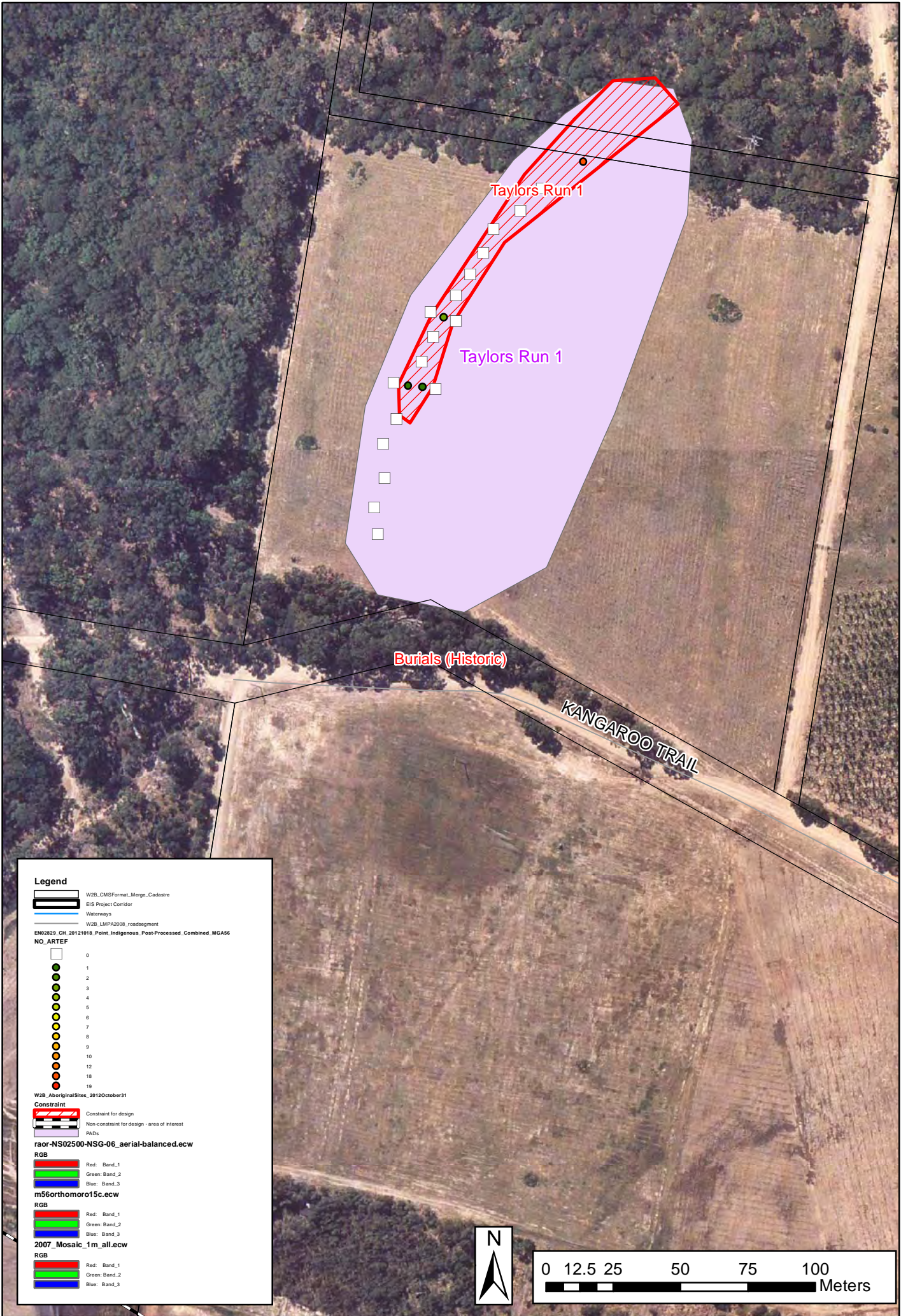































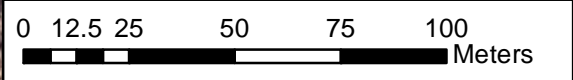


# Appendix G Test excavation figures

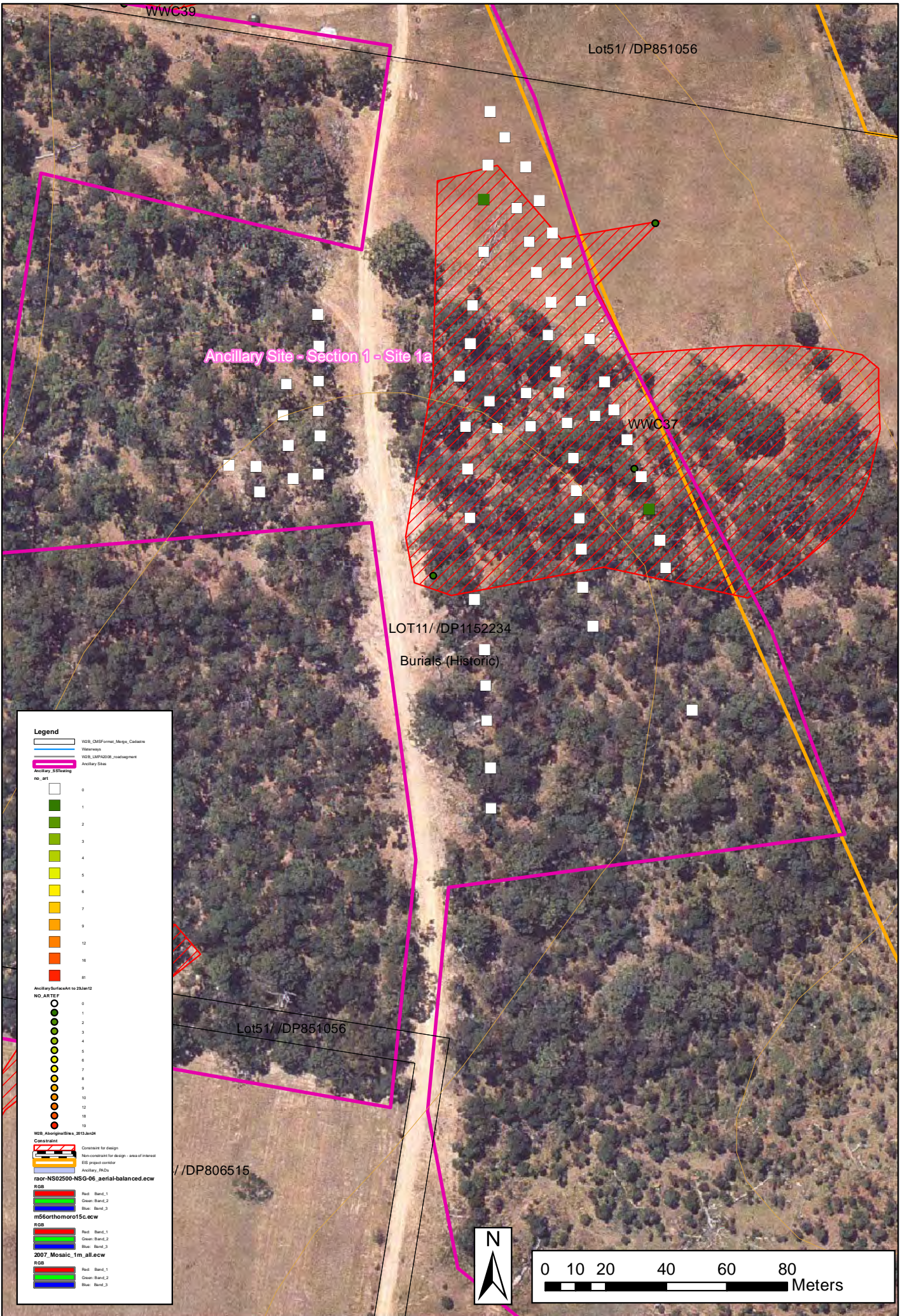


**Legend**

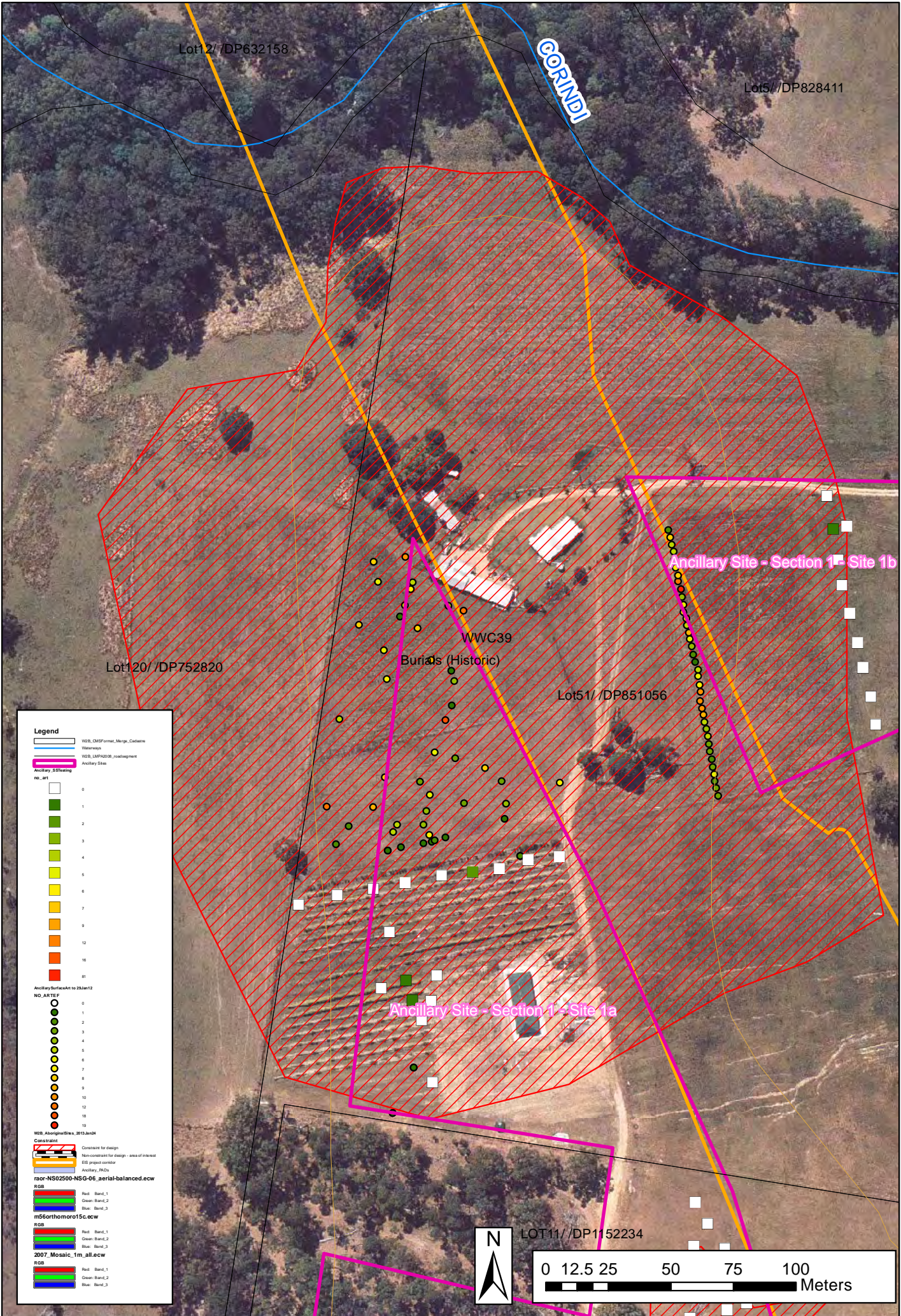
-  W2B\_CMSFormat\_Merge\_Cadastre
-  EIS Project Corridor
-  Waterways
-  W2B\_LMPA2008\_roadsegment
-  EN02929\_CH\_20121018\_Paint\_Indigenous\_Post-Processed\_Combined\_MGA56
- NO\_ARTEF**
-  0
-  1
-  2
-  3
-  4
-  5
-  6
-  7
-  8
-  9
-  10
-  12
-  18
-  19
- W2B\_AboriginalSites\_2012October31**
- Constraint**
-  Constraint for design
-  Non-constraint for design - area of interest
-  PKDs
- raor-NS02500-NSG-06\_aerial-balanced.ecw**
- RGB**
-  Red: Band\_1
-  Green: Band\_2
-  Blue: Band\_3
- m56orthomorof5c.ecw**
- RGB**
-  Red: Band\_1
-  Green: Band\_2
-  Blue: Band\_3
- 2007\_Mosaic\_1m\_all.ecw**
- RGB**
-  Red: Band\_1
-  Green: Band\_2
-  Blue: Band\_3











Lot 2/DP632158

CORINDI

Lot 5/DP828411

Lot 20/DP752820

WWC39  
Burials (Historic)

Lot 51/DP851056

Ancillary Site - Section 1 - Site 1b

Ancillary Site - Section 1 - Site 1a

LOT 11/DP1152234

**Legend**

- WGB\_DMSFormal\_Merge\_Catchline
- Watermark
- WGB\_LMP2020R\_reassignment
- Ancillary Site
- Ancillary Site

no\_art

- 0
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 12
- 16
- 81

Ancillary SurfaceArt to 29Jan12

NO\_ARTIF

- 0
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 12
- 16
- 81

WGB\_AboriginalSites\_2013Jan04

Constraint

- Constraint for design
- Non-constraint for design - areas of interest
- ESB project corridor
- Ancillary (RDC)

raor-NS02500-NS0-06\_aerial-balanced.ecw

RGB

- Red: Band\_1
- Green: Band\_2
- Blue: Band\_3

m56orthomor15c.ecw

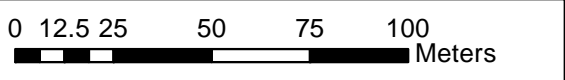
RGB

- Red: Band\_1
- Green: Band\_2
- Blue: Band\_3

2007\_Mosaic\_1m\_all.ecw

RGB

- Red: Band\_1
- Green: Band\_2
- Blue: Band\_3





REDBANK

Lot3/ /DP623588

Lot5/ /DP793340

Lot6/ /DP793340

PACIFIC

Lot11/ /DP1110135

Lot6/ /DP865228

Lot5/ /DP865228

Lot4/ /DP865228

Lot2/ /DP211641

Lot3/ /DP865228

Lot1/ /DP619732

Lot2/ /DP519232

Lot4/ /DP524113

Lot2/ /DP619732

Lot12/ /DP583175







































Lot3/ /DP815051

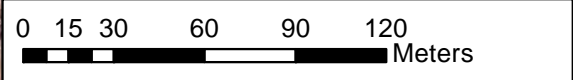
Lot4/ /DP815051

Ancillary Site - Section 1 - Site 2

Ancillary Site - Section 1 - Site 2a

Legend

-  WGB\_CMFFormat\_Merge\_Custome
-  Waterways
-  WGB\_LMP420M\_roadtagment
-  Ancillary Sites
-  Ancillary\_SSEading
-  0
-  1
-  2
-  3
-  4
-  5
-  6
-  7
-  9
-  12
-  16
-  81
-  WGB\_AboriginalSites\_2013.Jan04
-  Constraint
-  Constraint for design
-  Non-constraint for design - area of interest
-  EIS project corridor
-  Ancillary\_RFCs
-  raor-NS02500-NS0-06\_aerial-balanced.ecw
-  RG B
-  Red: Band\_1
-  Green: Band\_2
-  Blue: Band\_3
-  m56orthomorot5c.ecw
-  RG B
-  Red: Band\_1
-  Green: Band\_2
-  Blue: Band\_3
-  2007\_Mosaic\_1m\_all.ecw
-  RG B
-  Red: Band\_1
-  Green: Band\_2
-  Blue: Band\_3







PACIFIC

REDBANK

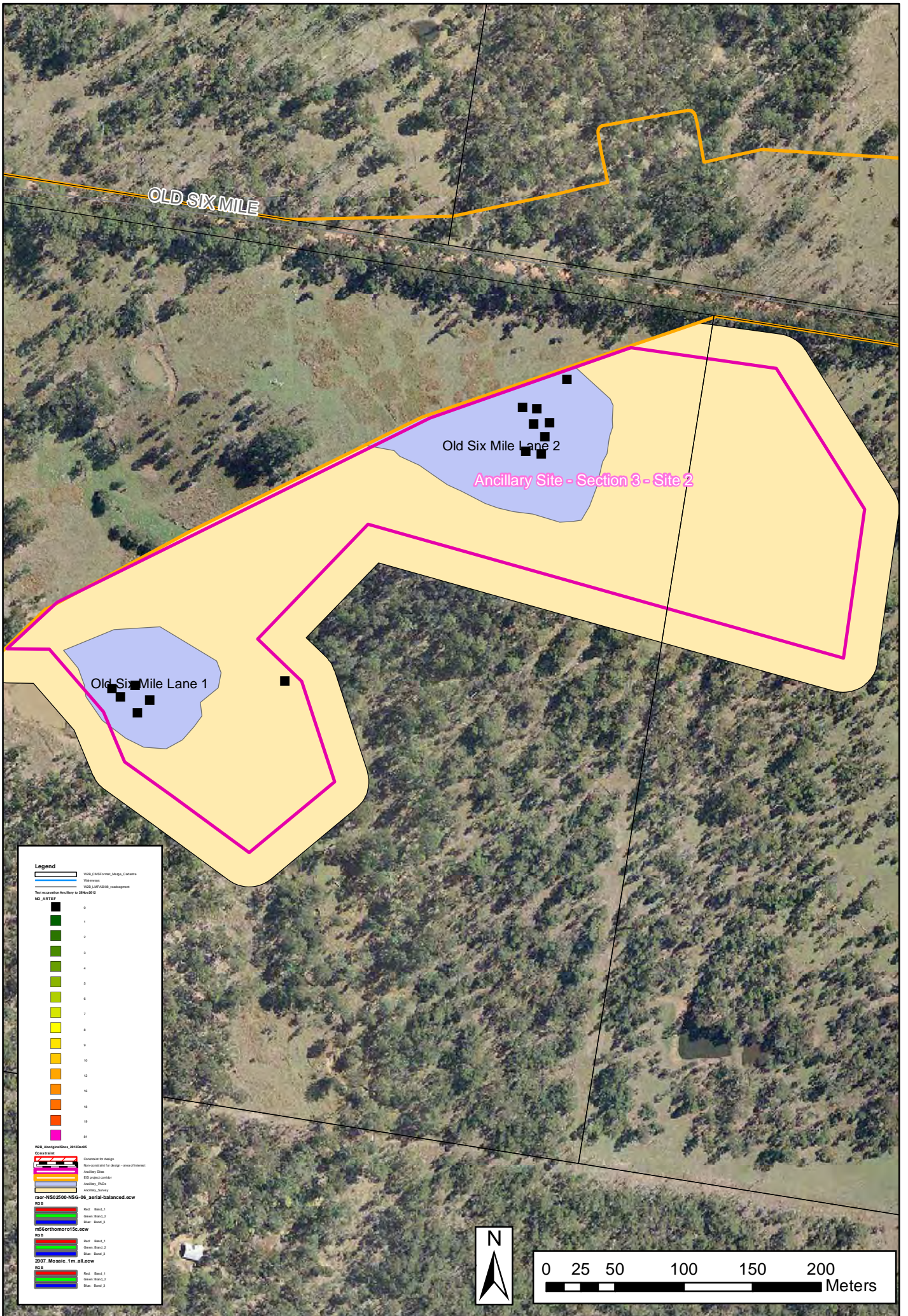
WWC Dirty Creek 1d

Blue: Band\_3  
m56orthomoro15c.ecw  
RGB  
Red: Band\_1  
Green: Band\_2  
Blue: Band\_3  
2007\_Mosaic\_1m\_all.ecw  
RGB  
Red: Band\_1  
Green: Band\_2  
Blue: Band\_3

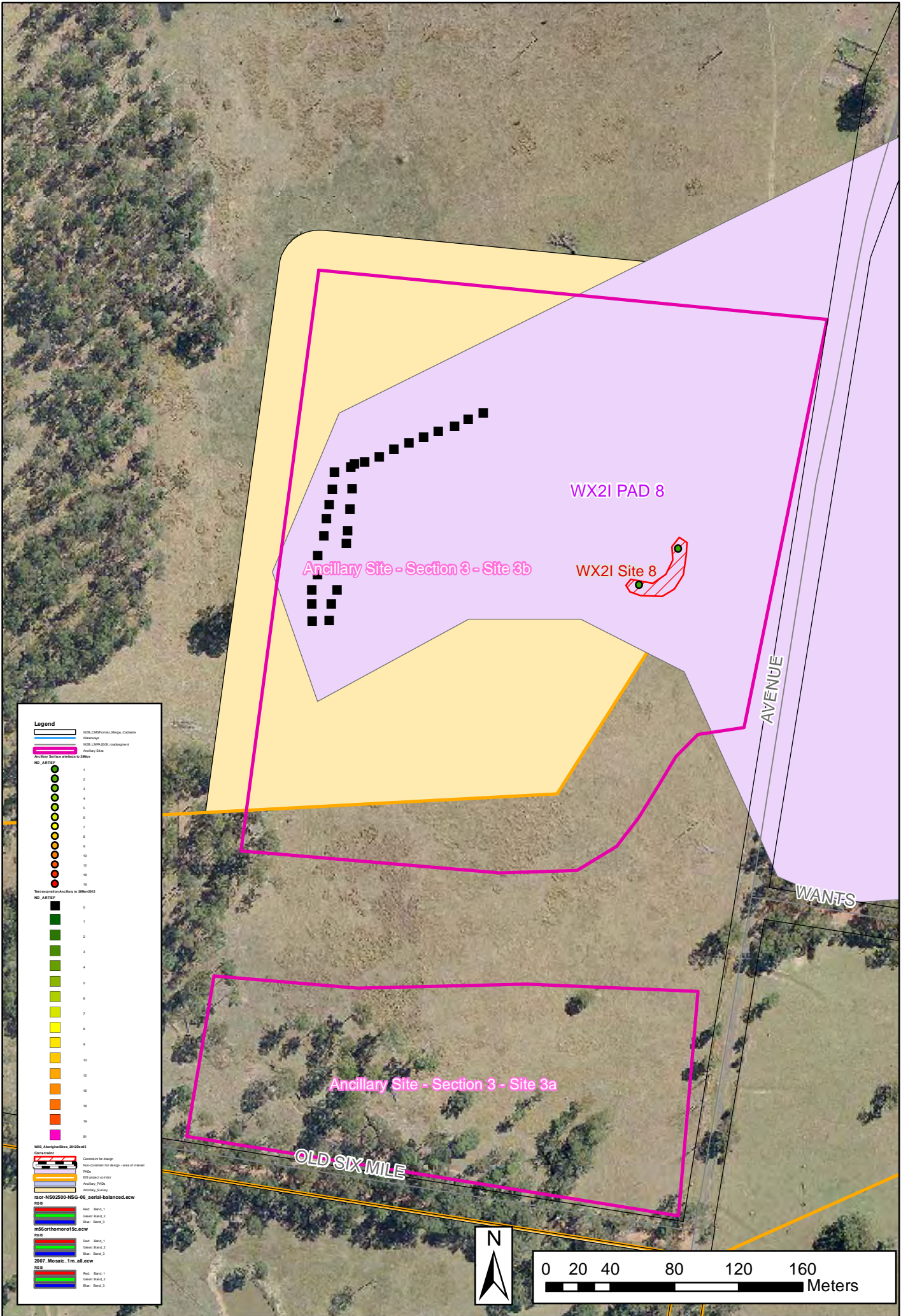


0 20 40 80 120 160 Meters



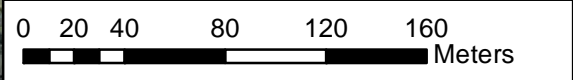




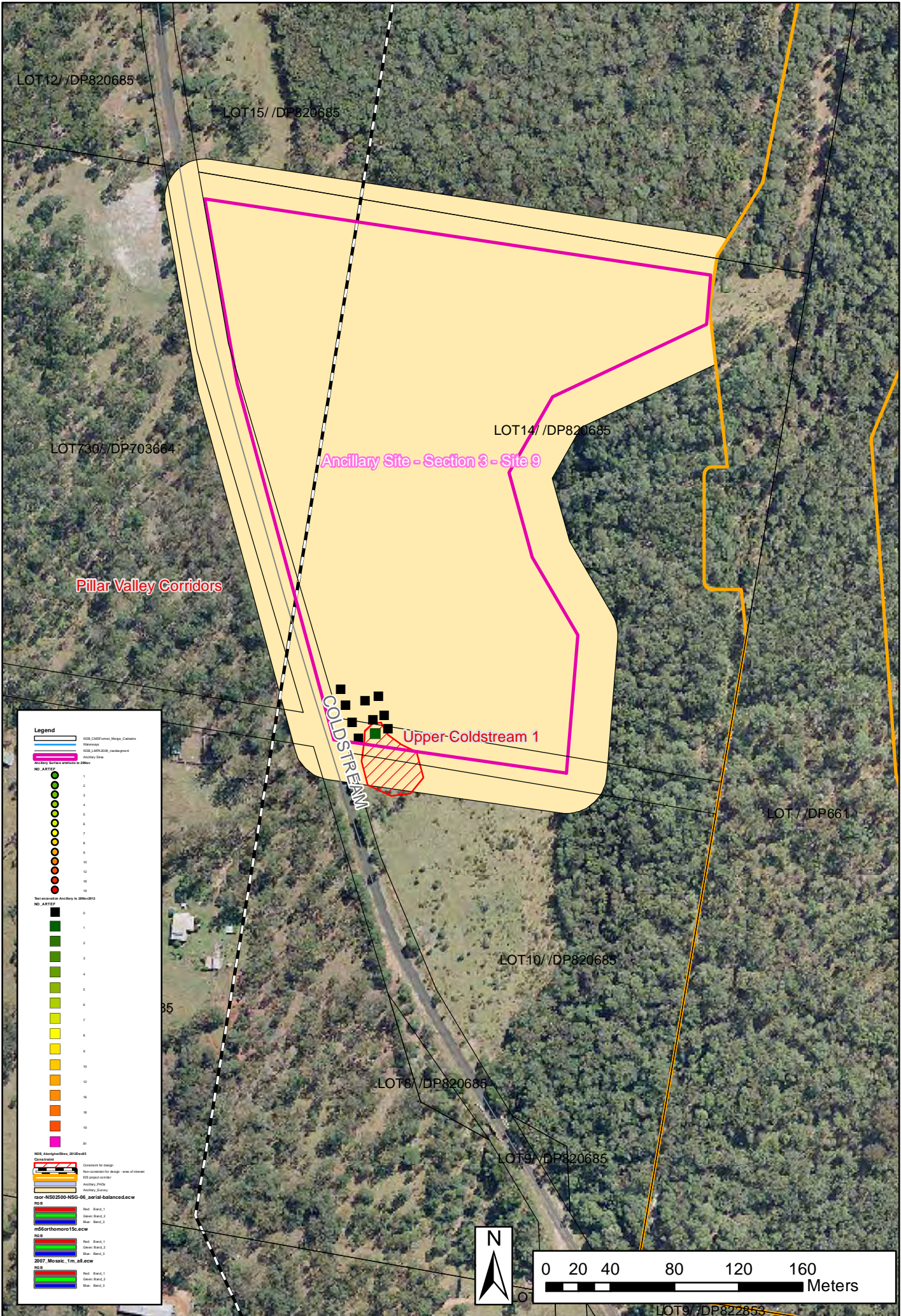


**Legend**

- |  |                           |
|--|---------------------------|
|  | WSB_CMSFormal_Maps_Catena |
|  | Interference              |
|  | WSB_LMP2008_roadalign     |
|  | Ancillary Sites           |
- |   |    |
|---|----|
| ● | 1  |
| ● | 2  |
| ● | 3  |
| ● | 4  |
| ● | 5  |
| ● | 6  |
| ● | 7  |
| ● | 8  |
| ● | 9  |
| ● | 10 |
| ● | 11 |
| ● | 12 |
| ● | 13 |
| ● | 14 |
| ● | 15 |
| ● | 16 |
| ● | 17 |
| ● | 18 |
| ● | 19 |
| ● | 20 |
- |   |    |
|---|----|
| ■ | 0  |
| ■ | 1  |
| ■ | 2  |
| ■ | 3  |
| ■ | 4  |
| ■ | 5  |
| ■ | 6  |
| ■ | 7  |
| ■ | 8  |
| ■ | 9  |
| ■ | 10 |
| ■ | 11 |
| ■ | 12 |
| ■ | 13 |
| ■ | 14 |
| ■ | 15 |
| ■ | 16 |
| ■ | 17 |
| ■ | 18 |
| ■ | 19 |
| ■ | 20 |
- |  |                             |
|--|-----------------------------|
|  | WSB_AbsorptionIndex_0100-05 |
|--|-----------------------------|
- |  |  |
|--|--|
|  | Constraint                                   |
|  | Non-constraint for design - area of interest |
|  | RDCs   |
|  | ESZ project corridor                         |
|  | Ancillary PADs                               |
|  | Ancillary Corridor                           |
- |  |  |
|--|--|
|  | rsr-NS02500-NSG-06_aerial-balanced.ecw |
|  | RGB                                    |
|  | RGB - Band 1                           |
|  | Green - Band 2                         |
|  | Blue - Band 3                          |
- |  |                     |
|--|---------------------|
|  | rs56orthomosaic.ecw |
|  | RGB                 |
|  | RGB - Band 1        |
|  | Green - Band 2      |
|  | Blue - Band 3       |
- |  |                       |
|--|-----------------------|
|  | 2007_Mosaic_1m_08.ecw |
|  | RGB                   |
|  | RGB - Band 1          |
|  | Green - Band 2        |
|  | Blue - Band 3         |







LOT 12 / DP820685

LOT 15 / DP820685

LOT 14 / DP820685

LOT 730 / DP703664

Ancillary Site - Section 3 - Site 9

Pillar Valley Corridors

Upper-Goldstream 1

LOT 7 / DP661

LOT 10 / DP820685

LOT 8 / DP820686

LOT 9 / DP820685

LOT 9 / DP822853

COLDSTREAM

**Legend**

- WSB\_CMSFormal\_Midgs\_Colours
- WSB\_Aerial
- WSB\_OrthoMosaic\_2007
- Ancillary Sites
- Aerial Base Surface Analysis to 200m

**NO\_AIRTEL**

1-19 (Color scale)

Test accuracy on Ancillary to 200m

**NO\_AIRTEL**

0-19 (Color scale)

WSB\_AerialBase, 200m

**OrthoMosaic**

Controlled for design

Non-controlled for design - area of interest

2007\_OrthoMosaic

Ancillary PDA

Ancillary Control

2007-NS02500-NS0-06\_aerial-balanced.ecw

NS0

NS0\_Band\_1

NS0\_Band\_2

NS0\_Band\_3

2007\_OrthoMosaic\_150.ecw

NS0

NS0\_Band\_1

NS0\_Band\_2

NS0\_Band\_3

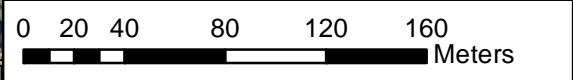
2007\_Mosaic\_1m\_08.ecw

NS0

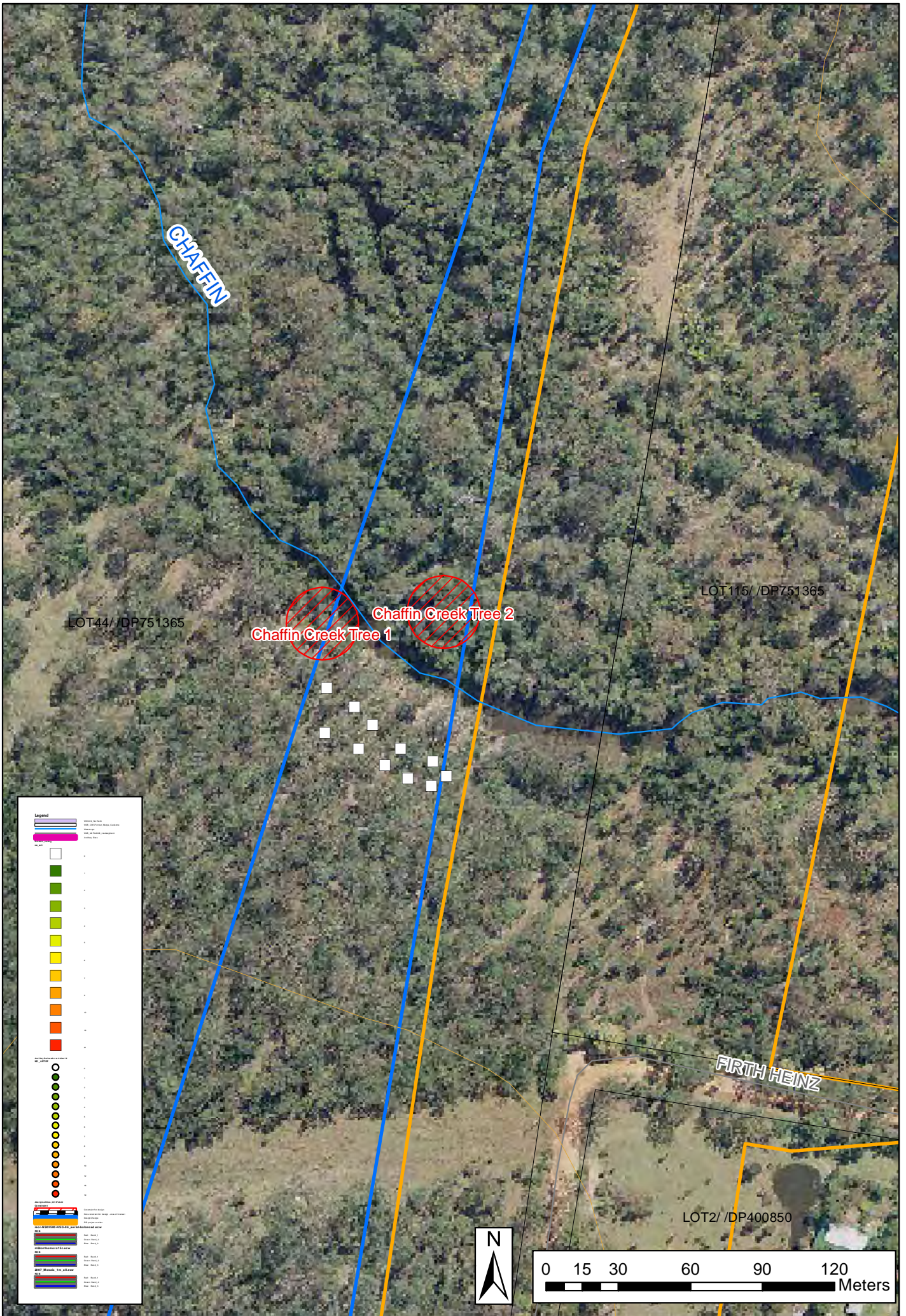
NS0\_Band\_1

NS0\_Band\_2

NS0\_Band\_3







CHAFFIN

LOT 44 / DP751365

LOT 115 / DP751365

Chaffin Creek Tree 1

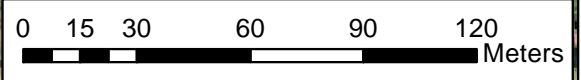
Chaffin Creek Tree 2

FIRTH HEINZ

LOT 2 / DP400850

**Legend**

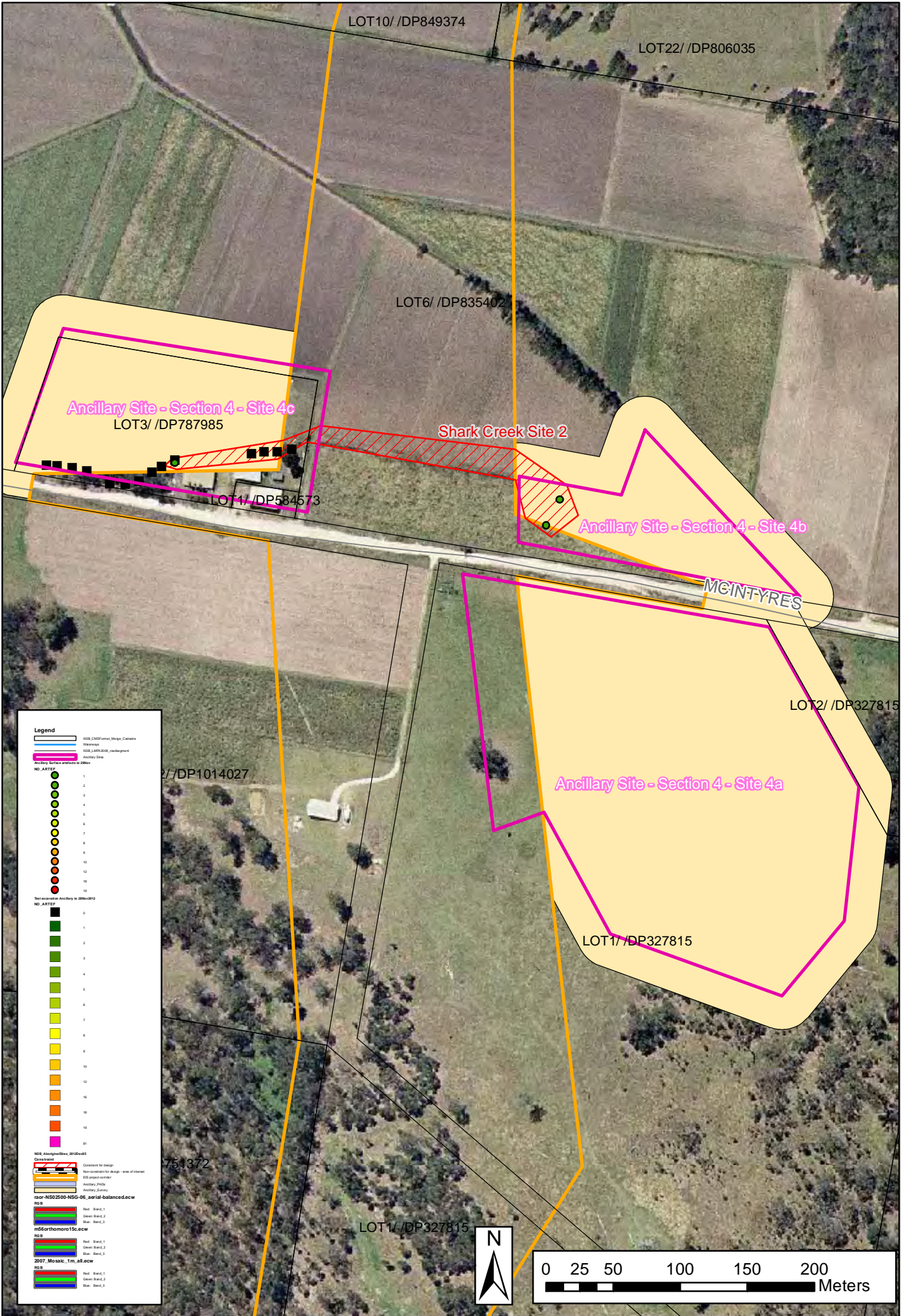
- Watercourse (Blue line)
- Boundary (Black line)
- Chaffin Creek Tree 1 (Red hatched circle)
- Chaffin Creek Tree 2 (Red hatched circle)
- White square
- Color scale (Green to Red)
- North arrow
- Scale bar (0 to 120 Meters)











