casuarina cunninghamiana* (She-Oak)	M	590	730	19	8	4	C	1	1	Pa/-/-	
28	*Casuarina cunninghamiana* (She-Oak)	M	230	270	14	2	3	S	3	3	Pa/-/-	Partially suppressed, poor vigour.
29	*Casuarina cunninghamiana* (She-Oak)	M	260 & 240	560	16	4	3	C	2	2	Pa/-/-	Forms codominant leaders at ground level – union appears sound.
30	*Casuarina cunninghamiana* (She-Oak)	M	220	290	15	2	2	S	3	3	Pa/-/-	Partially suppressed, poor vigour.

Tree No	Tree Species	Age Class	DBH (mm)	DRB (mm)	Tree Height (M)	Crown Width (M)	Crown Condition	Crown Class	STARS	ULE	Root Zone/ Defects/ Services	Comments
31	*Casuarina cunninghamiana* (She-Oak)	M	470	590	17	7	3	C	2	2	Pa/-/-	Holds medium volumes of deadwood between 30 – 100mm in diameter.
32	*Casuarina cunninghamiana* (She-Oak)	M	510	620	17	10	4	C	1	1	Pa/-/-	
33*	*Agonis flexuosa* (Willow Myrtle)	M	Est 320, 120, 250 x 2	600	7 – 8	8	3	D	2	1	Ga/-/-	Tree on adjoining property measured 1.9m offset to galvanised fence. Trees on adjoining properties are afforded a high retention value.
34*	Hedge of *x Cupressocyparis leylandii* (Leyland Cypress)	M	Est Average 100	-	3 – 4	-	4	C	1	2	Ga/-/-	Hedge on adjoining property affords screening. Trees on adjoining properties are afforded a high retention value. Exempt species based under Willoughby Council's DCP, requires property owners consent to remove.
35*	Hedge of *Viburnum tinus* (Laurustinus)	M	Est 120-200	-	3	-	4	C	1	2	Ga/-/-	Hedge on adjoining property affords screening. Trees on adjoining properties are afforded a high retention value
36*	Hedge of *x Cupressocyparis leylandii* (Leyland Cypress)	M	Est 150-200	-	5 – 6	-	5	C	1	2	Ga/-/-	Hedge on adjoining property affords screening. Trees on adjoining properties are afforded a high retention value Exempt species based under Willoughby Council's DCP, requires property owners consent to remove..
37*	*Agonis flexuosa* (Willow Myrtle)	M	Est 400	Est 460	5	8	3	D	1	2	Ga/-/-	Tree on adjoining property Trees on adjoining properties are afforded a high retention value
38*	*Melaleuca bracteata* (Black Tea-Tree)	M	Est 400 & 350	Est 550	10	8	3	D	1	3	Ga/-/-	Tree on adjoining property planted hard to boundary, forms two leaders at ground level. Tip dieback within canopy, in early stages of senescence.

Tree No	Tree Species	Age Class	DBH (mm)	DRB (mm)	Tree Height (M)	Crown Width (M)	Crown Condition	Crown Class	STARS	ULE	Root Zone/ Defects/ Services	Comments
39*	Hedge of *Syzygium species (Lilly Pilly)*	M	Est 120	-	4 – 5	-	4	C	1	2	Ga/-/-	Hedge on adjoining property affords screening. Trees on adjoining properties are afforded a high retention value
40*	*Ulmus glabra* (Wych Elm)	M	520	590	9	14	3	C	1	2	Pa, K/-/-	Council owned asset – street tree
41*	*Ulmus procera* (English Elm)	M	380	460	9	10	3	D	1	2	Pa, K/-/-	Council owned asset – street tree
42*	*Ulmus procera* (English Elm)	Y	90	120	5	2	4	D	1	2	Pa, K/-/-	Council owned asset – street tree
43*	*Ulmus procera* (English Elm)	M	310 & 420	590	9	12	3	D	1	2	Pa, K/-/-	Council owned asset – street tree
44*	*Syagrus romanzoffianum* (Cocos Palm)	M	-	-	9	2.5	4	D	1	2	Pa/-/-	Tree on neighbouring property

Trees in Green assessed with a high landscape value coupled with a medium to long ULE are allocated a high priority for retention.
Trees in Blue are less critical for retention, their retention should be a priority with removal considered when design options have been exhausted & adversely affecting the proposal.
Trees in Pink are of low retention value, nor require special works or design modifications to be implemented.
Tree in Orange are considered hazardous, in irreversible decline or environmental weed species and recommended for removal irrespective of development.
***** Indicates trees or hedges close to the boundary on neighbouring properties or street trees

APPENDIX B

Notes on tree inventory schedule

Tree No: Relates to number on site diagram.

Species: Coded to tree species schedule

Age Class:

Y	Young- recently planted
S	Semi mature- <20% of life expectancy
M	Mature- 20-80% of life expectancy
O	Over mature- >80% of life expectancy

Height: In metres

Crown Diameter: In metres

Crown Class:

D	Dominant	Crown extends above general canopy; not restricted by other trees.
C	Co-dominant	Crown forms the bulk of the general Canopy but crowded by other trees.
I	Intermediate	Crown extends into dominant/ codominant canopy but quite crowded on all sides.
S	Suppressed	Crown development restricted from Overgrowing trees.

