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27th January 2022

Mr John Green
Sirius Developments Pty Ltd
120B Underwood Street
Paddington NSW 2021

Dear Mr Green,

Re: Sirius Building - Tree numbers 50 and 51 – Options for basement rectification works – Updated advice 27/1/2022.

Reference is made to my previous advices in respect of the likely impacts of the proposed basement rectification works at the Sirius Building to two adjoining trees located in the Gloucester Walk and, specifically, my advice dated 9th December 2021.

It is noted that City of Sydney has raised additional concerns regarding the proposed removal of the trees following the meeting held on 9/12/21 with representatives of the City of Sydney and the NSW Department of Planning Industry and the Environment (DPIE).

In response to the City of Sydney's concerns, the DPIE, by letter dated 23/12/2021, has requested further information as follows:
The Department requests the following:

- *undertake root mapping to provide an understanding of the existing root activity and tree stability*
- *provide any further evidence to support the statements that the wall is failing*
- *consider alternate methods to demolish/reconstruct or rectify the wall*
- *Provide details of the construction methodology which would be used both with and without the trees*
- *consider whether a performance solution could be implemented to certify the retaining wall in accordance with the National Construction Code*.

The trees in question are identified as tree numbers 50 and 51 in the earlier report prepared by Landscape Matrix and were summarised in my advice of 9th December 2021 – this advice needs to be read in conjunction with my advice of 9th December 2021 (attached as Appendix B).

I have also been provided with, and considered, the letter dated 19/01/2022 prepared by SCP Engineers and Development Consultants (SCP).

At page 6 of the SCP letter it is identified*: As a result, the retaining walls at Tree 50 and 51 as constructed fail the AS4678-2002 stability requirements. This is true even before the added pressure of the tree root balls is considered and therefore the walls are not certifiable to AS4678-2002 Earth Retaining Structures. The walls inherent non-compliances render the existing retaining walls non-repairable.*

At pages 1 to 5 of the SCP letter the proximity of the trees to the existing walls is identified together with documentary and photographic evidence of the proximity of the trees to the walls, the past damage to/failure of the walls and evidence of root penetration at a junction of the wall.

Given the proximity of the trees to the damage and the absence of other vegetation of substance adjacent to the damage it is inevitable that the roots are from tree numbers 50 and 51.

I have also been provided with photographs of root mapping undertaken under the basement slab in 2 test pits excavated on 18th January 2022. The photographs were provided by Ben Wilderink of Richard Crookes Constructions and are included in Appendix A.

Based on the dimensions, proximity to the trees and bark characteristics the roots depicted in those photographs are from tree number 50. I am advised the roots in question were of 25mm to 70mm diameter and had grown under the existing retaining wall footing. Photographs provided to me depicting the roots are attached in Appendix A. (NB: I am advised that root mapping on the eastern side of the retaining wall adjacent to the trees is not able to be undertaken).

In addition to the above, and as noted in my earlier advice, I have been provided with 'in pipeline' videos showing roots have infiltrated existing storm water lines adjacent to tress 50 and 51 with blockages and damage to the pipelines. Given the proximity of the trees to the blocked pipelines, together with lack of other vegetation of substance in the vicinity, it is considered highly probable roots from trees 50 and 51 are the cause of the blockages. The CCTV video was from the blocked pipeline adjacent to tree 51. I am advised the pipeline adjacent to tree 50 was too heavily blocked to enable a video of the roots.

In conclusion, the Tree Root Mapping undertaken along Gloucester Walk, the CCTV Survey undertaken of the storm water lines within the existing basement and the test pits excavated within the vicinity of both trees 50 and 51 show that tree roots from both trees 50 and 51 are growing in an easterly direction across Gloucester Walk and are also growing in a westerly direction under the existing Sirius Building basement.

