Bolivia Hill Upgrade - Assessment of Route Options

APPENDIX F
ABORIGINAL HERITAGE REPORT

Cardno
Shaping the Future

ABORIGINAL ARCHAEOLOGICAL ASSESSMENT

Preferred Route Options Report for the New England Highway Upgrade at Bolivia Hill

Cardno and Roads and Maritime Services

JUNE 2013

Local Government Area:	Tenterfield Shire LGA
Consultant Name:	Niche Environment and Heritage Pty Ltd
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Proponent:	Roads and Maritime Services

Document Controls

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Cover Photo: Overlooking granite platforms along Bolivia Creek with Donny Kirk (Source: Niche EH).

Summary

This Archaeological Report (AR) presents the results of an Aboriginal archaeological assessment for the Roads and Maritime Services (RMS) proposed upgrade of the New England Highway at Bolivia Hill in northern New South Wales.

Niche Environment and Heritage Pty Ltd (Niche) was commissioned by Cardno, on behalf of RMS, to prepare an AR in accordance with the following guidelines:

- *Aboriginal cultural heritage consultation requirements for proponents 2010* (Department of Environment, Climate Change and Water NSW, 2010);
- *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (Department of Environment, Climate Change and Water NSW, 2010); and
- *Procedures for Aboriginal Cultural Heritage Consultation and Investigation* (Roads and Maritime Services 2011).

As part of a preliminary assessment, background research and a predictive model were developed for the subject area (Niche 2012). This indicated that it would be likely that Aboriginal heritage sites could exist in the subject area. A surface survey was undertaken, with representatives of the Mombahlene Local Aboriginal Land Council, in January 2013. The surface survey located four Aboriginal heritage sites (Bolivia Hill AS1 [PAD 3], Bolivia Hill GG1, Bolivia Hill RA1 and Bolivia Hill CMST1) and four areas of Potential Archaeological Deposit (PAD) (Bolivia Hill PAD1, Bolivia Hill PAD2, Bolivia Hill PAD3 and Bolivia Hill PAD4). The Aboriginal heritage site types include an open camp site (artefact scatter), a grinding groove site, a rock art site and a culturally modified scar tree.

The following recommendations are made in relation to the subject area;

1. In the first instance, RMS should seek to avoid all areas of archaeological potential and all identified archaeological sites. Within the subject area, these include:
    a. Bolivia Hill AS1 as well as lands within 100m of the site.
    b. Bolivia Hill GG1 as well as lands within 100m of the site.
    c. Bolivia Hill CMST1 as well as lands within 100m of the site.
    d. Bolivia Hill RA1 as well as lands within 100m of the site.
    e. Bolivia Hill PAD 1, Bolivia Hill PAD 2 and Bolivia Hill PAD 4.These areas have been identified as areas of archaeological potential.

2. If these areas cannot be avoided, additional works would be required before any impacts can occur. These works would include the following:
    a. The implementation of PACHI Stage 3: Formal consultation and preparation of an Aboriginal Cultural Heritage Assessment (ACHA) report.
    b. Subsurface testing of Bolivia Hill PAD 1, Bolivia Hill PAD 2, Bolivia Hill PAD 3 and Bolivia Hill PAD 4 under the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW, 2010). Results of the testing would be used to inform RMS of the nature, extent and significance of any subsurface deposits within these areas.
    c. Additional salvage excavations may be required if any identified sites are considered to be of high archaeological significance.
3. Continued consultation with the Aboriginal stakeholders is recommended to ensure they are kept informed of the project.

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List of Abbreviations

ACHCRs	Aboriginal cultural heritage consultation requirements for proponents 2010 (DECCW, 2010).
AHD	Australian Height Datum
AHIMS	Aboriginal Heritage Information Management System
AHIP	Aboriginal Heritage Impact Permit
DA	Development Application
DECCW	Department of Environment, Climate Change and Water
DP	Deposited Plan
EP&A Act	Environmental Planning & Assessment Act (NSW, 1979)
LEP	Local Environmental Plan
LGA	Local Government Area
NP&W Act	National Park and Wildlife Act (NSW, 1974)
NPWS	NSW National Parks & Wildlife Service
PACHI	Procedure for Aboriginal Cultural Heritage Investigations (RMS, 2010)
RMS	Roads and Maritime Services

*All measurements are abbreviated as per standard metric notation

1. Introduction

This Archaeological Report (AR) presents the results of an Aboriginal archaeological assessment for the NSW Roads and Maritime Services (RMS) proposed upgrade of the New England Highway at Bolivia Hill in northern New South Wales.

Niche Environment and Heritage Pty Ltd (Niche) was commissioned by Cardno, on behalf of RMS, to prepare an AR in accordance with the following guidelines:

- *Aboriginal cultural heritage consultation requirements for proponents 2010* (Department of Environment, Climate Change and Water NSW, 2010);
- *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (Department of Environment, Climate Change and Water NSW, 2010); and
- *Procedures for Aboriginal Cultural Heritage Consultation and Investigation* (Roads and Maritime Services 2011).

The main objective of this assessment was to identify whether Aboriginal sites, objects or places would be impacted by the proposed works and provide appropriate mitigation and management recommendations in accordance with the *National Parks and Wildlife Act 1974*.

The report will form part of a preferred route selection report which will be considered by RMS in the selection of the preferred route.

2. Site Location

The subject area is located along the New England Highway at Bolivia Hill, which is located in the Bolivia Range about 55km north of Glen Innes and 30km south of Tenterfield in northern NSW. A map showing the general location of the subject area is shown in Figure 1.

The Bolivia Range runs east west and connects with the Great Dividing Range to the east. Deepwater River, a major water source in the local area, passes around the range to the west. The New England Highway and the Great Northern Railway line pass through gaps in the range on the western side of Bolivia Hill. A 9km stretch of the New England Highway passes through the Bolivia Range. 'Bolivia Hill' is a 2km stretch of the highway which descends 100m over 2km.

Four route options for the highway upgrade at Bolivia Hill are currently being considered by RMS. These options, with an additional 100 metre buffer, define the subject area (See Figure 1).

Table 1: Location details for the subject area.

Location Information	
LGA	Tenterfield Shire Council
County	Clive County
Parish	Bolivia
Land Council Area	Moombahlene Local Aboriginal Land Council

3. Investigators and Contributors

This investigation was conducted by Amanda Atkinson, Archaeologist and Fiona Leslie, Senior Archaeologist of Niche Environment and Heritage. The archaeological surface survey was undertaken by Amanda Atkinson (Archaeologist, Niche), Fiona Leslie (Senior Archaeologist, Niche), Clare Anderson (Archaeologist, Niche), Darren Daley (Moombahlene Local Aboriginal Lands Council), Donald Kirk (Moombahlene Local Aboriginal Lands Council) and Graham Purcell (Cultural Heritage Officer, RMS). This report was authored by Amanda Atkinson and reviewed by Fiona Leslie and Cameron Harvey (Heritage Team Leader, Niche).

Table 2: Table of Contributors

Contributor	Company	Role
Amanda Atkinson	Archaeologist, Niche Environment & Heritage	Field survey, draft report, client & community consultation
Fiona Leslie	Senior Archaeologist, Niche Environment & Heritage	Project Manager, field survey, report review, client & community consultation.
Clare Anderson	Archaeologist, Niche Environment & Heritage	Field survey
Cameron Harvey	Heritage Team Leader, Niche Environment & Heritage	Report review, quality assurance.
Darren Daley	Moombahlene LALC	Field survey, contribution to site significance discussion.
Donald Kirk	Moombahlene LALC	Field survey, contribution to site significance discussion.
Graham Purcell	Roads and Maritime Services	Community Consultation, field survey.
Dr Ross Jenkins	Niche Environment & Heritage	GIS/Mapping.

4. Description of Development Proposal

The New England Highway is one of the major link roads between the Hunter region to the New England region of New South Wales and beyond into south-eastern Queensland. The highway is also a major route for heavy transport between Sydney and Brisbane. The aims of the proposed Bolivia Hill upgrade are to:

- Improve road safety;
- Improve road transport productivity, efficiency and reliability of travel;
- Minimise impact on the natural, cultural and built environment; and
- Provide value for money.

Stage 1 through Stage 5 of the Project involves the investigation of four short-listed route options to upgrade a section of the New England Highway at Bolivia Hill to reduce the frequency of serious crashes and increase transport efficiency. The design stage of the project will involve:

- The identification of potential road corridors and route options;
- Selection of the preferred route; and
- Development of a concept design.

To select the most appropriate upgrade route through Bolivia Hill, RMS has defined a broad study area that includes four short-listed route options and a 100m buffer for the project. Once a preferred route has been selected, a concept design and construction methodology will be developed by RMS. The short-listed route options are shown in Figure 2.

5. Community Consultation

The RMS Cultural Heritage Advisor implemented PACHI Stage 2 community consultation for the field survey. Stage 2 of the PACHI recommends consultation with the Local Aboriginal Land Council (LALC). Two members of the Moombahlene LALC attended all 5 days of the field survey. The representatives from Moombahlene LALC provided vital information about the Aboriginal cultural heritage in the region. Consultation, at the reporting stage, with Aboriginal stakeholder groups did not form part of the scope of this project. It is therefore not possible to comment on the cultural values of the site.

