Arboricultural Assessment
Precinct Structure Plan - 1078 - Plumpton.

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Growth Areas Authority

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Tree management for the urban forest

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Version control	Site	Date	Author		File No
Version 1	PSP 1078 - Plumpton	27/06/2013	Bruce Callander	Draft	13_4906
Version 2	PSP 1078 - Plumpton	4/10/2013	Bruce Callander	GAA property No's and map details	13_4906
Version 3	PSP 1078 - Plumpton	4/10/2013	Bruce Callander	Owner /Representative comments	13_4906

1 Executive summary

1.1 The tree population was sparse and generally unremarkable overall, both across the study area and within individual properties.

1.2 Two hundred and fifty five (255) tree features were inspected within the study area including one hundred and sixty one (161) individual trees and ninety four (94) tree group features comprising approximately 2,990 additional trees, making a total of approximately 3,151 trees that were reviewed.

1.2.1 These figures do not include the countless smaller exotic conifers in numerous windrows around many of the house and property boundaries. Based on observations these trees were considered to be unremarkable features of low significance in the landscape and outside the scope of works.

1.3 Each of the assessed tree features was attributed an 'Arboricultural Rating'. The arboricultural rating correlates the combination of tree condition factors (health, structure & form) with tree amenity value and reflects the retention value of the tree(s). Refer to Table 1.

Table 1: Arboricultural rating	**Total trees**	**Total tree groups**	***Trees in tree groups***
Very High	9	1	*17*
High	44	5	*≈581*
Moderate	69	31	*≈900*
Low	39	56	*≈1466*
None		1	*26*
Total	**161**	**94**	*≈2990*

1.4 Indigenous trees that appeared to be naturally occurring were identified in open pasture within the property parcel number 2 (3542) on the west side of Plumpton Road. These naturally occurring indigenous trees were associated with a natural drainage line that extends across the north west quadrant of the tree study areas.

1.4.1 The trees provide visual, amenity, hydrological and ecological benefits to the site and are highly desirable to retain.

1.4.2 While all trees can shed limbs River Red Gum trees have a well documented propensity for limb shedding. It is recommended that when retaining such trees, a larger than normal tree protection zone is applied to protect the tree but also to exclude prolonged occupation of the area beneath the canopy to reduce the risk of personal injury or property damage were limbs to fall. The recommended tree protection zone for maturing River Red Gum trees includes protecting the canopy and excluding development from the canopy width plus 1 metre on all sides.

1.5 All other trees were specimens that had been planted for revegetation, ornamental or functional purposes such as wind breaks and screens. Tree protection zones that comply with AS4970-2009 must be applied.

1.6 A Cypress hedgerow (Group 26) located at the front of parcel 25 (11995) is listed under Heritage Overlay 58 of the Melton Planning Scheme and tree controls apply to the hedge.

1.7 Not all 'Moderate or Low' rated tree features should be dismissed as candidates poorly suited for retention, though overall, the retention of such trees should not compromise design intent. In general Moderate rated trees were of semi-mature age and size and could be readily replaced during development of the site. In certain landscape settings, smaller specimens in otherwise reasonable condition have the potential to offer an established tree resource, even if only as an interim measure. Low rated trees with health or structural deficiencies are generally not desirable candidates for retention. Windrows with health and structural defects should generally be removed.

1.8 All trees of Very High, High or Moderate arboricultural rating would benefit from some level of tree crown maintenance or reduction pruning to ensure they can be retained for the long term. Pruning

can reduce the potential for further limb shed and thereby minimise problems associated limb failure and infection with decay organisms.

1.9 Trees attributed an arboricultural value of None were the least suited to retention on arboricultural grounds, having significant health and / or structural defects.

2 Client Brief

The Growth Areas Authority (GAA) commissioned Tree Logic to undertake an arboricultural survey of tree features within the area defined as Precinct 1078 – Plumpton region to inform the future precinct design process.

The tree study area, Precinct Structure Plan 1078 (PSP78), comprised approximately 9.8 square kilometres and is defined to the north by the Melton Highway, to the south by Taylors Road, and nominated property boundaries to the west and east which is partially defined by the power line easement in the east. The study area is transected diagonally by Beattys Road. Refer to Plate 1.

Plate 1: *Plumpton PSP 1078 Area, powerline easement and aerial image of tree study area.*

The land is currently used for a variety of rural purposes and is zoned Urban Growth Zone with a number of overlays affecting parcels within the site. It is divided into 55 allotments of varying size from 0.5 to 110 hectares with the average being between 10 and 20 hectares.

3 Key Objectives:

The scope of the assessment included determining the species, origin, health and integrity of the trees within the precinct as well as the arboricultural value, landscape value and the ability to survive in an urban environment.

Whilst the assessment included reviewing all trees in the precinct, the scope was confined to recording only large and very large tree features that existed outside of the prescribed excluded and conservation areas. The assessment included trees in the road reserves as well.

Where access to private land was denied or unable to be obtained an assessment has been undertaken from the boundary to obtain a basic understanding of the trees value.

The purpose of the report is to identify the retention values of trees within the precinct.

- The arboricultural report tables the collected data, illustrating the retention value of all surveyed trees on a plan of the PSP area, and includes discussion and recommendations regarding suitability for retention in an urban environment, required protection zones (AS4970-2009) and strategies to maximise longer term viability, where relevant.

The assessment data supplied in Appendix 1 includes:

- Surveys for all trees within the precinct High or Very High retention value > 15cm trunk diameter.
- A unique identifying tree number
- Number of trees (when assessed as a group)
- Location (GPS/GIS co-ordinates in Latitude / Longitude)
- Species (botanical and common name)
- Tree origin (exotic, native, indigenous, planted)
- Dimensions (Diameter Breast Height (DBH), tree height, canopy width)
- Age class
- Health rating
- Structural rating
- Useful life expectancy
- Arboricultural retention value
- Tree Protection Zone based on Australian Standards (AS 4970-2009).
- Any relevant comments

- The report includes plans that locate the trees in conjunction with cadastral layers provided by the GAA as site plans attached as Appendix 2.

4 Method:

4.1. Site inspection methodology;

4.1.1 Site inspections were undertaken by Tree Logic staff over a two week period during May and June, 2013. The trees were inspected from the ground and observations made of the growing environment and surrounding area. The trees were not climbed, no samples of the trees or site soil were taken and no investigation of the root plate below ground was undertaken.

4.1.2 Individually assessed trees and tree group features were attributed with unique identifying numbers. Trees numbers used in this report and appearing in column 1 of the tree assessment tables in Appendix 1 correspond with unique identifying labels provided in the GIS data sets and plans compiled for the site.

4.1.3 Observations were made of the trees to determine age and condition, with measurements taken to establish tree height (measured with a height meter), crown width (paced) and trunk diameter (measured at 1.4m above grade unless otherwise stated). Definitions of arboricultural descriptors can be seen in Appendix 3.

4.1.4 Trees on public road reserves were recorded as “Street tree”.

4.1.5 Photographs of some trees and site conditions were taken for further reference and inclusion in the report.

4.1.6 Spatial data relating to tree locations was recorded measuring tool equipped ruggedised tablet computers using a combination of GIS surveying software (ArcPad), orthorectified site aerial imagery and property boundary cadastre data supplied by the GAA.

4.1.7 Where sufficient identifying characteristics were present trees were identified to species level. Trees were assessed to determine their age class, structure and condition. Tree height was measured using a height meter. Where groups of close spaced trees were assessed, sample heights within the stand were taken and the height of remaining trees estimated against the sample heights. Crown spread was estimated by pacing the crown widths on the widest axis.

4.1.8 Trunk diameter was measured using linear tape measures and diametric tape measures in 5cm increments. The default height for measurement was 1.4m above grade. Where short trunked trees forking at or below 1.4m above grade were assessed, trunk diameter was measured at the narrowest point of the single stem below the fork.

4.2. Field Survey Limitations

4.2.1. The study area comprised 55 separate titles. Not all properties were accessible for the purpose of this survey.

4.2.2. Access was denied to 8 properties (parcels 2, 3, 8, 11, 12, 22, 46, 47).

4.2.3. There were no contact details supplied for eleven properties and despite a number of attempts to gain lawful access to the sites some could not be inspected other than from the property boundary.

4.2.4. Tree records were recorded from the boundaries of property boundaries of parcels 2, 3, 6, 9, 10, 12, 13, 19, 23, 25, 31, 42, 50, 36 & 37 due to restricted access and the assessments of trees/groups are limited to observations from available vantage points external to the site.

4.2.5. Accurate assessment of dimensions, health and structure of these trees must be verified by closer arboricultural inspection prior to enacting any recommendations arising from this report.

4.3. Arboricultural assessment method;

4.3.1. The health and structural characteristics of each tree was assessed and each tree was attributed an 'Arboricultural Rating'. The arboricultural rating correlates the combination of tree condition factors (health, structure & form) with tree amenity value. Amenity relates to the trees biological, functional and aesthetic characteristics within a built environment. The arboricultural rating in combination with other factors can assist the project team and planners in nominating trees suitable for retention. The five arboricultural ratings used by Tree Logic include:

- **Very High:** Tree of very high quality in good condition. Generally a prominent arboricultural feature. Tree is capable of tolerating changes in its environment if managed appropriately.
- **High:** Tree of high quality with generally sound structural condition and good health. Generally is or has the potential to become a prominent landscape feature.

Trees that were considered to have less than High retention value were not required to be surveyed.

Trees that are generally desirable for retention typically display the following attributes:

- Are of a healthy condition that would allow it to tolerate development-associated modifications to its growing environment and,
- Have a structure that was not predisposed to potential failure that could cause damage or injury and,
- Are of an age and/ or size that provide an immediate and ongoing obvious contribution to the landscape.

Conversely trees in poor health, with suspect or deficient structure, or subject to pest or disease infestation that was having a discernible negative impact on tree condition are generally not considered suitable for retention in an urban environment. Trees recognised as environmental weeds and known to be potentially invasive in the locale of the subject site are generally not considered suitable for retention. Small specimens that provide negligible contribution to the landscape, irrespective of condition should not impede reasonable land use.

Full and further tree descriptors are attached as Appendix 3.

4.4. Establishing Tree Protection Zones (TPZ);

4.4.1. To successfully retain suitable trees within or around a development site, consideration must be given to protecting the trunk, crown and roots of each specimen. Tree protection zones (TPZ's) are used to provide adequate space for the preservation of sufficient roots to maintain tree health (particularly important for mature trees) whilst providing a buffer zone between construction activity and the tree trunk and crown.

4.4.2. The method for determining tree protection zones adopted in this report is the Australian Standard for protection of trees on development sites (AS4970-2009). It provides a method for establishing a TPZ area that is based on the trunk diameter measurement measured at 1.4m and multiplied by 12. The trunk of the tree is used as the centre point for the measurement.

4.4.3. TPZ measurements are included in the tree assessment data in Appendix 1.

4.4.4. The method employed in this document for assigning tree protection zones is a guide for planning purposes. Additional guidelines are outlined in Appendix 4 for establishment and maintenance of the tree protection

4.5. Documents reviewed include;

- Planning property reports and Melton City council planning overlays relevant to the sites including:
- Urban Growth Zone (UGZ).
- Land Subject to Inundation Overlay (LSIO)
- Public Acquisition Overlay (PAO)
- Clause 52.17 applies to sites greater than 4,000 m^2 in area.
  Under the clause it is a requirement to '*demonstrate the steps taken to;*
  - *Avoid the removal of vegetation native to Victoria.*
  - *Minimise the removal of native vegetation.*
  - *Appropriately offset the loss of native vegetation if required*.'

4.6. The arboricultural report and data supplied as Excel spreadsheet is provided to support ongoing planning of future development of the region. The project survey is delivered in the following formats to support this.

4.6.1. ESRI Shp files.

4.6.2. MapInfo TAB files.

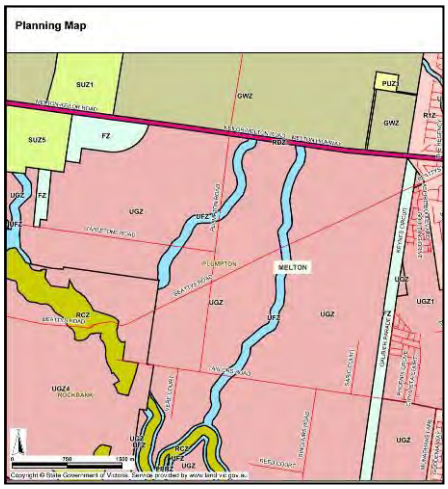
4.6.3. CAD dwg files.

In each format a separate layer has been created to allow the tree features attributed an arboricultural rating of High or Very High to be displayed independently of the wider assessed tree population.

5 Observations

5.1 Site description.

The tree study area was generally flat land on the volcanic plains west of Melbourne which is highly disturbed and has a long history of previous land uses including farming for grazing and crop raising.



An un-named creek line runs in a north south direction towards Kororoit Creek. The creek exists beyond the western edge of the tree study area but a natural drainage line extends across the north west corner of the site, crossing below Plumpton Road and flowing west toward the creek line.

Away from the drainage and creek line the land was predominantly flat and featureless.

In general the properties comprised pasture for grazing and crop raising with trees generally confined to windrow plantings surrounding the paddocks and house lots. Numerous windrows existed around many of the house and property boundaries comprised of countless exotic conifers of relatively small size. Based on observations these trees were considered to be unremarkable features of low significance in the landscape and outside the scope of works.

The existing tree cover was relatively sparse with the entire tree cover estimated to occupy less than 10% of the PSP area.

A number of naturally occurring indigenous River Red Gum (*Eucalyptus camaldulensis*), Yellow Gum (*Eucalyptus leucoxylon*) and Red Box (*Eucalyptus polyanthemos*) trees were found within the drainage line on property parcel 5 (3542) that are potentially significant for arboricultural, amenity and

ecological reasons. There was natural recruitment of indigenous species associated with this pocket of trees. These trees would trigger permit and offset requirement under Clause 52.17.

Apart from these indigenous trees all other assessed trees were planted specimens, predominantly installed for functional purposes as screens, windrows and shelterbelts and occurring along internal and boundary fence lines.

The plantings generally surrounding the house lots comprised close planted groups of exotic conifers too numerous to count and which in most cases were of relatively small size and low arboricultural condition and at spacing which has influenced the growth of the trees by overcrowding, shading or producing asymmetric form. These trees were generally not considered to fit within the scope of the tree study and are not included in the tree assessment out comes. Many of the conifers are susceptible to pest and disease such as cypress canker, drought stress and wind damage and many were displaying symptoms of decline or stress.

Trees in the roadside reserves were also inspected to assist in identifying opportunities for new roads linking to the Melton Highway or internal roads within the precinct.

With the exception of the aforementioned indigenous trees, the overall impression of the site was that vegetation comprised planted trees of assorted species, age and quality.

5.2 Tree population.

Approximately 3,151 trees were observed across the site and collected as 255 tree features comprising 161 individual trees and 94 tree groups comprising approximately 2,990 additional trees. The numerous exotic conifer windrows were not included in the assessment.

5.3 The species and origin of each tree was identified to determine whether any trees were locally indigenous or native to Victoria and is recorded in the tree data as tree origin.

5.4 Twenty one (21) different species were identified during the site inspection. The most prevalent species of individual tree inspected are indicated in Table 2.

Table 2. Most prevalent species	Number of Trees /Groups	Origin
Eucalyptus camaldulensis (River Red Gum)	46 (7 Groups)	Indigenous or planted
Eucalyptus cladocalyx (Sugar Gum)	30 (29 Groups)	Australian native
Eucalyptus spathulata (Swamp Mallet)	19	Australian native
Eucalyptus leucoxylon (Yellow Gum)	13	Indigenous or Victorian native
Eucalyptus cladocalyx 'Nana' (Bushy Sugar Gum)	11 (16 Groups)	Australian native
Eucalyptus occidentalis (Swamp Yate)	8	Australian native
Cupressus macrocarpa (Monterey Cypress)	5	Exotic conifer
Eucalyptus polyanthemos (Red Box)	4	Indigenous
Melaleuca lanceolata (Moonah)	2	Indigenous

5.4.1 The remainder of species comprise introduced utilitarian or ornamental species including fewer than 3 individual specimens.

5.4.2 The origin of the trees is indicated in Table 3.

Table 3: Origin	Total	Tree groups
Indigenous	17	Group 8 (17 trees)
Planted Indigenous	41	6 groups (251 trees)
Victorian Native	15	3 group (83 trees)
Australian Native	75	51 groups (1,520 trees)
Exotic Conifer	10	29 groups (1,077 trees)
Exotic Palm	1	1 group (8 trees)
Exotic Evergreen	2	0
Exotic deciduous	0	2 groups (22 trees)
Total	161	94

5.5 The indigenous trees were considered to be naturally occurring specimens of locally endemic species, River Red Gum, with the possibility to include Yellow Gum, Red Box and Moonah the range of which is known to extend through the western region to varying degrees.

5.5.1 Forty one (41) of the River Red Gum were considered to be planted specimens based on observations of spatial arrangement and similarities in age, size and condition.

5.5.2 The Victorian native trees included planted specimens of Yellow Gum varieties (*Eucalyptus leucoxylon* var.), Spotted Gum (*Corymbia maculata*) and Red Ironbark (*Eucalyptus sideroxylon*).

5.6 Tree health was assessed based on foliage colour, size and density as well as shoot initiation and elongation.

Table 4: Tree health	Total	Groups
Good	40	5
Fair	113	68
Fair - Poor	7	20
Poor	1	1
Total	161	94

5.6.1 The majority of trees (94% of trees and 78% of tree groups) displayed fair or better health considered to be typical of the species growing in the current conditions.

5.6.2 The most profound health deficiencies could be attributed to the previous decade of drought conditions, shading and competition for resources due to close planting and exposure to elements primarily hot and strong winds.

5.7 Tree structure was assessed for defects and deficiencies, likelihood of failures and presence of targets.

Table 5: Tree structure	Total	Groups
Fair	97	41
Fair-poor	45	45
Poor	1	8
Very poor	18	
Total	161	94

5.7.1 66% of the trees and 44% of tree groups were attributed a Fair rating for structure. 29% of trees and 48% of tree groups were attributed a rating of Fair-poor due to minor structural deficiencies or a history of limb failures.

5.7.2 Due to their age, large size and exposed locations, some of the larger indigenous trees had sustained some limb failures resulting in trunk wounds that act as infection courts for decay organisms and fungal brackets.

5.7.3 Wood decay is frequently exploited by insects, mammal and birds that hollow out degraded wood tissue. Large decayed wounds also limit health by interrupting paths of water and nutrient uptake.

5.7.4 Many of the maturing trees, even those attributed a fair arboricultural rating for structure, would benefit from some level of tree crown maintenance or reduction pruning to ensure they can be retained for the long term. Pruning can reduce the potential for further limb shed.

5.8 The stage of life of each tree was recorded.

Table 6: Tree age	Total	Groups
Over-mature	7	6
Maturing	69	28
Semi-mature	85	60
Total	161	94

5.8.1 The longevity of mature specimens of eucalypt species like River Red Gum and Sugar Gum could still span many decades and semi-mature to maturing specimens may grow on in excess of 100 years if left undisturbed.

