Birds Tree Consultancy

Consulting Arborist AQF5 • Horticultural Consultancy • Project Management • Resistograph Testing

35 Robertson Road, Scotland Island, NSW

ARBORICULTURAL RISK ASSESSMENT REPORT – REVISION A

22nd August 2018

Prepared for Far East Land and Housing Development Company Pte. Ltd

Prepared by

Birds Tree Consultancy
Glenn Bird Dip. Hort (Arboriculture) (AQF5)
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MEMBER OF INSTITUTE OF AUSTRALIAN CONSULTING ARBORICULTURISTS

Executive Summary

This Arboricultural Risk Assessment Report has been ordered by Far East Land and Housing Development Company Pte. Ltd to report on one tree within the site of 35 Robertson Road, Scotland Island, NSW. This was commissioned as part of a site wide arboricultural risk assessment. This report specifically deals with just the one tree. The subject tree has previously been reported on as Tree 32 within Birds Tree Consultancy Arboricultural Development Impact Assessment for 35 Robertson Road Scotland Island dated 11 March 2016 and again as Tree 2 within Birds Tree Consultancy Arboricultural Assessment Report Revision A dated 7 April 2017 (refer Appendix B). Additional to to this 7 April 2017 report, site instruction was provided based on aerial inspection made on 7 March 2017 (refer Appendix C). This report is to be read in conjunction with these previous reports.

The subject site is 35 Robertson Road, Scotland Island NSW. This site is currently under development including the construction of a new residential dwelling. All tree protection measures have been certified as correctly installed (see certification in Appendix D) and are being maintained. The subject tree is located in close proximity to the new dwelling and a dwelling on the neighbouring property.

On the 31 July 2018, Glenn Bird of Birds Tree Consultancy attended site and inspected the subject trees from the ground as well as from the elevated level of the residential dwelling currently under construction. A Visual Tree Assessment was undertaken in accordance with Visual Tree Assessment (VTA) guidelines (Mattheck and Breloer, 1994). Tree heights were measured using a Nikon Forestry 550 Heightmeter.

The subject tree is preserved under Northern Beaches (Pittwater Council) Tree Preservation Order and is a representative species of Pittwater Spotted Gum Forest which is an Endangered Ecological Community in the Sydney Basin Bioregion under the Threatened Species Conservation Act (1995).

Every effort has been made in order to for this tree to remain viable to be retained within this developed site and landscape. The building design has been amended in order to minimise the construction impact on this tree (refer to Birds Tree Consultancy Arboricultural Development Impact Assessment for 35 Robertson Road Scotland Island dated 11 March 2016) and an aerial inspection and assessment report has been prepared with subsequent remedial pruning carried out in order to minimise the risk of failure of this tree. Despite these remedial and risk mitigation measures, large limbs within the upper canopy continue to fail in high winds and now pose an increased risk to persons and property in the close vicinity to the tree.

Due to the fact that the live canopy is now supported by two co dominant trunks with structural defects in each and the exposed aspect of the remaining canopy, this tree poses a residual risk after these previous risk mitigation measures.

This risk has been assessed as outlined within 4.0 Risk Assessment and the residual risk has been found to be moderate to high. Due to the compromised form of the canopy, further remedial pruning to mitigate this risk is not possible. It is also not possible to move the targets from within the zone of the tree. As a result, in order to remove the hazard posed by this moderate to high risk, we recommend the removal of this tree.

Contents

1.0 Scope of Works

This Arboricultural Risk Assessment Report has been ordered by Far East Land and Housing Development Company Pte. Ltd to report on one tree within the site of 35 Robertson Road, Scotland Island, NSW. This was commissioned as part of a site wide arboricultural risk assessment. This report specifically deals with just the one tree. The subject tree has previously been reported on as Tree 32 within Birds Tree Consultancy Arboricultural Development Impact Assessment for 35 Robertson Road Scotland Island dated 11 March 2016 and again as Tree 2 within Birds Tree Consultancy Arboricultural Assessment Report Revision A dated 7 April 2017 (refer Appendix B). Additional to to this 7 April 2017 report, site instruction was provided based on aerial inspection made on 7 March 2017 (refer Appendix C). This report is to be read in conjunction with these previous reports.

