

USYD-ETP

DPIE Submission – SSD 8636 Modification 2, 18 September 2020

The University of Sydney (the “University”) has reviewed the City of Sydney’s comments in their letter to DPIE dated 3rd September 2020. The University provides the following detailed response. The response is to be read in conjunction with the following attachments enclosed:

Attachment 1 – TCL Revised Tree Proposal

Attachment 2 – Nursery availability lists

Attachment 3 – Updated Landscape Plans

Attachment 4a- Previous Comparison Plans

Attachment 4b- Previous Comparison Plans

1. Variations to tree pot sizes

The submitted RtS seeks further changes to tree sizes due to supply issues. The amended proposal now includes a 4th tree species as 200L pot size, *Jacaranda mimisofolia*, in addition to the *Backhousia citriodora*, *Archontophoenix cunninghamiana* and *Syzygium luehmannii*. The RtS also proposes to substitute species *Syzygium luehmannii* with *Waterhousia floribunda*.

Of the 42 new trees proposed only 12 trees or 30% will be 400L at installation. These changes are a result of poor project and tree procurement management.

Further, the RtS shows evidence of tree stock availability from only one nursery. The City recommends that the developer engages with other nurseries for 400 litre trees and species availability including 400 litre *Melaleuca quinquenervia* (Paperbark) trees for the South Plaza.

TreeIQ and Glascott, have further pursued the tree stock and availability with a number of nurseries. The following revised proposed tree schedule (figure 1) of native trees has been recommended by the project’s independent arborist, TreeIQ. It includes 8 additional trees for a total of 52, which consists of 25 trees in 400Lt (48%), 8 trees in 300Lt (15.5%), and 19 trees in 200Lt (36.5%). Refer to attachment 1 for details and attachment 2 for feedback from 3 nurseries on availability of tree stock.

All tree species have been assessed and recommended by both TreeIQ and University of Sydney.

Landscape Area	Approved SSDA Trees			Previous Proposed Trees			Revised Proposed Trees - For Approval								
	Approved SSDA Species	Approved Number	Approved Size	Previous Proposed Species	Previous Proposed Number	Previous Proposed Size	Revised Proposed Species For Approval - Current	Tree Code on Plan	Proposed Number	Proposed Available Size	Tree Supplier	Tree Mature Height	Crown Diameters/Area @ maturity	Crown Diameters/Area @ 10 years	Growing Condition
Eastern Courtyard	Archontophoenix cunninghamiana	8	400L	Archontophoenix alexandrae	8	200L	Archontophoenix alexandrae	Aa	8	200L	Andreasen's.	15-25m	4m/14m2	4m/14m2	On Slab
Northern Courtyard	Backhousia citriodora	6	400L	Backhousia citriodora	11	200L	Backhousia citriodora	Bc	11	200L	Andreasen's.	10-20m	6m/30m2	6m/30m2	At Grade
Northern Courtyard	Cupaniopsis anacardioides	11	400L	Cupaniopsis anacardioides	7	400L	Cupaniopsis anacardioides	Ca	7	400L	Andreasen's.	10-15m	10m/80m2	8m/80m2	At Grade
Northern Courtyard	Davidsonia pruriens	4	400L	Jacaranda mimosaefolia	4	200L	Eucalyptus punctata	Ep	8	300L	Trees Impact.	20-30m	12m/80m2	8m/80m2	At Grade
Northern Courtyard	Elaeocarpus reticulatus	5	400L	Elaeocarpus reticulatus	6	400L	Elaeocarpus reticulatus	Er	6	400L	Andreasen's.	10-15m	4m/14m2	4m/14m2	At Grade
Northern Courtyard	Jacaranda mimosaefolia	1	400L	-	0	-	Lophostemon confertus	Lc	1	400L	Trees Impact	10-25m	15m/115m2	10m/115m2	At Grade
Southern Courtyard	Melaleuca quinquenervia	6	400L	Jacaranda mimosaefolia	6	200L	Waterhousea floribunda 'Amaroo'	Wf	6	400L	Andreasen's.	10-15m	15m/80m2	10m/80m2	At Grade
Southern Courtyard	-	-	-	-	-	-	Tristaniaopsis laurina 'Luscious'	Tl	2	400L	Andreasen's.	10-15m	7m/20m2	6m/20m2	At Grade
Southern Courtyard	-	-	-	-	-	-	Elaeocarpus eumundi	Ee	1	400L	Andreasen's.	10-25m	8m/20m2	5m/20m2	At Grade
Northern Courtyard	Syzygium luehmannii	3	400L	Waterhousea floribunda	2	200L	Tristaniaopsis laurina 'Luscious'	Tl	2	400L	Andreasen's.	10-15m	7m/20m2	6m/20m2	At Grade
		44			44	13 x 400L (30%) 31x 200L (70%)			52	19x 200L (36.5%) 8x 300L (15.5%) 25x 400L (48%)					

Figure 1 - Updated Tree Schedule - Refer to attachment 1 for details

2. Landscape changes

The amended Landscape Plan proposes the substitution of six *Melaleuca quinquenervia* (Paperbark) in the South plaza detention basin with six *Jacaranda mimosifolia* (Jacaranda). Jacaranda trees are an exotic semi-deciduous tree species, native to South America. Paperbark trees are evergreen trees endemic to the eastern coast of Australia. Paperbark trees naturally grow in swampy areas and are culturally important to the Aboriginal and Torres Strait Islander peoples.