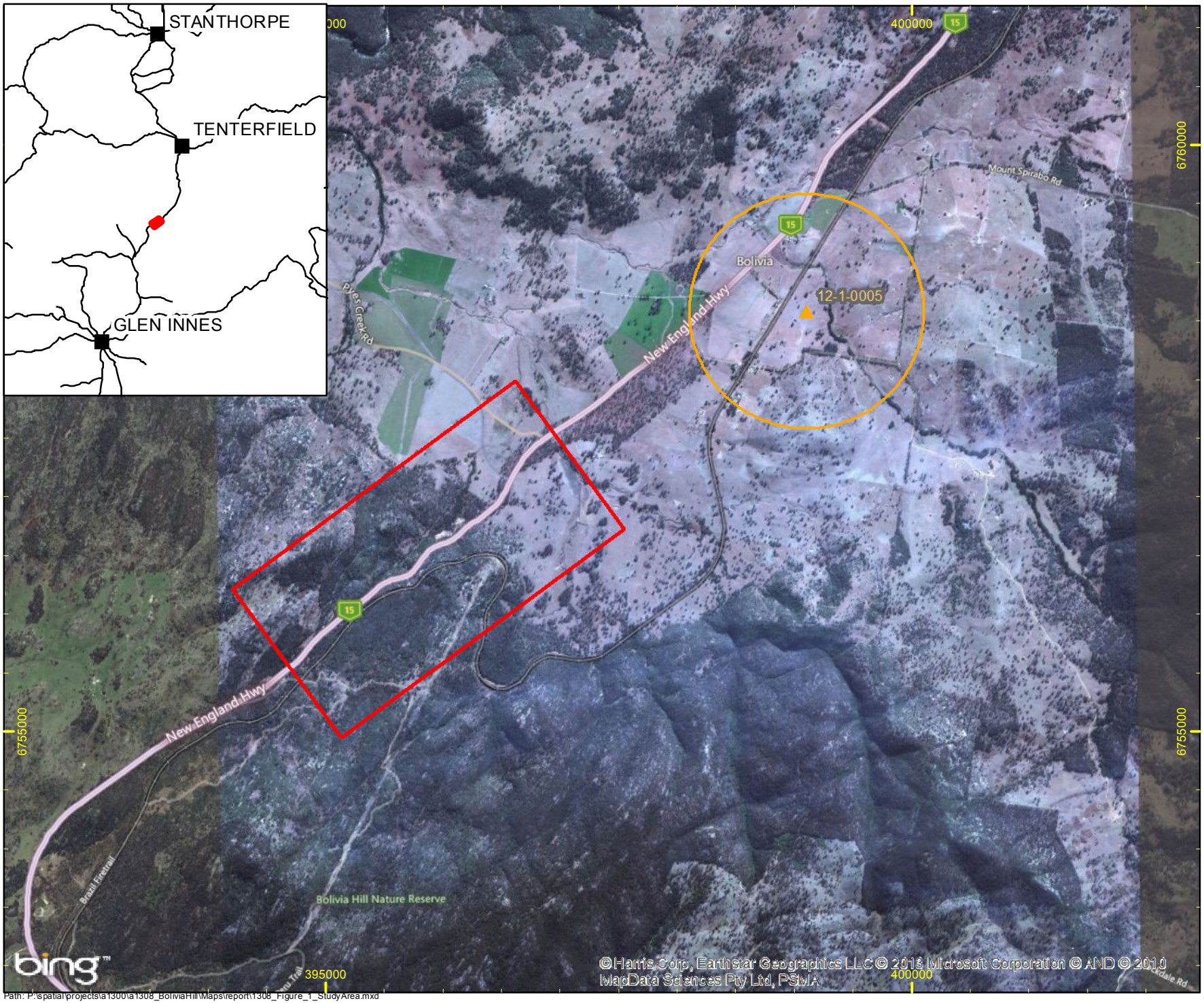

Figure 1: Location Map

1308 Bolivia Hill

Drawn by: RJ
Project Mgr: FJL

Date: 18/06/2013

Subject Area

AHIMS 8 Oct 2012

Bora/Ceremonial

1 km Buffer

N
W E
S

km
0 0.5 1 1.5

niche
Environment and Heritage

Horizontal Datum:
GDA 1994 MGA Zone 56

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Figure 2: Route Options

1308 Bolivia Hill

Drawn by: RJ
Project Mgr: FJL

Date: 18/06/2013

Alignment Options

- 10
- 6
- 7
- 7b
- 100m buffer

N
W E
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km
0 0.25 0.5

niche
Environment and Heritage

Horizontal Datum:
GDA 1994 MGA Zone 56

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6. Landscape Context

The study area is located in the Bolivia Range, a rugged landscape characterised by steep hills and cliffs with clusters of granite outcrops. The climate in the study area is moderate with mild summers and cold winters. Rainfall is quite high, the average being around 850mm annually. This environment creates plentiful resources which would have been utilised by Aboriginal people in the past.

6.1 Soils, Geology and Topography

The Bolivia Hill landscape is moderately rugged, incorporating part of the Bolivia Range which runs east-west, with elevation varying from 950m to around 1,225 metres above sea level. Bolivia Hill is dominated by an early Triassic granitoid known as the Bolivia Range Leucomonzogranite, which has produced well drained to moist and loamy or sandy loam soils. Domed (granite) outcrops occur in clusters with large exposures and shallow soils. The study area is also characterised by the Dundee Rhyodacite geology (Figure 3). The Dundee Rhyodacite is a strongly porphyrtitic rhyodacitic ignimbrite (NPWS 2011). The soils in the study area consist of shallow gritty loams and red or yellow earthy sands. Larger valleys may have deep dark clay deposits within swampy streamlines (Mitchell 2002:80).

The soils in the study area have not been extensively mapped, but observations during the site inspection suggest shallow to moderately deep sandy and loam soils. Erosion along the creek banks and creek terraces showed moderately deep (c. 1m) alluvial soil. Surface soils, near the creek line, featured stone artefact scatters but it is not known if the stratigraphy is intact.

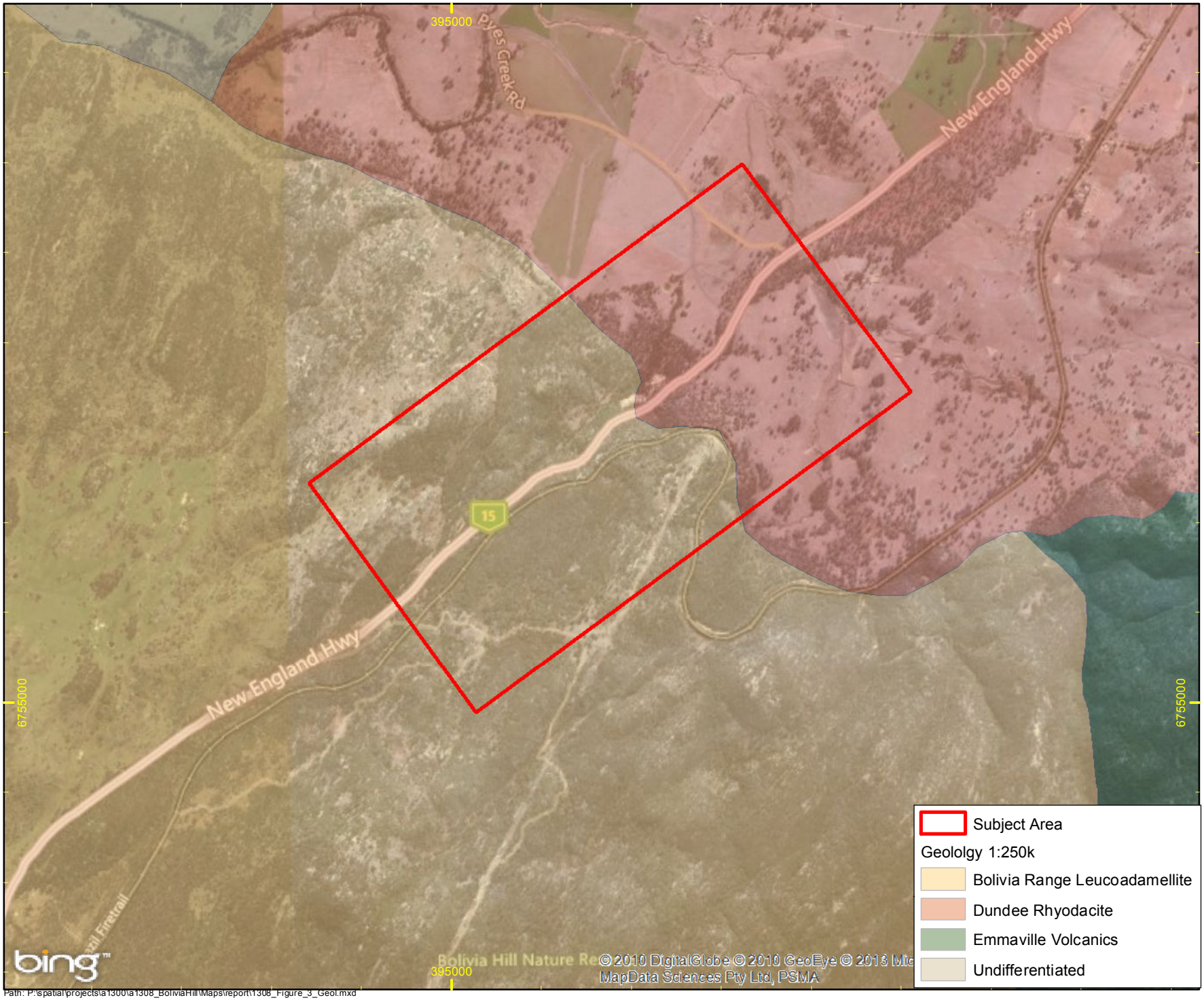

Figure 3: Geological Units

1308 Bolivia Hill

Drawn by: RJ
Project Mgr: FJL

Date: 18/06/2013

N
W E
S

km
0 0.5 1

niche
Environment and Heritage

Horizontal Datum:
GDA 1994 MGA Zone 56

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6.2 Flora and Fauna

Much of the vegetation on Bolivia Hill is endemic. The vegetation is diverse with many species available for resource utilization. The species endemic to Bolivia Hill include Bolivia stringybark (*Eucalyptus boliviana*), Bolivia wattle (*Acacia pycnostachya*), Bolivia Hill boronia (*Boronia boliviensis*), Bolivia homoranthus (*Homoranthis croftianus*), Bolivia Hill pimelea (*Pimelea venosa*), Creeping tick-trefoil (*Desmodium campylocaulon*) and Austral toadflax (*Thesium australe*) (NPWS 2011).