5.9 In contrast many of the other species of trees may have a comparatively short useful life due to the poor structural characteristics, inferior timber quality, structural characteristics and susceptibility to decay. An estimate of the useful life expectancy is included for each tree.

Table 7: Useful Life Expectancy (ULE)	Trees	Groups
< 5 Yrs	2	2
5_15 Yrs	31	29
15_25 Yrs	58	42
25_50 Yrs	23	13
>50 Yrs	47	8
Total	161	94

5.10 Each of the assessed trees was attributed an Arboricultural Rating. The arboricultural rating correlates the combination of tree condition factors (health, structure and form) with tree amenity value. Amenity relates to the trees biological, functional and aesthetic characteristics within an urban landscape context and its ability to continue to provide these qualities into the medium to long term future. The arboricultural rating in combination with other factors can assist the project team and planners in nominating trees suitable for retention.
It should be noted that the arboricultural rating is different to the conservation/ecological values placed on trees by other professions. Refer to Table 4 for arboricultural rating and tree numbers.

Table 8. Arboricultural Rating	Total	Trees number
Very High	9	42, 43, 44, 46, 47, 50, 51, 52, 54
High	44	1, 2, 3, 7, 8, 10, 11, 12, 13, 14, 15, 17, 18, 19, 22, 23, 25, 26, 28, 29, 30, 31, 32, 33, 34, 35, 36, 38, 41, 45, 48, 49, 53, 55, 100, 101, 127, 128, 133, 134, 135, 136, 140, 154
Moderate	69	4, 9, 16, 20, 21, 24, 27, 37, 39, 58, 59, 60, 61, 63, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 76, 77, 78, 79, 80, 81, 83, 87, 95, 97, 102, 105, 107, 109, 110, 111, 113, 115, 116, 117, 119, 120, 123, 124, 126, 129, 130, 131, 132, 137, 138, 141, 142, 144, 145, 146, 147, 148, 149, 151, 152, 155, 156, 157, 158
Low	39	5, 6, 40, 56, 57, 62, 64, 75, 82, 84, 85, 86, 88, 89, 90, 91, 92, 93, 94, 96, 98, 99, 103, 104, 106, 108, 112, 114, 118, 121, 122, 125, 139, 143, 150, 153, 159, 160, 161
None	0	
Total	161	

Tree Groups Arboricultural rating	Total	Group Numbers
Very High	1	Gp 8 (17 trees)
High	5	Gp 2, Gp 5, Gp 6, Gp 71, Gp 72, (581 trees)
Moderate	30	Gp 4, Gp 7, Gp 9, Gp 12, Gp 13, Gp 14, Gp 15, Gp 16, Gp 17, Gp 19, Gp 21, Gp 22, Gp 23, Gp 24, Gp 25, Gp 36, Gp 52, Gp 55, Gp 64, Gp 67, Gp 76, Gp 77, Gp 78, Gp 79, Gp 80, Gp 81, Gp 82, Gp 83, Gp 84, Gp 87 (900 trees)
Low	57	Gp 1, Gp 3, Gp 10, Gp 11, Gp 18, Gp 20, Gp 26, Gp 27, Gp 28, Gp 29, Gp 30, Gp 31, Gp 32, Gp 33, Gp 34, Gp 35, Gp 37, Gp 38, Gp 39, Gp 40, Gp 41, Gp 42, Gp 43, Gp 44, Gp 45, Gp 46, Gp 47, Gp 48, Gp 49, Gp 50, Gp 53, Gp 54, Gp 56, Gp 57, Gp 58, Gp 59, Gp 60, Gp 61, Gp 62, Gp 63, Gp 65, Gp 66, Gp 68, Gp 69, Gp 70, Gp 73, Gp 74, Gp 75, Gp 85, Gp 86, Gp 88, Gp 89, Gp 90, Gp 91, Gp 92, Gp 93, Gp 94 (1,466 trees)
None	1	Gp 51 (26 trees)
Grand Total	94	94 (2990 trees)

Very High, High and Moderate rated trees are suitable and desirable to retain but may require arboricultural management and input now and into the future.

Low rated trees are not worthy of being a constraint on reasonable site redevelopment. Not all Low rated trees should be disregarded as many could be retained as an established tree resource with appropriate management in situations where they do not present a risk or an impediment to reasonable design intent.

Trees rated None displayed health or structural defects that are beyond arboricultural amendment or are virulent weed species that are considered unsuitable to retain. Definitions of arboricultural ratings can be seen in Appendix 3.

6 Discussion:

6.1 Indigenous Trees 1, 2, 41, 42, 43, 44, 45, 46, 47, 48, 50, 51, 52, 133, 134, 135 and 136 as well as Tree Groups 8, 71 and 72 were growing within the drainage line to the west of Plumpton Road in Parcel 5 (3542). They displayed fair health and structure and were attributed a High arboricultural rating with the potential to be medium to long term features of the landscape. The species is prevalent in other sections along the drainage line and performing well. These trees should be retained and could be enhanced with further planting of the same species and intergraded with additional indigenous Yellow Gum and Red Box.

6.2 Planted River Red Gum Trees 7, 8, 10, 11, 12, 13, 14, 15, 17, 18, 19, 22, 23, 25, 26, 28, 29, 30, 31, 32 were growing adjacent to a large farm shed on parcel 44 (19564) and were attributed an arboricultural rating of High due to their good condition and potential for being a long term component in the landscape. Interspersed with these trees there were additional specimens rated Moderate being slightly smaller.

6.3 All of the River Red Gum trees within the study area could be considered for retention within public open space or larger private open space accompanied by recruitment of new trees and new plantings of indigenous shrubs and grasses.

6.3.1 Several groups of trees within this parcel were also attributed a high arboricultural rating. They were tree groups 2, 5 and 6 and comprised linear rows of Bushy Sugar Gums.

- Group 2 was a semi-mature group of 58 trees that extended around the house lot.
- Groups 5 was linear group of trees 225 trees on the eastern boundary
- Group 6 was a linear group of 190 trees along the western boundary flanking Plumpton Road. As individual trees they are of moderate value but as an established group that extend some 600 metres along a through road they provide a tree feature of high landscape value with a potentially long useful life expectancy.

6.4 Three high rated trees, being River Red Gum trees 127, 128 and Sugar Gum tree 154, were identified from the boundary of Parcel 2 (3540).

6.5 A Yellow Gum, Tree 140, attributed a high arboricultural rating was identified in Parcel 50 (138836).

6.6 Six street trees, being trees 3, 33, 34, 35, 36, 38 were attributed a High arboricultural rating located on Melton Hwy road reserve outside Parcel 1 (11986) and Parcel 18 (11989). They included specimens of Yellow Gum, Spotted Gum (*Corymbia maculata*), Swamp Mallet and Swamp Yate.

6.7 Two high rated trees, being Yellow Gum tree 100 and Deodar Cedar tree 101 were identified from the boundary of Parcel 25 (11995).

6.8 *Eucalyptus camaldulensis* species (River Red Gum) is indigenous to the area adjacent to the Kororoit Creek and its various tributaries. It is generally desirable to retain trees of this kind wherever possible and State legislation (Victoria's Native Vegetation Management – A Framework for Action) also outlines the importance of indigenous/remnant vegetation and specific guidelines are provided for preservation and management of such vegetation.
The importance of preserving River Red Gums along waterways and rivers in other parts of the City of Melton is also highlighted in the Environmental Significant Overlay-Schedule Two.

6.8.1 The retention and management of River Red Gums can create significant issues in urban settings, which are best addressed by assigning generous tree protection distances. It is well known and well documented that maturing River Red Gums can shed large limbs without warning, and without signs of defect. All tree species have the potential to shed branches or limbs, but maturing River Red Gums have a much greater propensity for this than most common urban trees. This characteristic is probably more evident with River Red Gums

because of their prominence in Melbourne's developing outer suburbs, their large size and their ultimate age.

6.8.2 It could be argued that the likelihood of further branch failure is a matter of when rather than if for many mature River Red Gums. In contrast to this antisocial tendency, the positive characteristics of the species would include its variable form and its ability to decline and recover from drought and flood. These abilities highlight the resilience of the species and reflect the essence of its rugged and desirable landscape character.

6.8.3 A further challenge with this species is that the most ecologically significant trees; those trees containing many hollows for habitat (most hollows forming from major limb failures), are potentially more hazardous, when we consider the trees might be retained in an urban setting.

6.8.4 The establishment of tree protection zones for River Red Gums must therefore meet the needs of tree protection and also the obligation of protecting people and property from any individual tree. On this basis, the tree protection zones should be more extensive than the normal requirements for other tree species. Whilst the nominated TPZ area is likely to be sufficient to sustain tree health, it is recommended that a TPZ area equivalent to the edge of the canopy dripline plus one metre is implemented to provide greater protection to the mature River Red Gums as well as excluding placement of high value targets beneath the tree crown where there is potential for damage from limb shed. Landscape treatments that effectively excludes targets reduces the level of exposure to risk as well as the perception of risk to persons and property which could lead to trees being removed prematurely.

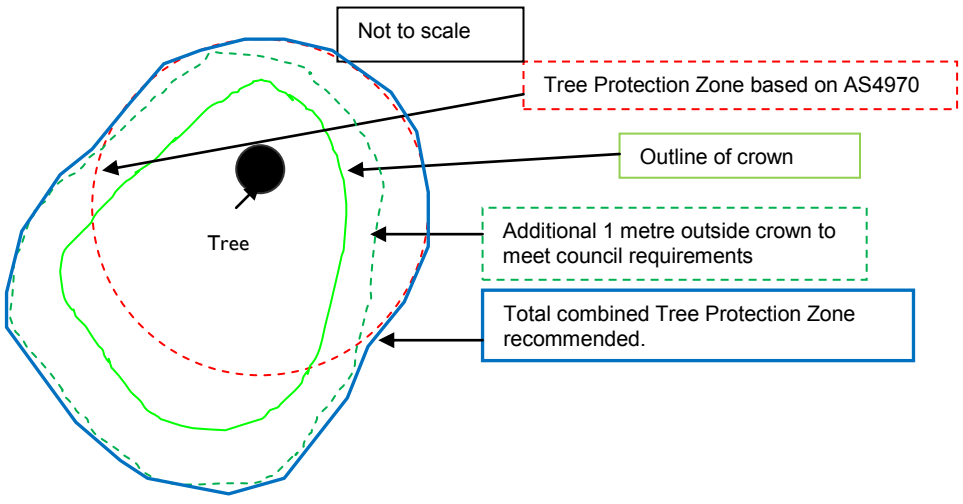
6.8.5 The TPZ distances generated by using the AS4970 trunk ratio formula method are provided for all trees, in Appendix 1.

However, these distances may need to be modified to account for asymmetric tree crowns. Where necessary the protection distance should be extended to one metre beyond the crown, if and when this is not provided for by the tree protection method in AS4970.

This may result in a tree protection zone that is oddly shaped.

The following example is provided in Diagram 1.

No	Common Name (*Species*)	DBH (cm)	Height (m)	Width (m) (N,S,E,W)
#	River Red Gum	147	9	15 (5,6,5,10)



6.9 Principles of water sensitive urban design should be adopted when designing around these large old River Red Gum trees with landscape treatments that reduce the opportunity for targets to exist beneath the tree crown.

6.10 Not all 'Moderate' rated tree features should be dismissed as candidates poorly suited for retention, though overall, the retention of such trees should not compromise design intent. In certain landscape settings, smaller specimens in otherwise reasonable condition have the potential to offer an established tree resource, even if only as an interim measure.

6.11 Low rated trees with health or structural deficiencies are generally not desirable candidates for retention.

6.12 Trees attributed an arboricultural value of None were the least suited to retention on arboricultural grounds, having significant health and / or structural defects. Such trees are unlikely to provide a useful tree resource insofar as providing established canopy in future development even where risk levels associated with their retention can be managed to an acceptable level.

6.13 Windrows with health and structural defects should generally be removed.

6.13.1 The older Sugar Gum windrows such as Group 1, Group 18, Group 30, Group 31, Group 32, Group 40, Group 89, Group 92, Group 93, comprised trees that had been planted at close spacing and had been variously lopped and coppiced for practical agricultural purposes such as fuel and fence posts harvesting. The trees have an ability to rapidly grow back and produce more fuel or posts but the tree is forever damaged and has intrinsically poor structure as a result. Such trees are unsuitable to consider for retention in any future urban setting due to the inherent structural defects.

6.13.2 As a response to the close grown planting and competition for available light resources, many of the trees have developed bifurcations of the trunk with included bark. These included bark forks have the potential to split as the trees mature or if they become exposed to new wind forces.

6.13.3 Fragmentation of groups of close grown trees can expose individual trees with structural deficiencies to altered environmental conditions and wind loading resulting in increased failure rates among retained trees. Therefore, fragmentation should only occur where retained trees provide sufficient ongoing mutual protection to maintain stand integrity. If the group is overly fragmented it is unlikely the trees will acclimatise to the increased wind loading of previously protected limbs and limb failure and premature decline will result.

6.14 The assessment included a useful life expectancy component. The useful life expectancy estimation provides an indicative range of potential functional longevity before anticipated health, structural or age related attrition renders trees inappropriate in the context of an urban setting. Given the scale of the development and potential settings for trees, the useful life expectancy rating has obvious limitations. In a natural or semi-natural situation and in the absence of people or property, the life expectancy of a tree ends when it collapses and completely decomposes. In an urban setting the useful life expectancy of an individual tree or group of trees is measured by its ability to provide ongoing amenity and is therefore highly dependent on context. Another obvious challenge with assigning useful life expectancies is that it presumes some consistency of environmental conditions. Development can irrevocably alters site conditions that have a deleterious effect on tree condition and natural lifespan. Therefore attributing a meaningful useful life expectancy in the absence of design plans that contextualizes the trees setting and environmental changes relies on many assumptions and may be misleading. The useful life expectancy attributed in this assessment, should not therefore be interpreted in isolation from other assessment criteria.

6.15 All trees nominated for retention will require periodic inspection and appropriate arboricultural maintenance and pruning. All pruning must be undertaken by suitably trained and experienced arborists and comply with Australian Standard 4373-2007 - Pruning of Amenity trees.

6.16 No form of excavation for footings or trenching for installation of underground services is permitted within the nominated Tree Protection Zone (TPZ) areas due the risk of severing roots vital to the stability and continued health of the trees. Smothering of tree roots by raising soil levels by more than 200mm within the TPZ area can also cause trees to decline.

6.17 In the absence of site design plans, it is not appropriate to speculate on which trees are most appropriate for retention, beyond the general guide provided by the arboricultural ratings attributed to each tree feature. Retention suitability correlates with the future landscape setting of retained trees, which will vary given the scale of the intended development. The following recommendations are provided for consideration in the design process.

6.17.1 On the basis of tree quality and potential amenity, preference should be given to retaining trees of Very High, High and Moderate arboricultural rating in built areas, or areas of increased target potential.

6.17.2 Trees of Low arboricultural value should not compromise reasonable design intent.

6.17.3 Small trees of Moderate or Low arboricultural value that are otherwise in reasonable condition may offer a potential established tree resource, even if only as an interim measure.

6.17.4 Low rated trees with health or structural deficiencies could generally be considered for removal.

6.17.5 Principles of risk management should be adopted to appropriately locate large maturing River Red Gum trees that are to be retained in any future development.

6.17.6 Avoid fragmenting retained windrows. Fragmentation should only be considered when the fragments retain sufficient trees to largely negate the change in the trees' environment that may otherwise result in deterioration of retained specimens.

6.17.7 Position retained windrows in large areas of open space, where the target potential is low and the trees can continue to grow in relatively undisturbed conditions.

6.17.8 Windrows of Low arboricultural value with health and structural defects should be removed.

6.18 Under Native Vegetation Framework referred to in section 52.17 the Victorian Planning Provisions, appropriate steps must be demonstrated to avoid, minimise or offset the removal of naturally occurring vegetation that is native to Victoria.

6.18.1 Exemptions apply to trees planted for ornamental or windbreak purposes or as street trees.

6.18.2 This exemption does not apply if public funding was provided to assist in planting or managing the native vegetation. Apart from road reserve trees, including trees 3, 4 and 5, it is unlikely that any of the trees inspected within private property would have been planted with public funds or would trigger permit requirement.

7 Photographic catalogue:

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1 Shows the relative size, condition and location of Very High rated River Red Gum trees associated with the natural drainage line passing through Parcel 5 (3542) on the west side of Plumpton Road.

2 Shows the relative size, condition and location of High rated indigenous River Red Gum trees in Group 8 associated with the natural drainage line passing through Parcel 5 (3542) on the west side of Plumpton Road.

3 Shows the relative location, size and condition of River Red Gum trees planted around the sheds at Parcel no 44 (19564).

4 Shows the relative location, size and condition of Bushy Sugar Gum trees that comprise Group 6 in Parcel no 44 (19564) on the east side of Plumpton Road.

8 Conclusion and Recommendations:

8.1 Tree Logic, acting on behalf of The Growth Areas Authority, surveyed and assessed trees within the Plumpton Precinct identified as PSP1078. The survey was commissioned primarily for the purpose of providing information on the arboricultural merit of larger trees onsite to inform the design process.

8.2 The tree population was generally unremarkable both across the site and within individual properties.

8.3 Two hundred and fifty five (255) tree features were inspected within the study area including one hundred and sixty one (161) individual trees and ninety four (94) tree group features comprising approximately 2,990 additional trees.

8.4 Each of the assessed tree features was attributed an 'Arboricultural Rating'. The arboricultural rating correlates the combination of tree condition factors (health, structure & form) with tree amenity value and reflects the retention value of the tree(s). Refer to Table 1.

8.4.1 9 trees and 1 group of approximately 17 trees were attributed an arboricultural rating of Very High.

8.4.2 44 trees and 5 groups were attributed an arboricultural rating of High.

8.4.3 69 trees and 30 groups were attributed an arboricultural rating of Moderate.

8.4.4 The remainder were attributed arboricultural rating of Low or None and do not meet the scope of the project brief nor are they considered worthy of being a constraint on any reasonable future development.

8.5 Indigenous trees that appeared to be naturally occurring were identified in open pasture within the property parcel number 5 (3542) on the west side of Plumpton Road. These naturally occurring indigenous trees were associated with a natural drainage line that extends across the north west quadrant of the tree study areas.

8.5.1 The trees provide visual, amenity, hydrological and ecological benefits to the site and are highly desirable to retain.

8.6 All other trees were specimens that had been planted for revegetation, ornamental or functional purposes such as wind breaks and screens. Tree protection zones that comply with AS4970-2009 must be applied.

8.7 In the absence of site design plans, it is not appropriate to speculate on which trees are most appropriate for retention, beyond the general guide provided by the arboricultural ratings attributed to each feature. Retention suitability correlates with the future landscape setting around retained trees, which will vary given the scale of the intended development. Therefore, on the basis of tree quality and potential amenity, preference should be given to retaining trees of Very High or High arboricultural rating that have relatively long lifespan in built areas, or areas of increased target potential.

8.8 Areas of public open space are best suited for the retention of High and Very high rated quality trees, but also provides an opportunity to retain trees of Moderate or Low arboricultural quality either as interim canopy until such time as new landscape is established or as longer term landscape elements in areas where risk associated with the retention of such trees is acceptable.

8.9 Dimensions of tree protection zones for all trees are included in the tree assessment table attached as Appendix 1. Tree protection zone guidelines are attached in Appendix 4.