The approved South Plaza plans proposed planting the Paperbark trees within a garden bed, ideal conditions for healthy tree growth and aiding in mitigation of flood water. The Jacaranda trees as shown on the proposed South Plaza plan will be planted in compact gravel, with restricted root growth by the concrete retaining walls and are situated too close together (future canopy conflicts and suppression of healthy canopies). The proposed design for the South Plaza would be a poor design outcome for supporting healthy canopy trees, contributing to the site 15% canopy coverage in accordance with Sydney DCP 2012 and aiding in the mitigation of flooding.

If the replacement of the approved *Melaleuca quinquenervia* (Paperbark) species is supported, the substitute species must be to a native tree species of a comparable mature size and within a garden bed area as detailed in the existing approved plans.

The University understands the City of Sydney's concern and after consultation with the project's arborist (TreeIQ) and various nurseries, we would like to offer the followings changes for consideration:

- Due to the unavailability (and issues with Myrtle Rust) of *Melaleuca quinquenervia* (Paperbark) species, substitute this for an alternate native tree species in 400Lt, *Waterhousea floribunda* 'Amaroo'. The *Waterhousea floribunda* are also more likely to form a single canopy with less suppression due to their shade tolerance.
- Replace the compacted gravel around tree planting with a porous material. We propose a 20mm rock mulch with no fines that allow maximum soil volume at 1.2m depth in accordance with Sydney Landscape Code. Example in figure 2 below.
- Garden bed to the base of each tree (min. 1.2m diameter circle)

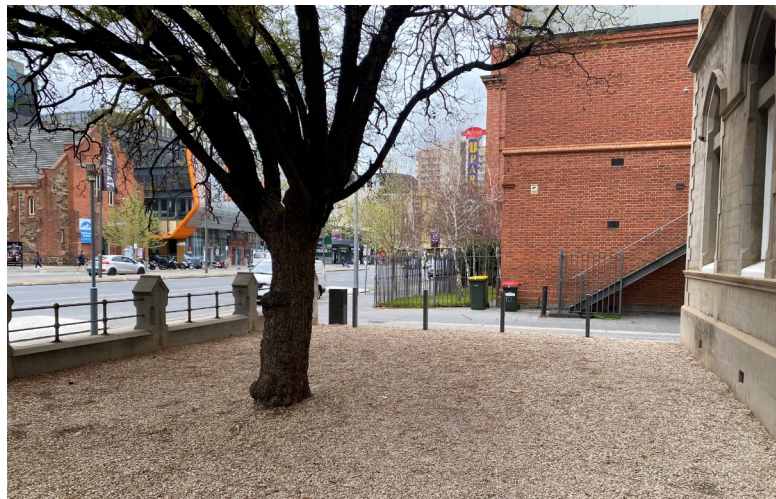


Figure 2 - Precedent, tree with 20mm rock/gravel mulch, no fines

Refer to the **Proposed Tree Canopy Cover** plan of revised tree species and increased quantities. We can confirm the proposed combined tree canopy will achieve over 36% coverage within 10 years after the project completion. This is in compliance with min. 15% canopy coverage required in the Sydney DCP 2012.

Proposed Tree Canopy Coverage



Figure 3 - Proposed Tree Canopy Coverage. Refer to Attachment 1 for details

2.1 Maze Crescent

The City does not support the proposed deletion of six street trees along Maze Crescent. The six trees will provide much needed shade and aid in combating the urban heat island effect.

Street trees along Maze Crescent have been moved due to the existing authority owned services assets being directly underneath the street trees as shown in the extract below. Furthermore, the existing site gradients and Maze Crescent road levels and new DDA compliant footpaths are generating a gradient across the kerb's garden bed which in places also make it unsuitable for the street trees. Unfortunately, there isn't adequate space to achieve appropriate clearance and appropriate grade to accommodate these trees along Maze Crescent kerb in a way that complies with service authority requirements (Refer to figure 5 below from Sydney Water). Moving the trees further east to provide clearance will impede on the footpath and also clashes with a Jemena gas main that runs adjacent to the Sydney Water main as illustrated in figure 4 below.