The environment at Bolivia Hill is generally made up of open woodland communities with a dense under storey and includes silvertop stringybark (*Eucalyptus laevopinea*), broad-leaved stringybark (*Eucalyptus caliginosa*), Blakely's red gum *(Eucalyptus blakelyii*), narrow-leaved peppermint (*Eucalyptus radiata*), yellow box (*Eucalyptus melliodora*), apple box (*Eucalyptus bridgesiana*), red ironbark (*Eucalyptus sideroxylon*), Caley's ironbark (*Eucalyptus caleyi*), rough-barked apple (*Angophora floribunda*) and black cypress pine (*Callitris endlicheri).* In moist areas open forest of: New England peppermint (*Eucalyptus cinerea*), manna gum (*Eucalyptus viminalis*), mountain gum (*Eucalyptus dalrympleana*), New England blackbutt (*Eucalyptus andrewsii* ssp. *campanulata)*, diehard stringybark (*Eucalyptus cameronii*), Deane's gum (*Eucalyptus deanei*), messmate (*Eucalyptus obliqua),* privet-leaved stringybark (*Eucalyptus ligustrina*), Youman's stringybark (*Eucalyptus youmanii),* swamp gum (*Eucalyptus camphora*), Gibraltar rock blackbutt (*Eucalyptus pyrocarpa)*, tumbledown red gum (*Eucalyptus dealbata*) and orange gum (*Eucalyptus prava*) sometimes with closed forest species in the understorey, especially in the eastern parts of the landscape.

Many fauna species exist in the study area due to the plentiful water and habitat resources. These species may have been utilized by Aboriginal people for food and include Eastern grey kangaroo (*Macropus giganteus*), brush-tailed rock wallaby (*Petrogale penicillata*), eastern pigmy possum (*Cercartetus nanus*), spotted-tail quoll (*Dasyurus maculatus*), yellow-bellied glider (*Petaurus australis*), squirrel glider (*Petaurus norfolcensis*), Brush-tailed phascogale (*Phascogale tapoatafa*), Koala (*Phascolarctos cinereus*), Emu (*Dromaius novaehollandiae*) as well as many species of birds, fish, reptiles and amphibians.

Many species within these vegetation communities are known to have been used by Aboriginal people in the past. Some old growth trees occur within close proximity to the proposed route options. Where remnant native vegetation occurs, it is possible that the vegetation may have significance to contemporary Aboriginal people as an example or link between the landscape of today and that inhabited by their ancestors. Brickyard Creek and its tributary would have provided a varied and rich range of resources including fish, bird, mammal, reptile and amphibians.

Table 3: Plant and food resources available in the subject area

Resource	Traditional Uses	Location	Seasonal Availability
Yellow Box	Bark used for many purposes.	Mostly along creek lines and lower slope.	Year round
Fuzzy Box	Bark used for many purposes	Mostly found on decomposing granite	Year round
Narrow-leaved peppermint	Medicines as well as bark for many purposes.	Throughout study area	Year round.
Black Cypress Pine	The sap has antiseptic properties.	Throughout study area.	Year round
Bolivia Wattle	Seeds for food	Throughout study area	July to October
Messmate	Inner bark used to make sting	Throughout study area	Year round
Manna Gum	Wood and bark used for shields and bowls.	Throughout study area	Year round
Elonga Yam	Roots eaten	Throughout study area	Year round
Brush-tailed rock wallaby	Meat eaten, skins utilized	Possible habitats in study area	Year round
Eastern grey kangaroo	Meat eaten, skins utilized	Possible habitats in study area	Year round
Emu	Eggs and meat cooked and eaten	Possible habitats in the study area	Year round, breeding season December and January.
Kangaroo	Meat cooked and eaten	Common across study area	Year round
Wild ducks	Eggs and meat cooked and eaten	Possible habitats in the study area	September to November
Possums	Meat cooked and eaten	Common across the study area.	Year round
Snakes	Meat cooked and eaten	Common across the study area	Warmer months
Lizards	Meat and eggs cooked and eaten	Common across the study area	Warmer months
Honey Ants	Eaten	Possible habitats in the study area.	Year round

6.3 Hydrology

The hydrology of the region is dominated by the Deepwater River, which flows north-west of the study area and around the west of the Bolivia Range (See Figure 4).

Within the study area are two creek lines. A tributary of Brickyard Creek flows through the north-western corner of the study area. Bolivia Creek, a permanent creek line, flows from the SW-NE through the middle of the study area. Immediately surrounding the study area, there are a number of small second and third order creeks lines. At the time of the site inspection, the Deepwater River was flowing and Bolivia Creek and the tributaries of Brickyard Creek held small amounts of water, resembling waterholes.

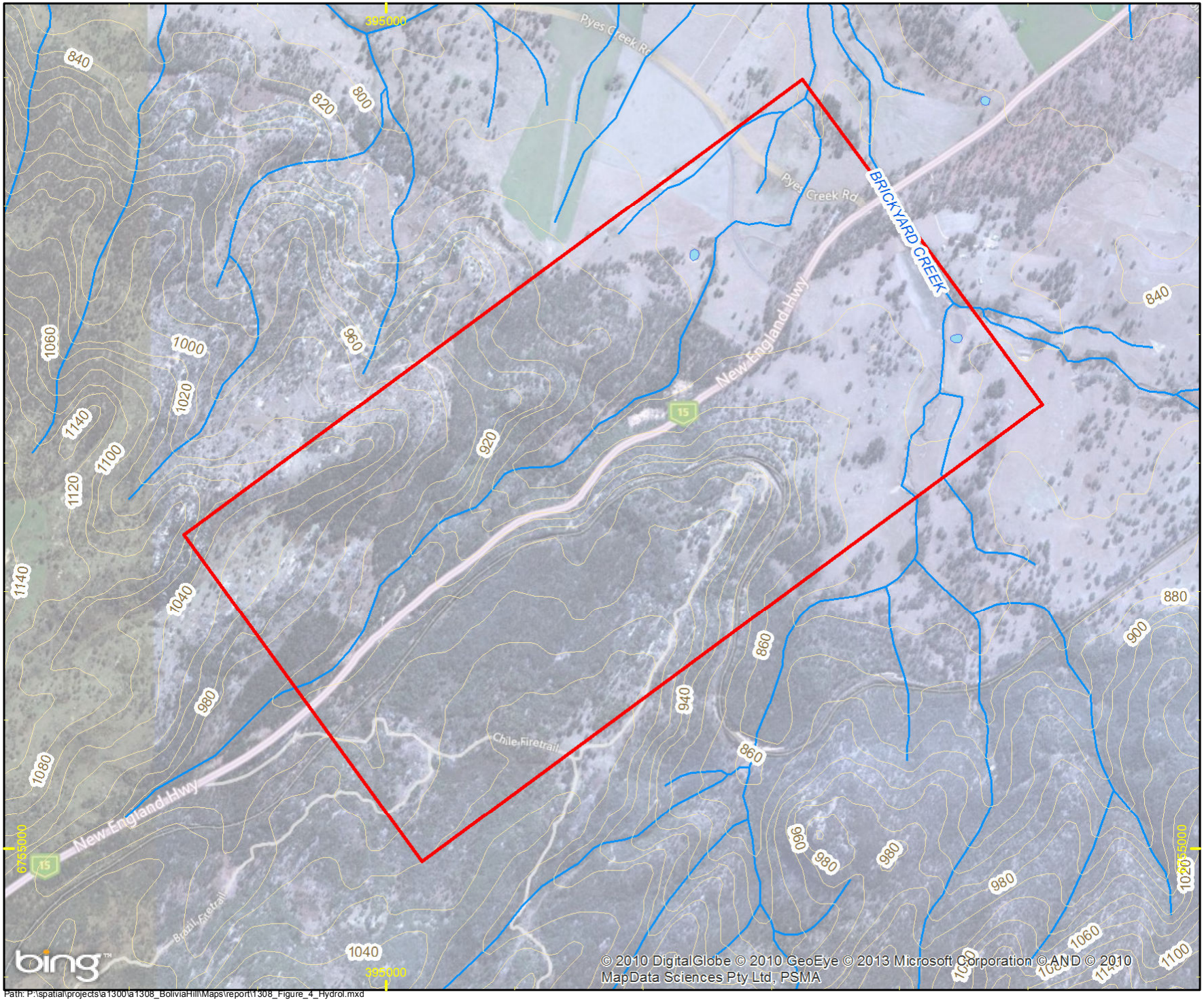

Figure 4: Hydrology

1308 Bolivia Hill

Drawn by: RJ
Project Mgr: FJL

Date: 17/06/2013

Subject Area

N
W E
S

Metres
0 200 400 600 800

niche
Environment and Heritage

Horizontal Datum:
GDA 1994 MGA Zone 56

Path: P:\spatial\projects\a1300\a1308_BoliviaHill\Maps\report\1308_Figure_4_Hydrol.mxd

6.4 Climate

The New England region of New South Wales has a moderate climate with an average annual rainfall of around 850mm. The temperatures are mild in summer and cool in winter; the average high in summer is 27°C and the average high in winter is 15°C. The temperatures often drop below 0°C in the winter months (BOM 2013). Temperatures in the Bolivia range were observed to be similar however the range offers some protection from the elements.