On the 31 July 2018, Glenn Bird of Birds Tree Consultancy attended site and inspected the subject trees from the ground as well as from the elevated level of the residential dwelling currently under construction. A Visual Tree Assessment was undertaken in accordance with Visual Tree Assessment (VTA) guidelines (Mattheck and Breloer, 1994). Tree heights were measured using a Nikon Forestry 550 Heightmeter.

2.0 Site Analysis

2.1 Site

The subject site is 35 Robertson Road, Scotland Island NSW. This site is currently under development including the construction of a new residential dwelling. All tree protection measures have been certified as correctly installed (see certification in Appendix D) and are being maintained. The subject tree is located in close proximity to the new dwelling and a dwelling on the neighbouring property.

2.2 Identification

The subject tree is identified as Tree 32 within Birds Tree Consultancy Arboricultural Development Impact Assessment for 35 Robertson Road Scotland Island dated 11 March 2016. This report is to be read in conjunction with this previous report. Refer to Appendix E for location of subject tree.

3.0 Subject Tree

The following trees were inspected from the ground and aerially and the following items identified.

3.1 Tree 32 – *Corymbia maculata.*

This tree is a mature *Corymbia maculata* and is approximately 27m tall with canopy spread of 22m. The tree is in fair health and condition with moderate deadwood and minimal epicormic growth. This tree has multiple co-dominant trunks from 6m above the base with a diameter at breast height (DBH) of 1180mm. There is evidence of large number of failed limbs where the point of failure is away from collar.

There has been significant resources and measures implemented in order to retain this tree and ensure the viability of this tree within the developed landscape. These implementations include redesign of the dwelling in order to ensure that pier footings and water storage do not impact the Tree Protection Zone, aerial inspections and reporting, remedial pruning.

In previous reports, this tree has previously had decay and cavities identified in a number of locations which placed this tree at increased risk of failure. Remedial pruning was recommended with Birds Tree Consultancy Arboricultural Assessment Report Revision A dated 7 April 2017 and this pruning has been carried out which mitigates the risk of failure at this point to some extent. Part of this previous pruning was carried out to remove horizontal end weighted branches overhanging the neighbouring property. There are no branches overhanging the neighbouring dwelling.

Since our last inspection for this tree for the above mentioned report, there has been a large limb fail from the upper canopy which has torn out at a collar. This failed limb landed on the roof of the neighbouring property, puncturing the roof and damaging solar power panels. This failed limb was not overhanging the neighbouring dwelling.

This tree has three co-dominant trunks from a point between 6-10m from the base. One of the co-dominant trunks has been topped in order to remove structural defects and limbs overhanging the neighbouring property and yet retain fauna habitat. This removal is in accordance with guidelines in Birds Tree Consultancy Arboricultural Assessment Report Revision A dated 7 April 2017. Both of the remaining co-dominant trunks have significant defects present. The central co dominant trunk has a cavity present from a previous failure with possums living in it. The most western co dominant trunk has two points of decay where previous failures have occurred.

Figure 1- Cavity in Tree 32

Figure 2 - Point of recent limb failure

Figure 3 - Base of failed limb

Figure 4 - Damage to neighbouring roof

Figure 5 - Damage to neighbouring roof

Figure 6 - Damage to Solar Panel

4.0 Risk Assessment

The subject tree has a number of structural defects within the canopy of this tree. There are three co dominant trunks, one of which has been topped. The other two co dominant trunks both have points of decay and cavity within them. This places these co dominant trunks at increased risk of failure at these points.

In addition, this tree has a history of frequent limb failures. The most recent failure which damaged the neighbouring property failed at the collar during a period of high winds, however there is a large amount of evidence of other limb failures away from the collar in a manner that is typical of Sudden Limb Drop (SLD).

The subject tree is in a location close to the waterfront on Scotland Island and frequent is exposed to strong winds.

This Arboricultural Risk Assessment is made in accordance with the International Society of Arboriculture (ISA) Tree Risk Assessment guidelines.