8.10 While all trees can shed limbs River Red Gum trees have a well documented propensity for limb shedding. It is recommended that when retaining such trees, a larger than normal tree protection zone is applied to protect the tree but also to exclude prolonged occupation of the area beneath the canopy to reduce the risk of personal injury or property damage were limbs to fall. The recommended tree protection zone for maturing River Red Gum trees includes protecting the canopy and excluding development from the canopy width plus 1 metre on all sides. Design modification must therefore allow for the protection of the TPZ as well as the tree canopy in the case of the indigenous trees.

I am available to answer any questions arising from this report.

No part of this report is to be reproduced unless in full.

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Appendix 1A: Individual Tree assessment details: PSP 1078 - Plumpton

Refer to following 6 pages.

DBH = Diameter at Breast Height (measured in centimetres at 1.3m above ground unless otherwise stated).

H x W = Height x Width of crown (measured in metres).

TPZ = Tree Protection Zone (metre radius). Radius distances measured in metres from the centre of the trunk.
ULE = Useful Life Expectancy (Estimated)

For tree location and numbering refer to plans at Appendix 2. See Appendix 3 for tree descriptors.

Tree_No	Latitude	Longitude	Species	Common_Name	Origin	DBH_cm_	DBH Height	Tree Height (m)	Crown Width (m)	Life Stage	Health	Structure	Retention_ Value	ULE	Comments	TPZ	Site Accessed	PSP 78 Ref Number
1	-37.697229	144.6948	Eucalyptus polyanthemos	Red Box	Indigenous	58,53		15	17	Maturing	Good	Fair	High	25_50 Yrs	Naturally occurring. Acute Branch union. Borer exit holes.	9.4	Yes	5
2	-37.69724	144.69495	Eucalyptus polyanthemos	Red Box	Indigenous	34		13	11	Maturing	Fair	Fair	High	>50 Yrs	Naturally occurring.	4.1	Yes	5
3	-37.686606	144.69102	Eucalyptus leucoxylon	Yellow Gum	Victorian Native	65		13	14	Maturing	Good	Fair	High	15_25 Yrs		7.8	Street Tree	1
4	-37.717745	144.71431	Eucalyptus cladocalyx	Sugar Gum	Australian Native	58		19	18	Maturing	Good	Fair	Moderate	25_50 Yrs		7	No	50
5	-37.706906	144.68855	Eucalyptus cladocalyx	Sugar Gum	Australian Native	100		15	14	Over Mature	Fair	Poor	Low	5_15 Yrs	Lopped.	12	No	9
6	-37.70562	144.69304	Eucalyptus cladocalyx	Sugar Gum	Australian Native	75		14	17	Over Mature	Fair	Poor	Low	5_15 Yrs	Lopped. Trunk decay.	9	No	10
7	-37.71531	144.69451	Eucalyptus camaldulensis	River Red Gum	Planted Indigenous	54		11	10	Semi-mature	Good	Fair	High	>50 Yrs		6.5	Yes	44
8	-37.715337	144.69465	Eucalyptus camaldulensis	River Red Gum	Planted Indigenous	37		9	9	Semi-mature	Good	Fair	High	>50 Yrs		4.4	Yes	44
9	-37.715352	144.69475	Eucalyptus camaldulensis	River Red Gum	Planted Indigenous	23		7	6	Semi-mature	Fair	Fair	Moderate	>50 Yrs		2.8	Yes	44
10	-37.715365	144.69483	Eucalyptus camaldulensis	River Red Gum	Planted Indigenous	23		7	6	Semi-mature	Good	Fair	High	>50 Yrs		2.8	Yes	44
11	-37.715317	144.69484	Eucalyptus camaldulensis	River Red Gum	Planted Indigenous	22		7	6	Semi-mature	Good	Fair	High	>50 Yrs		2.6	Yes	44
12	-37.715274	144.69485	Eucalyptus camaldulensis	River Red Gum	Planted Indigenous	23		6	7	Semi-mature	Good	Fair	High	>50 Yrs		2.8	Yes	44
13	-37.71522	144.69486	Eucalyptus camaldulensis	River Red Gum	Planted Indigenous	38	@0.75m	7	7	Semi-mature	Good	Fair	High	>50 Yrs		4.6	Yes	44
14	-37.715174	144.69487	Eucalyptus camaldulensis	River Red Gum	Planted Indigenous	28		8	7	Semi-mature	Good	Fair	High	>50 Yrs		3.4	Yes	44
15	-37.715133	144.69488	Eucalyptus camaldulensis	River Red Gum	Planted Indigenous	26		7	7	Semi-mature	Fair	Fair	High	>50 Yrs		3.1	Yes	44
16	-37.715089	144.69489	Eucalyptus camaldulensis	River Red Gum	Planted Indigenous	23		5	6	Semi-mature	Fair	Fair	Moderate	>50 Yrs		2.8	Yes	44
17	-37.715021	144.69481	Eucalyptus camaldulensis	River Red Gum	Planted Indigenous	29		7	8	Semi-mature	Good	Fair	High	>50 Yrs		3.5	Yes	44
18	-37.715012	144.69476	Eucalyptus camaldulensis	River Red Gum	Planted Indigenous	23		9	7	Semi-mature	Good	Fair	High	>50 Yrs		2.8	Yes	44
19	-37.715009	144.6947	Eucalyptus camaldulensis	River Red Gum	Planted Indigenous	21		8	6	Semi-mature	Good	Fair	High	>50 Yrs		2.5	Yes	44
20	-37.715003	144.69467	Eucalyptus camaldulensis	River Red Gum	Planted Indigenous	14		4	4	Semi-mature	Fair	Fair	Moderate	>50 Yrs		2	Yes	44
21	-37.714999	144.69464	Eucalyptus camaldulensis	River Red Gum	Planted Indigenous	20		5	6	Semi-mature	Fair	Fair	Moderate	>50 Yrs		2.4	Yes	44
22	-37.71499	144.6946	Eucalyptus camaldulensis	River Red Gum	Planted Indigenous	27		9	7	Semi-mature	Fair	Fair	High	>50 Yrs		3.2	Yes	44
23	-37.714977	144.69454	Eucalyptus camaldulensis	River Red Gum	Planted Indigenous	37		9	9	Semi-mature	Good	Fair	High	>50 Yrs		4.4	Yes	44
24	-37.71497	144.69449	Eucalyptus camaldulensis	River Red Gum	Planted Indigenous	16		7	6	Semi-mature	Fair	Fair	Moderate	>50 Yrs		2	Yes	44
25	-37.714968	144.69444	Eucalyptus camaldulensis	River Red Gum	Planted Indigenous	29		12	7	Semi-mature	Good	Fair	High	>50 Yrs		3.5	Yes	44
26	-37.715008	144.69442	Eucalyptus camaldulensis	River Red Gum	Planted Indigenous	34		11	10	Semi-mature	Good	Fair	High	>50 Yrs		4.1	Yes	44
27	-37.714964	144.69441	Eucalyptus camaldulensis	River Red Gum	Planted Indigenous	15		6	4	Semi-mature	Fair	Fair	Moderate	>50 Yrs		2	Yes	44
28	-37.714957	144.69437	Eucalyptus camaldulensis	River Red Gum	Planted Indigenous	39		14	8	Semi-mature	Good	Fair	High	>50 Yrs		4.7	Yes	44

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Tree Logic Pty. Ltd.

Tree_No	Latitude	Longitude	Species	Common_Name	Origin	DBH_cm_	DBH Height	Tree Height (m)	Crown Width (m)	Life Stage	Health	Structure	Retention_ Value	ULE	Comments	TPZ	Site Accessed	PSP 78 Ref Number
29	-37.715029	144.69429	Eucalyptus camaldulensis	River Red Gum	Planted Indigenous	20		6	5	Semi-mature	Fair	Fair	High	>50 Yrs		2.4	Yes	44
30	-37.715072	144.69426	Eucalyptus camaldulensis	River Red Gum	Planted Indigenous	21		5	5	Semi-mature	Fair	Fair	High	>50 Yrs		2.5	Yes	44
31	-37.715117	144.69425	Eucalyptus camaldulensis	River Red Gum	Planted Indigenous	18		7	6	Semi-mature	Good	Fair	High	>50 Yrs		2.2	Yes	44
32	-37.716308	144.69349	Eucalyptus camaldulensis	River Red Gum	Planted Indigenous	42		8	8	Semi-mature	Good	Fair	High	>50 Yrs		5	Yes	44
33	-37.688859	144.71018	Eucalyptus spathulata	Swamp Mallet	Australian Native	50		14	18	Maturing	Good	Fair - Poor	High	15_25 Yrs	Over-extended Limbs.	6	Street Tree	18
34	-37.688827	144.71006	Eucalyptus occidentalis	Swamp Yate	Australian Native	90		20	21	Maturing	Fair	Fair	High	15_25 Yrs	Euc occidentalis	10.8	Street Tree	18
35	-37.688786	144.70964	Corymbia maculata	Spotted Gum	Victorian Native	41		10	9	Semi-mature	Good	Fair	High	>50 Yrs		4.9	Street Tree	18
36	-37.688779	144.7093	Eucalyptus spathulata	Swamp Mallet	Australian Native	70		15	20	Maturing	Good	Fair	High	15_25 Yrs	Over-extended Limbs.	8.4	Street Tree	18
37	-37.688757	144.70908	Eucalyptus spathulata	Swamp Mallet	Australian Native	80	@0.5m	12	15	Maturing	Fair	Fair	Moderate	15_25 Yrs		9.6	Yes	18
38	-37.688741	144.70889	Eucalyptus spathulata	Swamp Mallet	Australian Native	86		15	20	Maturing	Fair	Fair	High	15_25 Yrs		10.3	Street Tree	18
39	-37.68871	144.70858	Eucalyptus spathulata	Swamp Mallet	Australian Native	100	@1.0m	15	16	Maturing	Fair	Fair - Poor	Moderate	5_15 Yrs		12	street Tree	18
40	-37.688684	144.70875	Eucalyptus occidentalis	Swamp Yate	Australian Native	60		17	18	Over Mature	Fair - Poor	Fair - Poor	Low	5_15 Yrs	Euc occidentalis	7.2	Street Tree	18
41	-37.697273	144.69488	Eucalyptus polyanthemos	Red Box	Indigenous	29		9	7	Semi-mature	Fair	Fair	High	25_50 Yrs	Naturally occurring. Partly Suppressed. Crown Bias-Sth	3.5	Yes	5
42	-37.697359	144.69541	Eucalyptus camaldulensis	River Red Gum	Indigenous	44		9	10	Maturing	Good	Good	Very High	>50 Yrs	Naturally occurring.	5.3	Yes	5
43	-37.697377	144.69537	Eucalyptus camaldulensis	River Red Gum	Indigenous	85		14	15	Maturing	Good	Fair	Very High	>50 Yrs	Naturally occurring.	10.2	Yes	5
44	-37.697367	144.69533	Eucalyptus camaldulensis	River Red Gum	Indigenous	55		15	19	Maturing	Good	Fair	Very High	>50 Yrs	Naturally occurring.	6.6	Yes	5
45	-37.697396	144.6953	Melaleuca lanceolata	Moonah	Indigenous	66	@0.1m	4	11	Over Mature	Good	Fair	High	5_15 Yrs	Naturally occurring. Subsiding limbs.	7.9	Yes	5
46	-37.697381	144.69526	Eucalyptus camaldulensis	River Red Gum	Indigenous	50		15	15	Maturing	Fair	Fair	Very High	>50 Yrs	Naturally occurring.	6	Yes	5
47	-37.697383	144.69522	Eucalyptus camaldulensis	River Red Gum	Indigenous	35,35		15	19	Maturing	Good	Fair	Very High	>50 Yrs	Naturally occurring.	5.9	Yes	5
48	-37.6974	144.69518	Melaleuca lanceolata	Moonah	Indigenous	70	@0.1m	5	12	Over Mature	Good	Fair	High	15_25 Yrs	Naturally occurring. Subsiding limbs.	8.4	Yes	5
49	-37.697591	144.69439	Eucalyptus cladocalyx	Sugar Gum	Australian Native	64		18	15	Maturing	Fair	Fair	High	25_50 Yrs		7.7	Yes	5
50	-37.697584	144.6945	Eucalyptus polyanthemos	Red Box	Indigenous	33		15	9	Semi-mature	Good	Fair	Very High	25_50 Yrs	Naturally occurring.	4	Yes	5
51	-37.697615	144.69454	Eucalyptus leucoxylon	Yellow Gum	Indigenous	90	@1.0m	18	10	Maturing	Good	Fair	Very High	25_50 Yrs	Naturally occurring. Over-extended Limbs.	10.8	Yes	5
52	-37.697577	144.69457	Eucalyptus camaldulensis	River Red Gum	Indigenous	54	@0.5m	7	11	Semi-mature	Good	Fair	Very High	>50 Yrs	Naturally occurring.	6.5	Yes	5
53	-37.698151	144.69365	Eucalyptus camaldulensis	River Red Gum	Planted Indigenous	35		13	10	Semi-mature	Good	Fair	High	>50 Yrs		4.2	Yes	5
54	-37.697986	144.69194	Eucalyptus camaldulensis	River Red Gum	Planted Indigenous	48		11	14	Semi-mature	Good	Fair	Very High	>50 Yrs		5.8	Yes	5
55	-37.698201	144.69161	Eucalyptus camaldulensis	River Red Gum	Planted Indigenous	34		10	10	Semi-mature	Fair	Fair	High	>50 Yrs		4.1	Yes	5
56	-37.69749	144.69089	Eucalyptus cladocalyx	Sugar Gum	Australian Native	90	@0.75m	17	19	Maturing	Fair - Poor	Fair - Poor	Low	15_25 Yrs	Basal Wound.	10.8	Yes	5

Tree_No	Latitude	Longitude	Species	Common_Name	Origin	DBH_cm_	DBH Height	Tree Height (m)	Crown Width (m)	Life Stage	Health	Structure	Retention_ Value	ULE	Comments	TPZ	Site Accessed	PSP 78 Ref Number
57	-37.697061	144.719	Eucalyptus spathulata	Swamp Mallet	Australian Native	46,36		14	20	Over Mature	Good	Poor	Low	5_15 Yrs	Active Split.	7	Yes	27
58	-37.697117	144.71904	Eucalyptus spathulata	Swamp Mallet	Australian Native	40	@1.0m	12	13	Maturing	Good	Fair	Moderate	15_25 Yrs	Partly Suppressed. Crown Bias-W.	4.8	Yes	27
59	-37.697206	144.71954	Eucalyptus spathulata	Swamp Mallet	Australian Native	50	@0.5m	11	15	Maturing	Good	Fair - Poor	Moderate	15_25 Yrs	Subsiding limbs.	6	Yes	27
60	-37.697246	144.71979	Eucalyptus camaldulensis	River Red Gum	Planted Indigenous	20		8	4	Semi-mature	Good	Fair	Moderate	>50 Yrs		2.4	Yes	27
61	-37.697386	144.71988	Eucalyptus camaldulensis	River Red Gum	Planted Indigenous	32		12	5	Semi-mature	Good	Fair - Poor	Moderate	25_50 Yrs	Included Bark Fork.	3.8	Yes	27
62	-37.697655	144.71893	Eucalyptus spathulata	Swamp Mallet	Australian Native	27,22,22		10	16	Maturing	Fair	Poor	Low	5_15 Yrs	Basal Wound.	4.9	Yes	27
63	-37.697619	144.71897	Eucalyptus spathulata	Swamp Mallet	Australian Native	30		11	12	Semi-mature	Good	Fair	Moderate	15_25 Yrs		3.6	Yes	27
64	-37.691721	144.69672	Eucalyptus cladocalyx 'Nana'	Bushy Sugar Gum	Australian Native	20,18		9	10	Semi-mature	Fair	Fair - Poor	Low	5_15 Yrs		3.2	No	13
65	-37.691675	144.69698	Eucalyptus leucoxylon	Yellow Gum	Victorian Native	24		9	8	Semi-mature	Fair	Fair - Poor	Moderate	15_25 Yrs		2.9	No	13
66	-37.691987	144.69832	Eucalyptus ?camaldulensis	River Red Gum	Planted Indigenous	30	@0.5m	10	7	Semi-mature	Fair	Fair - Poor	Moderate	15_25 Yrs		3.6	No	13
67	-37.691952	144.6977	Eucalyptus ?camaldulensis	River Red Gum	Planted Indigenous	15,20,18		10	9	Semi-mature	Fair	Fair - Poor	Moderate	15_25 Yrs		3.7	No	13
68	-37.69209	144.69737	Eucalyptus cladocalyx	Sugar Gum	Australian Native	45	@1.0m	14	13	Semi-mature	Fair	Fair - Poor	Moderate	15_25 Yrs		5.4	No	13
69	-37.692254	144.69749	Eucalyptus cladocalyx	Sugar Gum	Australian Native	35	@1.0m	14	10	Semi-mature	Fair	Fair - Poor	Moderate	15_25 Yrs		4.2	No	13
70	-37.692232	144.69707	Eucalyptus cladocalyx	Sugar Gum	Australian Native	25,30		15	14	Semi-mature	Fair	Fair - Poor	Moderate	25_50 Yrs	Co dominant stems	4.7	No	13
71	-37.692692	144.69866	Eucalyptus ?camaldulensis	River Red Gum	Planted Indigenous	18,15,18		10	8	Semi-mature	Fair	Fair - Poor	Moderate	15_25 Yrs		3.5	No	13
72	-37.693158	144.7003	Eucalyptus cladocalyx	Sugar Gum	Australian Native	60		16	16	Semi-mature	Fair	Fair - Poor	Moderate	15_25 Yrs		7.2	No	13
73	-37.697128	144.70305	Eucalyptus cladocalyx	Sugar Gum	Australian Native	50		16	16	Semi-mature	Fair	Fair - Poor	Moderate	15_25 Yrs	Deadwood.	6	No	12
74	-37.695778	144.70159	Eucalyptus cladocalyx	Sugar Gum	Australian Native	55		16	17	Semi-mature	Fair	Fair - Poor	Moderate	15_25 Yrs	Over-extended Limbs.	6.6	No	12
75	-37.695385	144.70213	Eucalyptus cladocalyx	Sugar Gum	Australian Native	60		15	15	Semi-mature	Fair	Fair - Poor	Low	5_15 Yrs	Over-extended Limbs. Deadwood	7.2	No	12
76	-37.693907	144.69996	Eucalyptus cladocalyx	Sugar Gum	Australian Native	45		19	15	Semi-mature	Fair	Fair - Poor	Moderate	15_25 Yrs		5.4	No	13
77	-37.693859	144.6991	Eucalyptus camaldulensis	River Red Gum	Planted Indigenous	25,25		8	9	Semi-mature	Fair	Fair	Moderate	25_50 Yrs		4.2	No	13
78	-37.712559	144.69148	Pinus sp.	Pine	Exotic Conifer	110	@0.1m	15	18	Over Mature	Good	Fair - Poor	Moderate	5_15 Yrs	Over-extended Limbs.	13.2	No	42
79	-37.700839	144.69464	Eucalyptus camaldulensis	River Red Gum	Planted Indigenous	39		17	8	Semi-mature	Fair	Fair - Poor	Moderate	15_25 Yrs	Acute Branch union.	4.7	No	6
80	-37.703315	144.69941	Eucalyptus cladocalyx	Sugar Gum	Australian Native	29	@1.0m	9	7	Semi-mature	Fair	Fair	Moderate	25_50 Yrs	Past Power line clearance. On road reserve.	3.5	Street Tree	11
81	-37.703363	144.6994	Eucalyptus cladocalyx 'Nana'	Bushy Sugar Gum	Australian Native	17		5	5	Semi-mature	Fair	Fair	Moderate	15_25 Yrs	Under power lines, on road reserve.	2	Street Tree	11
82	-37.70329	144.6995	Eucalyptus cladocalyx	Sugar Gum	Australian Native	22		9	7	Semi-mature	Fair	Fair - Poor	Low	5_15 Yrs	On road reserve	2.6	Street Tree	11
83	-37.703216	144.69971	Eucalyptus cladocalyx 'Nana'	Bushy Sugar Gum	Australian Native	25	@1.0m	6	8	Semi-mature	Fair	Fair	Moderate	15_25 Yrs	Past branch failure.	3	Street Tree	11
84	-37.700902	144.70567	Eucalyptus cladocalyx	Sugar Gum	Australian Native	45		17	13	Maturing	Fair	Fair - Poor	Low	15_25 Yrs	Group of 3 trees.	5.4	Street Tree	12

