



Arboricultural Impact Assessment

Physical Education & Sports Precinct Project at St Joseph's College, Hunters Hill

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2 Summary

This Arboricultural Impact Assessment (AIA) is based on sixty seven (67) trees located near the proposed physical education and sports precinct project at St Joseph’s College (subject site).

The proposed works include demolition of the existing sports courts and buildings and construction of a new sports court facility with basement parking, workshop and storage, and driveway/pedestrian entry ramps, construction of a new gymnasium building and installation of new electrical services.

The Retention Values of the subject trees were rated as outlined in the following Table. Refer to the Tree Protection Plans (Attachment C) for tree locations.

Table A: Retention Values of the Subject Trees.

	High Retention Value (Tree Number)	Medium Retention Value (Tree Number)	Low Retention Value (Tree Number)
To be Retained	8, 9, 10, 12, 13, 14, 15, 16, 17, 18, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 60, 62	7, 9a, 11, 61, 63, 64, 65	-
To be Removed	2, 36, 40, 59	1, 3, 4, 6, 19, 20, 21, 24, 26, 28, 29, 29a, 30, 31, 32, 33, 34, 38, 39	5, 22, 23, 25, 27, 35, 37, 41

The majority of the assessed High Retention Value trees are able to be retained. All other significant trees within the school grounds outside of the assessed area will also be retained.

Thirty one (31) trees are proposed to be removed to facilitate the proposed works. This includes four (4) High Retention Value trees, nineteen (19) Medium Retention Value tree and eight (8) Low Retention Value trees. This includes twenty one (21) trees located along the Luke Street verge. A comprehensive tree replacement strategy is proposed as outlined in the Landscape Strategy Plan.

There are works proposed within the Tree Protection Zones (TPZ) of Trees 16, 17, 18, 42-52, 54-57 and 60. Recommendations have been made regarding tree protection measures, canopy pruning and tree sensitive construction methods to limit the potential for impacts on retained trees.

3 Introduction

3.1 Background

This Arboricultural Impact Assessment (AIA) was prepared for Bloompark Consulting in relation to the existing trees and the proposed Physical Education and Sports Precinct Project at St Joseph’s College, Hunters Hill (subject site).

The purpose of this AIA is to assess the likely impacts of the proposed works on the existing site trees and make recommendations regarding construction methods and tree protection measures to limit adverse impacts on trees recommended for retention.

This AIA has been prepared with guidance from with the Australian Standard 4970-2009, *Protection of trees on development sites*.

3.2 Subject Site/Proposed Works

The subject site is currently occupied by sports courts, school buildings and landscaped areas.

It is proposed to demolish the existing sports courts and surrounding structures and construct a new sports court facility with basement parking, workshop and storage, and driveway/pedestrian entry ramps. Construction of a new gymnasium building and installation of electrical services is also proposed.

3.3 Subject Trees

The assessed trees are located in three (3) different locations:

Those located in the south-eastern corner of the school grounds (surrounding the existing sports courts) and street trees located along Gladesville Road and Luke Street.

- Those located along the southern boundary of the site in the area of proposed electrical services installation.
- Those located near the north-western corner of the site in the area of the proposed Healy Gym area.

The assessed tree population is made up of a mixture of planted exotics and planted Australian natives. Each of the assessed trees are protected as Prescribed Vegetation under Clause 2.3.3 of the Hunters Hill Consolidated DCP 2013.

None of the assessed trees were considered to form part of remnant bushland or native vegetation communities.

None of the assessed trees was listed on a register of significant trees.

None of the assessed trees are protected under the Threatened Species Conservation Act (1995) or Biodiversity Conservation Act (1999).

Refer to the Tree Protection Plans (Attachment C) for tree locations and numbers. A detailed description of the subject trees is included in the Tree Assessment Table (Attachment A).

4 Methodology

4.1 Site Inspection

Site inspection and tree assessment was undertaken by Alexis Anderson on the 27th of February, 2018. The trees were assessed from ground level using a Tree Assessment Table, which is included as Attachment A. The definitions and explanations of terms used are outlined in the Tree Table Definitions page which is included at Attachment B.

4.2 Plans and Diagrams

The set of plans provided by TDK Architects (Revision P1) was reviewed as part of this assessment.

The Proposed Healy Gym Plan (Revision A) and Electrical Services Schematic Design (Revision 2) was also reviewed.

The proposed site layout had been finalised at the time that the plans were supplied. There was no arboricultural input into the design layout.

The Preliminary Landscape Strategy (draft) prepared by Taylor Brammer was also reviewed.

No Stormwater/Hydraulics plan or Engineering Detail was available for review at the time of assessment.

4.3 Tree Protection Zones

Tree assessments in accordance with the Australian Standard 4970-2009, *Protection of trees on development sites*, require calculation of a Tree Protection Zone (TPZ) and Structural Root Zone (SRZ). The following is a brief explanation of these terms:

Tree Protection Zone -TPZ: This is the area that should be isolated from construction disturbance so that the tree remains viable. Some disturbance within the TPZ may be possible following arboricultural assessment.

Structural Root Zone -SRZ: This is the area or undisturbed soil and roots required to maintain tree stability. Excavation within the SRZ can lead to whole tree failure.

Refer to the Tree Assessment Table (Attachment A) for the Tree Protection Zones of the assessed trees.

4.4 Retention Values

Retention values are derived from a combination of Estimated Life Expectancy rating and Landscape and Environmental Significance ratings. Refer to Attachment B for an explanation of the methodology used.

- **HIGH Retention Value:** These trees are worthy of retention and design consideration should be made where possible to allow their retention.
- **MEDIUM Retention Value:** These trees are worthy of retention and minor design consideration should be made to retain these trees wherever possible (e.g. placement of ancillary structures, garden retaining walls, driveway levels).

- **LOW Retention Value:** These trees should not be considered to be a constraint to design layout. Some of these trees should be removed irrespective of any proposed development.

The method of determining and defining retention values used in this report has been derived from the ©Retention Index developed by Tree Wise Men® Australia Pty Ltd.

4.5 Consideration for Tree Retention and Removal

Tree removal recommendations have been based on tree Retention Values and construction offsets.

Trees are generally proposed to be removed in the following circumstances:

- Trees located within construction footprints.
- Trees with construction proposed within SRZ where root loss cannot be avoided through sensitive design.
- Trees with a TPZ loss of more than 25%, may be recommended for removal providing tree sensitive design cannot be implemented to avoid significant root and canopy loss.
- Trees with low Retention Values may be recommended for removal irrespective of proposed development.

Where demolition of existing structures, excavation or fill is proposed within the Tree Protection Zone (TPZ), arboricultural consultation and sensitive construction methods will be required. Where works are proposed outside of the TPZ, no sensitive construction methods are required.