LOT10/DP849374

LOT22/DP806035

LOT6/DP835402

Ancillary Site - Section 4 - Site 4c  
LOT3/DP787985

Shark Creek Site 2

LOT1/DP584573

Ancillary Site - Section 4 - Site 4b

MCINTYRES

LOT2/DP327815

Ancillary Site - Section 4 - Site 4a

LOT1/DP327815

LOT1/DP1014027

LOT1/DP1014027

LOT1/DP327815

**Legend**

- WSB\_CMSFormal\_Maps\_Colours
- WSB\_Aerial
- WSB\_Satellite\_Orthomosaic
- Ancillary Sites
- Ancillary Sites

NO\_AIRTEL

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
12  
15  
18  
20

Terrace on Ancillary to 2000000

NO\_AIRTEL

0  
1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
12  
15  
18  
20

WSB\_Aerial\_Ortho\_2015

NO\_AIRTEL

Controlled for design  
Non-controlled for design - area of interest  
2000000

Ancillary Sites

2007\_Mosaic\_1m\_88.ecw

NO\_S

NO\_S

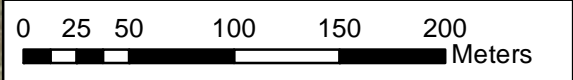
2007\_Mosaic\_1m\_88.ecw

NO\_S

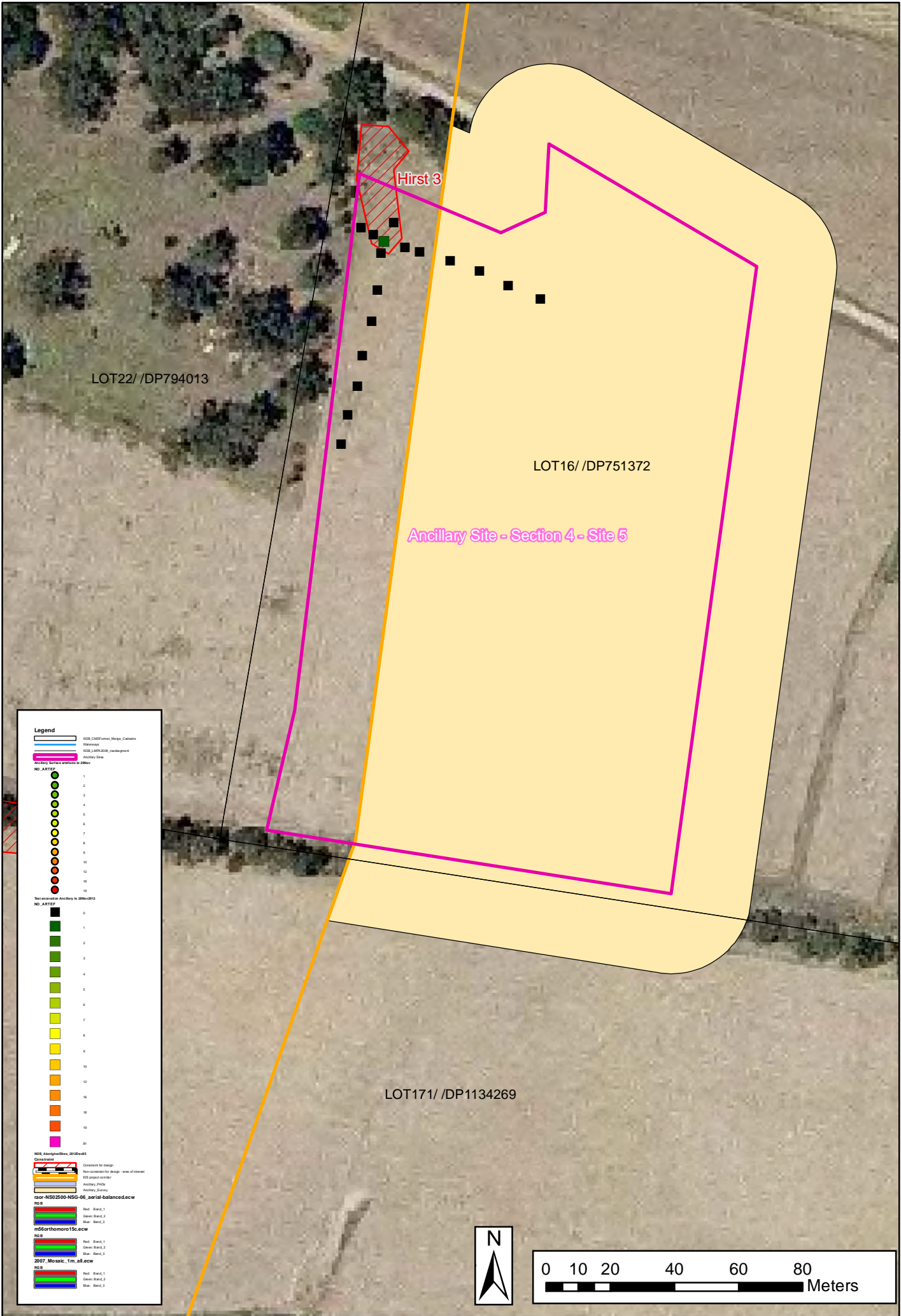
NO\_S

NO\_S

NO\_S







LOT22/DP794013

Hirst 3

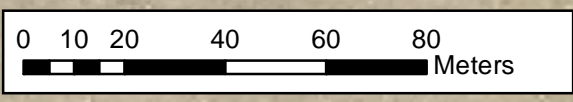
LOT16/DP751372

Ancillary Site - Section 4 - Site 5

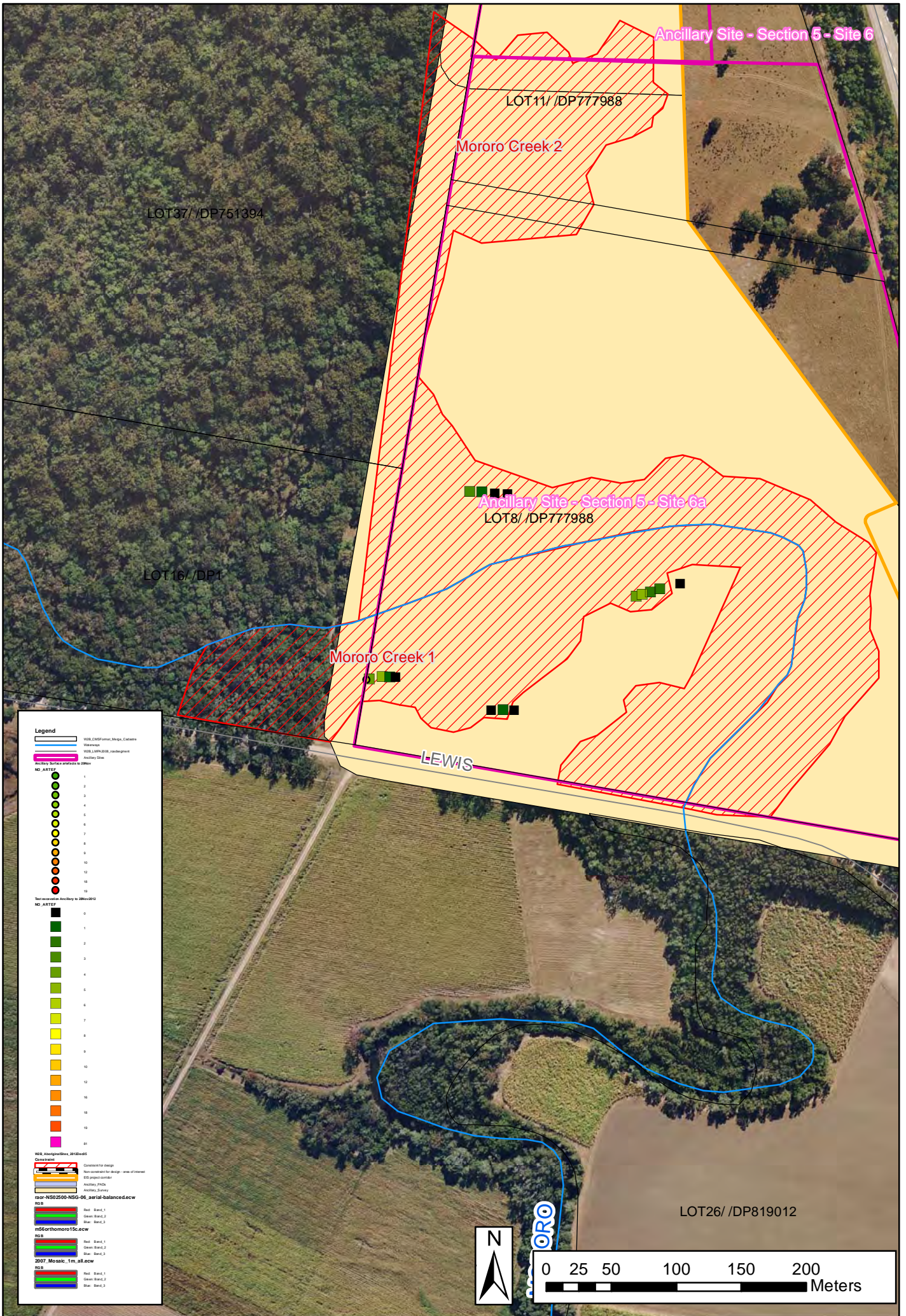
LOT171/DP1134269

**Legend**

- WSB\_CMSFormal\_Midg\_Culvert
- WSB\_Invoca
- WSB\_LMWS2002\_Canalsystem
- Ancillary Site
- Ancillary Surface area to 20m
- NO\_ARTER**
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 12
- 15
- 18
- 21
- Test area on Ancillary to 20m**
- NO\_ARTER**
- 0
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 12
- 15
- 18
- 21
- WSB\_AncillarySite\_20m**
- Obstruction**
- Constraint for design
- Non-constraint for design - area of interest
- 20m buffer
- Ancillary PDA
- Ancillary Control
- gsr-NS02500-NS0-06\_aerial-balanced.ecw**
- RS S**
- Red: Band\_1
- Green: Band\_2
- Blue: Band\_3
- rs5orthomono15.ecw**
- RS S**
- Red: Band\_1
- Green: Band\_2
- Blue: Band\_3
- 2007\_Mosaic\_1m\_08.ecw**
- RS S**
- Red: Band\_1
- Green: Band\_2
- Blue: Band\_3







LOT37//DP751394

LOT11//DP777988

Mororo Creek 2

Ancillary Site - Section 5 - Site 6

LOT16//DP1

Ancillary Site - Section 5 - Site 6a

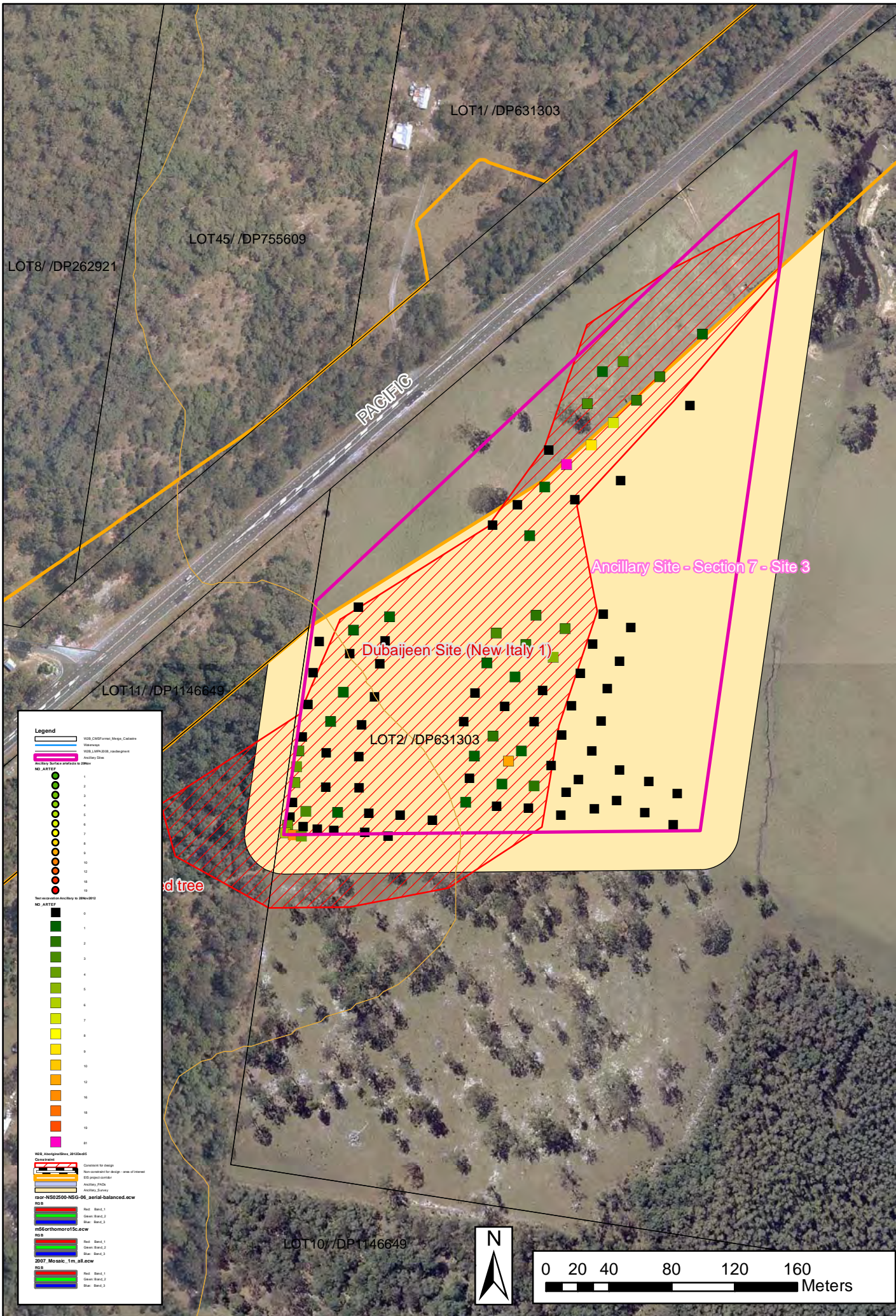
LOT8//DP777988

Mororo Creek 1

LEWIS

LOT26//DP819012





LOT1/ DP631303

LOT45/ DP755609

LOT8/ DP262921

PACIFIC

Ancillary Site - Section 7 - Site 3

Dubaijeen Site (New Italy 1)

LOT2/ DP631303

LOT11/ DP1146649

LOT10/ DP1146649

**Legend**

- WSZ\_CMSFormal\_Maps\_Colours
- WSZ\_Airway
- WSZ\_LandUse\_Coverage
- Ancillary Sites
- Air Base Surface Analysis to 200m

**NO\_ARTIF**

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16
- 17
- 18
- 19
- 20

Test on Ancillary to 200m

**NO\_ARTIF**

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16
- 17
- 18
- 19
- 20

Test on Ancillary to 200m

**WSZ\_Airway**

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16
- 17
- 18
- 19
- 20

WSZ\_CMSFormal\_Maps\_Colours

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16
- 17
- 18
- 19
- 20

Controlled for design

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16
- 17
- 18
- 19
- 20

Non-controlled for design - area of interest

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16
- 17
- 18
- 19
- 20

Ancillary Sites

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16
- 17
- 18
- 19
- 20

Ancillary Control

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16
- 17
- 18
- 19
- 20

nsor-NS02500-NSG-06\_aerial-balanced.ecw

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16
- 17
- 18
- 19
- 20

ns5ortho150.ecw

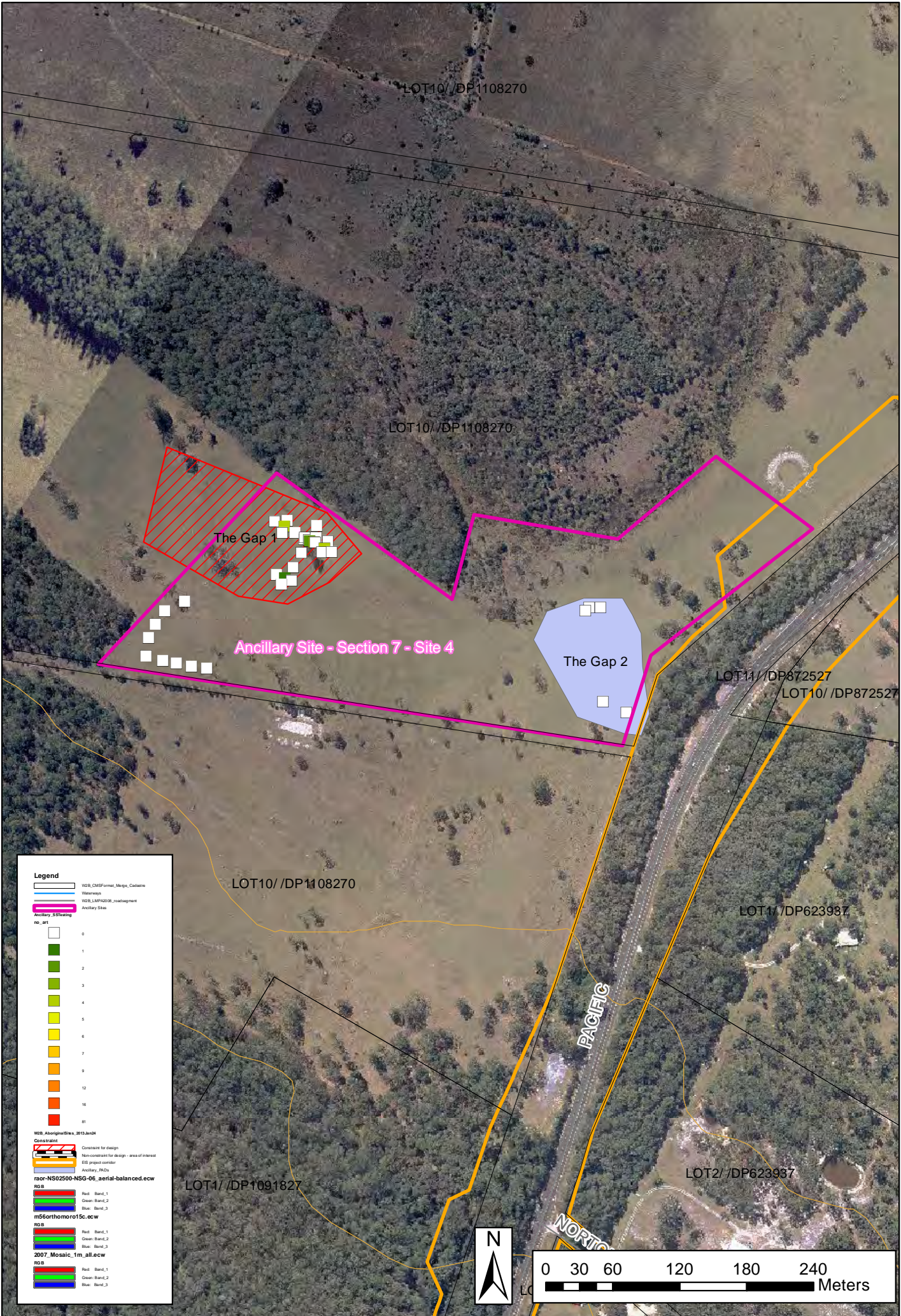
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16
- 17
- 18
- 19
- 20

2007\_Mosaic\_1m\_88.ecw

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16
- 17
- 18
- 19
- 20

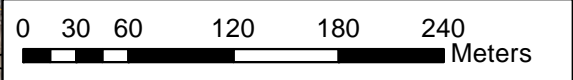




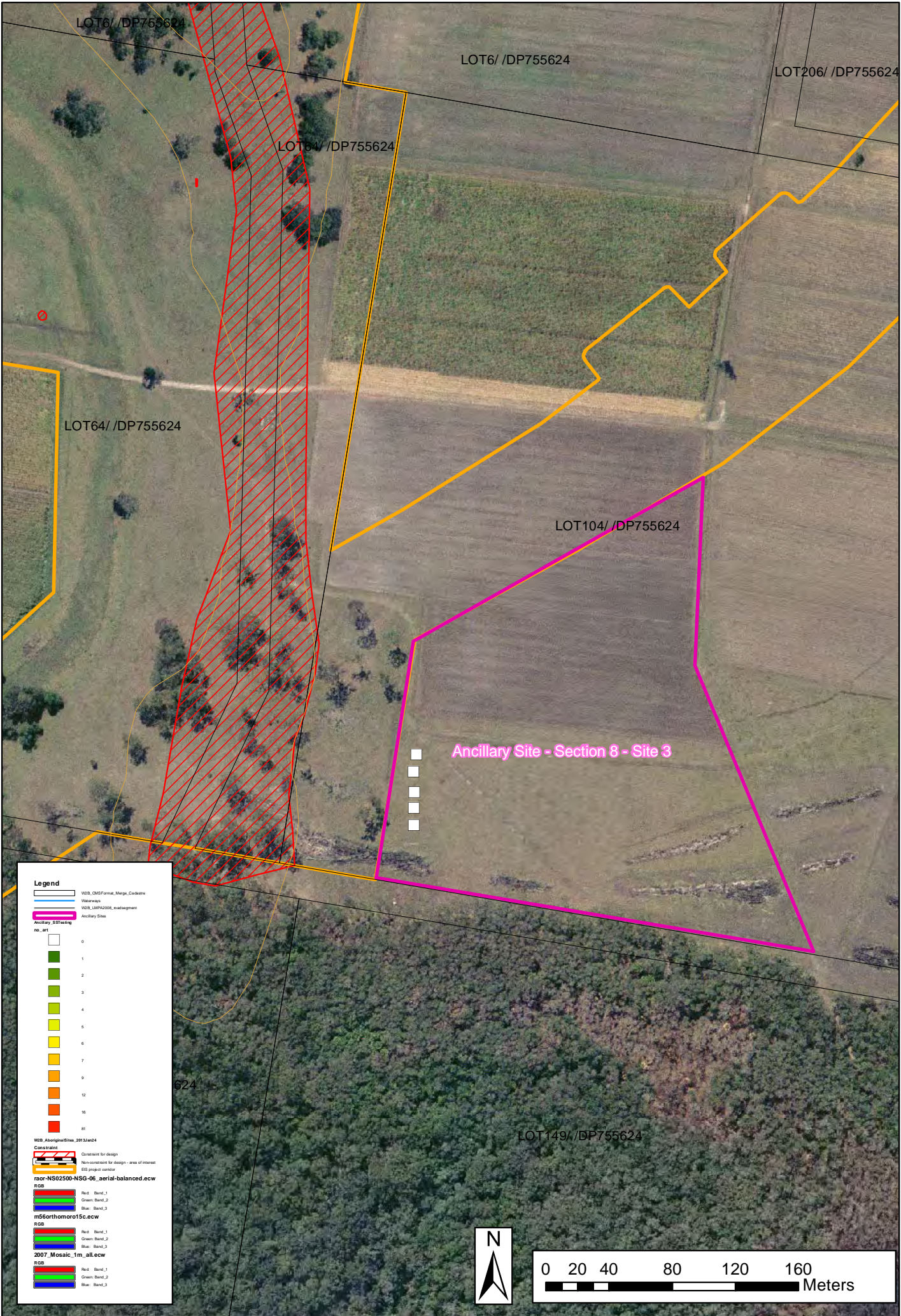


**Legend**

- WGB\_CMSFormat\_Merge\_Catchment
- WGB\_LMPAD2008\_redevelopment
- Ancillary Sites
- Ancillary Site
- no\_spl
- 0
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 9
- 12
- 16
- 81
- WGB\_AboriginalSites\_2013.Jan04
- Constraint for design
- Non-constraint for design - area of interest
- EIS project corridor
- Ancillary Sites
- raor-NS02500-NS0-06\_aerial-balanced.ecw
- RGB
- Red: Band\_1
- Green: Band\_2
- Blue: Band\_3
- m56orthomor15c.ecw
- RGB
- Red: Band\_1
- Green: Band\_2
- Blue: Band\_3
- 2007\_Mosaic\_1m\_all.ecw
- RGB
- Red: Band\_1
- Green: Band\_2
- Blue: Band\_3







LOT6/DP755624

LOT6/DP755624

LOT206/DP755624

LOT64/DP755624

LOT64/DP755624

LOT104/DP755624

Ancillary Site - Section 8 - Site 3

LOT149/DP755624

**Legend**

- WGB\_OMSFormat\_Merge\_Cadastral Waterlines
- WGB\_LMPA2008\_reassignment
- Ancillary Sites
- Ancillary Site Testing

no\_m1

- 0
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 9
- 12
- 16
- 21

WGB\_AboriginalSites\_2013a.mxd

Constraints

- Constraints for design
- Non-constraints for design - area of interest
- EIS project corridor

r3or-NS02500-NS0-06\_aerial-balanced.ecw

RGB

- Red: Band\_1
- Green: Band\_2
- Blue: Band\_3

m56orthomor015c.ecw

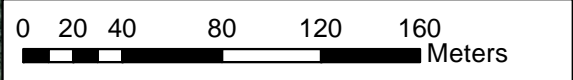
RGB

- Red: Band\_1
- Green: Band\_2
- Blue: Band\_3

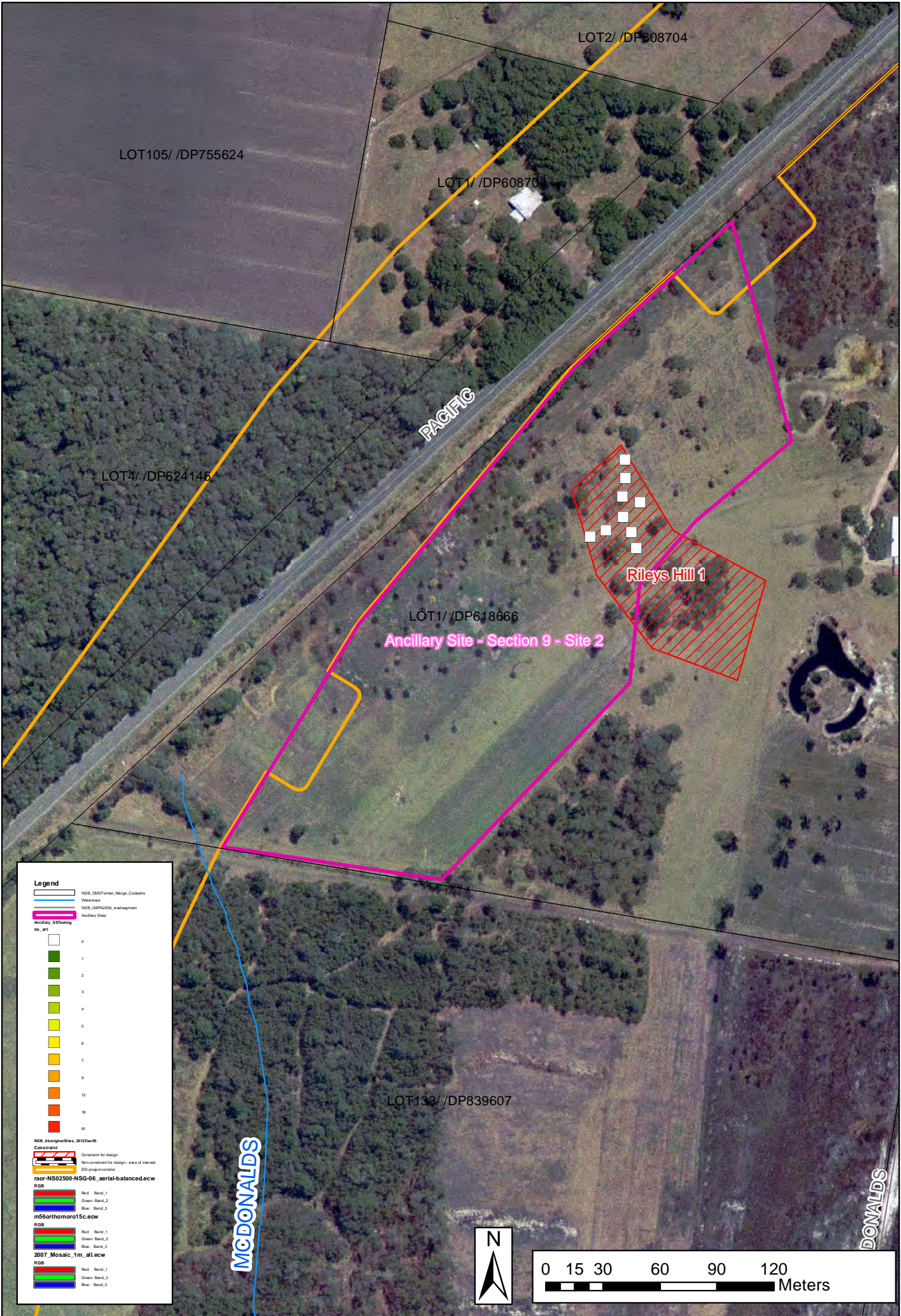
2007\_Mosaic\_1m\_all.ecw

RGB

- Red: Band\_1
- Green: Band\_2
- Blue: Band\_3







LOT105/DP755624

LOT2/DP608704

LOT1/DP60870

LOT4/DP624146

PACIFIC

LOT1/DP618666

Ancillary Site - Section 9 - Site 2












Rileys Hill 1

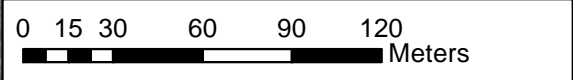
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MCDONALDS

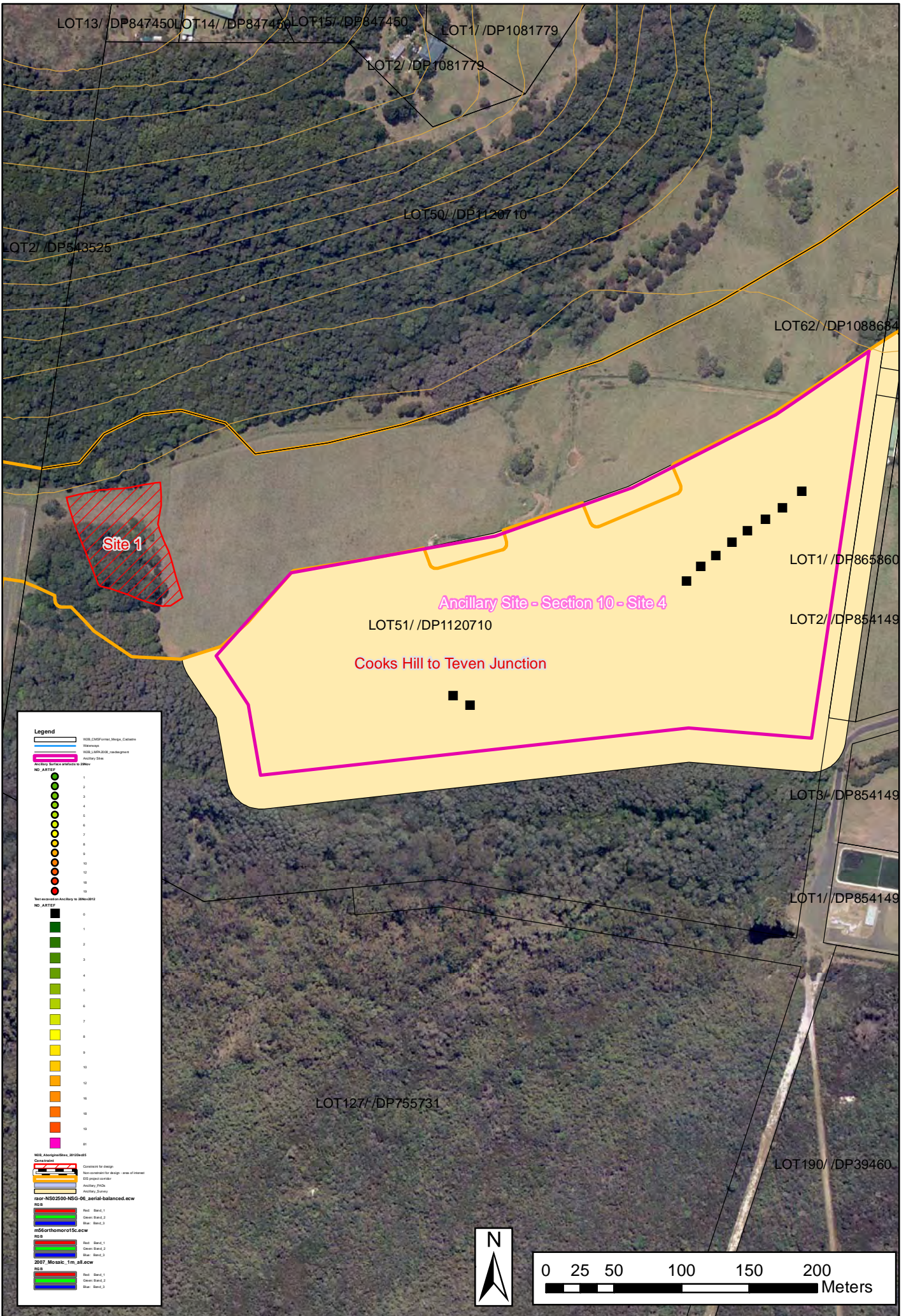
DONALDS

**Legend**

-  WGS\_OMSFormer\_Merge\_Cadastral Waterways
-  WGS\_LMPA2008\_reassignment Ancillary Sites
-  Ancillary\_SSEwing no\_01
-  0 to 21
-  WGS\_AboriginalSites\_2012Dec05 Constraints
-  Constraints for design
-  Non-constraints for design - areas of interest
-  EIS project corridor
-  rcor\_NS02500-NS0-06\_aerial-balanced.ecw RGB
-  m56orthomor15c.ecw RGB
-  2007\_Mosaic\_1m\_atLecw RGB