Tree_No	Latitude	Longitude	Species	Common_Name	Origin	DBH_cm_	DBH Height	Tree Height (m)	Crown Width (m)	Life Stage	Health	Structure	Retention_ Value	ULE	Comments	TPZ	Site Accessed	PSP 78 Ref Number
85	-37.700858	144.70581	Eucalyptus cladocalyx	Sugar Gum	Australian Native	60		16	14	Maturing	Fair	Poor	Low	5_15 Yrs	Trunk Decay.	7.2	Street Tree	12
86	-37.700671	144.70597	Eucalyptus cladocalyx	Sugar Gum	Australian Native	110	@0.75m	21	24	Maturing	Fair	Poor	Low	5_15 Yrs	Trunk Decay.	13.2	No	12
87	-37.700738	144.70606	Eucalyptus cladocalyx 'Nana'	Bushy Sugar Gum	Australian Native	50		9	16	Maturing	Fair	Fair	Moderate	15_25 Yrs		6	Street Tree	12
88	-37.700682	144.7061	Eucalyptus cladocalyx 'Nana'	Bushy Sugar Gum	Australian Native	38	@0.75m	8	9	Semi-mature	Fair	Poor	Low	5_15 Yrs	Large trunk wounds.	4.6	Street Tree	12
89	-37.700717	144.7062	Eucalyptus cladocalyx	Sugar Gum	Australian Native	45		16	10	Semi-mature	Fair	Fair - Poor	Low	15_25 Yrs	Basal Wound.	5.4	Street Tree	12
90	-37.700739	144.70621	Eucalyptus cladocalyx 'Nana'	Bushy Sugar Gum	Australian Native	41	@1.0m	11	11	Maturing	Fair	Poor	Low	5_15 Yrs	Basal Decay.	4.9	Street Tree	12
91	-37.700643	144.70647	Eucalyptus cladocalyx 'Nana'	Bushy Sugar Gum	Australian Native	60	@1.0m	10	11	Maturing	Fair	Poor	Low	5_15 Yrs		7.2	Street Tree	12
92	-37.700613	144.70655	Eucalyptus cladocalyx 'Nana'	Bushy Sugar Gum	Australian Native	50	@1.0m	14	8	Maturing	Fair	Poor	Low	5_15 Yrs	Basal Decay.	6	Street Tree	12
93	-37.70057	144.70656	Eucalyptus cladocalyx	Sugar Gum	Australian Native	40		15	9	Maturing	Fair	Poor	Low	5_15 Yrs	Lopped.	4.8	Street Tree	12
94	-37.700564	144.7066	Eucalyptus cladocalyx	Sugar Gum	Australian Native	50		17	11	Maturing	Fair	Fair - Poor	Low	5_15 Yrs		6	Street Tree	12
95	-37.699974	144.70665	Eucalyptus cladocalyx	Sugar Gum	Australian Native	40		18	14	Semi-mature	Fair	Fair	Moderate	25_50 Yrs		4.8	No	12
96	-37.701343	144.70448	Eucalyptus cladocalyx	Sugar Gum	Australian Native	140	@0.1m	15	18	Maturing	Fair	Poor	Low	15_25 Yrs	Trunk Decay.	15	Street Tree	12
97	-37.697387	144.7065	Eucalyptus cladocalyx 'Nana'	Bushy Sugar Gum	Australian Native	40	@1.0m	8	8	Semi-mature	Fair	Fair	Moderate	15_25 Yrs		4.8	No	12
98	-37.690141	144.72305	Cupressus macrocarpa	Monterey Cypress	Exotic Conifer	50		10	13	Maturing	Fair - Poor	Fair - Poor	Low	5_15 Yrs		6	No	25
99	-37.690518	144.72248	Cupressus macrocarpa	Monterey Cypress	Exotic Conifer	80		19	15	Maturing	Fair	Fair - Poor	Low	5_15 Yrs		9.6	No	25
100	-37.690465	144.72318	Eucalyptus leucoxylon	Yellow Gum	Victorian Native	55	@0.75m	11	15	Maturing	Fair	Fair	High	15_25 Yrs		6.6	No	25
101	-37.690713	144.72312	Cedrus deodara	Deodar	Exotic Conifer	55		16	20	Maturing	Fair	Fair	High	25_50 Yrs		6.6	No	25
102	-37.690718	144.723	Eucalyptus leucoxylon	Yellow Gum	Victorian Native	35		10	11	Semi-mature	Fair	Fair	Moderate	15_25 Yrs		4.2	No	25
103	-37.690356	144.71876	Pinus radiata	Monterey Pine	Exotic Conifer	30	@0.5m	5	5	Semi-mature	Fair	Fair	Low	15_25 Yrs	Small size	3.6	No	23
104	-37.690256	144.7157	Eucalyptus cladocalyx 'Nana'	Bushy Sugar Gum	Australian Native	40	@1.0m	9	12	Maturing	Fair	Fair - Poor	Low	5_15 Yrs	Over-extended Limbs. Limb wounds	4.8	Yes	21
105	-37.68973	144.71546	Ficus rubiginosa	Port Jackson Fig	Australian Native	55	@0.5m	6	8	Semi-mature	Fair	Fair	Moderate	25_50 Yrs	Variegated form	6.6	Yes	21
106	-37.689688	144.71557	Ficus rubiginosa	Port Jackson Fig	Australian Native	30	@0.5m	4	6	Semi-mature	Fair - Poor	Fair	Low	15_25 Yrs		3.6	Yes	21
107	-37.689282	144.71371	Eucalyptus spathulata	Swamp Mallet	Australian Native	41		12	15	Maturing	Fair	Fair - Poor	Moderate	15_25 Yrs	Partly Suppressed. Crown Bias-Nth. On road reserve	4.9	Street Tree	20
108	-37.689312	144.71376	Eucalyptus spathulata	Swamp Mallet	Australian Native	20		7	9	Semi-mature	Fair	Poor	Low	5_15 Yrs	Asymmetric. On road reserve.	2.4	Street Tree	20
109	-37.689205	144.71366	Eucalyptus occidentalis	Swamp Yate	Australian Native	50		15	16	Maturing	Fair	Fair	Moderate	15_25 Yrs	On road reserve.	6	Street Tree	20
110	-37.689271	144.71361	Eucalyptus spathulata	Swamp Mallet	Australian Native	37	@0.75m	15	10	Semi-mature	Fair	Fair - Poor	Moderate	15_25 Yrs	Partly Suppressed. Crown Bias-Sth. Compression flaring, on road reserve.	4.4	Street Tree	20

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111	-37.689173	144.71352	Eucalyptus occidentalis	Swamp Yate	Australian Native	57		19	16	Maturing	Fair	Fair	Moderate	15_25 Yrs	Over-extended Limbs. Dbh 57,33,20. On road reserve.	6.8	Street Tree	20
112	-37.689184	144.71335	Eucalyptus occidentalis	Swamp Yate	Australian Native	53		19	16	Maturing	Fair	Poor	Low	5_15 Yrs	Trunk Decay. On road reserve. Occidentalis	6.4	Street Tree	20
113	-37.689171	144.71321	Eucalyptus occidentalis	Swamp Yate	Australian Native	62		21	18	Maturing	Fair	Fair	Moderate	15_25 Yrs	On road reserve	7.4	Street Tree	20
114	-37.689129	144.71319	Corymbia maculata	Spotted Gum	Victorian Native	20	@1.0m	8	6	Semi-mature	Fair - Poor	Fair	Low	15_25 Yrs	Dieback Crown. On road reserve.	2.4	Street Tree	20
115	-37.689176	144.71311	Eucalyptus occidentalis	Swamp Yate	Australian Native	72		23	16	Maturing	Fair	Fair - Poor	Moderate	15_25 Yrs	Trunk wound, on road reserve.	8.6	Street Tree	20
116	-37.689225	144.71308	Eucalyptus spathulata	Swamp Mallet	Australian Native	56		21	16	Maturing	Fair	Fair - Poor	Moderate	15_25 Yrs	Partly Suppressed. Crown Bias-Sth. Trunk & limb wounds. On road reserve.	6.7	Street Tree	20
117	-37.689206	144.71298	Eucalyptus spathulata	Swamp Mallet	Australian Native	56	@0.1m	16	15	Maturing	Fair	Fair	Moderate	15_25 Yrs	Partly Suppressed. Crown Bias-Sth. On road reserve.	6.7	Street Tree	20
118	-37.689124	144.71304	Eucalyptus occidentalis	Swamp Yate	Australian Native	85		23	16	Maturing	Fair	Poor	Low	5_15 Yrs	Trunk Decay. On road reserve.	10.2	Street Tree	20
119	-37.689097	144.71292	Eucalyptus spathulata	Swamp Mallet	Australian Native	72	@0.75m	15	17	Maturing	Fair	Fair	Moderate	15_25 Yrs	On road reserve.	8.6	Street Tree	20
120	-37.68916	144.71289	Eucalyptus spathulata	Swamp Mallet	Australian Native	105		19	17	Maturing	Fair	Fair - Poor	Moderate	15_25 Yrs	Included Bark Fork. On road reserve.	12.6	Street Tree	20
121	-37.689116	144.71269	Eucalyptus spathulata	Swamp Mallet	Australian Native	18		7	5	Semi-mature	Fair	Fair - Poor	Low	5_15 Yrs	On road reserve	2.2	Street Tree	19
122	-37.689125	144.71254	Eucalyptus spathulata	Swamp Mallet	Australian Native	60	@1.0m	10	15	Maturing	Fair	Poor	Low	5_15 Yrs	Basal Decay. On road reserve	7.2	Street Tree	19
123	-37.68907	144.71242	Eucalyptus melliodora	Yellow Box	Victorian Native	31		11	11	Semi-mature	Fair	Fair - Poor	Moderate	15_25 Yrs	Over-extended Limbs.	3.7	Street Tree	19
124	-37.689577	144.71164	Phoenix canariensis	Canary Island Date Palm	Exotic Palm	50	@1.0m	6	10	Semi-mature	Fair	Fair	Moderate	25_50 Yrs		6	No	19
125	-37.708947	144.69521	Eucalyptus cladocalyx	Sugar Gum	Australian Native	75	@1.0m	16	12	Semi-mature	Fair - Poor	Poor	Low	15_25 Yrs		9	No	36 & 37
126	-37.687612	144.69692	Eucalyptus sideroxylon	Red Ironbark	Victorian Native	25		6	4	Semi-mature	Fair	Fair	Moderate	25_50 Yrs		3	No	2
127	-37.687544	144.69671	Eucalyptus camaldulensis	River Red Gum	Planted Indigenous	45		10	9	Semi-mature	Fair	Fair	High	>50 Yrs		5.4	No	2
128	-37.687589	144.69668	Eucalyptus camaldulensis	River Red Gum	Planted Indigenous	45		11	10	Semi-mature	Fair	Fair	High	>50 Yrs		5.4	No	2
129	-37.695576	144.69203	Eucalyptus camaldulensis	River Red Gum	Planted Indigenous	30		12	7	Semi-mature	Fair	Fair	Moderate	>50 Yrs		3.6	Yes	4
130	-37.69562	144.69203	Eucalyptus camaldulensis	River Red Gum	Planted Indigenous	30		12	8	Semi-mature	Fair	Fair	Moderate	>50 Yrs		3.6	Yes	4
131	-37.695529	144.69074	Corymbia maculata	Spotted Gum	Victorian Native	35		9	6	Semi-mature	Fair	Fair	Moderate	>50 Yrs		4.2	Yes	4
132	-37.694176	144.69591	Eucalyptus camaldulensis	River Red Gum	Planted Indigenous	34		7	6	Semi-mature	Fair	Fair	Moderate	>50 Yrs		4.1	Yes	4
133	-37.696176	144.69194	Eucalyptus camaldulensis	River Red Gum	Indigenous	75		18	12	Semi-mature	Fair	Fair - Poor	High	>50 Yrs	Naturally occurring.	9	Yes	5
134	-37.697642	144.69317	Eucalyptus camaldulensis	River Red Gum	Indigenous	70		13	19	Semi-mature	Fair	Fair	High	>50 Yrs	Naturally occurring.	8.4	Yes	5
135	-37.697502	144.69405	Eucalyptus leucoxylon	Yellow Gum	Indigenous	68		15	16	Maturing	Fair	Fair - Poor	High	25_50 Yrs	Naturally occurring.	8.2	Yes	5
136	-37.697353	144.69354	Eucalyptus leucoxylon	Yellow Gum	Indigenous	50.38.20		16	13	Maturing	Fair	Fair - Poor	High	>50 Yrs	Naturally occurring.	7.9	Yes	5

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Tree_No	Latitude	Longitude	Species	Common_Name	Origin	DBH_cm_	DBH Height	Tree Height (m)	Crown Width (m)	Life Stage	Health	Structure	Retention_ Value	ULE	Comments	TPZ	Site Accessed	PSP 78 Ref Number
137	-37.713969	144.71552	Eucalyptus sp.	Gum Tree	Australian Native	20		7	4	Semi-mature	Fair	Fair	Moderate	25_50 Yrs		2.4	No	49
138	-37.71433	144.71541	Eucalyptus sp.	Gum Tree	Australian Native	25		9	5	Semi-mature	Fair	Fair	Moderate	25_50 Yrs		3	No	49
139	-37.714933	144.71263	Eucalyptus leucoxylon	Yellow Gum	Victorian Native	50		13	13	Maturing	Fair	Fair - Poor	Low	5_15 Yrs	Basal wound, limb wound.	6	No	48/49
140	-37.715014	144.71261	Eucalyptus leucoxylon	Yellow Gum	Victorian Native	47		11	17	Maturing	Fair	Fair	High	25_50 Yrs		5.6	No	48/49
141	-37.715344	144.71253	Eucalyptus leucoxylon	Yellow Gum	Victorian Native	33		11	9	Maturing	Fair	Fair	Moderate	15_25 Yrs		4	No	48/49
142	-37.715631	144.71248	Eucalyptus leucoxylon	Yellow Gum	Victorian Native	35		10	12	Maturing	Fair	Fair	Moderate	15_25 Yrs	Borer damage.	4.2	No	48/49
143	-37.715867	144.71244	Eucalyptus leucoxylon	Yellow Gum	Victorian Native	28		13	7	Maturing	Poor	Fair - Poor	Low	< 5 Yrs		3.4	No	48/49
144	-37.716174	144.71238	Eucalyptus leucoxylon	Yellow Gum	Victorian Native	20, 32		13	16	Maturing	Fair	Fair - Poor	Moderate	15_25 Yrs	Included Bark Fork.	4.5	No	48/49
145	-37.693111	144.69191	Eucalyptus sp.	Gum Tree	Australian Native	35,50		15	14	Maturing	Fair	Fair	Moderate	15_25 Yrs	Over-extended Limbs.	7.3	No	3
146	-37.693108	144.69171	Eucalyptus sp.	Gum Tree	Australian Native	30,35		14	14	Maturing	Fair	Fair	Moderate	15_25 Yrs	Over-extended Limbs.	5.5	No	3
147	-37.693471	144.69507	Cupressus macrocarpa	Monterey Cypress	Exotic Conifer	65	@0.5m	9	14	Semi-mature	Fair	Fair	Moderate	25_50 Yrs		7.8	No	3
148	-37.692227	144.69365	Eucalyptus cladocalyx	Sugar Gum	Australian Native	65		14	15	Maturing	Fair	Fair	Moderate	25_50 Yrs		7.8	No	3
149	-37.691715	144.69449	Cupressus macrocarpa	Monterey Cypress	Exotic Conifer	50		9	13	Semi-mature	Fair	Fair	Moderate	15_25 Yrs	C. Macro aurea.	6	No	3
150	-37.691603	144.69221	Eucalyptus cladocalyx	Sugar Gum	Australian Native	60		17	14	Maturing	Fair	Fair - Poor	Low	15_25 Yrs	Deadwood.	7.2	No	3
151	-37.691305	144.6917	Eucalyptus sp.	Gum Tree	Australian Native	65		13	13	Maturing	Fair	Fair	Moderate	15_25 Yrs	Asymmetric. Minor asymmetry to south.	7.8	No	3
152	-37.690738	144.69527	Pinus radiata	Monterey Pine	Exotic Conifer	35		12	9	Maturing	Fair	Fair	Moderate	15_25 Yrs	Minor crown assymmetry	4.2	No	2
153	-37.690204	144.69512	Pinus radiata	Monterey Pine	Exotic Conifer	90	@0.5m	12	10	Maturing	Fair - Poor	Poor	Low	< 5 Yrs		10.8	No	2
154	-37.689857	144.69609	Eucalyptus cladocalyx	Sugar Gum	Australian Native	50		18	20	Maturing	Fair	Fair	High	25_50 Yrs		6	No	2
155	-37.689209	144.69561	Schinus areira	Peppercorn Tree	Exotic Evergreen	45	@0.75m	6	7	Semi-mature	Fair	Fair	Moderate	25_50 Yrs		5.4	No	2
156	-37.688677	144.69546	Schinus areira	Peppercorn Tree	Exotic Evergreen	100	@0.5m	9	10	Maturing	Fair	Fair	Moderate	15_25 Yrs		12	No	2
157	-37.689588	144.69292	Cupressus macrocarpa	Monterey Cypress	Exotic Conifer	75	@0.5m	13	16	Maturing	Fair	Fair	Moderate	15_25 Yrs		9	No	1
158	-37.703769	144.70571	Eucalyptus cladocalyx	Sugar Gum	Australian Native	30		12	8	Semi-mature	Fair	Fair	Moderate	15_25 Yrs		3.6	No	31
159	-37.705656	144.70575	Eucalyptus cladocalyx	Sugar Gum	Australian Native	55	@0.75m	16	14	Maturing	Fair	Fair - Poor	Low	5_15 Yrs	Deadwood.	6.6	No	31
160	-37.705704	144.70572	Eucalyptus cladocalyx 'Nana'	Bushy Sugar Gum	Australian Native	50	@0.75m	9	9	Maturing	Fair	Fair - Poor	Low	5_15 Yrs		6	No	31
161	-37.70166	144.70499	Eucalyptus cladocalyx	Sugar Gum	Australian Native	60		16	14	Maturing	Fair	Fair - Poor	Low	5_15 Yrs	Deadwood. Trunk and basal wounds.	7.2	No	31

Appendix 1B: Tree Group assessment details: PSP 1078 - Plumpton

Refer to following 4 pages.