5 Potential Impacts of Proposed Works

5.1 Trees to be Removed

Tree Number	Retention Value	Reason for Proposed Removal
1	Medium	Located within the proposed pedestrian entry ramp.
2	High	Construction and earthworks are proposed within the Structural Root Zone. Major root loss is expected.
3, 4, 6	Medium	Within the proposed new driveway.
5 (Row of 6)	Low	Within the proposed area of bulk excavation (basement level).
24	Medium	
36	High	
22, 23, 25, 27, 35, 37	Low	The new building scaffold is likely to straddle the boundary wall with supports and hoarding required on the verge. Tree removal will be required to accommodate the scaffolding, supports and hoarding. Some of these trees (Trees 33-35) have the potential to cause damage to the heritage sandstone wall due to their potential size and interaction with wall footings. These trees are proposed to be replaced as outlined in the Landscape Plan.
19, 20, 21, 26, 28, 29, 29a, 30, 31, 32, 38, 39	Medium	
33, 34	High	
40	High	Basement level excavation and battering is proposed within the Structural Root Zone. Major root loss and tree destabilisation is likely.
41	Low	The boundary wall is to be dismantled and re-constructed to allow service installation in this location.
59	High	Within the proposed Healy Gym footprint.



Photo A: Tree 1



Photo B: Tree 2



Photo C: Trees 3 and 5 (row of 6)

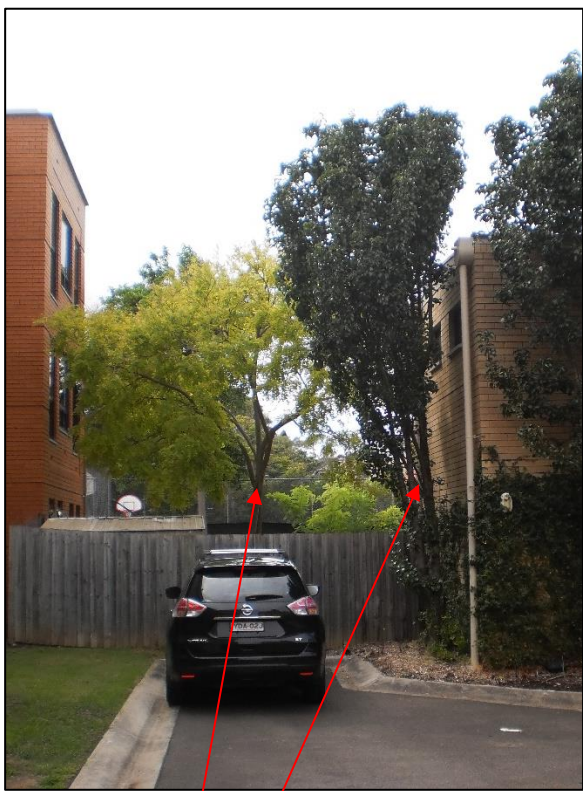


Photo D: Trees 4 and 6



Photo E: Trees 19-39 located along the Luke Street frontage.



Photo F: Trees 33-35. These trees have the potential to damage the heritage sandstone wall.



Photo G: Tree 59. Located within the proposed Healy Gym footprint.

5.2 Potential Impacts of Proposal on Retained Trees

Tree Number	Retention Value	Works proposed within the Tree Protection Zone (TPZ)
16	High	Canopy pruning will be required to accommodate scaffolding and hoarding during construction. Approximately 10% of the canopy area will require removal.
17	High	Canopy pruning will be required to accommodate scaffolding and hoarding during construction. Approximately 15-20% of the canopy area will require removal.
18	High	Canopy pruning will be required to accommodate scaffolding and hoarding during construction. Approximately 20-25% of the canopy area will require removal.
42	High	Excavation for basement level, battering and service installation is proposed within the Tree Protection Zone.
42, 43, 44, 45, 46, 47, 47, 48, 49, 50, 51, 52, 54, 55, 57	High	Excavation for electrical conduit installation is proposed within the TPZ. Some root loss is likely. The extent of root damage could be minimised by careful excavation (refer to the recommendations). Excavation is clear of the Structural Root Zones and no impact on tree stability is expected.
56	High	Excavation for electrical conduit installation is proposed within the TPZ. Some root loss is likely. The extent of root damage could be minimised by careful excavation (refer to the recommendations). Excavation is proposed within the Structural Root Zone (SRZ) and an impact on the stability of this tree is possible. The route of the electrical services should be re-located to clear the SRZ (refer to the recommendations).
60	High	The proposed Healy Gym is proposed within the TPZ. Excavation and root loss is expected as part of installation of floor slab footings. Approximately 15-20% of the TPZ area will be affected. An impact on the health and vitality of this tree is possible. The impact is unlikely to be detrimental and the tree is likely to remain viable in the long-term. Proposed excavation is clear of the Structural Root Zone and no impact on tree stability is expected.

Incidental Impacts: There is the potential for incidental/accidental damage to the trunk, canopy and shallow roots of all retained trees throughout the construction process. Trees are commonly impacted on construction sites in the following ways.

- Stripping of topsoil and removal of organic material from the soil surface.

- Compaction of the topsoil and damage to surface roots through use of heavy machinery and frequent foot traffic.
- Soil contamination through washing out barrows and disposal or spillage of chemical materials.
- Root loss due to unforeseen excavation for plumbing upgrades and landscape construction.
- Bark/trunk and branch injuries from accidental contact with machinery.

These impacts can be easily avoided through communication with building contractors and basic tree protection measures.

6 Recommendations

6.1 Site Establishment –Prior to Construction

Appointment of a Project Arborist: An Arborist with an AQF Level 5 qualification in Arboriculture and experience in tree protection within construction sites should be engaged prior to the commencement of work on the site. The Project Arborist should be present at the following times:

- Following installation of tree protection fencing.
- During pruning of Trees 16, 17 and 18.
- During trenching works and boundary wall demolition/re-construction within the TPZ of Tree 42.
- During excavation for electrical services installation within the TPZ’s of Trees 42, 43, 44, 47, 48, 49, 54, 55, 56 and 57.
- During excavation for the Healy Gym floor slab within the TPZ of Tree 60.
- During any other earthworks within the TPZ of retained trees.
- At project completion to verify tree protection and retention.

Tree Protection Fencing: Tree protection fencing is recommended for Trees 7, 16, 17, 18, 42-53, 55, 56, 57, 60-65. Tree Protection Fencing should be installed prior to any machinery or materials being bought on site and remain in position throughout the entire project. Tree Protection Fencing should be erected around the Tree Protection Zones as defined in the Tree Protection Plans (Attachment C). An example of adequate Tree Protection Fencing is detailed in Figure A below.

