ARBORICULTURAL IMPACT ASSESSMENT REPORT

STATION STREET FOOTBRIDGE, MENANGLE

Prepared for: Mirvac Homes (NSW) c/o Calibre

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STURT NOBLE ARBORICULTURE

Sturt Noble
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1.0 INTRODUCTION

1.1 Purpose of this Report

Sturt Noble Arboriculture was engaged by Mirvac Homes (NSW) c/o Calibre to prepare an Arboricultural Impact Assessment Report and Tree Protection Recommendations in relation to the proposed Station Street footbridge between Stevens Road and Road No. 01 in Stage 2. The footbridge will allow pedestrians to move safely over the rail corridor.

This report deals with trees between the Stage 1 development and the future Stage 2 development and on the rail corridor easement.

The purpose of this report is to:

- Assess and review the health and condition of existing trees by undertaking a Visual Tree Assessment.
- Assess each individual tree's suitability to be retained as a sustainable part of the proposed development in the long term, considering the likely impacts of works proposed.
- Provide recommendations for tree removal, retention and protection.
- Provide recommendations where appropriate to enable trees to be retained or have better long term health outcomes and minimize potentials for hazard.
- To provide information on appropriate tree protection measures, appropriate setbacks, constraints and tree management procedures during site works.

This report has been carried out as per the Methodology outlined in **Appendix 1**

1.2 Background

The preparation of this report has been prepared in awareness and consideration of the following standards, controls and guidelines:

- Wollondilly Shire Council's Development Control Plan 2016 including:
  - Control 6.3 Heritage Conservation Area – Menangle
  - PART 10 – Tree removal
- Australian Standard AS4970-2009 Protection of Trees on Development Sites
- Australian Standard AS4373-2007 Pruning of Amenity Trees

It has also taken into consideration advice from the following reports:

- Flora and Fauna Assessment for a Pedestrian Bridge, Station Street Menangle, Project No. 34876, 23.04.2021 by Biosis
- Sturt Noble Arboricultural Impact Assessment ARB-1819-001 rev C dated 16/11/2018 as approved with DA/2019/93

1.3 The Proposal

This impact assessment has been prepared based on the following plans:

- Detail and Contour Survey over part Lot 202 D.P. 590247 and part Lot 11 D.P. 1262205, DWG ref. 300058-DET-004-A, 27/04/2021 prepared by ADW Johnson
- Engineering Plan 17-003293-02-PED_LD_SWC_DESIGN (002), 15/08/2022 prepared by Calibre
- Soil and Water Management and Site Regrading Plan 17-003293.002.PED Drawing No. 101, 01/07/2021 prepared by Calibre

Refer to plans **Appendix 2.**

The proposed works to the site include:

- Site regrading
- Construction of new kerb, ramp, pavement and footbridge
- Excavation for services and utilities

The plans provided by Calibre Consulting and Bridge Design of the proposed new footbridge are quite thorough and will allow us to make a reasonably complete assessment.

1.4 Foreseeable Construction Impacts

Foreseeable impacts noted from the proposed development, construction type and anticipated methodology include:

- Excavations and filling for site regrading
- Excavations and construction of new kerb ramps, road surfacing and pavements
- Excavations and trenching for underground stormwater services
- Excavations and footings for new footbridge
- Soil level changes including the placement of fill material for the footings and to make up grades
- Laying impermeable paving to paths
- Movement and storage of plant, equipment & vehicles;
- Erection of site sheds;
- Storage of building materials, waste and waste receptacles.

2.0 PLANNING CONTROLS

2.1 Planning Definitions

Wollondilly Shire Council's Development Control Plan 2016 Volume 1 – General defines the following:

"Native Vegetation means any of the following types of indigenous vegetation:

(a) trees (including any sapling or shrub, or any shrub);
(b) understorey plants;
(c) groundcover (being any type of herbaceous vegetation);
(d) plants occurring in a wetland.

Vegetation is indigenous if it is a species of vegetation, or if it comprises species of vegetation, that existed in the state before European settlement.

In this section a tree is considered to be a tree or shrub which meets one of the following:

(a) is greater than 3 metres in height; or
(b) The trunk has a circumference of 450mm at 1 metre above ground level; or
(c) has a branch span of greater than 3 metres."

2.2 Council Consent

Wollondilly Shire Council's DCP notes the following planning and approval requirements:

- *Any prescribed tree or native vegetation shall not be ringbarked, cut down, topped, lopped, removed, poisoned, injured, or wilfully destroyed without a Tree and Bushland Vegetation Removal Permit unless authorised by a current Development Consent.*
- Some trees as outlined in the DCP are exempt. These species can be removed without consent from Council. These include:
  - *Removal of a tree or other form of vegetation being carried out under the following legislation:*
  - *(a) Action required, or authorised to be carried out under the Electricity Supply Act 1995, the Roads Act, 1993 or the Surveying and Spatial Information Act 2002.*
  - *(b) The Clearing of Native Vegetation that is authorised by a development consent or a Property Vegetation Plan under the Native Vegetation Act, 2003.*
  - *(c) Functions as required to protect persons from dangers to their safety and health, and to protect property from destruction or damage, arising from floods and storms under the State Emergency Services Act, 1989.*
  - *(d) Works for which an order or permit has been issued by the NSW Rural Fire Services under the Rural Fires Act, 1997.*
  - *(e) Any removal authorised for removal from the NSW Rural Fire Service 10/50 Vegetation Clearing Code of Practice for NSW.*
  - *(f) Removal carried out in accordance with a license, permit, authority or approval under the Water Act, 1912 or the Water Management Act, 2000.*

- *(g) Removal for the purpose of the construction, operation and maintenance of infrastructure by Water NSW in the exercise of its land management activities within SP2 zones, including roads, tracks, viewing platforms, signs and recreation facilities.*
- *(h) Removal on Crown Lands within the meaning of the Crown Lands Act, 1993 or on crown public roads within the meaning of the Roads Act, 1993, where removal is being undertaken or authorised by the Department of Lands.*
- *(i) Any clearing carried out in accordance with an order under the Trees (Disputes between Neighbours) Act, 2006 or other like Neighbourhood Dispute legislation.*

- Removal of a tree or other vegetation species that is a declared noxious weed by the NSW Government under the Noxious Weeds Act, 1993 or that is a species of tree identified on Councils exempt list, regardless of size (unless the tree is listed as a heritage item)
- *The row of established vegetation that runs along Stevens Road shall be retained during any future development*

3.0 THE EXISTING SITE

3.1 The Site

The project is located between Stevens Road and Moreton Park Road, Menangle, NSW, within Lot 11 D.P. 1262205, Lot 202 D.P. 590247 and within the public road boundaries. The site is situated within the Wollondilly Shire Council Local Government Area (LGA). Refer Figure 1 – Site location plan. It is located within the Menangle development area.

The site is between existing Stage 1 development and future Stage 2 development and this report assesses the trees in that area. Stage 1 is to the west of the rail corridor while Stage 2 is to the east.

The site currently consists of a vehicular bridge that runs perpendicular to the rail corridor which forms part of Station Street. Stevens Road and Moreton Park Road run parallel to the rail corridor and the ground level falls steeply from these roads to the train tracks. The proposed Stage 2 road is north of the termination of Moreton Park Road and currently consists of a private dirt road. The Stage 2 area is largely cleared agricultural land with trees being a combination of scattered groupings of exotic and native (non endemic) species.

Figure 1: Location Plan

3.2 Soils

The bedrock at the site belongs to Ashfield Shale and comprises dark grey to black shale and laminate. The soil belongs to the Theresa Park soil group, which is characterised by gently undulating slopes, mostly less than 5%, on Tertiary and Quaternary flood plains and terraces of Nepean Rive south of Cobbitty Creek. Soils in this landscape are highly variable and include poorly structured orange to red silty loam. The landscape is susceptible to localised flooding, seasonal water logging, very high erosion and concentrated flows.

3.3 Vegetation Communities

Biosis completed a Flora and Fauna Assessment for the area directly affected by the pedestrian bridge. The study area was found to be dominated by remnant canopy trees with highly disturbed understorey and groundcover species which consist primarily of exotic grasses and weeds. The study area has previously been cleared with remnant native species and exotic introduced species distributed linearly along the side of Stevens Road, with smaller remnant patches also occurring at the edges of Station Street. Two native vegetation communities were found in the study area:

- *PCT 849 Grey Box – Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion* which forms part of the Cumberland Plain Woodland CEEC
- Urban Native/Exotic

The occurrence of *Eucalyptus crebra* (Tree Nos. 2 and 3) within this area identifies it as part of the Cumberland Plain Woodland.

No threatened flora species were recorded in the study area and according to the Flora and Fauna Assessment by Biosis, they are unlikely to occur.

One *Eucalyptus tereticornis* (Tree 4A) was surveyed on the eastern side of the rail corridor and is a dominant species in the Shale Plains Woodland ecological community and could be a remnant bushland specimen.

3.4 The Trees

Seven trees have been surveyed as part of this assessment. Four are within the road reserve along Stevens Road and Station Street while the remaining three are within the rail corridor. Five trees are native and two are exotic species. Refer to **Appendix 2** for tree locations and numbers.

Each of the trees assessed has been allocated a Sustainable Retention Index Value (SRIV) that is based on their health, vigour, structure and age class. The SRIV does not take into account the impact of the proposed development.

A complete and detailed tree assessment schedule was prepared and is included in **Appendix 3**.

Trees 10 and 11 have previously been assessed by Sturt Noble Arboriculture and have been approved for removal on the 21st May 2021, Consent No. DA/2019/93/2.

Trees 1, 5, 6, 8 – 11 have previously been assessed by Sturt Noble Arboriculture in relation to Consent No. DA/2019/93/2 dated 21st May 2021. Trees 1, 5 and 6 have been reassessed in light of the newly proposed works. Trees 8-11 are not part of this assessment. They remain on the plans for reference.

We were unable to ascertain the exact TPZ of Tree 4A as it is located on railway land and surrounded by a significant vegetation barrier. An estimate has been provided by Sturt Noble Arboriculture.

3.5 Special Tree Conditions

Tree preservation orders do not apply to Tree Nos. 1A and 2A that are African Olives (*Olea europaea)* and are on Council's exempt list.