In summary

1. The SCP letter dated 19/1/2022 clearly identifies the proximity of the trees to the damaged/failing sections of the retaining wall;
2. The SCP letter dated 19/1/2022 clearly identifies root penetration of the wall with a root that can only be from tree number 50 (given the absence of any other vegetation of significance in the vicinity);
3. The SCP letter dated 19/1/2022 discusses other alternatives suggested by the City of Sydney but concludes (page 9) that, *Due to practical limitations on site, the only remedial solution is to remove and replace the existing retaining walls at Tree 50 and 51*.
4. Due to the close proximity of the trees to the wall, it is inevitable that roots from the trees have grown up to and along the wall and that the wall forms a crucial part of the tree's structural support. This is supported by the

documented evidence of damage to the wall opposite the trees and evidence of roots both penetrating and growing under the wall.

5. The proposed retaining wall works will have a significant impact on the trees and will almost certainly render the trees unstable and at risk of failure in the short term. In this respect, I am of the opinion there is not a practically achievable and arboriculturally acceptable method to stabilise the trees in the short and longer term using mechanic measures such as braces etc.
6. Given the high levels of target (human) activity in the immediate vicinity of the trees their removal, prior to commencement of works, is the only option if the works are to proceed as proposed.

In addition to the above I also confirm my previous advice as follows:

1. The trees are relatively young mature trees with considerable future growth potential (above and below ground).
2. As the trees continue to grow the pressure from root growth against the retaining wall will continue as will the existing disturbance to the Gloucester Walk (lifted and cracked paving).
3. The paving will require ongoing management to minimise trip hazards etc, including raising the existing pavement levels to effect repairs and retain roots. It is understood this will render Gloucester Walk not compliant to DDA requirements in the future.

Don’t hesitate to contact me if you wish to discuss any aspect of this advice.

Yours sincerely

Guy Paroissien MAIH, MIACA, MISA, MAA
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Director
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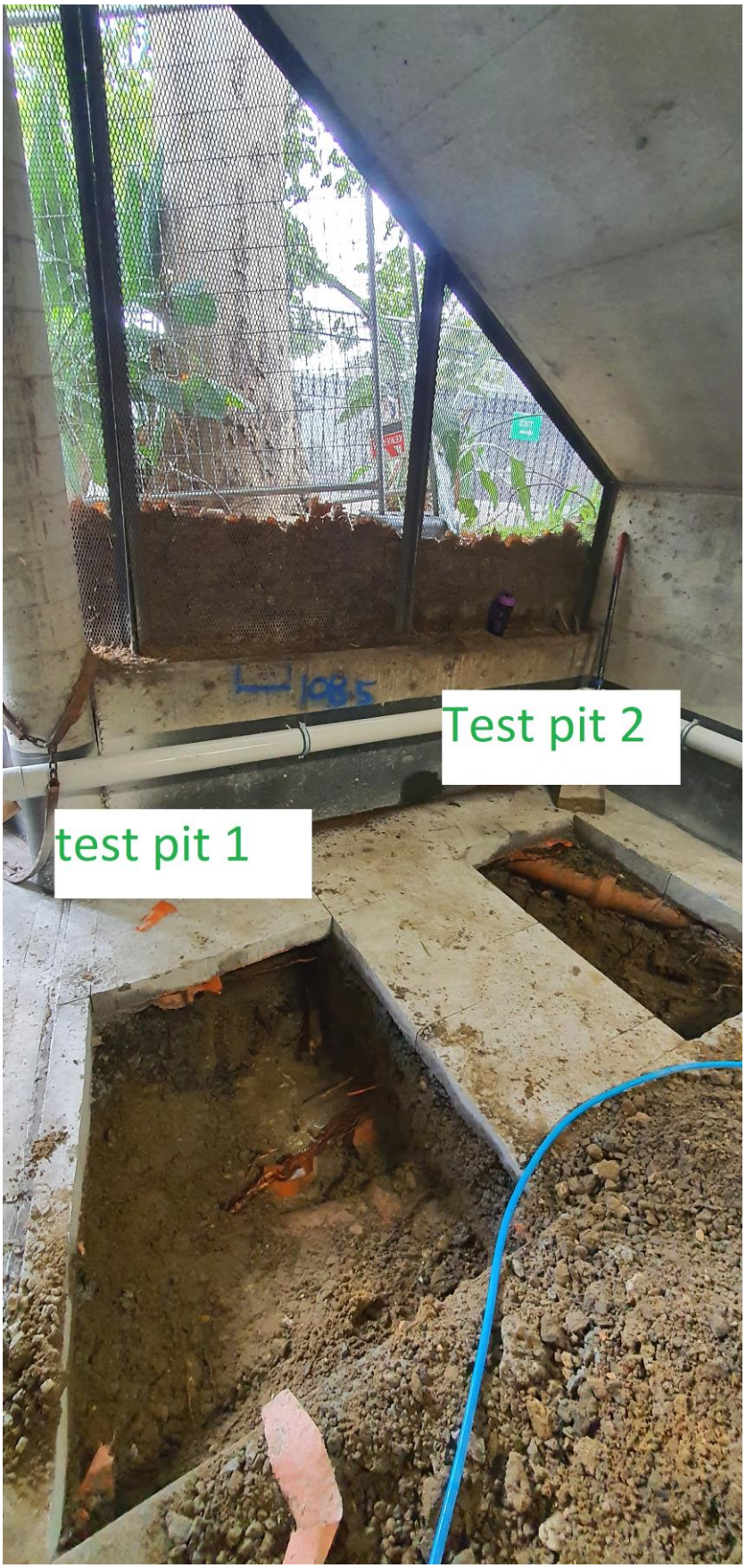
APPENDIX A: PHOTOGRAPHS