Crown Condition: Overall vitality

0	Dead
1	Severe decline (<20% canopy density; major dead wood)
2	Declining (20-60% canopy density; twig and branch dieback)
3	Average/ low vigour (60-90% canopy density; twig dieback)
4	Good (90-100% canopy density; little or no dieback or other problems)
5	Excellent (100% canopy density; no deadwood or other problems)

Root Zone:

C	Compaction
D	Damaged/wounded roots
E	Exposed roots
Ga	Tree in garden bed
Gi	Girdled roots
Gr	Grass
K	Kerb close to tree
L+	Raised soil level
L-	Lowered soil level
M	Mulched
Pa	Paving/concrete/bitumen
Pr	Roots pruned
O	Other

Defects:

B	Borers
C	Cavity
D	Decay
F	Previous failures
I	Inclusions
L	Lopped
M	Mistletoe/parasites
S	Splits/Cracks
T	Termites
O	Other

Services adjacent structures:

Bs	Bus stop
Bu	Building within 3 metres
Hvo	High voltage open wire construction
Hvb	High voltage bundled (ABC)
Lvo	Low voltage open wire construction
Lvb	Low voltage bundled (ABC)
Na	No services above
Nb	No services below
Si	Signage
Sl	Street light
T	Transmission lines
U	Underground services
O	Other

STARS: Significance of a Tree Assessment Rating System (copyright Institute of Australian Consulting Arborists 2010)

ULE: Useful Life Expectancy adapted from Barrell J (2001)

1	Long ULE	Trees that appear to be retainable at the time of assessment for more than 40 years
2	Medium ULE	Trees that appear to be retainable at the time of assessment for more than 15-40 years
3	Short ULE	Trees that appear to be retainable at the time of assessment for more than 5-15 years
4	Remove	Trees that should be removed within the next 5 years
5	Small, young or regularly pruned	Small trees less than 5 Metres in height or young trees less than 15 years old but over 5 metres in height.

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

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

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

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

Tree Significance - Assessment Criteria

1. High Significance in landscape

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

2. Medium Significance in landscape

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

3. Low Significance in landscape

- The tree is in fair-poor condition and good or low vigour;
- The tree has form atypical of the species;
- The tree is not visible or is partly visible from surrounding properties as obstructed by other vegetation or buildings,
- The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area,
- The tree is a young specimen which may or may not have reached dimension to be protected by local Tree Preservation orders or similar protection mechanisms and can easily be replaced with a suitable specimen,
- The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa *in situ* - tree is inappropriate to the site conditions,
- The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms,
- The tree has a wound or defect that has potential to become structurally unsound.

Environmental Pest / Noxious Weed Species

- The tree is an Environmental Pest Species due to its invasiveness or poisonous/ allergenic properties,
- The tree is a declared noxious weed by legislation.