**Legend**

- WSB\_CMSFormal\_Maps\_Colours
- WSB\_Aerial
- WSB\_1:50000\_OrthoMosaic
- Ancillary Sites
- Ancillary Sites

WSB\_AerialToOrthoMosaic\_2007  
 NO\_AIRTEL

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15

Test section on Ancillary to 2007  
 NO\_AIRTEL

0  
1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15

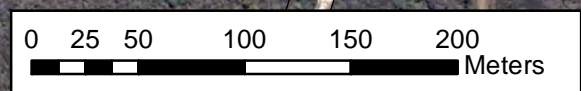
WSB\_AerialToOrthoMosaic\_2007

OrthoMosaic  
 Constraints for design:  
 Non-constraints for design - areas of interest:  
 2007\_OrthoMosaic  
 Ancillary Sites  
 Ancillary Sites  
 Ancillary Sites

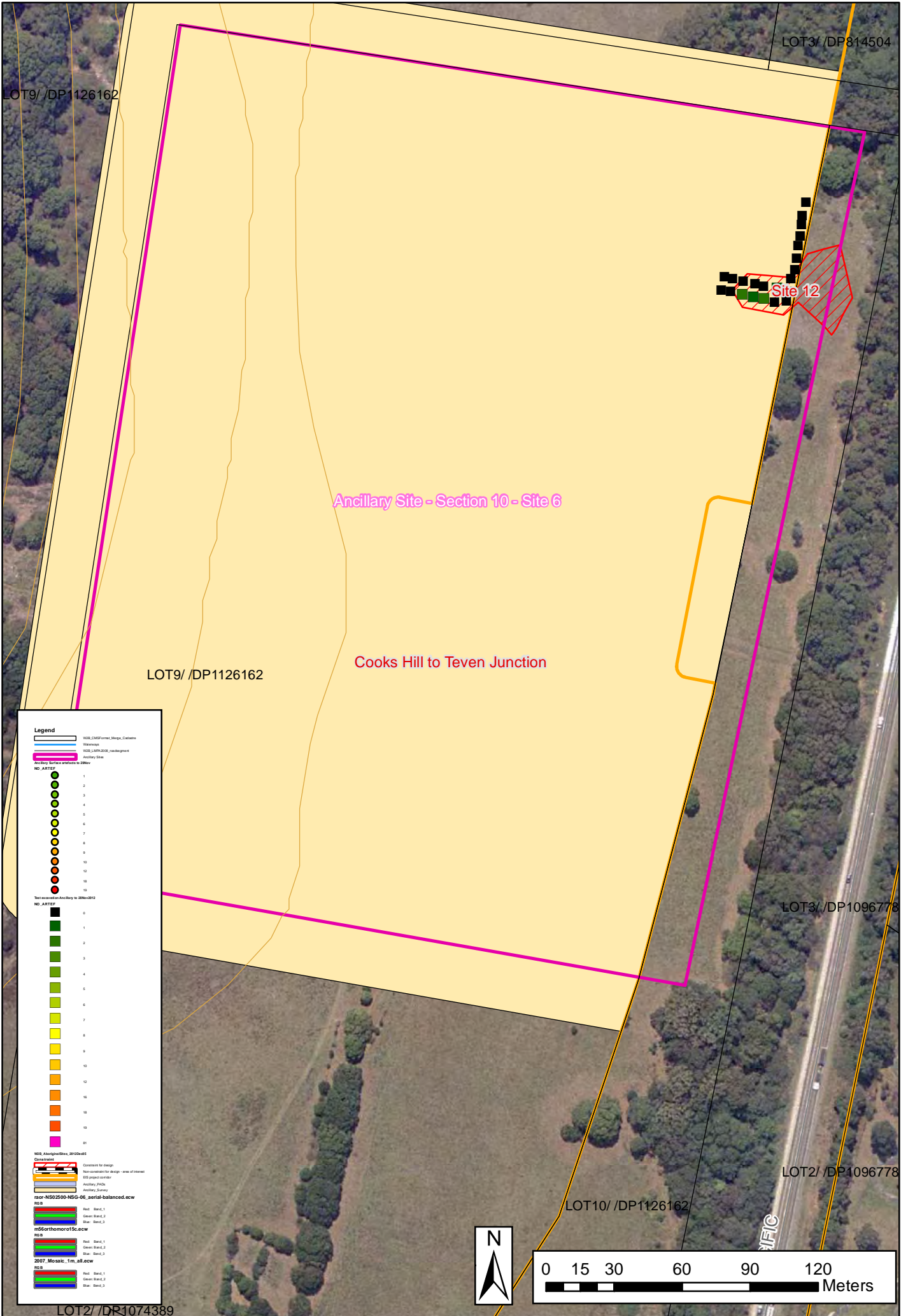
2007-NS02500-NSG-06\_aerial-balanced.ecw  
 NS B  
 NS: Band\_1  
 Green: Band\_2  
 Blue: Band\_3

2007-NS02500-NSG-06\_ortho-balanced.ecw  
 NS B  
 NS: Band\_1  
 Green: Band\_2  
 Blue: Band\_3

2007\_Mosaic\_1m\_08.ecw  
 NS B  
 NS: Band\_1  
 Green: Band\_2  
 Blue: Band\_3

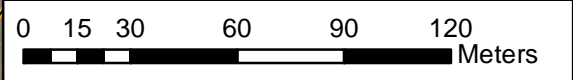






**Legend**

- WSB\_CMSFormal\_Maps\_Colours
- Waterways
- WSB\_LandUse\_ZoningDesignation
- Ancillary Sites
- Aerial Base Surface analysis to 20m elev
- NO\_AIRTEL
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 12
- 15
- 18
- 21
- Test section on Ancillary to 20m to 2012
- NO\_AIRTEL
- 0
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 12
- 15
- 18
- 21
- WSB\_AerialBaseSurf\_2012to25
- Observation
- Constraint for design
- Not constraint for design - area of interest
- 100m buffer
- Ancillary PDA
- Ancillary Control
- near-NS02500-NSG-06\_aerial-balanced.ecw
- NSB
- NSB - Band 1
- Green - Band 2
- Blue - Band 3
- nd56orthomorph15.ecw
- NSB
- NSB - Band 1
- Green - Band 2
- Blue - Band 3
- 2007\_Mosaic\_1m\_38.ecw
- NSB
- NSB - Band 1
- Green - Band 2
- Blue - Band 3





# Appendix H Test excavation details



Woolgoolga to Ballina Pacific Highway Upgrade  
Ancillary facilities and design changes Aboriginal cultural heritage assessment

Date	MGA Zone 56		Site / PAD Name	Transect Number	STP Number	End depth (mm)	Landscape unit (landform)	No. of artefacts	Artefact materials	Site condition	Comments
	Easting	Northing									
19/09/2012	505858	6708555	WX2I Site 8	1	1	200	Crest of small rise	0			
19/09/2012	505860	6708566	WX2I Site 8	1	2	200	Crest of small rise	0			
19/09/2012	505863	6708574	WX2I Site 8	1	3	300	Crest of small rise	0			
19/09/2012	505869	6708603	WX2I Site 8	1	4	250	Crest of small rise	0			
19/09/2012	505870	6708611	WX2I Site 8	1	5	300	Crest of small rise	0			
19/09/2012	505871	6708625	WX2I Site 8	1	6	150	Crest of small rise	0			
19/09/2012	505872	6708637	WX2I Site 8	1	7	150	Crest of small rise	0			
19/09/2012	505874	6708653	WX2I Site 8	1	8	100	Crest of small rise	0			
19/09/2012	505847	6708566	WX2I Site 8	2	1	200	Crest of small rise	0			
19/09/2012	505847	6708555	WX2I Site 8	2	2	250	Crest of small rise	0			
19/09/2012	505847	6708574	WX2I Site 8	2	3	100	Crest of small rise	0			
19/09/2012	505851	6708584	WX2I Site 8	2	4	200	Crest of small rise	0			



Woolgoolga to Ballina Pacific Highway Upgrade  
Ancillary facilities and design changes Aboriginal cultural heritage assessment

Date	MGA Zone 56		Site / PAD Name	Transect Number	STP Number	End depth (mm)	Landscape unit (landform)	No. of artefacts	Artefact materials	Site condition	Comments
	Easting	Northing									
19/09/2012	505851	6708596	WX2I Site 8	2	5	200	Crest of small rise	0			
19/09/2012	505855	6708608	WX2I Site 8	2	6	200	Crest of small rise	0			
19/09/2012	505856	6708618	WX2I Site 8	2	7	250	Crest of small rise	0			
19/09/2012	505858	6708627	WX2I Site 8	2	8	250	Crest of small rise	0			
19/09/2012	505860	6708637	WX2I Site 8	2	9	150	Crest of small rise	0			
19/09/2012	505861	6708648	WX2I Site 8	2	10	200	Crest of small rise	0			
19/09/2012	505872	6708651	WX2I Site 8	3	1	100	Crest of small rise	0			
19/09/2012	505880	6708654	WX2I Site 8	3	2	200	Crest of small rise	0			
19/09/2012	505889	6708657	WX2I Site 8	3	3	200	Crest of small rise	0			
19/09/2012	505899	6708662	WX2I Site 8	3	4	100	Crest of small rise	0			
19/09/2012	505917	6708670	WX2I Site 8	3	6	150	Crest of small rise	0			
19/09/2012	505926	6708673	WX2I Site 8	3	7	100	Crest of small rise	0			
19/09/2012	505936	6708676	WX2I Site 8	3	8	250	Crest of small rise	0			
19/09/2012	505945	6708681	WX2I Site 8	3	9	200	Crest of small rise	0			



Woolgoolga to Ballina Pacific Highway Upgrade  
Ancillary facilities and design changes Aboriginal cultural heritage assessment

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	Easting	Northing									
19/09/2012	505954	6708685	WX2I Site 8	3	10	100	Crest of small rise	0			
19/09/2012	505908	6708666	WX2I Site 8	3	5	100	Crest of small rise	0			
9/10/2012	545605	6799578	Site 1	1	1	350	Floodplain, edge of swamp	0			
9/10/2012	545591	6799566	Site 1	1	2	300	Floodplain, edge of swamp	0			
9/10/2012	545578	6799558	Site 1	1	3	300	Floodplain, edge of swamp	0			
9/10/2012	545565	6799549	Site 1	1	4	300	Floodplain, edge of swamp	0			
9/10/2012	545554	6799540	Site 1	1	5	250	Floodplain, edge of swamp	0			
9/10/2012	545541	6799531	Site 1	1	6	300	Floodplain, edge of swamp	0			
9/10/2012	545531	6799523	Site 1	1	7	300	Floodplain, edge of swamp	0			
9/10/2012	545520	6799512	Site 1	1	8	300	Floodplain, edge of swamp	0			
9/10/2012	545360	6799420	Site 1	2	1	450	Floodplain, edge of swamp	0			Sandy silt
9/10/2012	545348	6799428	Site 1	2	2	250	Floodplain, edge of swamp	0			
9/10/2012	546492	6801443	Site 12	1	1	1000	Sandy rise	0			
9/10/2012	546493	6801447	Site 12	1	2	800	Sandy rise	0			
9/10/2012	546494	6801452	Site 12	1	3	900	Sandy rise	0			



Woolgoolga to Ballina Pacific Highway Upgrade  
Ancillary facilities and design changes Aboriginal cultural heritage assessment

Date	MGA Zone 56		Site / PAD Name	Transect Number	STP Number	End depth (mm)	Landscape unit (landform)	No. of artefacts	Artefact materials	Site condition	Comments
	Easting	Northing									
9/10/2012	546496	6801456	Site 12	1	4	800	Sandy rise	0			
9/10/2012	546496	6801462	Site 12	1	5	800	Sandy rise	0			
9/10/2012	546497	6801467	Site 12	1	6	800	Sandy rise	0			
9/10/2012	546498	6801471	Site 12	1	7	800	Sandy rise	0			
9/10/2012	546498	6801476	Site 12	1	8	800	Sandy rise	0			
9/10/2012	546499	6801480	Site 12	1	9	700	Sandy rise	0			
9/10/2012	546500	6801486	Site 12	1	10	600	Sandy rise	0			Big roots
9/10/2012	546487	6801442	Site 12	2	1	900	Sandy rise	0			
9/10/2012	546482	6801444	Site 12	2	2	1100	Sandy rise	2	Chert		Charcoal removed from same layer as artefacts
9/10/2012	546477	6801444	Site 12	2	3	950	Sandy rise	1	Chert		Angular fragment
9/10/2012	546472	6801445	Site 12	2	4	1000	Sandy rise	2	Chalcedony, chert		
9/10/2012	546467	6801447	Site 12	2	5	1100	Sandy rise	0			
9/10/2012	546463	6801448	Site 12	2	6	1000		0			
9/10/2012	546488	6801448	Site 12	3	1	950		1	Chert		
9/10/2012	546482	6801449	Site 12	3	2	1000		0			
9/10/2012	546478	6801450	Site 12	3	3	1050		0			
9/10/2012	546473	6801451	Site 12	3	4	1050		0			
9/10/2012	546468	6801453	Site 12	3	5	1000		0			



Woolgoolga to Ballina Pacific Highway Upgrade  
Ancillary facilities and design changes Aboriginal cultural heritage assessment

Date	MGA Zone 56		Site / PAD Name	Transect Number	STP Number	End depth (mm)	Landscape unit (landform)	No. of artefacts	Artefact materials	Site condition	Comments
	Easting	Northing									
9/10/2012	546465	6801454	Site 12	3	6	1000	Edge of rise, adjacent to swamp	0			
2/10/2012	519435	6736385	Shark Creek Site 2	1	1	100	Top of slope	0			
2/10/2012	519425	6736381	Shark Creek Site 2	1	2	240	Top of slope	0			
2/10/2012	519418	6736376	Shark Creek Site 2	1	3	300	Top of slope	0			
2/10/2012	519409	6736369	Shark Creek Site 2	1	4	200	Top of slope	0			
2/10/2012	519398	6736367	Shark Creek Site 2	1	5	100	Top of slope	0			
2/10/2012	519387	6736368	Shark Creek Site 2	1	6	100	Top of slope	0			
2/10/2012	519370	6736377	Shark Creek Site 2	2	1	200	Top of slope	0			
2/10/2012	519359	6736380	Shark Creek Site 2	2	2	200	Top of slope	0			
2/10/2012	519348	6736381	Shark Creek Site 2	2	3	250	Top of slope	0			



Woolgoolga to Ballina Pacific Highway Upgrade  
Ancillary facilities and design changes Aboriginal cultural heritage assessment

Date	MGA Zone 56		Site / PAD Name	Transect Number	STP Number	End depth (mm)	Landscape unit (landform)	No. of artefacts	Artefact materials	Site condition	Comments
	Eastings	Northing									
2/10/2012	519340	6736382	Shark Creek Site 2	2	4	290	Top of slope	0			
2/10/2012	519493	6736390	Shark Creek Site 2	3	1	100	Top of slope	0			
2/10/2012	519502	6736391	Shark Creek Site 2	3	2	250	Top of slope	0			
2/10/2012	519512	6736392	Shark Creek Site 2	3	3	200	Top of slope	0			
2/10/2012	519523	6736393	Shark Creek Site 2	3	4	250	Top of slope	0			
4/10/2012	519841	6737591	Hirst 3	1	1	250	Terrace	0			
4/10/2012	519848	6737587	Hirst 3	1	2	250	Terrace	1	Chert	Flake	
4/10/2012	519859	6737583	Hirst 3	1	3	200	Terrace	0			
4/10/2012	519869	6737580	Hirst 3	1	4	150	Terrace	0			
4/10/2012	519878	6737577	Hirst 3	1	5	150	Terrace	0			
4/10/2012	519887	6737573	Hirst 3	1	6	150	Terrace	0			
4/10/2012	519897	6737569	Hirst 3	1	7	200	Terrace	0			
4/10/2012	519845	6737589	Hirst 3	1	2a	200	Terrace	0			
4/10/2012	519851	6737592	Hirst 3	1	2b	200	Terrace	0			
4/10/2012	519855	6737585	Hirst 3	1	2c	150	Terrace	0			
4/10/2012	519847	6737583	Hirst 3	1	2d	250	Terrace	0			



Woolgoolga to Ballina Pacific Highway Upgrade  
Ancillary facilities and design changes Aboriginal cultural heritage assessment

Date	MGA Zone 56		Site / PAD Name	Transect Number	STP Number	End depth (mm)	Landscape unit (landform)	No. of artefacts	Artefact materials	Site condition	Comments
	Easting	Northing									
4/10/2012	519835	6737523	Hirst 3	2	1	250	Top slope	0			
4/10/2012	519837	6737532	Hirst 3	2	2	250	Top slope	0			
4/10/2012	519840	6737541	Hirst 3	2	3	200	Top slope	0			
4/10/2012	519841	6737551	Hirst 3	2	4	250	Top slope	0			
4/10/2012	519844	6737562	Hirst 3	2	5	200	Top slope	0			
4/10/2012	519846	6737571	Hirst 3	2	6	250	Top slope	0			
2/10/2012	523684	6752292	Mororo Creek 1	1	1	1100	Low sandy rise adjacent to swampy creek	0			
2/10/2012	523679	6752292	Mororo Creek 1	1	2	950	Low sandy rise adjacent to swampy creek	1	Chert		
2/10/2012	523673	6752293	Mororo Creek 1	1	3	1000	Low sandy rise adjacent to swampy creek	5	Chert		
2/10/2012	523663	6752291	Mororo Creek 1	1	4	800	Low sandy rise adjacent to swampy creek	4			All excavated artefacts reburied in bags at base of this pit
2/10/2012	523757	6752267	Mororo Creek 1	2	1	800	Low sandy rise adjacent to swampy creek	0			
2/10/2012	523766	6752267	Mororo Creek 1	2	2	900	Low sandy rise adjacent to swampy creek	1	Silcrete		



Woolgoolga to Ballina Pacific Highway Upgrade  
Ancillary facilities and design changes Aboriginal cultural heritage assessment

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	Easting	Northing									
2/10/2012	523775	6752267	Mororo Creek 1	2	3	850	Low sandy rise adjacent to swampy creek	0			Artefact reburied in shovel probe 3
2/10/2012	523869	6752355	Mororo Creek 1	3	1	900	Low sandy rise adjacent to swampy creek	4	Quartzite, chert		
2/10/2012	523873	6752356	Mororo Creek 1	3	2	800	Low sandy rise adjacent to swampy creek	5	Chert		
2/10/2012	523880	6752358	Mororo Creek 1	3	3	600	Low sandy rise adjacent to swampy creek	2	Chert		Shell found
2/10/2012	523887	6752360	Mororo Creek 1	3	4	700	Low sandy rise adjacent to swampy creek	2	Chert		
2/10/2012	523903	6752364	Mororo Creek 1	3	5	800	Low sandy rise adjacent to swampy creek	0			
9/10/2012	523770	6752433	Mororo Creek 2	1	1	600	Sandy rise above creek	0			
9/10/2012	523760	6752434	Mororo Creek 2	1	2	500	Sandy rise above creek	0			Abandoned due to large root and ant nest
9/10/2012	523750	6752435	Mororo Creek 2	1	3	600	Sandy rise above creek	1	Chert		
9/10/2012	523741	6752435	Mororo Creek 2	1	4	700	Sandy rise above creek	3	Chert		Artefacts reburied in bags
24/10/2012			Taylors Run 1	1	1	50	Crest of gentle ridge	0			



Woolgoolga to Ballina Pacific Highway Upgrade  
Ancillary facilities and design changes Aboriginal cultural heritage assessment

Date	MGA Zone 56		Site / PAD Name	Transect Number	STP Number	End depth (mm)	Landscape unit (landform)	No. of artefacts	Artefact materials	Site condition	Comments
	Easting	Northing									
24/10/2012			Taylors Run 1	1	2	50	Crest of gentle ridge	0			
24/10/2012			Taylors Run 1	1	3	50	Crest of gentle ridge	0			
24/10/2012			Taylors Run 1	1	4	100	Crest of gentle ridge	0			
24/10/2012			Taylors Run 1	1	5	100	Crest of gentle ridge	0			
24/10/2012			Taylors Run 1	1	6	75	Crest of gentle ridge	3	Mudstone		
24/10/2012			Taylors Run 1	1	6A	150	Crest of gentle ridge	0			
24/10/2012			Taylors Run 1	1	6B	150	Crest of gentle ridge	0			Disturbed
24/10/2012			Taylors Run 1	1	7	100	Crest of gentle ridge	0			
24/10/2012			Taylors Run 1	1	8	125	Crest of gentle ridge	0			
24/10/2012			Taylors Run 1	1	9	100	Crest of gentle ridge	1	Siltstone		Mixed deposit with clay nodules, ACHARcoal and gravel
24/10/2012			Taylors Run 1	1	9A	30	Crest of gentle ridge	1	Chalcedony		
24/10/2012			Taylors Run 1	1	9B	150	Crest of gentle ridge	0			Disturbed
24/10/2012			Taylors Run 1	1	9Ai	?	Crest of gentle ridge	0			



Woolgoolga to Ballina Pacific Highway Upgrade  
Ancillary facilities and design changes Aboriginal cultural heritage assessment

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	Easting	Northing									
24/10/2012			Taylors Run 1	1	10	150	Crest of gentle ridge	0			Disturbed
24/10/2012			Taylors Run 1	1	11	100	Crest of gentle ridge	0			
24/10/2012			Taylors Run 1	1	12	100	Crest of gentle ridge	0			Disturbed
24/10/2012			Taylors Run 1	1	13	100	Crest of gentle ridge	0			Disturbed
24/10/2012			Taylors Run 1	1	14	75	Crest of gentle ridge	0			Disturbed
24/10/2012			WWC37	1	1	75	Crest of spur				
24/10/2012			WWC37	1	2	150	Crest of spur				
24/10/2012			WWC37	1	3	100	Crest of spur				
24/10/2012			WWC37	1	4	100	Crest of spur				
24/10/2012			WWC37	1	5	50	Crest of spur				
24/10/2012			WWC37	1	6	150	Crest of spur				Some ACHARcoal
24/10/2012			WWC37	2	1	50	Crest of spur				
24/10/2012			WWC37	2	2	350	Crest of spur				Old burnt out tree
24/10/2012			WWC37	2	3	150	Crest of spur				
24/10/2012			WWC37	2	4	100	Crest of spur				
24/10/2012			WWC37	3	1	50	Crest of spur				
24/10/2012			WWC37	3	2	100	Crest of spur				
24/10/2012			WWC37	3	3	25	Crest of spur				



Woolgoolga to Ballina Pacific Highway Upgrade  
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	Easting	Northing									
23/10/2012	516676.6	6680135.2	Dirty Creek	1	1	80	Flat above floodplain/swamp	0	-		
23/10/2012	516669.7	6680139.9	Dirty Creek	1	2	20	Flat above floodplain/swamp	0	-		
23/10/2012	516661.3	6680141.2	Dirty Creek	1	3	50	Flat above floodplain/swamp	0	-		
23/10/2012	517756.9	6677953.4	Dirty Creek	1	4	80	Flat above floodplain/swamp	0	-		
01/11/2012	529275.8	6774893.4	Dubaijeen (New Italy)	1	1	40	Mid slope	1	silcrete		
01/11/2012	529278.4	6774901.9	Dubaijeen (New Italy)	1	2	40	Mid slope	0	-		
01/11/2012	529276.7	6774896.8	Dubaijeen (New Italy)	1	3	35	Mid slope	0	-		
01/11/2012	529280.0	6774911.3	Dubaijeen (New Italy)	1	4	40	Mid slope	0	-		
01/11/2012	529280.5	6774890.6	Dubaijeen (New Italy)	1	5	35	Mid slope	0	-		
01/11/2012	529285.5	6774889.7	Dubaijeen (New Italy)	1	6	35	Mid slope	0	-		
01/11/2012	529286.8	6774895.8	Dubaijeen (New Italy)	1	7	35	Mid slope	0	-		
01/11/2012	529288.6	6774905.5	Dubaijeen (New Italy)	1	8	35	Mid slope	0	-		
01/11/2012	529295.7	6774894.2	Dubaijeen (New Italy)	1	9	35	Mid slope	0	-		
01/11/2012	529308.5	6774904.7	Dubaijeen (New Italy)	1	10	35	Mid slope	0	-		



Woolgoolga to Ballina Pacific Highway Upgrade  
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	Easting	Northing									
01/11/2012	529306.3	6774893.3	Dubaijeen (New Italy)	1	11	35	Mid slope	0	-		
01/11/2012	529326.1	6774892.4	Dubaijeen (New Italy)	1	12	30	Mid slope	0	-		
01/11/2012	529328.7	6774904.4	Dubaijeen (New Italy)	1	13	30	Mid slope	0	-		
01/11/2012	529348.7	6774902.9	Dubaijeen (New Italy)	1	14	30	Mid slope	0	-		
02/11/2012	529488.4	6774932.0	Dubaijeen (New Italy)	1	15	0	Mid slope	0	-		
02/11/2012	529507.0	6774924.4	Dubaijeen (New Italy)	1	16	0	Mid slope	0	-		
02/11/2012	529525.2	6774916.6	Dubaijeen (New Italy)	1	17	10	Mid slope	0	-		
02/11/2012	529522.5	6774897.0	Dubaijeen (New Italy)	1	18	10	base of slope	0	-		
02/11/2012	529504.3	6774904.8	Dubaijeen (New Italy)	1	19	10	lower slope	0	-		
02/11/2012	529486.5	6774912.7	Dubaijeen (New Italy)	1	20	15	Mid slope	0	-		
02/11/2012	529368.9	6774900.0	Dubaijeen (New Italy)	1	21	30	Mid slope	0	-		
02/11/2012	529340.9	6774889.7	Dubaijeen (New Italy)	1	22	0	Mid slope	4	silcrete, basalt		
02/11/2012	529281.4	6774923.9	Dubaijeen (New Italy)	1	23	35	Mid slope	0	-		
19/11/2012	529282.5	6774934.2	Dubaijeen (New Italy)	1	24	35	Mid slope	3	silcrete		



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	Easting	Northing									
19/11/2012	529284.1	6774944.0	Dubaijeen (New Italy)	1	25	35	upper slope	0	-		
19/11/2012	529289.8	6774973.4	Dubaijeen (New Italy)	1	26	35	upper slope	0	-		
19/11/2012	529286.1	6774952.8	Dubaijeen (New Italy)	1	27	35	upper slope	0	-		
19/11/2012	529293.0	6774993.7	Dubaijeen (New Italy)	1	28	35	upper slope	1	chalcedony		
19/11/2012	529304.3	6774962.8	Dubaijeen (New Italy)	1	29	35	upper slope	0	-		
19/11/2012	529301.1	6774920.8	Dubaijeen (New Italy)	1	30	35	upper slope	0	-		
19/11/2012	529301.5	6774942.6	Dubaijeen (New Italy)	1	31	40	upper slope	1	-		
19/11/2012	529312.2	6774981.4	Dubaijeen (New Italy)	1	32	35	upper slope	0	-		
19/11/2012	529322.5	6774920.4	Dubaijeen (New Italy)	1	33	30	upper slope	0	-		
19/11/2012	529322.2	6774940.6	Dubaijeen (New Italy)	1	34	35	upper slope	0	-		
19/11/2012	529230.2	6774654.2	Dubaijeen (New Italy)	1	35	0	upper slope	0	-		
20/11/2012	529323.9	6774960.5	Dubaijeen (New Italy)	1	36	35	upper slope	0	-		
20/11/2012	529332.2	6774978.4	Dubaijeen (New Italy)	1	37	35	upper slope	0	-		
20/11/2012	529392.6	6774926.5	Dubaijeen (New Italy)	1	38	35	upper slope	1	chalcedony		



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	Easting	Northing									
20/11/2012	529395.9	6774940.9	Dubaijeen (New Italy)	1	39	30	mid slope	1	quartz		
20/11/2012	529390.2	6774911.1	Dubaijeen (New Italy)	1	40	35	mid slope	0	-		
20/11/2012	529409.9	6774908.8	Dubaijeen (New Italy)	1	41	25	mid slope	1	silcrete		
20/11/2012	529413.4	6774923.0	Dubaijeen (New Italy)	1	42	35	mid slope	2	chert		
20/11/2012	529433.9	6774921.7	Dubaijeen (New Italy)	1	43	25	mid slope	12	silcrete		
20/11/2012	529417.5	6774937.4	Dubaijeen (New Italy)	1	44	35	mid slope	0	-		
20/11/2012	529430.2	6774907.4	Dubaijeen (New Italy)	1	45	25	mid slope	0	-		
20/11/2012	529454.3	6774917.6	Dubaijeen (New Italy)	1	46	25	mid slope	0	-		
20/11/2012	529451.1	6774903.3	Dubaijeen (New Italy)	1	47	25	lower slope	0	-		
20/11/2012	529472.2	6774907.1	Dubaijeen (New Italy)	1	48	0	lower slope	0	-		
20/11/2012	529297.1	6775013.7	Dubaijeen (New Italy)	1	49	35	lower slope	1	chalcedony		
21/11/2012	529318.8	6775020.8	Dubaijeen (New Italy)	1	50	40	lower slope	0	-		
21/11/2012	529316.4	6775006.2	Dubaijeen (New Italy)	1	51	40	lower slope	0	-		
21/11/2012	529322.0	6775035.6	Dubaijeen (New Italy)	1	52	35	lower slope	0	-		



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	Easting	Northing									
21/11/2012	529335.8	6774999.5	Dubaijeen (New Italy)	1	53	40	mid slope	0	-		
21/11/2012	529339.1	6775014.0	Dubaijeen (New Italy)	1	54	40	upper slope	1	chalcedony		
21/11/2012	529341.8	6775029.4	Dubaijeen (New Italy)	1	55	50	upper slope	0	-		
21/11/2012	529389.1	6774962.6	Dubaijeen (New Italy)	1	56	35	upper slope	0	-		
21/11/2012	529396.4	6774981.0	Dubaijeen (New Italy)	1	57	35	upper slope	2	chalcedony		
21/11/2012	529407.6	6774953.5	Dubaijeen (New Italy)	1	58	35	upper slope	1	chalcedony		
21/11/2012	529403.7	6775000.1	Dubaijeen (New Italy)	1	59	40	upper slope	0	-		
21/11/2012	529415.2	6774972.3	Dubaijeen (New Italy)	1	60	25	mid slope	1	chalcedony		
21/11/2012	529421.7	6774991.1	Dubaijeen (New Italy)	1	61	35	mid slope	3	chalcedony		
21/11/2012	529409.7	6775019.2	Dubaijeen (New Italy)	1	62	35	mid slope	2	chalcedony silcrete		
22/11/2012	529428.6	6775011.8	Dubaijeen (New Italy)	1	63	35	mid slope	2	sandstone		
22/11/2012	529435.2	6775030.5	Dubaijeen (New Italy)	1	64	35	mid slope	1	chalcedony		
22/11/2012	529425.9	6774944.0	Dubaijeen (New Italy)	1	65	30	mid slope	0	-		
22/11/2012	529433.8	6774962.9	Dubaijeen (New Italy)	1	66	30	mid slope	3	silcrete, rose quartz		



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	Easting	Northing									
22/11/2012	529453.5	6775022.0	Dubaijeen (New Italy)	1	67	40	mid slope	0	-		
22/11/2012	529439.4	6774982.5	Dubaijeen (New Italy)	1	68	30	mid slope	5	slope		
22/11/2012	529446.0	6775003.8	Dubaijeen (New Italy)	1	69	35	mid slope	0	-		
22/11/2012	529444.7	6774934.7	Dubaijeen (New Italy)	1	70	20	lower slope	0	-		
22/11/2012	529457.8	6774972.6	Dubaijeen (New Italy)	1	71	25	lower slope	0	-		
22/11/2012	529451.6	6774954.2	Dubaijeen (New Italy)	1	72	30	lower slope	0	-		
22/11/2012	529471.1	6775012.0	Dubaijeen (New Italy)	1	73	35	lower slope	0	-		
22/11/2012	529477.9	6775030.9	Dubaijeen (New Italy)	1	74	25	lower slope	0	-		
22/11/2012	529463.5	6774993.4	Dubaijeen (New Italy)	1	75	30	lower slope	0	-		
22/11/2012	529488.4	6775000.9	Dubaijeen (New Italy)	1	76	25	lower slope	0	-		
22/11/2012	529480.5	6774983.8	Dubaijeen (New Italy)	1	77	20	mid slope	0	-		
22/11/2012	529495.6	6775022.6	Dubaijeen (New Italy)	1	78	25	lower slope	0	-		
22/11/2012	529476.6	6774963.2	Dubaijeen (New Italy)	1	79	25	mid slope	0	-		
23/11/2012	529470.7	6774944.3	Dubaijeen (New Italy)	1	80	25	mid slope	0	-		



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	Easting	Northing									
23/11/2012	529462.2	6774925.7	Dubaijeen (New Italy)	1	81	30	lower slope	0	-		
23/11/2012	529423.2	6775100.8	Dubaijeen (New Italy)	1	82	35	lower slope	1	chert		
23/11/2012	529440.6	6775112.0	Dubaijeen (New Italy)	1	83	35	lower slope	81	silcrete chert		
23/11/2012	529454.5	6775126.3	Dubaijeen (New Italy)	1	84	45	mid slope	0	-		
23/11/2012	529407.4	6775087.9	Dubaijeen (New Italy)	1	85	40	lower slope	1	-		
23/11/2012	529431.0	6775081.1	Dubaijeen (New Italy)	1	86	40	crest of low rise	9	silcrete		
23/11/2012	529470.5	6775138.8	Dubaijeen (New Italy)	1	87	35	crest of low rise	7	silcrete quartz		
23/11/2012	529484.4	6775153.0	Dubaijeen (New Italy)	1	88	35	crest of low rise	2	silcrete		
23/11/2012	529499.3	6775167.4	Dubaijeen (New Italy)	1	89	35	crest of low rise	0	-		
23/11/2012	529459.7	6775104.0	Dubaijeen (New Italy)	1	90	45	crest of low rise	2	silcrete, chalcedony		
23/11/2012	529514.0	6775182.2	Dubaijeen (New Italy)	1	91	25	crest of low rise	1	silcrete		
23/11/2012	529541.1	6775209.6	Dubaijeen (New Italy)	1	92	0	mid slope of low rise	0	-		
23/11/2012	529489.0	6775116.0	Dubaijeen (New Italy)	1	93	45	mid slope of low rise	0	-		
23/11/2012	529443.2	6775135.5	Dubaijeen (New Italy)	1	94	35	mid slope of low rise	3	silcrete		



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	Easting	Northing									
23/11/2012	529467.9	6775165.3	Dubaijeen (New Italy)	1	95	35	mid slope of low rise	0	-		
23/11/2012	529533.2	6775164.1	Dubaijeen (New Italy)	1	96	25	upper slope	3	silcrete		
23/11/2012	529490.5	6775192.3	Dubaijeen (New Italy)	1	97	35	upper slope	1	chalcedony		
18/12/2012	517847.5	6678297.5	WWC39	1	1	125	lower slope	0	-		
18/12/2012	517845.7	6678308.6	WWC39	1	2	300	lower slope	0	-		
18/12/2012	517842.6	6678320.2	WWC39	1	3	350	lower slope	0	-		
18/12/2012	517840.2	6678330.0	WWC39	1	4	200	lower slope	0	-		
18/12/2012	517837.2	6678341.8	WWC39	1	5	200	lower slope	0	-		
18/12/2012	517834.1	6678353.2	WWC39	1	6	250	lower slope	0	-		
18/12/2012	517832.6	6678363.3	WWC39	1	7	150	lower slope	0	-		
18/12/2012	517830.6	6678375.5	WWC39	1	8	200	lower slope	1	Silcrete		
18/12/2012	517827.9	6678389.0	WWC39	1	8a	200	lower slope	0	-		
18/12/2012	517836.0	6678376.9	WWC39	2	1	175	lower slope	0	-		
18/12/2012	517708.8	6678243.4	WWC39	2	2	75	crest of low spur	0	-		
18/12/2012	517705.7	6678244.9	WWC39	2	3	0	crest	2	Chert		
18/12/2012	517697.2	6678239.8	WWC39	2	4	75	crest	0	-		
18/12/2012	517721.3	6678244.7	WWC39	2	5	100	crest	0	-		
18/12/2012	517686.5	6678238.5	WWC39	2	6	100	crest	2	Hornfels		
18/12/2012	517674.1	6678237.2	WWC39	2	7	200	upper slope	0	-		
18/12/2012			WWC39	2	8						