Wollondilly Shire Council's Development Control Plan 2016 Volume 1 Section 10.3 item 4 states: "*Removal of any tree or other form of native vegetation that Council is satisfied is dying or dead and is not required as the habitat of native fauna. The owner of the land (or persons acting on their behalf) on which the tree or vegetation exists must provide to Council written justification, including photographs, from an arborist or other suitably qualified person. Works must not be undertaken until Council has provided written advice that it is satisfied that the tree or vegetation is dying or dead."* Based on this clause, we recommend that permission is sought from Council to remove Tree 3 that has been identified as dead by Sturt Noble Arboriculture.

Wollondilly Shire Council's Development Control Plan 2016 Volume 1 Section 6.9 item 14 states: *"The row of established vegetation that runs along Stevens Road shall be retained during any future development."*

There are no endangered tree species on site. Three trees are part of indigenous plant community Cumberland Plains Woodland, two *Eucalyptus crebra* (Tree Nos. 2 and 3) and one *Eucalyptus tereticornis* (Tree No. 4A).

We could not locate the Council's Significant Tree Register at the time of writing this assessment.

4.0 ABORICULTURE IMPACT ASSESSMENT

4.1 Construction Assumptions

It is assumed for this report that the following activities will impact on existing trees:

- Excavations and filling for site regrading
- Excavations and construction of new kerb ramps, road surfacing and pavements
- Excavations and trenching for underground service
- Excavations and footings for new footbridge
- Soil level changes including the placement of fill material for the footings and to make up grades
- Laying impermeable paving to paths
- Movement and storage of plant, equipment & vehicles
- Erection of site sheds
- Storage of building materials, waste and waste receptacles

4.2 Trees to be removed

The plans show that five trees will need to be removed to accommodate the proposed development.

Table 1: Trees to be removed

Construction works critical to the following trees	Removal recommended due to death/ poor health	Tree species to be removed (exempt and can be removed without consent)
T2	T3	T1A, T2A

Trees 2 and 3 are located within the rail corridor. Approval will need to be sought for the removal of both of these trees.

Since the previous arboricultural assessment undertaken by Sturt Noble in 2019, Tree 3 has died. We recommend removal of the dead tree as it could become a hazard as it deteriorates.

Trees 1A and 2A are on Council's exemption list and can be removed without application for consent.

4.3 Trees to be retained

With implementation of the tree protection measures it should be possible to retain all other trees on the developed site. The plans show that five trees are proposed to be retained.

Table 2: Trees to be retained

Clear of all works	Minor encroachment from works	Major encroachment from works
T4A	NA	T1, T4, T5, T6, T7

Trees 4, 5, 6 & 7 will be majorly impacted by trenching for underground services with a maximum encroachment of 33.7%. These trees are suitable for underboring and we recommend underboring at a minimum depth of 1.5m for the full extent of the TPZ is utilised to install underground services . In this way T4, T5, T6, T7 can be retained with only minor impacts.

The TPZ of Tree 1 will be moderately impacted by proposed the new kerb line. The encroachment is moderate at 15.1% and the tree can be retained if appropriate tree protection works are undertaken.

These encroachments are in my opinion of lesser importance as the TPZ's are located in an impervious graded gravel road surface with poor conditions for feeder root establishment. In addition, Tree nos. 1,5 and 6 would have already been impacted by construction of the road kerb along the western side of Stevens Road. It is highly probable that any structural or large roots would have been severed at this stage of the works. The existing trees appear to have accommodated this disturbance.

We do note a footpath kerbside of Trees 1,5 and 6 is now indicated on revised drawings. The engineers have specified permeable paving laid on a gap graded subbase ABOVE existing grades with no cut. Subject to this been carried out T1, T5, T6 can be retained with only minor impacts.

We were unable to ascertain the TPZ of Tree 4A as it is located on railway land and surrounded by a significant vegetation barrier. However, based on a visual assessment of the size of the tree we have supplied an estimated TPZ and we believe it is clear of all works.

Proposed design and construction of the footbridge and associated services should consider the Tree Protection Zones as discussed in the following sections to minimise any adverse impact.

Careful consideration is especially required to all works proposed in the Stevens Road Reserve to ensure impacts to the street trees are minimised. This shall include the works themselves, their location and construction methodology

4.4 Works within Tree Protection Zones

Any disturbance to soils within TPZ's could destabilise the trees or impact on long term health. Should any changes to soil within the TPZ/ SRZ be proposed further discussion and assessment must be undertaken.

The plan in **Appendix 2** indicates trees TPZ's and SRZ's and should be used to inform later design decisions and temporary tree protection fences.

4.5 Pruning works

In addition to Tree Protection Zones, the extent of the canopy (canopy dripline) should also be considered, particularly in relation to construction activities and along access points.

Significant pruning of trees to accommodate digging machinery is generally not acceptable. Trees may not be pruned by more than 10% without consent.

Branches should be temporarily pushed or tied where possible to minimise the amount of pruning works.

4.6 Ongoing management of trees to be retained

A number of the trees identified to be retained have structural defects and/or deadwood at the time of assessment. Ongoing monitoring and maintenance should be undertaken especially for trees located in areas of high use and activity.

Trees 4 and 7 should be pruned to remove deadwood.

5.0 TREE PROTECTION RECOMMENDATIONS

5.1 Tree Protection Measures

It is recommended that a site specific Tree Protection Plan (TPP) is prepared to guide the construction process to ensure all trees designated for retention remain as a sustainable part of the landscape in the long term.

The plan shall be prepared by a consulting arborist (AQF Level 5) and should at a minimum include a detailed plan of the locations of, and specifications for, tree protection measures.

The TPP shall include a monitoring schedule relating to critical points during the works (hold points) where the Project Arborist is required to visit the site and confirm that works are being undertaken as conditioned by Council/as required.

The following tree protection measures shall be implemented prior to the commencement of any site works, and shall remain in place for the duration of the development.

5.2 Tree Protection Zones

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

The following activities are generally prohibited within the specified Tree Protection Zones. Site arborist will provide advice where encroachments are required:

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

Where possible place a 50-75mm layer of coarse organic mulch over the entire surface of the TPZ or within the nominated Tree protection area. Where the TPZ is adjacent to

construction activities first lay down geotextile fabric beneath the mulch to facilitate easy removal of the mulch at completion and any accidental spillage of construction materials.

Install drip irrigation around the root zone if required by the Project Arborist.

5.3 Tree Protection Fencing

All trees within the site to be retained shall be protected prior to and during construction from all activities that may result in detrimental impact by erecting a suitable protective fence beneath the canopy to the Tree Protection Zone where possible (excluding the footprint of the proposed works, vehicle access areas, roadways and areas within adjoining properties).

As a minimum the fence should consist of temporary chain wire panels 1.8 metres in height, supported by steel stakes as required and fastened together and supported to prevent sideways movement. The fence shall be erected prior to the commencement of any work on-site and shall be maintained in good condition for the duration of construction. Where tree protection zones merge together a single fence encompassing the area is deemed to be adequate.

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

Refer to **Appendix 4** for examples of protective fencing and signage.

5.4 Trunk, Branch & Ground Protection

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

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

Refer to **Appendix 4** for examples of trunk, branch and ground protection.

5.5 Demolition Works within Tree Protection Zones

Where demolition of structures and pavements is required within the Tree Protection Zones of trees to be retained it is to be carried out to avoid disturbance to existing soils, damage to existing roots or potential root growth.

Machinery shall work within the footprint of existing pavements where possible to avoid compaction of the adjacent soil and Tree Protection Zones.

When removing hard surfaces it shall be stripped-off in thick layers using a small rubber tracked excavator or alternative approved method to avoid damage to underlying roots and minimise soil disturbance. The final layer of sub-base material shall be removed using hand tools where required to avoid compaction of the underlying soil profile and damage to woody roots.

If any concentrations of roots or roots with diameters equal to or greater than 50mm are encountered they must be retained in an undamaged condition for assessment by the Project Arborist. If the Project Arborist deems surrounding underground elements such as footing and pipes are providing support, these elements shall be left in-situ.

5.6 Excavations within Tree Protection Zones

The excavator shall work within the footprint of existing pavements where possible to avoid compaction of the adjacent soil and Tree Protection Zones.

5.7 Underground Services

All proposed underground services should be located as far away as practicable from existing trees to be retained to avoid excavation within the Tree Protection Zone.

For underground services, where the incursion to the Root Zone is less than 10% of the total TPZ (i.e. beyond the Minimum Setback Distance), a chain trenching device may be used. A backhoe or skid steer loader (bobcat) is unacceptable due to the potential for excessive compaction and root damage. Where large woody roots (greater than 50mm in diameter) are encountered during excavation or trenching, these shall be retained intact wherever possible (eg by sub-surface boring beneath roots or re-routing the service etc).

Excavations required for underground services within the Structural Root Zone of any tree to be retained should only be undertaken by sub-surface boring. The Invert Level of the pipe, plus the pipe diameter, must be lower than the estimated root zone depth as specified at a minimum depth of 600mm. This will depend on the soil conditions at the site. Where this is not practical and root pruning is the only alternative, proposed root pruning should be assessed by the Project Arborist to determine continued health and stability of the subject tree.

5.8 Canopy pruning

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

All pruning works shall be directed by the Project Arborist and shall be carried out by an AQF Level 3 Arborist. All pruning works shall be in accordance with the Australian Standard *(AS) 4373:2007 Pruning of amenity trees.* This standard outlines appropriate pruning practices and procedures that reduce the risk of damage and injury to trees. Correct pruning practices respect the natural form and branching habit of a tree and work with the trees natural defence mechanisms against disease to avoid damage and injury to trees.

Pruning should always be limited to the minimum amount necessary to achieve the desired aim. Significant loss of foliage created by excessive pruning may weaken the tree, leading to premature decline or predisposition to branch failure or disease, creating potential hazards.

Council consent will be required prior to commencement of the work. Pruning must be performed in accordance with *Australian Standard (AS) 4373:2007 Pruning of amenity trees* (Standards Australia 2007).

5.9 Root Investigation

Exploratory excavation may be required where the proposed excavation created by the development works exceeds 10% of the Tree Protection Zone of any Prescribed Tree; or service trenches are required within the TPZ; to determine the impact of the development on the tree. The purpose of the investigation is to verify the quantity, size, type, depth and orientation of tree roots along the perimeter of the proposed encroachment in order to make an informed judgement in relation to the potential impact on the tree.