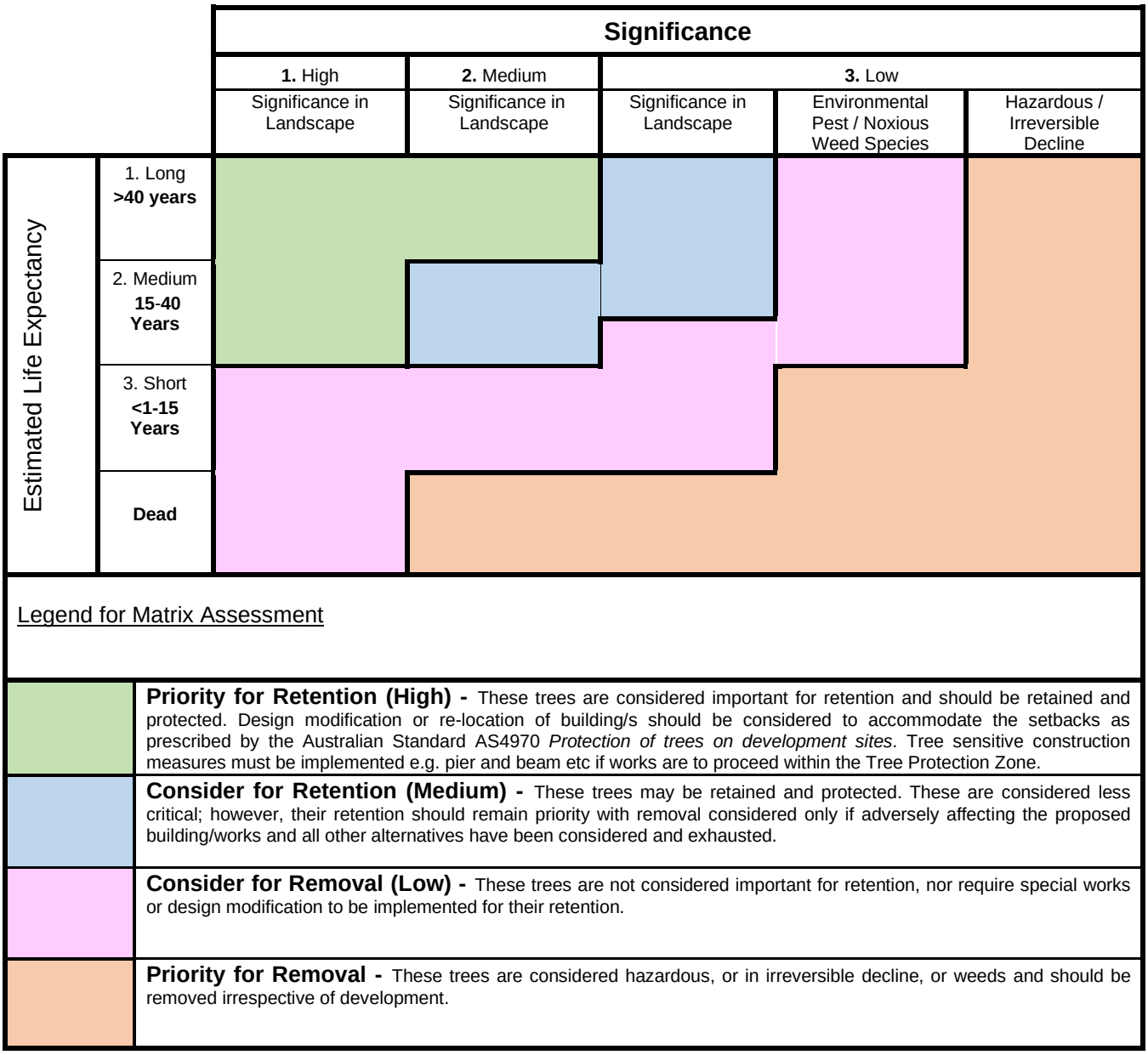
Hazardous/Irreversible Decline

- The tree is structurally unsound and/or unstable and is considered potentially dangerous,
- The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or part in the immediate to short term.

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

Note: The assessment criteria are for individual trees only, however, can be applied to a monocultural stand in its entirety e.g. hedge.

Table 6.0 Tree Retention Value - Priority Matrix



Legend for Matrix Assessment

	Priority for Retention (High) - These trees are considered important for retention and should be retained and protected. Design modification or re-location of building/s should be considered to accommodate the setbacks as prescribed by the Australian Standard AS4970 *Protection of trees on development sites*. Tree sensitive construction measures must be implemented e.g. pier and beam etc if works are to proceed within the Tree Protection Zone.
	Consider for Retention (Medium) - These trees may be retained and protected. These are considered less critical; however, their retention should remain priority with removal considered only if adversely affecting the proposed building/works and all other alternatives have been considered and exhausted.
	Consider for Removal (Low) - These trees are not considered important for retention, nor require special works or design modification to be implemented for their retention.
	Priority for Removal - These trees are considered hazardous, or in irreversible decline, or weeds and should be removed irrespective of development.

USE OF THIS DOCUMENT AND REFERENCING

The IACA Significance of a Tree, Assessment Rating System (STARS) is free to use, but only in its entirety and must be cited as follows:

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

REFERENCES

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

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

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

APPENDIX D
Photographic documentation

Figure 4. Tree 8 forms a hedge of 16 x *Callistemon viminalis*

Figure 5. Tree 20 major encroachment of the TPZ and SRZ due to removal of low retaining walls, pedestrian access to Crabbes Ave and underground parking.

Figure 65. Trees 25 – 32 removal of bitumen, kerb & ripping of subsoil proposed within TPZ

Figure 7. Buttress of Tree 25 overhangs the kerb proposed for demolition.

