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APPENDIX JJ

Arboricultural Report

Tree IQ

Project No: SYD/FOOT/18 Report No: SFS/S2/AIA/A

ARBORICULTURAL IMPACT ASSESSMENT
TREE PROTECTION SPECIFICATION

Sydney Football Stadium
Stage 2

Prepared for: INFRASTRUCTURE NSW

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Revision A

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Contents

1.0 INTRODUCTION 3

1.1 Background 3
1.2 The Proposal 4

2.0 RESULTS 4

2.1 The Site 4
2.2 The Trees 6

3.0 ARBORICULTURAL IMPACT ASSESSMENT 7

3.1 Trees to be removed 7
3.2 Trees to be retained 8
3.3 Other Works within TPZ Areas 11

4.0 NEW TREE PLANTINGS 12

4.1 Planting Plans & Tree Pit Details 12
4.2 Stock Selection & Procurement 13

5.0 SUMMARY & CONCLUSIONS 13

6.0 LIMITATIONS & DISCLAIMER 14

7.0 BIBLIOGRAPHY & REFERENCES 14

8.0 APPENDICES 15

Appendix 1: Methodology 16
Appendix 2: Plans 18
Appendix 3: Tree Assessment Schedule 19
Appendix 4: Plates 29
Appendix 5: Tree Protection Specification 30
Appendix 6: Typical Tree Protection Details 33

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1.0 INTRODUCTION

1.1 Background

1.1.1 This Arboricultural Impact Assessment Report and Tree Protection Specification (Report) was prepared in relation to a State Significant Development (SSD) Development Application (DA) for the redevelopment of the Sydney Football Stadium (SFS). The SSDA is to be submitted to the Minister for Planning pursuant to Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The redevelopment is being conducted in stages comprising the following planning applications:

- **Stage 1** – Concept proposal for the stadium envelope and supporting retail and functional uses as well as development consent for the carrying out of early works, including demolition of the existing facility and associated structures.
- **Stage 2** – Detailed design, construction and operation of the stadium and supporting business, retail and functional uses.

1.1.2 Development consent was granted for the Concept Proposal and detailed approval to carry out early works and demolition (SSD 18_9249) by the Minister for Planning on 6th December 2018. This Report relates to the Stage 2 application and considers the detailed design, construction and operation of the new Sydney Football Stadium pursuant to the approved Concept Proposal.

1.1.3 The purpose of this Report is to undertake a Visual Tree Assessment[1] (VTA), determine the impact of the proposed works on the trees, and where appropriate, recommend the use of tree sensitive construction methods and tree protection measures to minimise adverse impacts.

1.1.4 In preparing this Report, the author is aware of and considered the following documents:

- *Sydney Development Control Plan - Section 3.5 Urban Ecology (2012)*
- *Centennial Parkland Tree Masterplan (2002)*
- *City of Sydney Street Tree Masterplan (2011)*
- *City of Sydney Register of Significant Trees (2013)*
- *Australian Standard 4970 Protection of Trees on Development Sites (2009)*
- *Australian Standard 4373 Pruning of Amenity Trees (2007)*
- *Australian Standard 2303 Tree Stock for Landscape Use (2015)*
- *Safe Work Australia Guide for Managing Risks of Tree Trimming and Removal Work (2016).*

Refer to Methodology **(Appendix 1)**

1.1.5 This Report is based on an assessment of the following supplied documentation/plans only:

- Landscape Drawing Package LA-001-LA802 Rev B – prepared by Aspect Studios dated 28.02.19
- Architectural Drawing Package A01.01-A99.IN.01 - prepared by Cox Architecture dated 28.02.19
- Tree Retention & Removal Plan LA-015 Rev C - prepared by Aspect Studios dated 10.05.19

[1] Mattheck & Breloer (2003)

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1.2 The Proposal

1.2.1 Development consent was granted for the Concept Proposal and Early Works/Demolition stage of the SFS redevelopment (SSD 18_9249) on 6th December 2018. This consent permitted the completion of demolition works on the site and established the planning and development framework through which to assess this subsequent Stage 2 application.

1.2.2 The Stage 2 Application seeks consent for the detailed design, construction and operation of the new stadium which includes:

- Construction of a new stadium with up to 45,000 seats (55,000 capacity in concert-mode), including playing pitch, grandstands, sports and stadium administration areas, food and drink kiosks, corporate facilities and all other aspects of a modern stadium
- Operation and use of the stadium and surrounding site area for a range of sporting and entertainment events
- Vehicular and pedestrian access and circulation arrangements, including excavation to deliver a partial basement level for storage, internal loading and servicing at the playing pitch level
- Reinstatement of the MP1 car park following the completion of construction, including enhanced vehicle rejection facilities and direct vehicular connection to the new stadium basement level
- Public domain improvements within the site boundary, including hard and soft landscaping, to deliver a range of publicly accessible, event and operational areas
- Provision of new pedestrian and cycling facilities within the site
- Signage, including building identification signage, business identification signage and a wayfinding signage strategy
- Extension and augmentation of physical infrastructure/ utilities for the development within the site

2.0 RESULTS

2.1 The Site

2.1.1 The site is located at 40-44 Driver Avenue, Moore Park within the Sydney Cricket Ground Precinct. It is bound by Moore Park Road to the north, Paddington Lane to the east, the existing SCG stadium to the south and Driver Avenue to the west. The site is located within the City of Sydney local government area.