Photograph 1: Illustrating the test pit locations, roots and tree number 50.

Photograph 2: Illustrating an exposed root in the test pit.

Photograph 3: Illustrating exposed roots in the test pit

Photograph 4: Illustrating a root dimension.

Photograph 5: Illustrating a root dimension.

Photograph 6: Illustrating a root dimension.

Photograph 7: Illustrating the proximity of tree 50 to the existing structures/basement.

Photograph 8: Illustrating the proximity of tree number 51 to the existing structures/basement

APPENDIX B

ABN 53 110 564 102
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9th December 2021

Mr John Green
Sirius Developments Pty Ltd
120B Underwood Street
Paddington NSW 2021

Dear Mr Green,

Re: Sirius Building - Tree numbers 50 and 51 – Options for basement rectification works – Updated advice 9/12/2021.

Reference is made to my previous Arboricultural Impact Report and advices in respect of the likely impacts of the proposed basement rectification works at the Sirius Building to two adjoining trees located in the Gloucester Walk. I note that City of Sydney has raised significant concerns regarding the proposed removal of the trees.

The trees in question are identified as tree numbers 50 and 51 in the earlier report prepared by Landscape Matrix and were summarised in the earlier report as follows:

Tree Number 50
A mature, single trunked Platanus x hybrida (Plane Tree) approximately 18 metres in height with a canopy spread of 16 metres and a DBH of 590mm. In good health and of high landscape significance.
The tree displays fair branch attachment with multiple leaders from 3 metres - not considered at risk of failure. Limited TPZ area due to adjacent infrastructure, level changes etc. Pathway adjacent to the tree is lifted and cracked consistent with displacement by roots. Some foliage damage likely due to Sycamore Lace Bug.

Tree Number 51
A mature, single trunked Platanus x hybrida (Plane Tree) approximately 18 metres in height with a canopy spread of 16 metres and a DBH of 570mm. In good health and of high landscape significance.
Limited TPZ area due to adjacent infrastructure, level changes etc. Pathway adjacent to the tree is lifted and cracked consistent with displacement by roots. Some foliage damage likely due to Sycamore Lace Bug.

Under *AS4970-2009 Protection of trees on development sites* tree number 50 has a tree protection zone (TPZ) of 7.1 metres and tree number 51 a TPZ of 6.8 metres. Both trees have a structural root zone (SRZ) of 2.9 metres. The TPZs and SRZs are radial offsets measured from the centre of trunk.

AS4970-2009 identifies the structural root zone as the area required for stability and where disturbance of any sort should be avoided.

As noted in the earlier report the trees have a limited TPZ area due to adjacent infrastructure, significant level changes etc. Included in these limitations is the existing basement of the Sirius building. The existing basement is located well within the identified SRZs of both trees.

The earlier Arboricultural Impact Report identified the trees would not be impacted by the development proposal as the existing basement wall was proposed to be retained in situ.