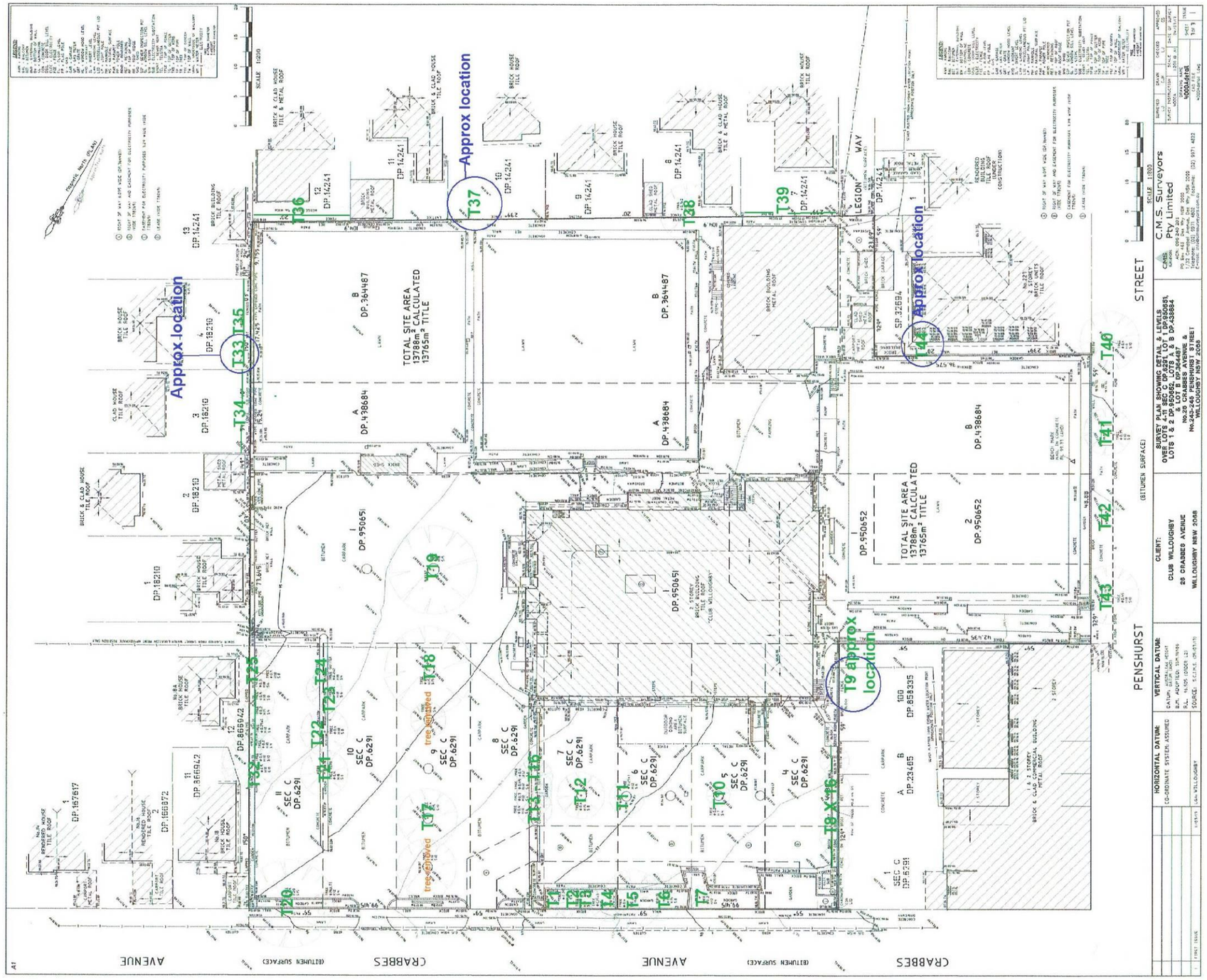
Figure 8. Neighbouring hedge Tree 36.

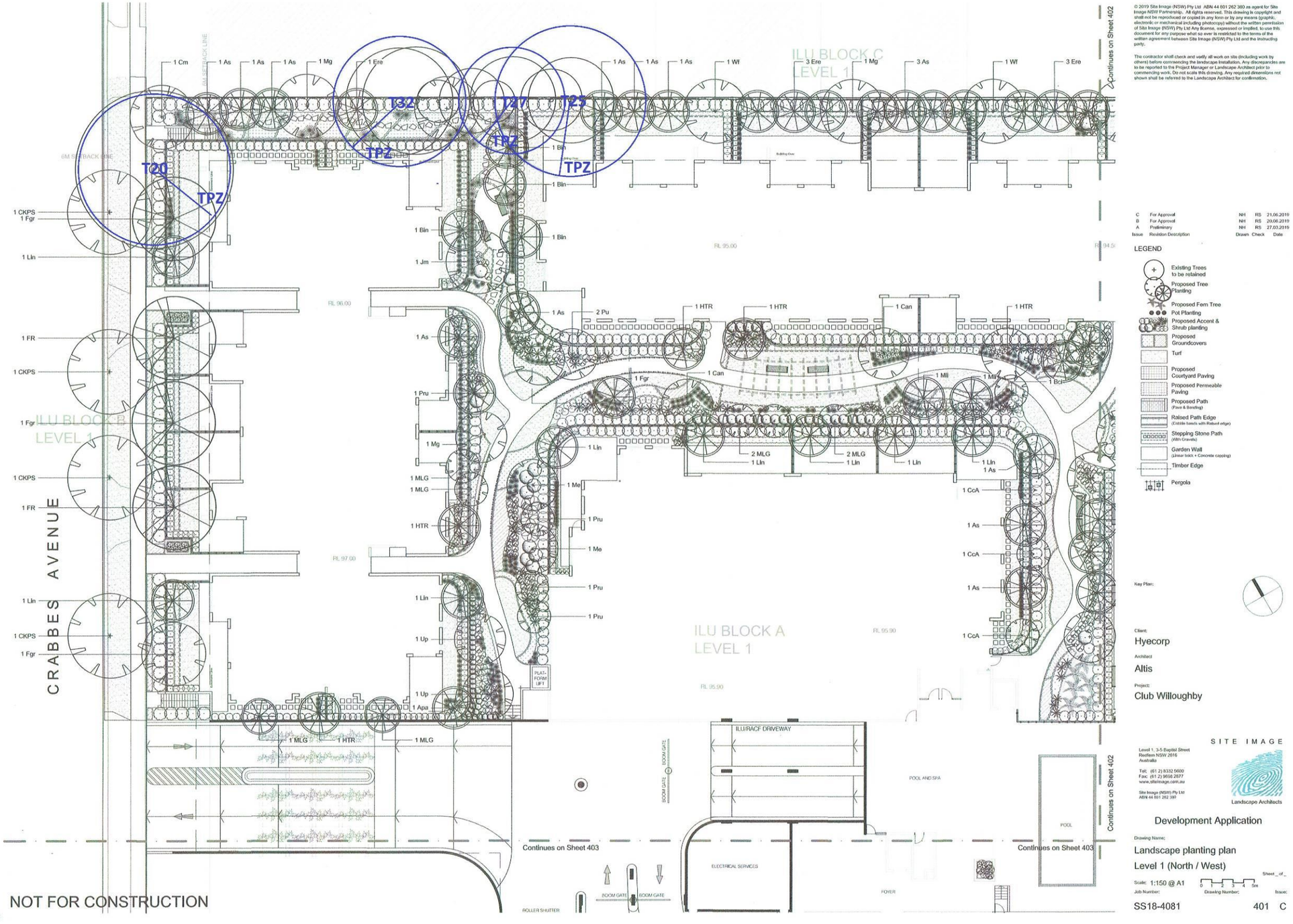
APPENDIX E
Examples of Trunk and Tree Protection Fencing