The following factors were compiled as part of this assessment:

1. Presence of structural defects, cavities and decay within both remaining co-dominant trunks.
2. Evidence of multiple limb failures away from the collar (evidence of SLD),
3. Evidence of multiple limb failures at the collar (indicitaive of high wind fractures).
4. High history of limb failures,
5. Site changes including recent removal of adjacent trees,
6. Partial protection from wind gusts, recently impacted by adjacent tree removal. Canopy extends above adjacent trees.
7. Codominant trunks present with no evidence of included bark

From this assessment we determine that this tree is at increased risk of failure of the co dominant trunks at points of structural defects, or continued limb failure by means of Sudden Limb Drop or high wind fractures.

Target Analysis

The subject tree is in close proximity to two residential dwellings posing a hazard to these buildings and their occupants. As evident by the damage caused by the recent failure, the consequence of a failure to these targets would be significant to severe.

Risk Analysis

Likelihood of Failure	Likelihood of Impact			
	Very low	**Low**	**Medium**	**High**
Imminent	Unlikely	Somewhat likely	Likely	Very likely
Probable	Unlikely	Unlikely	Somewhat likely	Likely
Possible	Unlikely	Unlikely	Unlikely	Somewhat likely
Improbable	Unlikely	Unlikely	Unlikely	Unlikely

Table 1 - Likelihood Matrix

Likelihood of Failure & Impact	Consequences of Failure			
	Negligible	**Minor**	**Significant**	**Severe**
Very likely	Low	Moderate	High	Extreme
Likely	Low	Moderate	High	High
Somewhat likely	Low	Low	Moderate	Moderate
Unlikely	Low	Low	Low	Low

Table 2 - Risk Rating Matrix

Target	Tree Part	Condition of Concern	Likelihood			Consequence	Risk Rating (Table 2)
			Failure	Impact	Failure & Impact (table 1)		
People	Trunk	Failure at decay/Cavity	Possible	High	Somewhat Likely	Severe	Moderate
People	Branch	Limb failure	Probable	High	Likely	Severe	High
Building	Trunk	Failure at decay/Cavity	Possible	High	Somewhat Likely	Severe	Moderate
Building	Branch	Limb failure	Probable	High	Likely	Significant	High

Table 3 - Risk Categorisation

5.0 Recommendations

The subject tree is preserved under Northern Beaches (Pittwater Council) Tree Preservation Order and is a representative species of Pittwater Spotted Gum Forest which is an Endangered Ecological Community in the Sydney Basin Bioregion under the *Threatened Species Conservation Act (1995).*

Every effort has been made in order to for this tree to remain viable to be retained within this developed site and landscape. The building design has been amended in order to minimise the construction impact on this tree (refer to Birds Tree Consultancy Arboricultural Development Impact Assessment for 35 Robertson Road Scotland Island dated 11 March 2016) and an aerial inspection and assessment report has been prepared with subsequent remedial pruning carried out in order to minimise the risk of failure of this tree. Despite these remedial and risk mitigation measures, large limbs within the upper canopy continue to fail in high winds and now pose an increased risk to persons and property in the close vicinity to the tree.

Due to the fact that the live canopy is now supported by two co dominant trunks with structural defects in each and the exposed aspect of the remaining canopy, this tree poses a residual risk after these previous risk mitigation measures.

This risk has been assessed as outlined within 4.0 Risk Assessment and the residual risk has been found to be moderate to high. Due to the compromised form of the canopy, further remedial pruning to mitigate this risk is not possible. It is also not possible to move the targets from within the zone of the tree. As a result, in order to remove the hazard posed by this moderate to high risk, we recommend the removal of this tree.

6.0 Environmental / Heritage/ Legislative Considerations

The subject trees are identified as representative of Pittwater Spotted Gum Forest an endangered ecological community under the *Threatened Species Conservation Act 1995.*

7.0 References

Mattheck, C. Breloer, K. 1993, The Body Language of Trees: A Handbook for Failure Analysis, 12th Impression 2010 The Stationery Office.
AS4970-2009 Protection of Trees on Development Sites : Standards Australia
Harris – Journal of Arboriculture 1983

8.0 Disclaimer

This Appraisal has been prepared for the exclusive use of the Client and Birds Tree Consultancy.
Birds Tree Consultancy accepts no responsibility for its use by other persons. The Client acknowledges that this Appraisal, and any opinions, advice or recommendations expressed or given in it, are based on the information supplied by the Client and on the data inspections, measurements and analysis carried out or obtained Birds Tree Consultancy and referred to in the Appraisal. The Client should rely on the Appraisal, and on its contents, only to that extent.