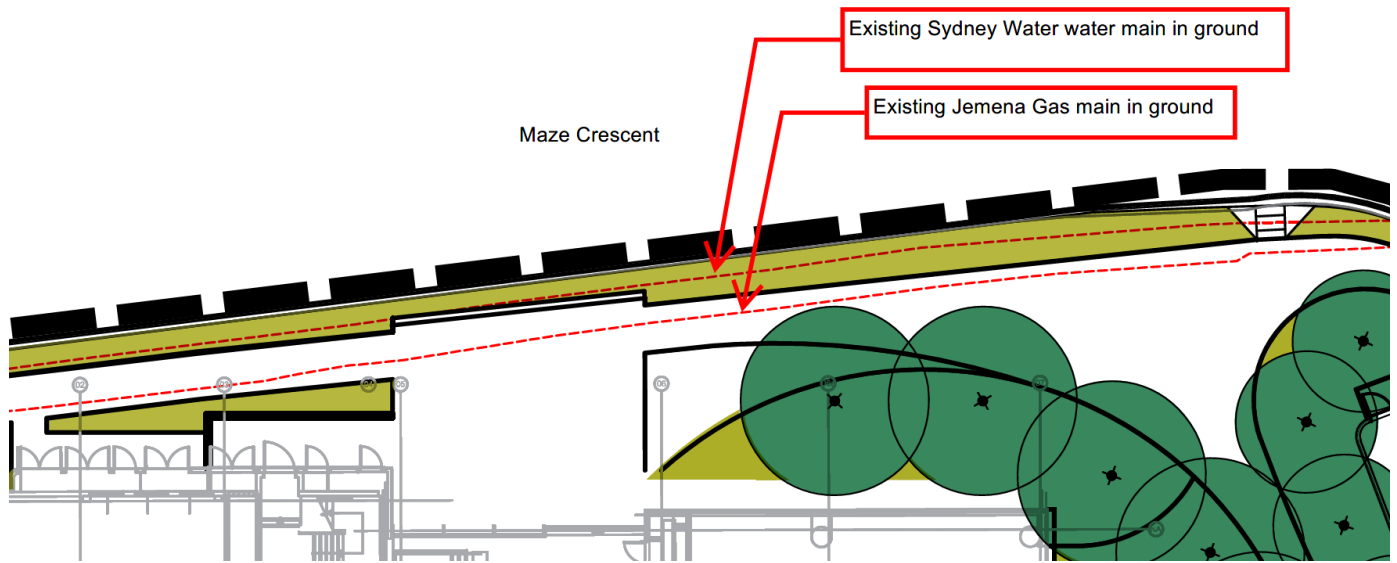
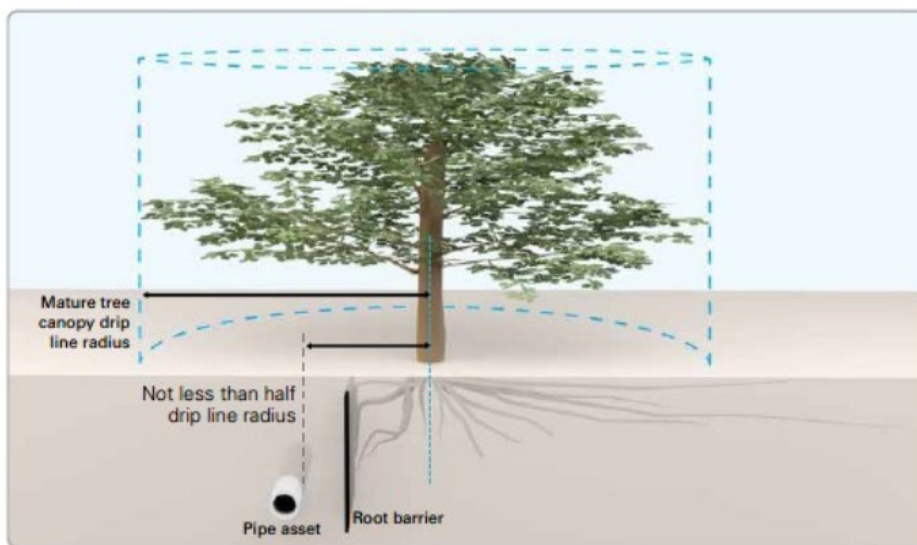


Figure 4 - Authority owned services assets along Maze Crescent

Diagram 5 – Planting trees



Note:

If you do not understand the intent of this diagram, you must seek technical advice or consult Sydney Water.

Figure 5 - Extract from Sydney Water Guidelines

These 6 trees have been relocated into the Northern Courtyard, with further 4 trees (1 x *Elaeocarpus Eumundi* and 3 x *Eucalyptus Punctata* – highlighted in figure 6 below) have also been added along Maze Crescent garden beds to assist in providing shade and combating the urban heat island effect to the building and footpath.