Historic accounts of the weather by Oxley (1818) suggest the region was very wet and storms with frequent heavy rain.

6.5 Disturbance and Modification

The study area has been subject to major disturbance throughout the historical period, however there are pockets of land in the study area that are less disturbed and may retain the original environmental setting. Within the study area, the following disturbances were noted:

- Small scale historic mining and quarrying;
- Historic logging;
- Light rural uses such as grazing;
- Light rural residential use;
- Historic market gardens;
- Historic unsealed roads including the Cobb N Co trail and a 1950's bypass;
- Construction of infrastructure such as roads, electricity easements and water drainage, including, the sealed New England Hwy which is major artery between Sydney and Brisbane; and
- Construction of infrastructure such as the Great Northern Railway which was a major transport line between Sydney and Brisbane.

The main impact in the study area is the construction of major infrastructure, such as the New England Highway and the Great Northern Railway. Smaller scale mining and quarrying have also disturbed the ground surface and have lead to areas of erosion. Another cause of erosion is historical land clearing and low-intensity farming. Generally, the areas of disturbance are areas which have been suitable for habitation, farming or tracks through the Bolivia Ranges, these areas are also most likely to contain evidence of past human occupation. The areas which are presently undisturbed are the steeper upper and mid-slope landforms. These are the areas least likely to contain evidence of past human occupation.

7. Register Searches

7.1 Commonwealth Registers

National Heritage Registers

Under the EPBC Act Amendments (No. 88, 2003), two mechanisms have been created for the protection of heritage places of National or Commonwealth significance:

- ❒ the National Heritage List (NHL); and
- ❒ the Commonwealth Heritage List (CHL).

(http://www.environment.gov.au/heritage/places/national/index.html)

The NHL provides protection to places of cultural significance to the nation of Australia, while the CHL comprises natural, Aboriginal and historic heritage places owned and controlled by the Commonwealth. There are no management constraints associated with listing on the Register of the National Estate unless the listed place is owned by a Commonwealth agency.

- ❒ Searches of the NHL and RNE were undertaken on the 22 October, 2012. No items were identified to be located within the subject area.

National Native Title Register (NNTR)

The *Commonwealth Native Title Act 1993* establishes the principles and mechanisms for the preservation of Native Title for Aboriginal people. Under Subdivision P of the Act, *Right to Negotiate*, Native Title claimants can negotiate over some proposed developments (known as the 'Future Acts') if they have the right to negotiate, which is granted only when the claimant's application satisfies the registration test conditions.

- ❒ A search of the NNTR was undertaken on the 30 January, 2013. No native title claims or registrations exist over the study area.

7.2 State Registers

National Parks and Wildlife Act Registers (AHIMS)

Aboriginal Archaeological Sites within 10km^2 of the Impact Area

An extensive AHIMS search was conducted on 5 October 2012 (AHIMS IDs 82030; Appendix 1) for the area surrounding the subject area. The search undertook an area approximately 10km^2, encompassing land around Bolivia Hill. There was 1 previously recorded site within the search area, of which none were located within the subject area (Figure 5).

Table 4: Results of the AHIMS extensive search (Source: AHIMS)

Site ID	Site Name	Site Type	Landform	Distance to water	Slope
12-1-0005	Bolivia	Ceremonial	Flat	unknown	unknown

A comparison of the site types and analysis of regional trends can not be made due to the low number of registered site in proximity to the study area. Section 8 includes a review of registered sites in the broader region.

Figure 5: Aboriginal Heritage Register

1308 Bolivia Hill

Drawn by: RJ
Project Mgr: FJL

Date: 18/06/2013

Subject Area
AHIMS Oct 2012
Bora/Ceremonial

N
W E
S

Metres
0 500 1,000

niche
Environment and Heritage

Horizontal Datum:
GDA 1994 MGA Zone 56

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Heritage Act Registers

The *State Heritage Register* (SHR) holds items that have been assessed as being of State Significance to New South Wales. The *State Heritage Inventory* (SHI) contains items that are listed on Local Environmental Plans and/or on a State Government Agency's Section 170 registers (NSW Office of Environment and Heritage Website – www.heritage.nsw.gov.au/index.html - accessed 19 September 2012). Items appearing on either the SHR or SHI have been granted a defined level of statutory protection under NSW legislation.

- Searches of the SHR and SHI were completed on the 22 October, 2012. The SHR and SHI were found to contain no items registered with the subject area.

Environmental Planning and Assessment Act Registers (EP&A Act)

Local Environmental Plans (LEP)

Each Local Government Area (LGA) is required to create and maintain an LEP that identifies and conserves Aboriginal and Historic heritage items. These items are protected under the EP&A Act 1979 and the *Heritage Act 1977*.

Tenterfield Local Environmental Plan (LEP)

- A search of the Tenterfield LEP (1996) was undertaken on the 22 October 2012. No heritage items listed on the LEP are located within, or in close proximity, to the study area.

8. Archaeological Background

The archaeological background of the region is rich in both Aboriginal and Non-Aboriginal heritage with the New England tablelands having been occupied by Aboriginal people for more than 9,000 years. The subject area borders the traditional lands of the Jukambal and the Ngarrabul people. Relatively few archaeological studies have been undertaken near the subject area but larger regional studies indicate a vast array of Aboriginal heritage sites exist in the broader region. The subject area has a long history of Non-Aboriginal occupation, beginning with John Oxley exploring the region in 1818. Bolivia Station was taken up by Edward Irby in 1843 and has been used for agriculture and farming to the present day.

8.1 Previous Archaeological Work

Based on current archaeological studies, occupation of the New England Tablelands dates back to around 9,000 years before present. Dates from an archaeological excavation at the Graman A2 rock shelter, located approximately 80km north-east of Glen Innes, confirms Aboriginal occupation occurred in the region during the Holocene (9,000 BP to present) (AMBS 2010:17). Other archaeological sites suggesting long occupation of the area are Graman B1 (c. 5,400 BP), Bendemeer 2 (c. 5,000BP) and Moore Creek rock shelters 4 and 6 (c. 4,000 BP).

McBryde (1974) has conducted extensive archaeological research in the region including a systematic field survey and targeted excavation. The aim of the field survey was a total recording of all sites located and the aim of excavation was to provide evidence in order to reconstruct human occupation in the region. McBryde's (1974) field survey located the remains of both Bora grounds and stone arrangements which were interpreted as the archaeological remains of ceremonial sites. Generally, bora grounds were located on slight rises in plains or terraces while stone arrangements were located on higher ground, specifically ridge lines or upper slopes. A bora ground, registered on the AHIMS, is located within 5km of the subject area; this bora ground is located on a plain at Sandy Flats but very little other information is available. McBryde's (1974) survey also located evidence of past artistic life in the form of rock art sites and geometric carving on trees. The rock art in the region is usually painted or drawn (pictographs) onto granite surfaces, such as the vertical faces of boulders or in rock shelters or overhangs. Rock engravings (petroglyphs) do exist, especially in the western part of the region but they are generally less common than painted or drawn art (McBryde 1974:67). Some of the most noteable rock art sites in the northern tablelands include the Moonbi sites, Bendemeer, Yarrowyck and Devils Cave at Tenterfield. These paintings include motifs of anthropomorphs, animals, tracks, stencils and geometric patterns. Stone quarrying sites and artefact scatters were discovered during the field survey; quartzite and chert quarries exist at Moore Creek and 'Girrawheen' station, respectively. These sites are not located in the same environmental context of the subject area therefore it is possible that different raw material types may be present in the subject area. McBryde (1974:158-159) describes the axe grinding grooves located in the Northern Tablelands as existing in small groups, however some

larger groups do exist, near occupation sites. Grinding groove sites associated with occupation sites have been located at Seelands, Nobby's Creek, Whiteman Creek and Blackman Creek.