Exploratory excavation shall only be carried out using non-destructive or non-injurious techniques, such as careful digging using hand held implements, using compressed air (Airspade®), water pressure, or suction (vacuum device) or a combination of these techniques, to carefully remove soil without damaging roots. The work shall be undertaken by an arborist with a minimum qualification of AQF Level 3. Once roots are exposed, a visual examination can be carried out with the Project Arborist to evaluate the potential impact of the proposed root loss on the health and stability of the tree.

5.10 Root Pruning

Where root pruning is required, roots shall be severed with sterile, clean, sharp pruning implements resulting in a clean cut. Any excavated root zones shall be retained in a moist condition during the construction phase using Hessian material or mulch where practical. Trees that have roots removed shall have drip irrigation installed around the root zone to ensure they receive an adequate supply of water.

5.11 Tree Damage/ Decline

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

In the event of any tree becoming damaged for any reason during the construction period the Project Arborist must be engaged to inspect and provide advice on any

remedial action to minimise any adverse impact. Such remedial action shall be implemented as soon as practicable and certified by the arborist.

6.0 CONCLUSION

Ten trees have been considered as part of this assessment and their locations are shown in **Appendix 1**, of which five trees are located within the road reserve and five are located within the rail corridor.

The supplied plans and assessment show that:

- Two trees will need to be removed to accommodate the proposed development. These trees are Nos. 2 & 3 and are in the rail corridor and consent from Rail must be sought for the removal of these trees.
- Trees 4, 5, 6 & 7 will be majorly impacted by trenching for underground services with a maximum encroachment of 33.7%. These trees are suitable for underboring and we recommend underboring at a minimum depth of 1.5m for the full extent of the TPZ is utilised to install underground services. In this way T4, T5, T6, T7 can be retained with only minor impacts.
- The TPZ of Tree 1 will be impacted by proposed the new kerb line. The encroachment is moderate at 15.1% and the tree can be retained if appropriate tree protection works are undertaken.
- These encroachments are in my opinion of lesser importance as the TPZ's are located in an impervious graded gravel road surface with poor conditions for feeder root establishment. In addition, Tree nos. 1,5 and 6 would have already been impacted by construction of the road kerb along the western side of Stevens Road. It is highly probable that any structural or large roots would have been severed at this stage of the works. The existing trees appear to have accommodated this disturbance.
- We do note a footpath kerbside of Trees 1,5 and 6 is now indicated on revised drawings. The engineers have specified permeable paving laid on a gap graded subbase ABOVE existing grades with no cut. Subject to this been carried out T1, T5, T6 can be retained with only minor impacts.
- Trees 1A and 2A are on Council's exempt list and should be removed.
- Two trees are to be retained as part of the proposed development. These trees are Nos. 1 and 4A.
- Trees 4 and 7 should be pruned to remove deadwood.
- We were unable to ascertain the TPZ of Tree 4A as it is located on railway land and surrounded by a significant vegetation barrier. However, based on a visual assessment of the size of the tree we believe it is clear of all works.
- Trees 8 - 11 are not part of this assessment. They remain on the plans for reference.

Trees to be retained as part of the approved development must be protected from potential damage caused by construction activities. Refer to Section 5.0 for tree protection recommendations and to the tree retention plan in **Appendix 2.**

Where recommended work processes and tree protection measures cannot be adhered to further advice should be sought from the Project Arborist.

7.0 DISCLAIMER

The author and Sturt Noble Arboricultural Consulting take no responsibility for actions taken and their consequences, contrary to those expert and professional instructions given as recommendations.

This is not a hazard assessment report and it should be noted that trees are always inherently dangerous. This assessment was carried out from the ground, and covers what was reasonably able to be assessed and available to the assessor at the time of inspection. No aerial or subterranean inspections were carried out and structural weakness may exist within roots, trunk or branches.

Any protection or preservation methods recommended are not a guarantee of tree survival or safety but are designed to improve vigour and reduce risk. Timely inspections and reports are necessary to monitor the trees' condition. No responsibility is accepted for damage or injury caused by the trees and no responsibility is accepted if the recommendations in this report are not followed.

Limitations on the use of this report: Trees are dynamic living structures, growing and adapting to conditions around them. Tree condition will change and vary over time depending on weather, environmental factors and mechanical or human interaction.

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

Assumptions: Care has been taken to obtain information from reliable resources. All data have been verified insofar as possible; however, Sturt Noble Arboricultural Consulting 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.

Assessment is limited to the conditions at the time of the inspection and only trees discussed in the report have been assessed.

Where access to the base of the tree is limited, such as difficult site access due to site conditions, only general comments can be made. Assessment of tree health and structure is limited to that visible from the site of proposed works and may not reflect the true condition of the tree. Assessment of tree health and structure is limited to that visible from the site of proposed works and may not reflect the true condition of the tree.

Plans used to assess likely impact are those appended/ referenced.

Ongoing monitoring of all trees is advised and where significant changes are observed, further advice should be requested. Unusual developments or sudden changes in a tree's condition should be addressed immediately.

8.0 REFERENCES

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APPENDIX 1: METHODOLOGY

A1.1 Site Inspection

This report, its comments and recommendations have been prepared based on the information gathered during a detailed site inspection carried out on the on the 21st April 2021. This assessment is summarised in **Appendix 1**.

A1.2 Tree Locations

The location of the subject trees are based on the site survey prepared by ADW Johnson dated 27/04/2021 DWG. Ref. 300058-DET-004-A.

A1.3 Visual Tree Assessment

The trees were assessed from the ground by the Visual Tree Assessment (VTA) method as described in Mattheck & Breloer (1994), using non-invasive tools such as binoculars and acoustic mallet. No digging or exposing of the root zones occurred in this inspection and no aerial inspection by climbing was performed. No diagnostic testing was undertaken as part of this assessment.

The following data was collected for each tree:

- Botanical and common name.
- Tree dimensions (approximate only).
- Canopy density (approximate only).
- Overall health and vitality, including epicormic growth, deadwood and predation by pests and diseases.
- Structural condition including evident faults such as Bark Inclusions or poor branch attachments, decay, cavities and mechanical or biological damage.
- Stability of the tree including excessive trunk lean, stability of the soil, soil cracking, soil heaving, exposed roots and root damage.

A1.4 Retention Value

Each tree has been given a Sustainable Retention Index Value (SRIV) according to the rating system set out in the Sustainable Retention Index Value Matrix (refer to the table in section A1.8). The SRIV for each tree is based on its health, vigour, structure and age class as established in the Visual Tree Assessment. The SRIV does not take into account the impact of the proposed development.

A1.5 Landscape Significance Assessment

Landscape Significance is an essential criterion to establish the importance that a particular tree may have on a site. Each tree has been given a Tree Significance in landscape rating based on the 'IACA Significance of a Tree, Assessment Rating System'. A tree is to have a minimum of three criteria in a category to be applicable for that rating.

Tree Significance in the landscape ratings:

High	**Medium**	**Low**
▪ 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. ▪	▪ 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.	▪ 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.

A1.6 Tree Protection Zones (TPZ) and Structural Root Zones (SRZ)

The intention of the TPZ is to ensure protection of the root system and canopy from the potential damage from construction works and ensure the long-term health and stability of each tree to be retained.

The Structural Root Zone (SRZ) is located within the TPZ around the base of a tree and provides the bulk of mechanical support and anchorage for a tree.

The Tree Protection Zones (TPZ) and Structural Root Zones (SRZ) have been arrived at using methods as detailed in Australian Standard AS 4970– 2009. Specific site factors are also considered that may influence the location of the TPZ and/or structural tree roots.

A1.7 Encroachment and Development Impacts

Encroachments and development impacts to tree TPZ's and SRZ's include;

- Excavation
- Filling
- Changes to existing soil levels
- Placing items and elements within the zones even if only temporarily
- Soil disturbance
- Any other physical damage to the trunk or root system or any other activity likely to cause damage to the tree.

Under *AS 4970:2009 Protection of trees on development sites*, a minor encroachment of up to 10% of the area of the TPZ is considered acceptable, provided that there is no encroachment to the SRZ. The area lost to this encroachment should be compensated for elsewhere in a contiguous area to the TPZ.

Major encroachments is greater than 10% of the area of the TPZ and the Project Arborist must determine and demonstrate that the tree would remain viable. More detailed investigations, such as exploratory excavations and root investigation to enable an informed evaluation of the potential impact of the proposed works may be required.

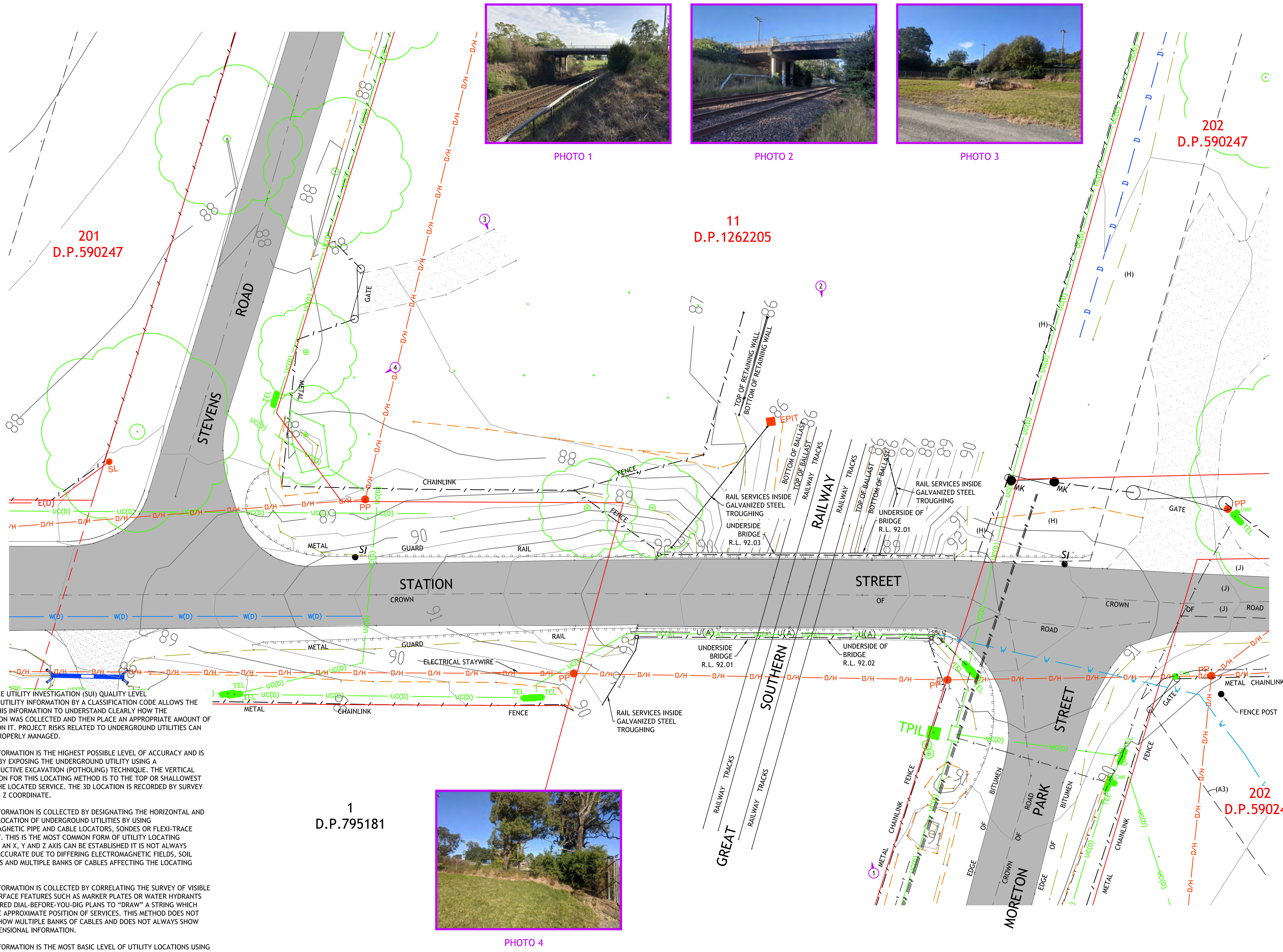
Encroachments into the SRZ are not likely to be supported unless the Project Arborist has undertaken exploratory investigation and can demonstrate that there will be minimal impact to the tree.