Refer to Figure 1

2.1.2 The site is legally described as Lots 1528 and 1530 in Deposited Plan 752011 and Lot 1 in Deposited Plan 205794. The site is Crown Land, with the Sydney Cricket and Sports Ground Trust (SCSGT) designated as the sole trustee under the *Sydney Cricket and Sports Ground Act 1978*. The site is wholly contained within designated land controlled by the Sydney SCSGT under Schedule 2A of the *Sydney Cricket and Sports Ground Act 1978*.

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Figure 1: Showing site area and local context

2.1.3 In a broader context, the site is largely surrounded by Centennial and Moore Parks, the Fox Studios and Entertainment Quarter precincts and the residential suburb of Paddington. The site is located approximately 3km from the Sydney CBD and approximately 2km from Central Station, and is connected to Sydney's transport network through existing bus routes and will benefit from a dedicated stop on the soon to be completed Sydney CBD and South East Light Rail.

Refer to Figure 2

Figure 2: Showing regional site context

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2.2 The Trees

2.2.1 Seventy-nine (79) trees (and groups of trees) were assessed using the Visual Tree Assessment[2] (VTA) criteria and notes. The trees comprise of a mix of locally indigenous, Australian native and exotic species. A VTA was not undertaken for Tree A which is located within the Fox Studios site due to limited access. Species and an estimated trunk diameter measurement was recorded for the purposes of determining the Tree Protection Zone (TPZ) calculations only.

2.2.2 Ten (10) trees are not covered by the tree management controls within the *Sydney Development Control Plan - Section 3.5 Urban Ecology (2012)* due to their size.[3] Refer to Table 1.

2.2.3 Table 1: Exempt Trees

Species	Tree Number
Cupaniopsis anacardioides (Tuckeroo)	246, 247 & 248
Eucalyptus tereticornis (Forest Red Gum)	302
Ficus rubiginosa (Port Jackson Fig)	177
Lophostemon confertus (Brush Box)	235, 236, 237, 238 & 245

2.2.4 A single *Ficus macrophylla* Moreton Bay Fig (Tree 125) is located off Moore Park Road and is the most valuable tree within the SFS site. It is an outstanding specimen with impressive sculptural form and a wide spreading canopy. Although isolated from other similar-aged plantings within Moore Park, this tree is considered to have individual significance at the local level and group significance at the City/LGA level as an important component of the Moore Park precinct.[4] Tree 125 is listed on the *City of Sydney Register of Significant Trees (2013)* and is the only tree within the SFS site which is of *very high* Landscape Significance.

2.2.5 A search of the *BioNet Atlas of NSW Wildlife Database* was undertaken in May 2018. No individual threatened tree species listed within this database for the area were identified during the current field investigations of the site.[5] The ecological significance and habitat value of the trees has not been assessed and is beyond the scope of this report.

2.2.6 As required by Clause 2.3.2 of *Australian Standard 4970 Protection of Trees on Development Sites (2009),* each tree assessed has been allocated a Retention Value. The Retention Value is based on the tree's Useful Life Expectancy and Landscape Significance with consideration to its health, structural condition and site suitability. The Retention Values do not consider any proposed development works and are not a schedule for tree retention or removal. The trees have been allocated one of the following Retention Values:

- Priority for Retention
- Consider for Retention
- Consider for Removal
- Priority for Removal

Refer to Tree Assessment Schedule **(Appendix 3)**

[2] Mattheck & Breloer (2003)
[3] City of Sydney (2013)
[4] City of Sydney (2013)
[5] NSW Office of Environment and Heritage (2011)

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3.0 ARBORICULTURAL IMPACT ASSESSMENT

3.1 Trees to be removed

3.1.1 Tree 232

Tree 232 was identified as *Platanus* x*acerifolia* (London Plane) and is a mature specimen located in the north-eastern corner of the site. The tree has an estimated Useful Life Expectancy (ULE) of 5-15 years, is of moderate Landscape Significance and has been allocated a Retention Value of *Consider for Retention.*

3.1.2 The supplied plans show that Tree 232 will need to be removed to accommodate the proposed hard landscaping works including the installation of retaining walls, stairs and pavements. Replacement planting using a healthy, advanced-size specimen could replace the loss of amenity from tree removal within a medium timeframe.