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	Eastings	Northing									
18/12/2012	517632.5	6678229.4	WWC39	3	1	100	upper slope	0	-		
18/12/2012	517617.0	6678225.6	WWC39	3	2	75	mid slope	0	-		
18/12/2012	517663.2	6678160.6	WWC39	3	3	0	upper slope	1	Silcrete		
18/12/2012	517654.7	6678142.3	WWC39	3	3a	0	upper slope	1	Chert		
18/12/2012	517646.8	6678231.9	WWC39	3	3b	175	upper slope	0	-		
18/12/2012	517653.4	6678214.6	WWC39	3	3c	100	upper slope	0	-		
18/12/2012	517660.0	6678195.2	WWC39	3	3d	150	upper slope	1	Chert		
18/12/2012	517666.1	6678179.3	WWC39	3	3e	100	upper slope	0	-		
18/12/2012	517670.5	6678154.6	WWC39	3	4	100	upper slope	0	-		
18/12/2012	517662.4	6678187.4	WWC39	3	5	100	upper slope	1	Chert		
19/12/2012	531093.3	6778216.0	Gap Rd 1	1	1	450	lower slope	0	-		
19/12/2012	531075.2	6778207.8	Gap Rd 1	1	2	250	lower slope	0	-		
19/12/2012	531066.9	6778196.1	Gap Rd 1	1	3	350	mid slope	0	-		
19/12/2012	531060.9	6778183.8	Gap Rd 1	1	4	650	upper slope	0	-		
19/12/2012	531058.7	6778167.5	Gap Rd 1	1	5	700	upper slope	0	-		
19/12/2012	531073.8	6778163.2	Gap Rd 1	1	6	500	mid slope	0	-		
19/12/2012	531085.9	6778161.1	Gap Rd 1	1	7	650	lower slope	0	-		
19/12/2012	531099.6	6778158.0	Gap Rd 1	1	8	850	lower slope	0	-		
19/12/2012	531113.1	6778156.2	Gap Rd 1	1	9	950	lower slope	0	-		
19/12/2012	531183.0	6778237.4	Gap Rd 1	2	1	550	Plain	1	silcrete		
19/12/2012	531180.1	6778231.5	Gap Rd 1	2	1a	550	Plain	0	-		
19/12/2012	531175.6	6778240.3	Gap Rd 1	2	1b	500	Plain	0	-		



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	Easting	Northing									
19/12/2012	531190.7	6778247.3	Gap Rd 1	2	1c	650	Plain	0	-		
19/12/2012	531198.0	6778259.9	Gap Rd 1	2	2	525	Plain	0	-		
19/12/2012	531205.6	6778270.7	Gap Rd 1	2	3	500	Plain	0	-		
19/12/2012	531210.2	6778269.0	Gap Rd 1	2	4	550	Plain	1	2		
19/12/2012	531211.7	6778283.9	Gap Rd 1	2	4a	500	Plain	0	-		
19/12/2012	531189.3	6778234.9	Gap Rd 1	2	4b	900	Plain	0	-		
19/12/2012	531200.8	6778273.4	Gap Rd 1	2	5	850	Plain	0	-		
19/12/2012	531218.7	6778264.0	Gap Rd 1	3	1	700	Plain	5	silcrete		
19/12/2012	531225.1	6778260.9	Gap Rd 1	3	1a	700	Plain	0	-		
19/12/2012	531221.6	6778270.4	Gap Rd 1	3	1b	600	Plain	0	-		
19/12/2012	531216.4	6778260.5	Gap Rd 1	3	1c	600	Plain	0	-		
19/12/2012	531209.1	6778269.6	Gap Rd 1	3	2	550	Plain	2	silcrete		
19/12/2012	531211.0	6778273.5	Gap Rd 1	3	2a	700	Plain	0	-		
19/12/2012	531204.5	6778271.5	Gap Rd 1	3	2b	700	Plain	0	-		
19/12/2012	531211.9	6778282.9	Gap Rd 1	3	2c	700	Plain	0	-		
19/12/2012	531200.7	6778272.3	Gap Rd 1	3	3	700	Plain	0	-		
19/12/2012	531192.1	6778277.8	Gap Rd 1	3	4	800	Plain	4	silcrete		
19/12/2012	531182.6	6778283.4	Gap Rd 1	3	4a	700	Plain	0	-		
19/12/2012	531180.7	6778277.7	Gap Rd 1	3	4b	600	Plain	0	-		
19/12/2012	531185.1	6778288.7	Gap Rd 1	3	4c	600	Plain	0	-		
19/12/2012	531455.8	6778211.1	Gap Rd 2	1	1	650	Plain/slight rise	0	-		
19/12/2012	531465.7	6778210.9	Gap Rd 2	1	2	700	Plain/slight rise	0	-		

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	Easting	Northing									
19/12/2012	531452.5	6778207.8	Gap Rd 2	1	3	900	Plain/slight rise	0	-		
19/12/2012	531468.3	6778126.6	Gap Rd 2	2	1	400	Plain/slight rise	0	-		
19/12/2012	531488.9	6778116.9	Gap Rd 2	2	2	500	Plain/slight rise	0	-		
20/12/2012	537502.1	6784495.9	Gittoes Jali	1	1	800	Flat/flood plain/swamp	0	-		
20/12/2012	537500.3	6784484.8	Gittoes Jali	1	2	500	Flat/flood plain/swamp	0	-		
20/12/2012	537500.8	6784471.8	Gittoes Jali	1	3	700	Flat/flood plain/swamp	0	-		
20/12/2012	537500.5	6784451.1	Gittoes Jali	1	4	700	Flat/flood plain/swamp	0	-		
20/12/2012	537500.5	6784461.8	Gittoes Jali	1	5	600	Flat/flood plain/swamp	0	-		
20/12/2012	538501.8	6786953.1	Rileys Hill	1	1	1000	Flat	0	-		
20/12/2012	538502.0	6786943.1	Rileys Hill	1	2	800	Flat	0	-		
20/12/2012	538500.5	6786933.5	Rileys Hill	1	3	750	Flat	0	-		
20/12/2012	538500.9	6786923.0	Rileys Hill	1	4	900	Flat	0	-		
20/12/2012	538505.2	6786914.6	Rileys Hill	1	5	800	Flat	0	-		
20/12/2012	538507.6	6786906.4	Rileys Hill	1	6	900	Flat	0	-		
20/12/2012	538509.7	6786930.4	Rileys Hill	2	1	800	Flat	0	-		
20/12/2012	538491.7	6786915.8	Rileys Hill	2	2	750	Flat	0	-		
20/12/2012	538483.6	6786912.3	Rileys Hill	2	3	750	Flat	0	-		
14/02/2013	512096.9	6715295.3	Chaffin Creek Tree 1	1	1	350	Creek bank	0	-		



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	Easting	Northing									
14/02/2013	512091.3	6715301.4	Chaffin Creek Tree 1	1	2	500	Creek bank	0	-		
14/02/2013	512077.8	6715306.9	Chaffin Creek Tree 1	1	3	200	Creek bank	0	-		
14/02/2013	512066.3	6715316.7	Chaffin Creek Tree 1	1	4	250	Creek bank	0	-		
14/02/2013	512058.8	6715324.1	Chaffin Creek Tree 1	1	5	200	Creek bank	0	-		
14/02/2013	512047.0	6715331.7	Chaffin Creek Tree 1	1	6	250	Creek bank	0	-		
14/02/2013	512090.6	6715291.2	Chaffin Creek Tree 1	2	1	500	Creek bank	0	-		
14/02/2013	512080.8	6715294.2	Chaffin Creek Tree 1	2	2	500	Creek bank	0	-		
14/02/2013	512071.2	6715299.8	Chaffin Creek Tree 1	2	3	300	Creek bank	0	-		
14/02/2013	512060.3	6715306.6	Chaffin Creek Tree 1	2	4	450	Creek bank	0	-		
14/02/2013	512046.2	6715313.4	Chaffin Creek Tree 1	2	5	500	Creek bank	0	-		

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	Easting	Northing									
15/02/2013	513623.3	6727429.9	Tyndale Dump1	1	1	400	Crest	0	-		
15/02/2013	513611.9	6727420.0	Tyndale Dump1	1	2	600	Crest	0	-		
15/02/2013	513605.1	6727415.8	Tyndale Dump1	1	3	400	Crest	0	-		
15/02/2013	513600.8	6727404.7	Tyndale Dump1	1	4	500	Crest	0	-		
15/02/2013	513596.6	6727391.8	Tyndale Dump1	1	5	250	Crest	0	-		
19/02/2013	543243.5	6789687.8	Cooks Hill 1	1	1	1200	Plain	0	-		
19/02/2013	543231.9	6789688.5	Cooks Hill 1	1	2	1200	Plain	0	-		
19/02/2013	543219.7	6789689.5	Cooks Hill 1	1	3	1100	Plain	2	Quartz, chalcedony		
19/02/2013	543211.8	6789691.1	Cooks Hill 1	1	3a	1100	Plain	0	-		
19/02/2013	543220.5	6789695.0	Cooks Hill 1	1	3b	1100	Plain	3	Quartz, chalcedony		
19/02/2013	543221.9	6789699.9	Cooks Hill 1	1	3c	1100	Plain	0	-		
19/02/2013	543151.8	6790095.1	Cooks Hill control area	1	1	800	Flat	0	-		
19/02/2013	543158.1	6790103.0	Cooks Hill control area	1	2	500	Flat	0	-		



Woolgoolga to Ballina Pacific Highway Upgrade  
Ancillary facilities and design changes Aboriginal cultural heritage assessment

Date	MGA Zone 56		Site / PAD Name	Transect Number	STP Number	End depth (mm)	Landscape unit (landform)	No. of artefacts	Artefact materials	Site condition	Comments
	Easting	Northing									
19/02/2013	543160.3	6790109.3	Cooks Hill control area	1	3	500	Flat	0	-		
19/02/2013	543166.1	6790117.2	Cooks Hill control area	1	4	300	Flat	0	-		
26/02/2013	517635.96	6678520.85	WWC39	NA	BH13	500	Creek bank	0			
26/02/2013	517630.47	6678512.53	WWC39	NA	BH15A	400	Creek bank	0			
26/02/2013	517630.47	6678512.53	WWC39	NA	BH15B	400	Creek bank	0			

# Appendix I Gumi arborist report

## Tree Report

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Back Channel Road - Wardell.  
Byron Bay Tree Services P/L



Prepared by Alex Nowell , Byron Bay Tree Services P/L

For: Vanessa Edmonds



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## **SYNOPSIS**

The following report was prepared by Alexander Nowell; as per the request of Vanessa Edmonds Lead Archaeologist-W2B Alliance.

The aim of this report is to provide estimation on the age of a possible Scar Tree located on private property at the end of Back Channel Road, Wardell.

Two methods were used in this assessment:

- a Visual Tree Assessment (VTA),
- an increment core sampling of woundwood tissue.

To provide an estimate as to the tree's age an increment borer was utilized, this method is predominantly used for softwood trees from the Northern hemisphere where core samples are easily removed from within the tree. As the subject tree is an Australian Native of a hardwood species and appeared to be hollow, the methodology was to core sample the wound wood tissue only, then inspect the samples under a microscope along the transverse plane (of the core sample) and attempt to identify early wood tissue from the late wood tissues (identifying growth seasons). Once identified the growth rings may be able to be counted an approximate age of the wound estimated.

The main findings are, the tree is considered to be no more than 100 -120 years old. The heartwood is not weathered and cracked and does not show signs of age. The tree appears to be hollow. There is no epicormic shoot development around past wounding events. Increment core sampling of the woundwood tissue indicates that the wound tissue appears to be in probability less than 30 years old. This would place the time of wounding Circa 1980's.

It is not considered by the author to be a 'Red mahogany' and/or a scar tree.





## **INTRODUCTION**

This report encompasses the assessment and identification of one tree (identified as a Red Mahogany by RMS) to establish its age, enabling the archaeologist to then determine whether the tree has the potential to be considered a scar tree. As stated previously these determinations were prepared at the request of Vanessa Edmonds, Lead Archaeologist-W2B Alliance.

The tree occurs within the fenced boundaries of a private property at the end of Back Channel Road, Wardell NSW.

The location of the site and the tree within are identified in the aerial photographs (refer Figures 1.0 and Figure 2.0.)

## **BACK GROUND**

### **Site Description**

The site is a privately owned property at the end of Back Channel Road, Wardell and is part of the proposed development of the new Pacific Highway between Woolgoolga and Ballina. The tree is located just north of the Richmond River, near Ballina NSW (refer Map 1).

The tree is situated at the base of a small hill, with a westerly aspect with an approximate elevation of 10 meters above river level. The soil type is clay/shale derived. (refer Map 2).

There is a variety of native species on the site, predominantly Coastal Blackbutt (*Eucalyptus pilularis*), Iron Barks (*Eucalyptus* spp.) and Bloodwood (*Corymbia eximia* /*Corymbia intermedia*). The majority of the dominant canopy trees are Coastal Blackbutt with other species of trees appearing within the understory of vegetation.

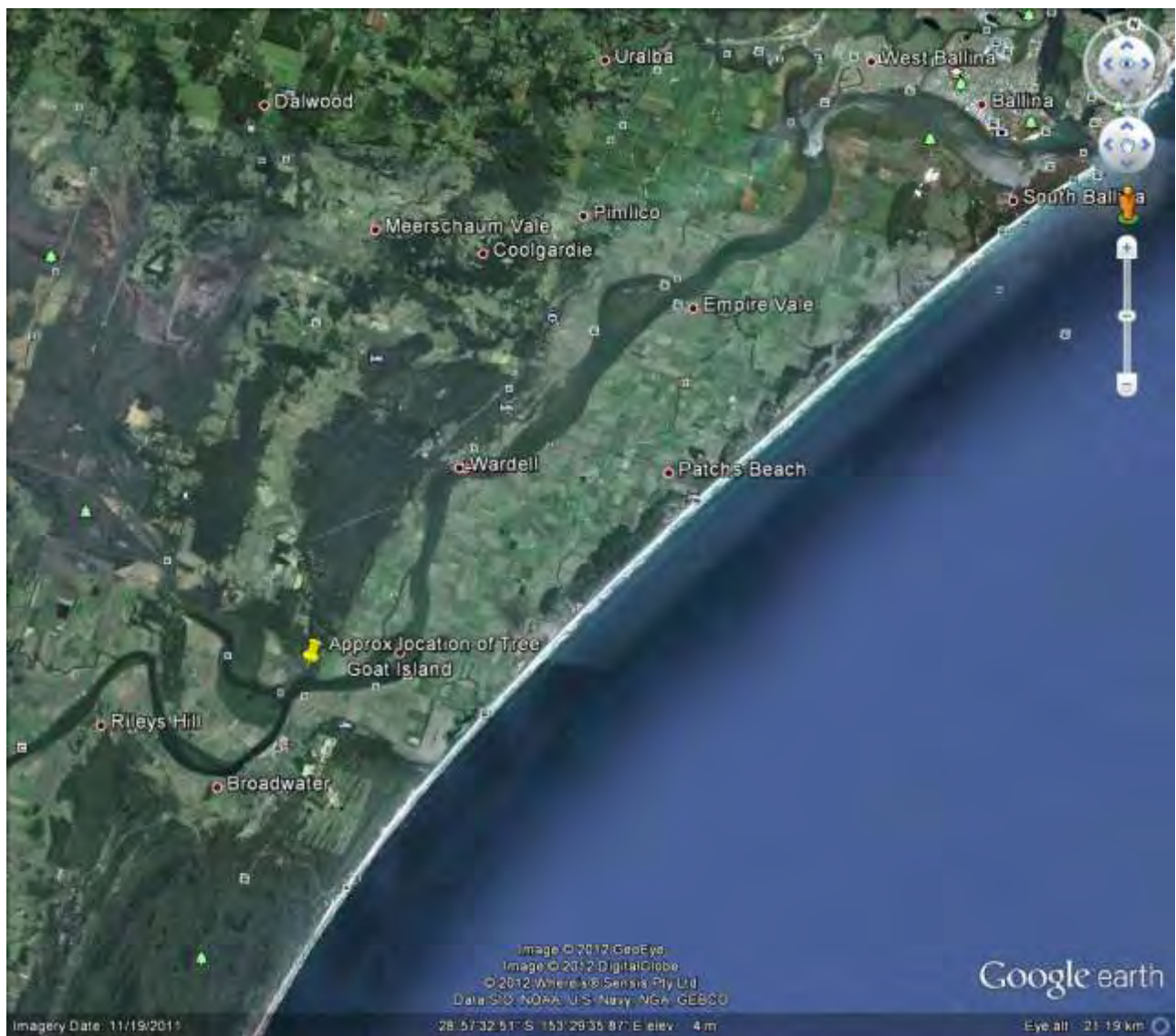
### **Site History**

During an on-site interview September 5<sup>th</sup> 2012, with Marcus Ferguson, and Dean Bolt ), representatives of Jali Local Aboriginal Land Council. Both Marcus and Dean indicated that the land was a place of Aboriginal inhabitation, where abundant artifacts had been recently uncovered ie. middens, stone tools, and other possible aboriginal scar trees.

'*The Land*' since white settlement has been utilized for farming purposes ie. Farm houses, stables, outbuildings and fences erected, roadwork construction, land clearing and improved pastures for stock grazing purposes etc.

Marcus and Dean stated that the property has been used like this for approximately the last 2 to 3 generations, with the traditional owners being removed from the area at least 3-to 4 generations ago.





Map 1. Location of study site relative to Ballina



Map 2. Close up of study site showing approximate location of tree



## **LEGISLATION**

It was outside the parameters of the author's brief, to delve into legislative requirements and/or covenants.

## METHODOLOGY

### Overview

All initial field work undertaken for the task was carried out on Wednesday September 5<sup>th</sup> 2012 and Friday November 2<sup>nd</sup> 2012.

Data was collected using Abiotic and Biotic Data Collection sheets, and core samples were taken from 3 separate places within the tissue on the 2<sup>nd</sup> of November. Pictures of these are included in Appendix C.

Increment core samples were taken and samples placed in a specific core sample tin. Samples were then observed under a microscope and early wood and late wood tissues identified where possible, with Xylem rays identified and then growth seasons counted.

The tree was identified and a visual tree assessment (VTA) was carried out.

Data collection in the field consisted of observing and documenting evidence in a systematic approach using materials listed below.

They consist of:

- A clip board, blank data collection prompt sheets, and a black pen.
- The approximate height of the trees was estimated using a SUUNTO PM5/1520 clinometer.
- A thirty (30) meter retractable measuring tape for purpose of measuring canopy spread and distance from base of tree for clinometers readings.
- An eight (8) meter retractable measuring tape to measure the trunk diameter at breast height (DBH) ie.dbh id measured at 1.3m from ground level). Also to measure the distance to neighboring fences, trees and boundaries.
- A digital camera (Olympus FE-190) was used to record the trees current Vitality and any defects or details that were of interest.



Tree species were identified by means of underpinning knowledge identifying particular features specific to the genus and species.

### **Visual Tree Assessment (VTA)**

The Visual Tree Assessment is an internationally recognized process of assessing a trees condition from the ground. It was formulated by Mattheck and Breloer 1994.

The process of VTA includes:

- The ground surrounding the root flare
- The root flare itself
- The bole or trunk of the tree including bark
- Limb or branch 'junctions' or 'unions'
- Scaffold branches
- Smaller branches attached to the scaffold branches
- The leaves
- The general form of the tree

By observing the body language of the tree and any associated defects, an interpretation can be made to identify factors or dysfunctions contributing to the current condition of the tree. This then provides a basis for predetermining possible failure criteria, age of the tree or proposal of any recommended tree works.

The VTA is based on the principal of Axiom of uniform stress. This principal works on the basis that a tree will respond to a weak spot or area of mechanical stress with the formation of sufficient tissue for support and loading. This includes all parts of the tree from the top of the canopy to evidence of sub surface anchoring by roots. (Judson R.Scott)

### **Increment core sampling-**

The process of core sampling involves a sample of tree being drilled with a hollow drill bit to a specified depth. By removing a cylindrical sample of wood from within the drill shaft an arborist can then predetermine growth seasons by counting the growth rings with either the naked eye or under magnification.

Restrictions and limiting factors with core sampling are that hardwood species are sometimes more difficult (as the name suggests), it can also be more difficult to drill to the required depth and remove samples.

As a tree grows, tissues are constantly being added from the oldest growth in the tree to the youngest wood on the outside. If the tree is hollow, there is only limited information that can be correlated; as any determinations are calculated on the availability of tissue areas that can be collected.

The Subject Tree was sounded with the 'Thor' hammer around the circumference of the wound area; it was outside the client brief to test further. This means we needed to modify the sampling procedure and sample only the woundwood tissue which may have given us an estimation of the age of the scar tissue.

With the age of the wound estimated, we may then be able to determine if the Subject Tree has the potential to be categorized as a *culturally scarred tree*.

Core samples were taken from the tissue on the top third, north eastern side of the wound wood using an increment borer. Samples were then transported to North Coast TAFE Wollongbar campus, where the samples were inspected under magnification.



## RESULTS / FINDINGS

### Abiotic Factors

The abiotic factors that could impact on the tree were noted; as the aspect and topography of the hill. All vegetation appeared to be re-growth and there were no abiotic factors such as roads, buildings etc. that may have impacted on the growth habits of the tree.

The reason that Abiotic factors are considered, are that they may directly influence either the growing conditions of the trees; such factors include microclimates, protection from prevailing winds, retention and radiation of heat and light etc. as well as for the purpose of target value in the event of failure of part and/or the complete system.

### Biotic Factors

Biotic factors are predominantly the driving force for decision making and recommendations. These factors include:

- All organic material within the soil profile - encompassing microbes, macrobes and fungal activity, any decomposing vegetative material
- Roots- the health and vitality of roots / wounds (entry points for decay and disease)
- Tree trunk- Bark, sapwood, heartwood,
- To Dominant leaders and multi stems and leaders, these may be the points of possible failure within the trees system.
- Any Previous pruning activity that may impact on the tree (possible entry points for decay and disease)
- The Age of the Tree

### VTA Summary Sheet

**Tree No. 1.**

Asymmetrical

**Botanical Name:** *Corymbia spp.*

healthy, senescing

**Form:**

**Condition:**

**Common Name:** Pink/Yellow Blood wood **Approx. Height:** 20.6m

**DBH:** 620mm  
100–120 years old

**Approx. Age:**

**Trunk and Canopy:** Good bark condition with good taper. Large wounding from approx 350mm above soil level for a height of 1880mm, with further wound wood tissue extending for another 640mm from point of wound apex.

Note\* wound wood tissue formation is not uniform (as seen with many other culturally scarred trees.)

Large deadwood on what possibly would have been the apical dominant stem. It would appear that there is white ant activity however this can be confirmed with an aerial inspection.

The exposed heartwood is smooth with minor cracking and what appear to be insect holes in the top left hand quadrant of the wound.

**Branches:** open, canopy spread approximately 8m.

**Roots:** No evident root or soil disturbance at time of inspection beneath the drip line.

**Wound wood Formation:** Average to good.

**Comments:** Knowing the species of the tree is mature, the DBH, westerly aspect and the soil type being poor, shale derived, it is expected that wound wood tissue formation would be slow. It is speculated that the tree is to be between 100 – 120 years old.

#### **Core Sampling** (refer 4.3)

Core samples were taken from the woundwood tissue, above and on either side of the exposed wound area.



Samples were then transported to North Coast TAFE Wollongbar campus, where the samples were inspected under magnification.

Under magnification an attempt was undertaken to calculate the age of the Subject Tree by a count of the seasonal growth rings.

Analysis indicated that a more detailed histological testing regime, would need to be utilized, to more accurately quantify the estimated age of the specimen.

## DISCUSSION AND ANALYSIS

### Tree Identification

The tree was originally identified as being a Red Mahogany, (*Eucalyptus resinifera*)

On closer inspection the tree in question was identified as being a *Corymbia* species. This was mainly due to the bark being tessellated not stringy as is found in the *Eucalyptus* genus.

Without flowers or fruit present it is very hard to correctly identify and 'key' out the exact species, however knowing that *Corymbia intermedia* or 'Pink Bloodwood' is a prevalent bloodwood species in the Northern NSW area, The author believes that it is this species of tree rather than *Corymbia eximia* or 'Yellow Bloodwood' (which is found in the Southern regions.)

Refer details of *Corymbia intermedia* vs. *Corymbia eximia* in Appendix A Tree Species:

### Scarred Trees

*"The common features of tree scars are:*

***Dry Face*** – *this is the dead, exposed timber that forms the scar surface. As the scar ages the dry face becomes increasingly cracked and weathered. Tool marks where the bark was cut and pried away are often preserved towards the top, bottom and occasionally across the centre of the scar. Tool marks will only be preserved on the sapwood (xylem) which can be eroded away quickly due to a high content of sugars (photosynthates), leaving the relatively inert underlying heartwood layer exposed.*

***Overgrowth*** – *the scar tissue or 'accelerated growth' that forms along the sides of a dry face. This is a natural response from the tree to rapidly 'seal' the damaged area and protect the wound from decay and infestation. Overgrowth generally develops at a much faster rate than the tree's normal growth and is often*



*distinctive from the surrounding bark. Eventually the wound may be completely absorbed into the trunk and hidden from view by overgrowth.*

***Epicormic stem*** – *a subsidiary limb can develop at the base of a scar which is sufficiently broad to prevent the downward flow of growth inhibiting hormones. As epicormic stems can occur directly as a result of a scarring event they may be used to date a scar through growth ring counting, without damaging the dry face or overgrowth.*

***Dieback*** – *an area of secondary damage above or below a scar, linked to, but occurring after the original scarring process. Typically this could happen where a large bark removal scar has interrupted the downward flow of photosynthates from the crown, which are forced to divert widely around the damaged area, thus killing off a larger part of the tree than originally affected by the scarring. Dieback can also be caused by insects which access adjacent parts of the tree soon after scarring.*

*Tool marks may only be seen on cultural scars where overgrowth has been inhibited by dieback at the top and bottom of a scar. These give us the opportunity to measure the original dimensions of a scar, and thus the shape and size of the sheet of bark removed.” - Page 10 Aboriginal scarred trees, a field manual by Andrew Long.*

On inspection of the Pink Blood wood it is noted that there is no epicormic growth at the base of the tree below the point of wounding. This is outlined in Andrew Longs field manual and is also occurring with other known and identified scarred trees on the property. It is also noted that these identified scarred trees are of a different genus and are growing in different conditions.

*‘Common scarred tree species include river red gum (E. camaldulensis), swamp box (Tristania suaveolens), yellow box (E. melliodora), grey box (E. moluccana), white box (E. albens), white mahogany (E. acmenoides), red box (E. polyanthemus), blackbutt (E. pilularis), stringybark (E. eugenioides) and brown barrell (E. fastigata). Other species known to have been scarred for more specialised purposes in localised areas include paperbark (Melaleuca sp.), Moreton Bay Fig (Ficus macrophylla), black bean (Castnospermum australe) and ironbark (Eucalyptus sp.). Ironbarks do not appear to have been used extensively.’ - Page 57*

At no point does the author mention Bloodwood as being a common scarred species this may indicate that either the species was not used for any particular purpose or it may indicate that the species does not live long enough to record therefore recordings are low to non-existent. This may indicate that the specimen or subject tree is not a scarred tree.

**How old is the tree on which the scar occurs, and how long has the scar been there?**

With some exceptions, Aboriginal and other historical scars in New South Wales will only exist on trees older than 65 years. This assumes that in most areas the last widespread bark removal activity occurred before c. 1950 on trees that were 10–15 years old at the time of scarring. Although in some specific localities, bark was removed for building shelters, often by Aboriginal people, beyond the 1950s, these instances are generally associated with well documented settlements and reserves. Across most of the State the extensive use of bark ceased soon after the end of the 19th century.

It is difficult to estimate the correct age of a tree given that after 100 years most trees have acquired the uniform attributes of maturity. Tree aging is a technical skill which involves assessing the girth of the tree, the state of the crown, the extent of any damage and the position of the tree in its local environment. In general, the larger the tree the older it is; but there are numerous exceptions to this. Some small, stunted trees could be very old, while other much larger trees could be only 40 or 50 years old. There simply has not been enough scientific study on the age of commonly scarred tree species to develop an effective visual dating system beyond the first 50–80 years of their life. An accurate tree age may only be gained through a scientific process involving both C14 (radio carbon dating) and growth ring counting. This may involve destroying part of the tree, though epicormic stems and other major limbs can sometimes be used instead of the main trunk.

**One simple way that could be used to assess the age of a scar (and very roughly the age of the tree) is to examine the degree of weathering on a scar dry face. As dead timber is exposed to the elements, through bark removal for instance, it dries and cracks. The more cracked and weathered the dry face, the older the scar is likely to be. Scars that have little cracking are unlikely to be very old and would not normally count as heritage sites even if they are cultural in origin.**

The age and extent of overgrowth can also be used to assess a scar's age, as this indicates the length of time a tree has had to repair the damage. Some species, notably red gum, have a remarkable ability in some cases to completely heal over even large areas of damage, while others, such as grey box, cease overgrowth relatively early. One of the best indicators of scar age is whether the



overgrowth is covered with old or young bark. It is easy to identify young bark since it is quite different in appearance and texture from bark on the trunk surrounding the scar. The presence of young bark proves that the scar can be no more 10–50 years old. -Page 68 Aboriginal scarred trees, a field manual by Andrew Long.

On inspection of the photographs that were taken on the day, it clearly identifies little if any cracks in the heartwood that lies beneath the sapwood. This would suggest that the scarring is relatively recent. (refer 1. & 2. Appendix B.)

### **Age of wounding**

On inspection of the sample under magnification and counting of the growth rings, it was dated as being approximately 30 years old. A calculated estimation was made due to the fact that the growing environment can be conducive to up to 2 growing seasons per year unlike soft wood species in the northern hemisphere where trees have greater extremes in climatic conditions and exact dating can be made to the year.

As the age of wounding is circa 1980, this clearly rules out that the scar on the tree was made by indigenous peoples assuming that in most areas the last widespread bark removal activity occurred before c. 1950 on trees that were 10–15 years old at the time of scarring as per Long's Field Manual of Aboriginal Scarred Trees.

## **CONCLUSION**

The author is of the considered option that the Subject Tree has been incorrectly identified (refer appendix A).

As mentioned previously with the difficulty in determining the age of some tree species; an exact age of the Subject Tree could not be determined. A more detailed histological assessment would need to be carried out.

The age of the wounding is considered to be in all probability to less than 30 years ie. based on species type and professional industry experience.

With the knowledge outlined in Longs' Field Manual of Aboriginal Scarred Trees, as well specific factors which aid in the identification of a scarred tree, as well as the known age of wounding It is evident that the tree in question is not a scarred tree, but a tree that has been affected by natural or incidental type of scarring/ wounding.

Research and anecdotal evidence (indigenous custodians) does not lead the author to believe that the Subject Tree should be categorized as a tree of significance.



## REFERENCES

Abeyta, D, (ed), 1995 *Guide to report writing for consulting arborists*, International Society of Arboriculture, United Graphics, Inc, Homer, Illinois

Boland, D. J. et al 2006 *Forest Trees of Australia* 5th Edition, Australia: CSIRO Publishing, Australia

Kempff, J.B. Regulation 2001. "Aboriginal Objects Due Diligence Code" For Plantation Officers administering the Plantations & Reforestation (Code)

Long, Andrew Department of environment and conservation July 2005 *Aboriginal scarred trees in NSW - A field manual*

Mattheck & Breloer (1994), *The Body Language of Trees: A Handbook for Failure Analysis*, The Stationary Office, London.

Matheny, Nelda P. & Clark, James R. *Evaluation Of Hazard Trees in Urban Areas*, 2<sup>nd</sup> Edition, International Society of Arboriculture, Champaign, Illinois, USA 1994

Meylan, B.A & Butterfield *Three-dimensional Structure of Wood – A Scanning Electron Microscope Study-* Chapman and Hall Ltd 1972

Schwarze, Francis & Engels, Julia & Mattheck, Claus 1999, "Fungal Strategies of Wood Decay in Trees", Springer – Verlag Berlin Heidelberg, Germany

Wrigley, John & Fagg, Murray 1998 *Australian Native Plants – Propagation, cultivation and use in landscaping*, Reed New Holland Publishers, Sydney, Australia

<http://plantnet.rbgsyd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&lvl=sp&name=Corymbia~eximia>

<http://plantnet.rbgsyd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&lvl=sp&name=Corymbia~intermedia>

[http://www.vineandbranch.net/2005pdf/MayJun05\\_Judson.pdf](http://www.vineandbranch.net/2005pdf/MayJun05_Judson.pdf)

## ASSUMPTIONS AND LIMITING CONDITIONS

- I. Any legal description provided to the consultant is assumed to be correct. Any titles and ownership to any property are assumed to be good and marketable. No responsibility is assumed for matters legal in character. Any and all property is appraised or evaluated as though free and clear, under responsible ownership and competent management.
- II. It is assumed that any property is not in violation of any applicable codes, ordinances, statutes, or other government regulations.
- III. Care has been taken to obtain all information from reliable sources. All data has been verified in so far as possible; however, the consultant can neither guarantee nor be responsible for the accuracy of information provided by others.
- IV. The consultant shall not be required to give testimony or to attend court by reason of this report unless subsequent contractual arrangements are made, including payment of additional fee for such services as described in the fee schedule and contract of engagement.
- V. Loss or alteration of any part of this report invalidates the entire report.
- VI. Possession of this report or a copy thereof does not imply right of publication or use for any purpose by any other than the person to whom it is addressed, without the expressed written consent of the of the consultant.
- VII. Neither all nor any part of the contents of this report, nor copy thereof, shall be conveyed by anyone, including the client, to the public through advertising, public relations, news, sales or other media, without the prior expressed written consent of the consultant – particularly as to value conclusions, identity of the consultant, or any reference to any professional society or institute or to any initialed designation conferred upon the consultant as stated in his qualification.
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  - B) The inspection is limited to visual examination of accessible items without dissection, excavation, probing, or coring. There is no warranty or guarantee, expressed or

implied, that problems or deficiencies of the plants or property in question may not arise in the ion the future



## **ABOUT THE AUTHOR**

This report was compiled by Alexander Nowell, Diploma of Horticulture (Arboriculture) Cert. Horticulturist, and Founding Director of Byron Bay Tree Services P/L. With over 17 years industry experience, Alex has a passion for trees and the local environment and has been operating Byron Bay Tree Services in the North Coast, NSW area for the past 10 years. He has completed his Cert V Diploma of Horticulture (Arboriculture) at Wollongbar TAFE 2012.

Byron Bay Tree Services is a quality assured company and has been providing the highest quality arboricultural solutions with a diverse range of clients that range from Statutory Authorities such as local councils, the Department of Conservation and Wild life (National Parks), Energy Networks and Providers, Roads and Maritime Services (RTA), local developers and the general public.

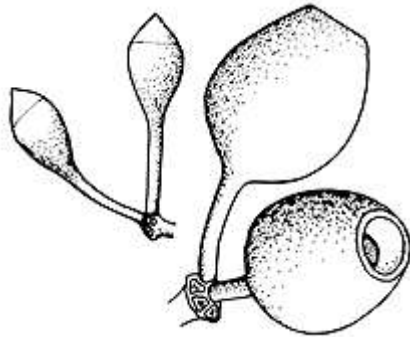
Alex is a trained and experienced practitioner of Quantified Tree Risk Assessment (Ellison 2007).

## APPENDICES

### Appendix A - Tree Species

#### *Corymbia intermedia* (R.T.Baker) K.D.Hill & L.A.S.Johnson [APNI\\*](#)

**Synonyms:** *Eucalyptus intermedia* R.T.Baker [APNI\\*](#)



**Description:** Tree to 30 m high; bark persistent, red-brown or grey-brown, tessellated.

Juvenile leaves disjunct, elliptic to ovate, peltate at very early stages, lacking simple hairs. Adult leaves disjunct, lanceolate, 10–15 cm long, 2–3 cm wide, green, glossy, discolorous, penniveined.

Conflorescence [compound](#); umbellasters 7-flowered; peduncle terete, 10–18 mm long; pedicels terete, 2–14 mm long. Buds ovoid to pyriform, 6–8 mm long, 3–4 mm diam., scar absent; calyptra hemispherical or conical, shorter and narrower than hypanthium.

Fruit ovoid or urceolate, sometimes white-scurfy, 12–20 mm long, 10–15 mm diam.; disc depressed; valves enclosed.



