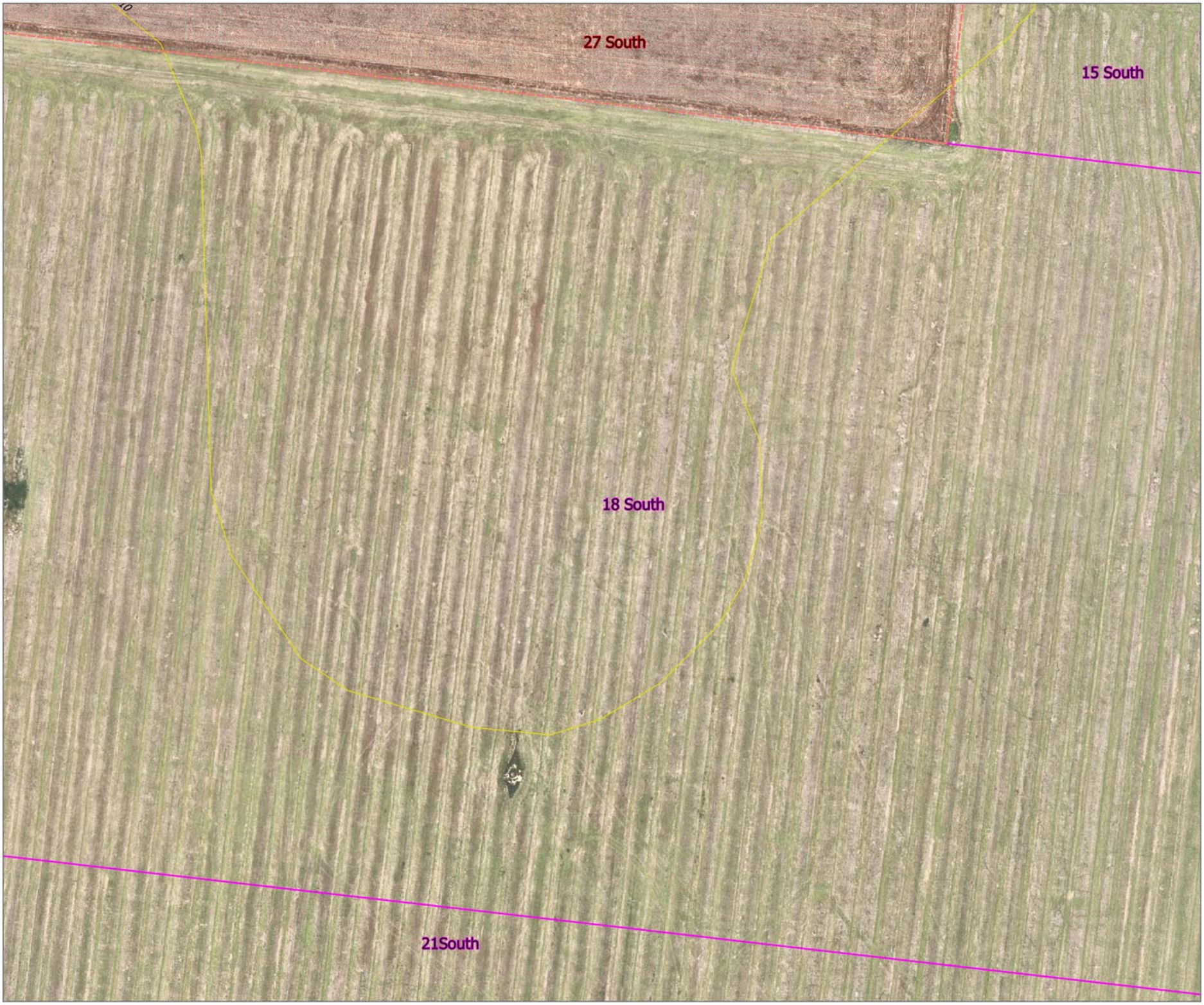
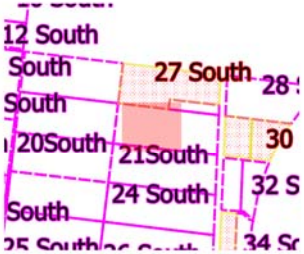


LEGEND

Parcel
No Access
Accessed
Contours
Project area

APPENDIX 2
TREE LOCATIONS AND PROTECTION ZONES

PROJECT
Wallan South & Wallan East Precinct Structure Plan



MAP NO.
21 / 52
Parcel(s): 18 South

CLIENT
Vic torian Planning Authority

DATE
2020-04-29

TL REF.
010255

DATA SOURCES
Near Map aerial imagery dated: 24/12/2018

TREE LOCATION DISCLAIMER
Tree locations are approximate

COORDINATE REFERENCE SYSTEM
EPSG:28355 | GDA 94 MGA Zone 55

0 20 40m

TREELOGIC PTY LTD
ABN: 95 080 021 610
TEL: 1300 656 926

4 / 21 Eugene Tce
Ringwood, VIC
Australia 3134

Treelogic
Plan, manage, protect

LEGEND

Trees by Arb rating
- Mod-B
- Mod-C
- Low
- Very Low

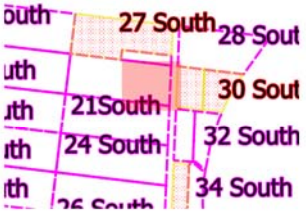
All Groups
- Mod-B
- Mod-C
- Low
- Very Low

Protection zones
- TPZ
- Watercourse

Parcel
- No Access
- Accessed
- Roads
- Project area

APPENDIX 2
TREE LOCATIONS AND PROTECTION ZONES

PROJECT
Wallan South & Wallan East Precinct Structure Plan



MAP NO.
22 / 52
Parcel(s): 18 South

CLIENT
Vic torian Planning Authority

DATE
2020-04-29

TL REF.
010255

DATA SOURCES
Near Map aerial imagery dated: 24/12/2018

TREE LOCATION DISCLAIMER
Tree locations are approximate

COORDINATE REFERENCE SYSTEM
EPSG:28355 | GDA 94 MGA Zone 55

0 20 40m

TREELOGIC PTY LTD
ABN: 95 080 021 610
TEL: 1300 656 926

4 / 21 Eugene Tce
Ringwood, VIC
Australia 3134

Treelogic
Plan, manage, protect

LEGEND

Trees by Arb rating
- Low
- Very Low

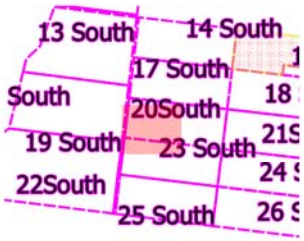
Protection zones
- TPZ
- Watercourse

All Groups
- Mod-B

Parcel
- Accessed
- Roads
- Contours
- Project area

APPENDIX 2
TREE LOCATIONS AND PROTECTION ZONES

PROJECT
Wallan South & Wallan East Precinct Structure Plan



MAP NO.
23 / 52
Parcel(s): 20 South

CLIENT
Vic torian Planning Authority

DATE
2020-04-29

TL REF.
010255

DATA SOURCES
Near Map aerial imagery dated: 24/12/2018

TREE LOCATION DISCLAIMER
Tree locations are approximate

COORDINATE REFERENCE SYSTEM
EPSG:28355 | GDA 94 MGA Zone 55

0 20 40m

TREELOGIC PTY LTD
ABN: 95 080 021 610
TEL: 1300 656 926

4 / 21 Eugene Tce
Ringwood, VIC
Australia 3134

Treelogic
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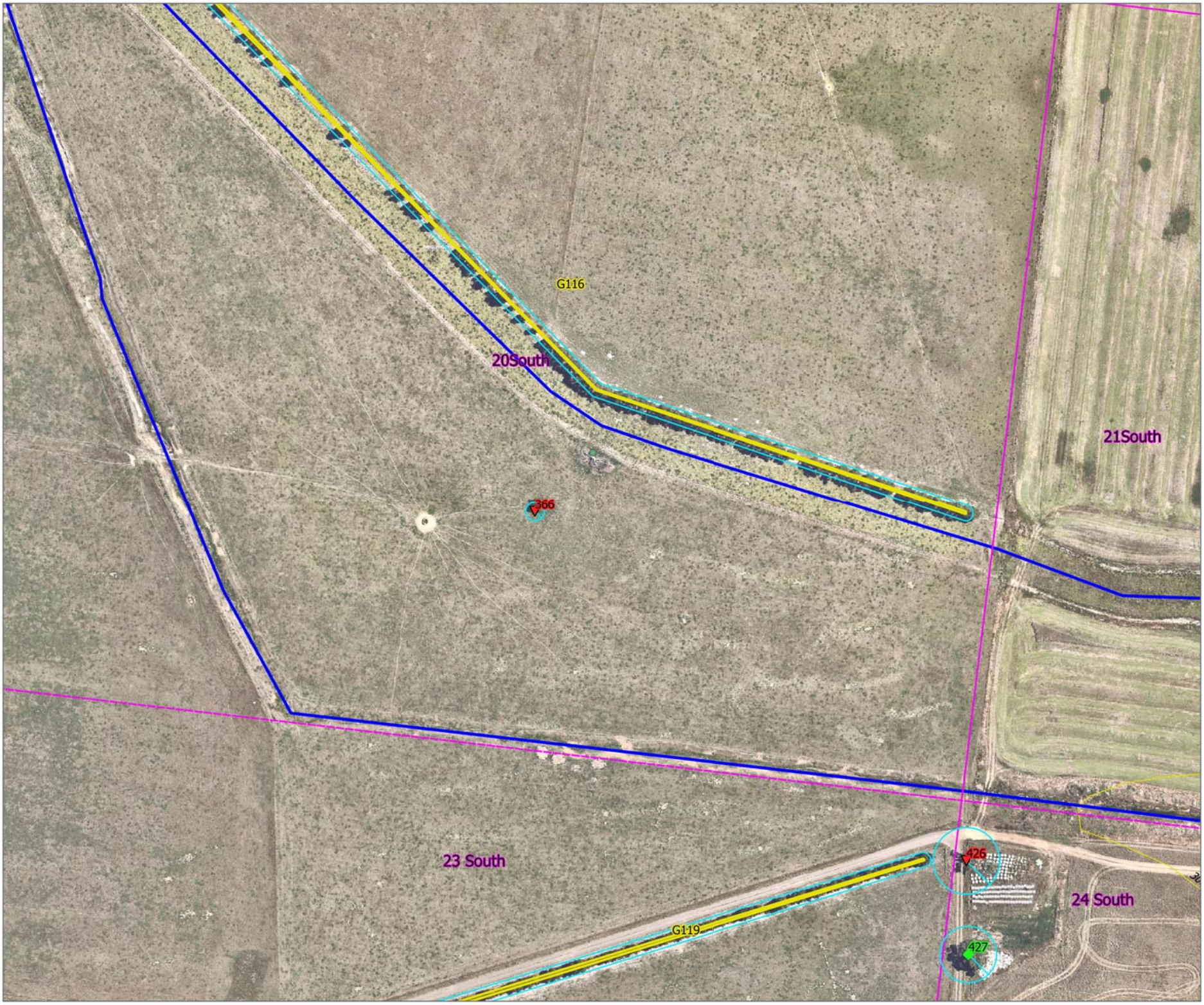


LEGEND

Trees by Arb rating
- Mod-B
- Very Low

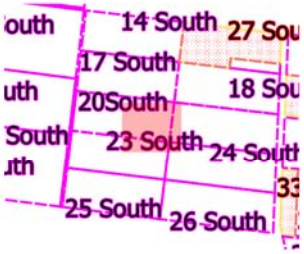
Protection zones
- TPZ
- Watercourse

All Groups
- Mod-B

Parcel
- Accessed
- Contours
- Project area

APPENDIX 2
TREE LOCATIONS AND PROTECTION ZONES

PROJECT
Wallan South & Wallan East Precinct Structure Plan



MAP NO.
24 / 52
Parcel(s): 20 South

CLIENT
Vic torian Planning Authority

DATE
2020-04-29

TL REF.
010255

DATA SOURCES
Near Map aerial imagery dated: 24/12/2018

TREE LOCATION DISCLAIMER
Tree locations are approximate

COORDINATE REFERENCE SYSTEM
EPSG:28355 | GDA 94 MGA Zone 55

0 20 40m

TREELOGIC PTY LTD
ABN: 95 080 021 610
TEL: 1300 656 926

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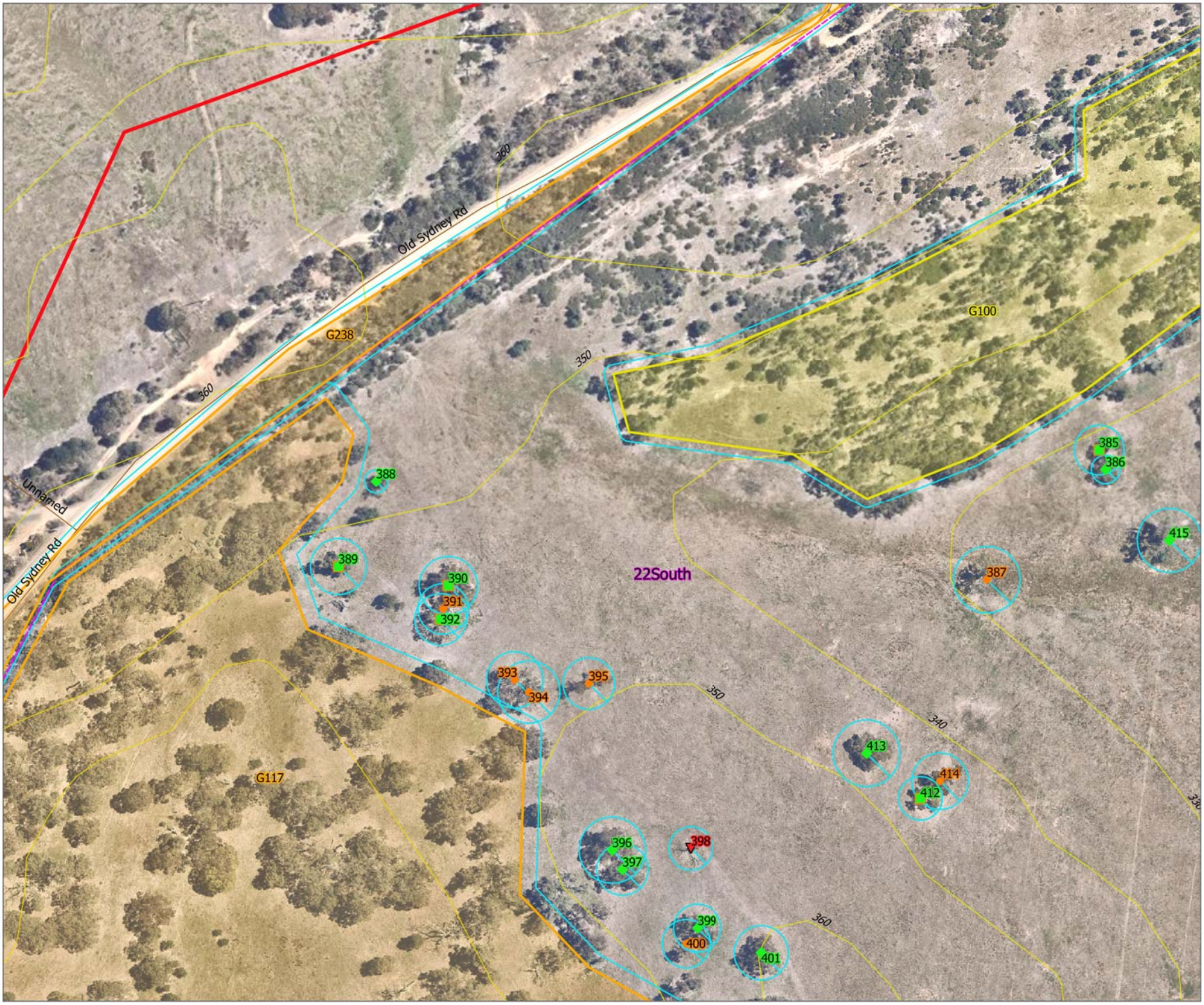
Ringwood, VIC
Australia 3134

Treelogic
Plan, manage, protect



LEGEND

Trees by Arb rating
- Mod-B
- Mod-C
- Low
- Very Low

Protection zones
- TPZ

All Groups
- Mod-B
- Mod-C

Parcel
- Accessed
- Roads
- Contours
- Project area

APPENDIX 2
TREE LOCATIONS AND PROTECTION ZONES

PROJECT
Wallan South & Wallan East Precinct Structure Plan

MAP NO.
25 / 52
Parcel(s): 22 South

CLIENT
Vic torian Planning Authority

DATE
2020-04-29

TL REF.
010255

DATA SOURCES
Near Map aerial imagery dated: 24/12/2018

TREE LOCATION DISCLAIMER
Tree locations are approximate

COORDINATE REFERENCE SYSTEM
EPSG:28355 | GDA 94 MGA Zone 55

0 20 40m

TREELOGIC PTY LTD
ABN: 95 080 021 610
TEL: 1300 656 926

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Ringwood, VIC
Australia 3134