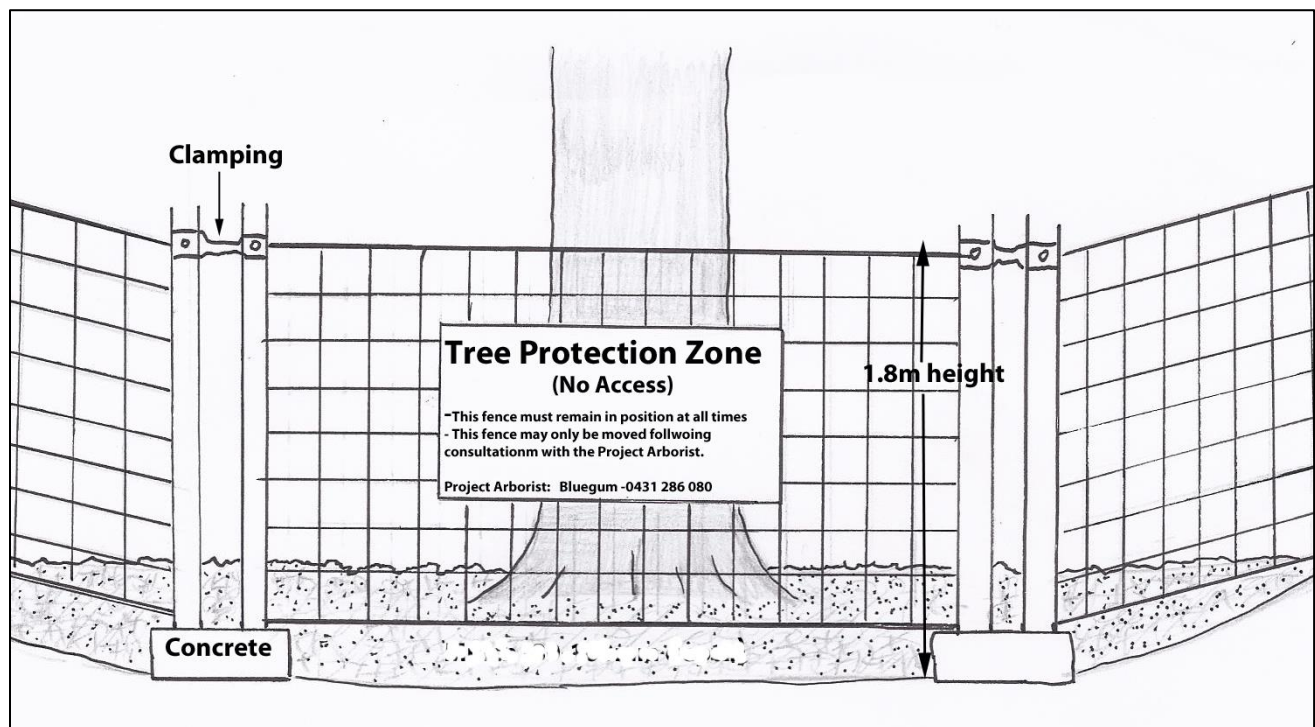


Figure A: Example of adequate tree protection fencing.

Tree Removal: Thirty one (31) trees are proposed to be removed as part of the project. Tree removal works should be undertaken in accordance with the WorkSafe Australia *Guide to Managing Risks of Tree Trimming & Removal Work*.

Canopy Pruning: The northern side of Trees 16, 17 and 18 are proposed to be pruned to accommodate the scaffolding and hoarding during construction. Canopy pruning should be supervised by the Project Arborist. Canopy pruning must be undertaken in accordance with AS4373-2007-*Pruning of Amenity Trees*, Section 7.2.4 (Selective Pruning).

Tree Number	Pruning Description	Pruning Limit
Tree 16	Canopy pruning should be limited to branches overhanging the property boundary. No other pruning is currently recommended.	10%
Tree 17		15-20%
Tree 18		20-25%

The approximate area that canopy pruning will be required is detailed in Photos H and I.



Photo H: Tree 16 showing the approximate extent of required pruning.



Photo I: Trees 17 and 18 showing the approximate extent of required pruning.

6.2 During Construction

Tree Protection Zones: Refer to the Tree Assessment Table (Attachment A) and Tree Protection Plan (Attachment C) for the spread of TPZ’s of trees nominated for retention. The following should be prohibited within the Tree Protection Zones:

- Stripping of topsoil or organic surface material outside of construction zones.
- Storage of material, vehicles and machinery.
- Disposal of solid, liquid or chemical waste.
- Any excavation, fill or other construction activity other than that discussed in this report.

Electrical Services Alignment (Tree 56): The alignment of the electrical services alignment must be re-routed near Tree 56 to avoid the Structural Root Zone (3.6m radius). Refer to Figure A for detail.

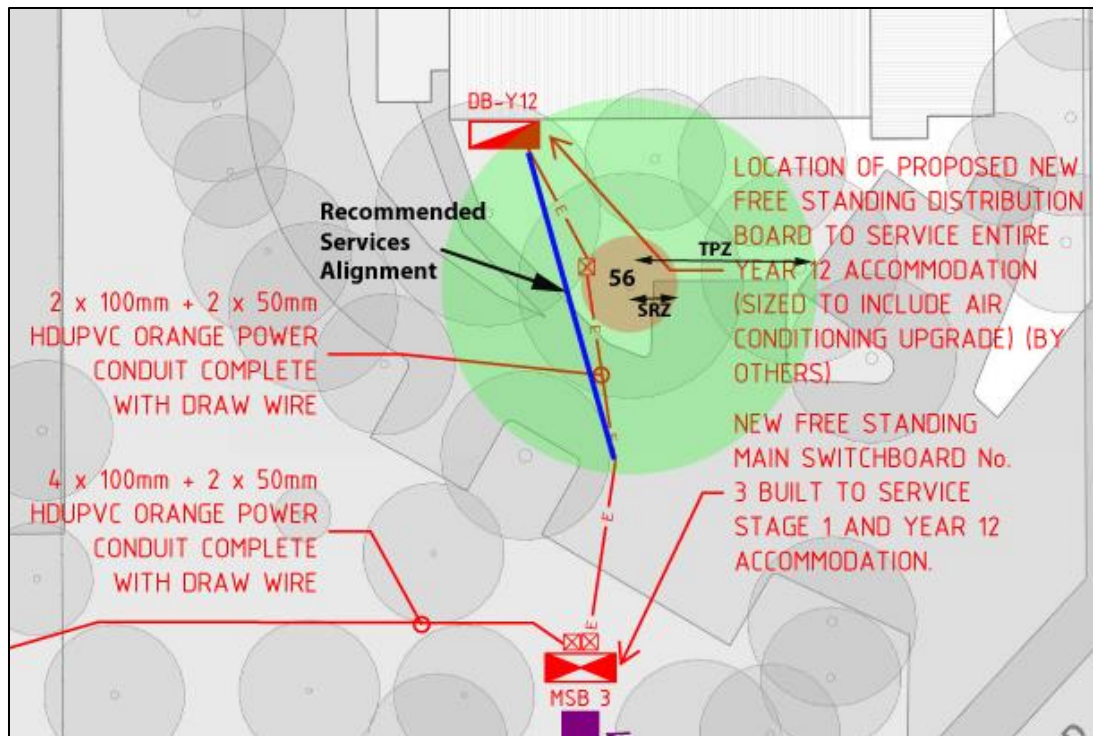


Figure B: Recommended electrical services alignment near Tree 56.

Trenching for Electrical Conduit Installation: The Project Arborist should be on-site to guide and assist all trenching within the TPZ's of Trees 42, 43, 44, 47, 48, 49, 54, 55, 56 and 57. The minimum possible excavator bucket width should be used (less than 300mm). Machine excavation should cease as tree roots are encountered. All tree roots encountered within the trench alignment should be carefully exposed using hand tools and cleanly cut. The purpose of this is to avoid additional root damage (tearing/splitting) that typically occurs when roots are pruned using an excavator. Machine excavation may continue beyond this depth.