A1.8 SRIV Table

	Vigour Class and Condition Class					
Age Class	Good Vigour & Good Condition (GVG)	Good Vigour & Fair Condition (GVF)	Good Vigour & Poor Condition (GVP)	Low Vigour & Good Condition (LVG)	Low Vigour & Fair Condition (LVF)	Low Vigour & Poor Condition (LVP)
	Able to be retained if sufficient space available above and below ground for future growth. No remedial work or improvement to growing environment required. May be subject to high vigour. Retention potential - Medium - Long Term.	Able to be retained if sufficient space available above and below ground for future growth. Remedial work may be required or improvement to growing environment may assist. Retention potential - Medium Term. Potential for longer with remediation or favourable environmental conditions	Able to be retained if sufficient space available above and below ground for future growth. Remedial work unlikely to assist condition, improvement to growing environment may assist. Retention potential - Short Term. Potential for longer with remediation or favourable environmental conditions.	May be able to be retained if sufficient space available above and below ground for future growth. No remedial work required, but improvement to growing environment may assist vigour. Retention potential - Short Term. Potential for longer with remediation or favourable environmental conditions.	May be able to be retained if sufficient space available above and below ground for future growth. Remedial work or improvement to growing environment may assist condition and vigour. Retention potential - Short Term. Potential for longer with remediation or favourable environmental conditions.	Unlikely to be able to be retained if sufficient space available above and below ground for future growth. Remedial work or improvement to growing environment unlikely to assist condition or vigour. Retention potential - Likely to be removed immediately or retained for Short Term. Potential for longer with remediation or favourable environmental conditions
Young (Y)	**YGVG - 9** Index Value 9 Retention potential - Long Term. Likely to provide minimal contribution to local amenity if height Retain, move or replace	**YGVF - 8** Index Value 8 Retention potential - Short - Medium Term. Potential for longer with improved growing conditions. Likely to provide minimal contribution to local amenity if height Medium-high potential for future growth and adaptability. Retain, move or replace.	**YGVP - 5** Index Value 5 Retention potential - Short Term. Potential for longer with improved growing conditions. Likely to provide minimal contribution to local amenity if height Low-medium potential for future growth and adaptability. Retain, move or replace	**YLVG - 4** Index Value 4 Retention potential - Short Term. Potential for longer with improved growing conditions. Likely to provide minimal contribution to local amenity if height Medium potential for future growth and adaptability. Retain, move or replace	**YLVF - 3** Index Value 3 Retention potential - Short Term. Potential for longer with improved growing conditions. Likely to provide minimal contribution to local amenity if height <5m. Low-medium potential for future growth and adaptability. Retain, move or replace	**YLVP - 1** Index Value 1 Retention potential - Likely to be removed immediately or retained for Short Term. Likely to provide minimal contribution to local amenity if height
Mature (M)	**MGVG - 10** Index Value 10 Retention potential - Medium - Long Term	**MGVF - 9** Index Value 9 Retention potential - Medium Term. Potential for longer with improved growing conditions.	**MGVP - 6** Index Value 6 Retention potential - Short Term. Potential for longer with improved growing conditions	**MLVG - 5** Index Value 5 Retention potential - Short Term. Potential for longer with improved growing conditions	**MLVF - 4** Index Value 4 Retention potential - Short Term. Potential for longer with improved growing conditions	**MLVP - 2** Index Value 2 Retention potential - Likely to be removed immediately or retained for Short Term.
Over-mature (O)	**OGVG - 6** Index Value 6 Retention potential - Medium - Long Term.	**OGVF - 5** Index Value 5 Retention potential - Medium Term.	**OGVP - 4** Index Value 4 Retention potential - Short Term.	**OLVG - 3** Index Value 3 Retention potential - Short Term. Potential for longer with improved growing conditions.	**OLVF - 2** Index Value 2 Retention potential - Short Term.	**OLVP - 0** Index Value 0 Retention potential - Likely to be removed immediately or retained for Short Term

APPENDIX 2: PLANS

300058-DET-004-A



LEGEND

- PM — PERMANENT MARK
- TREE — H:HEIGHT, D:DIAMETER, S:SPREAD
- SI — SIGN
- LP — LIGHT POLE
- EP — ELECTRICAL PILLAR
- SL — STREET LIGHT
- EPIT — ELECTRICAL PIT
- HYD — HYDRANT
- SV — STOP VALVE
- TEL — TELSTRA/COMMS PIT
- GATE
- DRAINAGE LINE
- FENCE LINE
- O/H — OVERHEAD ELECTRICAL LINE
- E(B) — UNDERGROUND ELECTRICITY (QL B)
- E(C) — UNDERGROUND ELECTRICITY (QL C)
- E(D) — UNDERGROUND ELECTRICITY (QL D)
- EMK — ELECTRICAL MARKER
- UC(B) — UNDERGROUND COMMS (QL B)
- UC(C) — UNDERGROUND COMMS (QL C)
- UC(D) — UNDERGROUND COMMS (QL D)
- W(A) — UNDERGROUND WATER MAIN (QL A)
- W(B) — UNDERGROUND WATER MAIN (QL B)
- W(C) — UNDERGROUND WATER MAIN (QL C)
- W(D) — UNDERGROUND WATER MAIN (QL D)
- STORMWATER PIPE (QL A)
- MINOR CONTOUR LINE
- BOUNDARY LINE
- TOP OF BANKS
- TOE OF BANKS
- PHOTOGRAPH DIRECTION
- TPIL — TELSTRA PILLAR
- WM — WATER METER
- MISC — MISC PIT
- CMK — COMMS MARKER
- MK — MISC CABLE MARKER

N
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NOTES:-

1. PLEASE REFER TO AS5488-2013-CLASSIFICATION OF SUBSURFACE UTILITY INFORMATION (SUI) FOR THE DEFINITION OF SERVICE LOCATION ACCURACIES SHOWN IN THIS PLAN.
2. SOME UNDERGROUND UTILITIES SHOWN ON THIS PLAN HAVE BEEN ESTIMATED BASED UPON DBYD INFORMATION PLANS. ADDITIONAL SERVICES MAY EXIST THROUGH THE SITE. SERVICE LOCATION HAS BEEN UNDERTAKEN IN PART OF THE CURRENT SCOPE OF WORKS ONLY.
3. SERVICES HAVE BEEN LOCATED WHERE VISIBLE ONLY. PRIOR TO EXCAVATION OR CONSTRUCTION, ALL SERVICES ARE TO BE LOCATED BY THE RELEVANT AUTHORITY.
4. BOUNDARIES ARE BASED ON EXTENSIVE BOUNDARY DEFINITION WORK AND ARE CONSIDERED FINAL. HOWEVER, ANY FUTURE PLAN OF SURVEY OF ADJOINING LOTS REGISTERED MAY IMPACT THE SUBJECT BOUNDARIES. ALL BOUNDARIES AND EASEMENTS ARE, THEREFORE, SUBJECT TO REGISTRATION OF A PLAN WITH LRS NSW.
5. SPOT LEVELS AND CONTOURS SHOWN HEREON ARE FOR DESIGN PURPOSES ONLY AND ARE TO BE CONFIRMED ON SITE PRIOR TO ANY EXCAVATION OR CONSTRUCTION.
6. SPOT LEVELS HAVE BEEN REMOVED FROM THE FACE OF THIS PLAN. SPOT LEVELS CAN BE ACCESSED ON THE ELECTRONIC COPY OF THIS PLAN FOR MORE DETAILED DESIGN WORKS.
7. THIS PLAN HAS BEEN PREPARED FOR THE PURPOSE OF DESIGN AND SHOULD NOT BE USED FOR ANYTHING OTHER THAN THAT PURPOSE.
8. SOME SURVEY INFORMATION HAS BEEN SOURCED FROM A CONTOUR & DETAIL PLAN PREVIOUSLY SURVEYED BY ADWJ, PLAN REF 300058-DET-003-A, DATED 09/2018. SITE CONDITIONS MAY HAVE CHANGED.
9. SOME SERVICES DATA HAS BEEN SOURCED FROM A PLAN PREPARED BY AUSTRALIAN LOCATING SERVICES (PLAN REF 204569-US, DATED MARCH 2021) AND HAS NOT BEEN CONFIRMED BY ADWJ. THIS DATA IS SHOWN FOR INFORMATION PURPOSES ONLY. PLEASE REFER TO ALS PLAN FOR QUALITY INFORMATION ON THIS DATA.