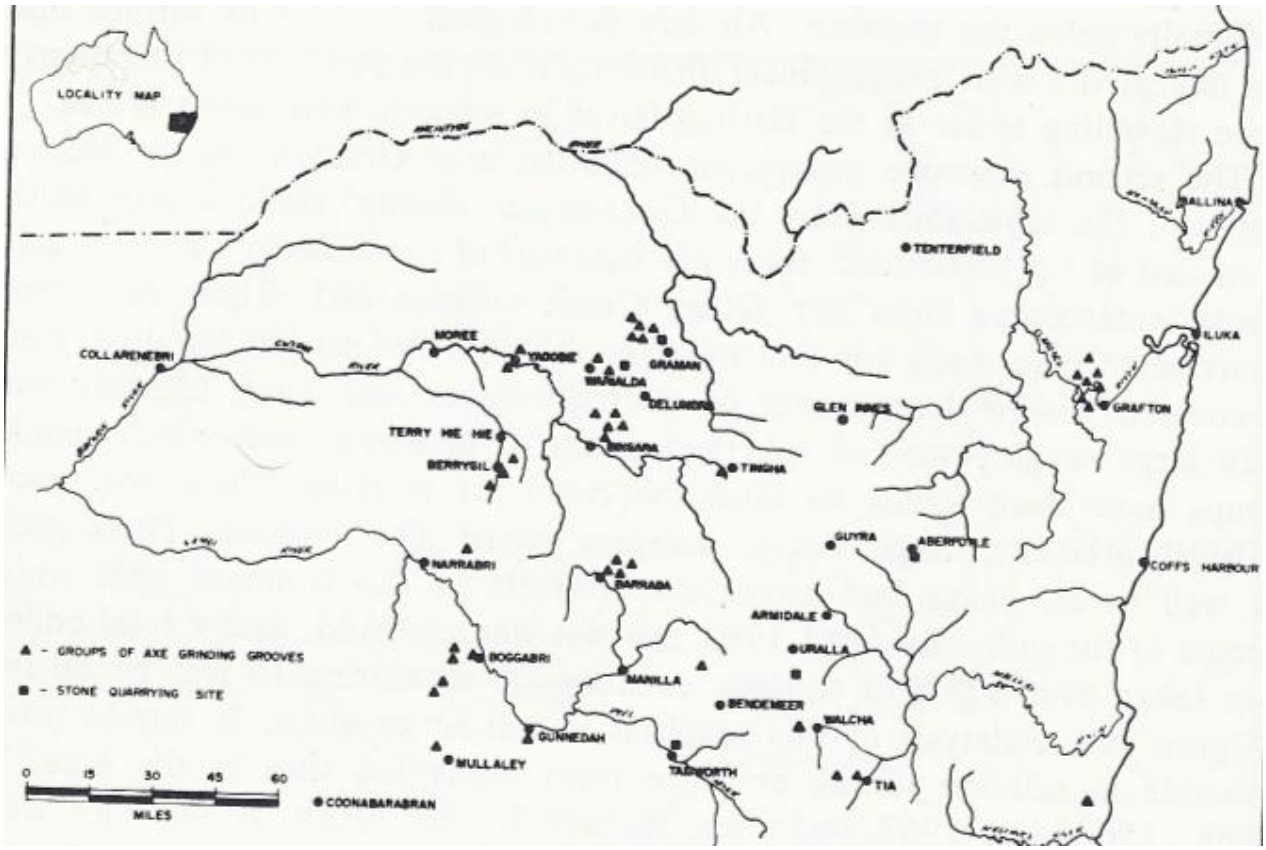

Figure 6: Distribution of quarry sites and axe grinding groove sites in the Northern Tablelands (Source: McBryde 1974:158 'Figure 30: Stone quarry sites and locations of axe-grinding grooves in north-eastern New South Wales).

Figure 7: Popular rock art motifs found in the New England Region 'Figure 20: Illustration of various motifs and their representation in the painted art style of the Northern Tablelands' in McBryde 1974:113.

A search of the AHIMS report register identified one archaeological investigation directly relevant to the subject area. In 1995 Griffiths was commissioned by Telstra Australia to conduct an archaeological survey of a proposed fibre optic route between the towns of Deepwater and Tenterfield in northern NSW. The report provides detailed background research relating to previous Aboriginal land-use. The assessment predicted that site types in the region might include; quarries, open camp sites, scarred trees and ceremonial/bora sites (Griffiths 1995:8). The background research revealed two ceremonial/bora sites registered on the AHIMS in the region, however significant ground disturbance caused by ongoing farming meant that it was unlikely that any sites survived (Griffiths 1995: 16-17). No Aboriginal heritage sites were found during the cultural heritage survey (Griffiths 1995:17).

Further north, on the outskirts of Tenterfield, an archaeological investigation was completed by Hudson in 2008 for members of the Moombahlene LALC. A survey was completed across a proposed traffic bypass area, using a random method of transect selection for survey. The survey located 10 heritage sites, 4 Non-Aboriginal heritage items and 6 Aboriginal cultural heritage sites. The Aboriginal cultural heritage sites consisted of 2 rock art sites, 2 scar trees, 1 possible burial site and 1 Potential Archaeological Deposit (PAD) (Hudson 2008: 23-28). Both rock art sites are pecked engravings on granite outcrops located near a creek (Hudson 2008: 24). The possible burial site is a large earthen mound oriented east-west (Hudson 2008: 27). The presence of rock art and ceremonial sites suggests that the area is highly significant to the local Aboriginal people (Hudson 2008:28).

To the south, a regional desktop Aboriginal cultural heritage study was completed by Australian Museum Business Services (AMBS 2010) for Glen Innes Severn Council. The study reports 70 Aboriginal cultural heritage sites occurring within the Glen Innes Local Government Area (LGA). The site types recorded included, open camp sites, scarred trees, isolated finds, stone arrangements, bora/ceremonial sites, burials, natural mythological sites, axe grinding grooves, water holes and rock art sites (AMBS 2010:36). AMBS (2010) state Aboriginal cultural heritage sites are likely to occur 'on flattish areas near streams, on small elevated areas near the confluences of streams, or on low spurs or ridges above streams; on areas…' The AMBS (2010) study did not have a survey component and therefore did not locate any additional Aboriginal heritage sites.

The results of these studies confirm that Aboriginal people were active in the region for an extended period of time and that a broad range of site types are likely to occur within the subject area (See Section 9).

8.2 Ethnohistory

Much of the information about Aboriginal people in the Northern Tablelands comes from early historical sources and some provide accounts of first contact between European explorers and Aboriginal people, although the sources are often fragmentary and many are biased.

The subject area is located on the border of the traditional lands of the Jukambal and Ngarrabul tribes. The Jukambal people lived from Glen Innes and north-east towards Drake, Tenterfield and near Wallangarra. The Ngarrabul (also spelled Ngoorbul, Nugumbul, Narbal or Narbul) people are the traditional owners of the land around the Glen Innes region, including Bolivia; their territory included Glen Innes, Deepwater, to Bolivia Station and to the Mole River in the north. A Ngarrabul story describes the separation of Ngarrabul into different tribes and language groups after one very large flood event (AMBS 2010:17).

It is estimated that there was a reasonably large Aboriginal population in the Northern Tablelands, most likely due to its favourable environment. Fry (in McBryde 1974:7) estimated a population of around 2000 people for the whole region. Tindale (1974) recorded many separate tribes in the northern region and it is accepted that there was cultural diversity amongst these tribal groups. It is believed the cultural diversity may have been due to the many resources available in the region which would have allowed the groups to live in relatively small areas (McBryde 1974:7). However, there is evidence, supported by oral history, which suggests the Aboriginal people of the Northern Tablelands moved through the landscape seasonally. In 1842, Oakes, the commissioner of Crown Land for the Macleay and Clarence districts wrote that the natives traversed the landscape to the coast in the season of fishing and to the interior during more favourable conditions for hunting. Other authors suggest Aboriginal people moved away from the interior during the cold winter months (Bowdler and Coleman 1981:12-3; McBryde 1974:9; Kerr *et al* 1999:18-19).

The Ngarrabul territories were defined by places in the physical landscape and were guarded, although some movement between territories was sanctioned at times. Tribal boundaries were indicated by marking trees while marked stones would indicate the boundaries of hunting grounds or fishing waters (Campbell 178:6; Kerr *et al* 1999:24-5). Evidence of trade and intermarriage between the Ngarrabul people and other Aboriginal groups in the Northern Tablelands exists in the material record. Stone traded from Graman and Moore Creek has been located in the Tablelands (AMBS 2010:20). Intermarriage was particularly popular between the Ngarrabul and people from the western plains (AMBS 2010:20).

Archaeological evidence and historic accounts suggest that ceremonies were often held by the Ngarrabul people on the flat ground of the river plains. Bora grounds, which are usually formed by two large earthern mounds, one inside the other and connected by pathways, have been recorded near the subject area (See section 7.2 above). In the New England Tablelands Bora grounds are often associated with carved and culturally modified scar trees (AMBS 2010:21).

It is reported that the Koala is the Ngarrabul totem animal and is described in the following account;

> *'Back in the dreamtime there was a man called Yarra, a lazy tribe member who, when other men went hunting, stayed home. One year there was a very bad drought so when the men went hunting there was very little food and water for the women. Yarra stayed behind as usual and, when no-one was looking, ate the remaining food and water. When the hunters discovered what had happened they punished him so badly that he developed cauliflower ears. Crying, he climbed a gum tree to get away, and that is why the bear cries Yarra and has cauliflower ears. He came back as a bear and became the tribe's totem. Tribal members are not allowed to eat or kill bears, as he was a member of the tribe'* (BTGIWC 1988:1).

The first European to encounter Aboriginal people in the region was John Oxley, a European explorer, who entered the New England region in 1818. Oxley described the Aboriginal people in the New England region as having poor condition and physique compared to the large manly figures he encountered in the interior (Oxley 1818). Oxley and later Cunningham both described the local Aboriginal people as flighty and were very often not able to interact with them as they would disappear when approached by white men. Tension is reported between many of the original squatters and land owners and the native people (Walker 1963:3). One event which took place close to the subject area is the alleged massacre of Aboriginal people by Edward Irby and his employees in retaliation for the alleged murder of a shepherd. Sources suggest that Irby and a few of his employees chased a group of Aboriginal people to Bluff Rock where they forced the Aboriginal people to jump from the cliff or shot those who would not jump. In a letter to his sister Irby writes of an incident;

> *'…got their fighting men together to attack us, so we punished them severely, and proved our superiority to them...'*(Irby n.d.:44-46).

However, in 1870 Thomas Keating (Irby's station manager) provides a more descriptive account of the massacre;

> *'The men got up to the top of the rock and threw the blacks off the rock onto the ground at the bottom. The front bit of the rock was a great bit from the ground below. A lot of the blacks got (killed) and a lot more crippled. None of that tribe was seen on the station after that'*(Keating in Thomas 1870).

Not all associations between the Aboriginal people of the New England region and European settlers were unpleasant. Many Aboriginal people were employed by station owners as permanent shepherds, stockmen and horse breakers and provisions of medicine and blankets was made available by the government in the early 1850's (Walker 1963:10-11).