Every effort has been made in this report to include, assess and address all defects, structural weaknesses, instabilities and the like of the subject trees. All inspections were made from ground level using only visual means and no intrusive or destructive means of inspection were used. For many structural defects such as decay and inclusions, internal inspection is required by means of resistograph or similar. No such investigation has been made in this case. Trees are living organisms and are subject to failure through a variety of causes not able to be identified by means of this inspection and report.

Appendix A – Critical Issues

Summer Limb Drop

Summer Limb Drop is the circumstance where apparently sound limbs fail and break out of the tree canopy in calm warm weather. In each case the limbs are live and have failed at a point away (usually 150-300) from the collar. *Eucalyptus spp (and Corymbia)* are known to be susceptible to Summer Limb Drop (Harris, Journal of Arboriculture 1983). Once a tree is prone to summer limb drop, it is likely to continue. These limbs failing unpredictably pose a risk to persons and property. Limb failure is most likely on long extended branches and particularly horizontal end weighted branches.

Appendix B – Previous Reports

Birds Tree Consultancy

Consulting Arborist AQF5 • Horticultural Consultancy • Project Management • Resistograph Testing

35 Robertson Road, Scotland Island, NSW

ARBORICULTURAL ASSESSMENT REPORT

7th of April 2017 REVISION A

Prepared for Far East Land and Housing Development Company Pte. Ltd

Prepared by

Birds Tree Consultancy
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Executive Summary

This Arboricultural Assessment Report has been ordered by Far East Land and Housing Development Company Pte. Ltd to report on two trees within the site of 35 Robertson Road, Scotland Island, NSW. It has been commissioned to outline the health, condition and stability of these trees. This report has been commissioned due to the fact that during pruning works as per approved DA N0176/16 an aerial inspection was made and further structural defects were encountered and inspected in these trees.

On the 13th March 2017, Glenn Bird of Birds Tree Consultancy attended site and inspected the subject trees from the ground. Nick Lloyd of All Arbor Tree Services inspected aerially and provided photographic evidence of defects. A Visual Tree Assessment was undertaken in accordance with Visual Tree Assessment (VTA) guidelines (Mattheck and Breloer, 1994). Tree heights were measured using a Nikon Forestry 550 Heightmeter.

The subject trees are preserved under Pittwater Council Tree Preservation Order. Both trees are representative species of Pittwater Spotted Gum Forest which is an Endangered Ecological Community in the Sydney Basin Bioregion under the Threatened Species Conservation Act (1995).

The cavities present in both trees as identified in the aerial inspection place both of the limbs involved at increased risk of failure. Once the decay or hollow exceeds 70% of the tree diameter, the tree is at an increased risk of failure and would be an unsatisfactory risk. (Mattheck & Breloer, 1994, page 185). These limbs are at increased risk of failure and this risk is increased by the fact that the cavity is open therefore leaving the trunk prone to “hose pipe kinking” (Mattheck & Breloer, 1994, Page 36,108), this increased risk and the likely longitudinal decay poses a hazard to life and property. The limb with the cavity present in tree 2 is overhanging the new residence on the adjoining neighbouring property. The limb with cavity in tree 1 is in the close vicinity of the proposed new residence to be constructed on the subject site. In order to remove the hazard posed to life and property as result of this increased risk of failure, we recommend that both of these limbs be removed.

Both trees 1 and 2 require remedial pruning. Remove the secondary limb on Tree 2 with the large cavity present. Limb removal is to be carried out at the lower primary junction. Care must be taken that the cavity in tree 2 currently is habitat for possums and these possums and any other fauna are to be safely relocated.

Tree 2 has a number of wounds and potential decay sites within the canopy. Removal of all of these limbs would make this tree not viable to be retained. This tree will remain viable for retention in the medium term (5-10 years). Tree 2 is to be monitored regularly to investigate the extent of potential decay within the socket wound present in this tree.

Remove the secondary limb on Tree 1 where the existing cavity is present back at the lower primary junction.