Flower

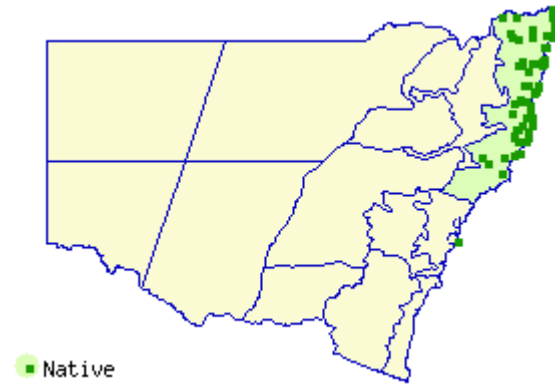


Other [photo](#)  
Photo J. & P. Edwards



Type  
Specimen

**Distribution and occurrence:** Locally abundant, in coastal forests on soils of medium fertility; north from Gloucester.  
NSW subdivisions: NC  
Other Australian states: Qld

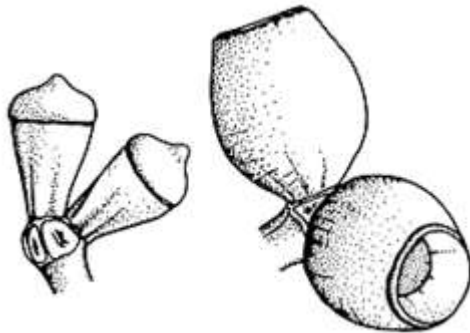


Text by K.D. Hill  
Taxon concept:



## *Corymbia eximia* (Schauer) K.D.Hill & L.A.S.Johnson [APNI\\*](#)

**Synonyms:** *Eucalyptus eximia* Schauer [APNI\\*](#)



**Description:** Tree to 20 m high; bark persistent, pale brown or yellow brown, tessellated or fibrous-flaky.

Juvenile leaves disjunct, ovate or elliptic to broad-lanceolate, dull grey-green. Adult leaves disjunct, lanceolate, 10–20 cm long, 1.3–3 cm wide, green, dull, concolorous.

Conflorescence [compound](#); umbellasters 7-flowered; peduncle terete or angular, 10–30 mm long; pedicels 0–2 mm long. Buds clavate to pyriform, 10–15 mm long, 6–8 mm diam., scar present; calyptra conical, slightly rostrate, shorter than and as wide as hypanthium.

Fruit sessile, ovoid or urceolate, 13–20 mm long, 10–15 mm diam.; disc depressed; valves enclosed.





Habitat

Photo A.E. Orme

Habit

Photo A.E. Orme

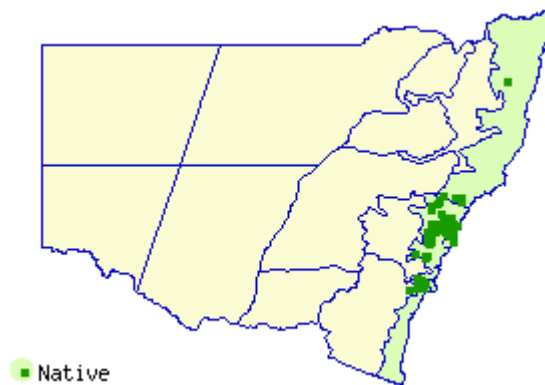
Fruit

[Photo](#) A.E. Orme

Type

Specimen

**Distribution and occurrence:** Locally abundant, in dry sclerophyll woodland on shallow infertile soils on sandstone, often on steep slopes; from Howes Valley to Tolwong.  
NSW subdivisions: NC, CC, SC



Text by K.D. Hill  
Taxon concept:

## Appendix B - Photographs



Photo 1. Showing uneven formation of woundwood tissue and smooth heartwood.





Photo 2. Wounding



## **Appendix C - Data Collection Sheets.**

**Site Assessment Biotic Factors**

Inspector: <u>AVLEX</u>	Date: <u>5/1/16</u>	Customer Request: <u>RMS - VANESSA GPS</u>	Aspect: <u>N</u>
Tree: <u>1</u>	Species: <u>COCCYBUS SP</u>	Common Name: <u>WOODHOOD</u>	
DBH @ 1.3m: <u>100</u>	Est. Age: <u>30-40</u>	Canopy spread: <u>55-90</u>	# of trunks
	Est. Height: <u>30-40</u>	Live Crown %: <u>55-90</u>	

**Trunk and canopy:**

basal cavity  cracks or fractures  crown filled  crown reduction/intricateness  decay visible  dieback/shingles  
 end weight  epicormic growth  fungal body  habitat visible  included bark at notch  insect activity  insects  
 multiple branching at fork  notches narrow/open  mechanical damage  shear crack or split trunk  
 storm damage/lightning strike POSSIBLE

**Notes:**

**Branch:**

cracked bark  deadwood  decay visible  epicormic growth  lion tailing  fungal body  tussock laterals  
 habitat visible  hanging branches  hazed beam  insect activity  multiple branching at fork  
 notches narrow/open  storm damage  reactive wood POSSIBLE  burn scar/lightning strike  
POSSIBLE STORM DAMAGE  
ALTERNATIVE SHRINE?

**Notes:**

**Roots:**

decay visible  fungal fruiting body  gliding or knifed  mechanical damage  pruning or cutting  suckers  
NO EVIDENCE OF ROOT DISTURBANCE AT BASE/DEFINING OF TREE

**Notes:**

**Form:**

Asymmetrical  sloughed  stem spread  other  
LARGE DEFENDERS IN CANOPY

**Notes:**

**Callous Formation:**

poor  average  good  none

**Notes:**

**Pruning practices:**

Compliant with AS 4373  No  Yes  
 flush  line clearing  topped  tipped  multiple events  successively formed  
NA

**Notes:**

MURDER EXCAVATION  
WORES LOGGERS NAME  
LITTLE SIGNIFICANCE/IMPACT  
ON VITALITY OF TREE

23° 59' 70.1" S    153° 26' 50.0" E  
TAKEN FROM PHONE

**Site Assessment Abiotic factors.**

Site/Add. det:	BACK CHANDEL ROAD WARENELL	Aspect	WESTERN
Inspector: ALB & JOB	Date: 5/1/12	Customer Request:	EMS - WARENELL
Tree# 1	Species: <i>Casuarina</i>	Common Name:	WATTLE
DBH (E.L.M): 60.0	Est. Age: 100-150 Y/O	Canopy spread:	15-20 M
	Est. Height: 20-25 M	Live Crown %:	100%

**Site Character:**

car park  streetroad  school  parkland  residence  natural area  wildlife corridor

windbreak linear  commercial/industrial  other

**Notes:**

**Landscape type:**  lawn (parkland reserve)  garden bed  mulched  container  mound  slope  raised  ON SORE

**Soil Assessment:**  lab analyses  profile taken

**Soil Type:** SHALE

**Soil Condition:**  drainage poor/Average/poor  droughty  erosion  saline  shallow  compacted  cracking

alkaline  acidic  small volume  reactive  expansive

**Notes:** 300 M<sup>2</sup> AREA CONCRETE/PAVING - SOME DRAINAGE PIPES

**Impacted Infrastructure:**  Y  N

**Type:**  pavement  streetroad  herb channel  drainage/sewerage  residential/footpath way  DEPTP

streetlights  buildings  underground utilities  traffic  adjacent veg  overhead status  Bus Stop  signage

**Notes:**

**Growth Obstructions:**  lights  line of sight  view

**Exposure to wind:**  single tree  below canopy  above canopy  recently exposed  windward  area prone to wind throw

**Irrigation:**  none  adequate  inadequate  excessive  trunk wetted

**Recent Site disturbance:**  Y  N  construction  soil disturbance  grade change  Site clearing  Fire

**Notes:** PART OF SITE HAS BEEN EXCAVATED APPROX 20-25 M NORTH OF ROAD.

**Status:**  Cultural/historical Significance  Endemic/rare  Exotic/Naturalisation  Inhabited  residents  other

**Notes:** POSSIBLE SAND TREE?

20m x 0.5%  
= 10m x 1.6m  
= 20.6m



TREE HEALTH EVALUATION SECTION

Site/Address: BARK CANNEL RD WARDLE GPS: \_\_\_\_\_ Aspect: \_\_\_\_\_  
 Inspector: ALEX Date: 5.9.12 CRF: \_\_\_\_\_  
 Tree#: 1 Species: LEUCOMBIA SPP Common Name: BLOODWOOD # of trunks: 1  
 DBH @ 1.3m: 620 Est. Age: 100-120 Est. Height: 30-6m Canopy spread: 8m Live Crown %: 85-90 Evergreen/Deciduous: 1  
 Age class:  young  semi-mature  mature  over mature/senescent  street tree  Screen

Amenity Value:  type specimen  heritage/historic  wildlife  unusual  Avenue tree  POSSIBLE HISTORIC  
 shade  indigenous  protected by Gov agency

Root Crown:  Poor  Average  Good  Mechanical damage  Cavity  Grinding roots  Termites  Flaring present  
 Cracks or fractures  Epicormic shoots  Grassed  Mulched  Soil Grade Changed

Root zone:  Poor  Average  Good  Compacted  cracks or fractures  Bird damaged  Seam lines

Notes:  Poor Taper  Average Taper  good taper  Mechanical damage  deadwood % > 20  
 Trunk:  Poor Taper  Average Taper  good taper  Mechanical damage  deadwood % > 20  
 developing reactive issues  excellent  good  
 Condition of bark:  poor  average  excellent  good  
 Vigour:  Declining  Poor  average  good  
 Vitality:  Declining  Poor  average  good  Epicormic shoots  Lion tailing  bird damaged  
 Canopy Structure:  poor  average  good  Epicormic shoots  inclusions present  deadwood % > 20  
 Forks/Union:  Poor  average  good  necrotic  none  Deciduous  
 Foliage colour:  normal  chlorotic  none  Deciduous  
 Leaf size:  normal  small  none  
 Epicormics:  No  Yes  poor  excellent  
 Annual shoot growth:  average  No  good  excellent  
 Twig dieback:  Yes  No  poor  remedial  Crown reduce  
 Woundwood development:  thinned  topped  deadwood  Crown raise  poliarised  Crown reduce  
 Pruning History:  cleaned  flush cuts  multiple events Approx dates: \_\_\_\_\_

Notes: NO PRUNING ACTIVITIES ON THIS TREE @ TIME OF INSPECTION

Percentage Compliant with AS 4373: N/A

LEAM:  Y  N <5 Degrees from vertical  natural  unnatural  Self correct

Notes:

## **UPGRADING THE PACIFIC HIGHWAY**

### **Woolgoolga to Ballina Upgrade**



### **Addendum Aboriginal Cultural Heritage Assessment**

**September 2013**

**Rev0\_PUBLIC**

**Authors: Joseph Brooke**

**Woolgoolga to Ballina Pacific Highway Upgrade  
Aboriginal cultural heritage assessment**



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# Abbreviations

CHAR	Aboriginal cultural heritage assessment report
ACHCRP	Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010
AFG/s	Aboriginal focus group/s
AHIMS	Aboriginal heritage information management system
AHIP	Aboriginal heritage impact permits
ASIRF	Aboriginal Site Impact Record Form/s
DEC	NSW Department of Environment and Conservation (now the Office of Environment and Heritage)
DECCW	NSW Department of Environment, Climate Change and Water (Now the Office of Environment and Heritage)
DP&I	NSW Department of Planning & Infrastructure
EIS	Environmental impact statement
ha	Hectare/s
ICOMOS	International Council of Monuments and Sites
km	Kilometre/s
m	Metre/s
mm	Millimetre/s
N/A	Not applicable
NSW	New South Wales
OEH	Office of Environment and Heritage
PACHCI	Procedure for Aboriginal cultural heritage consultation and investigation
PAD	Potential archaeological deposit
RAP	Registered Aboriginal Party
RMS	NSW Roads and Maritime Services
STP	Shovel test pits
UNESCO	United Nations educational, scientific and cultural organisation
working paper	Working paper - Aboriginal Cultural Heritage (SKM 2012)



# 1. Introduction

## 1.1. Introduction

The Roads and Maritime Service (RMS) of NSW is proposing to upgrade around 155 kilometres of the Pacific Highway from Woolgoolga to Ballina (the project). RMS is seeking project approval under Part 5.1 of the *Environmental Planning and Assessment Act 1979*. Aboriginal cultural heritage assessment has been undertaken for all works within the boundary of the project as detailed in the environmental impact statement (EIS) for the project (RMS 2012).

An Aboriginal cultural heritage assessment report (CHAR March 2013) was prepared in March 2013 as an addendum to the working paper to assess a number of potential ancillary facilities and design changes that had not been previously assessed in the EIS working paper. That CHAR continued the consultation and assessment which had been initiated and described within the working paper.

This CHAR forms the second addendum to the working paper and details additional Aboriginal heritage investigations undertaken following completion of the working paper and the first addendum CHAR. The purpose of these investigations is primarily to describe and assess potential impacts on Aboriginal cultural heritage resulting from design changes further to those assessed previously. This report adds to and updates the working paper (SKM 2012), hence this CHAR generally only includes information that is relevant to the additional investigations undertaken – for further detail and context, please refer to the working paper (SKM 2012) and to the first addendum to that paper prepared in March 2013.

## 1.2. Scope of assessment

Following the same methodology and similar scope described in the working paper and CHAR March 2013, broadly, the scope of this CHAR is as follows:

- Comply with the Department of Planning and Infrastructure (DP&I) Director-General environmental assessment requirements issued for the project.
- Identify gaps in previous Aboriginal heritage assessment and address these through further desktop assessment.
- Undertake consultation with Registered Aboriginal Parties (RAPs) (both through meetings and field investigations).
- Undertake field investigations (survey and sub-surface test excavation) with nominated site officers to investigate known Aboriginal cultural heritage sites, and to identify and sub-surface test PADs to better define the Aboriginal cultural heritage values identified near and within design changes that are previously not assessed in the working paper and previous addendum CHAR.
- Undertake a significance assessment of the sites and places identified. This includes both scientific (archaeological) and social (largely cultural determined by RAPs).
- Provide an assessment of the potential impact/harm to Aboriginal cultural heritage sites and places from proposed design changes.

- Develop management recommendations in consultation with RAPs in order to ensure that prior to, during, and after construction Aboriginal cultural heritage sites and places are effectively managed. The recommendations were developed on a site-by-site basis, rather than tied to a specific threshold, to account for variability of the identified impacts, the significance of the site or place, and also the value to and requests from RAPs.

### 1.2.1. Study requirements

The investigations and assessments were undertaken with regard to the Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales (NSW) (Office of Environment and Heritage (OEH) 2010), Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW (OEH 2011), the Aboriginal Cultural Heritage Consultation Requirements for Proponents (OEH 2010), the Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation (Department of Environment and Conservation 2005), and the Procedure for Aboriginal Cultural Heritage Consultation and Investigation (PACHCI) (RMS 2011).

These investigations and the assessment were scoped to meet the Director-Generals environmental assessment requirements for the project relevant to Aboriginal heritage, issued on the 23 November 2011.

Table 1-1 details the Director-Generals environmental assessment requirements and where these are addressed within this report. These require assessment of the impacts to sites and places 'within or near' the boundary of the project.

**Table 1-1 Director-General environmental assessment requirements Aboriginal heritage**

Requirements	Where addressed in report?
Investigation of impacts to Aboriginal heritage (including cultural and archaeological significance), in particular impacts to Aboriginal heritage sites identified within or near the project should be assessed.	Chapters 4,5 and 6
Where impacts are identified, the assessment shall outline the proposed mitigation and management measures (including measures to avoid significant impacts and an evaluation of the effectiveness of these measures), generally consistent with the Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation (Department of Environment and Conservation (DEC) 2005).	Chapters 4, 6 and 7
The assessment shall be undertaken by a suitably qualified heritage consultant.	See below
The assessment shall demonstrate effective consultation with Aboriginal communities in determining and assessing impacts and developing and selecting options and mitigation measures (including the final proposed measures).	Chapters 2, 6 and 7
The assessment shall develop an appropriate archaeological assessment methodology, including research design, to guide physical archaeological test excavations of the areas of PAD identified in a manner that establishes the full spatial extent and significance of any archaeological evidence across each area of PAD, and include the results of these excavations.	Working paper (SKM 2012) and Chapter 4

This Aboriginal cultural heritage assessment was supervised by fully qualified and experienced archaeologists and heritage consultants, primarily Joseph Brooke (Bachelor of Archaeology (Honours), seven years' experience), and Vanessa Edmonds (Bachelor of Arts, Master of Letters- Archaeology and Palaeoanthropology), 30 years' experience). Both are full members of the Australian Association of Consulting Archaeologists Incorporated.

### 1.2.2. Definitions

Throughout this report, the term 'working paper' refers to the Working paper - Aboriginal Cultural Heritage (SKM 2012) prepared as part of the project EIS. In this report the 'boundary of the project' refers specifically to the project as assessed in the working paper.

In this report, the term 'site' and 'place' are used to refer to Aboriginal archaeological sites (the same as *objects* in the *National Parks and Wildlife Act 1974*), and intangible or non-archaeological Aboriginal cultural places (not the same definition as declared *Aboriginal places* as per *National Parks and Wildlife Act 1974*), respectively. When defining a site, where artefacts and/or other features are within about 50 metres or on the same part of the landform as each other, they are generally designated to be a single site. Potential archaeological deposits (PADs) were defined on the basis of the predictive model (see the working paper), conditions encountered in the field (eg levels and types of disturbance), and consultation with RAPs.

### 1.2.3. Study areas

The future delivery of the project would most likely be staged dependent on upgrade need and availability of funding. For the purposes of planning this future staging, the project has been divided into 11 sections as listed in Table 1-2. As the project traverses a large area, to make consultation and communication relevant to the registered Aboriginal parties, four Aboriginal focus groups (AFGs) were used, based on respective geographies (final column of Table 1-2). This CHAR relates only to areas within the Woodburn to Ballina AFG.

**Table 1-2 AFGs for the project sections relevant to this CHAR**

Project section	Location	Relevant Aboriginal focus group
9	Broadwater National Park to Richmond River	Woodburn to Ballina
10	Richmond River to Coolgardie Road	Woodburn to Ballina
11	Coolgardie Road to Ballina bypass	Woodburn to Ballina

The area subject to this assessment, 'the study area', includes all areas identified in Table 1-3 and areas within 25 metres of these (as the Director-General requirements states that sites *near* or within the project should be investigated).

**Table 1-3 Locality of investigations within project section**

Section	Investigation
9	Quarries at Cooks Hill
10	Additional study areas
10	Quarries at Old Bagotville Road
10	Rest area at Old Bagotville Road



Section	Investigation
10,11	Coolgardie interchange

### 1.3. Legislative context

The following legislation is relevant to this investigation:

#### **New South Wales**

*Environmental Planning and Assessment Act 1979*

*National Parks and Wildlife Act 1974*

*National Parks and Wildlife Amendment Act 2010*

*Native Title Act (NSW) 1994*

*Aboriginal Land Rights Act (NSW) 1983*

#### **Commonwealth**

*Aboriginal and Torres Strait Islander Heritage Protection Act 1984*

*Environment Protection and Biodiversity Conservation Act 1999*

*Native Title Act 1993*

Additionally, the United Nations' Declaration on the Rights of Indigenous Peoples, to which Australia is a signatory, also provides further legislative context.

These Acts and how their relevant sections and associated regulatory documents (eg codes of practice, guidelines, etc) govern the project have been detailed in the working paper and the CHAR March 2013 and are not repeated in this addendum CHAR.

It should be noted that the project is being assessed as 'state significant infrastructure' under Part 5.1 of the *Environmental Planning and Assessment Act 1979*. As such, an Aboriginal heritage impact permit (AHIP) under Section 90 of the *National Parks and Wildlife Act 1974* would not be required to investigate Aboriginal objects. This is provided that the investigations are for the purposes of informing an assessment to which Director-General requirements issued under Part 5.1 are applicable.

### 1.4. Summary of areas investigated

The areas investigated and assessed in this CHAR are summarised below and shown in 0. Quarry sites at Cooks Hill and south of Old Bagotville Road

Two additional quarry areas east and north east of Cooks Hill were investigated to be included within the project.

Two additional quarry areas south of Old Bagotville Road were investigated to be included within the project. These quarry areas would be in addition to the quarry currently included within the project boundary at this location (Eaton's quarry).

During the investigations, RMS determined not to pursue the existing quarry areas at Cooks Hill. Although the assessment documentation for these areas is included in this CHAR, RMS would be only considering the Coolgardie interchange, the rest area near Old Bagotville Road, and the quarries at Old Bagotville Road design changes in the current project approval.

Although the Cooks Hill quarries are no longer being considered, as the sites were subject to field assessment and test excavation the results of these investigations have been presented in this report.

#### **1.4.1. Quarries at Old Bagotville Road**

The proposed change would have two quarries along Old Bagotville Road included as part of the project.

#### **1.4.2. Rest area at Old Bagotville Road**

The rest area north of Old Bagotville Road (north of Richmond River) would be relocated further north than the existing EIS design at station 147.6.

Since the review of the CHAR by the RAPs, a decision was made to move the northbound rest area further south to around chainage 148.5. This north bound rest area now falls within the EIS project boundary.

#### **1.4.3. Coolgardie interchange**

A realignment of the highway and change the layout of the Coolgardie interchange beyond the boundary of the project is proposed to avoid Commonwealth listed endangered flora and fauna. This design refinement would shift the alignment further east, affecting some new areas north of the EIS design for the interchange.

#### **1.4.4. Additional study areas**

Several areas were inspected during the field survey that were not associated with a design refinement. These included the property formerly owned by the Bolts (now owned by RMS) to inspect a possible scarred tree, a property on Wardell Road to investigate a report of possible human bones on the property, and another property on Wardell Road to investigate a possible bora reported to RMS.

## **2. Consultation**

### **2.1. Introduction**

Aboriginal stakeholder engagement and involvement has been important for the identification of Aboriginal cultural values of the project. This CHAR continues with the consultation that commenced in 2010 for the working paper (SKM 2012). The working paper should be referred to for full details of consultation with only an overview of the consultation process and consultation undertaken since the completion of the working paper (SKM 2012) discussed here.

### **2.2. Consultation process**

The consultation undertaken has followed relevant government and RMS consultation guidelines as detailed in section 1.2.1 and described below.

#### **2.2.1. Director-General requirements for consultation**

The DP&I issued Director-General environmental assessment requirements for the project (Table 1-1), which include assessment of impacts to Aboriginal heritage, and mitigation and management measures that is to be generally consistent with the Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation (DEC 2005). These guidelines have now been superseded by the Aboriginal Cultural Heritage Consultation Requirements for Proponents (ACHCRP) (Department of Environment Climate Change and Water (DECCW) 2010). As the 2010 and 2005 consultation requirements are broadly similar (with the 2010 requirements being generally more rigorous), this Aboriginal cultural heritage assessment remains consistent with both the ACHCRP and the Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation (DEC 2005), and consequently the Director-General requirements. The Director-General requirements also require consultation with LALCs and Aboriginal stakeholders relevant to the project; the project also complies with this requirement.

It should be noted that there are no Native Title holders within the boundary of the project, as Native Title holders have specific rights in relation to cultural heritage. Several claimants exist for the project; see below for more discussion on this.

#### **2.2.2. Procedure for Aboriginal Cultural Heritage Consultation and Investigation**

Consultation with RAPs followed the process described in the PACHCI (RMS 2011). The stages of PACHCI are:

- Stage 1 – Internal RMS assessment to identify key environmental issues.
- Stage 2 – Further assessment and site survey, with an archaeologist and specific Aboriginal stakeholders to assess the project's potential cultural heritage impacts.
- Stage 3 – Where Stages 1 and 2 lead to the preliminary view that harm to Aboriginal objects or places is likely to occur, then formal consultation must be undertaken and a cultural heritage assessment report prepared. This may also include sub-surface testing where required.



- Stage 4 – Implement project mitigation measures (eg salvage) in accordance with project approval.

Consultation for the project is being undertaken up to and including Stage 3 of the PACHCI (RMS 2011) procedure for projects assessed under Part 5.1 of the *Environmental Planning and Assessment Act 1979*; Stage 4 would generally be undertaken after project approval has been granted, but prior to construction.

The consultation for this CHAR has aimed to ensure that RAPs had the opportunity to contribute to the assessment in the following ways:

- The development and design of the cultural heritage assessment methodologies.
- The identification of Aboriginal heritage constraints to be considered within the design.
- The development of recommendations for the management of archaeological sites within the proposed design changes.

### 2.2.3. Consultation requirements for proponents

The ACHCRP apply to all AHIP applications submitted after 12 April 2010. This project does not require any AHIPs, as it is being assessed under Part 5.1 of the *Environmental Planning and Assessment Act 1979*, as such, these requirements do not strictly need to be applied. However, as the process outlined in the ACHCRP is good practice, it is followed anyway. Table 2-1 outlines the ACHCRP process, and a summary of how this was followed for the project.

The ACHCRP includes a process for the notification and registration of interested stakeholders, preparation for the Aboriginal cultural heritage assessment and the drafting, review and finalisation of an Aboriginal cultural heritage assessment report.

**Table 2-1 Consultation process implemented, based on the ACHCRP**

Stage	Steps undertaken
Stage 1: Notification of project proposal and registration of interest	<p>The following was undertaken:</p> <ol style="list-style-type: none"> <li>1) In 2010, consultation with OEH, relevant catchment management authorities, LALCs, Native Title Services Corporation Limited, the National Native Title Tribunal, relevant local councils, and the Registrar of Aboriginal Owners to request the names of Aboriginal people who may hold cultural knowledge relevant to determining the significance of Aboriginal objects and/or places for the project.</li> <li>2) In 2010, public notice in local newspapers, in <i>National Indigenous Times</i>, and <i>Koori Times</i> newspapers, and <i>Deadly Vibe</i> and <i>In Vibe</i> magazines for any Aboriginal person who may hold cultural knowledge relevant to determining the significance of Aboriginal objects and/or places for the project to register their interest in participating in each of the four Aboriginal focus groups. A period of 30 days was allowed for a response to register interest.</li> <li>3) In 2010, relevant stakeholders identified in step 1 were written to, inviting any Aboriginal people who may hold cultural knowledge relevant to determining the significance of Aboriginal objects and/or places for the project to register their interest in participating in each of the four Aboriginal focus groups. A period of 30 days was allowed for a response to register interest.</li> </ol> <p>The stakeholders who registered for the Woodburn to Ballina AFG were:</p> <ul style="list-style-type: none"> <li>• Bandjalang People #1 and #2 Native Title Claimants</li> <li>• Bogal LALC</li> <li>• Burabi Aboriginal Corporation</li> <li>• Jali LALC</li> </ul>

Stage	Steps undertaken
	<ul style="list-style-type: none"> <li>• Numbahjing Native Title Claimants</li> <li>• Tweed, Byron and Ballina Community Transport Inc</li> <li>• Gubba Gunya Aboriginal Corporation</li> </ul> <p>The following organisations were also sent project communications, as they had been involved in consultation for earlier stages of the project prior to 2010.</p> <ul style="list-style-type: none"> <li>• Bandjalang LALC</li> <li>• Bunjum Aboriginal Corporation</li> <li>• Burra:way Wa:jad Traditional Owners Group</li> </ul>
Stage 2: Presentation of information about the proposed project	<ul style="list-style-type: none"> <li>• Proposed methodology for investigation of any new areas identified beyond the boundary of the project (eg ancillary facilities, design changes, etc) was distributed to stakeholders and raised at meetings of AFGs on 13 and 14 December 2011 (see working paper for details). The methodology was agreed upon by those in attendance, and a period of 40 days was allowed for further comment, though none were received. Throughout field investigations since, this methodology has been continually discussed to ensure that RAPs are comfortable with the methodology.</li> </ul>
Stage 3: Gathering information about cultural significance	<ul style="list-style-type: none"> <li>• Field survey of proposed design changes, and sub-surface test excavation within PADs, with nominated site officers from the RAPs</li> </ul>
Stage 4: Review of draft cultural heritage assessment report	<ul style="list-style-type: none"> <li>• Draft copies of this CHAR were provided to RAPs with 30 days within which to provide comment.</li> <li>• Comments received were reviewed and incorporated into this CHAR.</li> </ul>

#### 2.2.4. Gathering information about cultural significance

Numerous Aboriginal focus group (AFG) meetings were held with RAPs throughout the assessment for the working paper to discuss the cultural values of the region around the project, and of specific Aboriginal places and archaeological sites near or within the project. An Aboriginal focus group meeting was held on the 7 August 2013 to discuss the results of the field investigations undertaken in this CHAR, significance of sites identified, potential impacts from the proposed design changes, and management recommendations for the sites and places that occur near and within the proposed design changes.

During fieldwork, nominated Aboriginal site officers were engaged to assist with the identification and investigation of sites, PADs and Aboriginal cultural places during survey and sub-surface test excavations (see Chapter 4).

Notable comments from RAP Aboriginal site officers during that fieldwork included:

- Members of many RAPs wanted to reiterate that they feel all staff and contractors involved in the project and areas of design changes should take part in a cultural and heritage awareness induction, that is at least in part conducted by local Aboriginal people, and that all personnel have this induction with local Aboriginal people, not just managers who then pass this information on.

- Marcus Fergusson (Jali LALC) felt that several trees located in design change areas (and one within the project corridor) had been scarred in accordance with Aboriginal cultural traditions. These were inspected and no evidence was provided to this interpretation, with all evidence showing that they were naturally scarred (eg all showed signs of natural scarring and some of the trees were also too young).
- Marcus Fergusson (Jali LALC) mentioned that he had seen a reference in the archives of the *Northern Star* newspaper that may point towards a bora located within the project boundary on Wardell Road – investigation was undertaken to search for the reference without success. The investigations could not prove presence of a bora there, and Marcus has not yet provided RMS with a copy of this reference.
- Marcus Fergusson (Jali LALC) mentioned that he had seen references to a traditional name for Lang Hill (location of Gittoes Jali site) and reference to it and two other hills in a traditional story.
- Marcus Fergusson (Jali LALC) mentioned that he had come across some bones that were potential human remains; these were inspected by Vanessa Edmonds who has experience in identifying human remains. The bones were determined not to be human and were most likely to be sheep (shank) bones.
- Lois Cook and members of Jali LALC expressed concern over the potential impacts to local fauna by construction of the highway in the proximity of Ngunya Jargoong Indigenous Protected Area. RMS responded that several design refinements had been made to reduce potential impacts, including concrete retaining walls around Old Bagotville Road, fauna fencing, and possible fauna underpass.
- Lois Cook and members of Jali LALC and Bandjalang People Native Title Claimants emphasised the cultural significance of different parts of the landscape between Woodburn and Ballina.

### **2.2.5. Aboriginal stakeholder comment on cultural heritage assessment report**

A statement of findings from the field survey was circulated to RAPs on Wednesday 10 July 2013 to provide an update and chance to reconfirm that the continued use of the project methodology was suitable. No comments were received.

A final draft of this CHAR was circulated to RAPs for review and comment on 6 August 2013, and a 30-day period given in which to provide comment by 4 September 2013. An Aboriginal focus group meeting was also held on 7 August 2013 to present the results and recommendations of the CHAR. A minor update to the CHAR regarding impacts to the Saezza 1 site was made and the CHAR redistributed on 8 August 2013. Subsequently, a letter was forwarded to all RAPs on 13 August 2013 informing RAPs that the quarries on Old Bagotville Road were now being included in the proposed design changes, and that they should be considered by the RAPs in their review of the CHAR, though no impacts to Aboriginal heritage are likely from the inclusion of the quarries within the project.

No comments were made on this CHAR during the 30-day review period, except for comments in the AFG meeting already mentioned above. The final version of this CHAR will be circulated to all relevant RAPs.



## 3. Desktop assessment

### 3.1. Desktop cultural heritage assessment

The proposed design changes were assessed at a desktop level to determine the potential risk of impact to Aboriginal heritage. The purpose was to identify whether further investigation was required to determine the potential risk of impact. The areas were assessed against the following criteria:

- Position of design change to boundary of project previously surveyed – all design changes, or part thereof, inside the boundary of the project were assessed as requiring no further investigation, as these have already been subject to detailed desktop and field assessment as part of the working paper; any parts of design changes outside the boundary of the project (or previously assessed in the first addendum CHAR) were recommended for survey.
- Presence of an Aboriginal archaeological site or cultural place within a design change (including a search of AHIMS).
- Presence of an Aboriginal archaeological site or cultural place within 25 metres of a design change.
- Type of land system affected by the design change – to place the design change within the predictive model developed in the archaeological assessment of the working paper; used to inform the recommendations and to provide context for any investigations recommended.
- Type of landform affected by the design change – to better contextualise the design change within the predictive model; used to inform the recommendations and to provide context for any investigations recommended.

Potential archaeological sensitivity of the design changes was assessed using a combination of factors including landform, and proximity to a known site or potential archaeological deposit (PAD). Potential archaeological sensitivity was used to inform what level of investigation was recommended. A desktop assessment matrix (see Appendix A) linked into an assessment of the risk of each design change potentially impacting upon Aboriginal cultural heritage.

Recommendations were then made for consultation and field assessment where the risk of impact to Aboriginal cultural values was not sufficiently known (ie were outside the boundary of the project), and/or where there was a known risk to impact Aboriginal cultural heritage values beyond the boundary of the project.

Broadly, the recommendations fell into two categories:

- 1) Survey and consultation, and potentially sub-surface testing where design changes are located outside the boundary of the project and there is a higher potential archaeological sensitivity and/or a known Aboriginal archaeological site/PAD located within or immediately adjacent to the design change.
- 2) No further investigation recommended where a proposed design change is located within the boundary of the project, and not likely to impact Aboriginal cultural heritage.

This process for investigation of any new areas outside the boundary of the project was discussed with and accepted (or no comment given) by RAPs during Aboriginal focus group (AFG) meetings held on 13 and 14 December 2011, and verbal checks undertaken at regular intervals since then to

ensure that RAPs were in agreement and/or had no concerns with this approach (see Appendix A for details of recent consultation). Previous (prior to March 2013) consultation is included in the working paper and the first addendum CHAR). The desktop assessment matrix for design changes is included in Appendix A.

### **3.2. Ngunya Jargoan Indigenous Protected Area**

One Indigenous Protected Area (IPA) – Ngunya Jargoan – is adjacent to the project and design changes in the vicinity of Thurgates Lane and Old Bagotville Road. Stretching over 1,114 hectares of the Lower Richmond Valley on the northern coast of New South Wales, Ngunya Jargoan Indigenous Protected Area is a refuge for a large number of plants and animals. Sites containing artefacts such as stone axes and flaked tools have also been identified within the IPA. Dedicated as an IPA on 12 February 2013, Ngunya Jargoan has become part of Australia's National Reserve System and will be managed under the International Union for the Conservation of Nature Category VI, as a protected area which is managed for conservation and the sustainable use of natural resources.

As this IPA has been declared since the working paper, impacts to this IPA are considered in this report. Due to the extensive size of the IPA (almost all of which is located beyond the boundary of the project), a comprehensive significance assessment of Ngunya Jargoan is beyond the scope of this assessment, and is not included here. An estimate of moderate significance is given to the IPA for the purposes of this report.

## 4. Field assessment

This chapter summarises the field assessment undertaken as part of this report, including field survey and sub-surface testing.

Appendix A presents the results, existing conditions and knowledge gaps for design changes. For detail on environmental and cultural context of the study area region, refer to the working paper (SKM 2012).

### 4.1. Aims

The aims of the field assessment were to:

- Identify sites and areas of PAD within the proposed design changes.
- Collaborate and consult with RAPs.
- Determine the presence of sub-surface deposits for all areas of PAD.
- Determine the nature, depth, extent and significance of archaeological deposits within the proposed design changes.
- Excavate consistently with the geomorphology of the relevant landform.
- Comply with the Director-General requirements.
- Undertake excavation with regard to the Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales 2010 and in accordance with the Director-General requirements.
- Undertake a sufficient amount of 'control' excavations outside PADs to test predictive model accuracy.

### 4.2. Assessment methodology

The assessment methodology reflects that undertaken in the working paper (SKM 2012) and should be referred to for full details on methodology. In accordance with the previously accepted methodology, complete survey coverage was attempted on all properties. This entailed traverse of each property on foot with the members of the survey team spaced evenly five metres to 10 metres apart, and giving extra scrutiny to areas of higher ground surface visibility and areas where the sub-surface is exposed. Survey areas were defined by property boundaries, and survey was undertaken across the entire area of the property that may be affected by the proposed design change, and that was outside the boundary of the project, generally plus a 25 metre buffer (subject to accessibility).

Complete survey of some properties was not possible due to water covering low lying swampy areas. These areas were discussed and assessed from the edges for their potential to contain Aboriginal heritage. All of these areas were assessed to be of low Aboriginal heritage potential, and were not considered to be a limitation to the investigation.