8.3 Historical Land Use

John Oxley was the first explorer to travel through the New England area, while travelling to Port Macquarie in 1818. It is believed Allan Cunningham was the first to have approached within 15 miles of modern day Tenterfield after discovering Darling Downs in 1827 (Halliday 1988). Later, in 1840, the

Ogilvie brothers travelled through the area on their return journey to the Hunter River (Baldwin n.d.). The original settlement of the area was afforded by squatters who were continuously pressing northwards in a quest to find new grazing land for their stock (Baldwin n.d.). Deepwater station, to the south-west of the subject area, was taken up in 1839. Archibald and Charles Windeyer were the original owners of Deepwater station. William Collin, who later became Deepwater station manager, took up the land for the Windeyer brothers in 1939 (Halliday 1988).

The first recorded use of the Bolivia name was in 1840 when a South American squatter took-up land between Deepwater and Tenterfield (NPWS 2011). Bolivia Station was taken up by Edward Irby in 1843 and was utilised for sheep and cattle (Halliday 1988). A part of the subject area crosses the southern corner of Bolivia Station. As discussed previously, a massacre of Aboriginal people reportedly occurred at Bluff Rock in 1844. The massacre involved the Irby brother of Bolivia Station, who found one of their shepherds had been attacked with spears and axes and left floating in the river. The Irby brothers, assisted by Windeyer of the neighbouring Deepwater station, pursued the local Aboriginal tribe to Bluff rock and drove them over the edge. This resulted in the death of several men, women and children (New England Examiner 1870). Another massacre occurred at Deepwater station, also in 1844, which resulted in the death of seven Aboriginal men, four Aboriginal women and five Aboriginal children (AMBS 2010:30).

The Main Northern Railway line was the original rail transport route between Sydney and Brisbane, primarily constructed by the Hunter River Railway Company (Halliday 2004). It was the Cobb and Co. coaching company, however, that won the railway construction contract between Glen Innes and Tenterfield. Work began in 1884, however in the same year work between Deepwater and Tenterfield ceased due to strike action by the labourers whose wage had been reduced. Work was delayed again in 1884 as several thousand sleepers, along with other timber used in the construction of culverts and bridges, were condemned. The railway line was eventually extended through Bolivia Hill and up to Tenterfield in 1886 (Halliday 2004). The development of the northern railway line improved transport to the New England region. Where there had previously been more than 500 teams working the road between the tablelands and the coast, the railway line meant that these teams were reduced significantly and the speed and efficiency of transport was greatly improved. The construction of the railway also saw the development of several new towns including: Bolivia, Sandy Flat, Bungulla and Bluff Rock (Halliday 2004).

In the 1900's Bolivia Station was subdivided into smaller blocks which include Clifferna, Gallipoli and The Shinnies (NPWS 2011).

8.4 Summary

The area in the vicinity of the subject area has been the subject of archaeological study since the late 1960's. The archaeological work completed in the region is a mixture of impact assessments for various infrastructure projects and academic research. To date, the main research issues that have been dealt

with by these studies have been to determine the presence or absence of sites, characterisation of where sites occur in the landscape and the chronology and sequence of occupation of the region. The subject area contains a landscape with plentiful resources and evidence suggests it was extensively utilised by Aboriginal people in the past. Historic land use has disturbed some of the ground surface however pockets of land exist within the subject area which is reasonably undisturbed and is likely to contain evidence of past Aboriginal occupation.

9. Predictive Model

Based on review of previous archaeological assessments in the broader region, the topography and geology of the landscape, a search of the AHIMS register and review of previous archaeological studies from the wider region, it is likely that Aboriginal heritage sites occur within the subject area.

The following should be considered when predicting the location and type of sites in the subject area;

- Access to water including temporary water sources, springs, ephemeral creeks and lakes as well as large and permanent water sources;
- Climatic conditions, landscapes which are well protected from both extremes of the elements; and
- Access to raw materials (quality stone) for the manufacture of stone tools.

Pearson (1981 cited in Kelton 1998) also suggests the following factors are important in predicting the location of Aboriginal heritage sites;

- Level ground with good drainage;
- Elevation above cold air currents and lingering front prone valley systems often with good views of the river flats and water courses; and
- Adequate fuel supplies.

The site types which are most likely to occur include: open camp sites, isolated artefacts, rock art sites, scarred trees and bora/ceremonial sites.

Table 5: Aboriginal heritage site types predicted to occur in the subject area

Site Type	Details
Open camp sites	Open camp sites in the area may consist of stone artefact scatters and other evidence of occupation such as hearths. Open camp sites represent the most common type of Aboriginal heritage site. This site type usually occurs as surface artefact scatters in areas of low vegetation and good ground surface visibility. Open camp sites may also contain subsurface archaeological deposits. Open camp sites will most often occur around resource rich areas such as permanent and reliable water sources.
Isolated artefacts	Isolated artefacts are stone tools which represent a discard event, or a single and limited knapping event. Isolated artefacts may be located in any landform in areas of low vegetation and good ground surface visibility.
Rock art sites	Rock art sites may occur on rock outcrops or in rock shelters. Rock art (engravings) may occur on high points in the landscape but can occur on any suitably flat and fine grained stone surface. Rock art (paintings) may occur in rock shelters that are well sheltered from weathering. The geology of the study area indicates rock art may occur.
Scarred Trees	Tree bark was utilised by Aboriginal people for various purposes including canoes, shields, coolamons and construction of bark huts. The removal of bark results in a scar being left of the tree. Scar trees usually occur in areas of remnant and mature vegetation however they can also occur in areas where Aboriginal people camped in the more recent past such as pastoral runs, stations and missions.
Bora/Ceremonial Sites	Aboriginal ceremonial sites are places which have ceremonial or spiritual connections. Ceremonial sites may comprise of natural landscapes or have archaeological material. Bora sites are ceremonial sites which consist of a cleared area and earthen rings. There is one ceremonial site recorded near

Site Type	Details
	the study area at Sandy Flat.
Stone Arrangements	Stone arrangements usually consist of arrangements of stone on rock outcrops of mid-slopes. Some stone arrangements are circular while others are linear or pathways. Stone arrangements are generally ceremonial.
Burial sites	Aboriginal burial sites often occur in soft and sandy soils close to rivers and creeks; they can also occur in rock shelters and middens. In some cases, Aboriginal burials are marked by carved or scarred trees, stone arrangements or other landmarks.
Axe Grinding Grooves	Axe grinding grooves are made by rubbing a stone against a natural rock surface. Axe grinding grooves may occur in creek beds or areas where other soft rock occurs.
Contact/Historical Sites	These sites occur when there has been a historical interaction between Aboriginal people and early settlers or explorers.
Quarries	Aboriginal quarry sites are sources of raw material which has been utilised for the manufacture of stone tools or the procurement of ochre.

Summary

Isolated artefacts, open camp sites (artefact scatters), scar trees and rock art are the most likely Aboriginal archaeological sites to occur within the subject area. There are first and second order creek lines running through the subject area, which are substantial and would have provided a permanent source of water. Water-related landforms are most likely to contain Aboriginal archaeological sites. The soils adjacent to the water-related landforms are also likely to contain subsurface archaeological deposit, although the potential for these soils to contain intact stratigraphy is unknown. The subject area also contains clusters of granite outcrops, which may be suitable canvases for rock art sites. The granite outcrops may also provide an environment with small rock shelters or overhangs suitable for occupation. A bora/ceremonial site is registered on the AHIMS as occurring within 5km^2 of the subject area, a review of sites in the broader region have also identified ceremonial sites. If ceremonial sites exist in the subject area, bora rings would be expected to occur on the flat plains; similarly stone arrangements may also occur in the subject area but would be expected to occur in the upper slope landform.