Treelogic
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LEGEND

Trees by Arb rating
- Mod-B
- Mod-C
- Low
- Very Low

Protection zones
- TPZ
- Watercourse

All Groups
- Mod-C

Parcel
- Accessed
- Roads
- Contours
- Project area

APPENDIX 2
TREE LOCATIONS AND PROTECTION ZONES

PROJECT
Wallan South & Wallan East Precinct Structure Plan

MAP NO.
26 / 52
Parcel(s): 22 South

CLIENT
Vic torian Planning Authority

DATE
2020-04-29

TL REF.
010255

DATA SOURCES
Near Map aerial imagery dated: 24/12/2018

TREE LOCATION DISCLAIMER
Tree locations are approximate

COORDINATE REFERENCE SYSTEM
EPSG:28355 | GDA 94 MGA Zone 55

0 20 40m

TREELOGIC PTY LTD
ABN: 95 080 021 610
TEL: 1300 656 926

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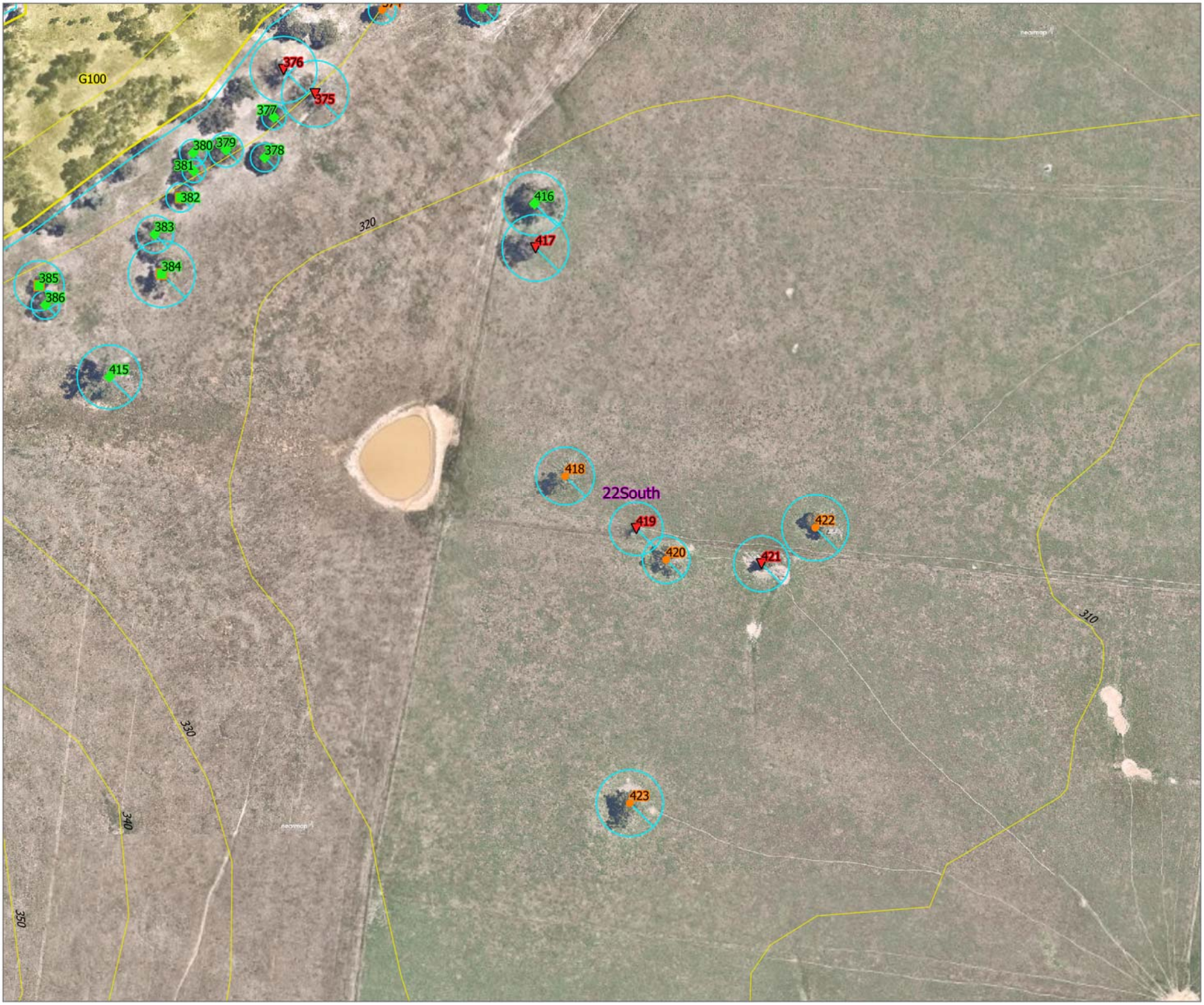
Ringwood, VIC
Australia 3134

Treelogic
Plan, manage, protect



LEGEND

Trees by Arb rating
- Mod-B
- Mod-C
- Low
- Very Low

All Groups
- Mod-B

Parcel
- Accessed
- Contours

Protection zones
- TPZ

- Project area

APPENDIX 2
TREE LOCATIONS AND PROTECTION ZONES

PROJECT
Wallan South & Wallan East Precinct Structure Plan

MAP NO.
27 / 52
Parcel(s): 22 South

CLIENT
Vic torian Planning Authority

DATE
2020-04-29

TL REF.
010255

DATA SOURCES
Near Map aerial imagery dated: 24/12/2018

TREE LOCATION DISCLAIMER
Tree locations are approximate

COORDINATE REFERENCE SYSTEM
EPSG:28355 | GDA 94 MGA Zone 55

0 20 40m

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ABN: 95 080 021 610
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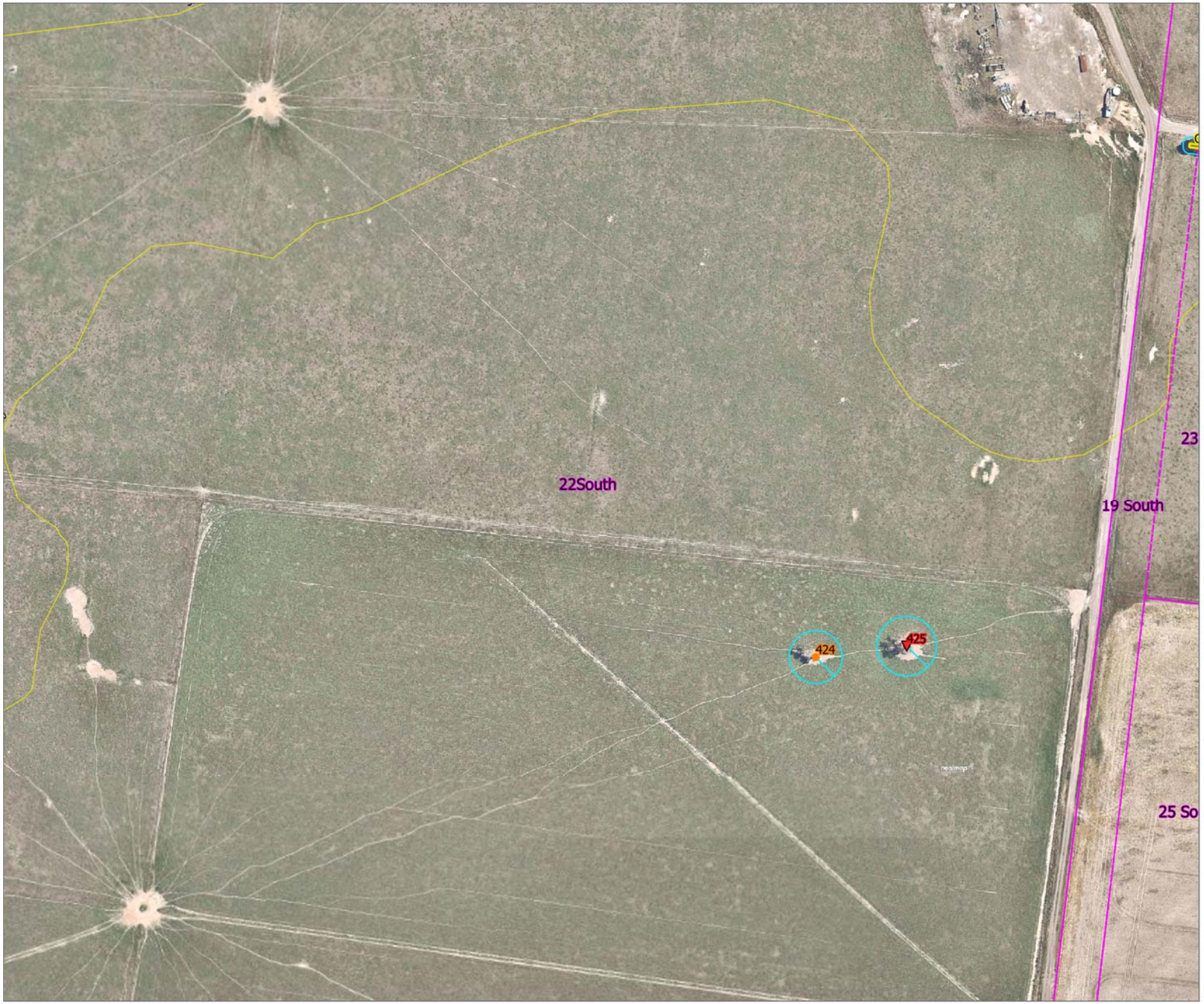
Ringwood, VIC
Australia 3134

Treelogic
Plan, manage, protect



LEGEND

Trees by Arb rating
- Low
- Very Low

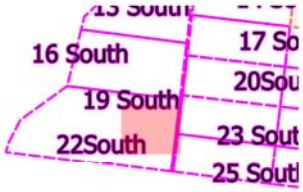
Protection zones
- TPZ

All Groups
- Mod-B

Parcel
- Accessed
- Contours
- Project area

APPENDIX 2
TREE LOCATIONS AND PROTECTION ZONES

PROJECT
Wallan South & Wallan East Precinct Structure Plan



MAP NO.
28 / 52
Parcel(s): 22 South

CLIENT
Vic torian Planning Authority

DATE
2020-04-29

TL REF.
010255

DATA SOURCES
Near Map aerial imagery dated: 24/12/2018

TREE LOCATION DISCLAIMER
Tree locations are approximate

COORDINATE REFERENCE SYSTEM
EPSG:28355 | GDA 94 MGA Zone 55

0 20 40m

TREELOGIC PTY LTD
ABN: 95 080 021 610
TEL: 1300 656 926

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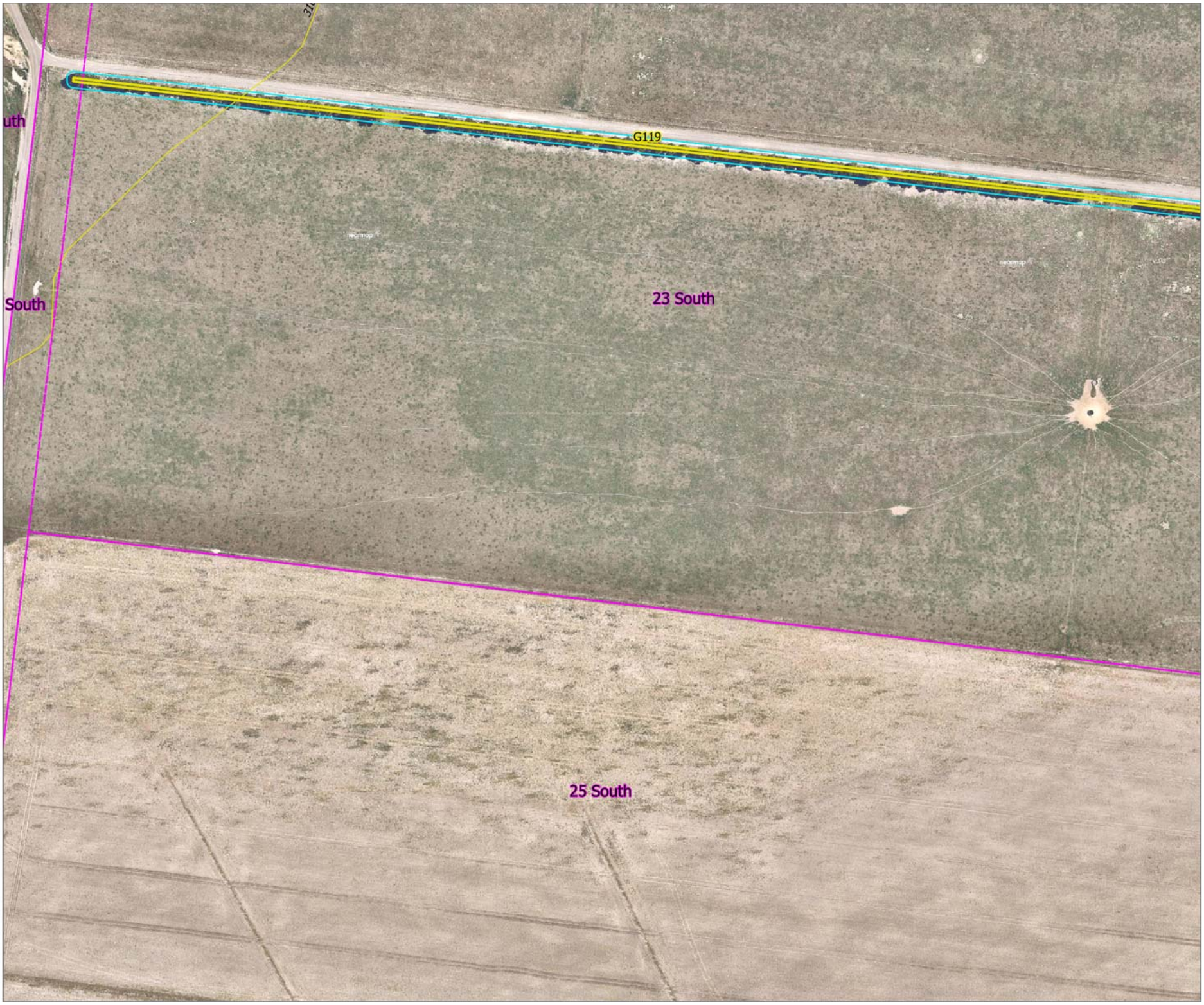
Ringwood, VIC
Australia 3134

Treelogic
Plan, manage, protect



LEGEND

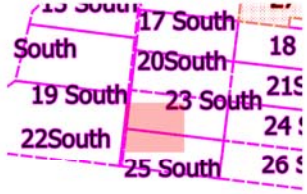
Protection zones
- TPZ

All Groups
- Mod-B

Parcel
- Accessed
- Contours
- Project area

APPENDIX 2
TREE LOCATIONS AND PROTECTION ZONES

PROJECT
Wallan South & Wallan East Precinct Structure Plan



MAP NO.
29 / 52
Parcel(s): 23 South

CLIENT
Vic torian Planning Authority

DATE
2020-04-29

TL REF.
010255

DATA SOURCES
Near Map aerial imagery dated: 24/12/2018

TREE LOCATION DISCLAIMER
Tree locations are approximate

COORDINATE REFERENCE SYSTEM
EPSG:28355 | GDA 94 MGA Zone 55

0 20 40m

TREELOGIC PTY LTD
ABN: 95 080 021 610
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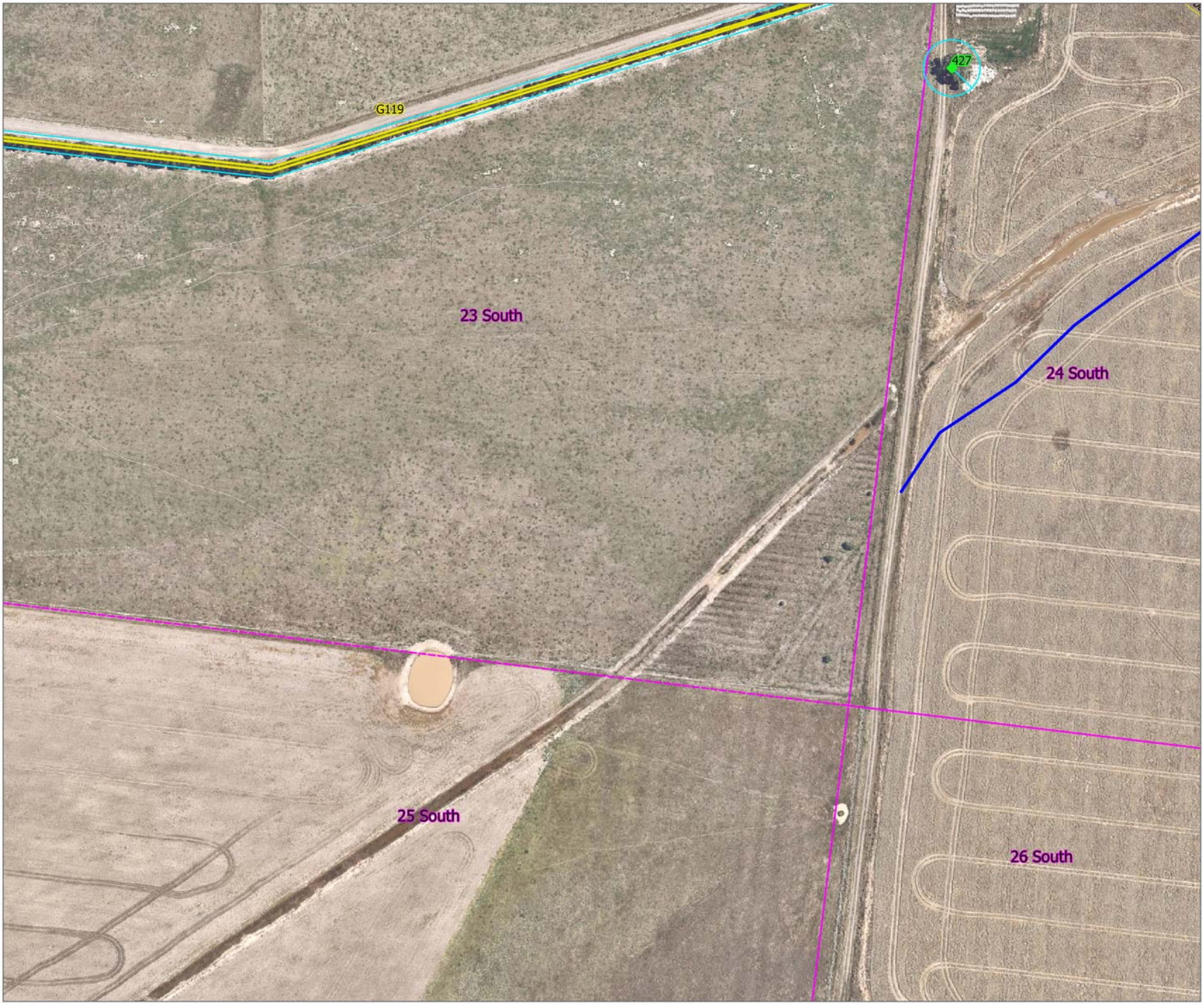
4 / 21 Eugene Tce
Ringwood, VIC
Australia 3134