All pruning is to be carried out by qualified and insured arborist of AQF Level 3 or higher in accordance with AS4373-2007 Pruning of Amenity Trees. Pruning works are to be carried out under the supervision of Glenn Bird AQF Level 5 Site Arborist

Contents

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2.0 Site Analysis

2.1 Site

The subject site is 35 Robertson Road, Scotland Island NSW. The subject trees are located within boundaries of this site which is currently being developed with the construction of a new residential dwelling.

2.2 Topography

The site grades steeply from the highest boundaries on Robertson Road to the lowest point at the high water mark. These level changes are retained by a series of low stone retaining walls. Please refer to survey drawings for greater details.

2.3 Identification

Trees as identified in the attached inspection forms in Appendix B and as shown in Tree location Plan A01 in Appendix C.

2.4 Soils

Soil material and horizons were not tested for this report.

3.0 Existing Trees

The following trees were inspected from the ground and aerially and the following items identified. Please refer also to the attached inspection data in appendix C.

3.1 Tree 1 – *Corymbia maculata.*

This tree is a mature *Corymbia maculata* and is approximately 30m tall with canopy spread of 16m. The tree is in good health and condition with moderate deadwood and minimal epicormic growth. This tree has a single trunk with a diameter at breast height (DBH) of 740mm. There is evidence of limb failure away from collar. There is a large wound with evident decay and cavity present in one central secondary limb.

Figure 1 - Decay and cavity in Tree 1

3.2 Tree 2 – *Corymbia maculata.*

This tree is a mature *Corymbia maculata* and is approximately 27m tall with canopy spread of 22m. The tree is in fair health and condition with moderate deadwood and minimal epicormic growth. This tree has multiple (6) co-dominant trunks from 6m above the base with a diameter at breast height (DBH) of 1180mm. There is evidence of large number of failed limbs away from collar. There is a large cavity within a primary limb that is overhanging the adjacent neighbour's residence currently under construction. This cavity is visually determined to be greater than 60% of the diameter of the limb by means of aerial visual inspection. The cavity is currently housing possums. There is also a large wound on the central primary trunk that appears to be as a result of a previous limb failure leaving a "socket". Upon aerial inspection this wound appears to have compartmentalised with no evident cavity or swelling indicative of significant decay.

Figure 2- - Cavity in Tree 2

Figure 3 - Socket wound in Tree 2

4.0 Recommendations

The subject trees are preserved under Pittwater Council Tree Preservation Order. Both trees are representative species of Pittwater Spotted Gum Forest which is an Endangered Ecological Community in the Sydney Basin Bioregion under the *Threatened Species Conservation Act (1995).*

The cavities present in both trees as identified in the aerial inspection place both of the limbs involved at increased risk of failure. Once the decay or hollow exceeds 70% of the tree diameter, the tree is at an increased risk of failure and would be an unsatisfactory risk. (Mattheck & Breloer, 1994, page 185). These limbs are at increased risk of failure and this risk is increased by the fact that the cavity is open therefore leaving the trunk prone to "hose pipe kinking" (Mattheck & Breloer, 1994, Page 36,108), this increased risk and the likely longitudinal decay poses a hazard to life and property. The limb with the cavity present in tree 2 is overhanging the new residence on the adjoining neighbouring property. The limb with cavity in tree 1 is in the close vicinity of the proposed new residence to be constructed on the subject site. In order to remove the hazard posed to life and property as result of this increased risk of failure, we recommend that both of these limbs be removed.

Both trees 1 and 2 require remedial pruning. Remove the secondary limb on Tree 2 with the large cavity present. Limb removal is to be carried out at the lower primary junction. Care must be taken that the cavity in tree 2 currently is habitat for possums and these possums and any other fauna are to be safely relocated.

Tree 2 has a number of wounds and potential decay sites within the canopy. Removal of all of these limbs would make this tree not viable to be retained. This tree will remain viable for retention in the medium term (5-10 years). Tree 2 is to be monitored regularly to investigate the extent of potential decay within the socket wound present in this tree.

Remove the secondary limb on Tree 1 where the existing cavity is present back at the lower primary junction.

All pruning is to be carried out by qualified and insured arborist of AQF Level 3 or higher in accordance with AS4373-2007 Pruning of Amenity Trees. Pruning works are to be carried out under the supervision of Glenn Bird AQF Level 5 Site Arborist.