Proposed Tree Planting Plan

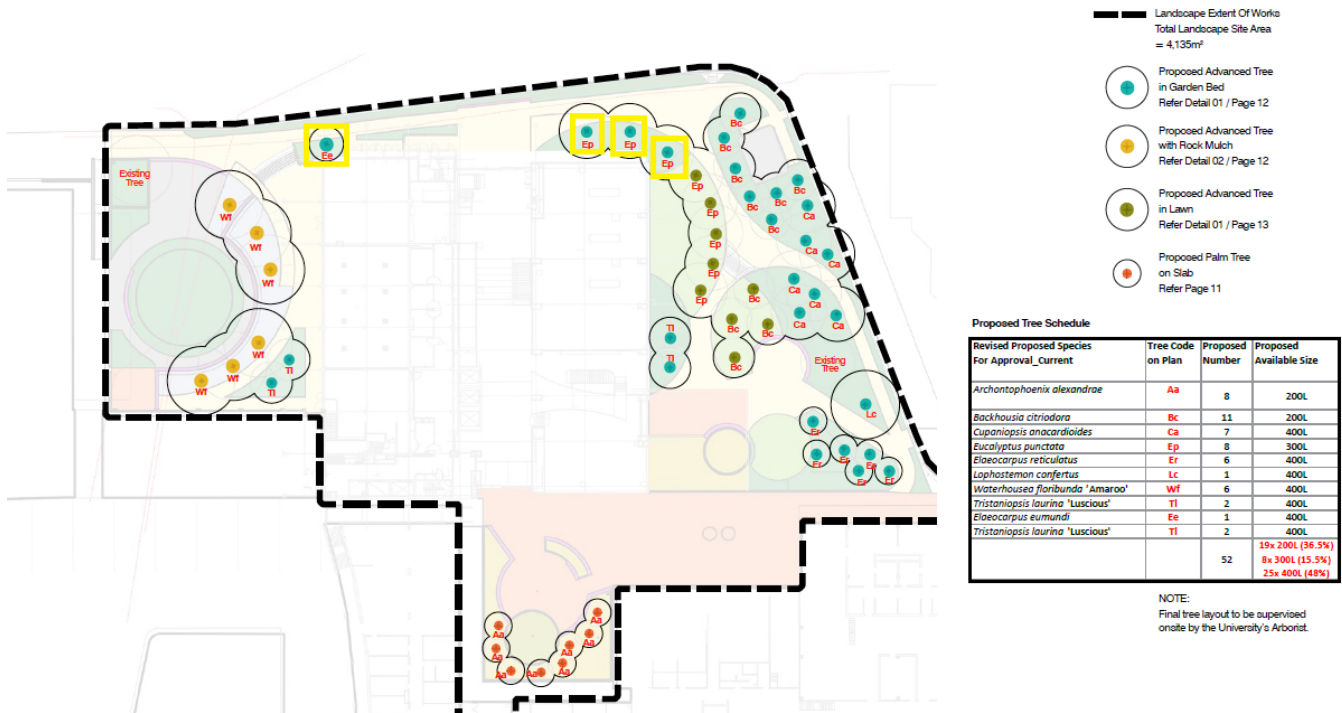


Figure 6 – Updated proposed tree planting plan showing additional trees on Maze Crescent

2.2 North Landscape

The proposed tree species within the northern landscaped area are predominantly small to medium sized trees that would reach a mature height of 10 metres. The City recommends larger canopy trees with a minimum mature height 15 metres are provided to achieve the 15% canopy coverage in accordance with the Sydney DCP 2012. The proposed raised tree planters on slab will not provide adequate soil depth to support healthy tree growth and do not comply with the Sydney Landscape Code. Consideration must be given to adequate soil availability and space (above and below ground) for all tree species to reach their full genetic potential.

Based on input from the project's independent arborist (treeIQ), all nominated trees have the potential to reach a 15m mature height – refer table in figure 7 below. With accumulated mature canopy coverage of more than 36% against the overall project site. An additional 8 trees have been added to assist in providing additional shade and natural amenity into the site.

Revised Proposed Trees - For Approval								
Revised Proposed Species For Approval_Current	Tree Code on Plan	Proposed Number	Proposed Available Size	Tree Supplier	Tree Mature Height	Crown Diameters/Area @ maturity	Crown Diameters/Area @ 10 years	Growing Condition
<i>Archontophoenix alexandrae</i>	Aa	8	200L	Andreasen's.	15-25m	4m/14m ²	4m/14m ²	On Slab
<i>Backhousia citriodora</i>	Bc	11	200L	Andreasen's.	10-20m	6m/30m ²	6m/30m ²	At Grade
<i>Cupaniopsis anacardioides</i>	Ca	7	400L	Andreasen's.	10-15m	10m/80m ²	8m/80m ²	At Grade
<i>Eucalyptus punctata</i>	Ep	8	300L	Trees Impact.	20-30m	12m/80m ²	8m/80m ²	At Grade
<i>Elaeocarpus reticulatus</i>	Er	6	400L	Andreasen's.	10-15m	4m/14m ²	4m/14m ²	At Grade
<i>Lophostemon confertus</i>	Lc	1	400L	Trees Impact	10-25m	15m/115m ²	10m/115m ²	At Grade
<i>Waterhousea floribunda</i> 'Amaroo'	Wf	6	400L	Andreasen's.	10-15m	15m/80m ²	10m/80m ²	At Grade
<i>Tristaniopsis laurina</i> 'Luscious'	Tl	2	400L	Andreasen's.	10-15m	7m/20m ²	6m/20m ²	At Grade
<i>Elaeocarpus eumundi</i>	Ee	1	400L	Andreasen's.	10-25m	8m/20m ²	5m/20m ²	At Grade
<i>Tristaniopsis laurina</i> 'Luscious'	Tl	2	400L	Andreasen's.	10-15m	7m/20m ²	6m/20m ²	At Grade
		52	19x 200L (36.5%) 8x 300L (15.5%) 25x 400L (48%)					