Figure 9. Example of trunk protection

Figure 10. Example of Tree Protection Fencing & mulching requirements

APPENDIX F
Survey and Landscape Plans





The contractor shall check and verify all work on site (including work by others) before commencing the landscape installation. Any discrepancies are to be reported to the Project Manager or Landscape Architect prior to commencing work. Do not scale this drawing. Any required dimensions not shown shall be referred to the Landscape Architect for confirmation.

Issue	Revision Description	Drawn	Check	Date
C	For Approval	NH	RS	21.06.2019
B	For Approval	NH	RS	20.06.2019
A	Preliminary	NH	RS	27.03.2019

LEGEND

- Existing Trees to be retained
- Proposed Tree Planting
- Proposed Fern Tree
- Pot Planting
- Proposed Accent & Shrub planting
- Proposed Groundcovers
- Turf
- Proposed Courtyard Paving
- Proposed Permeable Paving
- Proposed Path (Pave & Banding)
- Raised Path Edge (Cobble bands with Raised edge)
- Stepping Stone Path (With Gravels)
- Garden Wall (Linear brick + Concrete capping)
- Timber Edge
- Pergola

Key Plan:

Client: Hyecorp

Architect: Altis

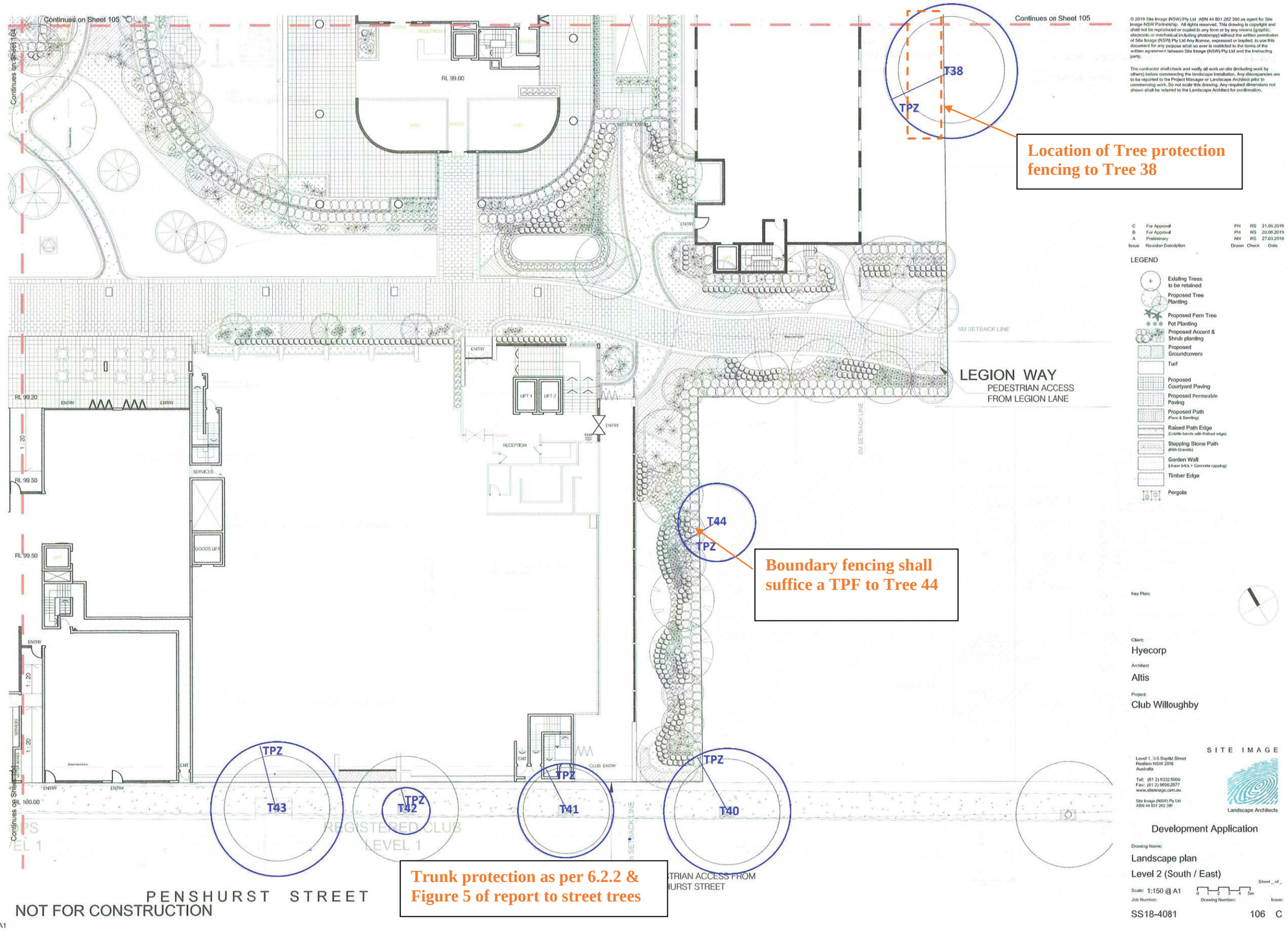
Project: Club Willoughby

SITE IMAGE
Level 1, 3-5 Baptist Street
Redfern NSW 2016
Australia
Tel: (61 2) 8332 5600
Fax: (61 2) 9698 2877
www.siteimage.com.au
Site Image (NSW) Pty Ltd
ABN 44 601 262 380
Landscape Architects

Development Application

Drawing Name: Landscape planting plan
Level 1 (North / West)

Scale: 1:150 @ A1 (0 1 2 3 4 5m)
Sheet _ of _
Job Number: SS18-4081
Drawing Number: 401
Issue: C



City Plan Strategy & Development P/L
ABN 58 133 501 774

3 December 2020

Our Ref: P-16261 (TC)

Mr Chris Nguyen
Assessment Officer
Willoughby City Council
PO Box 57,
CHATSWOOD NSW 2057
Christopher.Nguyen@willoughby.nsw.gov.au

Dear Mr Nguyen,

RE: RESPONSE TO SYDNEY NORTH PLANNING PANEL DEFERRAL OF DA2019/247
PPSSNH-26
ADDRESS: CLUB WILLOUGHBY
26 CRABBES AVENUE & 243-255 PENSHURST STREET, WILLOUGHBY

This letter has been prepared by City Plan Strategy and Development (City Plan) on behalf of Hyecorp Property Group as the Applicant, relating to the above-mentioned development application for demolition of existing structures and construction of a new registered club, three seniors living apartments containing self-contained dwellings, a residential aged care facility, shop top housing, basement carparking and ancillary uses including a new park.

This matter was referred to the Sydney North Planning Panel (SNPP) on 3 November 2020; whereby the application was deferred subject to resolving certain issues.