3.1.3 Tree 233

Tree 233 was identified as *Platanus* x*acerifolia* (London Plane) and is a semi-mature specimen located in the north-eastern corner of the site. The tree has a ULE of less than 5 years, is of low Landscape Significance and has been allocated a Retention Value of *Priority for Removal.*

3.1.4 The supplied plans show that Tree 233 will need to be removed to accommodate the proposed hard landscaping works including the installation of retaining walls, stairs and pavements. This tree is recommended for removal due to its poor overall condition, irrespective of future development. Replacement planting using a healthy, advanced-size specimen could replace the loss of amenity from tree removal within a short timeframe.

3.1.5 Tree 234

Tree 234 was identified as *Livistonia australis* (Cabbage Tree Palm) and is a mature specimen located in the north-eastern corner of the site. The tree has an estimated ULE of 5-15 years, is of moderate Landscape Significance and has been allocated a Retention Value of *Consider for Retention.*

3.1.6 The supplied plans show that Tree 234 will need to be removed to accommodate the proposed hard landscaping works including the installation of retaining walls, stairs and pavements. Replacement planting using a healthy, advanced-size specimen could replace the loss of amenity from tree removal within a medium timeframe.

3.1.7 Trees 235-238

Trees 235-238 were identified as *Lophostemon confertus* (Brush Box) and are semi-mature specimens located in the north-eastern corner of the site. The trees have an estimated ULE of 15-40 years, are of low Landscape Significance and have been allocated a Retention Value of *Consider for Removal.*

3.1.8 The supplied plans show that Trees 235-238 will need to be removed to accommodate the proposed hard landscaping works including the installation of retaining walls, stairs and pavements. Replacement planting using healthy, advanced-size specimens could replace the loss of amenity from tree removal within a short timeframe.

3.1.9 Tree B

Tree B was identified as *Lophostemon confertus* (Brushbox) and is a mature street tree located within the Moore Park Road road reserve. The tree has a ULE of 15-40 years, is of moderate Landscape Significance and has been allocated a Retention Value of *Consider for Retention.* The supplied plans show that Tree B will need to be removed to facilitate the proposed widening of the Moore Park Road site entry/exit.

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3.2 Trees to be retained

3.2.1 Tree 125

Tree 125 was identified as *Ficus macrophylla* (Moreton Bay Fig) and is a mature specimen located within a garden bed adjacent to Moore Park Road. The tree has an estimated ULE of 40+ years, is of very high Landscape Significance and has been allocated a Retention Value of *Priority for Retention.*

3.2.2 The supplied plans show that demolition works, concrete/timber bench seating, steel edging, paving and mass planting are proposed within the Tree Protection Zone (TPZ) of Tree 125 with the extent of works representing a *Major Encroachment* as defined by *Australian Standard 4970 Protection of Trees on Development Sites 2009 (AS-4970)*.

3.2.3 Extensive information has been published relating to the use of tree sensitive design and construction methods which can be used to minimise impacts of development on tree health and reduce conflict between trees and built structures. Much of this information has been incorporated into best practice guidelines and standards (i.e. *British Standard 5837 Trees in Relation to Design, Demolition and Construction 2012* and AS-4970. Specifically, Clause 3.3.4 of AS-4970, notes that design factors and tree sensitive methods can be used to minimise the impact of the encroachment. These methods should be confirmed as feasible by the relevant project consultants (i.e. architect, landscape, engineer etc) and may require flexibility at the time of construction.

3.2.4 The following tree sensitive methods should be used within the TPZ of Tree 125 to minimise adverse impacts:

- Demolition & Excavation Works: The footing of the existing retaining wall to the south of the tree should be demolished and carefully removed in small sections to minimse disturbance to the surrounding soil profile and prevent root damage (where present). The footing/roots should be assessed by the Project Arborist to determine if sections of the footing should be left in situ.

  Demolition and excavation works should be undertaken working away from the tree and machinery movements should be restricted to areas of existing pavement or ground protection at all times.

- Pavement Surfaces: New concrete paving laid on a flexible sub-base is proposed within the southern section of the TPZ and will require the lowering of levels by up to 650mm (approx.). The encroachment from the proposed paving represents less than 10% of the TPZ and is located within the footprint of the existing pavement surface which is elevated by 800mm (approx.) in the south-western corner of the garden bed.

  The lowering of levels should be undertaken in small increments using a compact excavator (<2T) fitted with a flat-bladed bucket. The excavator operator should be guided by a spotter at all times to ensure the tree's crown is not damaged.

  In the event that roots have grown under the retaining wall and up into the existing fill/sub-base layer below the existing pavement surface, this material should be retained in situ and reused. Minor, selective root pruning may be undertaken at the discretion of the Project Arborist only.

  Retained roots should have a minimum cover of 25mm of sub-base (to allow for the future expansion) which should be lightly consolidated with hand tools. The locations of retained, covered roots should be identified with marker spray and compaction machinery restricted from these areas.