DBH = Diameter at Breast Height (measured in centimetres at 1.3m above ground unless otherwise stated).

H x W = Height x Width of crown (measured in metres).

TPZ = Tree Protection Zone (metre radius). Radius distances measured in metres from the centre of the trunk.
ULE = Useful Life Expectancy (Estimated)

For tree location and numbering refer to plans at Appendix 2. See Appendix 3 for tree descriptors.

GroupNo	Dominant species	Other Species 1	Other Species 2	Avg DBH	No of stems	Avg Height	Avg Width	Life Stage	Avg Health	Avg_Structure	Retention value	ULE	Comments	Avg TPZ	Site Access	PSP 78 Ref Number
Group 1	Eucalyptus cladocalyx			55	65	18	13	Maturing	Fair - Poor	Fair - Poor	Low	5_15 Yrs	Borer damage. Crown asymmetry.m	6.6	No	
Group 2	Eucalyptus cladocalyx 'Nana'			22	58	7	7	Semi-mature	Fair	Fair	High	25_50 Yrs		2.6	Yes	44
Group 3	Eucalyptus cladocalyx			16	125	7	4	Semi-mature	Fair	Fair	Low	25_50 Yrs	Evenly spaced woodlot.	1.9	Yes	
Group 4	Pinus radiata			28	80	10	7	Semi-mature	Fair	Fair	Moderate	15_25 Yrs	Planted at 2-3 m spacing.	3.4	Yes	
Group 5	Eucalyptus cladocalyx 'Nana'			25	225	7	7	Semi-mature	Good	Fair	High	25_50 Yrs	Planted at 3m spacings.	3	Yes	44
Group 6	Eucalyptus cladocalyx 'Nana'			25	190	7	8	Semi-mature	Good	Fair	High	25_50 Yrs	Planted at 3m spacings.	3	Yes	44
Group 7	Eucalyptus cladocalyx 'Nana'			22	67	6	6	Semi-mature	Fair	Fair	Moderate	15_25 Yrs	Planted at 3m spacings. Partly lopped below HV/LV.	2.6	Yes	
Group 8	Eucalyptus camaldulensis			30	17	9	7	Semi-mature	Good	Fair	Very High	>50 Yrs	Naturally occurring recruitment.	3.6	Yes	5
Group 9	Eucalyptus cladocalyx			45	5	16	15	Maturing	Fair	Fair - Poor	Moderate	15_25 Yrs	Trunk & basal decay in 2.	5.4	Yes	
Group 10	Eucalyptus cladocalyx	Windrow conifer species.		30	15	8	7	Semi-mature	Fair	Fair - Poor	Low	15_25 Yrs		3.6	Yes	
Group 11	Exotic conifers			25	50	9	8	Semi-mature	Fair - Poor	Fair - Poor	Low	15_25 Yrs	Exotic conifer wind break around buildings.	3	No	
Group 12	Eucalyptus camaldulensis	Mixed exotic conifers.		25	50	11	10	Semi-mature	Fair	Fair	Moderate	25_50 Yrs	Conifers of low value.m	3	No	
Group 13	Exotic conifers	Eucalypt spp. X 3	Exotic deciduous.	35	25	13	12	Semi-mature	Fair	Fair - Poor	Moderate	15_25 Yrs		4.2	No	
Group 14	Eucalyptus camaldulensis x 17	Eucalyptus spathulata x 7	Pinus radiata x 8	25	32	12	6	Semi-mature	Fair	Fair	Moderate	15_25 Yrs	Eucalyptus camaldulensis x 17. Remove Pines.	3	Yes	
Group 15	Eucalyptus camaldulensis	Pinus radiata		25	35	14	6	Semi-mature	Fair	Fair	Moderate	25_50 Yrs	Eucalyptus camaldulensis x35. Growing inside & Competing with *Pinus radiata* windrow.	3	Yes	
Group 16	Eucalyptus spathulata	Eucalyptus platypus x 2		45	22	12	14	Maturing	Good	Fair - Poor	Moderate	15_25 Yrs	Subsiding limbs/stems.	5.4	Yes	
Group 17	Eucalypt sp.			40	5	18	7	Semi-mature	Fair	Fair - Poor	Moderate	15_25 Yrs		4.8	No	
Group 18	Eucalyptus cladocalyx			38	8	17	8	Maturing	Fair	Fair - Poor	Low	15_25 Yrs	Deadwood. Trunk wounds.	4.6	No	
Group 19	Eucalyptus globulus			34	5	14	7	Semi-mature	Good	Fair	Moderate	15_25 Yrs		4.1	No	
Group 20	Mixed natives.	Exotic pines	Ornamental sp.	30	50	10	6	Semi-mature	Fair	Fair - Poor	Low	15_25 Yrs		3.6	No	
Group 21	Eucalyptus cladocalyx 'Nana'			20	14	7	8	Semi-mature	Fair	Fair	Moderate	15_25 Yrs		2.4	Yes	
Group 22	Eucalyptus cladocalyx 'Nana'			25	25	7	8	Semi-mature	Fair - Poor	Fair - Poor	Moderate	15_25 Yrs		3	Yes	

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GroupNo	Dominant species	Other Species 1	Other Species 2	Avg DBH	No of stems	Avg Height	Avg Width	Life Stage	Avg Health	Avg_Structure	Retention value	ULE	Comments	Avg TPZ	Site Access	PSP 78 Ref Number
Group 23	Eucalyptus cladocalyx 'Nana'			22	53	7	8	Semi-mature	Fair - Poor	Fair	Moderate	15_25 Yrs		2.6	Yes	
Group 24	Eucalyptus cladocalyx			25	5	18	9	Semi-mature	Fair	Fair	Moderate	25_50 Yrs		3	No	
Group 25	Cupressus macrocarpa			60	4	14	10	Maturing	Fair	Fair	Moderate	15_25 Yrs		7.2	No	
Group 26	Cupressus macrocarpa			40-80	35	12	10	Maturing	Fair	Fair - Poor	Low	5_15 Yrs	Crown dieback, branch failures, subsiding limbs, deadwood. Subject to HO 58	4.8	No	25
Group 27	Eucalyptus cladocalyx			45	7	16	12	Semi-mature	Fair	Poor	Low	5_15 Yrs		5.4	No	
Group 28	Cupressus macrocarpa 'Aurea'			60	3	14	14	Maturing	Fair	Fair - Poor	Low	15_25 Yrs		7.2	No	
Group 29	Eucalyptus cladocalyx			55	11	18	12	Semi-mature	Fair	Fair - Poor	Low	15_25 Yrs		6.6	No	
Group 30	Eucalyptus cladocalyx			75	3	21	21	Maturing	Fair	Fair - Poor	Low	15_25 Yrs		9	No	
Group 31	Eucalyptus cladocalyx			50	7	16	13	Maturing	Fair	Poor	Low	5_15 Yrs		6	No	
Group 32	Eucalyptus cladocalyx			45	7	21	14	Maturing	Fair	Fair - Poor	Low	5_15 Yrs		5.4	No	
Group 33	Cupressus macrocarpa			65	8	10	10	Maturing	Fair - Poor	Fair - Poor	Low	5_15 Yrs		7.8	No	
Group 34	Cupressus macrocarpa			60	36	10	10	Over Mature	Fair - Poor	Poor	Low	5_15 Yrs	Dead trees among windrow	7.2	No	
Group 35	Cupressus macrocarpa			60	3	15	15	Maturing	Fair	Fair - Poor	Low	5_15 Yrs		7.2	No	
Group 36	Phoenix canariensis			35	8	6	5	Semi-mature	Fair	Fair	Moderate	25_50 Yrs		4.2	No	
Group 37	Pinus radiata	xCupressocyparis leylandii	2 x Eucalptus melliodora	20	46	8	8	Semi-mature	Fair - Poor	Fair - Poor	Low	5_15 Yrs	Dead trees among windrow	2.4	No	
Group 38	Pinus sp.	Eucalyptus cladocalyx 'Nana'		25	10	6	6	Semi-mature	Fair	Fair	Low	15_25 Yrs	Small size.	3	No	
Group 39	Eucalyptus cladocalyx 'Nana'	Eucalyptus cladocalyx	Cupressus sp.	40	20	14	12	Maturing	Fair	Fair - Poor	Low	5_15 Yrs		4.8	No	
Group 40	Eucalyptus cladocalyx			45	4	13	9	Maturing	Fair	Poor	Low	5_15 Yrs	Epicormic regrowth	5.4	No	
Group 41	Casuarina cunninghamiana	Melaleuca sp.	Eucalyptus cladocalyx 'Nana'	35	13	14	8	Semi-mature	Fair	Fair - Poor	Low	5_15 Yrs		4.2	No	
Group 42	Eucalyptus cladocalyx 'Nana'	Cupressus sp.		30	7	6	6	Semi-mature	Fair	Fair	Low	15_25 Yrs	Small size.	3.6	No	
Group 43	Cupressus sp.			26	9	12	8	Over Mature	Fair - Poor	Poor	Low	5_15 Yrs	Dieback & some dead trees.	3.1	Yes	
Group 44	Cupressus sp.	Eucalyptus cladocalyx 'Nana'		30	17	12	10	Over Mature	Fair - Poor	Fair - Poor	Low	5_15 Yrs	Some dead trees	3.6	Yes	
Group 45	xCupressocyparis leylandii 'Castlewellan Gold'			10	18	3	3	Semi-mature	Fair - Poor	Fair	Low	5_15 Yrs		1.2	Yes	
Group 46	xCupressocyparis leylandii			32	24	7	10	Over Mature	Fair - Poor	Fair - Poor	Low	5_15 Yrs		3.8	No	

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Group 47	xCupressocyparis leylandii			45	3	10	14	Over Mature	Fair - Poor	Fair	Low	5_15 Yrs		5.4	No	
Group 48	xCupressocyparis leylandii			45	23	7	8	Over Mature	Fair - Poor	Fair - Poor	Low	5_15 Yrs		5.4	No	
Group 49	xCupressocyparis leylandii	Melaleuca armillaris	Eucalyptus cladocalyx 'Nana'	30	41	7	7	Maturing	Fair - Poor	Fair - Poor	Low	5_15 Yrs	Dad trees among windrow.	3.6	No	
Group 50	xCupressocyparis leylandii			30	15	9	10	Maturing	Fair - Poor	Fair	Low	5_15 Yrs	Dieback.	3.6	No	
Group 51	xCupressocyparis leylandii			18	26	6	6	Semi-mature	Poor	Poor	None	<5 yrs		2.2	No	
Group 52	Eucalyptus cladocalyx 'Nana'	Pinus radiata		30	6	10	10	Semi-mature	Fair	Fair	Moderate	15_25 Yrs		3.6	No	
Group 53	Acacia baileyana	Melaleuca armillaris		30	4	6	6	Maturing	Fair	Fair - Poor	Low	5_15 Yrs		3.6	No	
Group 54	xCupressocyparis leylandii			30	9	13	9	Maturing	Fair - Poor	Fair - Poor	Low	5_15 Yrs	Dieback	3.6	No	
Group 55	Eucalyptus cladocalyx 'Nana'			30	13	11	10	Semi-mature	Fair	Fair	Moderate	15_25 Yrs		3.6	No	
Group 56	Pinus radiata			25	100	15	7	Semi-mature	Fair	Fair	Low	15_25 Yrs		3	Yes	
Group 57	Pinus radiata	Eucalyptus cladocalyx	Eucalyptus leucoxylon	25	200	9	8	Semi-mature	Fair	Fair	Low	>50 Yrs		3	Yes	
Group 58	Pinus radiata			20	50	9	6	Semi-mature	Fair	Fair	Low	>50 Yrs		2.4	Yes	
Group 59	Eucalyptus cladocalyx			50	9	16	10	Semi-mature	Fair - Poor	Fair - Poor	Low	15_25 Yrs		6	No	
Group 60	Eucalyptus cladocalyx 'Nana'			40	11	10	8	Semi-mature	Fair - Poor	Fair - Poor	Low	15_25 Yrs		4.8	Yes	
Group 61	Eucalyptus cladocalyx			50	8	16	12	Semi-mature	Fair	Fair - Poor	Low	15_25 Yrs		6	Yes	
Group 62	Pinus radiata			35	11	14	8	Semi-mature	Fair	Fair	Low	25_50 Yrs		4.2	Yes	
Group 63	Eucalyptus cladocalyx	Corymbia maculata		60	13	19	14	Semi-mature	Fair - Poor	Fair - Poor	Low	15_25 Yrs		7.2	Yes	
Group 64	Eucalyptus cladocalyx			25	12	8	6	Semi-mature	Fair	Fair	Moderate	>50 Yrs		3	Yes	
Group 65	Eucalyptus cladocalyx			40	8	12	12	Semi-mature	Fair	Poor	Low	5_15 Yrs		4.8	Yes	
Group 66	Eucalyptus cladocalyx			40	17	11	10	Semi-mature	Fair	Fair - Poor	Low	25_50 Yrs		4.8	Yes	
Group 67	Eucalyptus spathulata	Eucalyptus occidentalis		30	22	12	10	Semi-mature	Fair	Fair - Poor	Moderate	25_50 Yrs		3.6	Street trees	
Group 68	Eucalyptus spathulata	Corymbia maculata		30	6	7	6	Semi-mature	Fair	Fair	Low	>50 Yrs		3.6	Street trees	
Group 69	Eucalyptus cladocalyx			25	24	9	7	Semi-mature	Fair	Fair - Poor	Low	25_50 Yrs		3	No	
Group 70	Eucalyptus cladocalyx			45	6	11	9	Semi-mature	Fair	Fair - Poor	Low	15_25 Yrs		5.4	Yes	
Group 71	Eucalyptus camaldulensis			25	80	9	8	Semi-mature	Fair	Fair	High	>50 Yrs		3	Yes	5
Group 72	Eucalyptus camaldulensis			20	28	8	6	Semi-mature	Fair	Fair	High	>50 Yrs		2.4	Yes	5

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GroupNo	Dominant species	Other Species 1	Other Species 2	Avg DBH	No of stems	Avg Height	Avg Width	Life Stage	Avg Health	Avg_Structure	Retention value	ULE	Comments	Avg TPZ	Site Access	PSP 78 Ref Number
Group 73	Eucalyptus cladocalyx			45	22	12	10	Semi-mature	Fair	Fair - Poor	Low	25_50 Yrs		5.4	Yes	
Group 74	Eucalyptus cladocalyx 'Nana'	Eucalyptus cladocalyx		30	12	12	12	Maturing	Fair	Fair - Poor	Low	15_25 Yrs	Past limb failures, limb & trunk wounds,	3.6	No	
Group 75	Eucalyptus botryoides			25	76	9	8	Semi-mature	Fair - Poor	Poor	Low	<5 yrs	Crown dieback, deadwood. On road reserve.	3	Yes	
Group 76	Eucalyptus camaldulensis	Eucalyptus globulus	Eucalyptus melliodora	35	26	11	10	Semi-mature	Fair	Fair	Moderate	25_50 Yrs	Minor deadwood, past branch failures. 2 x blue gums poor in value.	4.2	Yes	
Group 77	Cupressus sp.	Pinus radiata	Eucalyptus sp.	25	16	9	8	Semi-mature	Fair	Fair	Moderate	15_25 Yrs		3	No	
Group 78	Pinus sp.			20	4	9	7	Semi-mature	Fair	Fair	Moderate	15_25 Yrs		2.4	No	
Group 79	Eucalyptus cladocalyx			50	21	17	15	Maturing	Fair	Fair - Poor	Moderate	15_25 Yrs		6	Yes	
Group 80	Eucalyptus cladocalyx			50	8	16	13	Maturing	Fair	Fair	Moderate	15_25 Yrs		6	No	
Group 81	Eucalyptus cladocalyx	Exotic conifers		45	25	17	15	Maturing	Fair	Fair	Moderate	15_25 Yrs		5.4	No	
Group 82	Eucalyptus cladocalyx 'Nana'	Eucalyptus siderloxylon		35	24	13	13	Maturing	Fair	Fair	Moderate	15_25 Yrs		4.2	No	
Group 83	Eucalyptus cladocalyx			45	4	15	13	Maturing	Fair	Fair	Moderate	15_25 Yrs		5.4	No	
Group 84	Eucalyptus cladocalyx 'Nana'			20	147	8	5	Semi-mature	Fair	Fair	Moderate	15_25 Yrs		2.4	Yes	
Group 85	Pinus radiata			18	125	9	5	Semi-mature	Fair	Fair - Poor	Low	15_25 Yrs	Some dieback amongst stand along roadside. Several collapsed.	2.2	No	
Group 86	Pinus radiata			20	55	11	7	Semi-mature	Fair	Fair - Poor	Low	5_15 Yrs	Some dead trees amongst stand and die back.	2.4	No	
Group 87	Salix babylonica	Eucalyptus sp.	Exotic conifers	30	12	12	10	Semi-mature	Fair	Fair	Moderate	15_25 Yrs		3.6	No	
Group 88	Eucalyptus cladocalyx 'Nana'			35	14	13	10	Maturing	Fair	Fair - Poor	Low	5_15 Yrs		4.2	No	
Group 89	Eucalyptus cladocalyx			45	35	16	15	Maturing	Fair	Fair - Poor	Low	5_15 Yrs	Deadwood, over extended branches.	5.4	No	
Group 90	Cupressus sp.			45	40	8	8	Semi-mature	Fair	Fair - Poor	Low	5_15 Yrs	Dead trees amongst stand	5.4	No	
Group 91	Fraxiinus angustifola subspecies angustifola	Pinus radiata		17	10	6	6	Semi-mature	Fair	Fair	Low	15_25 Yrs	Small size.	2	No	
Group 92	Eucalyptus cladocalyx			45	13	16	13	Maturing	Fair	Fair - Poor	Low	5_15 Yrs	Deadwood, over extended branches.	5.4	No	
Group 93	Eucalyptus cladocalyx			40	19	19	15	Maturing	Fair	Fair - Poor	Low	5_15 Yrs	Deadwood, over extended branches.	4.8	No	
Group 94	Eucalyptus cladocalyx			20	11	12	5	Semi-mature	Fair	Fair - Poor	Low	15_25 Yrs	Multi-stemmed coppice re-sprouts.	2.4	No	