The reasons for the Panel's deferral are listed below:

> *The Panel decided to defer the application to seek legal advice with respect to the SCC and the proposed deferred commencement conditions for drainage.*
>
> *At the same time, the Panel requires the applicant to provide details of the method, location, including above and below ground, and the likely impact of future drainage works to service the development.*

The purpose of this letter is to provide planning advice in relation to proposed future drainage works to service the development.

1. EXPLANATION OF STORMWATER DRAINAGE

The proposal before the Panel requires the discharge of stormwater from the site by gravity to Council's existing infrastructure in either Horsley Avenue or Summerville Crescent, Willoughby. This would be via a new 2.5m wide easement, within which a stormwater drainage line is proposed, in accordance with Council's requirements.

The new easement would be on private land that does not form part of the development site. There is no proposal for the development consent for this development application to authorise the use of (or any works on) the adjacent private land. The works, and use of that land, would be the subject of a separate development application made (either once an agreement for an easement is place, or a Court-ordered easement is imposed). The details of the stormwater works options have been presented in the documentation solely so that the environmental impact of the development, including works that will inevitability be required (albeit to be approved under a separate development consent), can be assessed by the consent authority on the determination of the current development application.

Presently there are 3 options being considered for the easement and pipe to be located, with Option 2 being the preferred.

The letter from IDC, dated 3 December 2020 and attached to this letter, confirms that each of the three options:

- Will achieve Council's statutory requirements for hydraulic performance, without surcharge in private property, and
- Will provide an acceptable drainage solution for the development site with no material adverse impacts in terms of drainage management.

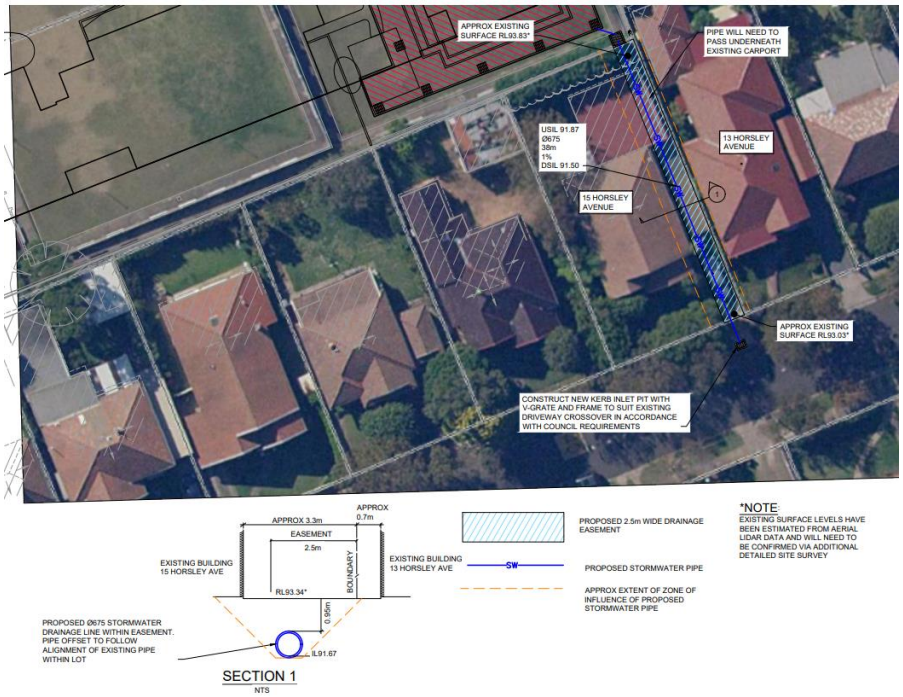
These options have been considered as each of them will have minimal environmental impact, whilst still achieving gravity fall to the street. The methodology chosen results in no changes to the existing ground levels within the easement area and the pipes will not be visible. There would be, therefore, no adverse amenity impacts.