Treelogic
Plan, manage, protect



LEGEND

Trees by Arb rating
- Mod-B

All Groups
- Mod-B

Protection zones
- TPZ
- Watercourse

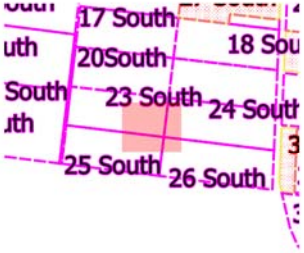
Parcel
- Accessed
- Contours
- Project area

APPENDIX 2

TREE LOCATIONS AND PROTECTION ZONES

PROJECT

Wallan South & Wallan East Precinct Structure Plan



MAP NO.

30 / 52

Parcel(s): 23 South

CLIENT
Vic torian Planning Authority

DATE
2020-04-29

TL REF.
010255

DATA SOURCES
Near Map aerial imagery dated: 24/12/2018

TREE LOCATION DISCLAIMER
Tree locations are approximate

COORDINATE REFERENCE SYSTEM
EPSG:28355 | GDA 94 MGA Zone 55

0 20 40m

TREELOGIC PTY LTD
ABN: 95 080 021 610
TEL: 1300 656 926

4 / 21 Eugene Tce
Ringwood, VIC
Australia 3134

Treelogic
Plan, manage, protect

LEGEND

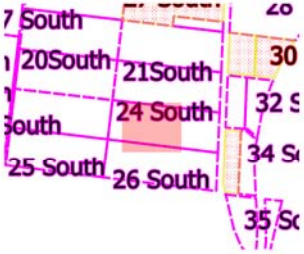
Trees by Arb rating
- Low

Watercourse

Parcel
- Accessed
- Contours
- Project area

APPENDIX 2
TREE LOCATIONS AND PROTECTION ZONES

PROJECT
Wallan South & Wallan East Precinct Structure Plan



MAP NO.
31 / 52
Parcel(s): 24 South

CLIENT
Vic torian Planning Authority

DATE
2020-04-29

TL REF.
010255

DATA SOURCES
Near Map aerial imagery dated: 24/12/2018

TREE LOCATION DISCLAIMER
Tree locations are approximate

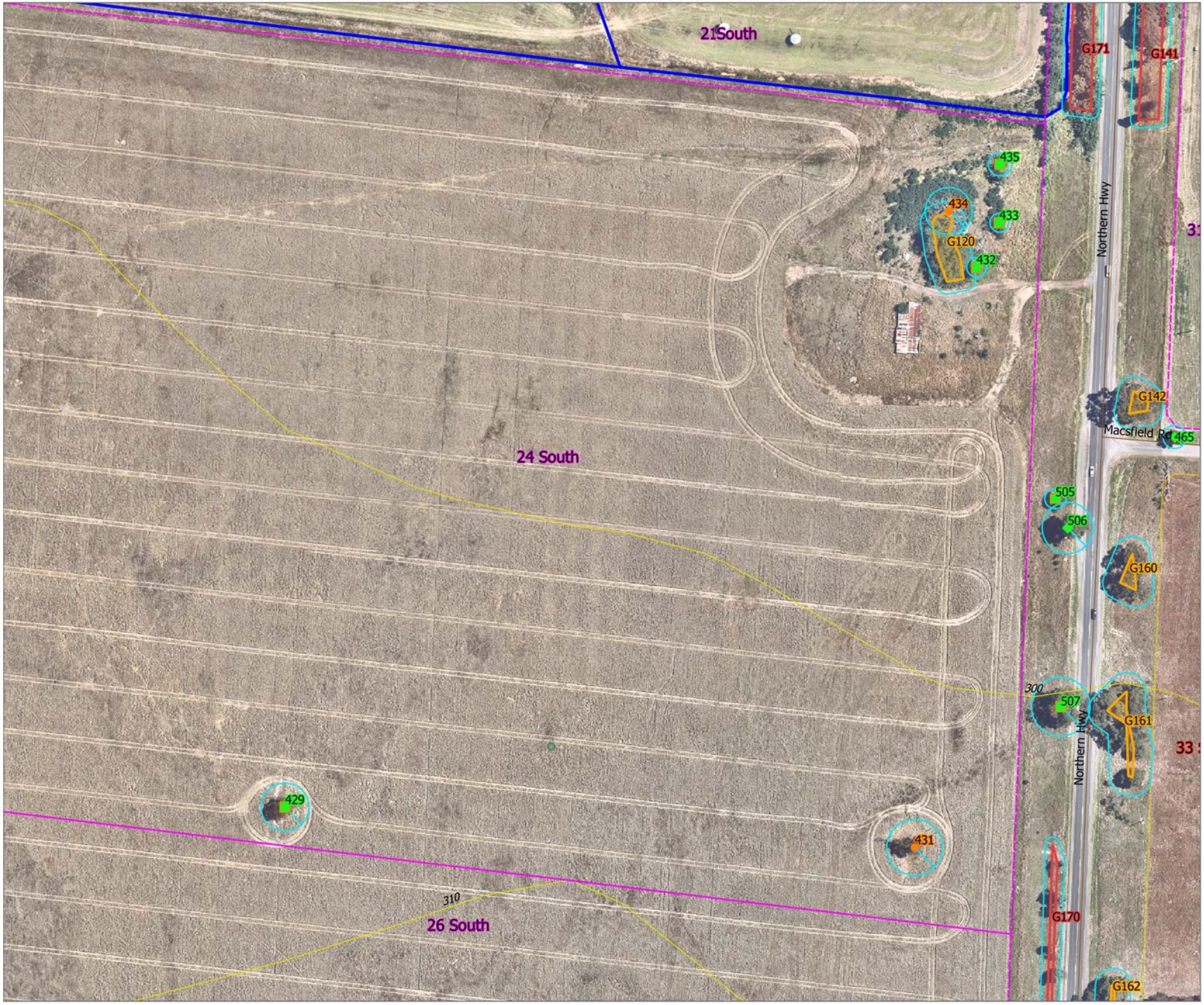
COORDINATE REFERENCE SYSTEM
EPSG:28355 | GDA 94 MGA Zone 55

0 20 40m

TREELOGIC PTY LTD
ABN: 95 080 021 610
TEL: 1300 656 926

4 / 21 Eugene Tce
Ringwood, VIC
Australia 3134

Treelogic
Plan, manage, protect



LEGEND

Trees by Arb rating
- Mod-B
- Mod-C
- Low

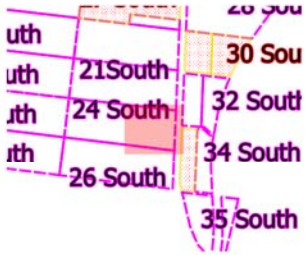
All Groups
- Mod-C
- Low
- Very Low

Protection zones
- TPZ
- Watercourse

Parcel
- No Access
- Accessed
- Roads
- Contours
- Project area

APPENDIX 2
TREE LOCATIONS AND PROTECTION ZONES

PROJECT
Wallan South & Wallan East Precinct Structure Plan



MAP NO.
32 / 52
Parcel(s): 24 South

CLIENT
Vic torian Planning Authority

DATE
2020-04-29

TL REF.
010255

DATA SOURCES
Near Map aerial imagery dated: 24/12/2018

TREE LOCATION DISCLAIMER
Tree locations are approximate

COORDINATE REFERENCE SYSTEM
EPSG:28355 | GDA 94 MGA Zone 55

0 20 40m

TREELOGIC PTY LTD
ABN: 95 080 021 610
TEL: 1300 656 926
4 / 21 Eugene Tce
Ringwood, VIC
Australia 3134

Treelogic
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LEGEND

Protection zones
- TPZ

Parcel
- Accessed
- Project area

All Groups
- Mod-C

APPENDIX 2
TREE LOCATIONS AND PROTECTION ZONES

PROJECT
Wallan South & Wallan East Precinct Structure Plan

MAP NO.
33 / 52
Parcel(s): 25 South

CLIENT
Vic torian Planning Authority

DATE
2020-04-29

TL REF.
010255

DATA SOURCES
Near Map aerial imagery dated: 24/12/2018

TREE LOCATION DISCLAIMER
Tree locations are approximate

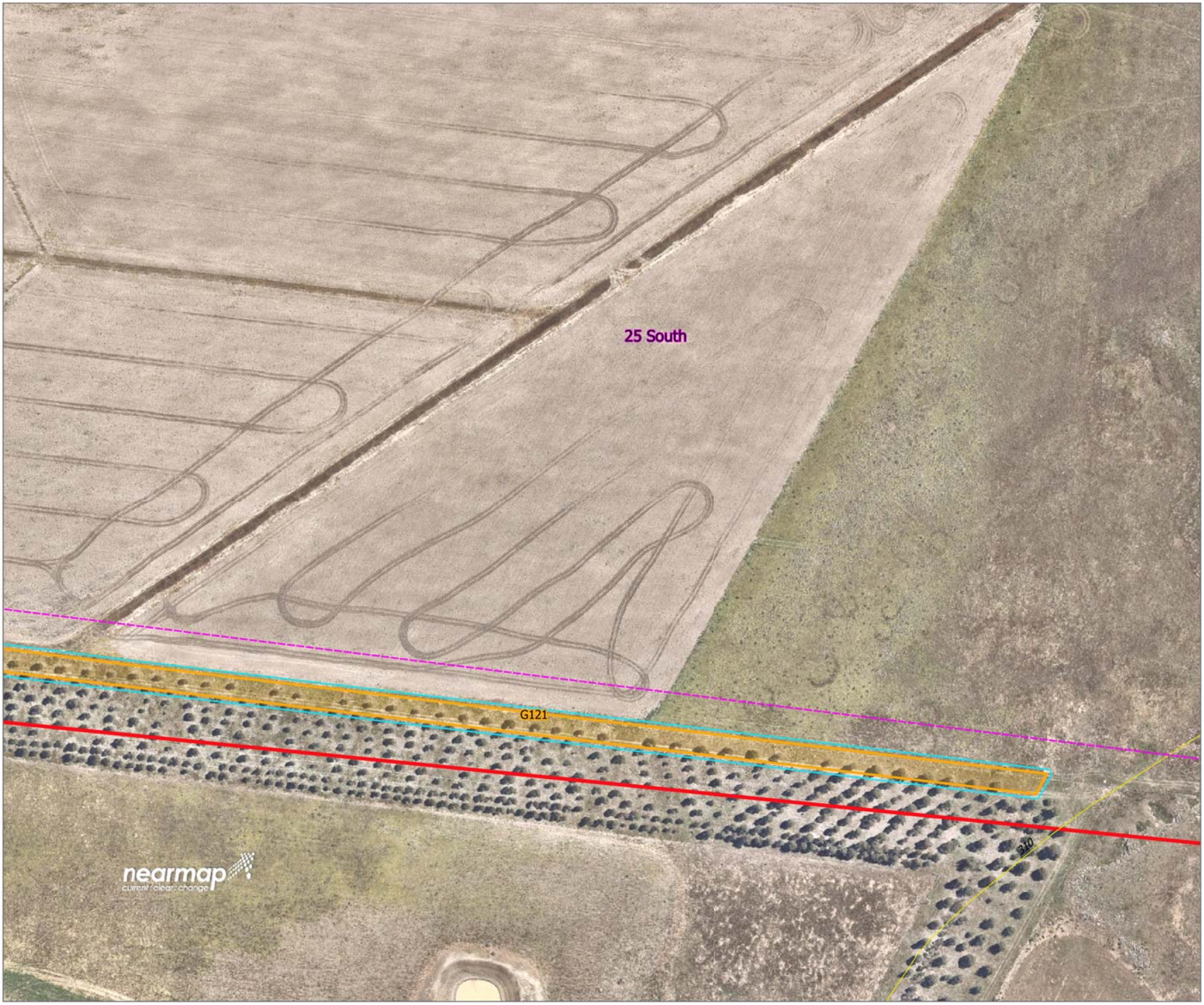
COORDINATE REFERENCE SYSTEM
EPSG:28355 | GDA 94 MGA Zone 55

0 20 40m

TREELOGIC PTY LTD
ABN: 95 080 021 610
TEL: 1300 656 926

4 / 21 Eugene Tce
Ringwood, VIC
Australia 3134

Treelogic
Plan. manage. protect



LEGEND

Protection zones
- TPZ

All Groups
- Mod-C

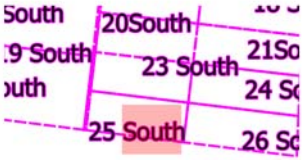
Parcel
- Accessed

Contours

Project area

APPENDIX 2
TREE LOCATIONS AND PROTECTION ZONES

PROJECT
Wallan South & Wallan East Precinct Structure Plan



MAP NO.
34 / 52
Parcel(s): 25 South

CLIENT
Vic torian Planning Authority

DATE
2020-04-29

TL REF.
010255

DATA SOURCES
Near Map aerial imagery dated: 24/12/2018

TREE LOCATION DISCLAIMER
Tree locations are approximate

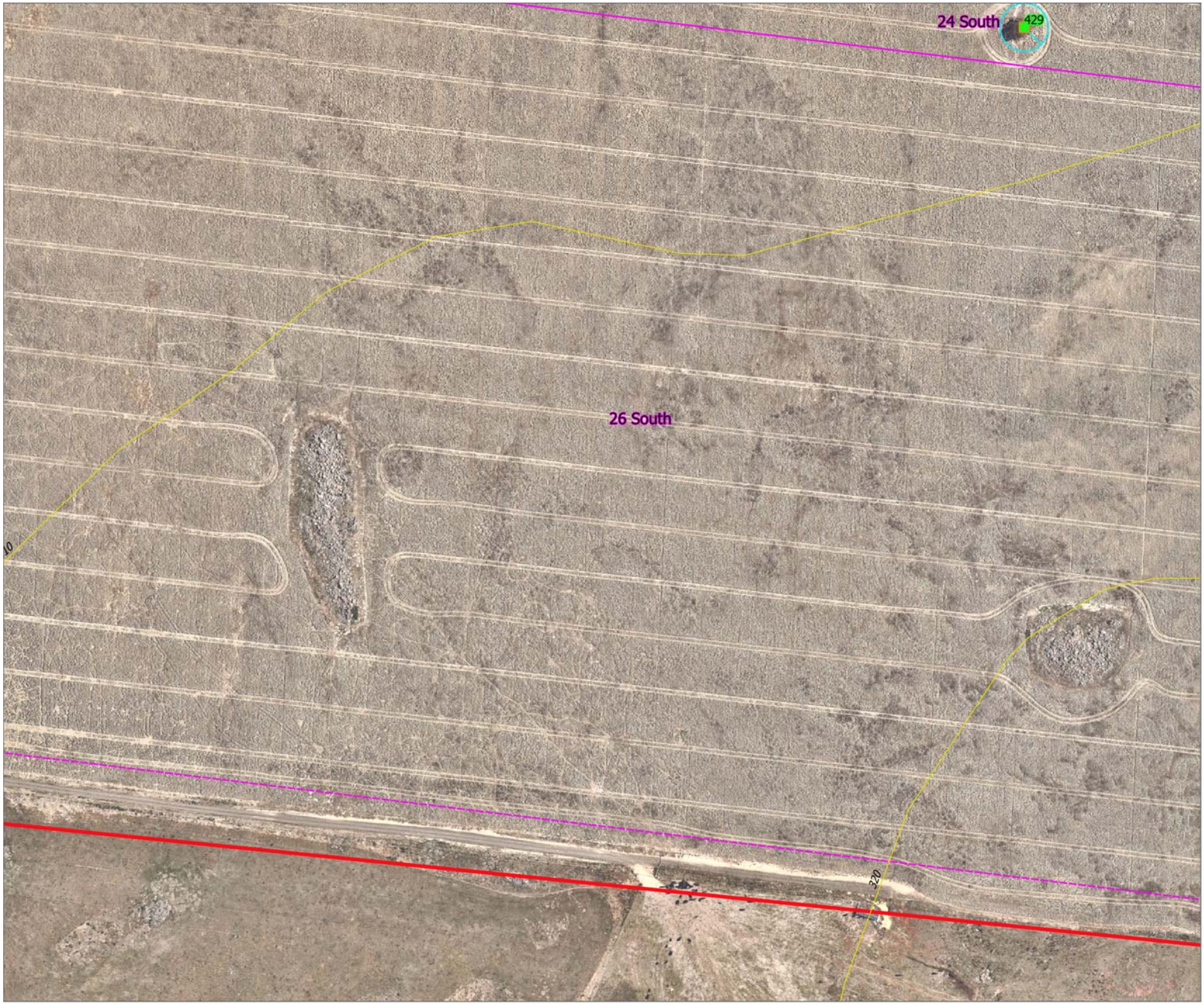
COORDINATE REFERENCE SYSTEM
EPSG:28355 | GDA 94 MGA Zone 55