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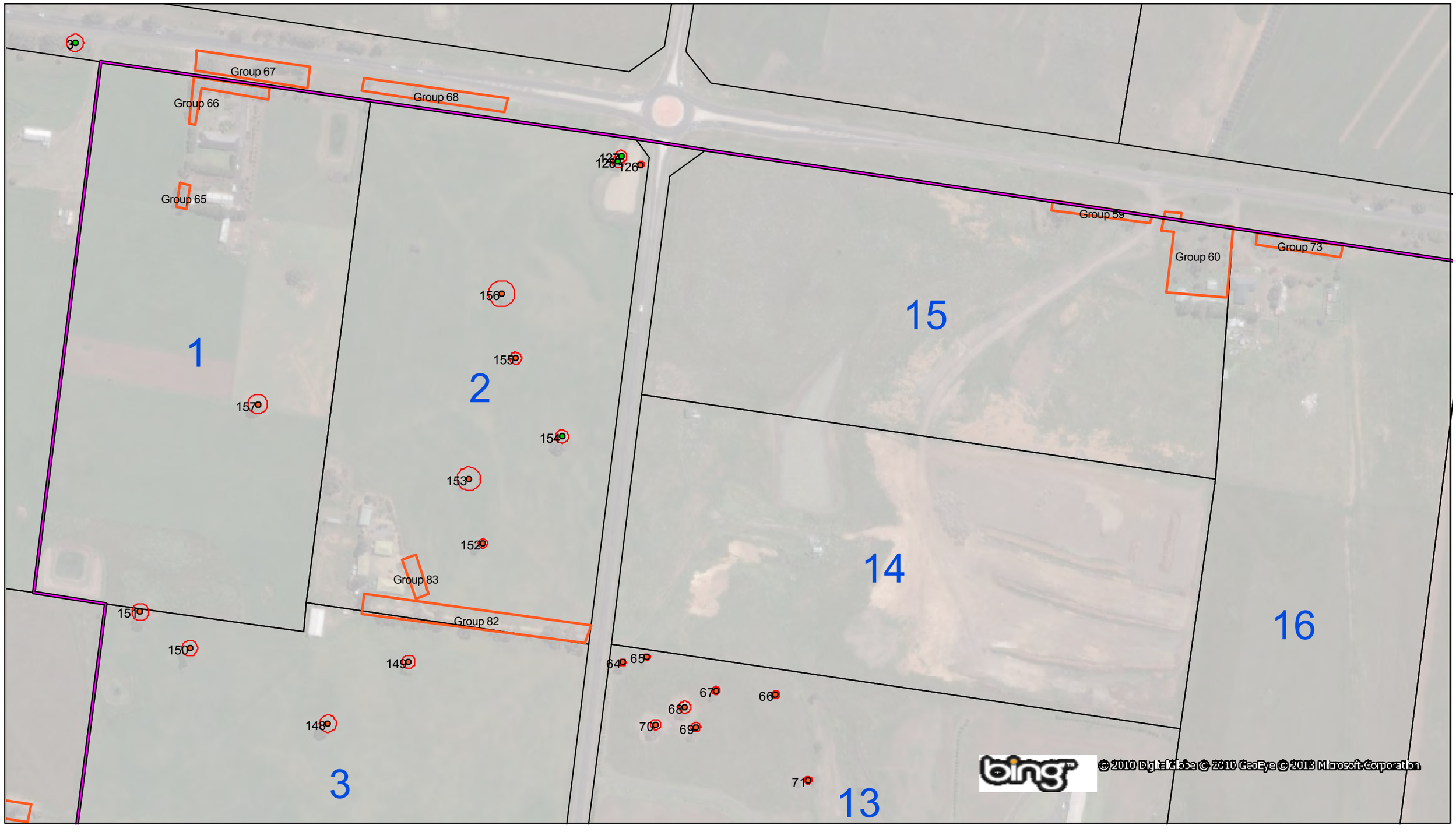
Appendix 2: Tree numbers & locations: PSP 1078 – Plumpton

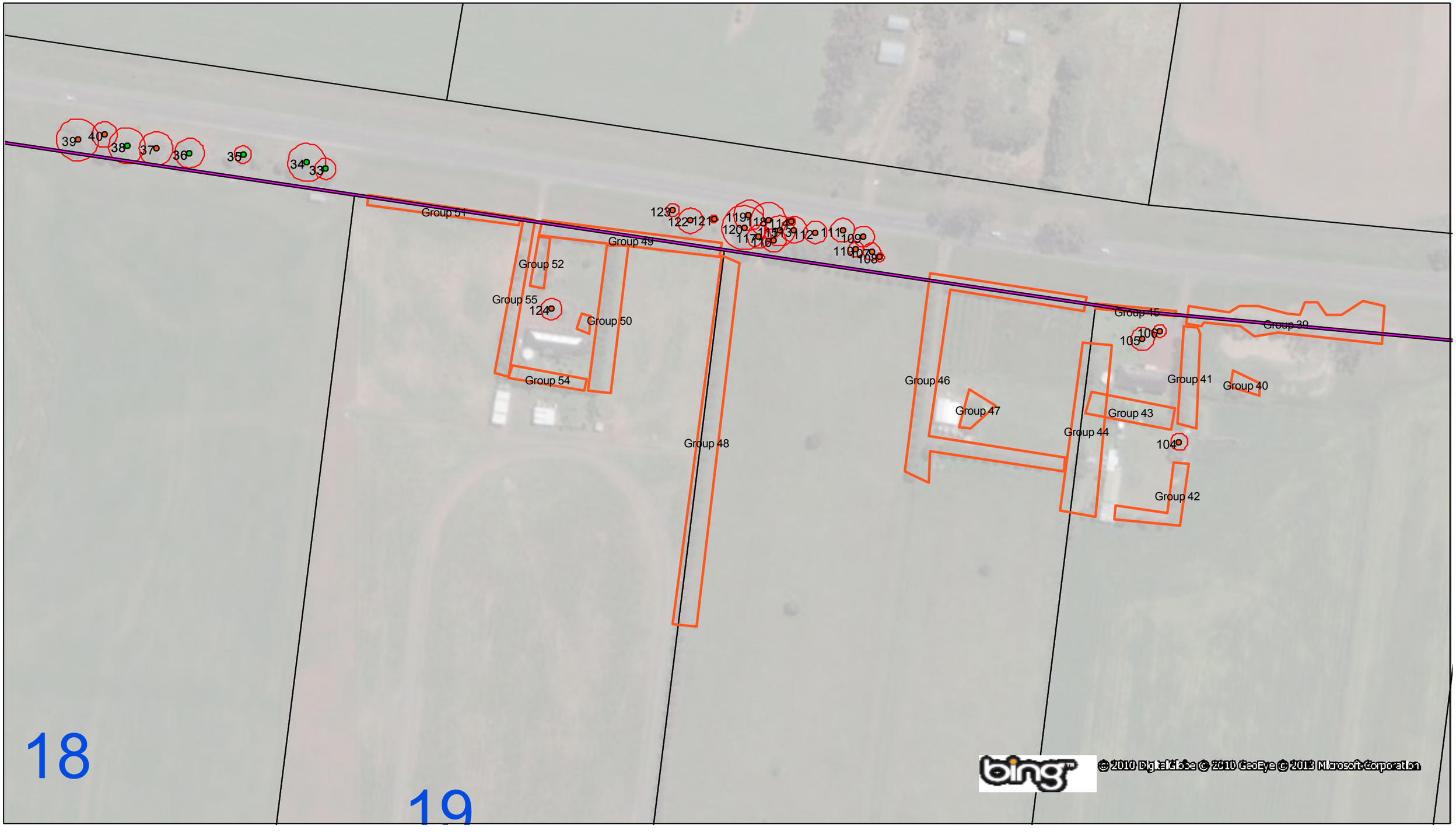
Comprising following 10 pages with detail inserts.

Appendix 2: Tree Location Plan - PSP 1078 Plumpton. Details on following 9 pages (Tree Logic 2013)

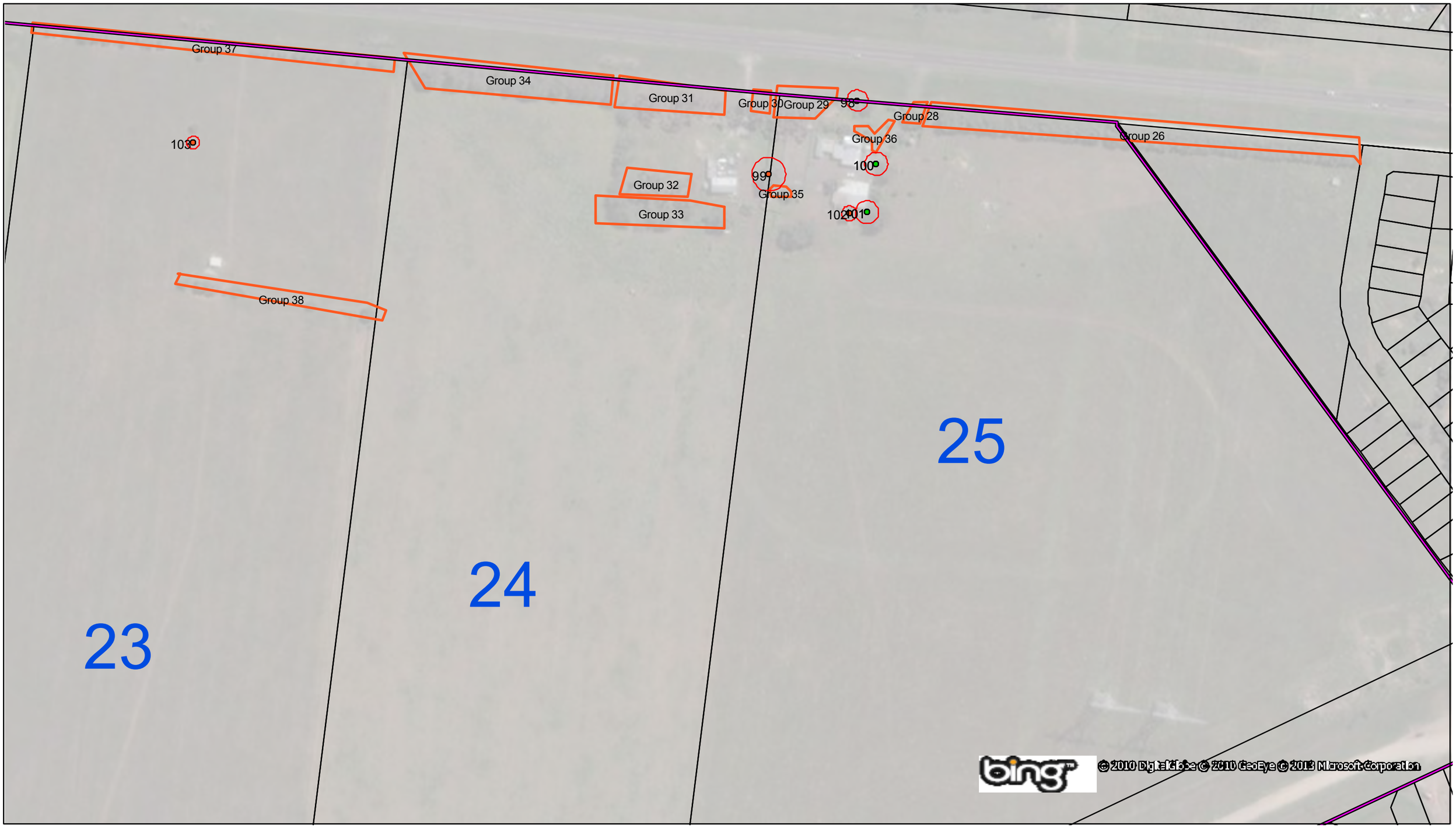
Appendix 2.1: Tree Location Plan - PSP 1078 Plumpton. Detail 1 (Tree Logic 2013)



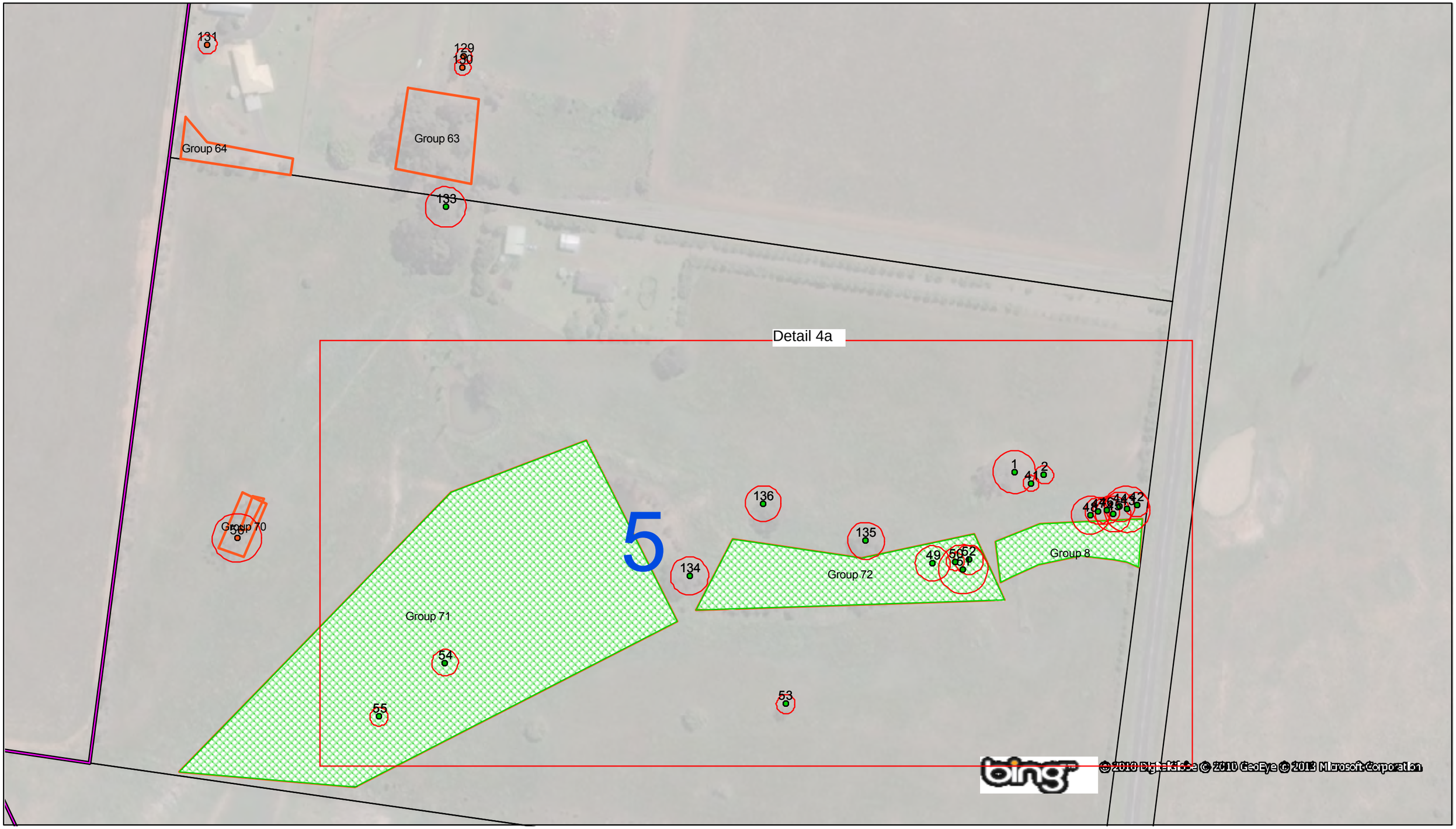
Appendix 2.2: Tree Location Plan - PSP 1078 Plumpton. Detail 2 (Tree Logic 2013)



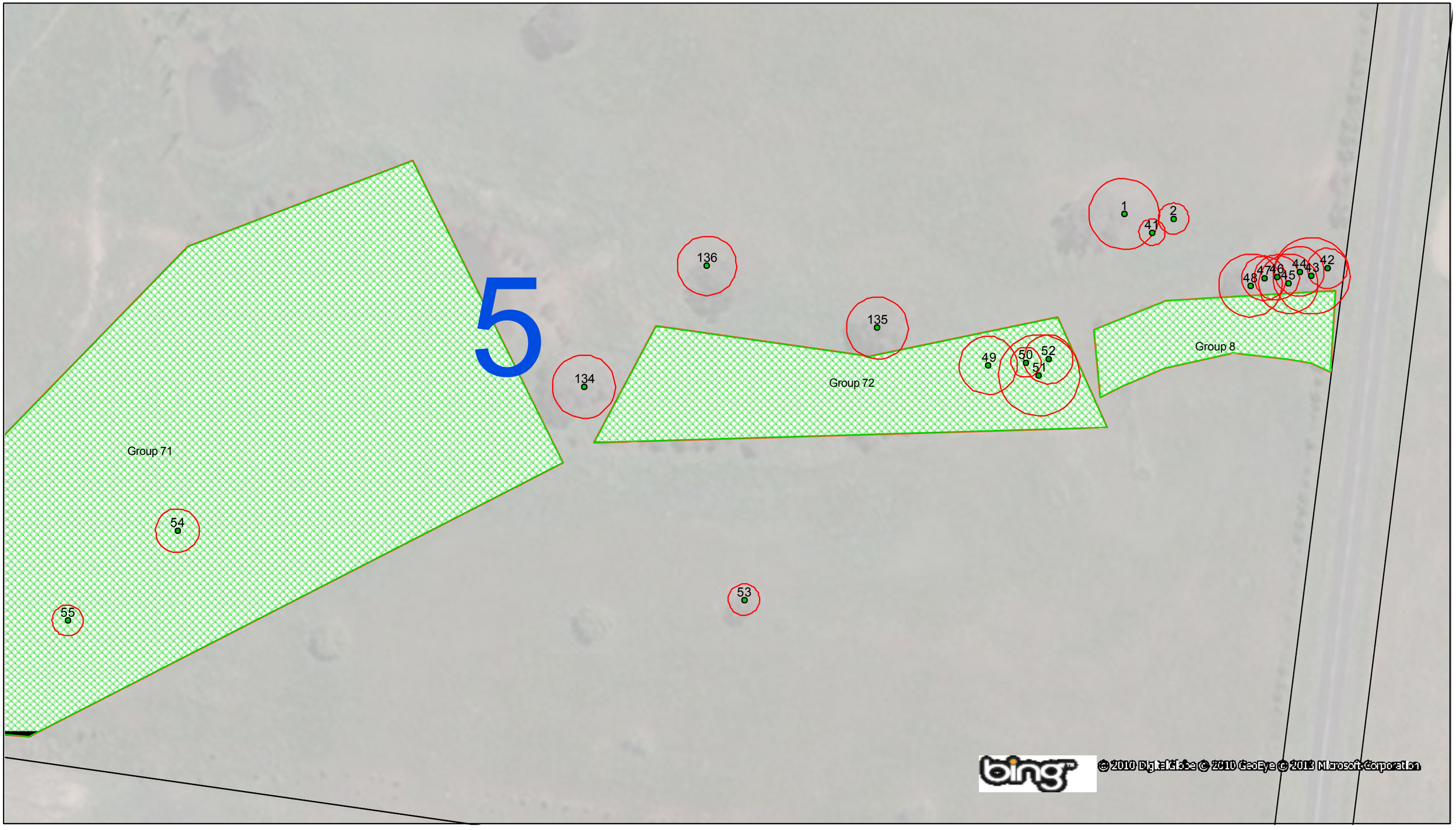
Appendix 2.3: Tree Location Plan - PSP 1078 Plumpton. Detail 3 (Tree Logic 2013)