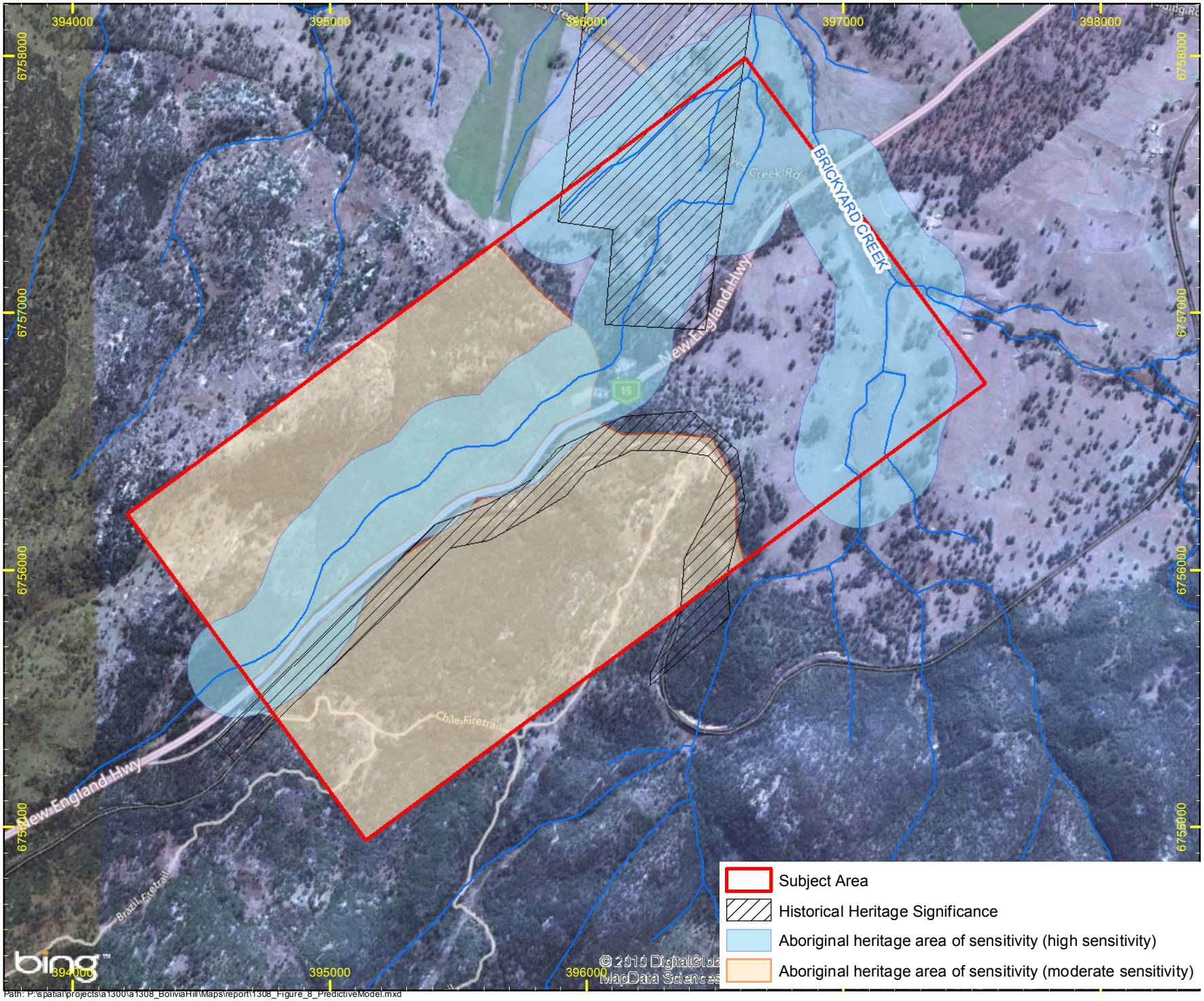

Figure 8: Predictive Model

1308 Bolivia Hill

Drawn by: EM
Project Mgr: FJL

Date: 18/06/2013

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Environment and Heritage

Horizontal Datum:
GDA 1994 MGA Zone 56

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10. Field Methods

The following methods were used to identify heritage values and significant cultural themes for the subject area:

- Aboriginal community input – this would be sought via participation in archaeological fieldwork and other correspondence;
- archaeological research, including a review of the regional ethnohistory, landscape characterisation and field survey.

A sound sampling strategy is required under the terms of the Code (DECCW 2010a) which states that:

Sampling must:

- *include all landforms that will potentially be impacted. Where there is more than one instance of similar or the same landforms that have the potential to be impacted each individual landform must be sampled.*
- *place a proportional emphasis on those landforms deemed to have archaeological potential, clearly describing and justifying the reasons for their selection (see Requirement 4).*

The sampling strategy must:

- *describe how sampling relates to the footprint that is proposed to be impacted by the development.*
- *clearly state when a full coverage survey will be undertaken and justify when it is not.*

The survey was undertaken, between Monday 14th and Friday 18th January 2013, through a combination of survey transects and sampling landforms identified within the subject area (survey units). Initially, it was expected the survey team would traverse the proposed route options in transects, however on inspection of the subject area it became apparent that there was very steep terrain and the original methodology would not be the most appropriate way to survey the proposed route options. The survey methodology was modified and a sampling strategy was employed. Each of the landforms were sampled by the survey team; this provided a good indication of the sites types which occurred or would be likely to occur in the subject area.

A non-differential hand held GPS unit was used to record all transects and appropriate site data for the survey. The following information was recorded for each survey unit:

- Representative photographs were taken of all survey units and landforms where they were thought to be informative to the overall Aboriginal archaeological report.
- A proportional emphasis was placed on the landforms identified within the predictive model as likely to contain Aboriginal archaeological objects or sites.
- Land surface and vegetation types.
- Exposure, defined as an estimate of the area which has a likelihood of revealing buried artefacts or deposits. It is the percentage of land for which erosion and exposure was sufficient

to reveal archaeological evidence on the surface of the ground, i.e. visibility refers to what reveals (Burke and Smith 2004:78-80).

- Archaeological visibility, defined as the amount of bare ground on the exposures which might reveal artefacts or other archaeological materials, i.e. visibility refers to what conceals (Burke and Smith 2004:78-80).
- Effective survey coverage area (the area of the survey unit multiplied by the visibility percentage and exposure percentage, given either in square metres or hectares).
- Any Aboriginal archaeological sites identified were recorded, using an iPad, to a detail in keeping with the site cards required by the OEH for accession of sites to the AHIMS register. The site card template can be accessed at the following website: http://www.environment.nsw.gov.au/licences/DECCAHIMSSiteRecordingForm.htm

Methods of assessing heritage significance

Heritage significance was assessed by considering each cultural or archaeological site against the significance criteria set out in the *DECCW Aboriginal Cultural Heritage Standards and Guidelines Kit*. The individual places were considered for their connectedness with each other and their contribution to the cultural landscape.

The cultural landscape was assessed by weaving the tangible and intangible aspects of the heritage values together, and identifying precincts and themes of significance wherever possible.

In all cases the assessment of significance was informed by the Aboriginal community, and this is documented in this report. If any culturally sensitive values were identified they would not be specifically included in the report, or made publicly available, but would be documented and lodged with the knowledge holder providing the information.

11. Results

The survey covered five primary landforms: upper slopes, mid slopes, lower slopes, the creek line and disturbed access tracks. Four Aboriginal heritage sites and four areas of PAD were located during the field survey.

10.1 Survey Conditions

Overall, survey coverage was poor due to the dense grasses and leafy debris covering the ground surface. Surface exposure was generally limited to pre-existing tracks or areas of historical disturbance. The mid-slope was extremely steep in parts of the survey area and was difficult to access by foot; some areas were completely inaccessible because of the degree of slope and dense understory. Aboriginal heritage sites were located in areas of good archaeological exposure, however, some areas of high archaeological potential had very little or no archaeological exposure and these areas were designated as PAD. A summary table of the coverage of these landforms is outlined below in Table 6.

Table 6: Survey coverage data

Transect ID	Landform	Area (sq.m)	Visibility	Exposure	Effective Cov Area (sq.m)	Effective Cov %
1	Upper slope	107,485	5%	2%	107.5	0.1%
2	Mid slope	592,144	5%	2%	592	0.1%
3	Lower slope	412,571	1%	1%	10.7	0.01%
4	Creek line	20,110	0%	0%	0	0%
5	Creek line	120,000	2%	2%	48	0.04%
6	Access tracks	1800	60%	70%	756	42%
		1,254,110 m²			**1,514.2m²**	**42.25%**

Table 7: Aboriginal heritage sites located on the assessed landforms

Transect ID	Landform	No of Sites	Site Types	Effective Coverage %
1	Upper slope	1	Rock art site	0.1%
2	Mid slope	0	Nil	0.1%
3	Lower slope	2	PAD	0.01%
4	Creek line	0	Nil	0%
5	Creek line	5	Grinding grooves site, artefact scatter, culturally modified scar tree, PAD	0.04%
6	Access tracks	0	Nil	42%
		8		

Transect 1 – Upper Slope

Transect 1 covered the north-western reaches of the upper slope and extended east. This transect was moderately vegetated with open woodland and low shrubs. There were minimal grasses however the ground surface was covered in leafy debris. There was very limited archaeological exposure however it was not expected that artefact scatters would be located within this landform. The geology of this transect, the Bolivia Range Leucomonzogranite, was evident is large clusters of granite outcrops. This is

a common environment for site types such as rock art sites, rock shelter or rock overhand sites and stone arrangement sites. One site was found on the upper slope landform, a rock art and rock shelter site (See site description Bolivia RA1).

Plate 1: A typical representation of the upper slope landform within the subject area.

Transect 2 – Mid-Slope

Transect 2 covered the north-western reaches of the mid slope and extended east. The topography was very steep and difficult to survey, the average slope being greater than 20 degrees. This transect was moderately vegetated with open woodland and low shrubs. There were minimal grasses however the ground surface was covered in leafy debris. There was very limited archaeological exposure however it was not expected that artefact scatters would be located on this landform. The geology of this transect, the Bolivia Range Leucomonzogranite, was evident in large clusters of granite outcrops. Although this landform contains clusters of granite, it is considered too steep to be a suitable environment for Aboriginal heritage sites. No sites were located in this landform.

Plate 2: Typical topography and vegetation of the mid-slope.

Transect 3 – Lower Slope

Transect 3 covered the north-western reaches of the lower slope and extended east. The topography was moderately steep to undulating. This transect was heavily vegetated with open woodland, low shrubs and tall grasses. There was very limited archaeological exposure which made it difficult to determine whether Aboriginal occupation sites, such as artefact scatters, exist on this landform. The geology of this transect, the Bolivia Range Leucomonzogranite, was evident in large clusters of granite outcrops. The granite outcrops on this landform had potential to create overhangs and small rock shelters and therefore potential Aboriginal occupation sites, however the overhangs identified during the survey did not contain any evidence of occupation. A culturally modified scar tree was located on this landform.

Plate 3: Typical topography and vegetation on the lower slope landform.

Transects 4 & 5 – Creek lines

Transects 4 & 5 covered the creek lines running through the subject area. The creek lines were identified as Brickyard Creek and its tributaries. The topography was moderately steep to undulating with the occasional area of very steep topography. This transect was very heavily vegetated with open woodland, low shrubs and tall, dense grasses. There was very limited archaeological exposure which made it difficult to determine whether Aboriginal occupation sites, such as artefact scatters, exist on this landform. In this landform granite was identified in the creek beds, creating large platforms, as well as small overhangs adjacent to the creek line. The overhangs were inspected during the site survey but had no evidence of occupation. However, a granite platform contained within the creek showed evidence of occupation in the form of a grinding groove site. One large exposure adjacent to the creek

line contained a low density artefact scatter. Due to the dense vegetation and likelihood of further Aboriginal occupation sites existing along the creek line multiple areas in this landform were deemed to have PAD. Six heritage sites were recorded in this landform.