Trenching for Services (Tree 42): Care must be taken to avoid damage to tree roots during trenching within a 9.0m radius of Tree 42. The services trenching should be aligned at a minimum distance of 3.0m from Tree 42. Following removal of the bitumen ground service, trenching should be undertaken using hand tools within the top 800mm of soil. All tree roots encountered should be cleanly cut. The purpose of this is to avoid additional root damage (tearing/splitting) that typically occurs when roots are pruned using an excavator. Machine excavation may continue beyond this depth. The Project Arborist should be on-site to guide and assist this process.

Excavation for the Healy Gym Footings (Tree 60): The Project Arborist should be on-site during excavation for the floor slab of the Healy Gym within the TPZ (9.6m radius) of Tree 60. All excavation must be undertaken using hand tools within the TPZ of Tree 60. All tree roots encountered should be carefully exposed using hand tools and cleanly cut. The purpose of this is to avoid additional root damage (tearing/splitting) that typically occurs when roots are pruned using an excavator.

6.1 Post Construction Tree Care

At the completion of the project, the retained trees should be inspected by the Project Arborist. Depending on the health and vitality of retained trees, the Project Arborist may prescribe some remedial tree care. This may include installation of temporary or permanent irrigation, application of soil conditioners, compost application, fertiliser application and installation of mulch.

7 Statement of Impartiality

- This report prepared by Bluegum Tree Care & Consultancy (BTCC) reflects the impartial and expert opinion of Alexis Anderson.
- BTCC is acting independently of and not as the advocate for the owners of the subject trees.
- BTCC does not undertake tree pruning and removal works and will not have any involvement with pruning or removing trees which are the subject of this report.

8 Limitations

- The findings of this report are based upon and limited to visual examination of trees from ground level without any climbing, internal testing or exploratory excavation.
- The tree assessment was undertaken for the purpose of pre-development planning. Detailed tree risk assessment was not requested or included in the scope of works.
- This report reflects the health and structure of trees at the time of inspection. Bluegum cannot guarantee that a tree will be healthy and safe under all circumstances or for a specified period of time. There is no guarantee that problems or defects with assessed trees, will not arise in the future. Liability will not be accepted for damage to person or property as a result of failure of assessed trees.

Tree No.	Common Name/ Genus Species	DBH (mm)	Height (m)	Canopy Spread Radius (m)	Age Class	Health / Vitality	Structural Condition	Tree Protection Zone (m)	Structural Root Zone (m)	Estimated Life Expectancy (ELE)	Landscape and Environmental Significance	Retention Value	Comments	Works Proposed Within the Tree Protection Zone	Proposed Action.
1	False Cypress, <i>Chamaecyparis sp.</i>	300	8	4	M	G	G	3.6	2.0	Long (30+ yrs)	3	Medium		Within the footprint of the proposed new access ramp.	Remove.
2	Chinese Elm, <i>Ulmus parvifolia</i>	250, 210	8	4	M	G	G	3.9	2.1	Long (30+ yrs)	2	High		Construction and earthworks are proposed within the Structural Root Zone. Major root and canopy loss is expected.	Remove.
3	Native Frangipani, <i>Hymenosporum flavum</i>	200	10	2	M	G	G	2.4	1.7	Long (30+ yrs)	3	Medium		Within proposed accessway. Bulk excavation is also proposed within the Structural Root Zone.	Remove.
4	Golden Robinia, <i>Robinia psuedoacacia 'Frisia'</i>	150, 150	9	4	M	G	G	2.7	1.8	Medium (10-30 yrs)	3	Medium		Within proposed accessway.	Remove.
5	Native Frangipani, <i>Hymenosporum flavum</i> (Row of 6)	100 to 200	9	3	M	F to P	F	2.4	1.7	Short (0-10 yrs)	4	Low	The majority of the trees in this group are in poor health. These trees are not plotted on the survey.	Within the area of proposed bulk (basement level) excavation.	Remove.
6	Ornamental Pear, <i>Pyrus calleryana</i>	90, 100	8	1	M	G	G	2.0	1.5	Long (30+ yrs)	3	Medium		Within proposed accessway.	Remove.
7	Ornamental Pear, <i>Pyrus calleryana</i>	200, 100	8	1	M	G	G	2.7	1.8	Long (30+ yrs)	3	Medium		Nil.	Retain.
8	Tallowwood, <i>Eucalyptus microcorys</i>	660	17	8	M	G	G	7.9	2.8	Long (30+ yrs)	2	High		Nil.	Retain.
9	Southern Blue Gum, <i>Eucalyptus globulus</i>	900	25	8	M	G	G	10.8	3.2	Long (30+ yrs)	2	High		Nil.	Retain.
9a	Australian Teak, <i>Flindersia australis</i>	80	4	1	IM	G	G	2.0	1.5	Long (30+ yrs)	3	Medium	Recently planted.	Nil.	Retain.
10	Brushbox, <i>Lophostemon confertus</i>	990	20	8	M	G	G	11.9	3.3	Long (30+ yrs)	2	High		Nil.	Retain.
11	Kurrajong, <i>Brachychiton populneus</i>	400	9	3	M	F	G	4.8	2.3	Long (30+ yrs)	3	Medium		Nil.	Retain.
12	Brushbox, <i>Lophostemon confertus</i>	430	10	5	M	G	G	5.2	2.3	Long (30+ yrs)	2	High	Street tree.	Nil.	Retain.
13	Brushbox, <i>Lophostemon confertus</i>	280	9	3	M	G	G	3.4	2.0	Long (30+ yrs)	2	High	Street tree.	Nil.	Retain.
14	Brushbox, <i>Lophostemon confertus</i>	310	8	4	M	G	G	3.7	2.1	Long (30+ yrs)	2	High	Street tree.	Nil.	Retain.
15	Brushbox, <i>Lophostemon confertus</i>	250	9	4	M	G	G	3	1.9	Long (30+ yrs)	2	High	Street tree.	Nil.	Retain.