SUBSURFACE UTILITY INVESTIGATION (SUI) QUALITY LEVEL
LABELLING UTILITY INFORMATION BY A CLASSIFICATION CODE ALLOWS THE USER OF THIS INFORMATION TO UNDERSTAND CLEARLY HOW THE INFORMATION WAS COLLECTED AND THEN PLACE AN APPROPRIATE AMOUNT OF RELIANCE ON IT. PROJECT RISKS RELATED TO UNDERGROUND UTILITIES CAN THEN BE PROPERLY MANAGED.

QL - 'A': INFORMATION IS THE HIGHEST POSSIBLE LEVEL OF ACCURACY AND IS OBTAINED BY EXPOSING THE UNDERGROUND UTILITY USING A NON-DESTRUCTIVE EXCAVATION (POTHOLING) TECHNIQUE. THE VERTICAL INFORMATION FOR THIS LOCATING METHOD IS TO THE TOP OR SHALLOWEST PART OF THE LOCATED SERVICE. THE 3D LOCATION IS RECORDED BY SURVEY AS AN X, Y, Z COORDINATE.

QL - 'B': INFORMATION IS COLLECTED BY DESIGNATING THE HORIZONTAL AND VERTICAL LOCATION OF UNDERGROUND UTILITIES BY USING ELECTROMAGNETIC PIPE AND CABLE LOCATORS, SONDES OR FLEXI-TRACE EQUIPMENT. THIS IS THE MOST COMMON FORM OF UTILITY LOCATING ALTHOUGH AN X, Y AND Z AXIS CAN BE ESTABLISHED IT IS NOT ALWAYS ENTIRELY ACCURATE DUE TO DIFFERING ELECTROMAGNETIC FIELDS, SOIL CONDITIONS AND MULTIPLE BANKS OF CABLES AFFECTING THE LOCATING SIGNAL.

QL - 'C': INFORMATION IS COLLECTED BY CORRELATING THE SURVEY OF VISIBLE UTILITY SURFACE FEATURES SUCH AS MARKER PLATES OR WATER HYDRANTS AND ACQUIRED DIAL-BEFORE-YOU-DIG PLANS TO "DRAW" A STRING WHICH SHOWS THE APPROXIMATE POSITION OF SERVICES. THIS METHOD DOES NOT USUALLY SHOW MULTIPLE BANKS OF CABLES AND DOES NOT ALWAYS SHOW THREE DIMENSIONAL INFORMATION.

QL - 'D': INFORMATION IS THE MOST BASIC LEVEL OF UTILITY LOCATIONS USING ONLY INFORMATION BASED ON EXISTING DIAL-BEFORE-YOU-DIG PLANS AND BY MEASURING BOUNDARY OFFSETS AS WELL AS ASSISTANCE VIA GROUND PENETRATING RADAR ETC. THIS METHOD OF UTILITY LOCATIONS SHOULD ALWAYS BE TREATED AS AN INDICATION OF THE PRESENCE OF A SERVICE ONLY AND SHOULD NOT BE USED FOR DESIGN.

ALL UTILITIES ARE QL - 'D' UNLESS OTHERWISE NOTED

(A3) EASEMENT FOR PIPELINE PURPOSES OVER EXISTING LINE OF PIPES (DP595674)
(H) RIGHT OF CARRIAGEWAY 10.06 WIDE & VARIABLE (D.P. 107066 & H860443)
(J) EASEMENT FOR PIPELINE 6 WIDE (DP595674)

ver.	date	comment	surveyed	drawn	checked	pm
A	27.04.21	INITIAL ISSUE	CG	KR	DK	BR

co-ordinate information	level information	scale (A1 original size)	page
CO-ORDINATE SYSTEM: MGA94 Z56 ORIGIN OF CO-ORDINATES: P.M.30963 DATE OF SURVEY 15.04.21	DATUM: AHD ORIGIN OF LEVELS: P.M.30963 (R.L. 89.148) CONTOUR INTERVAL: 0.5m	0 5.0 10.0m SCALE: 1:200 (FULL)	1 OF 1

WARNING OPTICAL FIBRE IN AREA

WARNING UNDERGROUND ELECTRICITY LINES

DIAL 1100 BEFORE YOU DIG

drawing title:
DETAIL & CONTOUR SURVEY OVER PART LOT 202 D.P.590247 & PART LOT 11 D.P.1262205

location: 1370 MORETON PARK ROAD & GREAT SOUTHERN RAILWAY, MENANGLE

council: WOLLONDILLY SHIRE

dwg ref: 300058-DET-004-A

client: mirvac

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EXISTING DEVELOPMENT
STAGE 1 MENANGLE BY CALIBRE

FUTURE DEVELOPMENT
STAGE 2 MENANGLE BY CALIBRE

ROAD

STEVENS

STATION STREET

RAILWAY CORRIDOR

RAILWAY CORRIDOR

No.01

ALL EXCAVATION WORKS WITH TPZ OF TREE TO BE UNDERTAKEN IN THE PRESENCE OF COUNCIL AND OR ARBORIST (LEVEL 5) AT COUNCILS DISCRETION. TREE MUST BE PROTECTED AND PRESERVED THROUGHOUT CONSTRUCTION PHASE.

REFER TO INSET 'A'

TREES TO BE REMOVED AS PER ARBORIST REPORT (AFRICAN OLIVE)

POSSIBLE STOCKPILE SITE

INSET 'A'
SCALE 1:100

BEFORE YOU DIG
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LEGEND

- SEDIMENT FENCE (SD 6-8)
- BARRIER FENCE
- GEOTEXTILE INLET FILTER (SD 6-12) DURING CONSTRUCTION OF THE ROAD.
- EXISTING CONTOUR (ORIGINAL NATURAL SURFACE)
- PROPOSED CONTOUR
- TREE TO BE RETAINED & PROTECTED
- TREE TO BE REMOVED (EXTENT OF TPZ) AS PER ARBORIST'S REPORT STURT NOBLE ARBORICULTURE
- DBH AS PER ARBORIST'S REPORT STURT NOBLE ARBORICULTURE
- SRZ AS PER ARBORIST'S REPORT STURT NOBLE ARBORICULTURE
- CUT AREA
- FILL AREA

EARTHWORKS VOLUMES

TOTAL FILL	101m³
TOTAL CUT	-5m³
TOTAL BALANCE	96m³

NOTE

ARP3860 & URS21616 WORKS ASSOCIATED WITH STAGE 2 REQUIRE TO BE COMPLETED TO CLEAR SERVICES FROM FOOTPRINT OF PEDESTRIAN BRIDGE WORKS.

FIRST ISSUE	DESIGN	DRAWN	CHECK	APPD.	DATE	AMENDMENT DETAILS
	AV	AB/JS	CK	EF	25/02/2021	
01	AV	LH	CK	EF	10/06/2021	ISSUED FOR CONSTRUCTION CERTIFICATE
02	AV	AB	CK	EF	01/07/2021	ISSUED FOR CONSTRUCTION CERTIFICATE
03	AV	AV	CK	EF	18/08/2022	ISSUED FOR CONSTRUCTION CERTIFICATE
04	RT	SS	CK	EF	26/09/2022	ISSUED FOR CONSTRUCTION CERTIFICATE

AMENDMENTS

STATUS: FOR REVIEW OF ENVIRONMENTAL FACTORS (PART 5)

AUTHORISED FOR ISSUE:
BY: ENRIQUE FRANCO
BE(Hons) MIEAust. CPEng NER
SIGN:
DATE: 28/9/22

SCALE
SCALE 1:100 (A1) SCALE 1:200 (A3)
SCALE 1:200 (A1) SCALE 1:400 (A3)

CLIENT: mirvac

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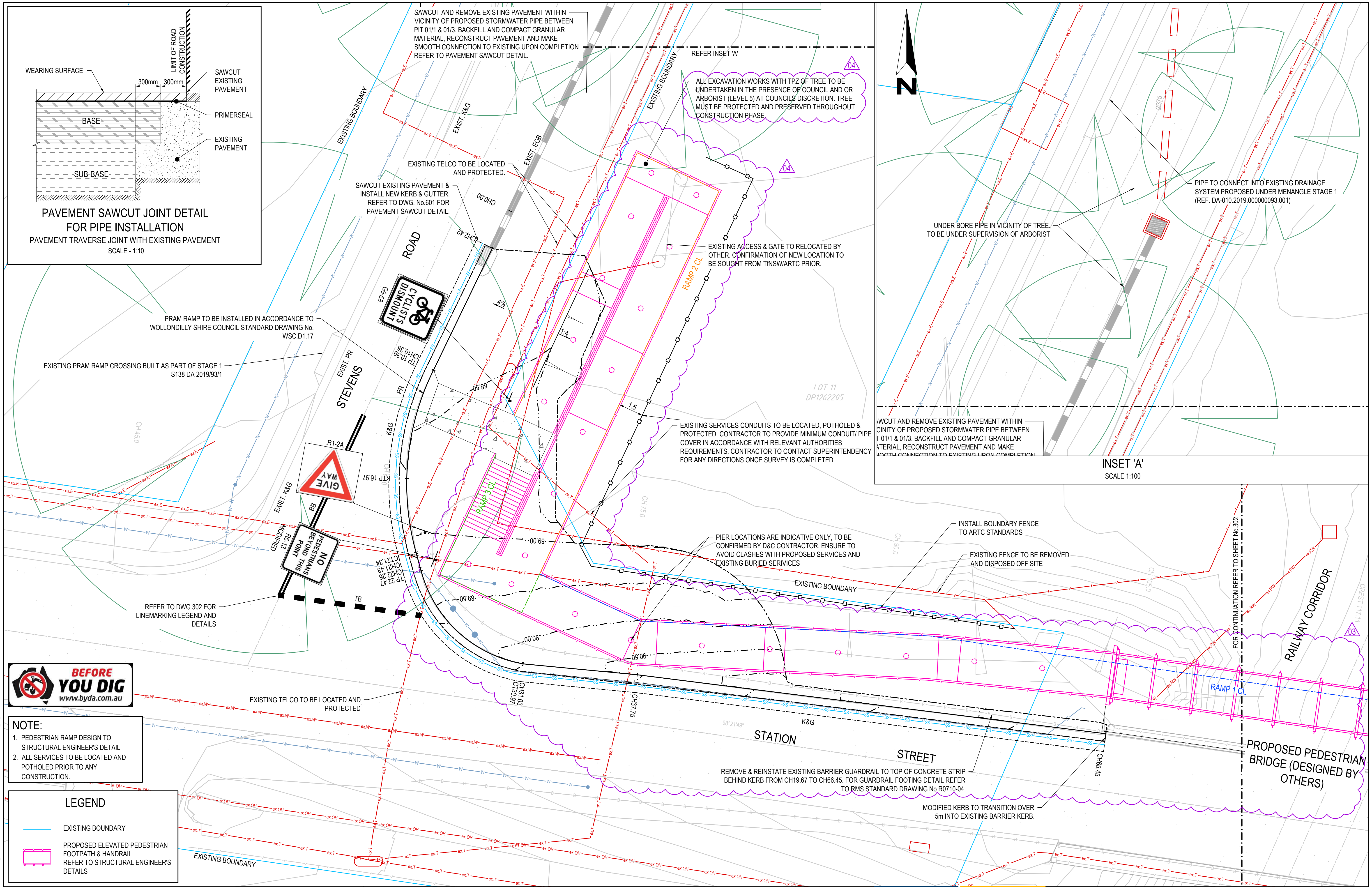
PROJECT: STATION ST MENANGLE PEDESTRIAN BRIDGE CROSSING