An Arborist Report prepared by Glenyss Laws Consulting Arborist, dated 23 November 2020 Revision B is attached with this letter providing advice in relation to the 3 options, as well as a report prepared by Bortec Laser Bore Pty Ltd, dated 24 November 2020 explaining the process. All three scenarios are acceptable in arboricultural terms and raise no issue of any material adverse impact on trees.

The construction methodology would be to adopt trenchless technology which would be to bore under or near any structures and landscaping. This would reduce the impact on landscaping as well, and it is intended to be able to the do the full length of the pipe in one continuous tunnel. The Bortec report states that due to the soil identified in the geotechnical reports, "the risk of subsidence or structural damage would be almost non-existent" and they do not expect any problems with the bore.

1.1. Option 1 - 15 Horsley Ave, Willoughby, easement to the east.

Option 1 is for the easement/pipe to go along the eastern side boundary of 15 Horsley Ave, Willoughby, which currently has carport and building structures within it. (Refer to Figure 1 below)



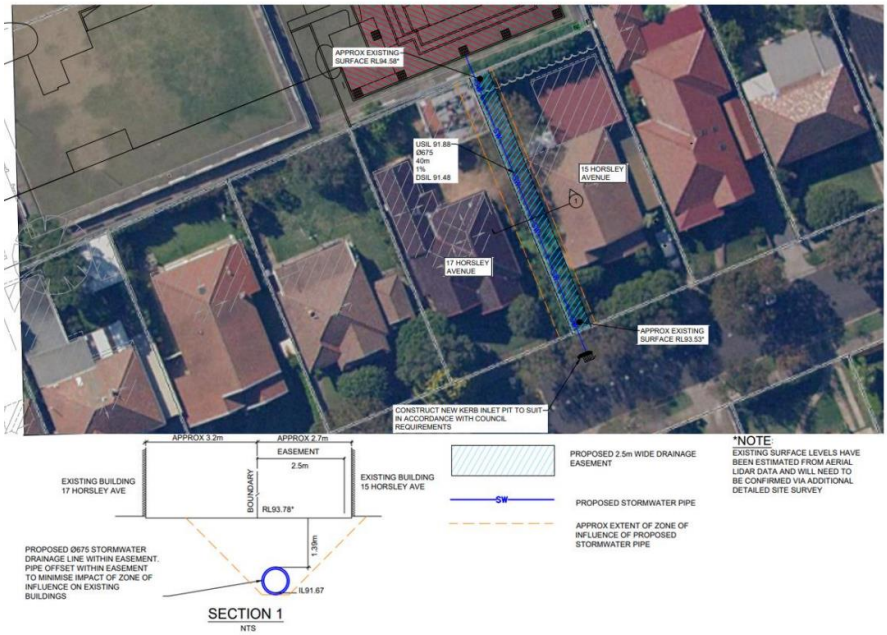
(Figure 1: proposed easement along eastern side of 15 Horsley Avenue, Willoughby, Source: HyeCorp Property Group)

This option requires the pipe to extend under carport and building structures and is within close proximity to the adjoining building at No. 13 Horsley Ave, Willoughby. Further, the Arborist report states that the stormwater pit is likely to fall within the footprint of the most eastern two trees which forms part of the hedge…"*the species is exempt under Appendix 1, Section C9 of Willoughby Council's Vegetation Management policy WDCP 2012. The hedge or part thereof can be removed provided consent is obtained by the property/tree owner*"

Although this can be achieved with minimal impact on the adjoining properties it is not the preferred option due to the location of the building structures and potential removal of some vegetation.

1.2. Option 2 - 15 Horsley Ave, Willoughby, easement to the west.

Proposes the provision of the easement and pipe along the western side boundary of No. 15 Horsley Avenue. This will be at a depth of 1.39m to top of pipe, extending from the rear to front boundary. (Refer to Figure 2 below)