0 20 40m

TREELOGIC PTY LTD
ABN: 95 080 021 610
TEL: 1300 656 926

4 / 21 Eugene Tce
Ringwood, VIC
Australia 3134

Treelogic
Plan, manage, protect



LEGEND

Trees by Arb rating
- Mod-C

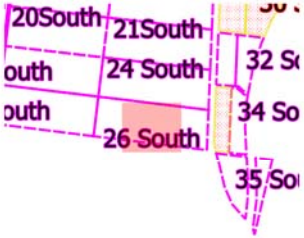
Contours

Project area

Parcel
- Accessed

APPENDIX 2
TREE LOCATIONS AND PROTECTION ZONES

PROJECT
Wallan South & Wallan East Precinct Structure Plan



MAP NO.
35 / 52
Parcel(s): 26 South

CLIENT
Vic torian Planning Authority

DATE
2020-04-29

TL REF.
010255

DATA SOURCES
Near Map aerial imagery dated: 24/12/2018

TREE LOCATION DISCLAIMER
Tree locations are approximate

COORDINATE REFERENCE SYSTEM
EPSG:28355 | GDA 94 MGA Zone 55

0 20 40m

TREELOGIC PTY LTD
ABN: 95 080 021 610
TEL: 1300 656 926

4 / 21 Eugene Tce
Ringwood, VIC
Australia 3134

Treelogic
Plan, manage, protect

LEGEND

Trees by Arb rating
- Mod-C
- Low

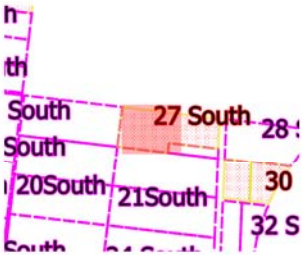
Protection zones
- TPZ
- Watercourse

Parcel
- No Access
- Accessed
- Roads
- Contours
- Project area

All Groups
- Low
- Very Low

APPENDIX 2
TREE LOCATIONS AND PROTECTION ZONES

PROJECT
Wallan South & Wallan East Precinct Structure Plan



MAP NO.
36 / 52
Parcel(s): 27 South

CLIENT
Vic torian Planning Authority

DATE
2020-04-29

TL REF.
010255

DATA SOURCES
Near Map aerial imagery dated: 24/12/2018

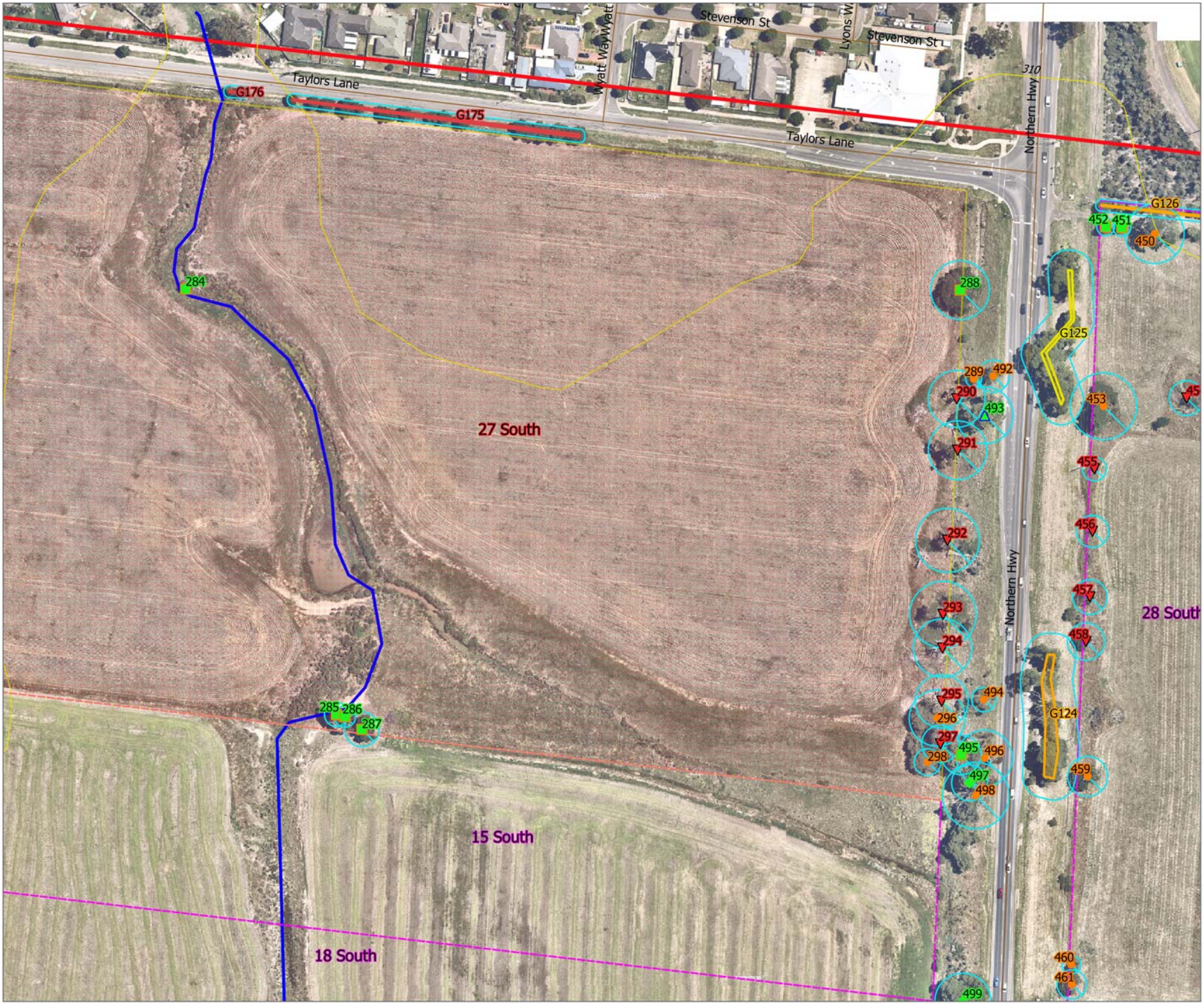
TREE LOCATION DISCLAIMER
Tree locations are approximate

COORDINATE REFERENCE SYSTEM
EPSG:28355 | GDA 94 MGA Zone 55

0 20 40m

TREELOGIC PTY LTD
ABN: 95 080 021 610
TEL: 1300 656 926
4 / 21 Eugene Tce
Ringwood, VIC
Australia 3134

Treelogic
Plan, manage, protect



LEGEND

Trees by Arb rating
- Mod-A
- Mod-B
- Mod-C
- Low
- Very Low

All Groups
- Mod-B
- Mod-C
- Low
- Very Low

Parcel
- No Access
- Accessed

Protection zones
- TPZ
- Watercourse

- Roads
- Contours
- Project area

APPENDIX 2
TREE LOCATIONS AND PROTECTION ZONES

PROJECT
Wallan South & Wallan East Precinct Structure Plan

MAP NO.
37 / 52
Parcel(s): 15 & 27 South

CLIENT
Vic torian Planning Authority

DATE
2020-04-29

TL REF.
010255

DATA SOURCES
Near Map aerial imagery dated: 24/12/2018

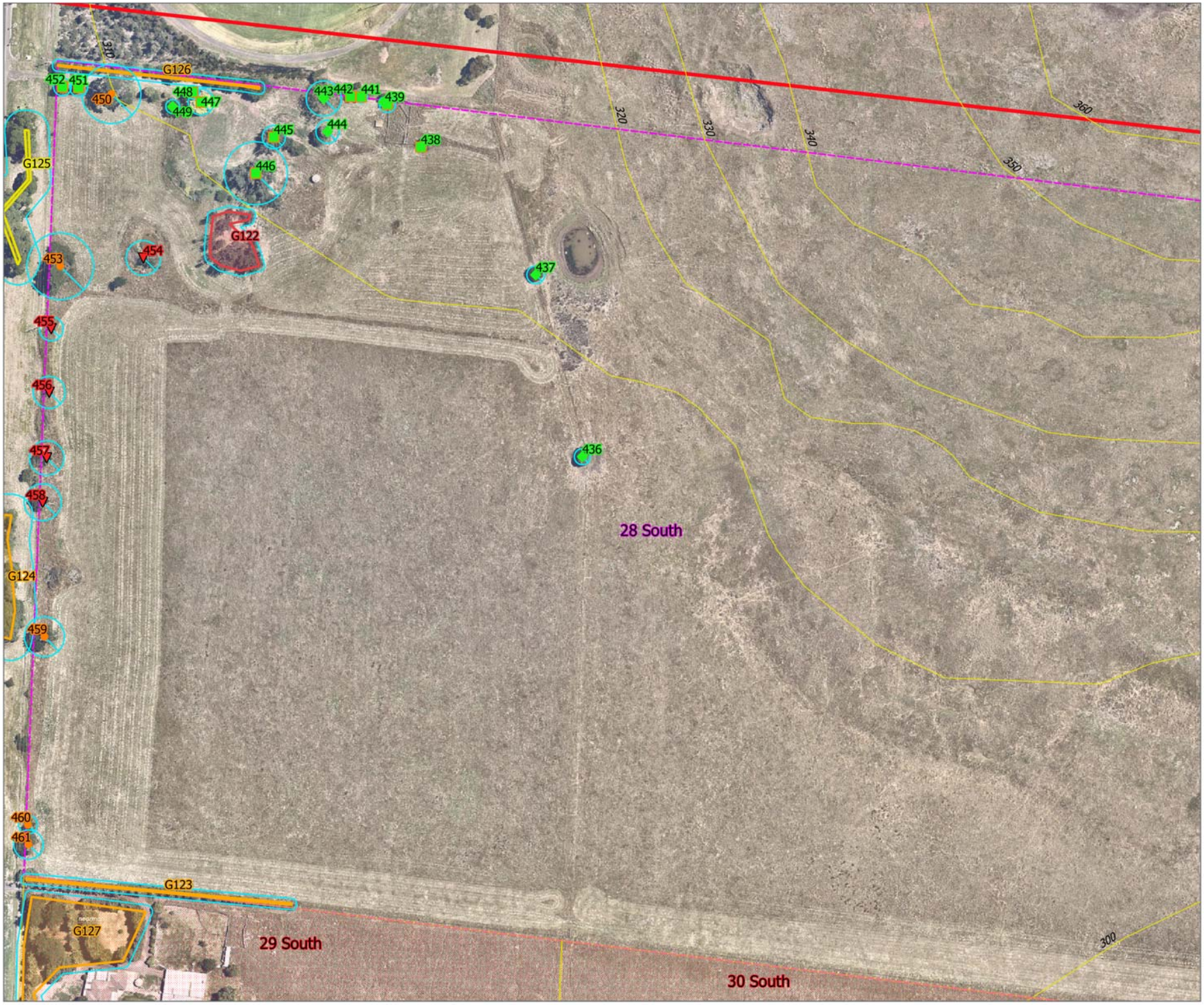
TREE LOCATION DISCLAIMER
Tree locations are approximate

COORDINATE REFERENCE SYSTEM
EPSG:28355 | GDA 94 MGA Zone 55

0 20 40m

TREELOGIC PTY LTD
ABN: 95 080 021 610
TEL: 1300 656 926
4 / 21 Eugene Tce
Ringwood, VIC
Australia 3134

Treelogic
Plan, manage, protect



LEGEND

Trees by Arb rating
- Mod-B
- Mod-C
- Low
- Very Low

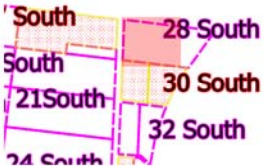
All Groups
- Mod-B
- Mod-C
- Low
- Very Low

Protection zones
- TPZ

Parcel
- No Access
- Accessed
- Contours
- Project area

APPENDIX 2
TREE LOCATIONS AND PROTECTION ZONES

PROJECT
Wallan South & Wallan East Precinct Structure Plan



MAP NO.
38 / 52
Parcel(s): 28 South

CLIENT
Vic torian Planning Authority

DATE
2020-04-29

TL REF.
010255

DATA SOURCES
Near Map aerial imagery dated: 24/12/2018

TREE LOCATION DISCLAIMER
Tree locations are approximate

COORDINATE REFERENCE SYSTEM
EPSG:28355 | GDA 94 MGA Zone 55

0 20 40m

TREELOGIC PTY LTD
ABN: 95 080 021 610
TEL: 1300 656 926

4 / 21 Eugene Tce
Ringwood, VIC
Australia 3134

Treelogic
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LEGEND

Trees by Arb rating
- Mod-B
- Mod-C

Protection zones
- TPZ
- Watercourse

Parcel
- No Access
- Accessed
- Roads
- Contours
- Project area

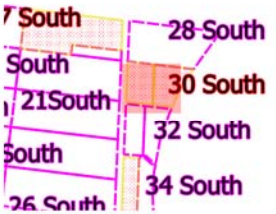
All Groups
- Mod-B
- Mod-C
- Low
- Very Low

APPENDIX 2

TREE LOCATIONS AND PROTECTION ZONES

PROJECT

Wallan South & Wallan East Precinct Structure Plan



MAP NO.