5.0 Environmental / Heritage/ Legislative Considerations

The subject trees are identified as representative of Pittwater Spotted Gum Forest an endangered ecological community under the *Threatened Species Conservation Act 1995.*

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AS4970-2009 Protection of Trees on Development Sites : Standards Australia

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Every effort has been made in this report to include, assess and address all defects, structural weaknesses, instabilities and the like of the subject trees. All inspections were made from ground level using only visual means and no intrusive or destructive means of inspection were used. For many structural defects such as decay and inclusions, internal inspection is required by means of resistograph or similar. No such investigation has been made in this case. Trees are living organisms and are subject to failure through a variety of causes not able to be identified by means of this inspection and report.

Appendix C – Previous On Site Instruction

Birds Tree Consultancy

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SITE INSPECTION NOTES

INSPECTION DATE:	7 March 2017	
PROJECT NUMBER	16091	
PROJECT:	35 Robertson Road Scotland Island	
ATTENDENCE:	Glenn Bird (BTC)	GB
	Jess Yue (Far East)	JY
	Nick Skelton (Ecology)	NS
	Nick Lloyd (All Arbor)	NL

Inspection Notes

1. GB and NS attended site on the above date with tree removal works commencing for All Arbor.
2. GB & NS assisted NL to correctly identify the trees to be removed in accordance with the scope of works.
3. GB identified to NL the limbs that are required to be pruned in accordance with the Scope of Works.
4. On site GB identified a large defect of the primary leader in the upper canopy of tree 32 that had not previously been identified. This defect is a large cavity which appears to be greater than 60% of the diameter of the trunk. This cavity places this trunk at greatly increased risk of failure at this point which would pose a hazard to life and property. We have recommended that this limb be removed at the lower junction at the collar in

accordance with *AS4373-2007 Pruning of Amenity Trees*. It is recommended that All Arbor carry out this work whilst they are carrying out other pruning works in this tree.

Figure 1 - Cavity in upper cavity of tree 32.

5. There appear to be another possible cavity/decay at a junction approximately 2m lower than the one identified in item 4 above. NL is to inspect this when he is aerial in the tree and provide feedback.
6. There is a large limb that has recently failed that we have requested by pruned back to the location of propbably decay/cavity as shown on site.

Figure 2 - Tree 32 failed limb requiring removal.

7. Tree 32 will require ongoing monitoring of the health and condition in order to identify and mitigate risks posed. Pruning options are now limited due to two large limbs previously removed have limited the amount of viable canopy. Management of this tree will be required over the following years in order to maintain the weight in the canopy in order to reduce the risk of failure.
8. There were two limbs identified for removal by the owner of the neighbouring property. The first was a horizontal branch of tree 32 that is directly overhanging the new residence of the neighbouring property. The neighbor has requested that this

branch be removed to prevent this branch falling on the dwelling. This branch is a healthy branch with no visible defects and does not require immediate removal. Over time this branch will decline in health and condition and may require removal prior to failure over the next 5-10years.

The second branch requested to be removed from the client is a dead limb that is overhanging their property. This limb is dead and should be removed.

Appendix D – Tree Protection Compliance

Birds Tree Consultancy
Consulting Arborist • Project Management • Horticultural Consultancy • Resistograph Testing

31 July 2017

Sam Crawford Architects
Level 2, 17 Federation Road
NEWTOWN NSW 2012

ATTENTION: Benjamin Chan,

Dear Sir

RE: 35 ROBERTSON ROAD SCOTLAND ISLAND – TREE PROTECTION MEASURES - CERTIFICATION

On 31 July 2017 we inspected the site at 35 Robertson Road Scotland Island. We wish to certify that all Tree Protection Measure had been installed correctly. Tree Protection Fencing has been erected in locations as previously agreed.

Please give me a call should you have any questions.