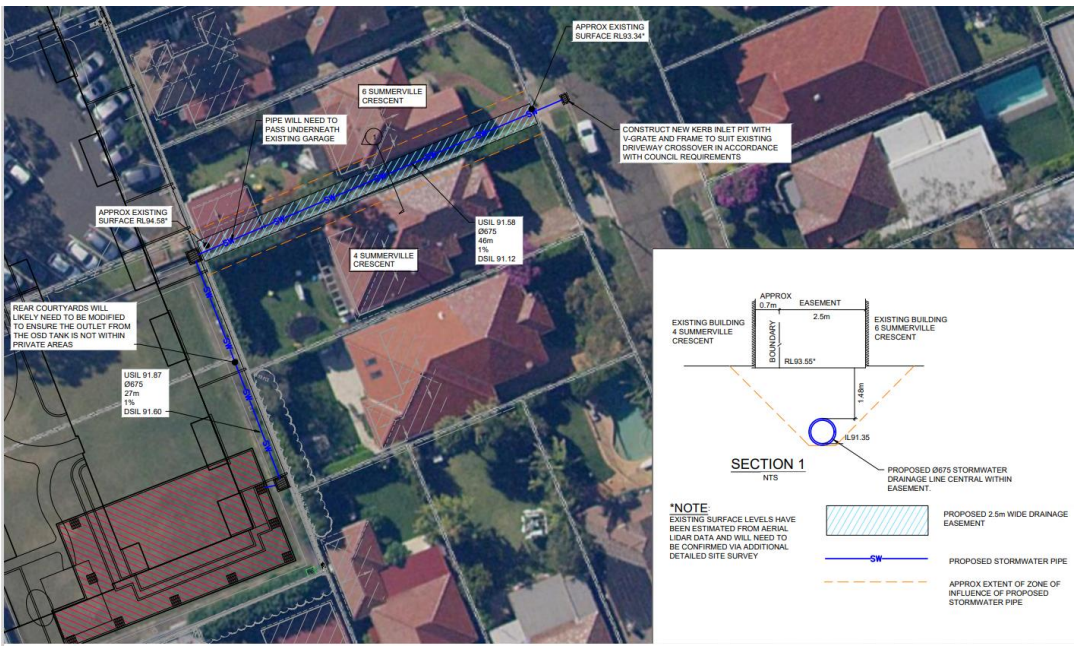


(Figure 2: proposed easement along western side of 15 Horsley Avenue, Willoughby, Source: HyeCorp Property Group)

This is considered the best option. While all of the three options have no or only negligible adverse impacts, this option has the least impact on adjoining properties. There are no structures within the proposed easement width, and the landscaping along that boundary consists of a hedge. The Arborist report states "*a stormwater drainage pit offset approximately 2m to the most western tree of the hedgerow identified as Tree 36. The proposal is a minor and acceptable encroachment under Clause 3.3.2 of AS4970 and equates to <4%. No trees or shrubs will require removal as part of Option 2*".

1.3. Option 3 - 6 Summerville Cres, Willoughby

This option is to connect the easement to through No. 6 Summerville Cres, Willoughby. (Refer to figure 3 below)



(Figure 3: proposed easement along the side of 6 Summerville Cr, Willoughby. Source: Hyecorp Property Group)

This option requires the pipe to go under garage structure, it is within close proximity to the adjoining building at No. 4 Summerville Cr, Willoughby; and may require the rear courtyards of the proposed development to be modified upon detailed drainage design. The Arborist report states "*The proposed stormwater line connecting to the easement running to the west of 4 & 6 Summerville Cres is a major TPZ/SRZ encroachment to Trees 33 & 34. Provided trenchless technology is adopted to install both the stormwater drainage and easement, then there will be no conflict or encroachment to the root system of vegetation on the neighbouring properties 4 & 6 Summerville Cres.*" This option is considered acceptable, however options 1 and 2 are simpler.

2. CONCLUSION

When considering the options as presented above, and based on the arborist information and boring methodology as well as aerial google map views of the various sites; the preferred option is No. 2. This option has no structures to contend with and will have minimal to no effect on the neighbouring trees and large shrubs due to the methodology and depth being proposed (as detailed in the documentation submitted to Council including arborist review and boring construction methodology).

Options 1 and 3 require boring under building structures, and in the event of option 3 it also impacts on the rear courtyards of the existing development as well as being close to significant trees. Nonetheless, these options are also acceptable in terms of environmental impacts.

We believe the options put forward comply with the requirements of Council's Draft Deferred Commencement Consent conditions, and will result in little to no impact on the adjoining neighbours. The pipe will not be visible and the ground levels are not being altered in the adjoining properties.

As the actual approval of the use of the adjacent private land (and the construction of the drainage lines through that land) is not sought as part of the current development application, it is not necessary for the consent authority to determine which of three options is ultimately implemented. The consent authority can be satisfied now that, whichever option is used, the environmental impacts have been considered and are acceptable. The selection of the final option would be a matter for the proponent, once an agreement for an easement (or a Court-ordered easement) is in place and a development application is submitted. These matters would have to be satisfactorily resolved before the development consent becomes operational (that is, they would be subject to a deferred commencement condition).

Irrespective of whichever option is chose, the applicant is fully aware of their responsibility in ensuring all works are at their cost and this is to include the reinstatement of any landscaping which may be affected during the process.

Yours Faithfully,

Tina Christy
Associate Director

3. APPENDIX 1 - LETTER PREPARED BY IDC INFRASTRUCTURE AND DEVELOPMENT CONSULTING

APPENDIX 2 - ARBORICULTURAL IMPACT ASSESSMENT REPORT PREPARED BY GLENYSS LAWS CONSULTING ARBORIST

4. APPENDIX 3 - LETTER PREPARED BY BORTEC LASER BORE PTY LTD DETAILING METHODOLOGY