39 / 52

Parcel(s): 29 & 30 South

CLIENT
Vic torian Planning Authority

DATE
2020-04-29

TL REF.
010255

DATA SOURCES
Near Map aerial imagery dated: 24/12/2018

TREE LOCATION DISCLAIMER
Tree locations are approximate

COORDINATE REFERENCE SYSTEM
EPSG:28355 | GDA 94 MGA Zone 55

0 20 40m

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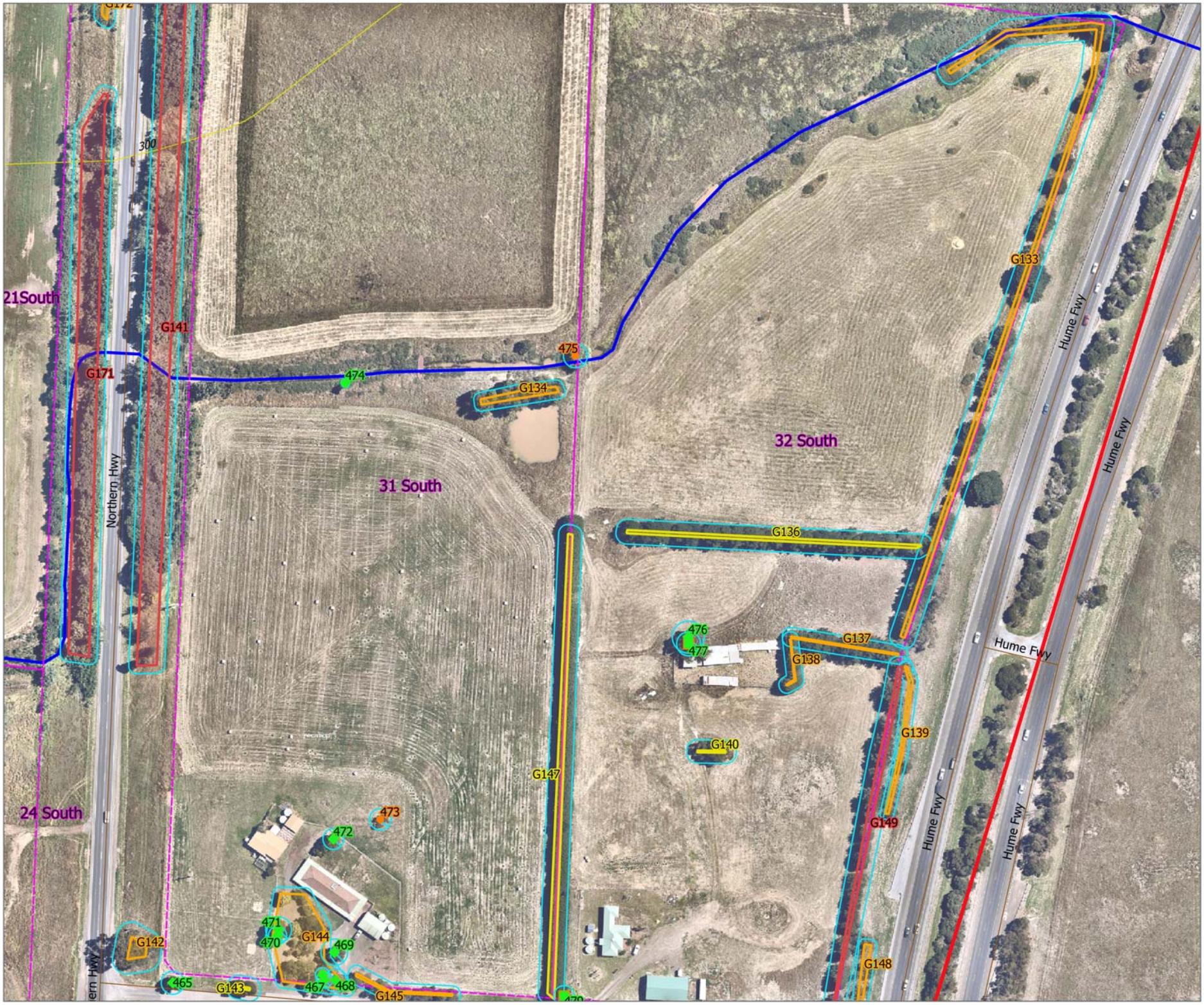


LEGEND

Trees by Arb rating
- Mod-B
- Mod-C
- Low

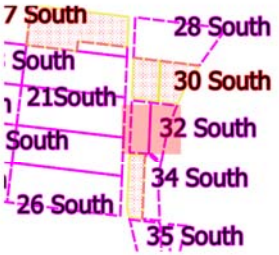
All Groups
- Mod-B
- Mod-C
- Low
- Very Low

Protection zones
- TPZ
- Watercourse

Parcel
- Accessed
- Roads
- Contours
- Project area

APPENDIX 2
TREE LOCATIONS AND PROTECTION ZONES

PROJECT
Wallan South & Wallan East Precinct Structure Plan



MAP NO.
40 / 52
Parcel(s): 31 & 32 South

CLIENT
Vic torian Planning Authority

DATE
2020-04-29

TL REF.
010255

DATA SOURCES
Near Map aerial imagery dated: 24/12/2018

TREE LOCATION DISCLAIMER
Tree locations are approximate

COORDINATE REFERENCE SYSTEM
EPSG:28355 | GDA 94 MGA Zone 55

0 20 40m

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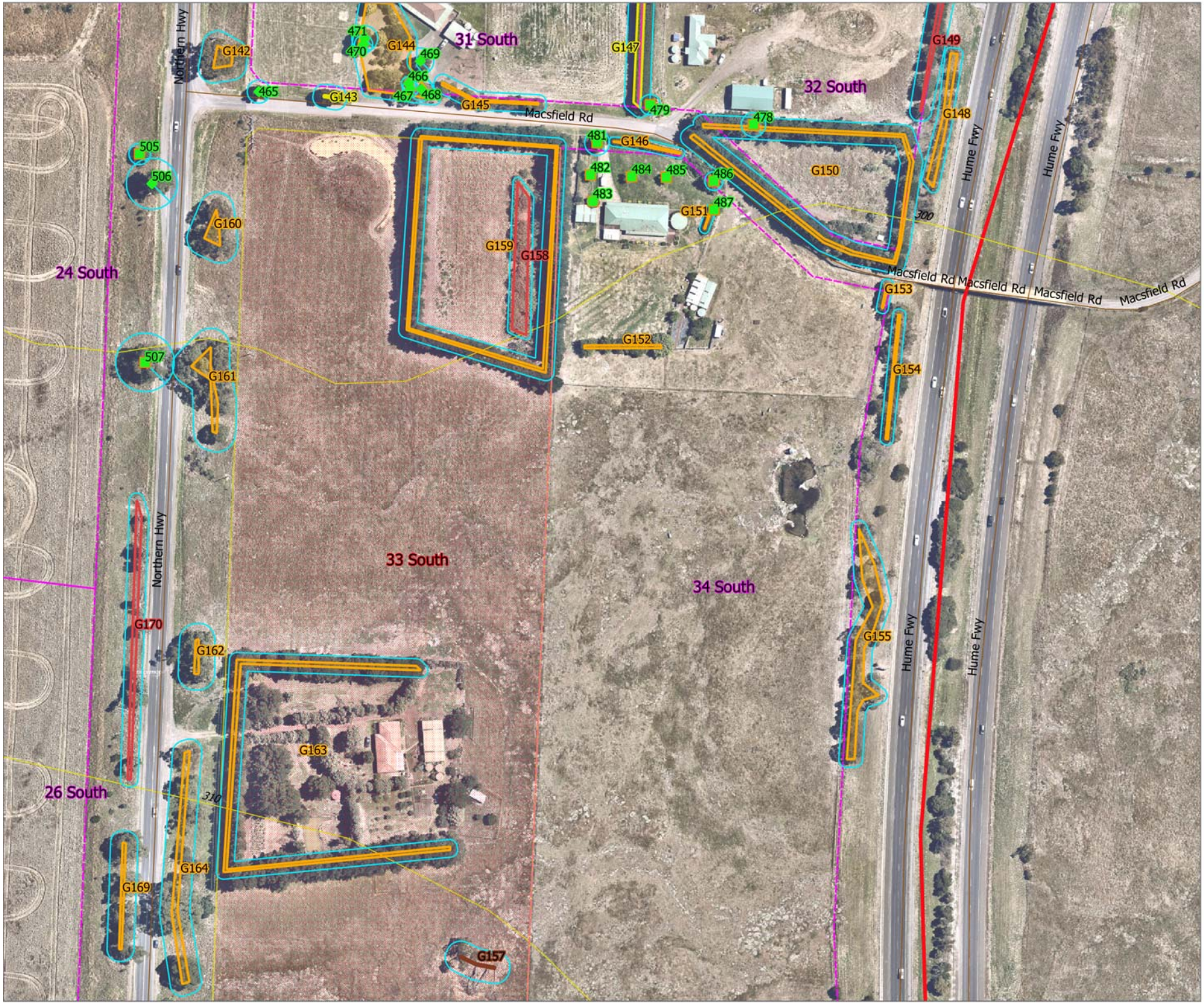


LEGEND

Trees by Arb rating
- Mod-B
- Mod-C

Protection zones
- TPZ

All Groups
- Mod-B
- Mod-C
- Low
- Very Low

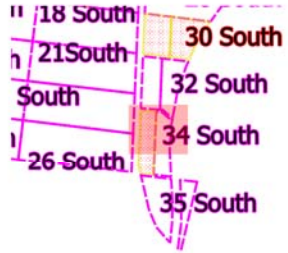
Parcel
- No Access
- Accessed
- Roads
- Contours
- Project area

APPENDIX 2

TREE LOCATIONS AND PROTECTION ZONES

PROJECT

Wallan South & Wallan East Precinct Structure Plan



MAP NO.

41 / 52

Parcel(s): 33 & 34 South

CLIENT
Vic torian Planning Authority

DATE
2020-04-29

TL REF.
010255

DATA SOURCES
Near Map aerial imagery dated: 24/12/2018

TREE LOCATION DISCLAIMER
Tree locations are approximate

COORDINATE REFERENCE SYSTEM
EPSG:28355 | GDA 94 MGA Zone 55

0 20 40m

TREELOGIC PTY LTD
ABN: 95 080 021 610
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Ringwood, VIC
Australia 3134

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LEGEND

Trees by Arb rating
- Mod-C
- Low

Protection zones
- TPZ

All Groups
- Mod-C
- Low
- Very Low

Parcel
- No Access
- Accessed

- Roads
- Contours
- Project area

APPENDIX 2

TREE LOCATIONS AND PROTECTION ZONES

PROJECT

Wallan South & Wallan East Precinct Structure Plan

MAP NO.

42 / 52

Parcel(s): 33, 34 & 35 South

CLIENT
Vic torian Planning Authority

DATE
2020-04-29

TL REF.
010255

DATA SOURCES
Near Map aerial imagery dated: 24/12/2018

TREE LOCATION DISCLAIMER
Tree locations are approximate

COORDINATE REFERENCE SYSTEM
EPSG:28355 | GDA 94 MGA Zone 55

0 20 40m

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ABN: 95 080 021 610
TEL: 1300 656 926

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Ringwood, VIC
Australia 3134

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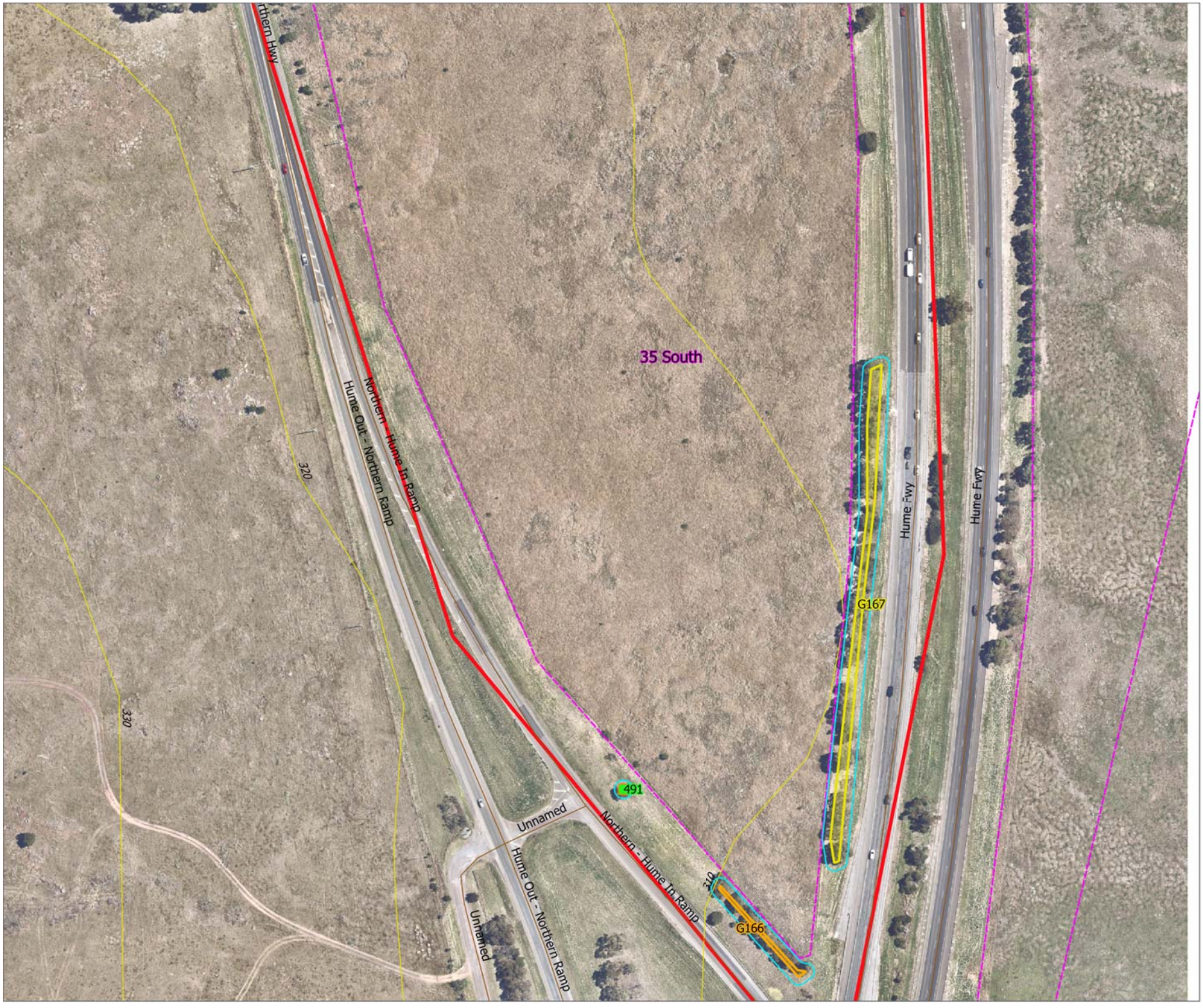


LEGEND

Trees by Arb rating
- Mod-C

Protection zones
- TPZ

All Groups
- Mod-B
- Mod-C

Parcel
- Accessed

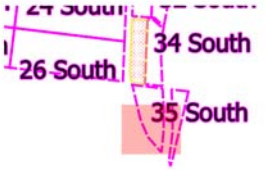
Roads

Contours

Project area

APPENDIX 2
TREE LOCATIONS AND PROTECTION ZONES

PROJECT
Wallan South & Wallan East Precinct Structure Plan



MAP NO.
43 / 52
Parcel(s): 35 South

CLIENT
Vic torian Planning Authority

DATE
2020-04-29

TL REF.
010255

DATA SOURCES
Near Map aerial imagery dated: 24/12/2018

TREE LOCATION DISCLAIMER
Tree locations are approximate

COORDINATE REFERENCE SYSTEM
EPSG:28355 | GDA 94 MGA Zone 55

0 20 40m

TREELOGIC PTY LTD
ABN: 95 080 021 610
TEL: 1300 656 926

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Ringwood, VIC
Australia 3134

Treelogic
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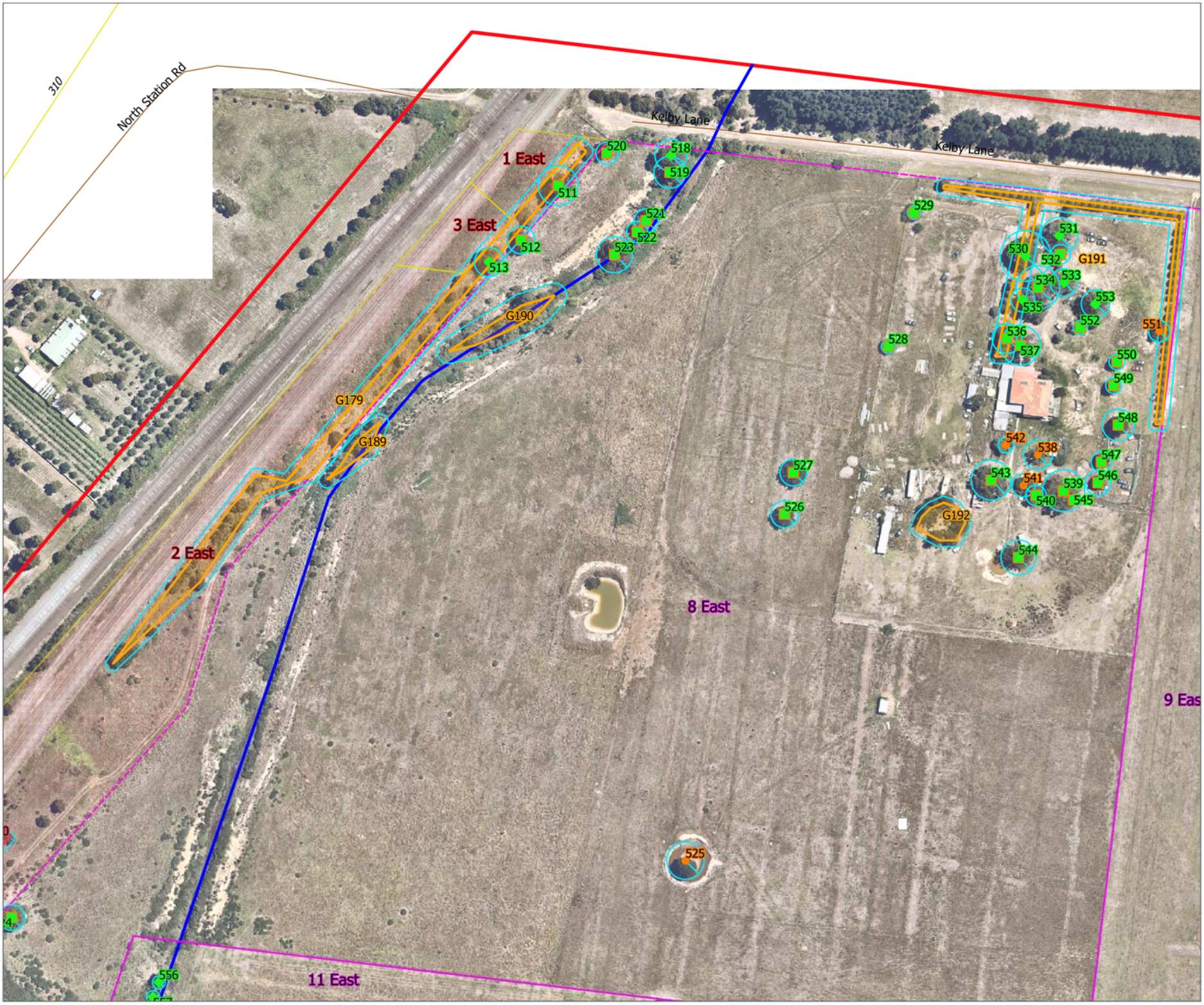