Several properties were not able to be accessed due to access permission being unavailable at the time of survey.



Subsequent to survey, sub-surface testing was undertaken in areas of PAD within proposed design changes by manually excavating 0.5 metre x 0.5 metre shovel test pits (STPs).

All stages of the archaeological assessment included consultation and involvement with nominated Aboriginal site officers of the relevant RAPs, as noted in Chapter 2. Prior to commencing each day of work, the methodology was discussed with Aboriginal site officers to ensure that they had no concerns and were comfortable with the methodology proposed.

### 4.3. Timing and personnel

Field investigation was undertaken at different times between 3 July 2013 and 18 July 2013. Personnel involved in fieldwork are included in Table 4-1.

**Table 4-1 Timing and personnel for field assessment**

Dates	Activity	Supervisors	Archaeologists	Nominated site officers
3-5 July 2013	Survey	Joseph Brooke	Vanessa Edmonds	<b>Jali LALC</b> Marcus Fergusson Dean Bolt  Lois Cook
16 July 2013	Survey and sub-surface testing	Joseph Brooke	Shoshanna Grounds Alistair Carr Rebecca Andrews	Lois Cook  <b>Burabi Aboriginal Corporation</b> Dwayne Cook Anthony Cook
17 July 2013	Sub-surface testing	Joseph Brooke	Shoshanna Grounds Alistair Carr Rebecca Andrews	<b>Bandjalang People Native Title Claimants</b> Daniel Wilson Doug Wilson  Lois Cook  <b>Burabi Aboriginal Corporation</b> Dwayne Cook Anthony Cook  <b>Jali LALC</b> Dean Bolt
18 July 2013	Sub-surface testing	Joseph Brooke	Shoshanna Grounds Alistair Carr Rebecca Andrews	Lois Cook  <b>Burabi Aboriginal Corporation</b> Dwayne Cook Anthony Cook  <b>Jali LALC</b> Dean Bolt

## 4.4. Survey and testing results

### 4.4.1. Coolgardie interchange

Property Lot3 DP1096778 was surveyed and no sites were identified. The property was located within tea-tree swamp and was not considered by the survey team to have sensitivity for Aboriginal heritage sites.

Property Lot9 DP594556 was surveyed and one PAD was identified – Pimlico Buffalo 1 (Figure 4-1). This PAD was a raised sand plain adjacent to swamp. Seven STPs were excavated at Pimlico Buffalo 1, with no archaeological material identified. This PAD was no longer considered to be a PAD or a site by the archaeologists and Aboriginal site officers. An Aboriginal Site Impact Record Form (ASIRF) has been submitted to AHIMS with this conclusion. Figure 4-1 shows the locations of STPs excavated.

Property Lot4 DP223267 was surveyed and two PADs were identified – Pimlico Hilton 1 and 2 (Figure 4-1). These PADs were both on separate raised sand plains adjacent to swamp. Four STPs were excavated at Pimlico Hilton 1, and no archaeological material was identified. Five STPs were excavated at Pimlico Hilton 2, and no archaeological material was identified, it was also noted that the soil appeared to be fill, likely from the creation of the adjacent lagoons. Both PADs were no longer considered PADs or sites by the archaeologists and Aboriginal site officers; ASIRFs have been submitted to AHIMS with this conclusion. Figure 4-1 shows the locations of STPs excavated.

Property Lot61 DP1088684 was surveyed and a PAD (an extension of Rudgley Site 2) was identified within the boundary of the proposed design change, outside the previous boundary of the project - Figure 4-2). In the same area, a probable Aboriginal scarred tree (named Rudgley Scarred Tree 2) was identified. Definitive identification is not possible as the scarred portion of the tree is dead, and has rotted away (Figure 4-3), leaving only three edges of the scar (the bottom edge is also missing). As the evidence points more towards it being of Aboriginal cultural origin, it has been recorded as such. The PAD extends north from Rudgley Site 2 for about 150 metres, and is a raised sand plain adjacent to a swampy tributary of Saltwater Creek (Figure 4-4). Eleven STPs were excavated at the PAD extension to Rudgley Site 2, and seven stone artefacts were recorded, as well as three pieces of ochre (two orange/red, and one grey). The site extent of Rudgley Site 2 was expanded outside the project corridor based on these results, and an ASIRF has been submitted to AHIMS to update their records on this site. Figure 4-2 shows the locations of STPs excavated and the updated site extent for Rudgley Site 2.

Property Lot62 DP1088684 was surveyed and no sites were identified. The property was located in heavy swampy soils, with no raised sandy areas or other landforms sensitive for Aboriginal heritage material identified.

Property Lot51 DP1120710 had been previously surveyed and subject to test excavation as part of the ancillary facilities assessment, but was inspected to confirm that the area had no sensitivity. All representatives agreed that this was the case.

Property Lot 2 DP543525 was not able to be surveyed due to property access constraints, but was inspected from the property boundary for potential Aboriginal sensitivity. The proposed design change in this location was not considered to be sensitive for Aboriginal heritage, as it is in a low-lying and swampy area, and has been disturbed through vegetation clearance, channelling and sustained deep ripping for sugar cane production.

#### **4.4.2. Rest area at Old Bagotville Road**

The proposed location for the rest area was not able to be accessed due to property access issues and partial water-inundation. As much of the property was inspected from the boundary as possible; the landforms visible during this inspection were not considered sensitive for Aboriginal heritage sites; this was agreed by Aboriginal site officers.

#### **4.4.3. Quarry sites at Old Bagotville Road**

All three quarry properties (Lot 1 DP787102, Lot 2 DP585377, and Lot 5 DP843369) south of Old Bagotville Road were surveyed. No sites were recorded – two trees with scars on them were noted that did not appear to have been cultural. Discussions were had on site regarding these; Marcus Fergusson (Jali LALC) felt that they were culturally scarred in accordance with Aboriginal tradition, while the archaeologists felt that they did not show the appropriate signs to have been culturally scarred. These trees fall outside the clearing boundary of the proposed works and are not likely to be impacted by the proposed design changes.





Figure 4-1 Coolgardie interchange - Pimlico PADs identified from survey, and locations of STPs



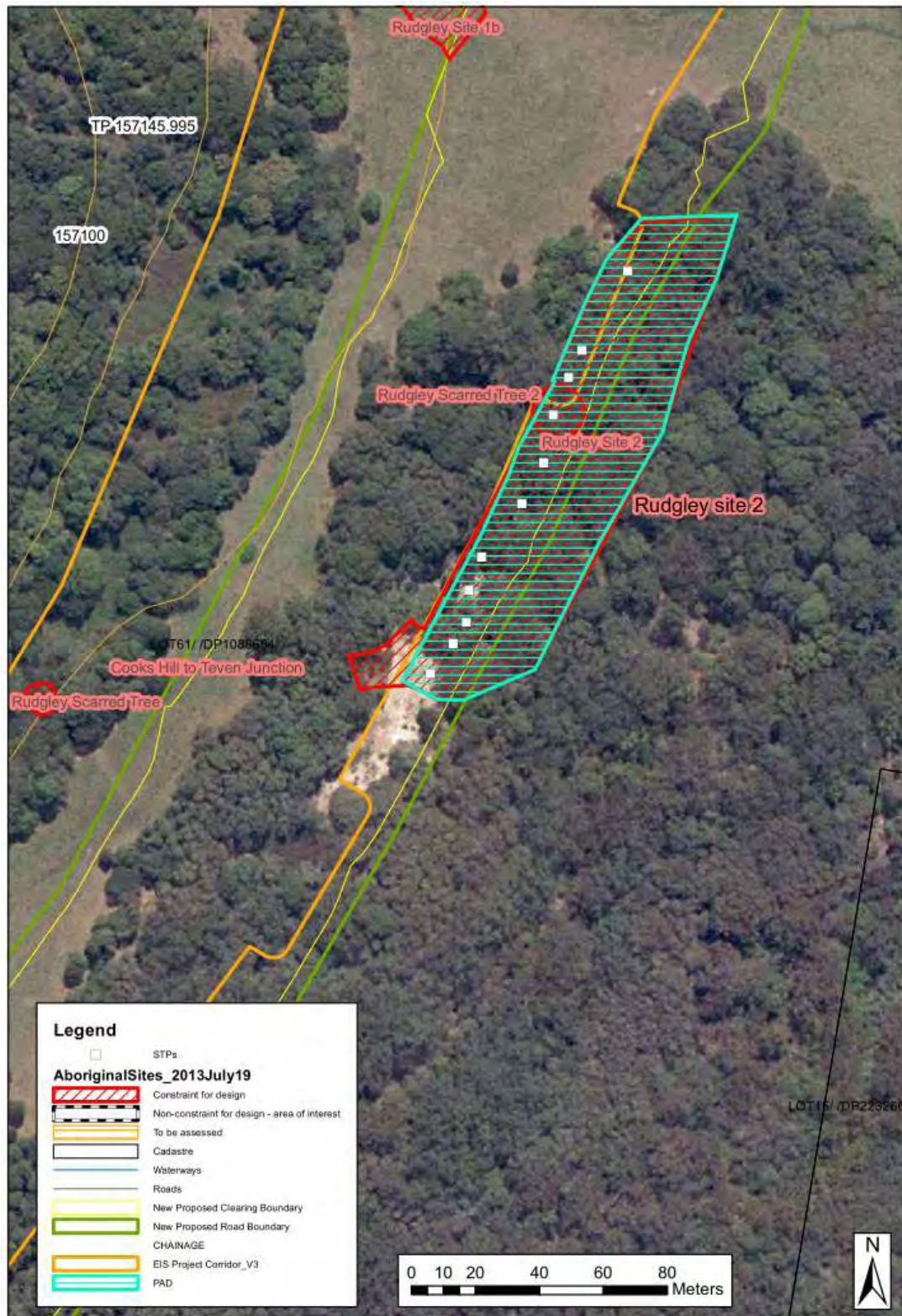
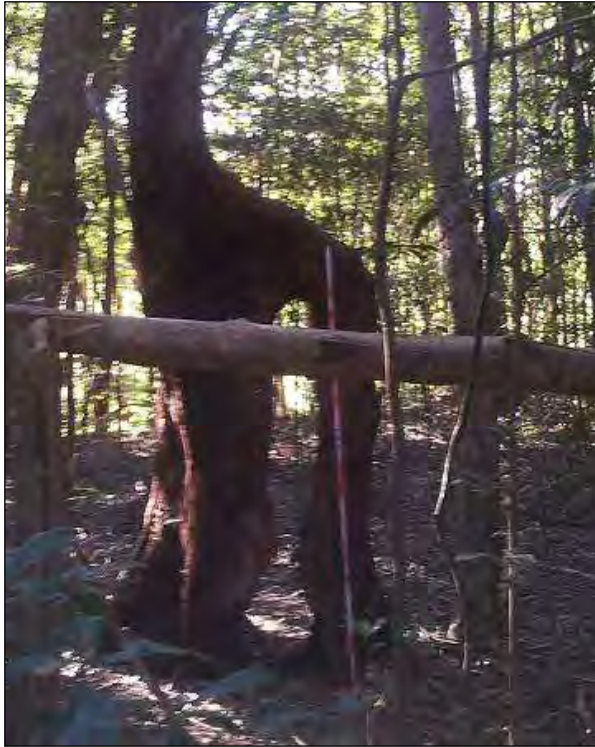


Figure 4-2 Coolgardie interchange - Rudgley Scarred Tree 2, Rudgley Site 2, and locations of STPs



**Figure 4-3 Rudgley Scarred Tree 2**



**Figure 4-4 Vanessa Edmonds recording at the PAD extension of Rudgley Site 2**



#### 4.4.4. Quarries at Cooks Hill

The quarries at Cooks Hill were divided into three areas – (1) the Cooks Hill rock quarry, (2) the swamp on the opposite side of the project (both on Lot2 DP1096808), and (3) the Cooks Hill sand quarry (Lot4 DP253906). Cooks Hill is known to be significant for Aboriginal culture and cultural heritage for several reasons (see working paper), and several sites and places have been identified nearby.

The two quarried areas were subject to field survey, with the swamp opposite the rock quarry too waterlogged to be accessed, although it was assessed to be not sensitive for Aboriginal heritage sites. No sites were identified within the Cooks Hill rock quarry, but due to the significance of Cooks Hill, Aboriginal Site Officers requested that the areas around the edges of the quarry that have not yet been disturbed are not subject to disturbance from the project.

The Cooks Hill sand quarry has been extensively quarried in the past, and subject to a section 90 permit to disturb (the predecessor to the current AHIP), much of an Aboriginal heritage site (E2/2 – an artefact and shell midden site) has been removed along with the sand quarrying. Artefacts are scattered over sandy areas across the study area, in previously quarried areas, and areas that have not been quarried. One Aboriginal scarred tree (Eversons Swamp 1) and a PAD extension to the E2/2 site were identified in this study area (Figure 4-5). The PAD includes areas adjacent to the south-western corner of E2/2 site, such as non-sandy areas at the base of Cooks Hill, and sandy areas that appear to be located within an old swamp. Eversons Swamp 1 is a probable Aboriginal scarred tree, located on the edge of a swamp that is part of Eversons Creek. The scar has several steel axe marks on the top edge of the scar. As the evidence points more towards it being of Aboriginal cultural origin, it has been recorded as such. Twenty STPs were excavated at the PAD extension to E2/2, and 18 stone artefacts were recorded from five STPs; small amounts of shell fragments were noted in all STPs, with no concentrations noted. The extent of the E2/2 site was expanded outside the project corridor based on these results, and an ASIRF has been submitted to AHIMS to update their records on this site. Figure 4-5 shows the locations of STPs excavated.

Three control STPs were excavated in a small segment of the lower slope of Cooks Hill that remains intact (ie has not been quarried) as this landform was not considered to be sensitive for Aboriginal cultural material. No archaeological material was identified in these control STPs.

Following completion of the field survey, it was decided that this potential design change would no longer be considered by RMS in this assessment.

This figure has been removed as it includes culturally sensitive information

**Figure 4-5 Quarry at Cooks Hill - showing extension to E2/2 extent, Eversons Swamp 1, and locations of test excavation**

#### 4.4.5. Additional study areas

The potential scarred tree on Lot7 DP 866508 off Old Bagotville Road was inspected, and determined to not have been scarred as a result of Aboriginal cultural tradition, and was most likely the result of a limb-tear or a lightning strike. Marcus Fergusson (Jali LALC) expressed doubts on this conclusion.

The property on Wardell Road where Marcus Fergusson (Jali LALC) had reported bones (LotA DP 412818) was inspected. The surveying archaeologist was able to determine that they were not human remains, and were most likely to be sheep bones. All agreed that the remains were not human.

The property on which a bora was reported to have existed (details removed to protect culturally sensitive information) was initially viewed from the boundary at Wardell Road. The property was covered in waist high grass, with none of the ground surface seeming to be visible for inspection. A number of hoop pines were noted on the property in the area of the potential bora, that Marcus Fergusson believes may mark the location of the bora (Figure 4-6), as a known bora further west has scarred hoop pines marking its boundary. Marcus believes he has seen reference to a bora at this location in an old issue of the *Northern Star* newspaper. One article (16 March 1937, page 11) refers to a *bullen bullen* (ceremonial ground) on the Wardell Road, but is referring to a location on the road to/from Wardell in Pimlico, not this location. Another article (20 July 1937, page 9) refers to the same *bullen bullen*, and states that it is near Laws Lane in Pimlico where Pimlico Hall is to be built. The property (Lot1 DP 218659) was accessed to check the hoop pines for scars, though none were present. The property was slashed in and around the potential bora location in sample squares to attempt to identify any surface archaeological material evidence or other evidence of a bora (such as the raised edge of an earthen ring). No surface evidence was present or perceptible, thus test excavation was undertaken to see if sub-surface material could be detected. Fourteen STPs were excavated (Figure 4-6), but no archaeological material was detected. Lois Cook suggested that a bora may have existed on top of the neighbouring hill (to the west – outside the project corridor), but was unlikely to be located in this location.



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**Figure 4-6 Location of potential bora, and locations of STPs**

#### 4.4.6. Summary

Of the proposed design changes areas, 395,453 square metres (88 per cent) were surveyed (see Appendix D for survey details), with a high (43 per cent – see Table 4-2) effective coverage. Areas that had been cleared of vegetation and eroded (often adjacent to quarried areas), provided the best survey visibility and exposure, giving a better chance of identifying sites on these parts of landforms. 'Removed' landforms were allocated in areas that had been substantially quarried and the landform no longer discernible.

Two new sites were identified following the survey of the proposed design changes, both of which were scarred trees (Rudgley Scarred Tree 2, and Eversons Swamp 1). Two new areas of PAD were identified associated with previously recorded sites (Rudgley Site 2, and E2/2 [initially termed Cooks Hill 2]), and three new standalone PADs were also identified (Pimlico Buffalo 1, and Pimlico Hilton 1 and 2). One area next to E2/2 was also selected for control testing. Appendix D provides details of the survey undertaken.

**Table 4-2 Survey coverage by landform for design changes**

Landform	Area within 25 m of design changes (m <sup>2</sup> )	Survey coverage (m <sup>2</sup> / per cent)	Visibility	Exposure	Effective coverage (m <sup>2</sup> / per cent)
Removed	174,640	174,640 (100%)	90%	90%	141,458 (81%)
Plain	64,466	58,079 (91%)	40%	25%	5,807 (9%)
Lower Slope	26,220	26,220 (100%)	60%	50%	7,866 (30%)
Mid Slope	7,353	7,353 (100%)	90%	90%	5,955 (81%)
Upper Slope	26,086	26,086 (100%)	90%	90%	21,129 (81%)
Swamp	150,764	103,075 (68%)	40%	25%	10,307 (7%)
<b>Total</b>	<b>449,529</b>	<b>395,453 (88%)</b>	<b>70%</b>	<b>60%</b>	<b>192,522 (43%)</b>

To comply with the Director-General requirements, sub-surface assessment of PADs was required (see Table 4-3). Sub-surface test excavation was undertaken at five PAD locations (including three stand-alone PADs, and two associated with a previously identified site), with the following results:

- No new sites were recorded as a result of sub-surface test excavations.
- At the Pimlico Buffalo 1, and Pimlico Hilton 1 and 2 PADs, no artefacts were discovered from sub-surface test excavations, and as a result are confirmed to not be sites or PADs.
- Test excavation was undertaken at a control area (lower slopes of Cooks Hill) and no finds were made, confirming that this area was not of archaeological sensitivity.
- At two sites (Rudgley Site 2 and E2/2) sub-surface testing finds added to existing recordings for these sites, leading to better understanding of the sites and their boundaries.

Sub-surface testing included the excavation of 64 shovel test pits (0.5 metres x 0.5 metres) at five areas of PAD and one control area; and discovery of 26 stone artefacts, three pieces of ochre (Rudgley Site 2) and scattered shell (E2/2) in two of these PADs. The locations of shovel test pits are shown in Figure 4-2 and Figure 4-6 and detailed in Appendix E.

Table 4-3 Summary of survey and sub-surface testing undertaken for proposed design changes

Site name (AHIMS site ID)	Proposed design change	Site type(s) after survey	Description	Investigation	Excavation	Sub-surface testing results	Updated site type(s) after completion of fieldwork
Pimlico Buffalo 1 (new - pending)	Coolgardie interchange	New PAD	Raised sand plain adjacent to swampy plain around Laws Lane, Pimlico	Survey and sub-surface testing	7 shovel test pits	No artefacts	No material found from sub-surface testing – <b>not considered to be a PAD or site</b>
Pimlico Hilton 2 (new - pending)	Coolgardie interchange	New PAD	Raised sand plain adjacent to swampy plain, south of Laws Lane, Pimlico	Survey and sub-surface testing	5 shovel test pits	No artefacts	No material found from sub-surface testing – <b>not considered to be a PAD or site</b>
Pimlico Hilton 1 (new - pending)	Coolgardie interchange	New PAD	Raised sand plain adjacent to swampy plain, south of Laws Lane, Pimlico	Survey and sub-surface testing	4 shovel test pits	No artefacts	No material found from sub-surface testing – <b>not considered to be a PAD or site</b>
Rudgley Site 2 (04-4-0169)	Coolgardie interchange	Updated site – Artefact scatter and PAD	Raised sand plain adjacent to swampy gully and plain feeding into Saltwater Creek, south of Coolgardie Road	Survey and sub-surface testing	11 shovel test pits	8 artefacts and 3 pieces of ochre	Updated site extent – Artefact scatter
Rudgley Scarred Tree 2 (new - pending)	Coolgardie interchange	New site – Modified tree	Probable scarred tree located on raised sand plain on bank of swampy gully tributary to Saltwater Creek	Survey	n/a	n/a	New site – Modified tree



Site name (AHIMS site ID)	Proposed design change	Site type(s) after survey	Description	Investigation	Excavation	Sub-surface testing results	Updated site type(s) after completion of fieldwork
E2/2 (13-1-0109)	Quarry at Cooks Hill	Updated site extent – Artefact scatter, shell midden and PAD	Sand ridge/rise at the base of Cooks Hill, adjacent to swampy plain and Eversons Creek, east of Broadwater	Survey and sub-surface testing	20 shovel test pits	18 artefacts, scattered shell throughout – no concentrations	Updated site extent – Artefact scatter, shell midden and PAD
Eversons Swamp 1 (new - pending)	Quarry at Cooks Hill	New site – Modified tree	Scarred tree on the verge of sandy rise and swamp immediately west of Eversons Creek, and east of Cooks Hill	Survey	n/a	n/a	New site – Modified tree
-	Quarry at Cooks Hill	Control area	Lower slope of Cooks Hill, immediately east of Cooks Hill	Survey and sub-surface testing	3 shovel test pits	No artefacts	No material found from sub-surface testing – <b>not considered to be a PAD or site</b>

#### 4.4.7. Aboriginal cultural places

Consultation was undertaken in the field with knowledge holders (Doug and Daniel Wilson, Lois Cook, Dean Bolt and Marcus Fergusson) to identify any Aboriginal cultural places within the proposed design changes. No new Aboriginal cultural places were identified in this assessment. Existing Aboriginal cultural places near or within the proposed design changes are: Cooks Hill Massacre Site, Cooks Hill Camp Sites, Cooks Hill Corridors of movement, and the Cooks Hill to Teven Junction landscape.

#### 4.4.8. Localities not assessed

Three properties where design changes are proposed were not able to be assessed due to property access restrictions or water inundation inhibiting access at this time. The proposed design changes identified in Table 4-4 have not been subject to field assessment.

**Table 4-4 Study areas not able to be accessed through field assessment**

Proposed design change	Archaeological potential *
Rest area at Old Bagotville Road (north) (Lot 2 DP787102)	Low-moderate – area is cleared of vegetation, swampy, and frequently inundated, but may include micro-rises which may hold some sensitivity.
Rest area at Old Bagotville Road (north) (Lot 109 DP1137975)	Low-moderate – area is predominantly swampy and partially cleared of vegetation, and frequently inundated, some minor rises may occur that would have low-moderate potential to contain Aboriginal archaeological sites.
Coolgardie interchange (Lot 2 DP543525)	Low-moderate – area is low lying and swampy, and has been predominantly cleared of vegetation and has been subject to channelisation and sustained deep ripping for sugar cane production, but is adjacent to the Blackwall Range foothills and may include micro-rises which may hold some sensitivity.

\* note that sensitivity is the potential to contain archaeological material, not significance

# 5. Significance assessment

## 5.1. Methodology

All Aboriginal cultural heritage sites or places identified near or within the proposed design changes are included below. Where the significance of sites or places that are discussed in the working paper (SKM 2012) remains unchanged in this CHAR, they are not discussed here. Only the significance of sites or places that are new or updated are discussed here. As previous sites were identified in the working paper that are now near or within the proposed design changes but did not require further investigation as part of this assessment, as relevant these are included below.

### 5.1.1. Basis for assessment

A significance assessment is made up of several significance criteria that attempt to define why a site is important. Evidently, this can be challenging as sites are important for different reasons to different people, and even at different times. The assessment of Aboriginal cultural heritage in this assessment is based upon the four values of the *Australia ICOMOS Burra Charter* (Australian ICOMOS 1999).

- Social values
- Historical values
- Scientific values
- Aesthetic values

Each of these values is assessed below, and an overall significance is then given based on an average across the values. This is inherently a reductive process, and oversimplifies what is important for different reasons to a range of different stakeholders, but is a necessary process in being able to create comparative values between sites. The significance of each site ultimately feeds the management of sites and places (see Chapter 7).

### 5.1.2. Social significance

The significance of a site does not relate only to its scientific or research value. Aboriginal people's views on the significance of archaeological sites are usually related to traditional, cultural and educational values, although some Aboriginal people also value any scientific information a site may be able to provide.

Aboriginal cultural significance was assessed from consultation with some knowledge holders from the RAPs during field assessments. It should be noted that Aboriginal significance assessed in this manner may not reflect the views of all members of the community.

### 5.1.3. Scientific significance

Aboriginal site significance assessments need to consider both the scientific and social or cultural values of a site. Research potential or scientific significance of an Aboriginal archaeological site can be assessed by utilising the criteria set out below. Social or cultural values of a site can only be established through Aboriginal consultation.



Criteria used for assessing scientific significance for Aboriginal archaeological sites are described below. Ratings are low, moderate or high.

- **Site integrity** – The integrity of a site refers to its state of preservation, or condition. A site can be disturbed through a number of factors among which are: natural erosion processes, destructive land use practices or repeated use of a site in the past by both humans and animals.
- **Site structure** – Structure refers to a site’s physical dimensions, that is, size and stratification, or sub-surface deposits. A large site or a site with stratified deposits has more research potential than small sites and/or surface scatters. Sometimes however, specific research questions may be aimed at smaller sites in which case they would be rated at a higher significance than normal. Site structure cannot be assessed for scarred trees or isolated artefacts.
- **Site contents** – This category refers to the range and type of occupation debris found in a site. Generally, complex art sites, extensive quarries with associated debris and surface sites that contain a large and varied amount of organic and non-organic materials are considered to have greater research potential than those sites with small, uniform artefacts, single motif art sites and small quarries with little or no debris. For scarred trees, contents may refer to the size and type of scar and/or how many scars there are on the one tree.
- **Representativeness and rarity** – Representativeness refers to how much variability exists between the subject site and others inside or outside the subject area. It also considers the types of sites already conserved in the area and how much connectivity between sites exists. Rarity considers how often a particular site type occurs in an area. Assessment of representativeness and rarity requires some knowledge of the background archaeology of the area or region in which a study is being undertaken. Rarity also relates to whether the subject site or area is important in demonstrating a distinctive way of life, custom, process, land use, function or design which is no longer practiced (OEH 2011:10).

#### 5.1.4. Aesthetic significance

This refers to the ‘sensory’ value of a place, and can include aspects such as form, texture, and colour, and can also include the smell and sound elements associated with use or experience of a site (Australian ICOMOS 1999). Aesthetic significance can be closely linked to the social value of a site.

#### 5.1.5. Historic significance

The historic value of a site is determined through its association with historically important people, events or activities.

#### 5.1.6. Scale of significance

Significance of sites and places is assigned to different geographic scales, such as local, regional, State and National, appropriate to the scale of importance. For example, Uluru is significant at a National (and World) scale, whereas a local historic building may only be significant on a local scale. This is reflected in the variety of heritage lists held by local councils, up to State and Federal government. In scale of significance, the criteria presented above as well as educational or

research potential, representativeness and rarity (Australian ICOMOS 1999) have been considered in determinations of significance.

Each site has been assessed and its scale of significance has been identified as being of importance at the State, regional or local level. Each site has also been given a grading of its significance overall based on the grading of each of the individual values. The gradings of low, moderate and high have been assigned comparatively across the sites investigated in the region.

## 5.2. Statements of significance

### 5.2.1. Cooks Hill to Teven Junction

The significance remains unchanged for this item – please see the working paper for the detailed significance assessment.

### 5.2.2. Cooks Corridors of Movement

The significance remains unchanged for this item – please see the working paper for the detailed significance assessment.

### 5.2.3. Cooks Hill Massacre Site

The significance remains unchanged for this item – please see the working paper for the detailed significance assessment.

### 5.2.4. Cooks Hill Camp Sites

The significance remains unchanged for this item – please see the working paper for the detailed significance assessment.

### 5.2.5. E2/2 (AHIMS ID: 13-1-0109)

Although the extent of this site has been extended somewhat, the significance of this item remains unchanged – please see the working paper (SKM 2012) for the detailed significance assessment.

### 5.2.6. Eversons Swamp 1 (AHIMS ID: pending)

#### **Social significance**

- Eversons Swamp 1 is a living tree with a scar of probable Aboriginal cultural origin, and is of moderate-high social significance as it is an increasingly uncommon site type, has a finite life span, and is located in a culturally significant area (around Cooks Hill).

#### **Historical significance**

- The site is of low historical significance due to post-contact Aboriginal occupation of this area, and several historical stories associated with this general area.

### **Scientific significance**

- The site has moderate scientific significance as it is ranked as having low integrity, no structure (as structure cannot be assessed for scarred trees), low-moderate contents and moderate-high representativeness/rarity. The scarred portion of the tree is relatively symmetrical, and has steel axe marks on the top edge. Scarred trees are increasingly uncommon site types locally and within NSW, therefore Eversons Swamp 1 has a moderate-high representativeness/rarity rating. The tree is located on the verge of a raised sandy plain and a swamp that surrounds Eversons Creek, and thus has some limited potential for local educational purposes in relation to traditional Aboriginal use of swamp resources and the sandy plain. It also fits within the larger suite of sites located on and around Cooks Hill.

### **Aesthetic significance**

- The tree has low aesthetic significance as it provides some visual distinction in the landscape.

### **Summary statement of significance**

- Overall, Eversons Swamp 1 is of moderate significance at the local level. The site is of moderate-high social significance and has moderate scientific significance due primarily to the rarity of scarred trees. The tree has low aesthetic significance as it provides some visual distinction in the landscape, and has low historical significance due to the known post-contact history of this general area.

#### **5.2.7. Site 1 (AHIMS ID: 04-2-0065)**

No new finds were made for this site, the significance remains unchanged – please see the working paper (SKM 2012) for the detailed significance assessment.

#### **5.2.8. Rudgley Scarred Tree 1 (AHIMS ID: 04-4-0170)**

No new finds were made for this site, the significance remains unchanged – please see the working paper (SKM 2012) for the detailed significance assessment.

#### **5.2.9. Rudgley Site 2 (AHIMS ID: 04-4-0169)**

### **Social significance**

- The artefact scatter at Rudgley Site 2 has moderate social significance because it provides evidence of the use of the area by Aboriginal people, it is situated on a deflated dune/sand ridge that was part of a pathway used by Aboriginal people leading from the Richmond River to the ranges, and includes a less common and culturally significant material, in two types of ochre – red/orange and grey/brown.

### **Historical significance**

- The site does not meet this criterion as there is no traditional knowledge or literary evidence of association of this site with historical (post-contact) times.



### **Scientific significance**

- Rudgley Site 2 consists of a low density artefact scatter comprising 11 stone artefacts (eight recorded during this assessment and three in the EIS working paper assessment) with no stratification of archaeological deposit evident, located on a slightly raised sandy plain surrounded by swamp. The site has low-moderate scientific significance as it is ranked as having low integrity, low-moderate structure, low contents and moderate representativeness/rarity
- The site has a low ranking for integrity and structure. The deflated dune on which the site is situated is continually subject to rising and falling ground water table and is a low density, and relatively small scatter.
- The site has a low contents ranking as the few raw materials noted (chalcedony and chert) are common to the area.
- The site has a moderate representativeness ranking as artefact scatters are common within the region, but ochre is less common, and having two types of ochre at one site is uncommon.
- The site has some limited research potential and limited local educational potential for researching and teaching the way local Aboriginal populations used this type of landform, and similar landforms in pathways that lead from the Richmond River to the ranges and could be used as part of a landscape analysis of similar pathway sites. The site may also yield archaeological evidence on the uses of ochre in the region.

### **Aesthetic significance**

- The site is of low aesthetic significance, as RAP representatives noted its relatively natural setting, giving good sensory feel for what it would have been like pre-contact, and its good definition of the landforms.

### **Summary statement of significance**

- Overall, Rudgley Site 2 has low-moderate level significance (previously low significance) at the local level. It has moderate social significance (previously low-moderate) as it provides evidence of use of the area by Aboriginal people, and includes two types of ochre, a culturally significant material. It has low-moderate scientific significance (previously low significance) due to its low density, common raw material, overall common presence of similar sites in the region, but the presence of ochre does add to the significance. The site has low-moderate aesthetic significance. The site has some limited research and educational potential.

### **5.2.10. Rudgley Scarred Tree 2 (AHIMS ID: pending)**

#### **Social significance**

- Rudgley Scarred Tree 2 is a living tree with a scar of probable Aboriginal cultural origin, and is of moderate social significance as it is an increasingly uncommon site type, and has a finite life span.

#### **Historical significance**

- The site does not meet this criterion as there is no traditional knowledge or literary evidence of association of this site with historical (post-contact) times.

### **Scientific significance**

- The site has moderate scientific significance as it is ranked as having low integrity, no structure (as structure cannot be assessed for scarred trees), low-moderate contents and moderate-high representativeness/rarity. The scarred portion of the tree has rotted away, leaving only a frame displaying three edges of the scar, and only a younger offshoot of the tree is still living, giving the tree a low level of integrity and low-moderate contents. Scarred trees are increasingly uncommon site types locally and within NSW, therefore Rudgley Scarred Tree 2 has a moderate-high representativeness/rarity rating. The tree is located on a raised sandy plain on the bank of a gully feeding a large swampy area that flows into Saltwater Creek, and thus has some limited potential for local educational purposes in relation to traditional Aboriginal use of swamp resources.

### **Aesthetic significance**

- The tree has low aesthetic significance as it provides some visual distinction in the landscape.

### **Summary statement of significance**

- Overall, Rudgley Scarred Tree 2 is of moderate significance at the local level. The site is of moderate social significance and has moderate scientific significance due primarily to the rarity of scarred trees. The tree has low aesthetic significance as it provides some visual distinction in the landscape.

#### **5.2.11. Rudgley Site 1a and 1b (AHIMS ID: 04-4-0167)**

No new finds were made for this site, the significance remains unchanged – please see the working paper (SKM 2012) for the detailed significance assessment.

#### **5.2.12. Saezza 1 (AHIMS ID: 04-4-0171)**

No new finds were made for this site, the significance remains unchanged – please see the working paper (SKM 2012) for the detailed significance assessment.

#### **5.2.13. Site 12 (AHIMS ID: 04-4-0176)**

No new finds were made for this site, the significance remains unchanged – please see the working paper (SKM 2012) for the detailed significance assessment.

## 5.3. Summary

The summary of the significance assessment of Aboriginal cultural places and archaeological sites is shown in Table 5-1.

**Table 5-1 Summary of significance assessment of sites/places**

AHIMS ID	Name	Scientific significance	Social significance	Aesthetic significance	Historical significance	Overall significance
N/A	Cooks Hill to Teven Junction	N/A	Moderate-high	Moderate	Low	Moderate
N/A	Cooks Hill Corridors of Movement	Moderate	Moderate	None	None	Moderate
N/A	Cooks Hill Massacre Site	High	Moderate-high	None	None	High
N/A	Cooks Hill Camp Sites	High	Moderate	None	Low	Moderate-high
13-1-0109	E2/2	Moderate	Moderate-high	Low	Moderate-high	Moderate-high
pending	Eversons Swamp 1	Moderate	Moderate-high	Low	Low	Moderate
04-4-0179	Site 1	Low	Low-moderate	Low	None	Low-moderate
pending	Rudgley Scarred Tree 2	Moderate	Moderate	Low	None	Moderate
04-4-0169	Rudgley Site 2	Low-moderate	Moderate	Low	None	Low-moderate
04-4-0170	Rudgley Scarred Tree	Moderate-high	Moderate-high	Low	None	Moderate-high
04-4-0167	Rudgley Site 1a and 1b	Low	Low-moderate	None	None	Low
04-4-0171	Saezza 1	Low-moderate	Moderate	Low	None	Moderate
04-4-0176	Site 12	Low-moderate	Moderate	Low	None	Moderate

## 6. Impact assessment

The potential impact to Aboriginal cultural places and archaeological sites recorded within or near the study area has been considered. This chapter looks specifically at those areas where:

- Avoidance of a site or place may occur, and the site may fall wholly outside proposed design changes, or some portion may remain within proposed design changes but be avoided by construction.
- A site or place may not be directly impacted, but may be at risk of indirect impacts, such as a culturally sensitive place becoming more visible or accessible due to the construction of the project.
- Partial impact to a site or place may occur, with avoidance to part of the site.
- Impact may be unavoidable, and the site is likely to be totally destroyed.