Tree No.	Common Name/ Genus Species	DBH (mm)	Height (m)	Canopy Spread Radius (m)	Age Class	Health / Vitality	Structural Condition	Tree Protection Zone (m)	Structural Root Zone (m)	Estimated Life Expectancy (ELE)	Landscape and Environmental Significance	Retention Value	Comments	Works Proposed Within the Tree Protection Zone	Proposed Action.
16	Brushbox, <i>Lophostemon confertus</i>	490	11	6	M	G	G	5.9	2.5	Long (30+ yrs)	2	High	Street tree.	Canopy pruning will be required to accommodate scaffolding and hoarding during construction.	Retain.
17	Brushbox, <i>Lophostemon confertus</i>	840	16	7	M	G	G	10.1	3.1	Long (30+ yrs)	2	High	Street tree.	Canopy pruning will be required to accommodate scaffolding and hoarding during construction.	Retain.
18	Brushbox, <i>Lophostemon confertus</i>	870	18	7	M	G	G	10.4	3.1	Long (30+ yrs)	2	High	Street tree.	Canopy pruning will be required to accommodate scaffolding and hoarding during construction.	Retain.
19	Weeping Bottlebrush, <i>Callistemon viminalis</i>	190	5	2	M	G	G	2.3	1.7	Medium (10-30 yrs)	3	Medium	Located in the narrow street verge between the sandstone wall and road.	The new building scaffolding is likely to straddle the boundary wall with supports and hoarding required on the verge. Tree removal will be required to accommodate the scaffolding, supports and hoarding.	Remove.
20	Weeping Bottlebrush, <i>Callistemon viminalis</i>	350 @base	5	3	M	G	G	4.2	2.1	Long (30+ yrs)	3	Medium	Located in the narrow street verge between the sandstone wall and road.		Remove.
21	Weeping Bottlebrush, <i>Callistemon viminalis</i>	350 @base	5	3	M	G	G	4.2	2.1	Long (30+ yrs)	3	Medium	Located in the narrow street verge between the sandstone wall and road.		Remove.
22	Jacaranda, <i>Jacaranda mimosifolia</i>	370	9	4	M	F	F	4.4	2.2	Short (0-10 yrs)	3	Low	Canopy dieback and trunk decay. Located in the narrow street verge between the sandstone wall and road.		Remove.
23	Camellia, <i>Camellia sasanqua</i>	90	3	1	M	G	G	2.0	1.5	Long (30+ yrs)	4	Low	Located in the narrow street verge between the sandstone wall and road.		Remove.
24	Brushbox, <i>Lophostemon confertus</i>	350, 350	10	5	M	F	G	5.9	2.5	Long (30+ yrs)	3	Medium	Located in the narrow street verge between the sandstone wall and road.	Within the alignment of the proposed bulk (basement level) excavation.	Remove.
25	Weeping Fig, <i>Ficus benjamina</i>	420, 320	11	7	M	F	G	6.3	2.6	Long (30+ yrs)	4	Low	Inappropriate species for a narrow planting bed close to structures. Located in the narrow street verge between the sandstone wall and road.	The new building scaffolding is likely to straddle the boundary wall with supports and hoarding required on the verge. Tree removal will be required to accommodate the scaffolding, supports and hoarding.	Remove.
26	Camellia, <i>Camellia sasanqua</i>	90, 90, 90, 90	4	2	M	G	G	2.1	1.5	Long (30+ yrs)	3	Medium	Located in the narrow street verge between the sandstone wall and road.		Remove.
27	WA Weeping Myrtle, <i>Agonis flexuosa</i>	410	8	3	M	F	F	4.9	2.3	Short (0-10 yrs)	3	Low	Dieback and thinning of the canopy. Located in the narrow street verge between the sandstone wall and road.		Remove.
28	Lilly Pilly, <i>Syzygium sp.</i>	150	7	2	M	G	G	2.0	1.5	Long (30+ yrs)	3	Medium	Located in the narrow street verge between the sandstone wall and road.		Remove.
29	Lilly Pilly, <i>Syzygium sp.</i>	150	7	2	M	G	G	2.0	1.5	Long (30+ yrs)	3	Medium	Located in the narrow street verge between the sandstone wall and road.		Remove.
29a	Lilly Pilly, <i>Syzygium sp.</i>	90	5	2	M	G	G	2.0	1.5	Medium (10-30 yrs)	3	Medium	Located in the narrow street verge between the sandstone wall and road.		Remove.

Tree No.	Common Name/ Genus Species	DBH (mm)	Height (m)	Canopy Spread Radius (m)	Age Class	Health / Vitality	Structural Condition	Tree Protection Zone (m)	Structural Root Zone (m)	Estimated Life Expectancy (ELE)	Landscape and Environmental Significance	Retention Value	Comments	Works Proposed Within the Tree Protection Zone	Proposed Action.
30	Weeping Bottlebrush, <i>Callistemon viminalis</i>	210, 200, 190	8	3	M	G	G	4.2	2.1	Long (30+ yrs)	3	Medium	Located in the narrow street verge between the sandstone wall and road.	The new building scaffolding is likely to straddle the boundary wall with supports and hoarding required on the verge. Tree removal will be required to accommodate the scaffolding, supports and hoarding.	Remove.
31	Weeping Bottlebrush, <i>Callistemon viminalis</i>	280, 250, 250, 190	10	3	M	G	G	6.0	2.5	Long (30+ yrs)	3	Medium	Located in the narrow street verge between the sandstone wall and road.		Remove.
32	Native Frangipani, <i>Hymenosproum flavum</i>	240	11	2	M	G	G	2.9	1.8	Long (30+ yrs)	3	Medium	Located in the narrow street verge between the sandstone wall and road.		Remove.
33	Broad-leaved Paperbark, <i>Melaleuca quinquenervia</i>	560	17	4	M	G	G	6.7	2.6	Long (30+ yrs)	3	Medium	Inappropriate species for a narrow planting bed close to structures. Located in the narrow street verge between the sandstone wall and road.		Remove.
34	Broad-leaved Paperbark, <i>Melaleuca quinquenervia</i>	360	15	3	M	G	G	4.3	2.2	Long (30+ yrs)	3	Medium			Remove.
35	Weeping Fig, <i>Ficus benjamina</i>	420, 350	14	5	M	G	G	6.6	2.6	Long (30+ yrs)	4	Low			Remove.
36	Brushbox, <i>Lophostemon confertus</i>	910	25	8	M	G	G	10.9	3.2	Long (30+ yrs)	2	High		Within the alignment of the proposed bulk (basement level) excavation.	Remove.
37	Sweet Viburnum, <i>Viburnum odoratissimum</i>	90, 80	6	2	M	G	G	2.0	1.5	Long (30+ yrs)	4	Low	Located in the narrow street verge between the sandstone wall and road.	The new building scaffolding is likely to straddle the boundary wall with supports and hoarding required on the verge. Tree removal will be required to accommodate the scaffolding, supports and hoarding.	Remove.
38	Chinese Tallow, <i>Sapium sebiferum</i>	430	9	4	M	G	G	5.2	2.3	Long (30+ yrs)	3	Medium	Located in the narrow street verge between the sandstone wall and road.		Remove.
39	Chinese Tallow, <i>Sapium sebiferum</i>	320	9	4	M	G	G	3.8	2.1	Long (30+ yrs)	3	Medium	Located in the narrow street verge between the sandstone wall and road.		Remove.
40	Norfolk Island Pine, <i>Araucaria heterophylla</i>	800	30	5	M	G	G	9.6	3.2	Long (30+ yrs)	2	High		Basement level excavation and battering within the Structural Root Zone. Major root loss and destabilisation is likely.	Remove.
41	Sweet Viburnum, <i>Viburnum odoratissimum</i>	120	5	2	M	G	G	2.0	1.5	Long (30+ yrs)	4	Low	Located in the narrow street verge between the sandstone wall and road.	Demolition and re-construction of the boundary wall is required for services installation.	Remove.
42	Brushbox, <i>Lophostemon confertus</i>	750	22	5	M	G	G	9.0	3.0	Long (30+ yrs)	2	High		Excavataion for basement level and battering is proposed within the TPZ. Excavation for services installation is proposed within the TPZ.	Retain.
43	Brushbox, <i>Lophostemon confertus</i>	610	17	5	M	F	G	7.3	2.7	Long (30+ yrs)	2	High		Excavation for electrical conduit installation is proposed within the TPZ.	Retain.