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- Timber Deck: The raised timber deck on a steel sub-frame should be supported on piered footings. The location of piers should be determined by preliminary hand excavation. Pier locations should be adjusted to enable the retention of roots (>25mmø) as required by the Project Arborist. Pier holes should be sleeved to prevent contact between roots (>25mmø) and concrete.

- Steel Edge & Folded Steel Wall: The steel edge and folded steel wall should be installed on inground posts. The location of posts should be determined by preliminary hand excavation. Post locations should be adjusted to enable the retention of roots (>25mmø) as required by the Project Arborist. Post holes should be sleeved to prevent contact between roots (>25mmø) and concrete.

- Irrigation: A permanent, automated drip irrigation system should also be installed across the entire garden bed area to support the health of the tree during prolonged dry periods and minimise physiological stress. The drip irrigation system should be installed prior to the commencement of the demolition works. In addition, regular ongoing applications of a seaweed-based soil conditioner (e.g. Seasol) should be applied to the garden bed area.

3.2.5 A 3D survey of the crown of Tree 125 was undertaken in May 2019 and overlaid onto the Landscape Masterplan. This plan shows that no pruning will be required to accommodate the proposed stadium.

3.2.6 Trees 133, 136-143, 145-149, 151, 154-161, 163-195 & 303-306

Trees 133, 136-143, 145-149, 151, 154-161, 163-195 and 303-306 are mix of Australian-native species including *Banksia integrifolia* (Coastal Banksia), *Corymbia maculata* (Spotted Gum), *Eucalyptus* spp. (Eucalypt species), *Ficus rubiginosa* (Port Jackson Fig) and *Lophostemon confertus* (Brush Box) which surround the existing carpark off Driver Avenue.

3.2.7 The supplied plans show that no works are proposed within the TPZ areas of Trees 133, 136-143, 145-149, 151, 154-161, 163-195 and 303-306. Tree 163 has a large (150mmø), broken branch hung up in the crown which should be removed immediately.

3.2.8 Tree 231

Tree 231 was identified as *Ficus microcarpa* var*. Hillii* (Hills Weeping Fig) and is a mature specimen located in the north-eastern corner of the site. The tree has an estimated ULE of 15-40 years, is of high Landscape Significance and has been allocated a Retention Value of *Priority for Retention.*

3.2.9 The supplied plans show that demolition works, concrete/timber bench seating, seating stairs and associated retaining wall, and mass planting are proposed within the TPZ of Tree 231 with the extent of works representing a *Major Encroachment* as defined by AS-4970.

3.2.10 The following tree sensitive methods should be used within the TPZ of Tree 231 to minimise adverse impacts:

- Demolition Works: Existing structures should be demolished and carefully removed in small sections to minimise disturbance to the surrounding soil profile and prevent root damage.

  Machinery must work from areas of ground protection at all times (i.e. plywood sheeting, HDPE ground mats, road plates or alternative ground protection where approved by the Project Arborist).

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- Pavement Surfaces: New in-situ concrete is to be installed to the east of the tree however the new pavement is to be installed above existing grade and within the footprint of the existing pavement. The existing pavement should be retained and used as a sub-base layer for the new pavement surface.

- Seating Stairs & Associated Retaining Wall: The proposed seating stairs and associated retaining wall is located outside of the TPZ. No over-excavation into the TPZ should be undertaken.

- Substation & Block Wall: A substation and block wall is proposed within the northern section of the TPZ. The encroachment from the proposed substation and wall represents less than 10% of the TPZ and should not significantly impact the health or ULE of the tree. No over-excavation into the TPZ should be undertaken and any requirement for sub-surface drainage to the rear of the wall should utilise a slimline drain cell-type product.

- Bench Seating: Bench seating should be supported on piered footings. The location of piers should be determined by preliminary hand excavation. Pier locations should be adjusted to enable the retention of roots (>25mmø) as required by the Project Arborist. Pier holes should be sleeved to prevent contact between roots (>25mmø) and concrete.

- Irrigation: A permanent, automated drip irrigation system should also be installed across the entire garden bed area to support the health of the tree during prolonged dry periods and minimise physiological stress. The drip irrigation system should be installed prior to the commencement of the development works. In addition, regular ongoing applications of a seaweed-based soil conditioner (e.g. Seasol) should be applied to the garden bed area.

3.2.11 Tree Group 245

Tree Group 245 comprises of six (6) semi-mature specimens of *Lophostemon confertus* (Brush Box) which are located within the existing carpark off Driver Avenue. The trees have an estimated ULE of 5-15 years, are of low Landscape Significance and have been allocated a Retention Value of *Consider for Removal.*

3.2.12 The supplied plans show that no works are proposed within the TPZ area of Tree Group 245.

3.2.13 Tree Group 246, 247 and 248

Tree Groups 246, 247 and 248 comprise of twenty-five (25) semi-mature specimens of *Cupaniopsis anacardioides* (Tuckeroo) which are located within the existing carpark off Driver Avenue. The trees have an estimated ULE of 15-40 years, are of low Landscape Significance and have been allocated a Retention Value of *Consider for Removal.*