Some of these potential impacts are avoidable through suitable management measures.

### 6.1. Approach

Impact is assumed to extend about 10 metres from the edge of all proposed design changes (to allow for construction footprint activities, as per the buffer distance provided for the concept design assessed in the EIS). Where a place or site occurs inside or within 25 metres of a proposed design change, the potential for indirect impact is also considered. Where sites and/or places occur within, but only near the edge of study areas, avoidance measures are suggested, and expanded upon in Chapter 7. Adjustments to the construction footprint within the study area may be possible to avoid impact to some of these sites – this option should be explored during detailed design wherever possible, before mitigation is considered.

During the investigations, RMS determined not to pursue the quarry sites at Cooks Hill. Only the design change at Coolgardie Road, the relocation of the rest area north of Old Bagotville Road, and the quarries at Old Bagotville Road would be included in the project approval.

### 6.2. Impacts

#### 6.2.1. Coolgardie interchange

As a result of the proposed design changes now being considered, indirect impact is possible (although easily avoided) to one site (Rudgley Scarred Tree 2) from the Coolgardie interchange design change. No new sites are directly impacted. One site (Rudgley Site 2) is likely to be subject to increased impact by the proposed design change – these impacts are considered acceptable with impact minimisation and mitigation (see Chapter 7). Impact would now be avoided for Site 12, and reduced for Site 1 and Rudgley Site 1a and 1b. One Aboriginal cultural place (Cooks Hill to Teven Junction cultural landscape) may be indirectly impacted by design changes, but the impact would be consistent with that assessed for the overall project and detailed within the working paper.



There would be a small (but not significant) decrease in the cumulative impact of the project as a result of the proposed design changes. This is as a result of the overall decrease in impacts to archaeological sites (ie Site 1, Rudgley Site 1a/b, and Site 12).

The Ngunya Jargoona IPA would not be directly impacted by the project, due to impact avoidance design measures (a concrete retaining wall at Old Bagotville Road). There is some potential for indirect impact to fauna moving into/from the IPA, this would be minimised by the installation of fauna fences, and investigation into the possibility of installing a fauna overpass/underpass (culvert) in the vicinity of the IPA. A temporary sediment basin that is within the concept design would need to be shifted to avoid impacts to the IPA.

There is low-moderate potential for unknown Aboriginal heritage within Lot 2 DP543525, and hence a low-moderate potential for impacts to Aboriginal heritage in this area.

### **6.2.2. Rest area at Old Bagotville Road**

This site could not be accessed due to access permission unavailable. Much of the properties were inspected from the boundary and were not considered sensitive for Aboriginal heritage sites. No known Aboriginal heritage sites or places would be impacted by this design change. There is low-moderate potential for unknown Aboriginal heritage within both of these lots, and hence a low-moderate potential for impacts to Aboriginal heritage in this area.

Since the review of the CHAR by the RAPs, a decision was made to move the northbound rest area further south to around chainage 148.5. This north bound rest area now falls within the EIS project boundary. No Aboriginal heritage sites are located within the new location of the northbound rest area. Although the Cooks Hill to Teven Junction landscape would be impacted by the design change, the impact would not be changed by the design change, as the impact is shifting within the same landscape.

### **6.2.3. Quarries at Old Bagotville Road**

No sites would be impacted within the construction footprint of these two quarry sites. The quarries are located within the Cooks Hill to Teven Junction landscape, which has been identified to be a culturally significant landscape. However, as the proposed locations are existing quarries, no increase in impact to this landscape is likely from the use of these quarries in the project.

**Table 6-1 Potential impacts to archaeological sites and Aboriginal cultural places**

Section(s)	Investigation site	AHIMS ID	Name	Overall significance	Site type	Impact	Description
9,10, 11	All design changes in this CHAR	N/A	Cooks Hill to Teven Junction	Moderate	Aboriginal cultural place	Direct	Unavoidable partial impact to this landscape as it encompasses whole region. The proposed design changes would result in no substantive change of impacts to the cultural heritage values additional from those proposed for the project (see the working paper).
9	Quarry Cooks Hill	N/A	Cooks Hill Corridors of Movement	Moderate	Aboriginal cultural place	None	No impact from the proposed design changes, as this design change is no longer being considered.
9	Quarry Cooks Hill	N/A	Cooks Hill Massacre Site	High	Aboriginal cultural place	None	No impact from the proposed design changes, as this design change is no longer being considered.
9	Quarry Cooks Hill	N/A	Cooks Hill Camp Sites	Moderate-high	Aboriginal cultural place	None	No impact from the proposed design changes, as this design change is no longer being considered.
9	Quarry Cooks Hill	13-1-0109	E2/2	Moderate-high	Artefact scatter	None	No impact from the proposed design changes, as this design change is no longer being considered.
9	Quarry Cooks Hill	pending	Eversons Swamp 1	Moderate	Scarred tree	None	No impact from the proposed design changes, as this design change is no longer being considered.
10	Rest area at Old Bagotville Road	N/A	Ngunya Jargoan Indigenous Protected Area	Moderate (estimated)	Indigenous Protected Area	None	No impact from the proposed design changes, as this design change is no longer being considered. Unmitigated impacts from the project as described in the working paper are likely to total less than 1% of the total protected area. These impacts may be able to be avoided in detailed design – this option is being pursued. No Aboriginal heritage sites have been identified within the areas potentially impacted.

Section(s)	Investigation site	AHIMS ID	Name	Overall significance	Site type	Impact	Description
10	Coolgardie interchange	04-4-0179	Site 1	Low-moderate	Artefact scatter	Direct	<p>A decrease in impact to this site is likely based on the proposed design change. The impacts to this site would be reduced from the working paper (100% impact) down to around 85%.</p> <p>The result would be the excavation for the construction of road of around 85% of the site and irreversible impact to this part of its heritage values.</p> <p>A small part (15%) of the site is outside the construction footprint and will not be directly or indirectly impacted by the project.</p>
10	Coolgardie interchange	pending	Rudgley Scarred Tree 2	Moderate	Scarred tree	Indirect	<p>No direct impacts to this place are likely from the proposed design change, as although the tree and its canopy are located within the boundary of the design change, the tree is able to be retained within the road boundary without direct impact. If not protected, there is the potential for impact to the tree's root system, and from associated construction activities, such as vehicle movement.</p>
10	Coolgardie interchange	04-4-0169	Rudgley Site 2	Low-moderate	Artefact scatter	Direct	<p>An increase in impact to this site is likely from the proposed design change from 20% to 40%.</p> <p>The result would be the excavation for the construction of road of around 40% of the site and irreversible impact to this part of its heritage values.</p> <p>Much (60%) of the site is outside the construction footprint and will not be directly or indirectly impacted by the project.</p>
10	Coolgardie interchange	04-4-0170	Rudgley Scarred Tree	Moderate-high	Scarred tree	None	<p>Based on the proposed design change, this site would no longer be within the boundary of the project, and would not be impacted by the project.</p>

Section(s)	Investigation site	AHIMS ID	Name	Overall significance	Site type	Impact	Description
10	Coolgardie interchange	04-4-0167	Rudgley Site 1a and 1b	Low	Artefact scatter	Direct	<p>A significant decrease in impact to this site is likely based on the proposed design change. The impacts to this site would be reduced from the working paper (50% impact) down to around 5%. Fencing would be required to ensure impact from associated activities is avoided to the remaining 95% of the site.</p> <p>The result would be the removal (for road cutting) of around 5% of the site and irreversible impact to this part of its heritage values.</p> <p>Most (95%) of the site is outside the construction footprint and will not be directly or indirectly impacted by the project.</p>
10	Coolgardie interchange	04-4-0171	Saezza 1	Moderate	Artefact scatter	Direct	<p>An increase in impact to this site is likely from the proposed design change from 0% to up to 30%.</p> <p>The result would be the excavation for the construction of a roundabout at the Coolgardie Road interchange of up to 30% of the site and irreversible impact to this part of its heritage values.</p> <p>Much (70%) of the site is outside the construction footprint and will not be directly or indirectly impacted by the project.</p>
11	Coolgardie interchange	04-4-0176	Site 12	Moderate	Artefact scatter	None	<p>Based on the proposed design change, this site would no longer be within the boundary of the project, and would no longer be impacted by the project.</p>



## 7. Management recommendations

### 7.1. Introduction

The following recommendations relate to new sites, sites updated by the results of field assessment described in this report, and sites previously recorded but within design changes. These recommendations were drafted in consultation with RAP site officers during field investigations. The general and specific management requirements in the working paper also extend to the proposed design changes, as these would form part of the overall project – the management recommendations must therefore be read with Chapter 9 of the working paper (SKM 2012), as many relevant details are included there that are not repeated here.

These recommendations have been developed based on the impact and significance assessments and in consultation with relevant RAPs. All recommendations were distributed as part of a draft version of this CHAR to RAPs for comment.

### 7.2. Specific management requirements

#### 7.2.1. Archaeological sites

##### 7.2.1.1. Impact avoidance/minimisation

In general the first principle of cultural heritage management is impact avoidance, then minimisation before mitigation. *If it is not possible to completely avoid sites, then mitigation is required for parts of sites not impacted.*

Where complete avoidance of sites by the project is not possible, mitigation actions required for impacted areas of each of the archaeological sites are presented in Table 7-1. Recommendations presented in Table 7-1 add to and/or update those in the working paper (SKM 2012) – where recommendations appear for a site mentioned in the working paper, the recommendations here add to those in the working paper, or in some specified instances these recommendations supersede those in the working paper (SKM 2012). Management recommendations have been drafted in accordance with the amount of impact to the site and the significance of the site. All management recommendations was presented to relevant registered Aboriginal parties, and their comments considered and where possible incorporated into the recommendations.

If avoidance of impact to any site (eg through exclusion zones and/or realignment) becomes possible after finalisation of this report, then mitigation is not required for that site. All exclusion zones established would be marked on the ground (preferably by high visibility construction webbing) and on construction plans.

Any impact proposed beyond those assessed in this report or beyond the boundary of the project must be subject to assessment and consultation with RAPs, consistent with the process in this report.

### 7.2.1.2. Salvage quotas

Salvage excavation quotas for archaeological sites are (unless otherwise specified) generally presented as a percentage of the portion of the site to be impacted, to account for the fact that proposed design changes are at concept design stage, and have not been subject to detailed design, which may result in increases or decreases in impact. This allows for reduction/avoidance of impacts to sites, and subsequent modifications to the management measures.

Where the proposed impact area to a site is less than the salvage excavation quota (if the quota is stated in *square metres*), the entire impact area would be salvaged. Where the proposed impact area to a site is less than the estimated impact (if the quota is stated in *square metres*) presented in this report, but is greater than the salvage excavation quota, the quota would stand. Where a *percentage* quota is stated and the proposed impact area to a site is 10 square metres or less, the entire impact area would be salvaged, with the approximate proportions of hand and machine excavation maintained as per the excavation quota proportions (with a minimum of one square metre of hand excavation where this method is required). Where a *percentage* salvage quota is stated, and the proposed impact area to a site is greater than the estimated impact presented in this report, the percentage quota would stand, with the approximate proportions of hand and machine excavation maintained as per the excavation quota proportions. Where the quota is stated in *square metres* and the proposed impact area to a site is greater than the estimated impact area presented in this report, the quota should be revised in consultation with the RAPs relevant to the area.

Where artefact concentrations per square metre (over all depths) encountered are 50 per cent greater than previously encountered, additional hand-tool salvage excavation must be undertaken. If these artefact concentrations are encountered during machine excavation, then machine excavation must stop within 20 metres, and hand-tool excavation must proceed to define the extent of the concentration within the boundary of the project. Other features that would trigger such additional salvage excavation include, encountering:

- An *in situ* lithic flaking floor feature.
- Remains of a hearth in a relatively *in situ* condition.
- *In situ* non-human bone relating to Aboriginal occupation.
- Midden deposit.

Up to but no more than an additional six square metres would be excavated in this situation at that location, unless rare features are encountered (or there are disputes regarding the amounts of additional excavation), in which case discussions with the registered Aboriginal parties and OEH should be undertaken to agree on a suitable approach.

### 7.2.1.3. Salvaged material

For all salvaged material, suitable storage would be agreed upon with the RAPs prior to commencing salvage in those areas. If it is determined that the objects would be removed from the proposed design changes to be transferred to a separate safe storage location (temporarily or permanently), the curator of these objects would be required to ensure they comply with Section 85A of the *National Parks and Wildlife Act 1974*. This would involve the submission to OEH of a Care Agreement application which must also include an accurate catalogue of any objects collected/transferred.

#### **7.2.1.4. Aboriginal cultural heritage induction**

The RAPs wanted to reiterate that they feel all staff and contractors involved in the project should take part in a cultural and heritage awareness induction, that is at least in part conducted by local Aboriginal people, and that all personnel have this induction with local Aboriginal people in order to appreciate the cultural significance to the local Aboriginal population.

#### **7.2.2. Quarries at Old Bagotville Road**

No sites were recorded at the quarries along Old Bagotville Road. It is recommended that the edges of the quarry area that are vegetated and currently undisturbed are avoided and not impacted. This was requested by the Aboriginal Site Officers during field survey.

**Table 7-1 Management requirements for archaeological sites**

Project section	Investigation site	Name (AHIMS ID)	Site type	Overall significance	Impact	Mitigation strategy/ recommendations
9	Quarry Cooks Hill	13-1-0109	E2/2	Moderate-high	0 %	No impact - no change to recommendations in working paper
9	Quarry Cooks Hill	pending	Eversons Swamp 1	Moderate	0 %	No impact - no change to recommendations in working paper
10	Rest area at Old Bagotville Road	Lot 2 DP787102	Not subject to field assessment	Low-moderate	-	This property could not be accessed for field investigations. As it occurs in an area of low-moderate Aboriginal heritage potential, there is some potential for archaeological evidence to occur here. Consequently, it is recommended that survey, and if necessary test excavation, is undertaken to determine the presence and extent of potential archaeological evidence here. This would be conducted in accordance with the methodology used here and in the working paper, and would occur several months prior to ground disturbing works for the project and/or proposed design change. Further recommendations for the site would then be made in consultation with the RAPs.
10	Rest area at Old Bagotville Road	Lot 109 DP113797 5	Not subject to field assessment	Low-moderate	-	This property could not be accessed for field investigations. As it occurs in an area of low-moderate Aboriginal heritage potential, there is some potential for archaeological evidence to occur here. Consequently, it is recommended that survey, and if necessary test excavation, is undertaken to determine the presence and extent of potential archaeological evidence here. This would be conducted in accordance with the methodology used here and in the working paper, and would occur several months prior to ground disturbing works for the project and/or proposed design change. Further recommendations for the site would then be made in consultation with the RAPs.
10	Rest area at Old Bagotville Road	N/A	Ngunya Jargoan Indigenous Protected Area	Moderate (estimated)	0 %	This site would not be impacted by the proposed design change. The 0% impact is based on design adjustments that would avoid impact to the IPA (such as retaining walls, and relocation of a sediment basin). There is some potential for indirect impact to fauna moving into/from the IPA, this would be minimised by the installation of fauna fences, and investigation into the possibility of installing a fauna overpass/underpass (culvert) in the vicinity of the IPA. A temporary sediment basin that is within the concept design would be shifted during detailed design to avoid impacts to the IPA.



Project section	Investigation site	Name (AHIMS ID)	Site type	Overall significance	Impact	Mitigation strategy/ recommendations
10	Coolgardie interchange	Lot 2 DP543525	Not subject to field assessment	Low-moderate	-	This property could not be accessed for field investigations. As it occurs in an area of low-moderate Aboriginal heritage potential, there is some potential for archaeological evidence to occur here. Consequently, it is recommended that survey, and if necessary test excavation, is undertaken to determine the presence and extent of potential archaeological evidence here. This would be conducted in accordance with the methodology used here and in the working paper, and would occur several months prior to ground disturbing works for the project and/or proposed design change. Further recommendations for the site would then be made in consultation with the RAPs.
10	Coolgardie interchange	04-4-0179	Site 1	Low-moderate	85 %	No change from recommendations in the working paper.
10	Coolgardie interchange	pending	Rudgley Scarred Tree 2	Moderate	0 %	An exclusion zone would be established at 5 m from the boundary of Rudgley Scarred Tree 2. The exclusion zone would consist of fencing (eg high visibility construction webbing) that would exclude entry by people or plant to avoid impact to the site, and would be marked on construction plans.
10	Coolgardie interchange	04-4-0169	Rudgley Site 2	Low-moderate	40 %	<p>Where this site is to be impacted, salvage excavation of the portion of the site to be impacted would be undertaken. This would comprise:</p> <ul style="list-style-type: none"> <li>▪ A total of 40 m<sup>2</sup> to be excavated by machine, or where excavation by machine is not viable (vegetation clearance is likely to be necessary to employ machine excavation), 10 m<sup>2</sup> by hand techniques. This would be undertaken with a mechanical sieve and an excavator (~900 mm bucket)</li> <li>▪ Each excavation would be undertaken in 50 mm spits to sterile base deposits</li> <li>▪ The location of excavations would be decided upon in the field by the archaeologist and RAPs</li> <li>▪ All artefacts which have previously been recorded and reburied during sub-surface testing would be recovered</li> <li>▪ All cultural material recovered during salvage would be removed off-site for detailed analysis. Once analysed the material would be returned to the RAPs for reburial or storage at a chosen location, subject to a care agreement being established</li> </ul> <p>All cultural material recovered would be subject to detailed analysis, which would be included in a technical report, including detailed discussion and interpretation.</p>

Project section	Investigation site	Name (AHIMS ID)	Site type	Overall significance	Impact	Mitigation strategy/ recommendations
10	Coolgardie interchange	04-4-0170	Rudgley Scarred Tree	Moderate-high	0 %	No change to recommendations in working paper
10	Coolgardie interchange	04-4-0167	Rudgley Site 1a and 1b	Low	5 %	No change to recommendations in working paper
10	Coolgardie interchange	04-4-0171	Saezza 1	Moderate	30 %	<p>Where this site is to be impacted, salvage excavation of the portion of the site to be impacted would be undertaken. This would comprise:</p> <ul style="list-style-type: none"> <li>▪ 10 m<sup>2</sup> by hand tools, and 40 m<sup>2</sup> to be excavated by machine. This would be undertaken with a mechanical sieve and an excavator (~900 mm bucket)</li> <li>▪ Each excavation would be undertaken in 50 mm spits to sterile base deposits</li> <li>▪ The location of excavations would be decided upon in the field by the archaeologist and RAPs</li> <li>▪ All artefacts which have previously been recorded and reburied during sub-surface testing would be recovered</li> <li>▪ All cultural material recovered during salvage would be removed off-site for detailed analysis. Once analysed the material would be returned to the RAPs for reburial or storage at a chosen location, subject to a care agreement being established</li> </ul> <p>All cultural material recovered would be subject to detailed analysis, which would be included in a technical report, including detailed discussion and interpretation.</p> <p>The portion of the site that would not be impacted (at least 70%), would be protected by fencing (eg high visibility construction webbing) that would exclude entry by people or plant to avoid impact to the site, and would be marked on construction plans.</p>
11	Coolgardie interchange	04-4-0176	Site 12	Moderate	0 %	<p>This site would no longer be impacted by the project. An exclusion zone would be established at the boundary of the site. If project activity is to occur within 10 m of the site, the exclusion zone would need to consist of fencing (eg high visibility construction webbing) that would exclude entry by people or plant to avoid impact to the site, and would be marked on construction plans.</p>

### 7.2.3. Aboriginal cultural places

*To be updated following RAP review*

Management recommendations for Aboriginal cultural places (as for archaeological sites) were discussed during the field program. No specific recommendations were made for Aboriginal cultural places, beyond that already presented in the EIS (all Aboriginal cultural places impacted by proposed design changes are also impacted by the project), however, discussion focussed on general mitigations and/or offset for loss of cultural resource as a result of impact to Aboriginal cultural places (as well as archaeological sites).

Recommendations included:

- Incorporation of acknowledgement of traditional lands along the highway.
- Inclusion of area specific information at rest areas, acknowledging culturally appropriate places and sites in the nearby area, particularly those impacted by the highway, and the information gathered as part of Aboriginal cultural heritage investigations conducted for the highway upgrade.
- The names of bridges to include culturally appropriate Aboriginal names put forward by the local Aboriginal community.
- Access provided to culturally significant areas.
- Vesting of unused portions of property to Aboriginal community.

## 7.3. Commitments

The measures above, combined with the management recommendations from the working paper, form part of the overall management measures for the project. All management measures for the project are included in the Submissions/Preferred Infrastructure Report.

## 8. References

Australian Government 2011, *Native Title Act 1993*, Australian Government, <http://www.comlaw.gov.au>.

Australian Government, Department of Sustainability, Environment, Water, Population and Communities 2012, *Environmental Protection and Biodiversity Conservation Act 1999*, Australian Government, <http://www.comlaw.gov.au>.

Australian Government, Heritage Division 2005, *Aboriginal and Torres Strait Islander Heritage Protection Act 1984*, Australian Government, <http://www.comlaw.gov.au>.

Australian ICOMOS 1999, *The Burra Charter: The Australia ICOMOS Charter for places of cultural significance*, accessed 21 Jan 2011 at [www.australia.icomos.org/publications/charters/](http://www.australia.icomos.org/publications/charters/).

Craib, J 1992, *A Reconnaissance survey of Aboriginal Archaeological resources in the Wentworth-Gol Gol Area, Western NSW*. Unpublished report to National Parks and Wildlife Service NSW.

DEC 2005, *Interim Community Consultation Requirements for Applicants*, viewed 26 September 2010, <http://www.environment.nsw.gov.au/resources/cultureheritage/interimConsulationGuidelines.pdf>.

DECCW 2010, *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010 (ACHCRP)*, Department of Environment, Climate Change and Water, [http://www.alc.org.au/media/43239/1004\\_per\\_cent20deccw\\_per\\_cent20community\\_per\\_cent20consultation\\_per\\_cent20requirements.pdf](http://www.alc.org.au/media/43239/1004_per_cent20deccw_per_cent20community_per_cent20consultation_per_cent20requirements.pdf).

DECCW 2010, *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales 2010*, Department of Environment, Climate Change and Water, <http://www.environment.nsw.gov.au>.

DECCW 2010, *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales 2010*, Department of Environment, Climate Change and Water 2010, <http://www.environment.nsw.gov.au>.

NSW Department of Planning 2012, *Environmental Planning and Assessment Act 1979*, NSW Wales Government, <http://www.legislation.nsw.gov.au>.

NSW Government 2012, *Aboriginal Land Rights Act 1983*, NSW Government, [http://www.austlii.edu.au/au/legis/nsw/consol\\_act/alra1983201/](http://www.austlii.edu.au/au/legis/nsw/consol_act/alra1983201/)

NSW Government 2012, *Native Title Act (NSW) 1994*, [http://www.austlii.edu.au/au/legis/nsw/consol\\_act/ntswa1994319/](http://www.austlii.edu.au/au/legis/nsw/consol_act/ntswa1994319/). Oakes, 1979, In Herons report on Cult/Hert Values relating to Lismore City Council LGA, Lismore.

OEH 2012, *National Parks and Wildlife Act 1974*, NSW Wales Government, <http://www.legislation.nsw.gov.au/>.

OEH 2012b, *National Parks and Wildlife Amendment Act 2010*, NSW Wales Government, <http://www.legislation.nsw.gov.au/>.



OEH 2012c, *Native Title (NSW) Act 1994*, NSW Government,  
[http://corrigan.austlii.edu.au/au/legis/nsw/consol\\_act/ntswa1994319/](http://corrigan.austlii.edu.au/au/legis/nsw/consol_act/ntswa1994319/)

RMS 2011, *Procedure for Aboriginal and Cultural Heritage Consultation and Investigation*, Roads and Maritime Services, Sydney.

RMS 2011b, *Standard Management Procedure: Unexpected Archaeological Finds*, Roads and Maritime Services,  
[http://www.rta.nsw.gov.au/environment/downloads/unexpected\\_archaeological\\_finds\\_procedure.pdf](http://www.rta.nsw.gov.au/environment/downloads/unexpected_archaeological_finds_procedure.pdf)

RMS (2012) *Upgrading the Pacific Highway Woolgoolga to Ballina Upgrade - Environmental Impact Statement*. November 2012

SKM (Brooke, J, Jenkins, R, Costello, A, Edmonds, V and Goldfarb, A) 2012, *Woolgoolga to Ballina Pacific Highway Upgrade Aboriginal Cultural Heritage Assessment (four sections)*, Report to RMS.

UNESCO 1991, *World Heritage Convention*, viewed 26 September 2010,  
<http://whc.unesco.org/en/conventiontext>.

United Nations 2012, *Declaration on the rights of Indigenous Peoples*,  
[http://www.un.org/esa/socdev/unpfii/documents/DRIPS\\_en.pdf](http://www.un.org/esa/socdev/unpfii/documents/DRIPS_en.pdf).

## Appendix A Desktop assessment

Station	Section	Design change name	Change to boundary of the project	Desktop assessment
155.4-159.5	10,11	Coolgardie interchange	Increase and decrease	<p>The shift of the alignment as part of this design change would shift the boundary of the project, increasing the impact in some locations, and decreasing the impact in other locations.</p> <p>The proposed design change would result in an unknown impact to several areas adjacent to the current boundary of the project. The project would now avoid impact to Site 12, move the boundary of the project further from Rudgley Scared Tree, reduce impact to Rudgley Site 1a/1b, and Site 1, remain avoiding Saezza 1, and increase impact to Rudgley Site 2. The proposed design change would result in no net difference of impact to the Cooks Hill to Teven Junction landscape.</p> <p>The design change would result in an overall net decrease in the impact to known Aboriginal heritage values. Survey, and if necessary test excavation, should be undertaken to determine any unknown impacts to Aboriginal heritage values.</p>
149.0-149.9	10	Rest area at Old Bagotville Road (north)	Increase	<p>The proposed design change would result in an unknown impact to several areas adjacent to the current boundary of the project. These areas are of low and low-moderate Aboriginal heritage potential. Survey, and if necessary test excavation, should be undertaken to determine any unknown impacts to Aboriginal heritage values.</p>
148.3, 148.5, 148.9	10	Quarries at Old Bagotville Road (south)	N/A	<p>This proposed design change is no longer being considered.</p>
143.3-144.7	9	Quarries at Cooks Hill	N/A	<p>This proposed design change is no longer being considered.</p>

## **Appendix B      Consultation details**

Woolgoolga to Ballina Pacific Highway Upgrade  
Aboriginal cultural heritage assessment July 2013

Date	Time	Alliance contact	Method	Contact person	Organisation	Subject
13/2-7/3/2013	All day	Andrew Costello	Field work	Marcus Fergusson and Dean Bolt Lee Laurie and Shane Mcleay Malcolm Brown and Shane Laurie Lois Cook  Doug and Daniel Wilson Rod and Brett Duroux Mark Flanders and Ian Brown Tony Dootson and EJ Williams  Mark Fergusson	Jali LALC  Yaegl LALC  Birrigan Gargle LALC Burabi Aboriginal Corporation Bandjalang People Grafton Ngerrie LALC Coffs Harbour LALC Yarrowarra Aboriginal Corporation Garlambirla Guuyu-girwaa	Design changes survey and test excavation Methodology reconfirmed with RAP Site Officers prior to commencing.
4/3/2013	Morning	Alistair Carr	Field work	Lee Laurie and Shane Mcleay	Yaegl LALC	Design changes survey Methodology reconfirmed with RAP Site Officers prior to commencing.
4/3/2013		Joseph Brooke	Email	All RAPs	All RAPs	Draft CHAR for ancillary facilities and design changes sent to registered Aboriginal parties with request for comment within 28 days
25/6/2013	4pm	Joseph Brooke	Phone	Marcus Fergusson Lois Cook	Jali LALC	Called to check availability for field survey



Date	Time	Alliance contact	Method	Contact person	Organisation	Subject
2/7/2013	5.30pm	Vanessa Edmonds	Phone	Marcus Fergusson	Jali LALC	Marcus called to check about work tomorrow.
3/7/2013	10am	Joseph Brooke	Phone	Marcus Fergusson Lois Cook	Jali LALC	Confirmed meeting this afternoon.
3/7/2013	3pm	Vanessa Edmonds and Joseph Brooke	Meeting	Marcus Fergusson and Dean Bolt Lois Cook	Jali LALC	Met to discuss proposed design changes, and investigation that we're planning to do. Discussed methodology for investigation and areas to be surveyed. Also discussed potential human remains and bora.
4/7/2013	8am-5pm	Vanessa Edmonds and Joseph Brooke	Field work	Dean Bolt Lois Cook	Jali LALC	Confirmed site officers were comfortable with survey methodology prior to commencing. Undertook survey of several properties within proposed design changes around Coolgardie Road and Cooks Hill.
5/7/2013	8am-4pm	Vanessa Edmonds and Joseph Brooke	Field work	Marcus Fergusson and Dean Bolt Lois Cook	Jali LALC	<p>Confirmed site officers were comfortable with survey methodology prior to commencing. Undertook survey of several properties within proposed design changes around Coolgardie Road and Old Bagotville Road. Also inspected potential scarred tree, potential human remains, and potential bora.</p> <p>Potential scarred tree not of cultural origin, though Marcus did not agree. Potential human remains were inspected and were confirmed to be sheep bones.</p> <p>Potential bora location inspected from property boundary (access restriction), and discussed. Marcus said that its similar to one further west (hoop pines around boundary of bora – one to the west has scars on hoop pines) and that he has seen documentary evidence for a bora located here.</p>

Date	Time	Alliance contact	Method	Contact person	Organisation	Subject
9/7/2013	12pm	Joseph Brooke	Phone	Marcus Fergusson	Jali LALC	Discussed potential Wardell Road bora with Marcus. JB said that the record in the <i>Northern Star</i> that Marcus referred JB to, was actually referring to a bora at Pimlico (Pimlico Hall) on the road to Wardell, not on Wardell Road, near Lumley's and Hillside Lanes, where the hoop pines are. Marcus said he would check his records at home, as he believes he has a record that points to a bora on Wardell Road there.
9/7/2013	2pm	Joseph Brooke	Phone	Marcus Fergusson Lois Cook	Jali LALC	Organised Aboriginal site officers for test excavation Tues, Weds, Thurs following week.
9/7/2013	7pm	Joseph Brooke	SMS	Marcus Fergusson	Jali LALC	Joseph asked Marcus for details regarding the reference to a bora ring on Wardell Road.
10/7/2013	1pm	Joseph Brooke	Email	All RAPs	All RAPs	Statement of findings from 4 and 5 July survey. Requested any comments by Monday 15 July.
10/7/2013	2pm	Joseph Brooke	SMS	Marcus Fergusson	Jali LALC	Joseph asked Marcus for details regarding the reference to a bora ring on Wardell Road.
10/7/2013	4pm	Joseph Brooke	Email	Sharon Cook	Burabi Aboriginal Corporation	Statement of findings from 4 and 5 July survey. Requested any comments by Monday 15 July.
11/7/2013	7am	Joseph Brooke	Email	Susan and Doug Anderson	Numbahjing Clan Native Title	Nomination of troy and his cousin as sites officers.
11/7/2013	4pm	Joseph Brooke	Email	Susan and Doug Anderson	Numbahjing Clan Native Title	Response that there are already sufficient site officers for the upcoming work. Also notified that an AFG is coming up in a few weeks.

Date	Time	Alliance contact	Method	Contact person	Organisation	Subject
15/7/2013	5pm	Joseph Brooke	SMS	Marcus Fergusson Lois Cook	Jali LALC	Sent message to reconfirm work tomorrow and meeting time and place.
16/7/2013	9am	Joseph Brooke	SMS	Marcus Fergusson and Dean Bolt Lois Cook	Jali LALC	Sent message to reconfirm work tomorrow and meeting time and place.
16/7/2013	9am	Joseph Brooke	SMS	Marcus Fergusson	Jali LALC	Sent message to say that he and Dean could no longer work today, but would come out tomorrow.
16/7/2013	12.30pm	Joseph Brooke Shoshanna Grounds Alistair Carr Rebecca Andrews	Field work	Lois Cook Anthony Cook Dwayne Cook	Burabi Aboriginal Corporation	Confirmed site officers understood and supported the test excavation methodology before commencing. Undertook sample test-excavation at Pimlico Buffalo 1, Pimlico Hilton 1, and Pimlico Hilton 2 PADs. No artefacts recovered – PADs no longer considered to be constraints. Also undertook survey of Lot62/DPP1088684 (Equestrian centre). No sites or areas of sensitivity recorded.
17/7/2013	8am	Joseph Brooke Shoshanna Grounds Alistair Carr Rebecca Andrews	Field work	Lois Cook Dean Bolt Anthony Cook Dwayne Cook	Jali LALC Burabi Aboriginal Corporation	Confirmed site officers understood and supported the test excavation methodology before commencing. Undertook sample test excavation at Cooks Hill, adjacent to E2/2 site to determine if site extends into adjacent area. Artefacts were identified (and reburied), it was discussed that the boundary of E2/2 would be modified to include this area.
17/7/2013	10am	Joseph Brooke	Phone	Marcus Fergusson	Jali LALC	Spoke to Marcus to organise slashing of potential bora location.

Date	Time	Alliance contact	Method	Contact person	Organisation	Subject
18/7/2013	8am	Joseph Brooke Shoshanna Grounds Alistair Carr Rebecca Andrews	Field work	Lois Cook Dean Bolt Anthony Cook Dwayne Cook	Jali LALC Burabi Aboriginal Corporation	Confirmed site officers understood and supported the test-excavation methodology before commencing. Undertook sample test excavation at PAD at Rudgley Site 2. Discovered several artefacts and pieces of ochre, the boundary of Rudgley Site 2 will be adjusted accordingly. Also undertook inspection and test excavation near a potential bora ring on Wardell Road to check for any material remains present – none were detected. Marcus also mentioned that he would provide Joseph with the reference to a bora ring on Wardell Road from the Northern Star. Nothing was found. Lois said that she didn't believe that a bora existed here, as they were normally up on hills, and she had travelled past this point with her uncle and father many times and they had never told her about a bora here, but had mentioned many others in the region.
19/7/2013	11.30am	Joseph Brooke	Email	Sharon Cook	Burabi Aboriginal Corporation	Email to request that all future correspondence for Burabi Aboriginal Corporation's involvement with SKM is directed to particular email addresses, as Lois Cook is no longer employed by the organisation. Also requested timesheets for this week's work.
19/7/2013	11.30am	Joseph Brooke	Email	Sharon Cook	Burabi Aboriginal Corporation	Replied with hours for Anthony and Dwayne Cook for the last few days of fieldwork.
19/7/2013	2.30pm	Joseph Brooke	SMS	Marcus Fergusson	Jali LALC	Joseph asked Marcus for details regarding the reference to a bora ring on Wardell Road.
23/7/2013	10.30am	Joseph Brooke	Email	Sharon Cook	Burabi Aboriginal Corporation	Sharon asked for hours worked by Burabi workers in last week's excavations.
23/7/2013	11.30am	Joseph Brooke	Email	Sharon Cook	Burabi Aboriginal Corporation	Sharon asked what normal period is for Burabi workers to be paid within.



Date	Time	Alliance contact	Method	Contact person	Organisation	Subject
25/7/2013	11.45am	Joseph Brooke	Email	Sharon Cook	Burabi Aboriginal Corporation	Responded that invoice from Lois for workers has been put through for payment and should hopefully go through within 7 days.
25/7/2013	11.45am	Joseph Brooke	Email	Sharon Cook	Burabi Aboriginal Corporation	Sharon emailed through times for Lois to check that these were accurate.
25/7/2013	11.45am	Joseph Brooke	Email	Sharon Cook	Burabi Aboriginal Corporation	Joseph confirmed that the hours were accurate.
25/7/2013	4pm	Joseph Brooke	Phone	Marcus Fergusson	Jali LALC	Joseph requested the reference in the Northern Star to the potential bora on Wardell road, Marcus said he had asked Rob to email it through, Joseph confirmed that he had not received it. Marcus said he'd give Rob a call to send it through. Joseph thanked Marcus, and said that it was urgent that he get it.
26/7/2013	2pm	Joseph Brooke	SMS	Marcus Fergusson	Jali LALC	Joseph asked Marcus for details regarding the <i>Northern Star</i> reference to a bora ring on Wardell Road.
29/7/2013	2.30pm	Joseph Brooke	Phone	Marcus Fergusson	Jali LALC	Joseph left a voice message for Marcus, asking for details regarding the <i>Northern Star</i> reference to a bora ring on Wardell Road, and said that he needed it today or tomorrow.
6/8/2013	1pm	Joseph Brooke	Email	All RAPs	All RAPs	Distribution of second addendum CHAR with results and recommendations from assessment of proposed design changes
7/8/2013	10am	Joseph Brooke, Vanessa Edmonds	Meeting	Lois Cook Marcus Fergusson and Dean Bolt Simon Wilson, Rowena Mitchell and Graham Purcell	Jali LALC  RMS	Aboriginal focus group meeting to discuss the results and recommendations from assessment of proposed design changes. Several comments regarding impacts to fauna from proximity of the project to the Ngunya Jargoona IPA – discussed design features in place (eg fauna fence, culvert underpasses, retaining walls) to minimise any indirect impact. Marcus Fergusson said that he would send through data captured on fauna camera traps (predominantly potoroos) from locations within the IPA.