Subsequent to the Development Application process further input from the Structural Engineer has been prepared during the course of detailed design development. This additional investigation has identified the existing basement walls are:

- Not compliant to current codes and cannot be certified;
- The retained material behind the walls needs to be removed;
- The walls will need to be demolished and re-constructed; and
- Tree root damage to the retaining walls has been documented and is compromising the structural integrity of wall allowing water ingress to basement;
- Tree root damage to the existing stormwater lines has also been documented;
- Given the immediate proximity of the trees to the damaged sections of the wall together with the absence of other trees in the vicinity it is considered inevitable that the roots causing the damage are from tree numbers 50 and 51.

The selected option to resolve the issues was to remove and reconstruct the walls in the same alignment as the current retaining walls. It is understood that other options were considered but not identified as the preferred solution due to a variety of factors. The other options included:

Rock anchor the existing wall – the existing wall would remain in situ and be anchored beyond the boundary with permanent anchors. It is understood the installation of the anchors will extend through the existing wall and SRZs of the tree's and result in high levels of disturbance and the likely loss of structural roots.

Without further detailed design information and investigation (including root mapping) it is not possible to accurately identify the impacts to the trees arising from this option. However, given the extent of works required and proximity to the trees, it is considered probable this option would have a significant impact on the trees.

To investigate this option further from a tree perspective, root mapping would need to be undertaken using an 'air-knife' or water jet under supervision of an AQF Level 5 arborist. This would involve carefully removing the soil around the proposed location of all of the anchors to identify the location, depth, dimensions etc of any roots that would be impacted by the works.

Following the collection of data through the root mapping an analysis would be undertaken to assess the likely impacts of the works.

However, I confirm my advice that there would be no justification to undertake the disturbance associated with this investigation if the option of rock anchors is not a viable option from an engineering perspective.

Build new soldier piled wall in front of the existing wall on the basement side – the existing wall would stay in situ and would minimise disturbance immediately adjacent to the trees. This option involves a soldier pile wall built in front of the existing wall (ca. 500mm diameter) embedded 4 metres below the basement level into rock.

The installation of the piers will likely result in some damage to roots as there is evidence of roots growing under the basement slab floor (the extent of which cannot be confirmed by ground penetrating radar due to interference to signals from the steel reinforcement in the basement slab).

However, this extent of root loss is considered likely to be within acceptable thresholds given the retention of the existing wall in situ. In addition, preliminary cutting in the slab (prior to piling) could be undertaken to enable location of the piers to avoid any structural roots of substance.

Remove and reconstruct the walls in the same alignment
The selected option was to remove and reconstruct the walls in the same alignment as the current retaining walls. My previous advice identified these works would have a significant impact on the trees and would almost certainly render the trees unstable and at risk of failure in the short term.

Given the high levels of target (human) activity in the immediate vicinity of the trees their removal, prior to commencement of works, was identified as the only option if the works were to proceed as proposed (i.e. removal of the existing walls and construction of new walls on the same alignment).

That advice remains unchanged.

In respect to the other issues raised the following advice is confirmed:
1. I have been provided with 'in pipeline' videos showing roots have infiltrated existing storm water lines adjacent to tress 50 and 51 with blockages and damage to the pipelines. Given the proximity of the trees to the blocked pipelines, together with lack of other vegetation of substance in the vicinity, it is considered highly probable roots from trees 50 and 51 are the cause of the blockages. The video was from the blocked pipeline adjacent to trees 51. I am advised the pipeline adjacent to tree 51 was too heavily blocked to enable a video of the roots.

2. The trees are relatively young mature trees with considerable future growth potential (above and below ground).

3. As the trees continue to grow the pressure from root growth against the retaining wall will continue as will the existing disturbance to the Gloucester Walk (lifted and cracked paving). The paving will require ongoing management to minimise trip hazards etc, including raising the existing pavement levels to effect repairs and retain roots. It is understood this will render Gloucester Walk not compliant to DDA requirements in the future.

Don’t hesitate to contact me if you wish to discuss any aspect of this advice.

Yours sincerely

Guy Paroissien MAIH, MIACA, MISA, MAA
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