3.2.14 The supplied plans show that no works are proposed within the TPZ areas of Tree Groups 246, 247 and 248.

3.2.15 Trees 301, 307 & 308

Trees 301, 307 and 308 were identified as *Lophostemon confertus* (Brush Box) and are semi-mature specimens located within the existing carpark off Driver Avenue. The trees have an estimated ULE of 15-40 years, are of low Landscape Significance and have been allocated a Retention Value of *Consider for Removal.*

3.2.16 The supplied plans show that no works are proposed within the TPZ areas of Trees 301, 307 and 308.

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3.2.17 Tree 302

Tree 302 was identified as *Eucalyptus tereticornis* (Forest Red Gum) and is a semi-mature specimen located within the existing carpark off Driver Avenue. The tree has a ULE of less than 5 years, is of low Landscape Significance and has been allocated a Retention Value of *Priority for Removal.*

3.2.18 The supplied plans show that no works are proposed within the TPZ of Tree 302. Consideration should be given to the removal and replacement of Tree 302 as part of the redevelopment works.

3.2.19 Tree A

Tree A was identified as *Ficus microcarpa* var. *Hillii* (Hills Weeping Fig) and located on the adjoining property to the east. The tree has been allocated a Retention Value of *Priority for Retention.*

3.2.20 The supplied plans show that no works are proposed within the TPZ of Tree A.

3.2.21 A 3D survey of the crown of Tree A was undertaken and overlaid onto the Landscape Masterplan. This plan shows that no pruning will be required to accommodate the proposed stadium.

3.3 Other Works within TPZ Areas

3.3.1 Underground Services

Underground services should be located outside of the TPZ areas. Where this is not possible, services should be installed using tree sensitive excavation (hand/hydrovac etc) methods with the services located around/below roots (>25mmø) as required by the Project Arborist. Excavation using compact machinery fitted with a flat-bladed bucket is permissible where approved by the Project Arborist. Excavation using compact machinery should be undertaken in small increments, guided by a spotter who is to look for and prevent damage to roots (>25mmø).

3.3.2 Alternatively, boring methods may be used for underground service installation where the obvert level (highest interior level of pipe) is greater than 1500mm below existing grade. Excavations for starting and receiving pits for boring equipment should be located outside of the TPZ areas or located to avoid roots (>25mmø) as deemed necessary by the Project Arborist. OSD tanks (where required) should be located outside of the TPZ areas.

3.3.3 Landscape Levels

Existing levels should be maintained wherever possible. Where minor regrading is required, these works should be undertaken using tree sensitive methods (hand/hydrovac/airspade etc) to enable the retention of roots (>25mmø) as required by the Project Arborist.

3.3.4 Other than the installation of soil conditioners to a maximum depth of 50mm above the existing soil profile, the installation of imported soil mixes should be excluded from the TPZ. Soil conditioners must not be placed around the base of the trunk/root collar of a tree.

3.3.5 Landscape Planting

The installation of plants should be undertaken using hand tools and roots (>25mmø) should be protected. No mechanical cultivation/ripping of soils should be undertaken.

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4.0 NEW TREE PLANTINGS

4.1 Planting Plans & Tree Pit Details

4.1.1 Planting Plans (LA – 401-404A)

The supplied Planting Plans show the extensive new tree planting is proposed across the site. This tree planting will significantly increase the site's canopy cover which is currently very low.

4.1.2 Softworks Details 2 (LA – 802A)

Details 1-4 show new trees in pavement areas are to be planted into a strata vault planting system. This type of product maximises the available space for root development whilst providing adequate support for the pavement. Where possible, individual tree pits should be linked to best utilise the available soil volume. Table 2 provides generic soil volumes for different tree sizes.

4.1.3 Table 2: Generic Soil Volumes[6]

Tree Size	Soil Volume (harsh sites)	Soil Volume (favorable sites)
Small (<7m)	36m^3	25m^3
Medium (7-10m)	38m^3	27m^3
Large (10m+)	39m^3	27m^3

4.1.4 It should be noted the soil volumes outlined above are a guide only and wherever possible greater volumes should be provided to promote tree health over the long term.

4.1.5 A minimum on structure soil depth of 750mm (excluding drainage) should be provided for new tree plantings. This minimum depth is required to ensure new trees develop a root system adequate to withstand potential, severe wind tunnel effects. Soil depths should not exceed 1.2m (excluding drainage).

4.1.6 Detail 1 shows two (2) slotted watering pipes are to be installed within the tree pits for watering ad aeration purposes. This design will allow for adequate watering of the trees during the later stages of establishment and over the long-term. However, it should be noted that research shows that lateral movement of water between the soil profile and a tree's rootball is often limited by differential soil textures. Rootballs can dry out before new root growth can develop into the wider soil profile and promote the optimum growth of the tree.