Figure 7- Updated Tree schedule - refer to attachment 1 for details

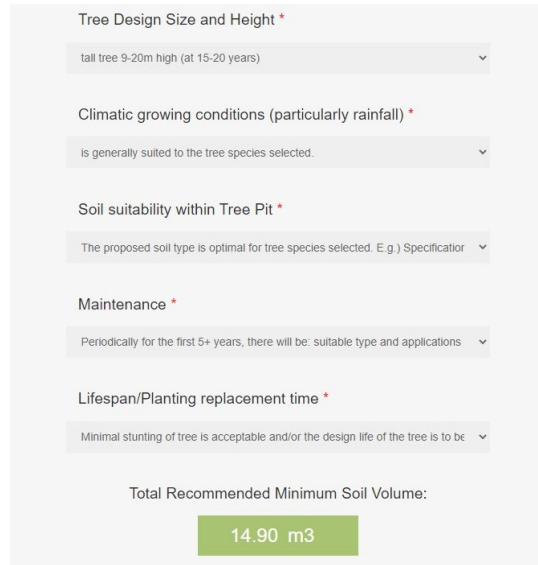
Note there is no tree on slab in the Northern Courtyard (please refer to **Proposed Finishes Surfaces** plan in attachment 1 for details). Proposed trees are either in garden bed or in lawn with tree rings with min. 1.2m soil depth which complies with the Sydney Landscape Code. Soil areas are limited due to the nature of relatively small spaces between the buildings, DDA compliant walkways and internal road network. Refer to the attached **Proposed Soil Volume** Plan in attachment 1 for further information.

Proposed Soil Volume



Figure 8 – Proposed Soil Volumes

The arborist has advised that the City of Sydney Landscape Code Vol 2' soil volumes are based on 'on-structure' planters which is only applicable for the east landscape. However, it is acknowledged that sufficient soil volumes are required to enable the trees to be viable in the long term. The Simon Leake and Elke Haege Soils Volume Simulator has been used to determine the minimum soil volumes based on the site conditions and tree biological requirements. The average volume per tree is more than 31m³ which is above the min. 15m³ per tree in limited urban space calculated by the Leake & Haege's soil volume simulator as shown in figure 9 below. Tree roots can further spread between adjacent garden beds and pathways between garden beds with minimal pavement surface depth and sub grade compaction.



The screenshot shows the following inputs and output:

- Tree Design Size and Height ***: tall tree 9-20m high (at 15-20 years)
- Climatic growing conditions (particularly rainfall) ***: is generally suited to the tree species selected.
- Soil suitability within Tree Pit ***: The proposed soil type is optimal for tree species selected. E.g.) Specification
- Maintenance ***: Periodically for the first 5+ years, there will be: suitable type and applications
- Lifespan/Planting replacement time ***: Minimal stunting of tree is acceptable and/or the design life of the tree is to be
- Total Recommended Minimum Soil Volume:** 14.90 m³

Figure 9 - Simon Leake and Elke Haege Soils Volume Simulator inputs & output

The South Plaza and bioretention /detention basin design varies from the SSDA approved design. This results in a major change to the design layout, symmetry of the outdoor spaces that related to an overriding indigenous strategy for the site, reduces new trees planting from 10 to 6, and reduced surface materials and features.

The proposed raised planting walls are low and rely on 1:3 mounds to achieve 600-700mm soil depth. The planters on slab do not provide adequate soil depth to support healthy tree growth and do not comply with the Sydney Landscape Code.

Overall configuration including planting has been reviewed and developed in order to improve flood protection of the building, maximise usable space within the courtyard and reinforces the starfield constellation arrangement as an extension of adjacent Cadigal Green. The constellation continues throughout the ground plane of our site, from Cadigal green to our landscape and through to the internal ground floor, creating a strong concept. Design changes include:

- The scheme has been updated to provide a more equitable access from Maze Crescent to the southern entry and spillout spaces of the existing J03 building
- Increase in usable space. There is more informal recreation and meeting spaces, and spill out space from J03 building southern face
- Bio-retention basin with reduced flood hazard levels enabling an inbuilt seating wall that acts as informal recreation space

- Generous forecourt and large tree plantings with rock mulch, suitable as informal outdoor learning and spillout space.
- 6 x *Waterhousea floribunda* 'Amaroo' with rock mulch and 2 x *Tristanopsis laurina* in garden bed that allow for a greater range of informal recreation under their canopy and prove a more desirable tree species for the new ETP building spill out space.

The additional 2 tree's have been added in consultation with the project's arborist. Any further additional tree's in the south courtyard is not possible due to the large existing Sydney Water services assets and associated required clearances as shown in figure 5 above. These assets are shown in all attached drawings for clarity.

The proposed raised planting walls are low and rely on 1:3 mounds to achieve 600-700mm soil depth. The planters on slab do not provide adequate soil depth to support healthy tree growth and do not comply with the Sydney Landscape Code.

There is no tree on slab in the Southern Courtyard, only area of planting on slab is the garden bed on the existing stormwater inlet slab structure (Southern East corner of the courtyard). The Sydney Landscape Code only requires 500-600mm of soil depth, therefore this garden bed detail is compliant. Refer to the attached **Proposed Soil Volume Plan** for further information.

2.4 East Plaza

Changes to the East plaza include rationalisation of the layout and addition of a new glazed awning (3.5-4m high) to engineering walk for users accessing the bike racks that segregates the landscape from the building. It's unclear if the seating walls will be accessible for students to sit and learn outdoors or now just a space that's viewed from the building.