Date	Time	Alliance contact	Method	Contact person	Organisation	Subject
8/8/2013	1pm	Joseph Brooke	Email	All RAPs	All RAPs	Notification and redistribution of CHAR with minor update regarding impact to Saezza 1 site.
13/8/2013	4pm	Garry McPherson	Email and letter	All RAPs	All RAPs	Letter that the Old Coolgardie Road quarries would now be included as part of the design changes in the CHAR, but that no impact to Aboriginal sites was likely from these changes. Note that CHAR would be updated following the RAP review of the CHAR.
20/8/2013	4pm	Joseph Brooke	Phone	Marcus Fergusson	Jali LALC	Notice that Joseph had not yet received the information regarding Wardell Road and a potential bora there. Marcus said that he would chase it up and try to make sure it gets through by tomorrow.
4/8/13	2pm	-	-	All RAPs	All RAPs	No comment had been made 30 days since the CHAR was distributed

# MEETING MINUTES



<b>Name of meeting:</b>	Aboriginal Focus Group Woodburn to Ballina
<b>Location of meeting:</b>	Kentwell Community Centre, Ballina
<b>Meeting facilitator:</b>	Woolgoolga to Ballina Planning Alliance
<b>Date:</b> 7 August 2013	<b>Time:</b> 10.00am
<b>Attendees:</b>	Lois Cook (LC) Dean Bolt, Jali LALC (DB) Marcus Ferguson, Jali LALC (MF) Vanessa Edmonds, Alliance archaeologist (VE) Joseph Brooke, Alliance archaeologist (JB) Graham Purcell, RMS Aboriginal Cultural Heritage Officer (GP) Garry McPherson, RMS Interface Manager (GM) Simon Wilson, RMS Project Development Officer (SW) Rowena Mitchell, RMS Environmental Advisor (RM)

Item	Action
<p><b>Welcome</b></p> <p>Introductions were made. Vanessa Edmonds (VE) acknowledged the traditional owners of the land. The purpose of the meeting is to go through the findings and recommendations in the addendum Cultural Heritage Assessment Report (CHAR).</p> <p>Simon Wilson provided a project update. He explained that RMS has received a number of submissions to the Environmental Impact Statement. In response to that RMS has made some design changes. We are hoping to submit the Submissions report and the Preferred Infrastructure Report (PIR) before the end of the year and to have project approval by the end of year.</p> <p>RMS has funding to do some early works, once project approval is granted. This includes soft soil sites. This involves sourcing fill from a location yet to be determined (to be worked out in detailed design) and then placing the fill on soft soil sites as embankments. This has to be done early so the soil has time to settle.</p> <p>RMS will organise another Aboriginal Focus Group meeting to discuss the PIR later this year.</p>	<p>GM/SW to organise further AFGs to discuss PIR and submissions</p>

	report.
<p><b>Addendum Cultural Heritage Assessment findings</b></p> <p>Joseph Brooke explained the CHAR process and the consultation, investigation and field work undertaken. He explained each of the design changes:</p> <ul style="list-style-type: none"> <li>• Area north and south of Coolgardie Road</li> <li>• Old Bagotville Road (north) rest area</li> <li>• Old Bagotville Road quarries – <b>no longer being considered.</b></li> <li>• Cooks Hill quarries – <b>no longer being considered.</b></li> </ul> <p>JB explained that the design changes at Old Bagotville Road quarries and Cooks Hill quarries are no longer being considered. However, the assessment is still included in the report because the work was done.</p> <p>In summary there were 5 new potential archaeological deposits (PADs) identified. Two of those were extensions of existing PADs (Rudgley Site 2 and E2/2). There were 3 new PADs, but these were not confirmed as sites at the survey stage. (Pimlico Hilton 1 and 2 and Pimlico Buffalo 1). There were no finds at Wardell Road.</p> <p>40% of Rudgley site 2 and 30% of Saezza 1 is likely to be directly impacted. Rudgley Scarred Tree 2 is within the project boundary but it will be avoided.</p> <p>Marcus Ferguson (MF) asked about access to Boundary Creek. He wants the community to be able to access it (without needing a key to unlock gates).</p> <p>JB confirmed that RMS is still considering this issue and we will continue to discuss it at future AFGs. SW said it will be worked on in detailed design.</p> <p>MF reiterated that they need access along the cane fields near Legges Trail and along North Boundary Trail to the beach.</p> <p>JB continued to describe the CHAR findings. He said they couldn't access the property where the Old Bagotville Rd north rest area is located, but they walked along and looked at it. JB said he didn't think it looked sensitive and asked the stakeholders what they think.</p> <p>MF asked what fauna connectivity is being provided near Old Bagotville Road. He is concerned about the potoroos.</p> <p>SW said there are no underpasses in the area currently. RMS is looking at putting something in at around CH 147400 (in the vegetated area). It will probably be a fauna overpass and a couple of culverts. It's being worked on and will be included in the PIR</p>	



<p>design.</p> <p>MF said he could provide RMS with long-nosed potoroo monitoring data from that area. Mick Anderen has been studying potoroos for a while. MF said there have been heaps of koalas out near Ghan's Road.</p> <p>SW said fauna fencing will be erected along there to channel fauna into the crossing structures.</p> <p>JB asked again about what the stakeholders think about the rest area? MF said there's potoroos all around there. He would like to go back and have a look at the rest area site.</p> <p>JB said this will be done when we can get access to the property or when RMS purchases the property.</p> <p>SW mentioned that the Indigenous Protected Area (IPA) will not be acquired as part of the project. A temporary water quality basin is required in the area for construction only. The location of the basin will be reviewed in detailed design to avoid impact on the IPA.</p> <p>MF said the geotech crew got coral in their core samples. He would like to know what date it is. VE said it would probably be too old for dating.</p> <p>Lois Cook (LC) said RMS should make sure that we don't change the environment near the Rudgley Scarred Tree 2, even though we're not impacting on it. She referred to indirect impacts such as changed drainage, wind impact etc.</p> <p>JB said Rudgley site 2 will now be 40% impacted. Rudgley site 1a/b will have a decrease in impact down to about 5%. The part of the sites not impacted will be protected with fencing during construction. He asked the group if this sounded OK? MF said yes.</p> <p>JB explained that the version of the addendum CHAR sent out prior to this meeting stated that there would be no impact on Saezza 1 site. However, the proposed design change is likely to impact on up to 30% of the site. MF asked if we could get some dating off the material salvaged? JB said yes, we'll do that for all sites (where there's material that's suitable). Dean Bolt (DB) asked if the excavation area would be the size of this room? JB said no it'll be smaller, 10 x 1 metre. VE said it'll be approximately 10% of the impact area (ie 10% of the 30% impacted).</p> <p>JB said site 12 will now be avoided. It will be protected with fencing during construction.</p>	<p>MF to provide long-nosed potoroo monitoring data to RMS.</p> <p>RMS to organise survey of Old Bagotville Road rest area when access is available.</p> <p>JB to update addendum CHAR to include LC's comment and a management measure to organise an arborist's assessment of Rudgley Scarred Tree 2.</p> <p>JB to update addendum CHAR to reflect Saezza 1 change and redistribute to stakeholders.</p>
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<p>LC requested that if any new sites come up, the Aboriginal stakeholders are notified straight away. JB confirmed that this would be done – it's part of the process.</p> <p>SW confirmed that RMS will maintain communication and consultation with this group throughout the detailed design phase, early works etc.</p> <p>Graham Purcell (GP) asked if the sites that haven't been surveyed are captured in the CHAR somewhere as work still to be done. JB said the sites that need more survey are identified in the CHAR.</p>	
<p>Meeting closed 11.30am</p>	



13 August 2013

RAP  
Address  
Address

### **Woolgoolga to Ballina Planning Alliance – update to design change CHAR**

This letter is to inform registered Aboriginal parties of a minor amendment to the design described within the CHAR sent 8 August 2013, for Aboriginal stakeholder review. The proposed change would have two quarries along Old Bagotville Road included as part of the project. This is as a result of the ownership of these existing quarry sites recently being transferred to RMS. Details on the design change are provided below.

#### **2. Assessment**

##### **2.1 Field survey**

Two properties (Lot 3 DP619233 and Lot 2 DP585377) along Old Bagotville Road are included. Ground survey for these properties were undertaken to assess whether any Aboriginal heritage may be impacted by the quarries. As detailed in the CHAR, survey was carried out on 3-5 July 2013 with Aboriginal Site Officers. No sites were recorded during this survey.

##### **2.2 Impacts**

No sites would be impacted within the construction footprint of these two quarry sites. The quarries are located within the Cooks Hill to Teven Junction landscape, which has been identified to be a culturally significant landscape. However, as the proposed locations are existing quarries, no increase in impact to this landscape is likely from the use of these quarries in the project.

##### **2.3 Recommendations**

No sites were recorded at the quarries along Old Bagotville Road. It is recommended that the edges of the quarry area that are vegetated and currently undisturbed are avoided and not impacted. This was requested by the Aboriginal Site Officers during field survey. In accordance with the EIS, if necessary an unexpected finds procedure would be implemented during construction.

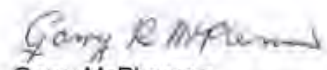
In undertaking your review, please note the proposal to include these quarries at Old Bagotville Road. As previously advised, please provide comment on the CHAR by Monday

**Roads & Maritime Services**

2 September 2013 or sooner, to allow RMS time to consider. If you have any questions, please do not hesitate to contact the project team on 1800 778 900, or alternatively you are welcome to contact myself on the number provided below.

Thank you.

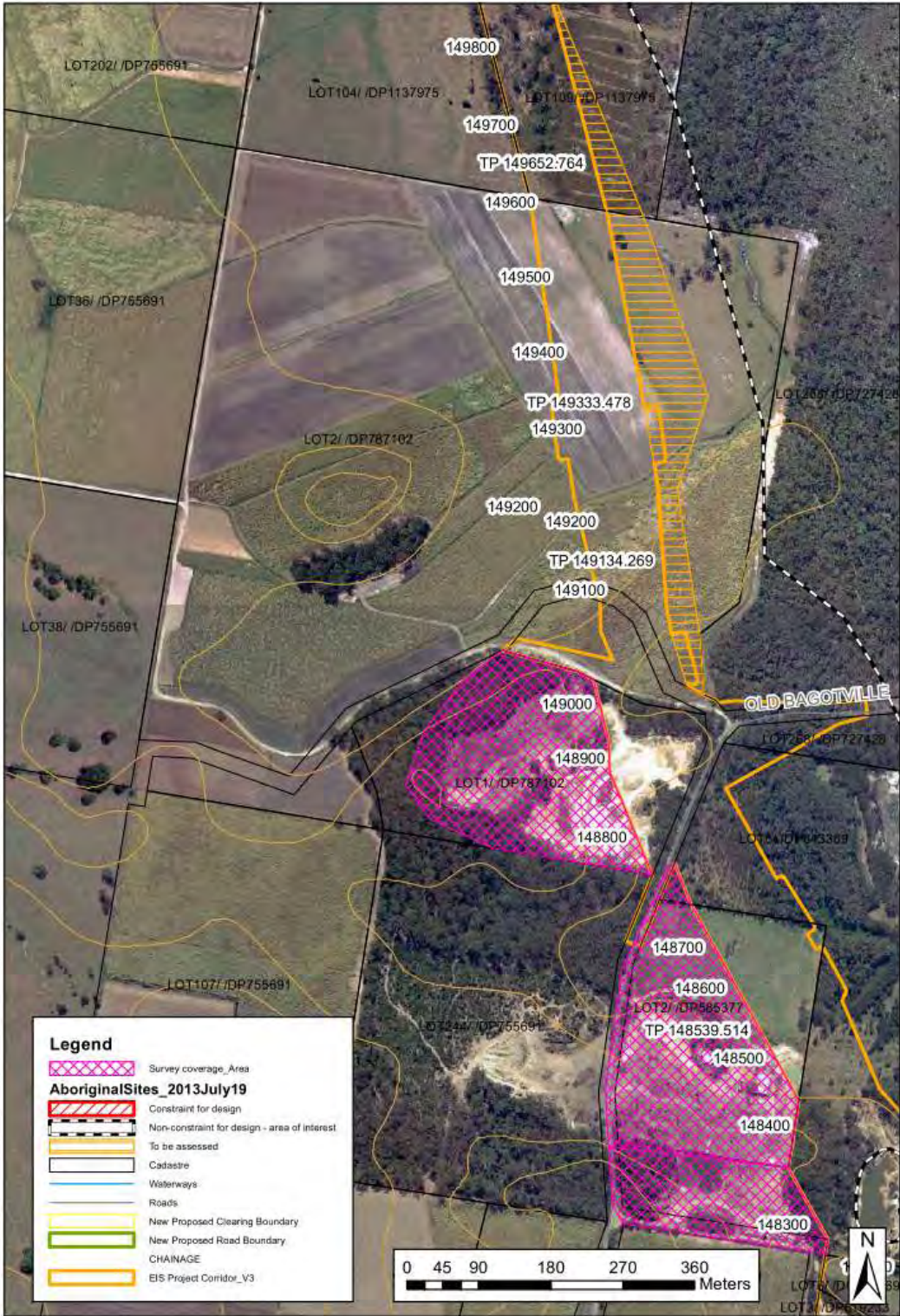
Yours sincerely

  
Garry McPherson  
Project Development Manager  
Pacific Highway  
0439 494015



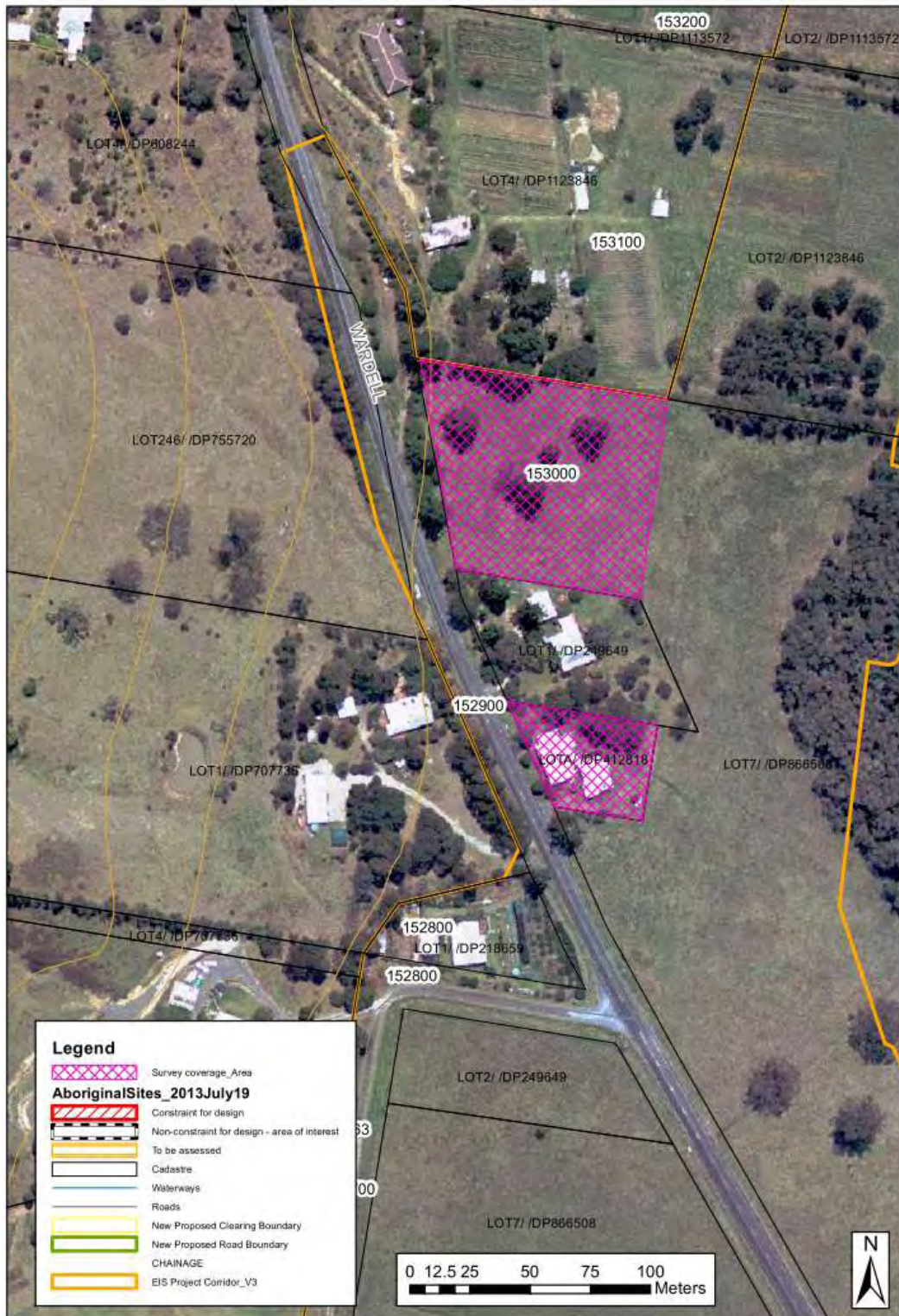
# Appendix C Survey coverage figures

This figure has been removed as it includes culturally sensitive information  
Cooks Hill



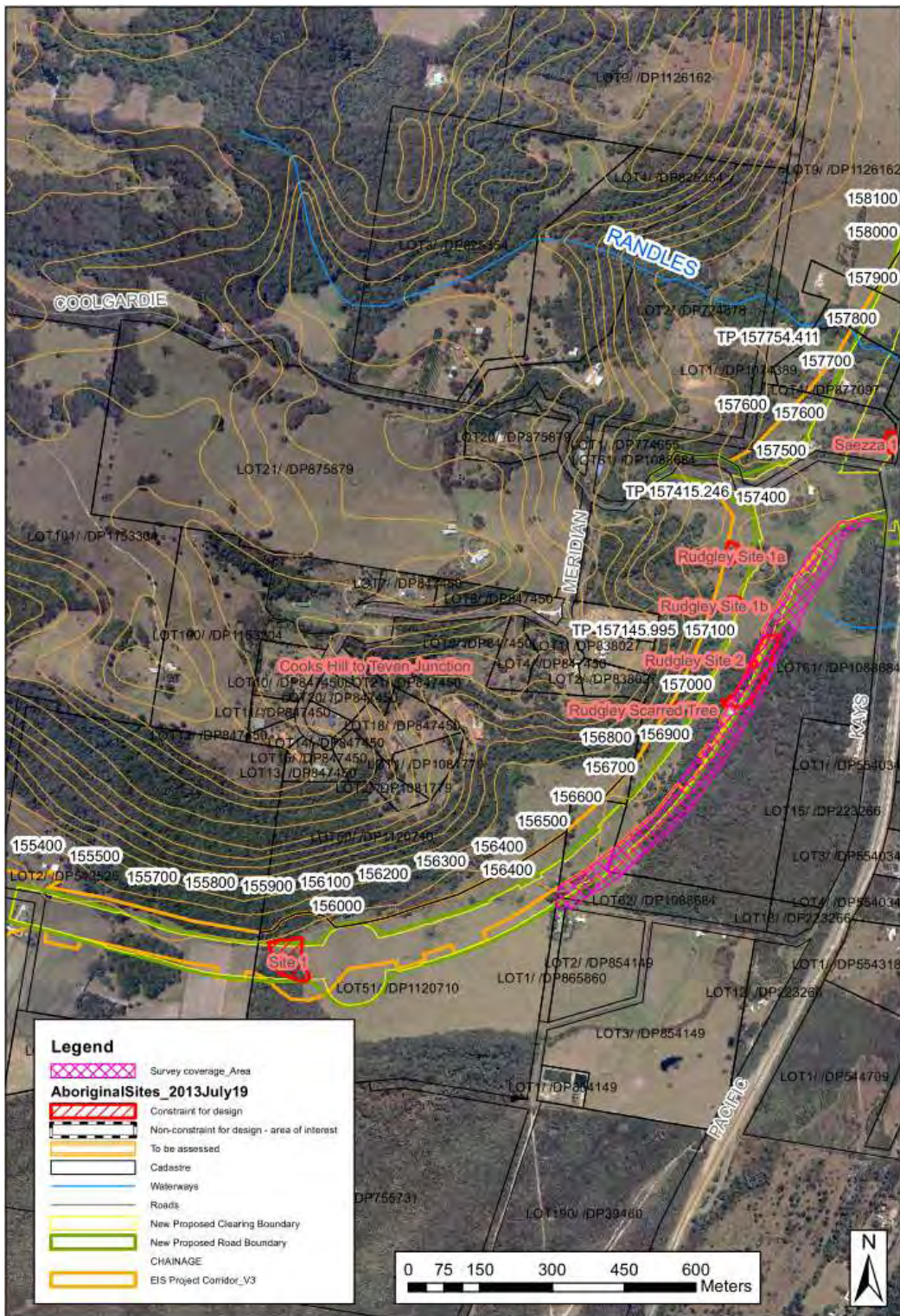
Old Bagotville Road





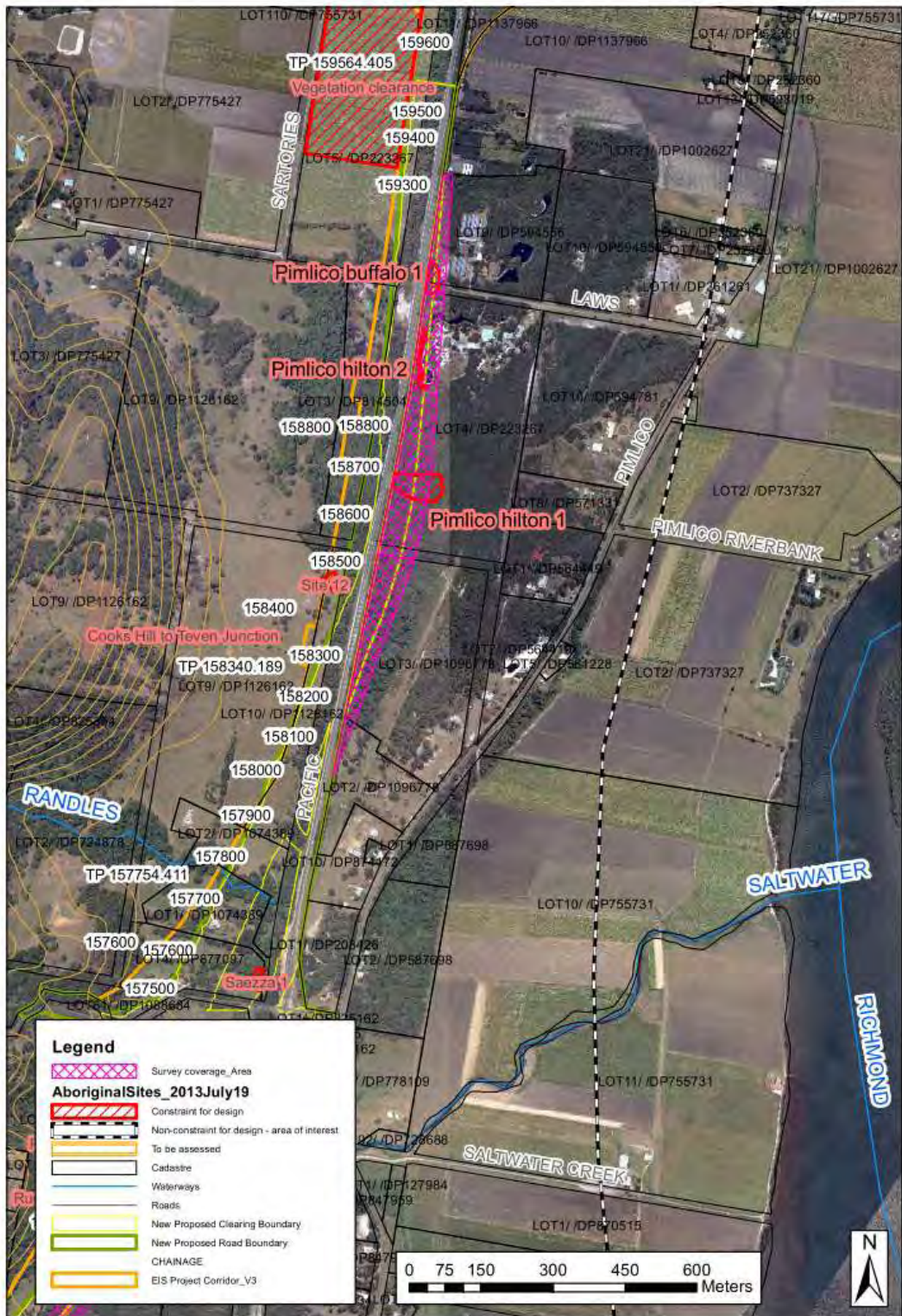
Wardell Road additional investigation areas





Coolgardie interchange (part 1)





Coolgardie interchange (part 2)

# Appendix D Survey details

Woolgoolga to Ballina Pacific Highway Upgrade  
 Aboriginal cultural heritage assessment July 2013

Design change	Property/s	Survey area (m <sup>2</sup> )	Site/PAD name (AHIMS ID)	Landform	Ground surface visibility	Sub surface exposure	Disturbance
Coolgardie interchange	Lots 2 and 3 DP1096778	19,005	None	Swamp (100%)	20 - 40 %	0 - 20 %	Minimal
Coolgardie interchange	Lot9 DP 594556	7,489	Pimlico Buffalo 1 ( <i>new - pending</i> )	Plain (50%), Swamp (50%)	20 - 40 %	0 - 20 %	Ploughing and some plantings
Coolgardie interchange	Lot4 DP 223267	35,373	Pimlico Hilton 1 ( <i>new - pending</i> ) Pimlico Hilton 2 ( <i>new - pending</i> )	Plain (20%), Swamp (80%)	20 - 40 %	0 - 20 %	Lagoons excavated, vegetation clearance in northern part of study area, otherwise minimal disturbance.
Coolgardie interchange	Lot61 DP1088684	44,187	Rudgley Scarred Tree 2 ( <i>new - pending</i> ) Rudgley Site 2 (new PAD extension - 04-4-0169)	Plain (30%), Swamp (70%)	20 - 40 %	0 - 20 %	Some vegetation clearance.
Coolgardie interchange	Lot62 DP1088684	6,893	None	Plain (10%) Swamp (90%)	20 - 40 %	0 - 20 %	Vegetation clearance
Coolgardie interchange	Lot51 DP1120710	n/a – not surveyed (previously surveyed)	Site 1	Swamp (100%)	not surveyed (previously surveyed)	not surveyed (previously surveyed)	Vegetation clearance
Coolgardie interchange	Lot 2 DP543525	12,966	None	Swamp (100%)	not surveyed	not surveyed	Vegetation clearance, deep ripping, channels, sugar cane agriculture
Rest area at Old Bagotville Road (north)	Lot109/DP1137975	9,175	-	Swamp (100%)	not surveyed	not surveyed	Vegetation clearance

Design change	Property/s	Survey area (m <sup>2</sup> )	Site/PAD name (AHIMS ID)	Landform	Ground surface visibility	Sub surface exposure	Disturbance
Rest area at Old Bagotville Road (north)	Lot 2 DP787102	31,935	-	Plain (20%) Swamp (80%)	not surveyed	not surveyed	Vegetation clearance, deep ripping, channels, sugar cane agriculture
Quarries at Old Bagotville Road (south)	Lot 1 DP787102	54,017	None	Upper slope (30%) Removed (70%)	80 - 100%	80 - 100%	Vegetation clearance, quarrying activities have removed most of the landform
Quarries at Old Bagotville Road (south)	Lot 2 DP585377	56,069	None	Swamp (15%) Lower slope (5%) Mid slope (5%) Upper slope (5%) Removed (70%)	80 - 100%	80 - 100%	Vegetation clearance, quarrying activities have removed most of the landform
Quarries at Old Bagotville Road (south)	Lot 5 DP843369	25,285	None	Mid slope (10%) Upper slope (10%) Removed (80%)	80 - 100%	80 - 100%	Vegetation clearance, quarrying activities have removed most of the landform
Quarries at Cooks Hill	Lot4 DP253906	222,107	Eversons Swamp 1 ( <i>new - pending</i> ) E2/2 (new PAD extension - 13-1-0109)	Plain (15%) Lower slope (5%) Removed (80%)	80 – 100 %	80 – 100 %	Vegetation clearance, quarrying activities have removed most of the landform, fill covers part of the plain landform



Design change	Property/s	Survey area (m <sup>2</sup> )	Site/PAD name (AHIMS ID)	Landform	Ground surface visibility	Sub surface exposure	Disturbance
Quarries at Cooks Hill	Lot2 DP1096808	91,004	None	Swamp (5%) Upper slope (5%) Lower slope (5%) Removed (85%)	80 – 100 %	80 – 100 %	Vegetation clearance, quarrying activities have removed most of the landform
Additional study area	Lot7 DP866508	50	None	Swamp (10%) Lower slope (90%)	0 - 20 %	0 - 20 %	Vegetation clearance, track formation
Additional study area	LotA DP412818	2,022	None	Swamp (20%) Lower slope (80%)	40 – 60 %	0 - 20 %	Vegetation clearance, residential structures
Additional study area	Lot1 DP218659	7626	None confirmed	Swamp (20%) Lower slope (80%)	0 - 20 %	0 - 20 %	Vegetation clearance

## **Appendix E      Test excavation details**

Woolgoolga to Ballina Pacific Highway Upgrade  
Aboriginal cultural heritage assessment July 2013

Date	MGA Zone 56		Site / PAD Name	STP Number	End depth (mm)	Landscape unit (landform)	No. of artefacts	Artefact materials
	Easting	Northing						
16/07/2013	546726	6802120	pimlico buffalo 1	stp1	900	Sand plain	0	
16/07/2013	546724	6802100	pimlico buffalo 1	stp2	900	Sand plain	0	
16/07/2013	546722	6802090	pimlico buffalo 1	stp3	800	Sand plain	0	
16/07/2013	546719	6802080	pimlico buffalo 1	stp4	800	Sand plain	0	
16/07/2013	546714	6802070	pimlico buffalo 1	stp5	800	Sand plain	0	
16/07/2013	546714	6802060	pimlico buffalo 1	stp6	800	Sand plain	0	
16/07/2013	546711	6802050	pimlico buffalo 1	stp7	800	Sand plain	0	
16/07/2013	546700	6801960	pimlico hilton 2	stp1	250	Sand plain	0	
16/07/2013	546699	6801950	pimlico hilton 2	stp2	150	Sand plain	0	
16/07/2013	546693	6801930	pimlico hilton 2	stp3	250	Sand plain	0	
16/07/2013	546696	6801860	pimlico hilton 2	stp5	200	Sand plain	0	
16/07/2013	546690	6801870	pimlico hilton 2	stp4	100	Sand plain	0	
16/07/2013	546672	6801660	pimlico hilton 1	stp1	800	Sand plain	0	
16/07/2013	546678	6801650	pimlico hilton 1	stp2	800	Sand plain	0	
16/07/2013	546668	6801640	pimlico hilton 1	stp3	800	Sand plain	0	
16/07/2013	546664	6801650	pimlico hilton 1	stp4	800	Sand plain	0	
17/07/2013	543302	6790630	E2/2	stp1	600	Sand plain	5	river cobble, chalcedony
17/07/2013	543292	6790630	E2/2	stp2	550	Sand plain	1	river cobble
17/07/2013	543281	6790630	E2/2	stp3	850	Sand plain	1	chalcedony
17/07/2013	543272	6790630	E2/2	stp4	850	Sand plain	2	silcrete, chalcedony
17/07/2013	543299	6790620	E2/2	stp5	750	Sand plain	0	
17/07/2013	543290	6790620	E2/2	stp6	700	Sand plain	0	

Date	MGA Zone 56		Site / PAD Name	STP Number	End depth (mm)	Landscape unit (landform)	No. of artefacts	Artefact materials
	Easting	Northing						
17/07/2013	543280	6790620	E2/2	stp7	800	Sand plain	0	
17/07/2013	543271	6790620	E2/2	stp8	800	Sand plain	0	
17/07/2013	543253	6790620	E2/2	stp9	850	Sand plain	0	
17/07/2013	543254	6790640	E2/2	stp10	1000	Sand plain	0	
17/07/2013	543289	6790690	E2/2	stp11	500	Sand plain	0	
17/07/2013	543291	6790700	E2/2	stp12	150	Sand plain	0	
17/07/2013	543295	6790710	E2/2	stp13	150	Sand plain	0	
17/07/2013	543282	6790720	E2/2	stp14	150	Sand plain	0	
17/07/2013	543285	6790740	E2/2	stp15	300	Sand plain	0	
17/07/2013	543272	6790700	E2/2	stp16	100	Sand plain	0	
17/07/2013	543267	6790700	E2/2	stp17	100	Sand plain	0	
17/07/2013	543262	6790670	E2/2	stp18	1000	Sand plain	0	
17/07/2013	543271	6790660	E2/2	stp19	850	Sand plain	0	
17/07/2013	543258	6790660	E2/2	stp20	850	Sand plain	0	
17/07/2013	543274	6790670	E2/2	stp21	1200	Lower slope	9	chalcedony
17/07/2013	543282	6790750	E2/2	stp22	350	Lower slope	0	
17/07/2013	543270	6790750	E2/2	stp23	200	Lower slope	0	
18/07/2013	546033	6800070	Rudgley site 2	stp1	850	Sand plain	6	chert, chalcedony
18/07/2013	546040	6800080	Rudgley site 2	stp2	400	Sand plain	0	
18/07/2013	546044	6800090	Rudgley site 2	stp3	250	Sand plain	0	
18/07/2013	546045	6800100	Rudgley site 2	stp4	1000	Sand plain	0	
18/07/2013	546049	6800110	Rudgley site 2	stp5	200	Sand plain	0	
18/07/2013	546061	6800130	Rudgley site 2	stp6	900	Sand plain	0	



Date	MGA Zone 56		Site / PAD Name	STP Number	End depth (mm)	Landscape unit (landform)	No. of artefacts	Artefact materials
	Easting	Northing						
18/07/2013	546068	6800140	Rudgley site 2	stp7	1200	Sand plain	0	
18/07/2013	546071	6800150	Rudgley site 2	stp8	1100	Sand plain	0	
18/07/2013	546076	6800170	rudgley site 2	stp9	1000	Sand plain	2	ochre (white and orange)
18/07/2013	546080	6800170	rudgley site 2	stp10	1100	Sand plain	2	chert, ochre (orange)
18/07/2013	546094	6800200	rudgley site 2	stp11	1000	Sand plain	0	
18/07/2013	542562	6798900	wardell rd 1	stp1	250	Lower slope	0	
18/07/2013	542561	6798910	wardell rd 1	stp2	150	Lower slope	0	
18/07/2013	542560	6798920	wardell rd 1	stp3	150	Lower slope	0	
18/07/2013	542558	6798930	wardell rd 1	stp4	150	Lower slope	0	
18/07/2013	542556	6798940	wardell rd 1	stp5	200	Lower slope	0	
18/07/2013	542577	6798900	wardell rd 1	stp6	200	Lower slope	0	
18/07/2013	542590	6798900	wardell rd 1	stp7	200	Lower slope	0	
18/07/2013	542604	6798900	wardell rd 1	stp8	150	Lower slope	0	
18/07/2013	542602	6798910	wardell rd 1	stp9	150	Lower slope	0	
18/07/2013	542598	6798920	wardell rd 1	stp10	100	Lower slope	0	
18/07/2013	542595	6798930	wardell rd 1	stp11	150	Lower slope	0	
18/07/2013	542585	6798950	wardell rd 1	stp12	150	Lower slope	0	
18/07/2013	542578	6798950	wardell rd 1	stp13	200	Lower slope	0	
18/07/2013	542569	6798950	wardell rd 1	stp14	100	Lower slope	0	