Tree No.	Common Name/ Genus Species	DBH (mm)	Height (m)	Canopy Spread Radius (m)	Age Class	Health / Vitality	Structural Condition	Tree Protection Zone (m)	Structural Root Zone (m)	Estimated Life Expectancy (ELE)	Landscape and Environmental Significance	Retention Value	Comments	Works Proposed Within the Tree Protection Zone	Proposed Action.
44	Brushbox, <i>Lophostemon confertus</i>	750	20	6	M	G	G	9.0	2.9	Long (30+ yrs)	2	High		Excavation for electrical conduit installation is proposed within the TPZ.	Retain.
45	Blackbean, <i>Castanospermum australe</i>	580	16	6	M	G	G	7.0	2.7	Long (30+ yrs)	2	High		Excavation for electrical conduit installation is proposed within the TPZ.	Retain.
46	Bald Cypress, <i>Taxodium distichum</i>	1020	20	8	M	G	G	12.2	3.4	Long (30+ yrs)	2	High		Excavation for electrical conduit installation is proposed within the TPZ.	Retain.
47	Brushbox, <i>Lophostemon confertus</i>	660	22	6	M	G	G	7.9	2.8	Long (30+ yrs)	2	High		Excavation for electrical conduit installation is proposed within the TPZ.	Retain.
48	Brushbox, <i>Lophostemon confertus</i>	660	17	6	M	G	G	7.9	2.8	Long (30+ yrs)	2	High		Excavation for electrical conduit installation is proposed within the TPZ.	Retain.
49	Brushbox, <i>Lophostemon confertus</i>	610	18	6	M	G	G	7.3	2.7	Long (30+ yrs)	2	High		Excavation for electrical conduit installation is proposed within the TPZ.	Retain.
50	Brushbox, <i>Lophostemon confertus</i>	760	20	5	M	G	G	9.1	3.0	Long (30+ yrs)	2	High		Excavation for electrical conduit installation is proposed within the TPZ.	Retain.
51	Brushbox, <i>Lophostemon confertus</i>	470	18	5	M	G	G	5.6	2.4	Long (30+ yrs)	2	High		Excavation for electrical conduit installation is proposed within the TPZ.	Retain.
52	Southern Blue Gum, <i>Eucalyptus globulus</i>	800	17	8	M	F	F	9.6	3.1	Medium (10-30 yrs)	2	High		Excavation for electrical conduit installation is proposed within the TPZ.	Retain.
53	Brushbox, <i>Lophostemon confertus</i>	490	18	5	M	G	G	5.9	2.5	Long (30+ yrs)	2	High		Nil.	Retain.
54	Brushbox, <i>Lophostemon confertus</i>	680	20	7	M	G	G	8.2	2.8	Long (30+ yrs)	2	High		Excavation for electrical conduit installation is proposed within the TPZ.	Retain.
55	Brushbox, <i>Lophostemon confertus</i>	980	23	7	M	F	G	11.8	3.3	Long (30+ yrs)	2	High		Excavation for electrical conduit installation is proposed within the TPZ.	Retain.
56	Brushbox, <i>Lophostemon confertus</i>	1140	21	8	M	G	G	13.6	3.6	Long (30+ yrs)	2	High		Excavation for electrical conduit installation is proposed within the TPZ and SRZ. The conduit alignment must be adjusted near this tree.	Retain.
57	Brushbox, <i>Lophostemon confertus</i>	710	22	8	M	G	G	8.5	2.9	Long (30+ yrs)	2	High		Excavation for electrical conduit installation is proposed within the TPZ.	Retain.
58	Brushbox, <i>Lophostemon confertus</i>	630	16	4	M	G	G	7.6	2.8	Long (30+ yrs)	2	High		Nil.	Retain.
59	Canary Island Date Palm, <i>Phoenix canariensis</i>	680	16	2	M	G	G	8.2	2.8	Long (30+ yrs)	2	High		Within the proposed building footprint.	Remove.

Tree No.	Common Name/ Genus Species	DBH (mm)	Height (m)	Canopy Spread Radius (m)	Age Class	Health / Vitality	Structural Condition	Tree Protection Zone (m)	Structural Root Zone (m)	Estimated Life Expectancy (ELE)	Landscape and Environmental Significance	Retention Value	Comments	Works Proposed Within the Tree Protection Zone	Proposed Action.
60	Hoop Pine, <i>Araucaria cunninghamiana</i>	800	30	5	M	G	G	9.6	3.0	Long (30+ yrs)	1	High	Prominent part of the landscape.	The proposed Healy Gym is proposed within the TPZ. Excavation and root loss is expected as part of floor slab footings. Approximately 15-20% of the TPZ area will be affected.	Retain.
61	Macadamia, <i>Macadamia tetraphylla</i>	160	7	3	M	G	G	3.0	1.6	Long (30+ yrs)	3	Medium		Nil.	Retain.
62	Brushbox, <i>Lophostemon confertus</i>	570	14	5	M	F	G	6.8	2.7	Long (30+ yrs)	2	High		Nil.	Retain.
63	Australian Teak, <i>Flindersia australis</i>	60	4	1	IM	G	G	2.0	1.5	Long (30+ yrs)	3	Medium		Nil.	Retain.
64	Ash, <i>Fraxinus excelsior</i>	90, 80	9	3	M	G	G	2.0	1.5	Medium (10-30 yrs)	3	Medium		Nil.	Retain.
65	Ash, <i>Fraxinus excelsior</i>	150, 110	9	3	M	G	G	2.2	1.6	Medium (10-30 yrs)	3	Medium		Nil.	Retain.

Attachment B: TREE ASSESSMENT DEFINITIONS

Height. Tree height is estimated from ground level. This assessment is made independently of data plotted on survey plan. These measurements have not been confirmed with clinometer or other surveying instrument.

Diameter at Breast Height (DBH). Trunk diameter is measured at 1.4 metres above ground level. A diameter tape is used which calculates the diameter from a measurement of the circumference. DBH is primarily used for the calculation of the TPZ. The trunk diameter above the root buttress is measured to calculate the Structural Root Zone. If a tree has more than 4 trunks, the diameter of the four largest trunks is recorded. For irregular trunk formations the DBH is calculated as outlined in Appendix A of AS4970-2009 -*Protection of Trees on Development Sites*.

Canopy Spread Radius. Average canopy spread radius is estimated from the centre of trunk to the outer edge of canopy. Refer to Comments column for detail of heavily skewed canopy spread.

Age Class - This is an estimation of the tree's current age class based on size, growth habit, local environmental conditions and comparison with surrounding trees.

- **Immature (IM):** This is a juvenile specimen that is likely to have germinated within the previous 5 years.
- **Early Mature (EM):** This is a tree that is established within its growing environment, though has not reached an age of reproductive maturity or the natural growth habit of a mature individual.
- **Mature (M):** This is a tree has reached both reproductive maturity and a physical form and shape typical for the species. Trees can have a Mature Age Class for the majority of their life span.
- **Late-Mature (LM):** These trees show early signs of senescence with symptoms such as reduced canopy density and an accumulation of dead branches.
- **Over-mature (OM):** These trees show symptoms of irreversible decline such as canopy dieback with dead branches concentrated in the upper canopy.

Health/Vitality - Good (G), Fair (F) or Poor (P). This is primarily based on the extent of vigorous new foliage growth at branch tips and the colour, size and density of foliage generally. The percentage of live branches to dead branches is considered. The location of any dead branches is also considered. The presence of any pest or disease is considered as part of this assessment. Health can vary with climatic conditions.