4.1.7 In the early stages of establishment (the initial three months), supplementary hand watering should be provided directly to the rootball of newly installed trees on a weekly basis to maintain soil water levels within the rootball at or around field capacity.

4.1.8 Details 3 and 4 shows compacted 5-7mm screened blue metal aggregate is to be installed to a depth of 50mm (approx.) around the root collar of the tree. Compaction of the aggregate has the potential to damage the bark around the tree's root collar and provide an entry point for pathogens which could impact tree health.

[6] City of Sydney (2015)

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4.2 Stock Selection & Procurement

4.2.1 Selecting a healthy and structurally sound tree with traits appropriate to site constraints can help to prevent future problems. Poorly grown stock will greatly reduce a tree's potential and is likely to have greater maintenance costs over its lifetime. *Australian Standard 2303: Tree Stock for Landscape Use (2015)* provides recommendations and specifications for the production of quality nursery stock. Newly planted trees should meet these standards as a minimum.

4.2.2 Forward-ordering and contract growing from specialised tree nurseries should be undertaken to ensure availability of species and numbers. Additional trees should be ordered to allow for the rejection of individual trees which are of insufficient quality or as replacements for any trees which fail to establish.

4.2.3 Lead times for growing trees will vary greatly between species (i.e growth rates) and starter stock available (i.e. what is either currently in production or able to be outsourced to grow-on). Table 3 provides generic estimations based on expected growth rates of fast, medium and slow growing species.

4.2.4 Table 3: Generic Growth Rates[7]

Growth Rate	Start	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Fast	25L	100L	250L	500L	800L	1200L	1500L	2000L
Medium	25L	45L	100L	200L	400L	700L	900L	1200L
Slow	25L	45L	100L	150L	250L	350L	450L	600L

5.0 SUMMARY & CONCLUSIONS

5.1.1 Seventy-nine (79) trees (and tree groups) were addressed within this Report and comprise of a mix of locally indigenous, Australian native and exotic species. Tree 125 is listed on the *City of Sydney Register of Significant Trees (2013)* and is the only tree within the SFS site which is of *very high* Landscape Significance.

5.1.2 The supplied plans show that eight (8) trees (Trees 232-238 & B) are to be removed as part of the redevelopment works. Of these, three (3) trees have been allocated a Retention Value of *Consider for Retention*, four (4) trees have been allocated a Retention Value of *Consider for Removal* and one (1) tree has been allocated a Retention Value of *Priority for Removal*. No trees to be removed have been allocated a Retention Value of *Priority for Retention* or are of *high* or *very high* Landscape Significance.

5.1.3 The supplied plans show that seventy-one (71) trees (Trees 125, 133, 136-143, 145-149, 151, 154-161, 163-195, 231, 245-248, 301-308 & A) are to be retained as part of the redevelopment works. Of these, seven (7) trees have been allocated a Retention Value of *Priority for Retention*, thirty-seven (37) trees have been allocated a Retention Value of *Consider for Retention*, twenty-six (26) trees have been allocated Retention Value of *Consider for Removal* and one (1) tree has been allocated a Retention Value of *Priority for Removal.*

5.1.4 The supplied plans show works are proposed within the TPZ areas of Trees 125 and 231. Tree sensitive methods as outlined within Section 3 should be used within TPZ areas to minimise adverse impacts. The trees to be retained should be protected in accordance with Tree Protection Specification **(Appendix 5)**. A Tree Protection Plan should be prepared by the Project Arborist when detailed construction plans have been finalised.

5.1.5 The supplied plans show the extensive new tree planting is proposed across the site as part of the redevelopment works. This tree planting will significantly increase the site's canopy cover which is currently very low. Replacement planting should be supplied in accordance with *Australian Standard 2303 (2015) Tree Stock for Landscape Use.*

[7] Trees Impact (2017)

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6.0 LIMITATIONS & DISCLAIMER

TreeiQ takes care to obtain information from reliable sources. However, TreeiQ can neither guarantee nor be responsible for the accuracy of information provided by others. Plans, diagrams, graphs and photographs in this Arboricultural Report are visual aids only and are not necessarily to scale. This Report provides recommendations relating to tree management only. Advice should be sought from appropriately qualified consultants regarding design/construction/ecological/heritage etc issues.

This Report has been prepared for exclusive use by the client. This Report shall not be used by others or for any other reason outside its intended target or without the prior written consent of TreeiQ. Unauthorised alteration or separate use of any section of the Report invalidates the Report.

Many factors may contribute to tree failure and cannot always be predicted. TreeiQ takes care to accurately assess tree health and structural condition. However, a tree's internal structural condition may not always correlate to visible external indicators. There is no warranty or guarantee, expressed or implied that problems or deficiencies regarding the trees or site may not arise in the future. Information contained in this report covers only the trees assessed and reflects the condition of the trees at the time of inspection. Additional information regarding the methodology used in the preparation of this Report is attached as Appendix 1. A comprehensive tree risk assessment and management plan for the trees is beyond the scope of this Report.