LEGEND

Trees by Arb rating
- Mod-B
- Mod-C
- Low

All Groups
- Mod-C
- Low
- Very Low

Protection zones
- TPZ
- Watercourse

Parcel
- No Access
- Accessed
- Roads
- Contours
- Project area

APPENDIX 2
TREE LOCATIONS AND PROTECTION ZONES

PROJECT
Wallan South & Wallan East Precinct Structure Plan

MAP NO.
44 / 52
Parcel(s): 1, 2 & 8 East

CLIENT
Vic torian Planning Authority

DATE
2020-04-29

TL REF.
010255

DATA SOURCES
Near Map aerial imagery dated: 24/12/2018

TREE LOCATION DISCLAIMER
Tree locations are approximate

COORDINATE REFERENCE SYSTEM
EPSG:28355 | GDA 94 MGA Zone 55

0 20 40m

TREELOGIC PTY LTD
ABN: 95 080 021 610
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Australia 3134

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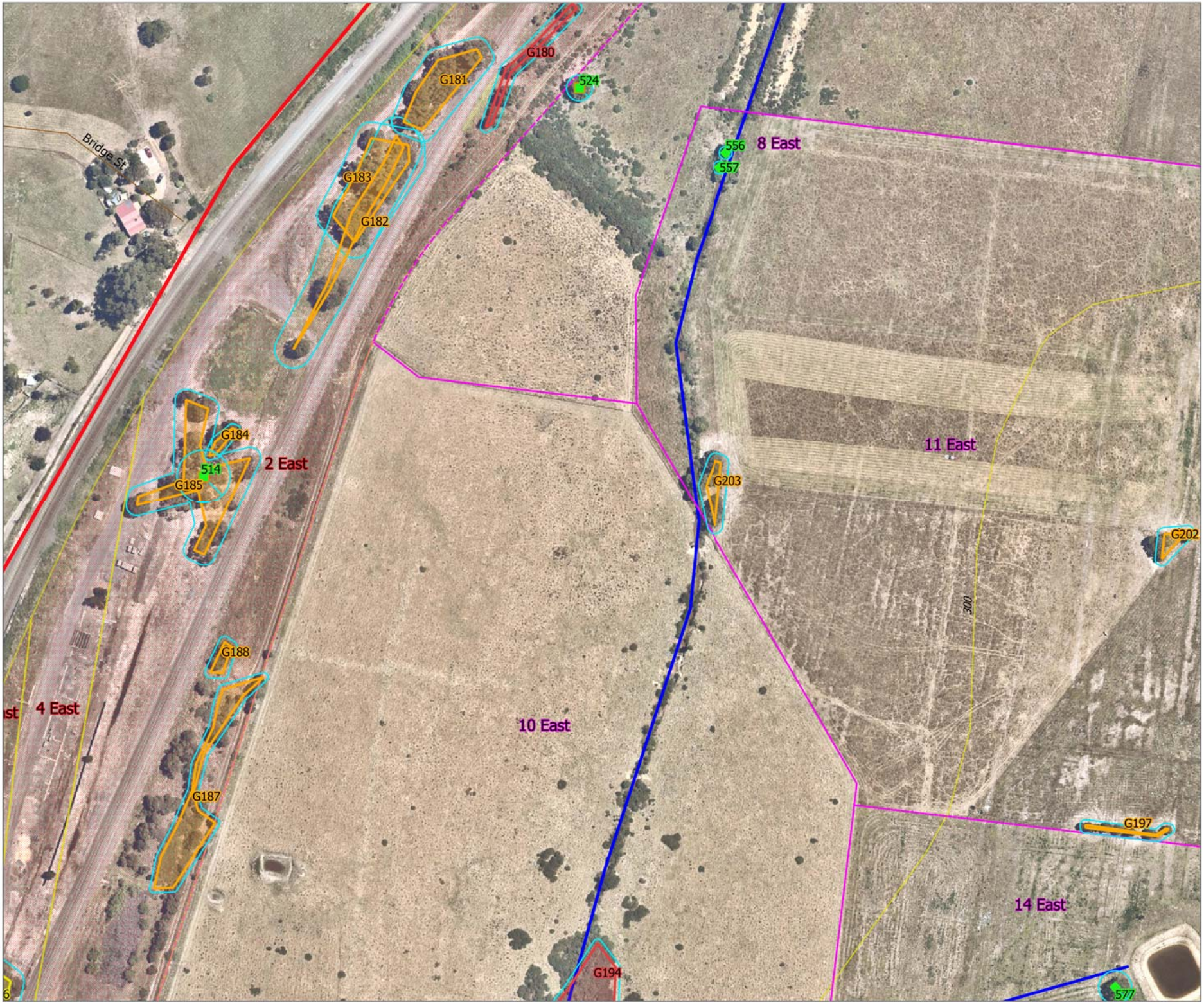

LEGEND

Trees by Arb rating
- Mod-B
- Mod-C

Protection zones
- TPZ
- Watercourse

Parcel
- No Access
- Accessed
- Roads
- Contours
- Project area

All Groups
- Mod-B
- Mod-C
- Low
- Very Low

APPENDIX 2
TREE LOCATIONS AND PROTECTION ZONES

PROJECT
Wallan South & Wallan East Precinct Structure Plan

MAP NO.
45 / 52
Parcel(s): 2, 3, 4, 11 East

CLIENT
Vic torian Planning Authority

DATE
2020-04-29

TL REF.
010255

DATA SOURCES
Near Map aerial imagery dated: 24/12/2018

TREE LOCATION DISCLAIMER
Tree locations are approximate

COORDINATE REFERENCE SYSTEM
EPSG:28355 | GDA 94 MGA Zone 55

0 20 40m

TREELOGIC PTY LTD
ABN: 95 080 021 610
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Ringwood, VIC
Australia 3134

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LEGEND

Trees by Arb rating
- Mod-B
- Mod-C
- Low

All Groups
- Mod-B
- Mod-C
- Low
- Very Low

Protection zones
- TPZ
- Watercourse

Parcel
- No Access
- Accessed
- Roads
- Contours
- Project area

APPENDIX 2
TREE LOCATIONS AND PROTECTION ZONES

PROJECT
Wallan South & Wallan East Precinct Structure Plan

MAP NO.
46 / 52
Parcel(s): 5-7 & 10 East

CLIENT
Vic torian Planning Authority

DATE
2020-04-29

TL REF.
010255

DATA SOURCES
Near Map aerial imagery dated: 24/12/2018

TREE LOCATION DISCLAIMER
Tree locations are approximate

COORDINATE REFERENCE SYSTEM
EPSG:28355 | GDA 94 MGA Zone 55

0 20 40m

TREELOGIC PTY LTD
ABN: 95 080 021 610
TEL: 1300 656 926

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Australia 3134

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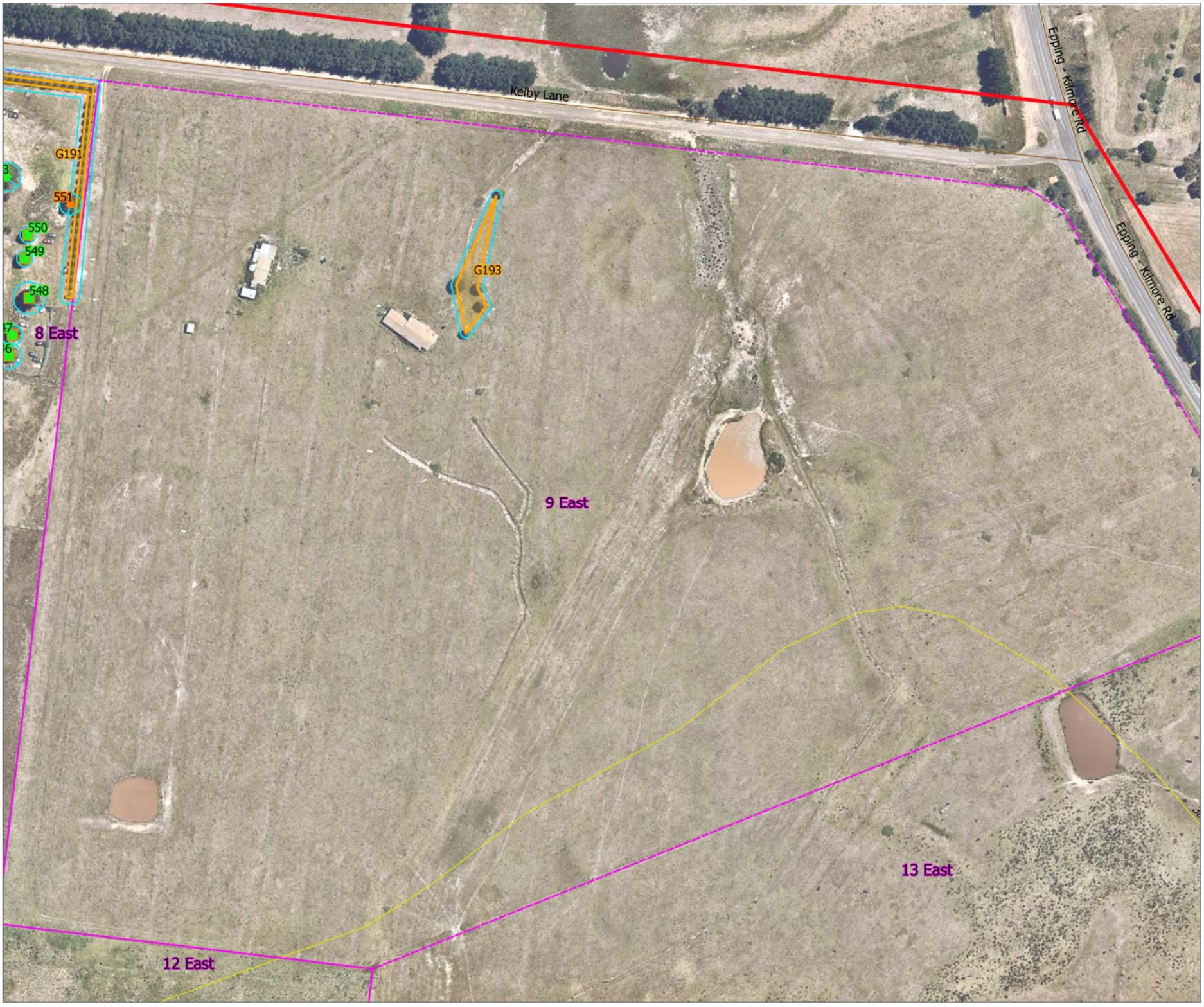

LEGEND

Trees by Arb rating
- Mod-B
- Mod-C
- Low

Protection zones
- TPZ

All Groups
- Mod-C

Parcel
- Accessed
- Roads
- Contours
- Project area

APPENDIX 2
TREE LOCATIONS AND PROTECTION ZONES

PROJECT
Wallan South & Wallan East Precinct Structure Plan

MAP NO.
47 / 52
Parcel(s): 9 East

CLIENT
Vic torian Planning Authority

DATE
2020-04-29

TL REF.
010255

DATA SOURCES
Near Map aerial imagery dated: 24/12/2018

TREE LOCATION DISCLAIMER
Tree locations are approximate

COORDINATE REFERENCE SYSTEM
EPSG:28355 | GDA 94 MGA Zone 55

0 20 40m

TREELOGIC PTY LTD
ABN: 95 080 021 610
TEL: 1300 656 926
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Ringwood, VIC
Australia 3134

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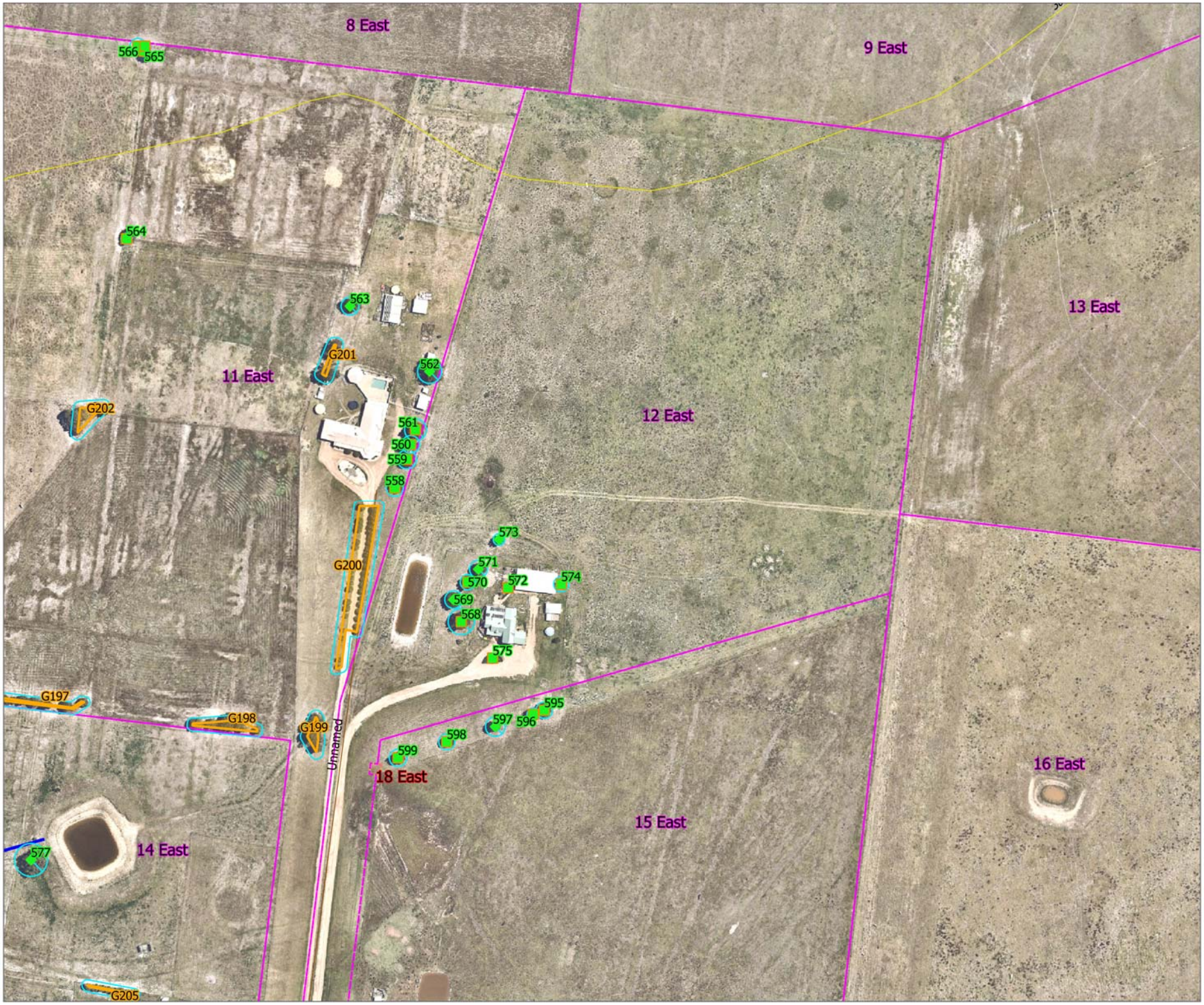