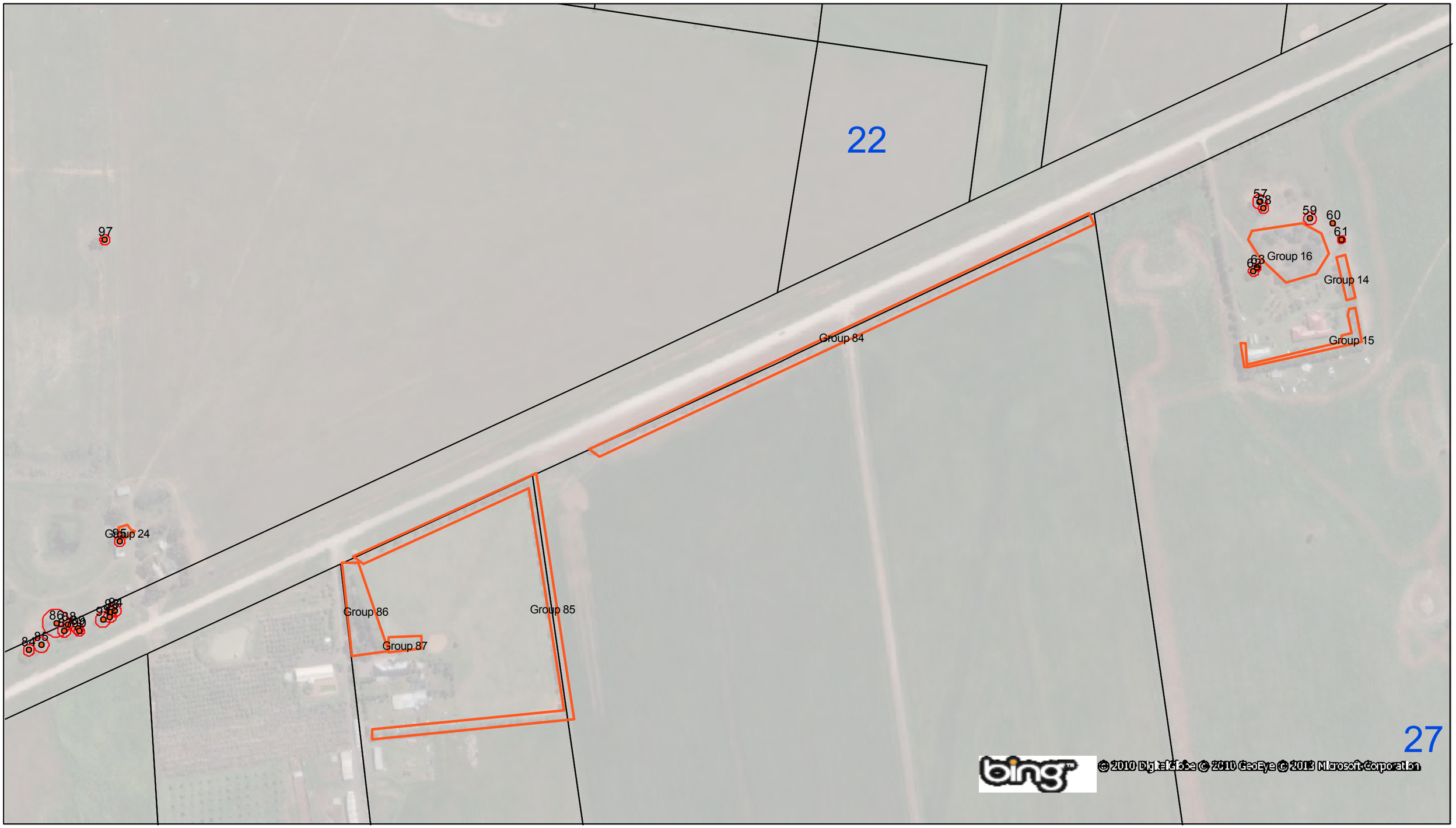
Appendix 2.4: Tree Location Plan - PSP 1078 Plumpton. Detail 4 (Tree Logic 2013)



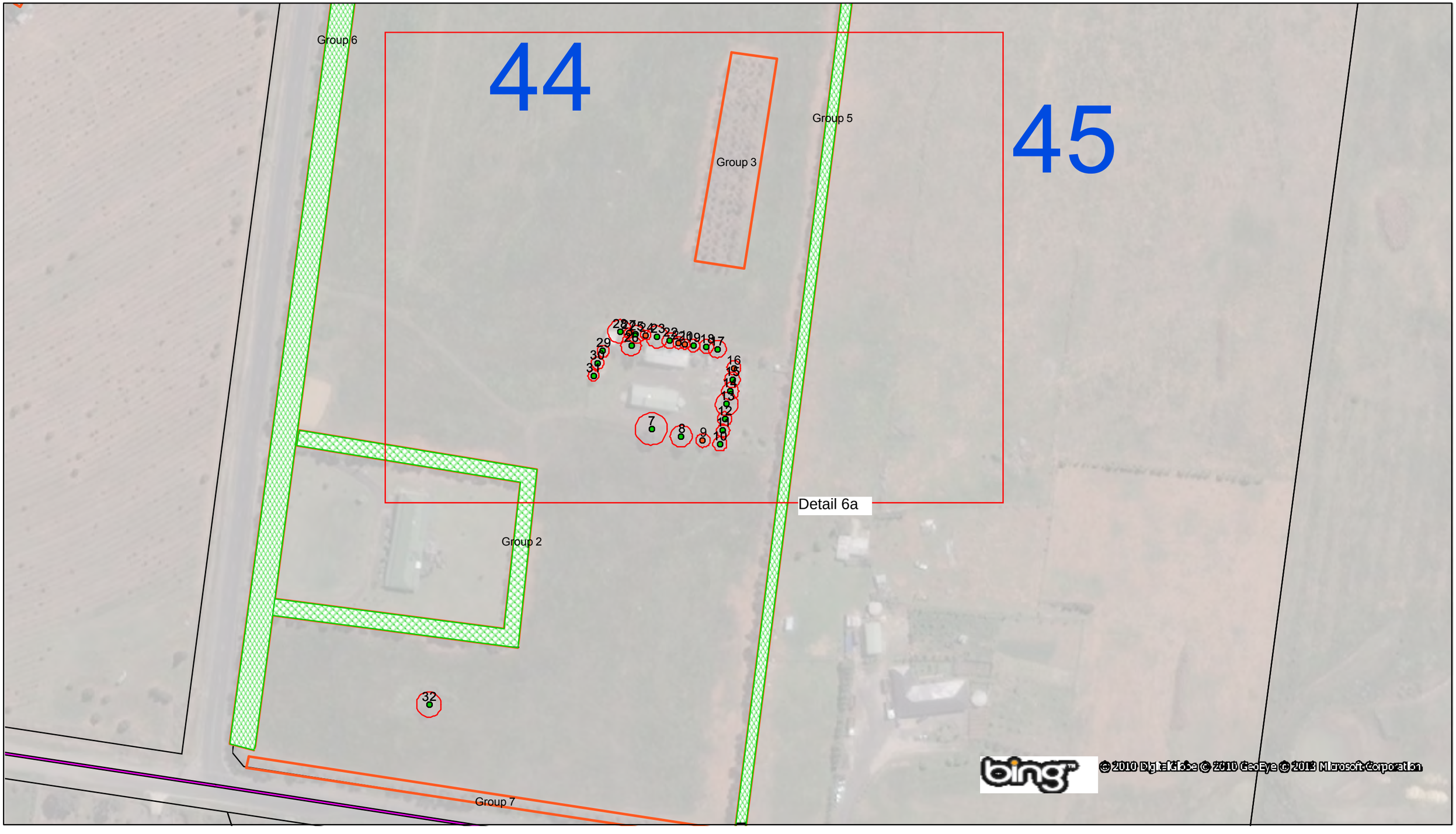
Appendix 2.5: Tree Location Plan - PSP 1078 Plumpton. Detail 4a (Tree Logic 2013)



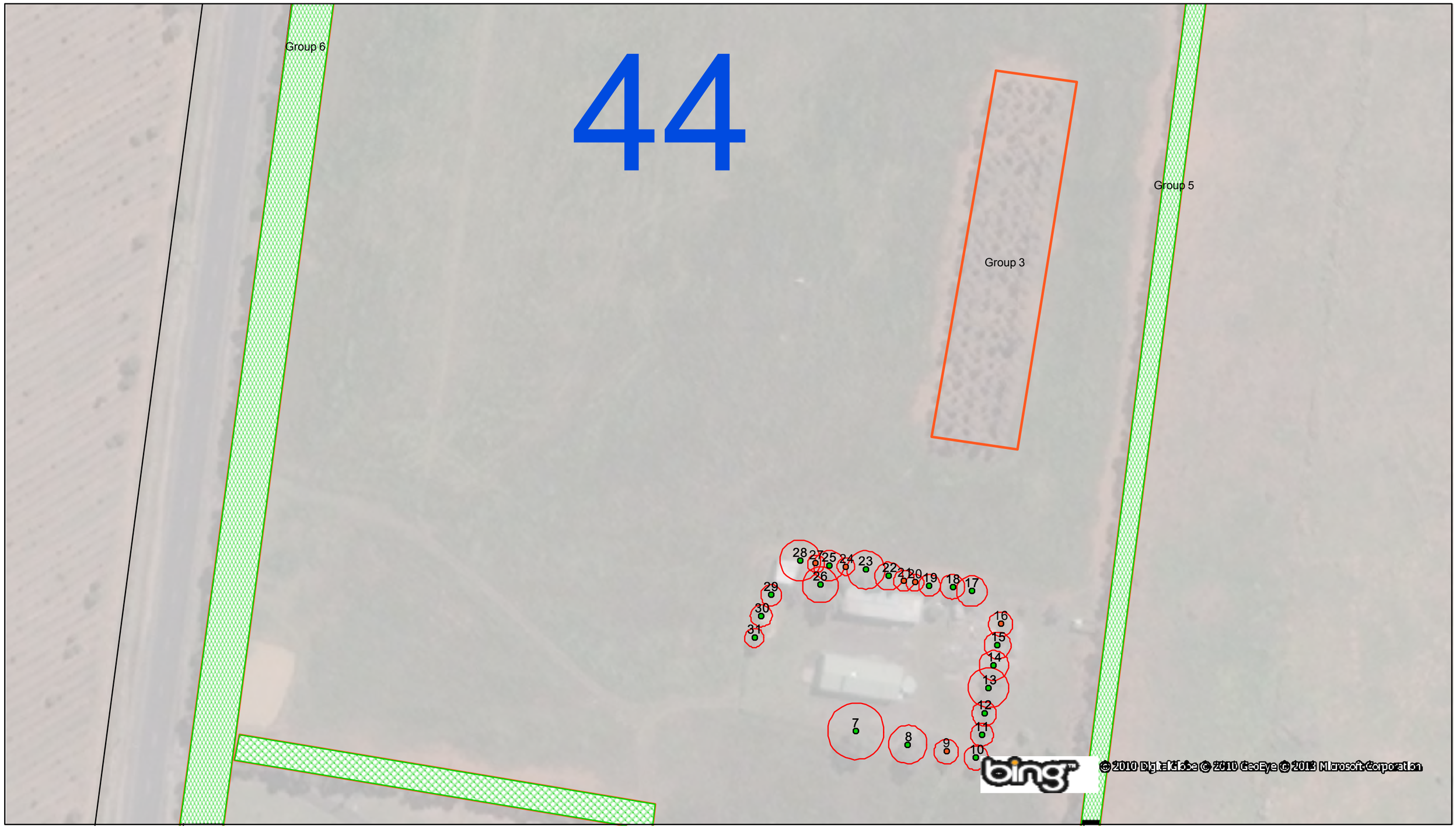
Appendix 2.6: Tree Location Plan - PSP 1078 Plumpton. Detail 5 (Tree Logic 2013)



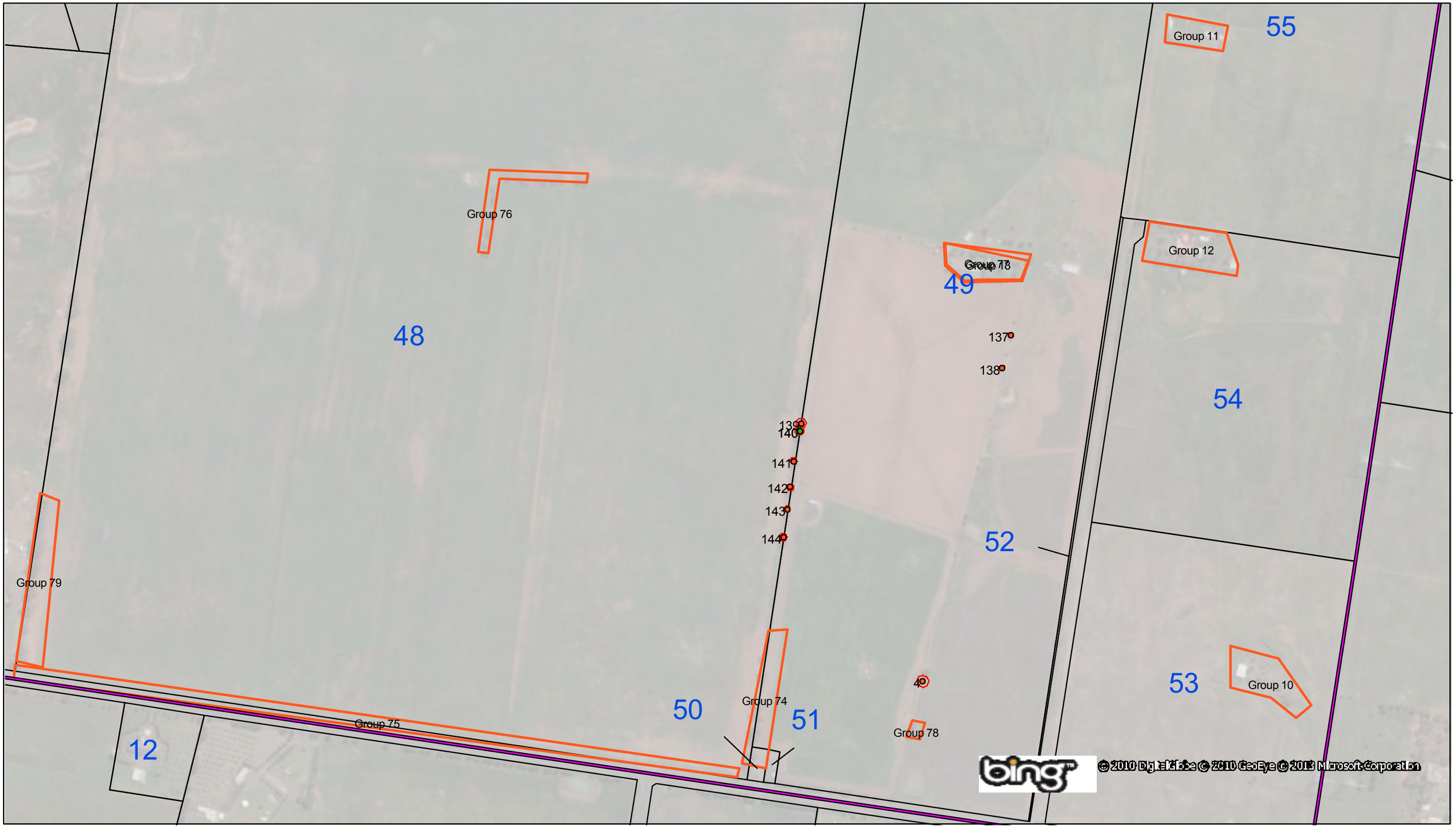
Appendix 2.7: Tree Location Plan - PSP 1078 Plumpton. Detail 6 (Tree Logic 2013)



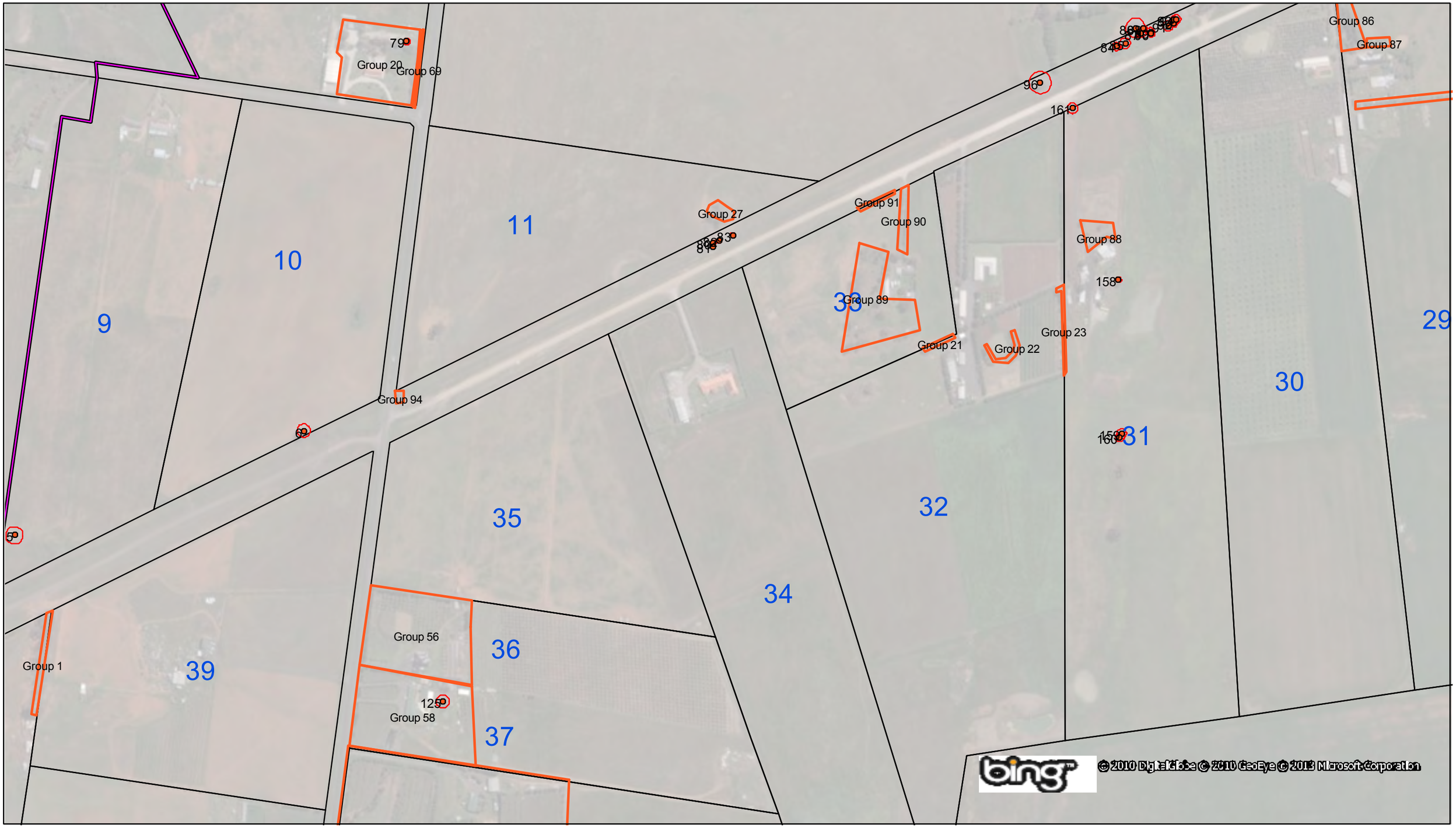
Appendix 2.8: Tree Location Plan - PSP 1078 Plumpton. Detail 6a (Tree Logic 2013)



Appendix 2.9: Tree Location Plan - PSP 1078 Plumpton. Detail 7 (Tree Logic 2013)



Appendix 2.10: Tree Location Plan - PSP 1078 Plumpton. Detail 8 (Tree Logic 2013)



Appendix 3: Arboricultural Descriptors

1. Tree Condition

The assessment of tree condition evaluates factors of health and structure. The descriptors of health and structure attributed to a tree evaluate the individual specimen t o what could be considered typical for that species growing in its location. For example, some species can display inherently poor branching architecture, such as multiple acute branch attachments with included bark. Whilst these structural defects may technically be considered arboriculturally poor, they are typical for the species and may not constitute an increased risk of failure. These trees may be assigned a structural rating of fair-poor (rather than poor) at the discretion of the author.