DISCLAIMER
ALL DIMENSIONS TO BE CHECKED ON SITE BY CONTRACTOR PRIOR TO CONSTRUCTION. USE WRITTEN DIMENSIONS ONLY. DO NOT SCALE. NOT FOR CONSTRUCTION UNLESS STAMPED BY CERTIFYING AUTHORITY

DRAWING TITLE: SOIL & WATER MANAGEMENT & SITE REGRADING PLAN

PROJECT No.	DRAWING No.	MILESTONE	REVISION
17-003293.002.PED	101	REF	04

FILE: H:\17\17-003293 - STATION ST MENANGLE - UD\06_MODEL\AUTOCAD\CIVIL\PEDESTRIAN BRIDGE\SHC\17-003293-02-PED_LD_SHC-101.DWG LAST SAVED BY JED SWEENEY



PAVEMENT SAWCUT JOINT DETAIL FOR PIPE INSTALLATION
PAVEMENT TRAVERSE JOINT WITH EXISTING PAVEMENT
SCALE - 1:10
WEARING SURFACE
LIMIT OF ROAD CONSTRUCTION
300mm
300mm
SAWCUT EXISTING PAVEMENT
PRIMERSEAL
BASE
EXISTING PAVEMENT
SUB-BASE
SAWCUT AND REMOVE EXISTING PAVEMENT WITHIN VICINITY OF PROPOSED STORMWATER PIPE BETWEEN PIT 01/1 & 01/3. BACKFILL AND COMPACT GRANULAR MATERIAL, RECONSTRUCT PAVEMENT AND MAKE SMOOTH CONNECTION TO EXISTING UPON COMPLETION. REFER TO PAVEMENT SAWCUT DETAIL.
REFER INSET 'A'
ALL EXCAVATION WORKS WITH TPZ OF TREE TO BE UNDERTAKEN IN THE PRESENCE OF COUNCIL AND OR ARBORIST (LEVEL 5) AT COUNCILS DISCRETION. TREE MUST BE PROTECTED AND PRESERVED THROUGHOUT CONSTRUCTION PHASE.
EXISTING BOUNDARY
EXIST. K&G
EXIST. EOB
EXISTING TELCO TO BE LOCATED AND PROTECTED.
SAWCUT EXISTING PAVEMENT & INSTALL NEW KERB & GUTTER. REFER TO DWG. No.601 FOR PAVEMENT SAWCUT DETAIL.
ROAD
STEVENS
EXIST. PR
CYCLISTS DISMOUNT
G9-58
PRAM RAMP TO BE INSTALLED IN ACCORDANCE TO WOLLONDILLY SHIRE COUNCIL STANDARD DRAWING No. WSC.D1.17
EXISTING PRAM RAMP CROSSING BUILT AS PART OF STAGE 1 S138 DA 2019/93/1
EXISTING ACCESS & GATE TO RELOCATED BY OTHER. CONFIRMATION OF NEW LOCATION TO BE SOUGHT FROM TfNSW/ARTC PRIOR.
RAMP 2 CL
RAMP 1 CL
LOT 11 DP1262205
EXISTING SERVICES CONDUITS TO BE LOCATED, POTHOLED & PROTECTED. CONTRACTOR TO PROVIDE MINIMUM CONDUIT/ PIPE COVER IN ACCORDANCE WITH RELEVANT AUTHORITIES REQUIREMENTS. CONTRACTOR TO CONTACT SUPERINTENDENCY FOR ANY DIRECTIONS ONCE SURVEY IS COMPLETED.
R1-2A
GIVE WAY
EXIST. K&G
NO PEDESTRIANS BEYOND THIS POINT
R6-13 MODIFIED
REFER TO DWG 302 FOR LINEMARKING LEGEND AND DETAILS
PIER LOCATIONS ARE INDICATIVE ONLY, TO BE CONFIRMED BY D&C CONTRACTOR. ENSURE TO AVOID CLASHES WITH PROPOSED SERVICES AND EXISTING BURIED SERVICES
INSTALL BOUNDARY FENCE TO ARTC STANDARDS
EXISTING FENCE TO BE REMOVED AND DISPOSED OFF SITE
EXISTING BOUNDARY
FOR CONTINUATION REFER TO SHEET No.302
RAILWAY CORRIDOR
RAMP 1 CL
EXISTING TELCO TO BE LOCATED AND PROTECTED
STATION
STREET
K&G
REMOVE & REINSTATE EXISTING BARRIER GUARDRAIL TO TOP OF CONCRETE STRIP BEHIND KERB FROM CH19.67 TO CH66.45. FOR GUARDRAIL FOOTING DETAIL REFER TO RMS STANDARD DRAWING No.R0710-04.
MODIFIED KERB TO TRANSITION OVER 5m INTO EXISTING BARRIER KERB.
PROPOSED PEDESTRIAN BRIDGE (DESIGNED BY OTHERS)
EXISTING BOUNDARY
PIPE TO CONNECT INTO EXISTING DRAINAGE SYSTEM PROPOSED UNDER MENANGLE STAGE 1 (REF. DA-010.2019.000000093.001)
UNDER BORE PIPE IN VICINITY OF TREE. TO BE UNDER SUPERVISION OF ARBORIST
SAWCUT AND REMOVE EXISTING PAVEMENT WITHIN VICINITY OF PROPOSED STORMWATER PIPE BETWEEN PIT 01/1 & 01/3. BACKFILL AND COMPACT GRANULAR MATERIAL, RECONSTRUCT PAVEMENT AND MAKE SMOOTH CONNECTION TO EXISTING UPON COMPLETION
INSET 'A'
SCALE 1:100
N
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NOTE:
1. PEDESTRIAN RAMP DESIGN TO STRUCTURAL ENGINEER'S DETAIL
2. ALL SERVICES TO BE LOCATED AND POTHOLED PRIOR TO ANY CONSTRUCTION.

LEGEND

- EXISTING BOUNDARY
- PROPOSED ELEVATED PEDESTRIAN FOOTPATH & HANDRAIL. REFER TO STRUCTURAL ENGINEER'S DETAILS

ISSUE	DESIGN	DRAWN	CHECK	APPD.	DATE	AMENDMENT DETAILS
FIRST ISSUE	AV	AB/JS	CK	EF	25/02/2021	
01	AV	LH	CK	EF	10/06/2021	ISSUED FOR CONSTRUCTION CERTIFICATE
02	AV	AB	CK	EF	01/07/2021	ISSUED FOR CONSTRUCTION CERTIFICATE
03	AV	AV	CK	EF	18/08/2022	ISSUED FOR CONSTRUCTION CERTIFICATE
04	RT	SS	CK	EF	26/09/2022	ISSUED FOR CONSTRUCTION CERTIFICATE

STATUS: FOR REVIEW OF ENVIRONMENTAL FACTORS (PART 5)

AUTHORISED FOR ISSUE:
BY: ENRIQUE FRANCO SIGN:
BE(Hons) MIEAust. CPEng NER
DATE: 26/9/22

SCALE: SCALE 1:100 (A1) SCALE 1:200 (A3)

CLIENT: mirvac

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PROJECT: STATION ST MENANGLE PEDESTRIAN BRIDGE CROSSING

DISCLAIMER: ALL DIMENSIONS TO BE CHECKED ON SITE BY CONTRACTOR PRIOR TO CONSTRUCTION. USE WRITTEN DIMENSIONS ONLY, DO NOT SCALE. NOT FOR CONSTRUCTION UNLESS STAMPED BY CERTIFYING AUTHORITY

DRAWING TITLE: ENGINEERING PLAN SHEET 01 OF 02

PROJECT No.	DRAWING No.	MILESTONE	REVISION
17-003293.002.PED	301	REF	04

FILE: H:\17\17-003293 - STATION ST MENANGLE - UD\06_MODEL\AUTOCAD\CIVIL\PEDESTRIAN BRIDGE\SWC17-003293-02-PED_LD_SWC-301.DWG LAST SAVED BY PAMA SENDURAN

LINEMARKING LEGEND

LINE TYPE	USE	DIMENSIONS (m) (FOR DIMENSIONS SHOWN * SEE MARKER SPACING COLUMN.)	COLOUR	RAISED MARKER TYPE	MARKER SPACING (*) (m)	
					NORMAL SPACING (A)	ALTERNATIVE SPACING (B)
TB	GIVE WAY LINE (USED WITH SIGNS)	0.6–0.6–0.6–0.6–0.6–0.6–0.6–0.6–0.6–0.6, 0.30	WHITE	NOT REQUIRED	-	-
BB	1. 1. REPLACES DIVIDING (SEPARATION) LINE IF RESTRICTED SIGHT DISTANCE FOR BOTH DIRECTIONS OR 2. APPROACH TO MEDIAN ISLAND OR 3. APPROACHES TO A PEDESTRIAN CROSSING	0.10, *, 0.025 MIN 0.05 MAX, 0.100.10, 0.025 MIN 0.05 MAX	WHITE	YY YY	12	12

N

NO PEDESTRIANS BEYOND THIS POINT
R6-13 MODIFIED

EXISTING BOUNDARY

FUTURE LOT1 DP1272871

LOT 202 DP590247

PEDESTRIAN RAMP & FOOTPATH TO MATCH IN SMOOTH BETWEEN RAMP & PROPOSED KERB

RAMP 1 C/

PR

PRAM RAMP TO BE INSTALLED IN ACCORDANCE TO WOLLONDILLY SHIRE COUNCIL STANDARD DRAWING No. WSC.D1.17

FUT. PR

G9-58 CYCLISTS DISMOUNT

CONTRACTOR TO MAINTAIN ACCESS

10.06m WIDE (VARIABLE) R.O.C.