Structural Condition - Good (G), Fair (F) or Poor (P). This is an assessment of tree structure and stability. Root anchorage, trunk lean, structural defects, canopy skew and any hazardous features are considered. Dead branches can be considered as part of Structural Condition if they are of a size and location that could cause injury or property damage.

Tree Protection Zone (TPZ). This is a radial distance of (12X) the DBH measured from centre of trunk. TPZ is rounded to the nearest 0.1 metre. A TPZ should not be less than 2m or greater than 15m. The TPZ for palms and other monocots should not be less than 1m outside of the crown projection. Existing constraints to root spread can vary the TPZ. For a tree to remain viable, construction activity should be excluded or undertaken with care within the TPZ. Disturbance within up to 10% of the TPZ area is considered to be a minor encroachment. Disturbance to more than 10% of the TPZ area is considered a major encroachment. Major encroachment into the TPZ is possible depending on the type of disturbance, and species tolerance to disturbance. Exploratory excavation may be required to quantify the presence of roots at the alignment of proposed ground disturbance. This is based upon the Australian Standard AS 4970, 2009, *Protection of trees on development sites* and the Matheney & Clarke "Guidelines for adequate tree preservation zones for healthy, structurally stable trees".

Structural Root Zone (SRZ). This is a radial distance based on the following formula- $SRZ = (D \times 50)^{0.42} \times 0.64$ (for trees less than 150mm Diameter, a minimum SRZ of 1.5 metres). The **D** in the formula is the trunk diameter measured above the root buttress. This was recorded in the field notes. SRZ measurements are rounded to the nearest 0.1m. The Structural Root Zone is the area of soil and roots required to maintain tree stability. Excavation within the SRZ can result in whole tree failure. Fully elevated construction is possible within SRZ with specific rootzone assessment. Existing constraints to root spread can vary the SRZ. This method of determining SRZ is outlined at Section 3.3.5 of Australian Standard AS 4970, 2009, *Protection of trees on development sites*.

Estimated Remaining Life Expectancy: This gives a length of time that the Arborist believes a particular tree can be retained from the time of assessment with an acceptable level of risk based on the information available at the time of the inspection. This system of rating does not take into consideration the likely impacts of any proposed development. Ratings are **Long** (retainable for 30 years or more with an acceptable level of risk), **Medium** (retainable for 10-30 years), **Short** (retainable for 0-10 years) and **Removal** (tree requiring removal due to risk/hazard or absolute unsuitability).

Landscape & Environmental Significance*. This is an assessment of the impact of the tree on the surrounding landscape amenity and natural environment. Rarity, habitat value, physical prominence, historical and cultural significance of the tree are considered in this rating system. The Landscape & Environmental Value ratings used in this report are:

1. Very High Value: This is an outstanding specimen that holds irreplaceable environmental, landscape or cultural value.

2. High Value: An excellent specimen that holds environmental, landscape or cultural value that is present in other site trees or that could be replaced.

3. Moderate Value: Can be a good to fair specimen with environmental, landscape or cultural value that is common within other trees in the locality.

4. Low Value: Removal would not result in any loss of site amenity or environmental value. Can include undesirable or weed species or trees growing in unsuitable locations.

5. Very Low Value: Dead or hazardous with no other environmental or cultural value. Could also include weed species. These trees should be removed or pruned in a way to make safe irrespective of any development.

***Note:** The concept of using a five (5) point scale to assess tree significance was derived from the Tree Wise Men® Australia Pty Ltd ©Significance Rating Scale.

Retention Value*. Retention values are derived from a combination of Estimated Life Expectancy rating and Landscape and Environmental Significance ratings.

Landscape & Environmental Significance		Estimated Life Expectancy			
		Long	Medium	Short	Removal
	Very High (1)	HIGH		MEDIUM	
	High (2)				
	Medium (3)	MEDIUM		LOW	
	Low (4)				
	Very Low (5)				

HIGH Retention Value: These trees are worthy of retention and major design consideration should be made where feasible to allow this.

MEDIUM Retention Value: These trees are worthy of retention and minor design consideration should be made to retain these trees wherever possible (e.g. placement of ancillary structures, garden retaining walls, driveway levels).

LOW Retention Value: These trees should not be considered to be a constraint to design layout. Some of these trees should be removed irrespective of any proposed development.

***Note:** The method of determining and defining retention values used in this report has been derived from the ©Retention Index developed by Tree Wise Men® Australia Pty Ltd.

Tree Protection Plan -Sheet 1

St Joseph's Physical Education and Sports Precinct Project

This plan is to be read in conjunction with the Arboricultural Impact Assessment report prepared for this site, July 2018.

This plan has been prepared using the Proposed Ground Floor Plan (TDK Architects), as a base.

Tree protection fencing is indicative only. Final positions should be determined with co-ordination between the Site Foreman and Project Arborist to allow adequate site access during construction.

In areas where tree protection fencing is not feasible or inhibiting safe site access, trunk battenning and ground protection will be required as an alternative.

Legend

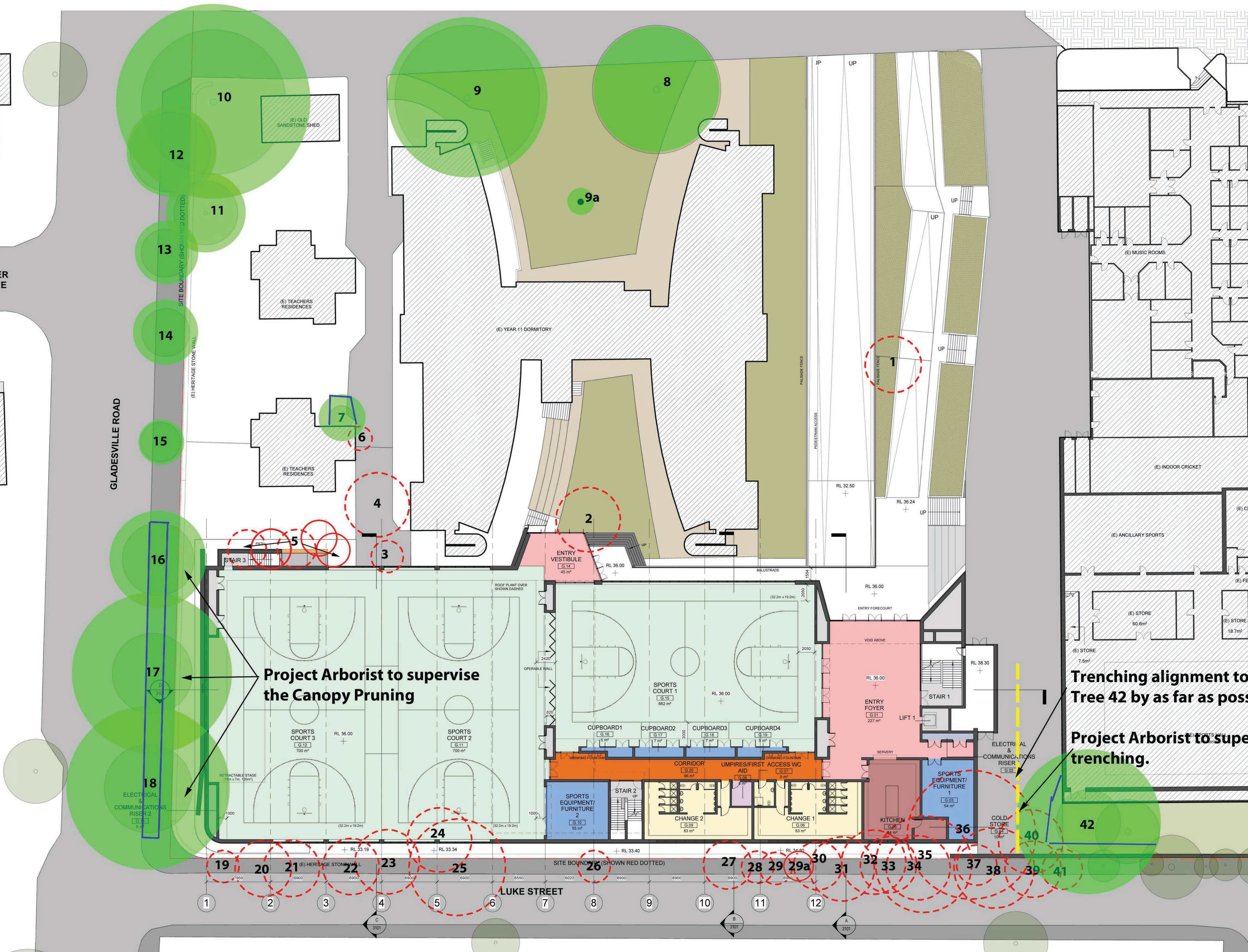
Tree Protection Zone	
Subject Tree to be Removed	
Tree Protection Fencing	