Reference should be made to any relevant legislation including Tree Management Controls. All recommendations contained within this Report are subject to approval from the relevant Consent Authority.

7.0 BIBLIOGRAPHY & REFERENCES

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8.0 APPENDICES

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Appendix 1: Methodology

1.1 **Site Inspection**: This report was determined as a result of several comprehensive site inspections during July 2015, July 2016 and May 2018. The comments and recommendations in this report are based on findings from these site inspections.

1.2 **Visual Tree Assessment (VTA)**: The subject tree(s) was assessed using the Visual Tree Assessment criteria and notes as described in *The Body Language of Trees – A Handbook for Failure Analysis.*[8] The inspection was limited to a visual examination of the subject tree(s) from ground level only. No internal diagnostic testing was undertaken as part of this assessment. Trees outside the subject site were assessed from the property boundaries only.

1.3 **Tree Dimensions**: The dimensions of the subject tree(s) are approximate only.

1.4 **Tree Locations:** The location of the subject tree(s) was determined from the supplied plans.

1.5 **Trees & Development**: Tree Protection Zones, Tree Protection Measures and Sensitive Construction Methods for the subject tree were based on methods outlined in *Australian Standard 4970-2009 Protection of Trees on Development Sites*.

The *Tree Protection Zone* (TPZ) is described in AS-4970 as a combination of the root area and crown area requiring protection. It is an area isolated from construction disturbance, so that the tree remains viable.

The *Structural Root Zone* (SRZ) is described in AS-4970 as the area around the base of a tree required for the tree's stability in the ground. Severance of structural roots within the SRZ is not recommended as it may lead to the destabilisation and/or demise of the tree.

In some cases it may be possible to encroach into or make variations to the theoretical TPZ. A *Minor Encroachment* is less than 10% of the area of the TPZ and is outside the SRZ. The area lost to this encroachment should be compensated for elsewhere and contiguous with the TPZ. A *Major Encroachment* is greater than 10% of the TPZ or inside the SRZ. In this situation the Project Arborist must demonstrate that the tree would remain viable. This may require root investigation by non-destructive methods or the use of sensitive construction methods.

1.6 **Tree Health**: The health of the subject tree(s) was determined by assessing:

I. Foliage size and colour
II. Pest and disease infestation
III. Extension growth
IV. Crown density
V. Deadwood size and volume
VI. Presence of epicormic growth

1.7 **Tree Structural Condition**: The structural condition of the subject tree(s) was assessed by:

I. Assessment of branching structure
(i.e co-dominant/bark inclusions, crossing branches, branch taper, terminal loading, previous branch failures)
II. Visible evidence of structural defects or instability
(i.e root plate movement, wounds, decay, cavities, fungal brackets, adaptive growth)
III. Evidence of previous pruning or physical damage
(root severance/damage, lopping, flush-cutting, lions tailing, mechanical damage)

1.8 **Useful Life Expectancy (ULE)**: The ULE is an estimate of the longevity of the subject tree(s) in its growing environment. The ULE is modified where necessary to take in consideration tree(s) health, structural condition and site suitability. The tree(s) has been allocated one of the following ULE categories (Modified from Barrell, 2001):

I. 40 years +
II. 15-40 years
III. 5-15 years
IV. Less than 5 years

[8] Mattheck & Breloer (2003)

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1.9 **Landscape Significance**: Landscape Significance was determined by assessing the combination of the cultural, environmental and aesthetic values of the subject tree(s). Whilst these values are subjective, a rating of high, moderate, low or insignificant has been allocated to the tree(s). This provides a relative value of the tree's Landscape Significance which may aid in determining its Retention Value. If the tree(s) can be categorized into more than one value, the higher value has been allocated.

Landscape Significance	Description
Very High	The subject tree is listed as a Heritage Item under the *Local Environmental Plan* with a local or state level of significance.
	The subject tree is listed on Council's Significant Tree Register or is considered to meet the criteria for significance assessment of trees and/or landscapes by a suitably qualified professional. The criteria are based on general principles outlines in the Burra Charter and on criteria from the Register of the National Estate.
High	The subject tree creates a 'sense of place' or is considered 'landmark' tree.
	The subject tree is of local, cultural or historical importance or is widely known.
	The subject tree forms part of the curtilage of a heritage item with a known or documented association with that item.
	The subject tree has been identified by a suitably qualified professional as a species scheduled as a Threatened or Vulnerable Species for the site defined under the provisions of the NSW *Biodiversity Conservation Act (2016)* or the Commonwealth *Environmental Protection and Biodiversity Conservation Act* (1999).
	The subject tree is known to contain nesting hollows to a species scheduled as a Threatened or Vulnerable Species for the site as defined under the provisions of the NSW *Biodiversity Conservation Act (2016)* or the Commonwealth *Environmental Protection and Biodiversity Conservation Act* (1999).
	The subject tree is an excellent representative of the species in terms of aesthetic value.
	The subject tree is of significant size, scale or makes a significant contribution to the canopy cover of the locality.
Moderate	The subject tree makes a positive contribution to the visual character or amenity of the area.
	The subject tree provides a specific function such as screening or minimising the scale of a building.
	The subject tree is a good representative of the species in terms of aesthetic value.
Low	The subject tree is a known environmental weed species or is exempt under the provisions of the local Council's Tree Management Controls
	The subject tree makes little or no contribution to the amenity of the locality.
	The subject tree is a poor representative of the species in terms of aesthetic value.