EXISTING TREE TO BE RETAINED AND PROTECTED

4%

FUT. RK

ROAD No.01

FUTURE DEVELOPMENT
STAGE 2 MENANGLE BY CALIBRE

FUTURE BOUNDARY PROPOSED UNDER DA/2019/644 & DP1272871

EXISTING BOUNDARY

FUTURE LOT 3 DP1272871

LOT 11 DP1262205

CREST 111

FOR CONTINUATION REFER TO SHEET No.301

RAILWAY CORRIDOR

EXISTING RAIL FENCE TO BE MAINTAINED

PIER LOCATIONS ARE INDICATIVE ONLY, TO BE CONFIRMED BY D&C CONTRACTOR. ENSURE TO AVOID CLASHES WITH PROPOSED SERVICES AND EXISTING BURIED SERIVICES

PROPOSED PEDESTRIAN BRIDGE (DESIGNED BY OTHERS)

STATION STREET

EXISTING BOUNDARY

EXISTING SERVICES CONDUITS TO BE LOCATED, POTHOLED & PROTECTED. CONTRACTOR TO PROVIDE MINIMUM CONDUIT/ PIPE COVER IN ACCORDANCE WITH RELEVANT AUTHORITIES REQUIREMENTS. CONTRACTOR TO CONTACT SUPERINTENDENCY FOR ANY DIRECTIONS ONCE SURVEY IS COMPLETED.

EXISTING BOUNDARY

6m WIDE EASEMENT

ROAD No.14

LOT 11 DP1262205

PP

NOTE:

1. PEDESTRIAN RAMP DESIGN TO STRUCTURAL ENGINEER'S DETAIL
2. ALL SERVICES TO BE LOCATED AND POTHOLED PRIOR TO ANY CONSTRUCTION.
3. EARTHWORKS AT FUTURE ROUNDABOUT TO REFER TO STAGE 2 CC PLANS BY CALIBRE (REF.DA/2020/401)

LEGEND

EXISTING BOUNDARY

PROPOSED ELEVATED PEDESTRIAN FOOTPATH & HANDRAIL. REFER TO STRUCTURAL ENGINEER'S DETAILS

BEFORE YOU DIG www.byda.com.au

FIRST ISSUE	DESIGN	DRAWN	CHECK	APPD.	DATE	AMENDMENT DETAILS
	AV	AB/JS	CK	EF	25/02/2021	
01	AV	LH	CK	EF	10/06/2021	ISSUED FOR CONSTRUCTION CERTIFICATE
02	AV	AB	CK	EF	01/07/2021	ISSUED FOR CONSTRUCTION CERTIFICATE
03	AV	AV	CK	EF	18/08/2022	ISSUED FOR CONSTRUCTION CERTIFICATE
04	RT	SS	CK	EF	26/09/2022	ISSUED FOR CONSTRUCTION CERTIFICATE

STATUS: FOR REVIEW OF ENVIRONMENTAL FACTORS (PART 5)

AUTHORISED FOR ISSUE:
BY: ENRIQUE FRANCO
BE(Hons) MIEAust. CPEng NER
SIGN:
DATE: 28/9/22

SCALE: 0 1 2 3 4 5 6 7 8
SCALE 1:100 (A1) SCALE 1:200 (A3)

CLIENT: mirvac

calibre

www.calibregroup.com

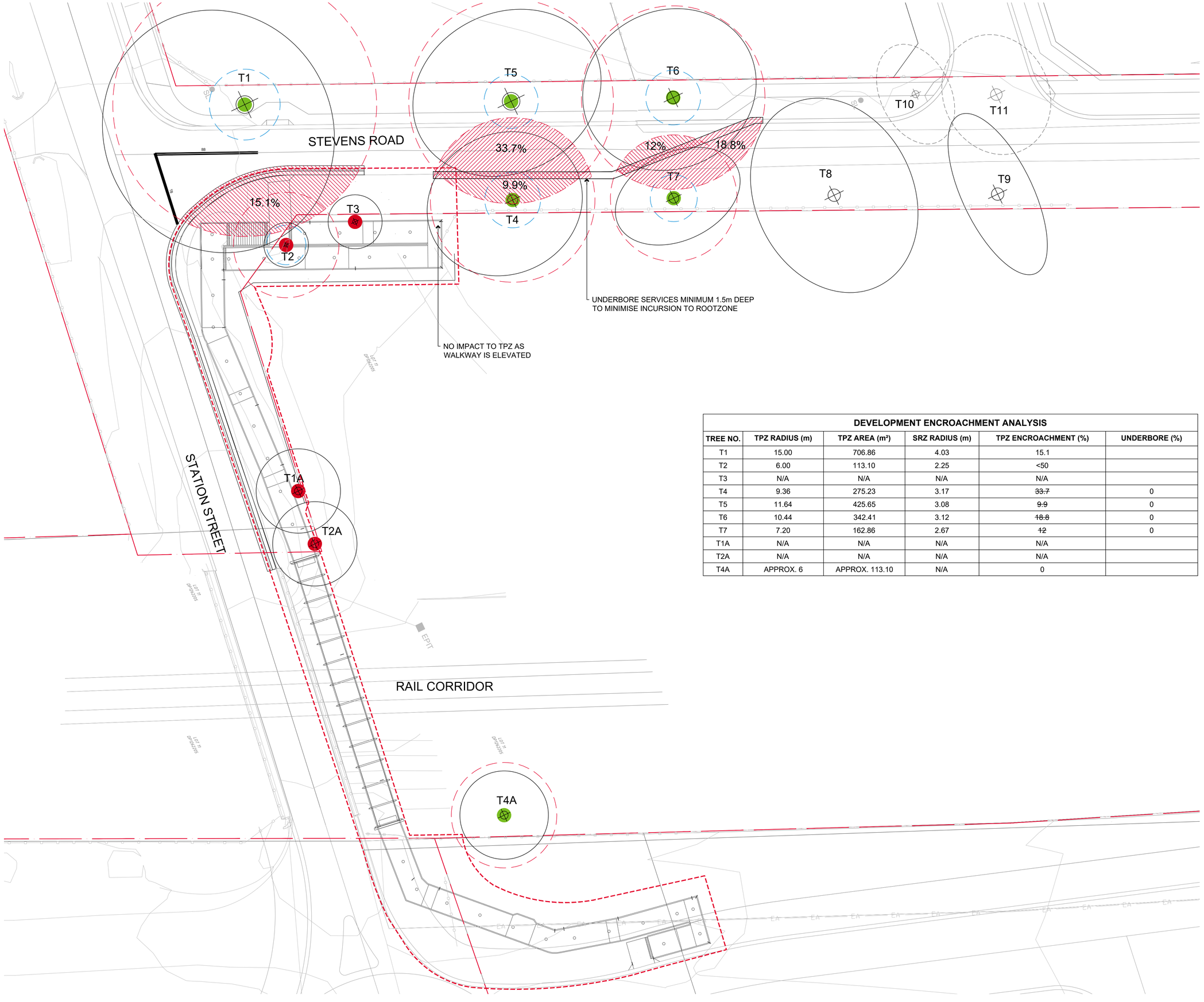
PROJECT: STATION ST MENANGLE PEDESTRIAN BRIDGE CROSSING

DISCLAIMER
ALL DIMENSIONS TO BE CHECKED ON SITE BY CONTRACTOR PRIOR TO CONSTRUCTION. USE WRITTEN DIMENSIONS ONLY. DO NOT SCALE. NOT FOR CONSTRUCTION UNLESS STAMPED BY CERTIFYING AUTHORITY

DRAWING TITLE: ENGINEERING PLAN SHEET 02 OF 02

PROJECT No.	DRAWING No.	MILESTONE	REVISION
17-003293.002.PED	302	REF	04

FILE: H:\17\17-003293 - STATION ST MENANGLE - U\006_MODEL\AUTOCAD\CIVIL\PED\STRAN BRIDGE\SWC\17-003293-02-PED_LD_SWC-302.DWG LAST SAVED BY PAMA SENDURAN



LEGEND

- PROPERTY BOUNDARY
- FENCE
- TX — EXISTING TREE Refer to Tree Impact Assessment Schedule
- TREES TO BE RETAINED Refer to Tree Impact Assessment Schedule
- TREES TO BE REMOVED Refer to Tree Impact Assessment Schedule
- TREES APPROVED FOR REMOVAL UNDER DA/2019/93 Refer to Tree Impact Assessment Schedule
- TREE PROTECTION ZONE
- STRUCTURAL ROOT ZONE
- XX% — TPZ INCURSION

DEVELOPMENT ENCROACHMENT ANALYSIS

TREE NO.	TPZ RADIUS (m)	TPZ AREA (m²)	SRZ RADIUS (m)	TPZ ENCROACHMENT (%)	UNDERBORE (%)
T1	15.00	706.86	4.03	15.1	
T2	6.00	113.10	2.25	<50	
T3	N/A	N/A	N/A	N/A	
T4	9.36	275.23	3.17	~~33.7~~	0
T5	11.64	425.65	3.08	~~9.9~~	0
T6	10.44	342.41	3.12	~~18.8~~	0
T7	7.20	162.86	2.67	~~12~~	0
T1A	N/A	N/A	N/A	N/A	
T2A	N/A	N/A	N/A	N/A	
T4A	APPROX. 6	APPROX. 113.10	N/A	0	

ISSUE	DESCRIPTION	DATE
C	ISSUE FOR IMPACT ASSESSMENT	27.09.2022
B	ISSUE FOR IMPACT ASSESSMENT	17.08.2022
A	ISSUE FOR IMPACT ASSESSMENT	16.06.2021