The Eastern Courtyard layout hasn't changed, and this courtyard is an outdoor learning and social space with seating walls at 450mm high and lawn that is accessible to students via the Engineering Walk which connects to all the 3 courtyards together to adjacent building entrances of J07, J13, J03, PNR and connects other buildings within the precinct. Figure 10 below is an extract from the updated landscape drawings in attachment 3 illustrating that the layout is fully accessible to students and DDA compliant. Note that the bike rack layout has been revised to improve circulation and efficiency of the space. Figure 11 and 12 show the area in 3D for clarity.

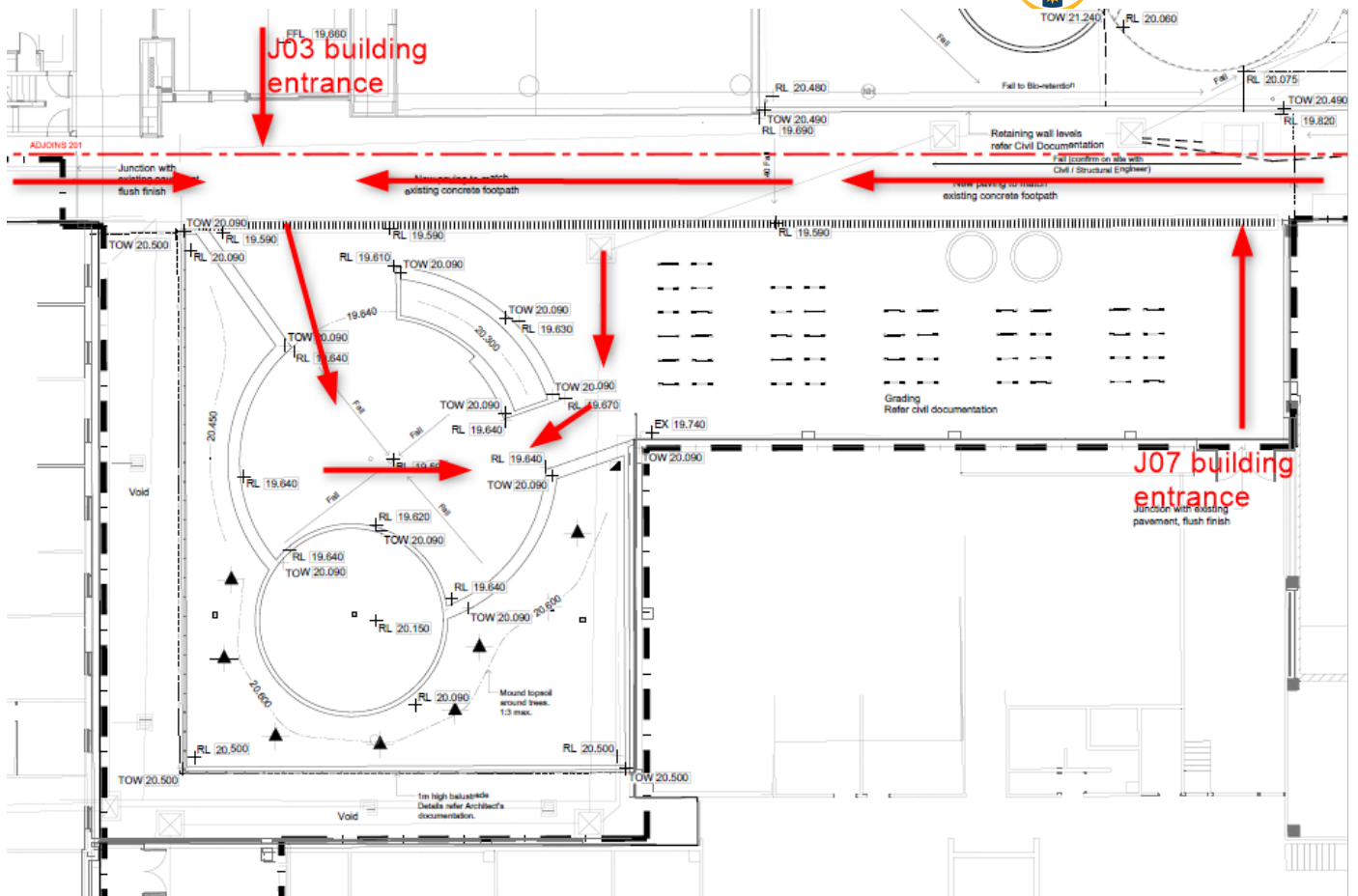


Figure 10 - accessible eastern landscape

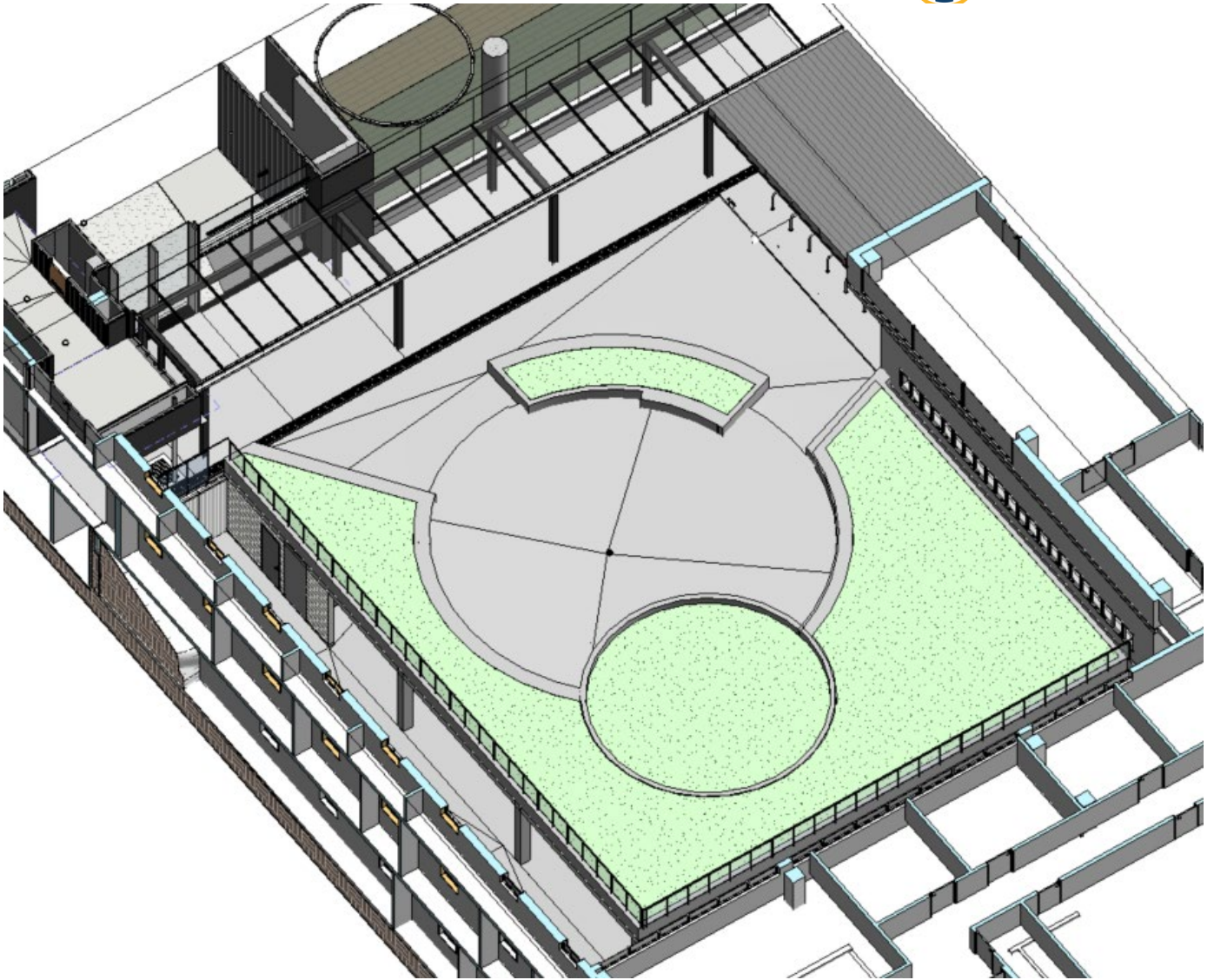


Figure 11 - 3D model of Eastern Landscape - looking North West

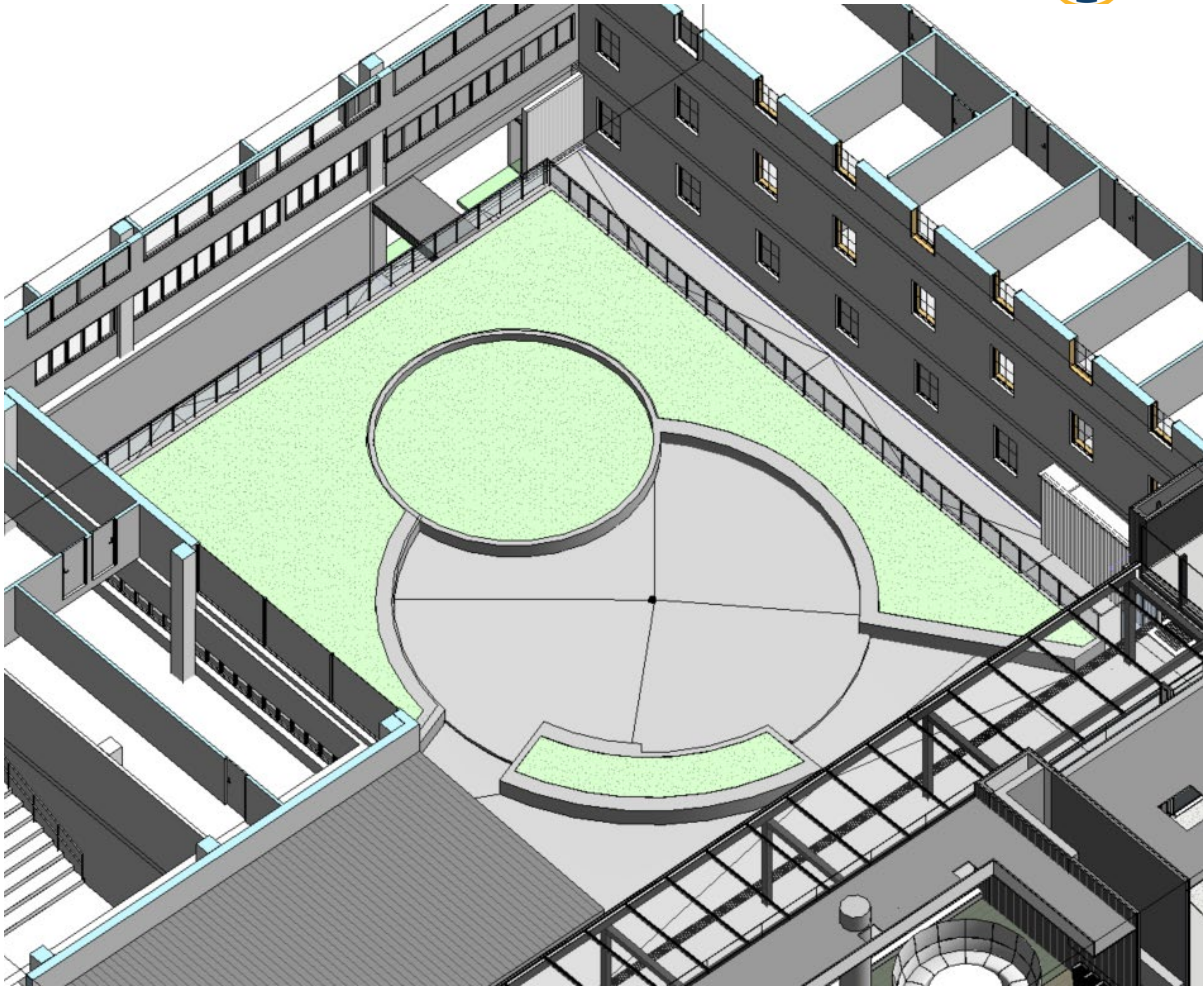


Figure 12 - 3D model of Eastern Landscape - Looking South East

The proposed changes to the layout, geometry, surface materials, and design quality of the plazas all dilutes and removes the considered TCL design approach and overriding indigenous strategy that was fundamental to the landscape design for the site. The changes may achieve significant cost savings, however, the significant changes proposed to the plazas are not supported from a landscape perspective. Overall, the proposed amendments to the approved Landscape Plans would result in a poor outcome for achieving 15% canopy coverage within 10 years of the completed works, in addition to mitigating the urban heat island effect and mitigating flood water. The City recommends additional larger-canopy trees with a minimum mature height 15 metres are incorporated into the design.