1.10 **Retention Value**: Retention Value was based on the subject tree's Useful Life Expectancy and Landscape Significance. The Retention Value was modified where necessary to take in consideration the subject tree's health, structural condition and site suitability. The subject tree(s) has been allocated one of the following Retention Values:

I. Priority for Retention
II. Consider for Retention
III. Consider for Removal
IV. Priority for Removal

ULE		Landscape Significance		
	Very High	High	Moderate	Low
40 years +	Priority for Retention	Priority for Retention		Consider for Removal
15-40 years		Priority for Retention	Consider for Retention	
5-15 years		Consider for Retention		
Less than 5 years	Consider for Removal	Priority for Removal		

The above table has been modified from the Footprint Green Tree Significance and Retention Value Matrix.

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Appendix 2: Plans

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MOORE PARK ROAD

OATLEY ROAD

MOORE PARK ROAD

RUGBY AUSTRALIA BUILDING

DRIVER AVENUE

TREE B

TREE A

FOX STUDIOS

KIPPAX LAKE

CRICKET NSW

SYDNEY CRICKET GROUND

TN 139 TN 142 TN 145 TN 146 TN 149 TN 154 TN 156 TN 306 TN 305 TN 304 TN 155 TN 303 TN 147 TN 148 TN 151 TN 141 TN 140 TN 143 TN 136 TN 137 TN 135 TN 157 TN 158 TN 159 TN 160 TN 161 TN 163 TN 164 TN 165 TN 166 TN 167 TN 168 TN 169 TN 170 TN 172 TN 171 TN 173 TN 174 TN 175 TN 176 TN 177 TN 178 TN 179 TN 180 TN 181 TN 183 TN 184 TN 187 TN 182 TN 186 TN 188 TN 185 TN 189 TN 190 TN 195 TN 193 TN 194 TN 192 TN 191 TN 196 GROUP

TN 245 GROUP

TN 391 TN 302

TN 199

TN 306 GROUP

TN 307

TN 248 GROUP

TN 247 GROUP

TN 125

TN 231 TN 232 TN 233 TN 234 TN 235 TN 236 TN 237

NOTES

These drawings are shown in colour and shall be read in digital format or print colour hardcopy.

These drawings shall be read in conjunction with all relevant information (not limited to legends, schedules, specifications)

These drawings shall be read in conjunction with any Engineers, Architects or other consultant information. (not limited to drawings, legends, schedules, specifications)

Check all dimensions and site conditions prior to commencement of any work and the procurement of any services, materials, fittings, fabrication or equipment.

Do not scale drawings – refer to figured drawings only. Any discrepancies shall immediately be referred to the Landscape Architect for clarification.

WARNING

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Services shown on this drawing are approximate only. The exact location is to be confirmed on site by contractor prior to commencement of work.

DATE	REV	AMENDMENTS
28/2/19	A	END OF FEBRUARY PACKAGE - FOR INFORMATION
29/3/19	B	ISSUED - FOR INFORMATION
10/5/19	C	FOR INFORMATION - STAGE 2 PLANNING

LEGEND

- STAGE 2 PLANNING BOUNDARY
- TN XXX — TREE NUMBER: REFER TO ARBORIST REPORT FOR FURTHER INFORMATION
- EXISTING TREE: RETAIN AND PROTECT
- TREE PROTECTION ZONE (TPZ): ALL WORKS TO BE HAND EXCAVATION AND HYDROVAC ONLY
- STRUCTURAL ROOT ZONE (SRZ): ALL WORKS TO BE HAND EXCAVATION AND HYDROVAC ONLY
- EXISTING TREE: SEEKING REMOVAL STAGE 2 DA

NOTES:
PROJECT ARBORIST TO REVIEW DESIGN AND CONFIRM EXTEND OF TREE REMOVAL AND RETENTION. REFER TO THE ARBORICULTURAL IMPACT ASSESSMENT.

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PROJECT: SYDNEY FOOTBALL STADIUM
Moore Park, New South Wales
S16030

DRAWING: TREE RETENTION & REMOVAL
Ground Plan

DRAWN	CHECKED	SCALE A0 | SCALE A3
IR | DC	JH	1:100 1:200

0 2.5 5 7.5 M

STATUS: FOR INFORMATION
NOT FOR CONSTRUCTION

NORTH

DRAWING NO. LA-015

REVISION C