Diagram 1, provides an indicative distribution curve for tree condition to illustrate that within a normal tree population the majority of specimens are centrally located within the condition range (normal distribution curve). Furthermore, that those individual trees with an assessed condition approaching the outer ends of the spectrum occur less often.

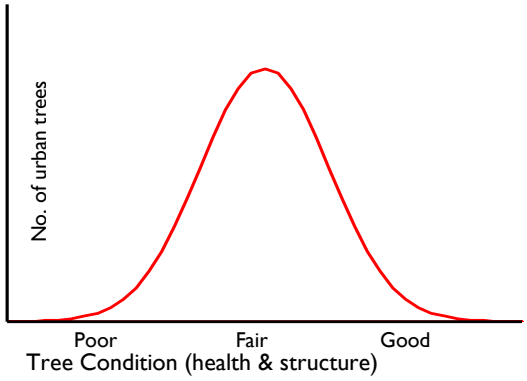


Diagram 1: Indicative normal distribution curve for tree condition

2. Tree Name

Provides botanical name, (genus, species, variety and cultivar) according to accepted international code of taxonomic classification, and common name.

3. Tree Type

Describes the general geographic origin of the species and its type e.g. deciduous or evergreen.

Category	Description
Indigenous	Occurs naturally in the area or region of the subject site
Victorian native	Occurs naturally within some part of the State of Victoria (not exclusively) but is not indigenous
Australian native	Occurs naturally within Australia but is not a Victorian native or indigenous
Exotic deciduous	Occurs outside of Australia and typically sheds its leaves during winter
Exotic evergreen	Occurs outside of Australia and typically holds its leaves all year round
Exotic conifer	Occurs outside of Australia and is classified as a gymnosperm
Native conifer	Occurs naturally within Australia and is classified as a gymnosperm
Native Palm	Occurs naturally within Australia. Woody monocotyledon
Exotic Palm	Occurs outside of Australia. Woody monocotyledon

4. Height and Width

Indicates height and width of the individual tree; dimensions are expressed in metres. Crown heights are measured with a height meter where possible. Due to the topography of some sites and/or the density of vegetation it may not be possible to do this for every tree. Tree heights may be estimated in line with previous height meter readings in conjunction with author's experience. Crown widths are generally paced (estimated) at the widest axis or can be measured on two axes and averaged. In some instances the crown width can be measured on the four cardinal direction points (North, South, East and West).

5. Diameter at Breast Height (DBH)

Indicates the trunk diameter (expressed in centimetres) of an individual tree measured at 1.4m above the existing ground level or where otherwise indicated, multiple leaders are measured individually. Plants with multiple leader habit may be measured at the base. The range of methods to suit particular trunk shapes, configurations and site conditions can be seen in Appendix A of Australian Standard AS 4970-2009 Protection of trees on development sites. Measurements taken with foresters or builders tape.

6. Health

Assesses various attributes to describe the overall health and vigour of the tree.

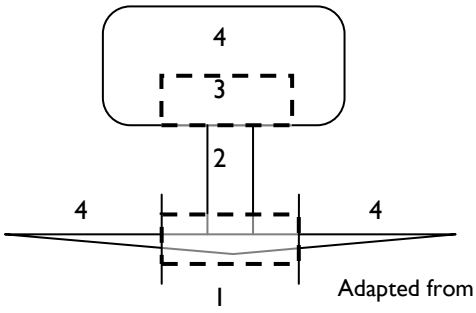
Category	Vigour/Extension growth	Decline symptoms/Deadwood	Foliage density, colour, size, intactness	Pests and or disease
Good	Above typical	None or minimal	Better than typical	None or minimal
Fair	Typical	Typical or expected	Typical	Typical, within damage thresholds
Fair to Poor	Below typical	More than typical	Exhibiting deficiencies	Exceeds damage thresholds
Poor	Minimal	Excessive and large amount/size	Exhibiting severe deficiencies	Extreme and contributing to decline
Dead	N/A	N/A	N/A	N/A

7. Structure

Assesses principal components of tree structure (Diagram 2).

Descriptor	Zone 1 - Root plate & lower stem	Zone 2 - Trunk	Zone 3 - Primary branch support	Zone 4 - Outer crown and roots
Good	No damage, disease or decay; obvious basal flare / stable in ground	No damage, disease or decay; well tapered	Well formed, attached, spaced and tapered	No damage, disease, decay or structural defect
Fair	Minor damage or decay. Basal flare present.	Minor damage or decay	Typically formed, attached, spaced and tapered	Minor damage, disease or decay; minor branch end-weight or over-extension
Fair to Poor	Moderate damage or decay; minimal basal flare	Moderate damage or decay; approaching recognised thresholds	Weak, decayed or with acute branch attachments; previous branch failure evidence	Moderate damage, disease or decay; moderate branch end-weight or over-extension
Poor	Major damage, disease or decay; fungal fruiting bodies present. Excessive lean placing pressure on root plate	Major damage, disease or decay; exceeds recognised thresholds; fungal fruiting bodies present. Acute lean. Stump resprout	Decayed, cavities or has acute branch attachments with included bark; excessive compression flaring; failure likely	Major damage, disease or decay; fungal fruiting bodies present; major branch end-weight or over-extension
Very Poor	Excessive damage, disease or decay; unstable / loose in ground; altered exposure; failure probable	Excessive damage, disease or decay; cavities. Excessive lean. Stump resprout	Decayed, cavities or branch attachments with active split; failure imminent	Excessive damage, disease or decay; excessive branch end-weight or over-extension

Diagram 2: Tree structure zones
1. Root plate & lower stem
2. Trunk
3. Primary branch support
4. Outer crown & roots



Adapted from Coder (1996)

Trees are assessed and the given a rating for a point in time. Generally, trees with a poor or very poor structure are beyond the benefit of practical arboricultural treatments. The lowest or worst descriptor assigned to the tree in any column could generally be the overall rating assigned to the tree. The assessment for structure is limited to observations of external and above ground tree parts. It does not include any exploratory assessment of underground or internal tree parts unless this is requested as part of the investigation.

Structure ratings will also take into account general tree architecture which considers aspects of stem taper, live crown ratio, branch distribution or crown bias and position such as a tree being suppressed amongst more dominant trees.

The management of trees in the urban environment requires appropriate arboricultural input and consideration of risk. Risk potential will take into account the combination of likelihood of failure and impact, including the perceived importance of the target(s).

8. Life Stage

Relates to the physiological stage of the tree's life cycle.

Category	Description
Young	Sapling tree and/or recently planted
Semi-mature	Tree rapidly increasing in size and yet to achieve expected size in situation
Maturing	Specimen approaching expected size in situation, with reduced incremental growth
Over-mature	Tree is senescent and in decline

9. Arboricultural Rating

Relates to the combination of tree condition factors, including health and structure (arboricultural merit), and also conveys an amenity value. Amenity relates to the trees biological, functional and aesthetic characteristics (Hitchmough 1994) within an urban landscape context.

Category	Description
Very High	Tree of very high quality in good condition. Generally a prominent arboricultural feature. Tree is capable of tolerating changes in its environment if managed appropriately. These trees have the potential to be a long-term component of the landscape if managed appropriately. Retention of these trees is highly desirable.
High	Tree of high quality with generally sound structural condition and good health. Generally is or has the potential to become a prominent landscape feature. These trees have the potential to be a medium- to long-term component of the landscape if managed appropriately. Retention of these trees is highly desirable.
Moderate	Tree of moderate quality, in fair or better condition. Tree may have a condition, and or structural problem that will respond to arboricultural treatment. These trees have the potential to be a medium- to long-term component of the landscape if managed appropriately. Retention of these trees is generally desirable.
Low	Tree of low quality and/or little amenity value. Tree in poor health and/or with poor structure. Tree is not significant for its size and/or young. These trees are easily replaceable. Tree (species) is functionally inappropriate to specific location and would be expected to be problematic if retained. Retention of such trees may be considered if not requiring a disproportionate expenditure of resources for a tree in its condition and location.
None	Tree has a severe structural defect and/or health problem that cannot be sustained with practical arboricultural techniques and the loss of tree would be expected in the short term. Tree whose retention would not be viable after the removal of adjacent trees (includes trees that have developed in close spaced groups and would not be expected to acclimatise to severe alterations to surrounding environment – removal of adjacent shelter trees). Tree has a detrimental effect on the environment, for example, the tree is a woody weed with potential to spread into waterways or natural areas.

10. Tree significance

Trees have many values, not all of which are considered when an arboricultural assessment is undertaken. However, individual trees or tree group features may be considered important community resources because of unique or noteworthy characteristics or values other than their age, dimensions, health or structural condition. Recognition of one or more of the following criterion is designed to highlight other considerations that may influence the future management of such trees.

Significance	Description
Horticultural Value/ Rarity	Outstanding horticultural or genetic value; could be an important source of propagating stock, including specimens that are particularly resistant to disease or exposure. Any tree of a species or variety that is rare.
Historic, Aboriginal Cultural or Heritage Value	Tree could have value as a remnant of a particular important historical period or a remnant of a site or activity no longer in action. Tree has a recognised association with historic aboriginal activities, including scar trees. Tree commemorates a particular occasion, including plantings by notable people, or having associations with an important event in local history.
Ecological Value	Tree could have value as habitat for indigenous wildlife, including providing breeding, foraging or roosting habitat, or is a component of a wildlife reserve. Remnant Indigenous vegetation that contribute to biological diversity

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Appendix 4: Tree protection zones. Tree logic Pty. Ltd. © 2009

1.0 Introduction

In order to sustain trees on a development site consideration must be given to the establishment of tree protection zones.

The physical dimensions of tree protection zones can sometimes be difficult to define. The projection of a tree's crown can provide a guide but is by no means the definitive measure. The unpredictable nature of roots and their growth, differences between species and their tolerances, and observable and hidden changes to the trees growing environment, as a result of development, are variables that must be considered.

Most vigorous, broad canopied trees survive well if the area within the drip-line of the canopy is protected. Fine root density is usually greater beneath the canopy than beyond (Gilman, 1997). If few to no roots over 3cm in diameter are encountered and severed during excavation the tree will probably tolerate the impact and root loss. A healthy tree can sustain a loss of between 30% and 50% of absorbing roots (Harris, Clark, Matheny, 1999), however encroachment into the structural root system of a tree may be problematic.

The structural root system of a tree is responsible for ensuring the stability of the entire tree structure in the ground. A tree could not sustain loss of structural root system and be expected to survive let alone stand up to average annual wind loads upon the crown.

2.0 Allocation of tree protection zone (TPZ)

The method of allocating a TPZ to a particular tree will be influenced by site factors, the tree species, its age and developed form.

Once it has been established, through an arboricultural assessment, which trees and tree groups are to be retained, the next step will require careful management through the development process to minimise any impacts on the designated trees. The successful retention of trees on any particular site will require the commitment and understanding of all parties involved in the development process. The most important activity, after determining the trees that will be retained is the implementation of a TPZ.

The intention of tree protection zones is to:

- mitigate tree hazards;
- provide adequate root space to sustain the health and aesthetics of the tree into the future;
- minimise changes to the trees growing environment, which is particularly important for mature specimens;
- minimise physical damage to the root system, canopy and trunk; and
- define the physical alignment of the tree protection fencing

Tree protection

The most important consideration for the successful retention of trees is to allow appropriate above and below ground space for the trees to continue to grow. This requires the allocation of tree protection zones for retained trees.

The Australian Standard AS 4970-2009 Protection of trees on development sites has been used as a guide in the allocation of TPZs for the assessed trees. The TPZ for individual trees is calculated based on trunk (stem) diameter (DBH), measured at 1.4 metres up from ground level. The radius of the TPZ is calculated by multiplying the trees DBH by 12. The method provides a TPZ that addresses both the stability and growing requirements of a tree. TPZ distances are measured as a radius from the centre of the trunk at (or near) ground level. The minimum TPZ should be no less than 2m and the maximum no more than 15m radius. The TPZ of palms should be not less than 1.0m outside the crown projection.

Encroachment into the TPZ is permissible under certain circumstances though is dependent on both site conditions and tree characteristics. Minor encroachment, up to 10% of the TPZ, is generally permissible provided encroachment is compensated for by recruitment of an equal area contiguous with the TPZ. Examples are provided in Diagram 1. Encroachment greater than 10% is considered major encroachment under AS4970-2009 and is only permissible if it can be demonstrated that after such encroachment the tree would remain viable.

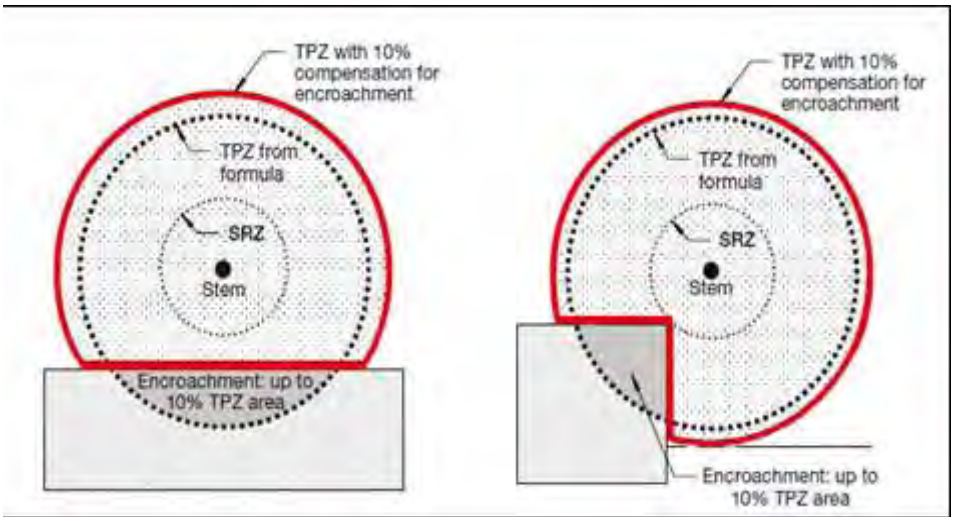

Diagram 1: Examples of minor encroachment into a TPZ. Extract from: AS4970-2009, Appendix D, p30 of 32

The 10% encroachment on one side equates to approximately ⅓ radial distance. Tree root growth is opportunistic and occurs where the essentials to life (primarily air and water) are present. Heterogeneous soil conditions, existing barriers, hard surfaces and buildings may have inhibited the development of a symmetrically radiating root system.

Existing infrastructure around some trees may be within the TPZ or root plate radius. The roots of some trees may have grown in response to the site conditions and therefore if existing hard surfaces and building alignments are utilised in new designs the impacts on the trees should be minimal. The most reliable way to estimate root disturbance is to find out where the roots are in relation to the demolition, excavation or construction works that will take place (Matheny & Clark, 1998). Exploratory excavation prior to commencement of construction can help establish the extent of the root system and where it may be appropriate to excavate or build.

The TPZ should also give consideration to the canopy and overall form of the tree. If the canopy requires severe pruning in order to accommodate a building and in the process the form of the tree is diminished it may be worthwhile considering altering the design or removing the tree.

General tree protection guidelines

The most important factors are:

- Prior to construction works the trees nominated for tree works should be pruned to remove larger dead wood. Pruning works may also identify other tree hazards that require remedial works.
- Installation of tree protection fencing. Once the tree protection zones have been determined the next step is to mulch the zone with woodchip and erect tree protection fencing. This must be completed prior to any materials being brought on-site, erection of temporary site facilities or demolition/earth works. The protection fencing must be sturdy and withstand winds and construction impacts. The protection fence should only be moved with approval of the site supervisor. Other root zone protection methods can be incorporated if the TPZ area needs to be traversed.
- Appropriate signage is to be fixed to the fencing to alert people as to importance of the tree protection zone.
- The importance of tree preservation must be communicated to all relevant parties involved with the site.
- Inspection of trees during excavation works.

Construction Guidelines

The following are guidelines that must be implemented to minimise the impact of the proposed construction works on the retained trees.

- The Tree Protection Zone (TPZ) is fenced and clearly marked at all times. The actual fence specifications should be a minimum of 1.2 - 1.5 metres of chain mesh or like fence with 1.8 meter posts (e.g. treated pine or star pickets) or like support every 3-4 metres and a top line of high visibility plastic hazard tape. The posts should be strong enough to sustain knocks from on site excavation equipment. This fence will deter the placement of building materials, entry of heavy equipment and vehicles and also the entry of workers and/or the public into the TPZ. Note: There are many different variations on the construction type and material used for TPZ fences, suffice to say that the fence should satisfy the responsible authority.
- Contractors and site workers should receive written and verbal instruction as to the importance of tree protection and preservation within the site. Successful tree preservation occurs when there is a commitment from all relevant parties involved in designing, constructing and managing a development project. Members of the project team need to interact with each other to minimise the impacts to the trees, either through design decisions or construction practices. The importance of tree preservation must be communicated to all relevant parties involved with the site.
- The consultant arborist is on-site to supervise excavation works around the existing trees where the TPZ will be encroached.
- A layer of organic mulch (woodchips) to a depth of no more than 100mm should be placed over the root systems within the TPZ of trees, which are to be retained so as to assist with moisture retention and to reduce the impact of compaction.
- No persons, vehicles or machinery to enter the TPZ without the consent of the consulting arborist or site manager.
- Where machinery is required to operate inside the TPZ it must be a small skid drive machine (i.e Dingo or similar) operating only forwards and backwards in a radial direction facing the tree trunk and not altering direction whilst inside the TPZ to avoid damaging, compacting or scuffing the roots.
- Any underground service installations within the allocated TPZ should be bored and utility authorities should common trench where possible.
- No fuel, oil dumps or chemicals shall be allowed in or stored on the TPZ and the servicing and re-fuelling of equipment and vehicles should be carried out away from the root zones.
- No storage of material, equipment or temporary building should take place over the root zone of any tree.
- Nothing whatsoever should be attached to any tree including temporary services wires, nails, screws or any other fixing device.
- Supplementary watering should be provided to all trees through any dry periods during and after the construction process. Proper watering is the most important maintenance task in terms of successfully retaining the designated trees. The areas under the canopy drip lines should be mulched with woodchip to a depth of no more than 100mm. The mulch will help maintain soil moisture levels. Testing with a soil probe in a number of locations around the tree will help ascertain soil moisture levels and requirements to irrigate. Water needs to be applied slowly to avoid runoff. A daily watering with 5 litres of water for every 30 mm of trunk calliper may provide the most even soil moisture level for roots (Watson & Himelick, 1997), however light frequent irrigations should be avoided. Irrigation should wet the entire root zone and be allowed to dry out prior to another application. Watering should continue from October until April.

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