The proposed design by TCL is in accordance with Wingara Mura design principles encouraging the return of the indigenous flora and fauna with more planting, less paving, creating a sustainable landscape or “bush library” to facilitate cultural and academic teachings and stories.

Each courtyard and as a whole continues the starfield arrangement established as part of Paul Carter’s original 2005 ‘Golden Grove’ exploration as a natural extension of Cadigal Green constellation of spaces, with curved forms juxtapose the rectilinear nature of the building and relate to the strong circular gestures of Cadigal Green while creating individuality of expression. The constellation narrative is continued within the building’s ground plane and atrium spaces further strengthening the project’s Wingara Mura design principles.

With the restriction of the site levels, the new design has managed to improve way finding and circulation across site for disabled and elderly through reduction of steps, simplified grading and a provision of a DDA compliant path network between buildings and its surrounding path network.

All courtyards provide generous and defined outdoor spaces that allow for a full variety of everyday uses, from small intimate study groups to larger teaching spaces and informal recreation areas with integrated seating spaces. Generous lawn spaces feature additional tree plantings and to provide cool summer settings for extended occupation, outdoor learning and increased comfort.

Increase in planting beds and decreased paving provides a softer approach and landscape setting for J03; increasing site porosity and decreasing heat build-up, resulting in net gains in human comfort and greater amenity in recreational and outdoor teaching environments.