Birds Tree Consultancy

Glenn Bird DipHort(Arb) MISAAC, MAA

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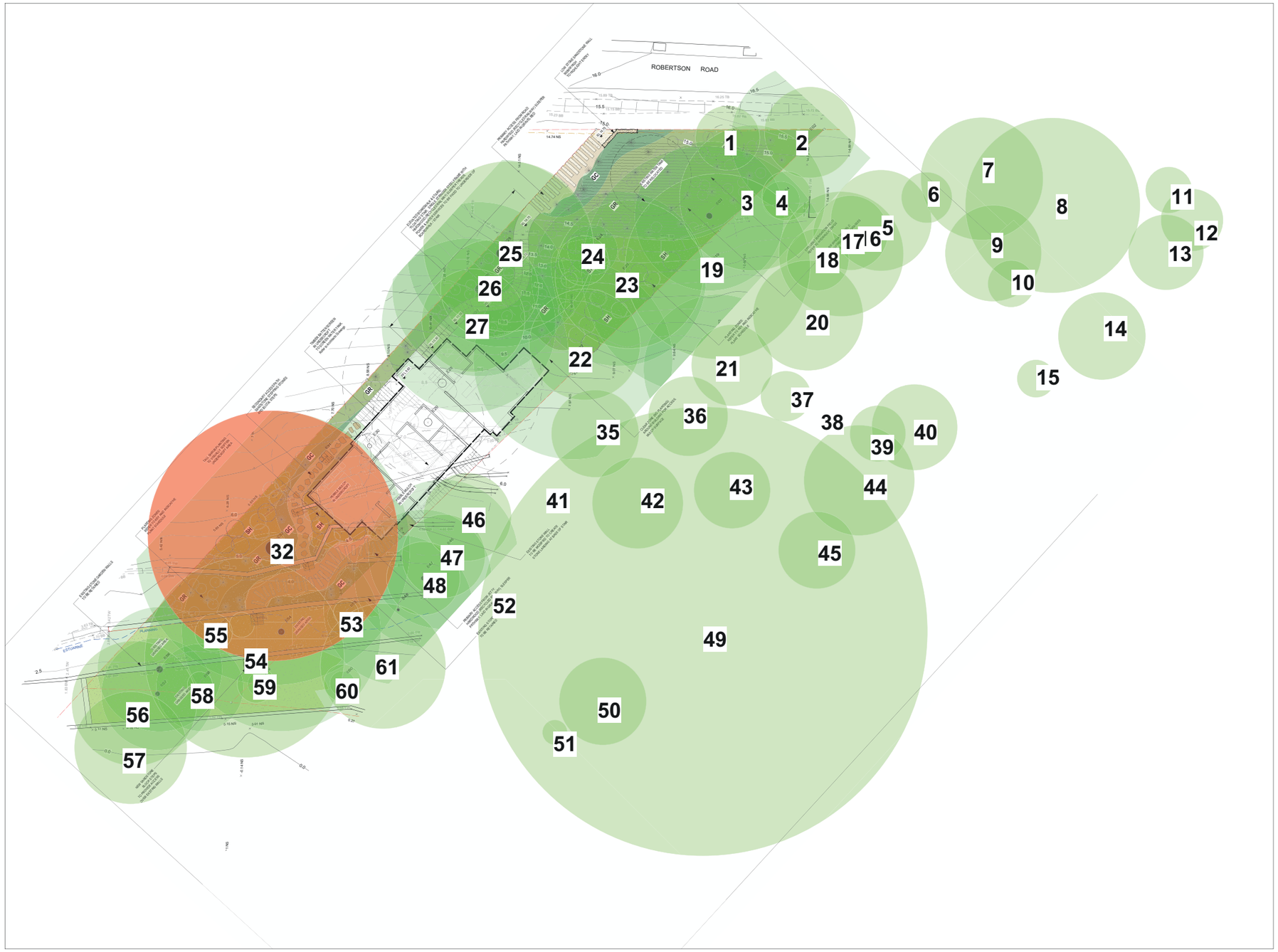
www.birdstrees.com.au ABN 31 105 006 657

Appendix E – Tree Location Plans



LEGEND

Tree to be retained

Tree recommended for Removal

Birds Tree Consultancy

0438 892 634

glenn@birdstrees.com.au

www.birdstrees.com.au

Project: 35 Robertson Road Scotland Island

Client: Far East Land & Housing Development Company Pte Ltd DWG: A01

Plan: Tree Location Plan

Date: 3 August 2018

Scale : Not to Scale