LEGEND

Trees by Arb rating
- Mod-B
- Mod-C

Protection zones
- TPZ
- Watercourse

Parcel
- No Access
- Accessed
- Roads
- Contours
- Project area

All Groups
- Mod-C

APPENDIX 2
TREE LOCATIONS AND PROTECTION ZONES

PROJECT
Wallan South & Wallan East Precinct Structure Plan

MAP NO.
48 / 52
Parcel(s): 11, 12 & 15 East

CLIENT
Vic torian Planning Authority

DATE
2020-04-29

TL REF.
010255

DATA SOURCES
Near Map aerial imagery dated: 24/12/2018

TREE LOCATION DISCLAIMER
Tree locations are approximate

COORDINATE REFERENCE SYSTEM
EPSG:28355 | GDA 94 MGA Zone 55

0 20 40m

TREELOGIC PTY LTD
ABN: 95 080 021 610
TEL: 1300 656 926

4 / 21 Eugene Tce
Ringwood, VIC
Australia 3134

Treelogic
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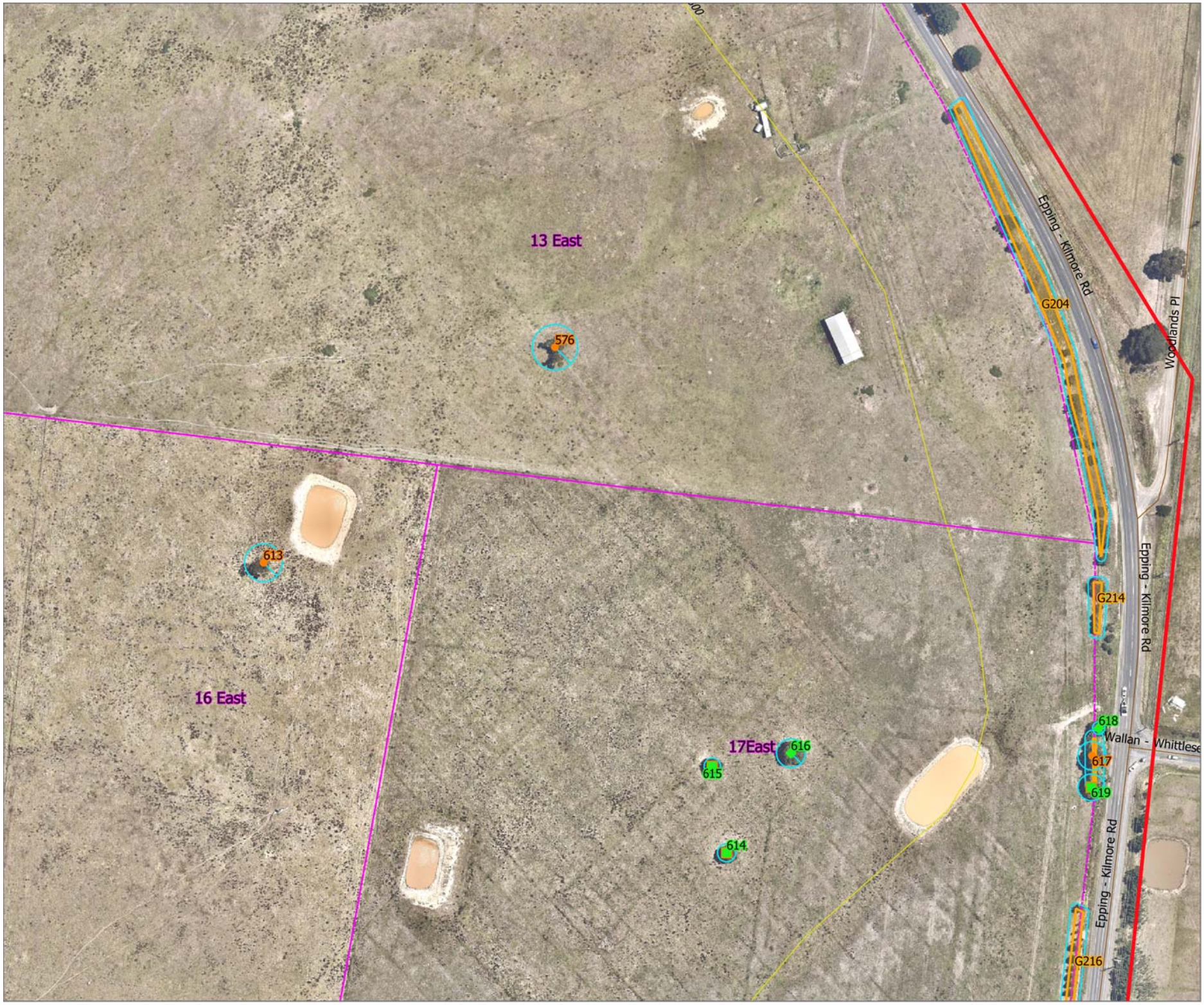

LEGEND

Trees by Arb rating
- Mod-B
- Mod-C
- Low

Protection zones
- TPZ

All Groups
- Mod-C

Parcel
- Accessed

- Roads
- Contours
- Project area

APPENDIX 2
TREE LOCATIONS AND PROTECTION ZONES

PROJECT
Wallan South & Wallan East Precinct Structure Plan

MAP NO.
49 / 52
Parcel(s): 13, 16 & 17 East

CLIENT
Vic torian Planning Authority

DATE
2020-04-29

TL REF.
010255

DATA SOURCES
Near Map aerial imagery dated: 24/12/2018

TREE LOCATION DISCLAIMER
Tree locations are approximate

COORDINATE REFERENCE SYSTEM
EPSG:28355 | GDA 94 MGA Zone 55

0 20 40m

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TEL: 1300 656 926

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Ringwood, VIC
Australia 3134

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LEGEND

Trees by Arb rating
- Mod-B
- Mod-C
- Low

All Groups
- Mod-B
- Mod-C
- Low
- Very Low

Protection zones
- TPZ
- Watercourse

Parcel
- No Access
- Accessed
- Roads
- Contours
- Project area

APPENDIX 2
TREE LOCATIONS AND PROTECTION ZONES

PROJECT
Wallan South & Wallan East Precinct Structure Plan

MAP NO.
50 / 52
Parcel(s): 19, 20, 21, 22 East

CLIENT
Vic torian Planning Authority

DATE
2020-04-29

TL REF.
010255

DATA SOURCES
Near Map aerial imagery dated: 24/12/2018

TREE LOCATION DISCLAIMER
Tree locations are approximate

COORDINATE REFERENCE SYSTEM
EPSG:28355 | GDA 94 MGA Zone 55

0 20 40m

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Ringwood, VIC
Australia 3134

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LEGEND

Trees by Arb rating
- Mod-B
- Mod-C
- Low
- Very Low

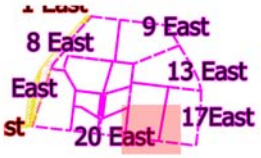
Protection zones
- TPZ
- Watercourse

All Groups
- Mod-C
- Low
- Very Low

Parcel
- No Access
- Accessed
- Roads
- Contours
- Project area

APPENDIX 2
TREE LOCATIONS AND PROTECTION ZONES

PROJECT
Wallan South & Wallan East Precinct Structure Plan



MAP NO.
51 / 52
Parcel(s): 16 East

CLIENT
Vic torian Planning Authority

DATE
2020-04-29

TL REF.
010255

DATA SOURCES
Near Map aerial imagery dated: 24/12/2018

TREE LOCATION DISCLAIMER
Tree locations are approximate

COORDINATE REFERENCE SYSTEM
EPSG:28355 | GDA 94 MGA Zone 55

0 20 40m

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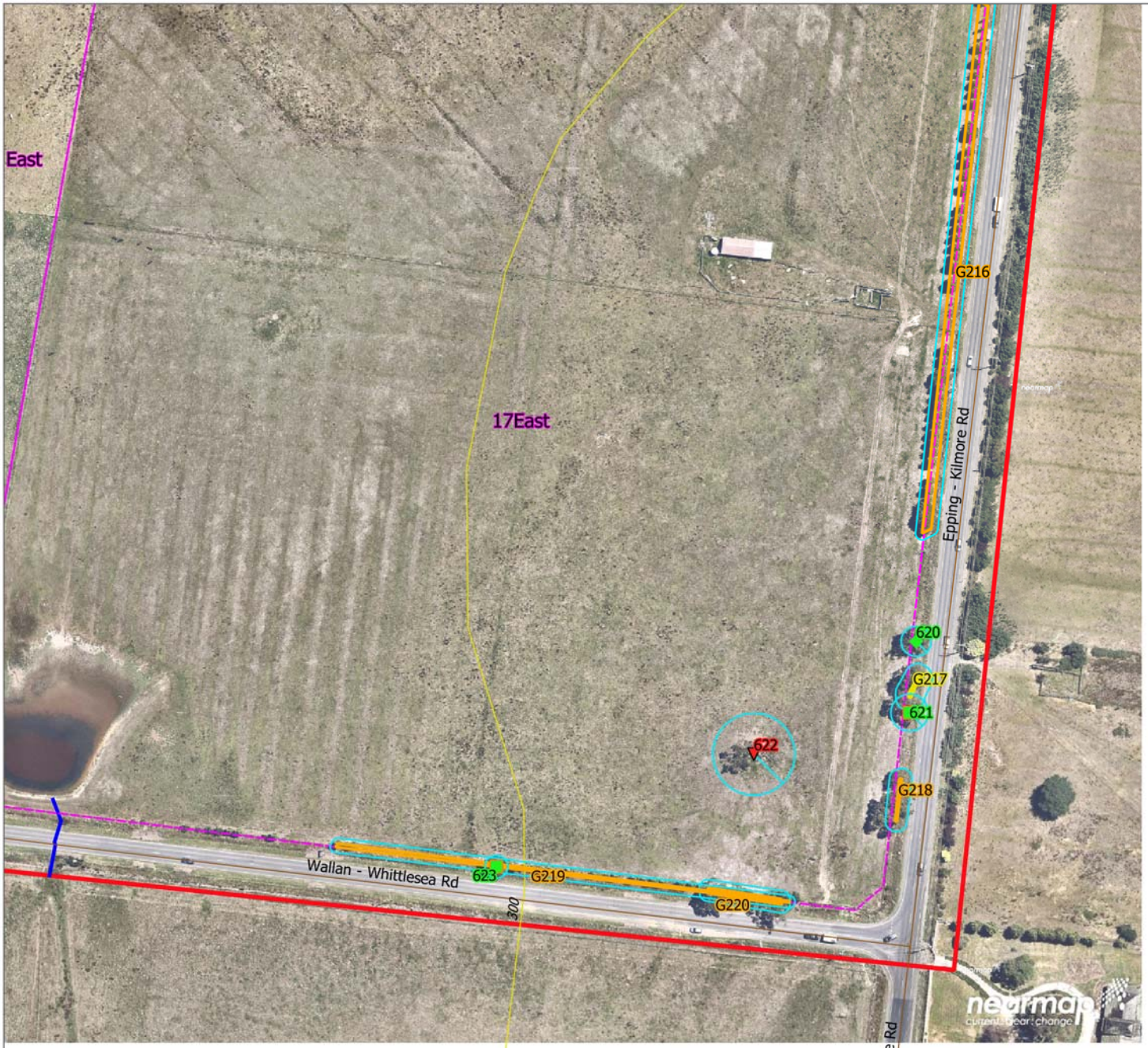


LEGEND

Trees by Arb rating
- Mod-B
- Mod-C
- Very Low

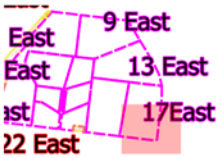
Protection zones
- TPZ
- Watercourse

All Groups
- Mod-B
- Mod-C

Parcel
- Accessed
- Roads
- Contours
- Project area

APPENDIX 2
TREE LOCATIONS AND PROTECTION ZONES

PROJECT
Wallan South & Wallan East Precinct Structure Plan



MAP NO.
52 / 52
Parcel(s): 17 East

CLIENT
Vic torian Planning Authority

DATE
2020-04-29

TL REF.
010255

DATA SOURCES
Near Map aerial imagery dated: 24/12/2018

TREE LOCATION DISCLAIMER
Tree locations are approximate

COORDINATE REFERENCE SYSTEM
EPSG:28355 | GDA 94 MGA Zone 55

0 20 40m

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Australia 3134

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Appendix 3: Arboricultural Descriptors (June 2018)

Note that not all of the described tree descriptors may be used in a tree assessment and report. The assessment is undertaken with regard to contemporary arboricultural practices and consists of a visual inspection of external and above-ground tree parts.

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 to what could be considered typical for that species growing in its location under current climatic conditions. 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 assessor.

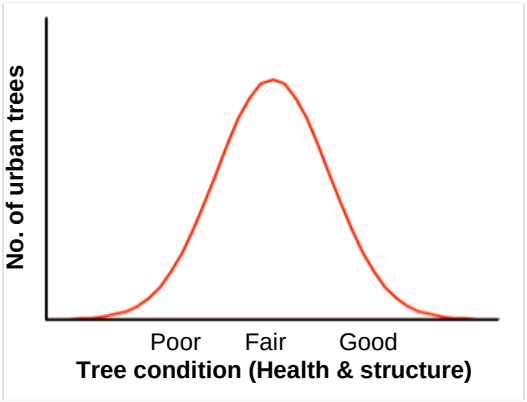


Diagram 1: Indicative normal distribution curve for tree condition

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.

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. Remnant.
Victorian native	Occurs naturally within some part of the State of Victoria (not exclusively) but is not indigenous (component of EVC benchmark). Could be planted indigenous trees.
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 assessor'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).

Crown height, crown spread are generally recorded to the nearest half metre (crown spread would be rounded up) for dimensions up to 10 m and the nearest whole metre for dimensions over 10 m. Estimated dimensions (e.g. for off-site or otherwise inaccessible trees where accurate data cannot be recovered) shall be clearly identified in the assessment data.

5. Trunk diameters

The position where trunk diameters are captured may vary dependent on the requirements of the specific assessment and an individual trees specific characteristics. DBH is the typical trunk diameter captured as it relates to the allocation of tree protection distances. The basal trunk diameter assists in the allocation of a structural root zone. Some municipalities require trunk diameters be captured at different heights, with 1.0 m above grade being a common requirement. The specific planning schemes will be checked to ascertain requirements.

Stem diameters shall be recorded in centimetres, rounded to the nearest 1 cm (0.01 m).

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 site*s. Measurements undertaken using foresters tape or builders tape.

Basal trunk diameter

The basal dimension is the trunk diameter measured at the base of the trunk or main stem(s) immediately above the root buttress. Used to ascertain the Structural Root Zone (SRZ) as outlined in AS4970.

6. Age class

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

Category	Description
Young	Sapling tree and/or recently planted. Approximately 5 or less years in location.
Semi-mature	Tree increasing in size and yet to achieve expected size in situation. Primary developmental stage.
Early-mature	Tree established, generally growing vigorously. > 50% of attainable age/size.
Mature	Specimen approaching expected size in situation, with reduced incremental growth.
Over-mature	Mature full-size with a retrenching crown. Tree is senescent and in decline. Significant decay generally present.

7. Health

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

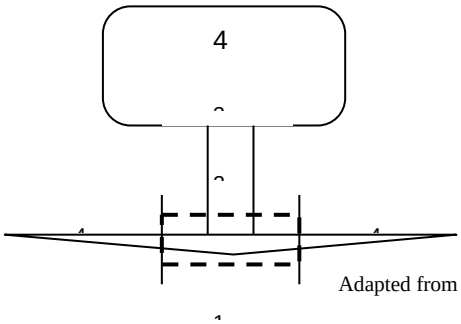
Health Category	Vigour, Extension growth	Decline symptoms, Deadwood, Dieback	Foliage density, colour, size, intactness	Pests and or disease
Good	Above typical. Excellent. Full canopy density	Negligible	Better than typical	Negligible
Fair	Typical vigour. >80% canopy density	Minor or expected. Little or no dead wood	Typical. Minor deficiencies or defects could be present.	Minor, within damage thresholds
Fair to Poor	Below typical - low vigour	More than typical. Small sub-branch dieback	Exhibiting deficiencies. Could be thinning, or smaller	Exceeds damage thresholds
Poor	Minimal - declining	Excessive, large and/or prominent amount & size of dead wood	Exhibiting severe deficiencies. Thinning foliage, generally smaller or deformed	Extreme and contributing to decline
Dead	N/A	N/A	N/A	N/A

8. Structure

Assesses principal components of tree structure (Diagram 2).
Structure ratings will also take into account general branching architecture, stem taper, live crown ratio, crown symmetry (bias or lean) and crown position such as tree being suppressed amongst more dominant trees.

Diagram 2: Tree structure zones

1. Root plate & lower stem
2. Trunk
3. Primary branch support
4. Outer crown & roots



Adapted from Coder (1996)

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. Trees are assessed and then 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 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). See table over page.

Structure Category	Zone 1 - Root plate & lower stem	Zone 2 - Trunk	Zone 3 - Primary branch support	Zone 4 - Outer crown and roots
Good	No obvious damage, disease or decay; obvious basal flare / stable in ground	No obvious damage, disease or decay; well tapered	Well formed, attached, spaced and tapered. No history of failure.	No obvious damage, disease, decay or structural defect. No history of failure.
Fair	Minor damage or decay. Basal flare present.	Minor damage or decay	Generally well attached, spaced and tapered branches. Minor structural deficiencies may be present or developing. No history of branch failure.	Minor damage, disease or decay; minor branch end-weight or over-extension. No history of branch failure.
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. Minor branch failure evident.
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 re-sprout	Decayed, cavities or has acute branch attachments with included bark; excessive compression flaring; failure likely. Evidence of major branch failure.	Major damage, disease or decay; fungal fruiting bodies present; major branch end-weight or over-extension. Branch failure evident.
Very Poor	Excessive damage, disease or decay; unstable / loose in ground; altered exposure; failure probable	Excessive damage, disease or decay; cavities. Excessive lean. Stump re-sprout	Decayed, cavities or branch attachments with active split; failure imminent. History of major branch failure.	Excessive damage, disease or decay; excessive branch end-weight or over-extension. History of branch failure.