Shade trees are located in spaces that cater for a range of occupation, from informal gatherings, teaching and study spaces. At their 10 years of installation, the proposed trees will provide approx. 36% coverage against the overall development, refer to the **Tree Canopy Coverage Plan**.

The substitution of *Melaleuca quinquenervia* (Paperbark) with *Jacaranda mimosifolia*. (Jacaranda) is not in keeping with the 'University's Wingara Mura design principles or ' Paul Carter's original 2005 'Golden Grove' exploration as a natural extension of Cadigal Green's' as referred to in the Request for Further Information Letter prepared by the applicant. Any proposed substitute species for the *Melaleuca quinquenervia* (Paperbark) must be to a native tree species of a comparable mature size.

In collaboration with the project's arborist, Tree iQ, we would like to propose *Waterhousea floribunda* 'Amaroo' in 400lt, as an alternative to *Melaleuca quinquenervia* (Paperbark) for consideration, this is in keeping with the 'University's Wingara Mura design principles and ' Paul Carter's original 2005 'Golden Grove' in encouraging the return of the indigenous plants in urban environment. The substitution of the *Melaleuca quinquenervia* (Paperbark) is proposed based on feedback from the arborist and various nurseries due to issues with myrtle rust.
<https://www.dpi.nsw.gov.au/biosecurity/plant/insect-pests-and-plant-diseases/myrtle-rust>

3 Flooding conditions

The University accepts the City's recommendations with respect to flooding conditions.