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PROJECT
MENANGLE FOOTBRIDGE

CLIENT
MIRVAC

DRAWING
IMPACT ASSESSMENT PLAN 01

DRAWING NUMBER: ARB-2119-101
ISSUE: C

SCALE: 1:200 @ A1, 1:400 @ A3
DRAWN: jc
CHECKED: gs
DIRECTOR: gs

0 2 4 10m

ACN: 164 245 514 ABN: 99 164 245 514

APPENDIX 3: TREE ASSESSMENT SCHEDULE

Tree Assessment Sheet

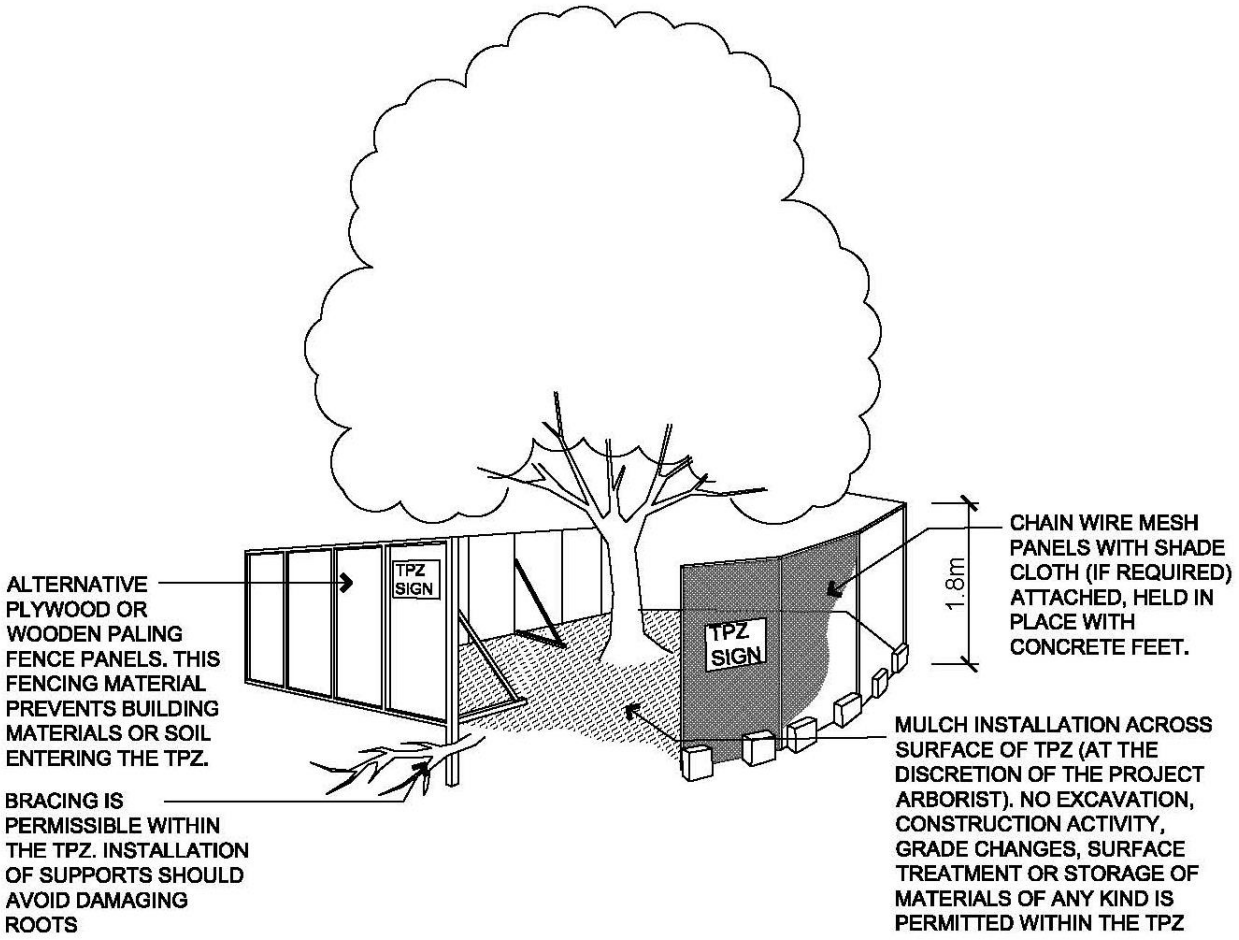
Location:	Menangle Footbridge
Client:	Mirvac
Date:	21.04.2021

Tree No.	Botanical Name / **Common Name**	Dimensions							Health				Vigour				Structure					Age Class					**Retention Value SRIV**	**Landscape Significance**	Comments
		TPZ radius (m)	**SRZ** radius (m)	DBH (m)	DAB (m)	Height (m)	Spread EW (m)	Spread NS (m)	Deadwood	Dieback	Pests	Diseases	Canopy density %	Foliage size	Foliage colour	Extension growth	Inclusions	Fractures	Wounds	Cavities	Decay	Senescent	Mature	Semi Mature	Young	New planting			
1	*Eucalyptus crebra* **Narrow-leaved Ironbark**	15.00	4.03	1.38	1.6	22	15/12"	9/17"	Y	Y	Y		50	S	OK	Y		Y	Y		Y	Y					**OLVF-2**	**H**	Sap present. Large wounds. Potential decay. Limited canopy.
2	*Eucalyptus crebra* **Narrow-leaved Ironbark**	6.00	2.25	0.5	0.4	14	8/3"	9					90	G	G	Y									Y		**YGVG-9**	**M**	
3	*Eucalyptus crebra* **Narrow-leaved Ironbark**	0.00	0.00																								**OLVP-0**	**L**	Dead
4	*Eucalyptus melliodora* **Yellow Box**	9.36	3.17	0.78	0.9	24	16	8/10"	Y		Y		80	G	G	Y			Y				Y				**MGVF-9**	**H**	Minor infestation of mistletoe, all dead
5	*Eucalyptus melliodora* **Yellow Box**	11.64	3.08	0.97	0.84	19	8/11"	22	Y				80	G	G	Y			Y				Y				**MGVF-9**	**H**	Co-dominant at 1.7m. Minor prune wounds
6	*Eucalyptus melliodora* **Yellow Box**	10.44	3.12	0.87	0.87	19	8/10"	20	Y		Y		80	G	G	Y			Y				Y				**MGVF-9**	**H**	Minor infestation of mistletoe, dead and alive.
7	*Eucalyptus melliodora* **Yellow Box**	7.20	2.67	0.6	0.6	13	10	8/7"	Y				80	G	G	Y			Y				Y				**MGVF-9**	**H**	Co-dominant at 2m
1A	*Olea africana* **African Olive**	0.00	0.00																									**L**	Exempt. Remove
2A	*Olea africana* **African Olive**	0.00	0.00																									**L**	Exempt. Remove
4A	*Eucalyptus tereticornis* **Forest Red Gum**	6.00	0.00	0.5									100														**MGVG-10**	**H**	Mouldy trunk

Legend

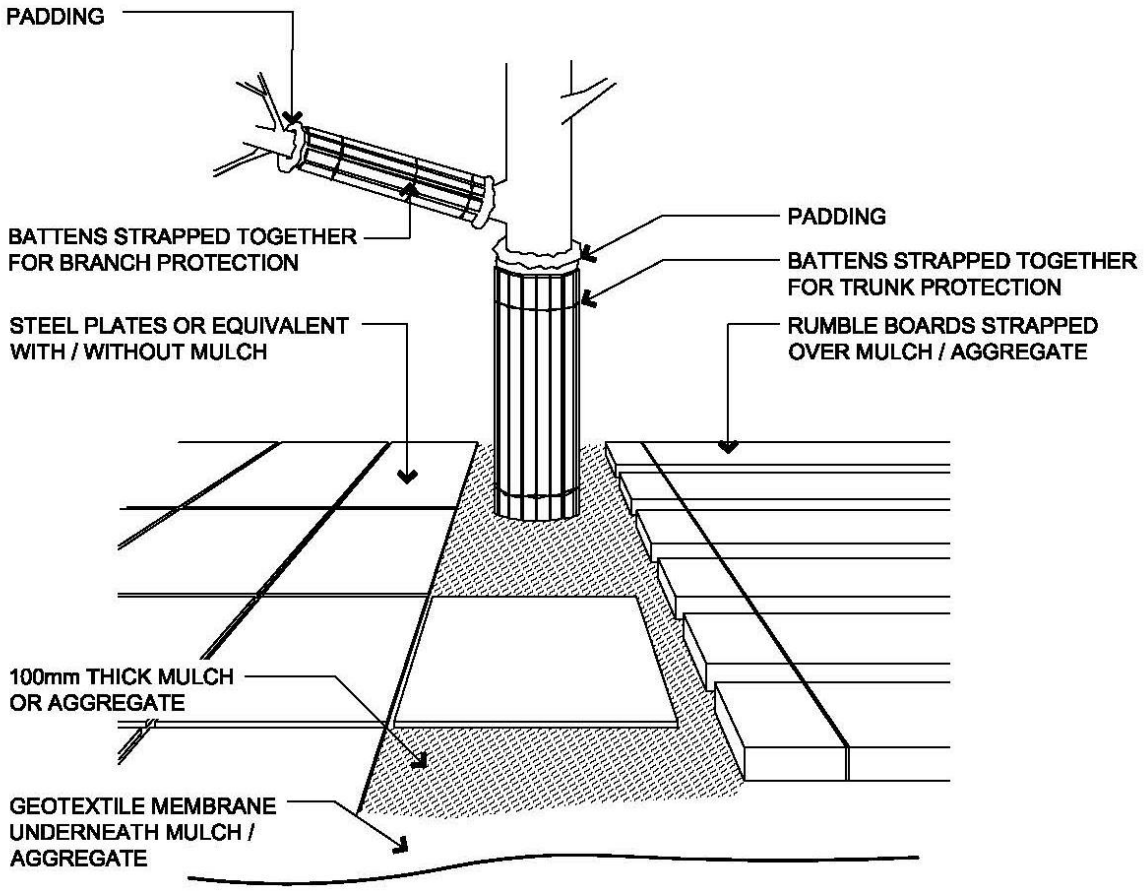
Tree to be retained and protected
Tree to be removed due to Construction
Tree to be removed due to other reason
Dead tree or weed species (exempt and can be removed without consent)

APPENDIX 4: TYPICAL TREE PROTECTION DETAILS



PROTECTIVE FENCING

Based on AS4970-2009 NOT TO SCALE



NOTE:
1. For trunk and branch protection use boards and padding that will prevent damage to bark. Boards are to be strapped to trees, not nailed or screwed.
2. Rumble boards should be of a suitable thickness to prevent soil compaction and root damage.

EXAMPLES OF TRUNK, BRANCH AND GROUND PROTECTION

Based on AS4970-2009 NOT TO SCALE

TREE PROTECTION ZONE SIGN

Based on AS4970-2009 NOT TO SCALE