- BASEMENT PARKING
- WORKSHOP
- CORRIDOR
- STAFF
- CIRCULATION
- FOYER
- GLA
- KITCHEN
- SERVICE
- SPORTS COURTS
- STORAGE
- WET AREA

Trenching alignment to clear Tree 42 by as far as possible.

Project Arborist to supervise trenching.

Project Arborist to supervise the Canopy Pruning



EXISTING TREES TO BE
DEMOLISHED FOR CONSTRUCTION

Tree Protection Plan -Sheet 2

St Joseph's Physical Education and Sports Precinct Project

This plan is to be read in conjunction with the Arboricultural Impact Assessment report prepared for this site, July 2018.

This plan has been prepared using the Electrical Services Schematic Design (Northrop), as a base.

Tree protection fencing is indicative only. Final positions should be determined with co-ordination between the Site Foreman and Project Arborist to allow adequate site access during construction.

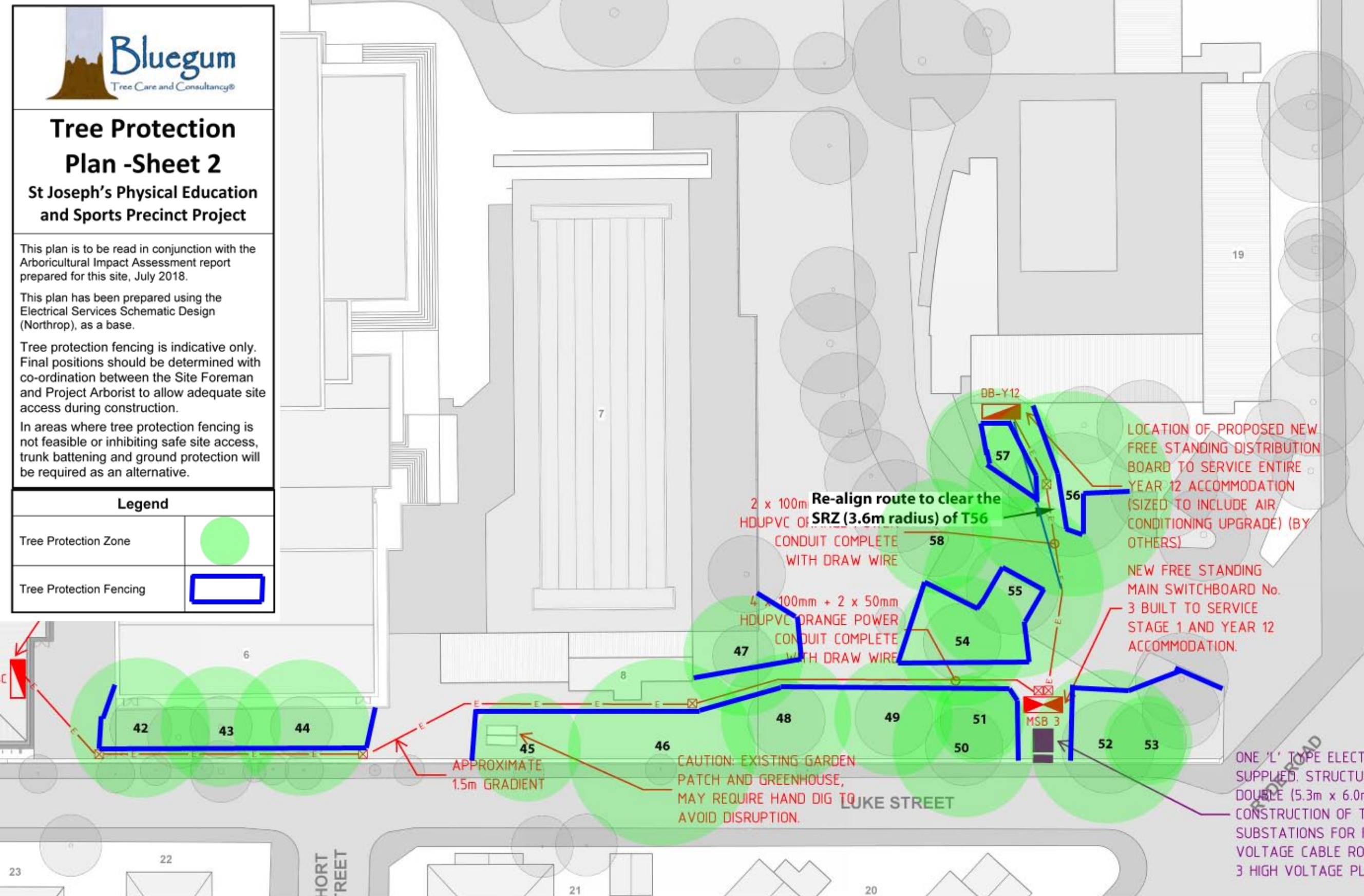
In areas where tree protection fencing is not feasible or inhibiting safe site access, trunk battening and ground protection will be required as an alternative.

Legend

Tree Protection Zone



Tree Protection Fencing



Tree Protection Plan -Sheet 3

St Joseph's Physical Education and Sports Precinct Project

This plan is to be read in conjunction with the Arboricultural Impact Assessment report prepared for this site, July 2018.

This plan has been prepared using the Proposed Healy Gym Plan (TDK Architects), as a base.

Tree protection fencing is indicative only. Final positions should be determined with co-ordination between the Site Foreman and Project Arborist to allow adequate site access during construction.

In areas where tree protection fencing is not feasible or inhibiting safe site access, trunk battening and ground protection will be required as an alternative.

Legend

Tree Protection Zone	
Subject Tree to be Removed	
Tree Protection Fencing	