Useful life expectancy

Assessment of useful life expectancy provides an indication of health and tree appropriateness and involves an estimate of how long a tree is likely to remain in the landscape based on species, stage of life (cycle), health, amenity, environmental services contribution, conflicts with adjacent infrastructure and risk to the community. It would enable tree managers to develop long-term plans for the eventual removal and replacement of existing trees in the public realm. It is not a measure of the biological life of the tree within the natural range of the species. It is more a measure of the health status and the trees positive contribution to the urban landscape.

Within an urban landscape context, particularly in relation to street trees, it could be considered a point where the costs to maintain the asset (tree) outweigh the benefits the tree is returning.

The assessment is based on the site conditions not being significantly altered and that any prescribed maintenance works are carried out (site conditions are presumed to remain relatively constant and the tree would be maintained under scheduled maintenance programs). See table over page.

Useful Life Expectancy category	Typical characteristics
<1 year (No remaining ULE)	Tree may be dead or mostly dead. Tree may exhibit major structural faults. Tree may be an imminent failure hazard. Excessive infrastructure damage with high risk potential that cannot be remedied.
1-5 years (Transitory, Brief)	Tree is exhibiting severe chronic decline. Crown is likely to be less than 50% typical density. Crown may be mostly epicormic growth. Dieback of large limbs is common (large deadwood may have been pruned out). Tree may be over-mature and senescing. Infrastructure conflicts with heightened risk potential. Tree has outgrown site constraints.
6-10 years (Short)	Tree is exhibiting chronic decline. Crown density will be less than typical and epicormic growth is likely to present. The crown may still be mostly entire, but some dieback is likely to be evident. Dieback may include large limbs. Over-mature and senescing or early decline symptoms in short-lived species. Early infrastructure conflicts with potential to increase regardless of management inputs.
11-20 years (Moderate)	Tree not showing symptoms of chronic decline, but growth characteristics are likely to be reduced (bud development, extension growth etc.). Tree may be over-mature and beginning to senesce. Potential for infrastructure conflicts regardless of management inputs.
21-40 years (Moderately long)	Trees displaying normal growth characteristics but vigour is likely to be reduced (bud development, extension growth etc.). Tree may be growing in restricted environment (e.g. streetscapes) or may be in late maturity. Semi-mature and mature trees exhibiting normal growth characteristics. Juvenile trees in streetscapes.
>40 years (Long)	Generally juvenile and semi-mature trees exhibiting normal growth characteristics within adequate spaces to sustain growth, such as in parks or open space. Could also pertain to maturing, long-lived trees. Tree well suited to the site with negligible potential for infrastructure conflicts.

Note that ULE may change for a tree dependent on the prevailing climatic conditions, which can either increase or decrease, or sudden changes to a tree's growing environment creating an acute stress.

The ULE may not be applicable for trees that are manipulated, such as topiary, or grown for specific horticultural purposes, such as fruit trees.

There may be instances where remedial tree maintenance could be extend a tree's ULE.

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. The presence of any serious disease or tree-related hazards that would impact risk potential are taken into account. See table over page.

Arboricultural rating Category	Description
High	Tree of high quality in good to fair condition; good vigour. Generally a prominent arboricultural/landscape feature. Particularly good example of the species; rare or uncommon. Tree may have significant conservation or other cultural value. These trees have the potential to be a medium- to long-term components of the landscape (moderately long to long ULE) if managed appropriately. Retention of these trees is highly desirable.
Moderate	*General -* 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 moderate- to long-term component of the landscape (moderate to long ULE) if managed appropriately. Retention of these trees is generally desirable. The following sub-categories relate predominately to age and size and amenity.
	A. Moderate to large, maturing tree. Contributes to the landscape character. Tree may have conservation or other cultural value.
	B. Moderate sized, established tree, > 50% of attainable age/size. Contributes to the landscape character. Maturing tree with amenity value but with identified deficiencies
	C. Small and/or semi-mature tree, established, >5 years in the location. May not be a dominant canopy. No special qualities. Maturing tree, accumulating deficiencies, trending towards being of Low arboricultural value.
Low	Unremarkable tree of low quality or little amenity value. Tree in either poor health or with poor structure or a combination. Short to transitory useful life expectancy. Tree is not significant because of either its size or age, such as young trees with a stem diameter below 15 cm. Trees regularly pruned to restrict size. 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.
Very Low	Trees of low quality with an estimated remaining life expectancy of less than 5 years. Tree has either a severe structural defect or health problem or combination that cannot be sustained with practical arboricultural techniques and the loss of the tree would be expected in the short term. Trees that are dead or are showing signs of significant, immediate, and irreversible overall decline. Tree infected with pathogens of significance to either the health or safety of the tree or other adjacent trees. 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 recognised environmental woody weed with potential to spread into waterways or natural areas. Unremarkable tree of no material landscape, conservation or other cultural value.

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.

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.

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.

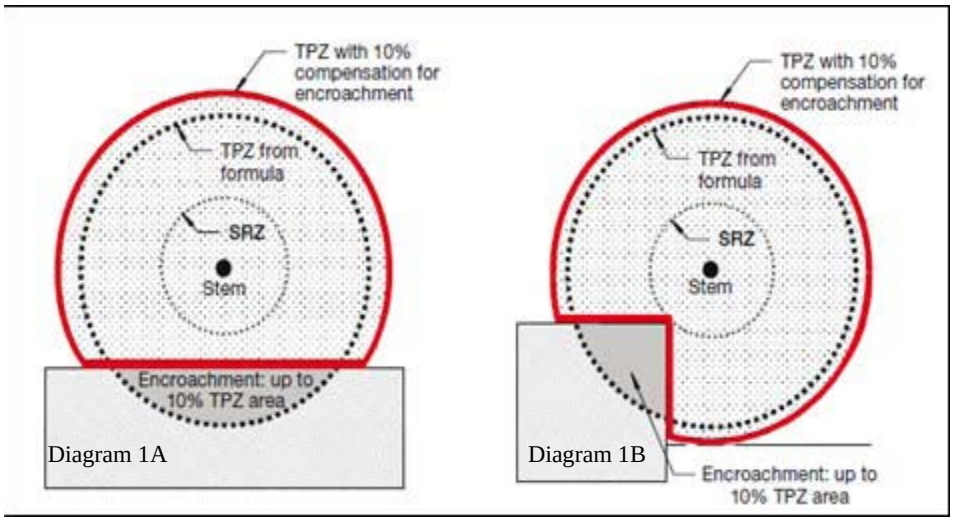


Diagram 1: Examples of minor encroachment into a TPZ.

(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.

Exploratory excavation

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. This also allows management decisions to be made and allows time for redesign works if required.

Any exploratory excavation within the allocated TPZ is to be undertaken with due care of the roots. Minor exploration is possible with hand tools. More extensive exploration may require the use of high pressure water or air excavation techniques. Either hydraulic or pneumatic excavation techniques will safely expose tree roots; both have specific benefits dependent on the situation and soil type. An arborist is to be consulted on which system is best suited for the site conditions.

Substantial roots are to be exposed and left intact.

Once roots are exposed decisions can be made regarding the management of the tree. Decisions will be dependent on the tree species, its condition, its age, its relative tolerance to root loss, and the amount of root system exposed and requiring pruning.

Other alternative measures to encroaching the TPZ may include boring or tunnelling.

How to determine the diameter of a substantial root

The size of a substantial root will vary according to the distance of the exposed root to the trunk of the tree. The further away from the trunk of a tree that a root is, the less significant the root is likely to be to the tree's health and stability.

The determination of what is a substantial root is often difficult because the form, depth and spread of roots will vary between species and sites. However, because smaller roots are connected to larger roots in a framework, there can be no doubt that if larger roots are severed, the smaller roots attached to them will die. Therefore, the larger the root, the more significant it may be.

Gilman (1997) suggests that trees may contain 4-11 major lateral roots and that the five largest lateral roots account (act as a conduit) for 75% of the total root system.

These large lateral roots quickly taper within a distance to the tree, this distance is identified as the Structural Root Zone (SRZ). Within the SRZ distance, all roots and the soil surrounding the roots are deemed significant.

No root or soil disturbance is permitted within the SRZ.
In the area outside the SRZ the tree may tolerate the loss of one or a number of roots. The table below indicates the size of tree roots, outside the SRZ that would be deemed substantial for various tree heights. The assessment of combined root loss within the TPZ would need to be undertaken by an arborist on an individual basis because the location of the tree, its condition and environment would need to be assessed.

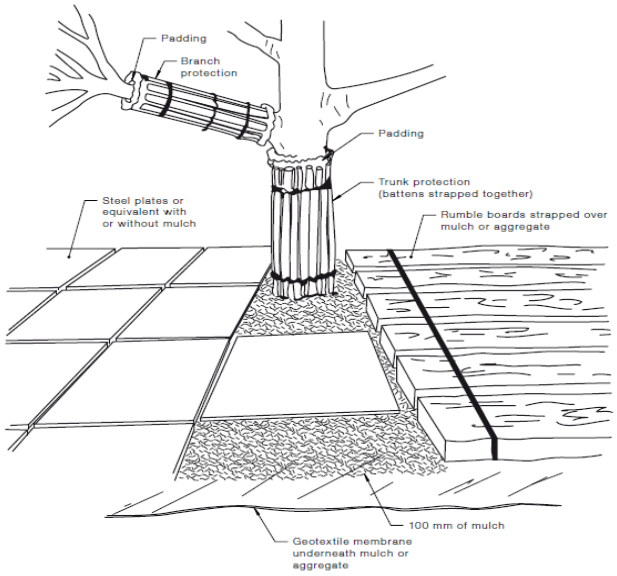
Table 1: Estimated significant root sizes outside SRZ

Height of tree	Diameter of root
Less than 5m	≥ 30mm
Between 5m - 15m	≥ 50mm
More than 15m	≥ 70mm

Ground buffering

Where works are required to be undertaken within the Tree root zone without penetration of the surface, ground buffering and trunk and limb protection must be provided to minimise the potential for soil to become compacted and avoid potential for impact wounds to occur to surface roots, trunk or limbs. Refer below.

Diagram 2: Examples of ground buffering and trunk and limb protection.



NOTES:
1 For trunk and branch protection use boards and padding that will prevent damage to bark. Boards are to be strapped to trees, not nailed or screwed.
2 Rumble boards should be of a suitable thickness to prevent soil compaction and root damage.

FIGURE 4 EXAMPLES OF TRUNK, BRANCH AND GROUND PROTECTION

(Extract from: AS4970-2009, Appendix D, pg17)

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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Appendix 5: ISA Tree Risk Assessment method (Modified)

This assessment method is adapted from the International Society of Arboriculture (ISA) Tree Risk Assessment method and is intended to act as a guide for collecting and recording tree risk assessment information.

The ISA Tree Risk Assessment method is a qualitative risk assessment tool that has replaced numerical rankings that uses descriptive categories, such as “improbable,” “possible,” “probable,” and “imminent” for likelihood of failure using a series of decision matrices to determine the overall risk rating. The system has omitted numerical ranking to avoid confusion and the false sense of accuracy that was often experienced with previous qualitative, mathematical formulas.

It should be noted that not all tree defects are observable and that not all the potential structural concerns associated with trees can be eliminated and that there will always be a residual risk following any mitigation works. There is no warranty or guarantee, expressed or implied by Tree Logic Pty. Ltd., that problems or deficiencies of the plants or site in question may not arise in the future. Tree condition can change quickly in response to environmental conditions or altered growing conditions.

Terms

Tree part — specify the branch, trunk, or root of concern.

Main concern / Conditions of concern — identify the concern(s) with the tree part listed. An example would be “large, dead branch over the house.”

Part size — a characterization of the part of the tree that may fail toward the target. Usually this is the diameter of the branch that can fall or the trunk diameter of the tree. It may be appropriate to indicate the size of the part that could impact the target. Could also consider size categories small (e.g. branches, sub-branches, deadwood up to 50 mm in diameter), medium (e.g. larger scaffold limbs, moderate – up to 15 m height – trees), Large (e.g. codominant leaders, large trees).

Fall distance — if applicable, record the distance that the tree or tree part will fall before hitting a target; this may be relevant to the consequences of failure.

Target — identify the target people, or property, or activities that could be injured, damaged, or disrupted by a tree failure—within the striking distance (target zone) of the tree part concerned.

Target protection — note any significant factors that could protect the target because this may affect the likelihood of impact and/or the consequences of failure.

Time frame — the time frame for which to calculate the likelihood of failure. All trees will eventually fail; the time frame helps narrow down an useful and relevant period that may need to be discussed with the client prior to assessment. Time frames are typically between 3-5 years; the shorter the time frame, the lower the likelihood of failure. Excessively short time frames may not accurately capture risk.

Tree risk has two components: (1) the likelihood of a tree failure striking a target, which is divided into the **likelihood of failure** and the **likelihood of impact**, (Matrix 1) and (2) the **consequences** of failure and subsequent **risk rating** (Matrix 2).

The **overall risk rating** for a tree is derived from the tree part with the highest individual risk rating.

Residual risk Note that the risk rating is based on the observed tree defect(s), the likelihood of that part failing and hitting a target. Once the prescribed works are undertaken to remove the tree defect/hazard, then the risk potential is mitigated, and the risk rating would be reduced.

Method

(1) Use your best judgment and the data available to assess the likelihood of failure (imminent, probable, possible and improbable) and the likelihood of impact (High, Medium, Low and Very Low) of a specified tree part. After these two decisions are made, use Matrix 1 for guidance on choosing the likelihood of failure and impact category (Unlikely, Somewhat likely, Likely, Very likely).

(2) Subsequently, take the result of Matrix 1 and assess the severity of associated consequences of failure (Severe, Significant, Minor and Negligible) based on your judgment and understanding of the site, ideally in consultation with the client. With these two factors, use Matrix 2 to determine the risk rating for that tree part.

The **likelihood of failure** can be categorized using the following guidelines:

Imminent — Failure has started or is most likely to occur soon, even if there is no significant wind or increased load. This is an infrequent occurrence for a risk assessor to encounter, and it may require immediate action to protect people from harm. The imminent category overrides the nominated timeframe, i.e. requires immediate action.

Probable — Failure may be expected under normal weather conditions within the specified time frame.

Possible — Failure may be expected in extreme weather conditions, but it is unlikely during normal weather conditions within the specified time frame.

Improbable — The tree or tree part is not likely to fail during normal weather conditions and may not fail in extreme weather conditions within the specified time frame.

Since these categories are time dependent, the time frame must be considered.

The **likelihood of impacting a target** can be categorized using the following guidelines:

High — the failed tree or tree part is likely to impact the target. This is the case when a fixed/constant target is fully exposed to the assessed tree or near a high-use road or walkway. No protection factors.

Medium — the failed tree or tree part could impact the target, but is not expected to do so. This is the case for people in a frequently used area when the direction of fall may or may not be toward the target. An example of medium likelihood of impacting people would be passengers in car travelling on an arterial road (frequent occupancy) next to the assessed tree with a large, dead branch over the street.

Low — There is a slight chance of the failed tree or tree part will impact the target. This is the case in an occasionally used area that is fully exposed to the assessed tree and no predictable direction of fall, a frequently used area that is partially protected, or a constant target that is well protected from the assessed tree. Examples include a little-used service road next to the assessed tree or a frequently used public street that has a street tree between the street and the assessed tree.

Very low — The chance of the failed tree or tree part impacting the specified target is remote. This is the case if the target is outside the target zone or if occupancy rate is rare, or an occasionally used site with protection by other trees or structures against being struck.

Matrix 1: Likelihood matrix

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

The **consequences of failure** can be categorized using the following guidelines:

Severe — could include serious personal injury or death, damage to high-value property, or major disruption of important activities (freeway traffic, state-wide power supply).

Significant — substantial personal injury, moderate- to high- value property damage, considerable disruption of activities (arterial road traffic, transmission lines).

Minor — minor personal injury, typically not requiring professional medical care, low-to-moderate property damage or small disruptions to activities (local roads, service lines)

Negligible — low-value property damage or disruption that can be replaced or repaired, and does not involve personal injury.

The **risk rating** of the individual part for a specified target is categorized using Matrix 2: Risk rating matrix, showing a combination of likelihood of tree failing and impacting a specified target, and the severity of the associated consequences. Risk rating terms are extreme, high, medium and low.

Matrix 2: Risk rating matrix

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

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RE: Arboricultural Consultancy

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