Plate 4: Typical topography and vegetation along the creek lines (Transects 4 & 5).

Transect 6 – Pre-existing vehicle or foot tracks.

Transect 6 covers the multiple access tracks which exist throughout the subject area. The access tracks are cleared of vegetation and the topography varies however generally the access tracks are on flat or slightly undulating ground. The access tracks were treated as a separate transect due to the very good archaeological exposure; generally access tracks had over 80% visibility. No Aboriginal heritage sites were located on the access tracks.

Plate 5: Typical exposure and archaeological visibility on access tracks in the subject area.

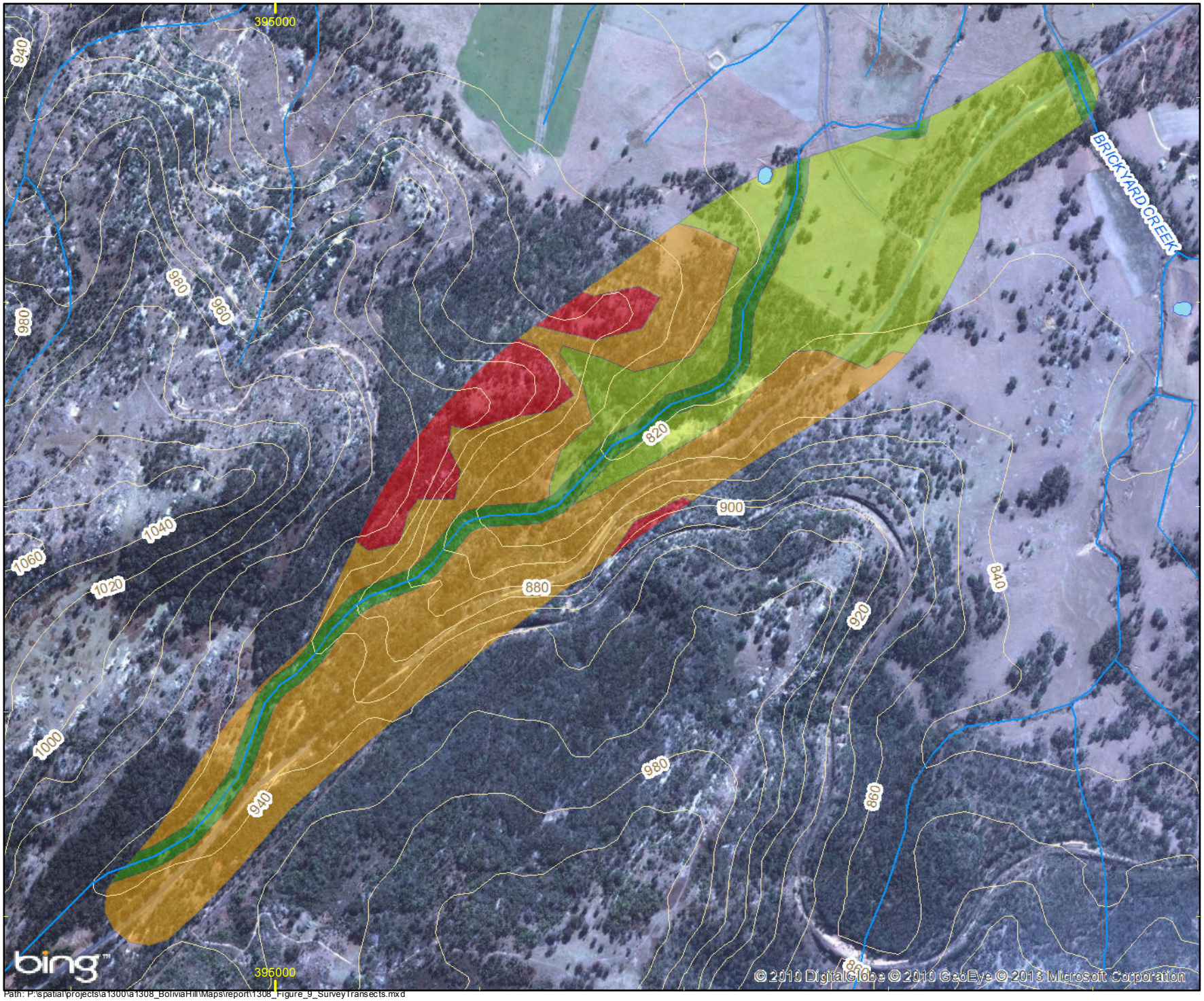

Figure 9: Survey Transects

1308 Bolivia Hill

Drawn by: RJ
Project Mgr: FJL

Date: 18/06/2013

Survey Stratification

- Upper slope
- Mid slope
- Lower slope
- Creekline

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10.2 Survey Results

The surface survey located four Aboriginal heritage sites and four areas of PAD (Site descriptions in Table 9 through 16). Site Bolivia Hill RA1 is located outside of the subject area while the remaining seven sites are located within the subject area.

Table 8: Summary of sites located during the surface survey

Site	Feature (s)	Survey Unit	Landform
Bolivia Hill AS1	Artefact Scatter and PAD	5	Creek line
Bolivia Hill CMST1	Culturally modified scar tree	5	Creek line
Bolivia Hill GG1	Grinding Grooves site	5	Creek line
Bolivia Hill RA1	Rock Art site	1	Upper Slope
Bolivia Hill PAD1	PAD	3	Lower Slope
Bolivia Hill PAD2	PAD	3	Lower Slope
Bolivia Hill PAD 3 (AS1)	PAD and artefact scatter	5	Creek line
Bolivia Hill PAD 4	PAD	5	Creek line

Table 9: Site Bolivia Hill AS1

Site 1: Bolivia Hill AS1	
Location	56 J E: 395990 N:6756688 Bolivia Hill AS1 is a low density artefact scatter located on a large exposure approximately 50m south-west of Bolivia Creek. There is a large area of historical disturbance, quarrying, located adjacent to the artefact scatter. The creek terrace also contains an area of PAD.
Vegetation	The site is relatively void of vegetation however the area designated as PAD is covered with scrub and low grasses. The area is heavily eroded by surface wash, historical disturbance and is generally in poor condition.
Water	The closest source of permanent water is Bolivia Creek located approximately 50m north-east of the site.
Site Description	The site comprises of 9 artefacts, 6 stone artefacts and 3 ceramic artefacts, located on a heavily eroded and disturbed surface. The total site covers an area of 400m^2 contained within an area of PAD; the PAD is approximately 4500m^2. The assemblage includes; Dolerite Core – 40mm x 20mm, 26g, 4 flake scars. Dolerite Flake – flaked platform, feather termination, 49mm x 51mm, 59g, tertiary with 0% cortex. Dolerite Flaked tool (bladelette) flaked platform, feather termination, 77m x 21mm, 16g, dorsal surface has 4 flake scars and 2% edge wear damage. Dolerite Core – 46mm x 39mm, 41g, 4 flake scars. Dolerite medial flake fragment – 11mm x 34mm, 3g and 5% cortex. Sandstone Hammerstone – 96mm x 65mm with pitting on one end. Ceramic flake – Flaked platform & hinge termination, 72mm x 35mm. Ceramic distal flake fragment – Hinge termination, 28mm x 7mm. Ceramic core – 52mm x 25mm, 2 flake scars.
Potential Archaeological Deposit	An area approximately 4500m^2 within the site has been designated as PAD. The erosion around the site suggests that at least a 40cm deep residual soil may contain stratified archaeological remains.
Photo (s)	 Plate 6: Overview of site Bolivia Hill AS1.

Plate 7: Stone artefact found at site Bolivia Hill AS1.

Table 10: Site Bolivia Hill GG1

Site 2: Bolivia Hill GG1	
Location	56 J E: 395048 N:6756124 Bolivia Hill GG1 is a patch of grinding grooves located on a smooth outcrop of granite within Bolivia Creek, creek bed approximately 80m north-east of the New England Hwy, Bolivia.
Vegetation	The site is void of vegetation however the area surrounding the site has dense scrubby vegetation and open woodland.
Water	The closest source of permanent water is Bolivia Creek. The site is located in the creek bed.
Site Description	The site comprises of 2 distinct grinding grooves and a patch of grinding grooves, the number of grooves in the patch is indeterminate. The entire site covers an area of 1m2. Grinding groove #1 – 210mm length x 50mm width x 3mm depth. Grinding groove #2 – 60mm length x 25mm width x 2mm depth.
Potential Archaeological Deposit	The site is located on a granite outcrop and does not have the potential to contain any subsurface archaeological deposit.
Photo (s)	 Plate 8: Grinding groove.

Table 11: Site Bolivia Hill CMST1

Site 3: Bolivia Hill CMST1	
Location	56 J E: 395024 N:6756141 Bolivia Hill ST1 is a culturally modified scar tree located on a lower slope approximately 50m south-west of Bolivia Creek.
Vegetation	The culturally modified scar tree is located in an open woodland environment with some understory.
Water	The closest source of permanent water is Bolivia Creek. The culturally modified scar tree is located approximately 50m south-west of the creek.
Site Description	The culturally modified scar tree comprises of one south-facing scar on a yellow box tree. The bottom of the scar is located 500mm from the base of the tree. Scar dimensions; 1160mm height 140mm width 80mm overgrowth thickness 160mm overgrowth width The scar is in good condition however the tree is in fair condition. It is dead and partially felled and also exhibits evidence of fire damage, rot and insect damage. The tree has been cut off approximately 400mm above the scar.
Potential Archaeological Deposit	The site is located in an area with large granite boulders protruding from the ground surface, it is unlikely that there is subsurface deposit associated with the CMST.
Photo (s)	 Plate 9: Bolivia Hill CMST1, culturally modified scar tree.

Table 12: Site Bolivia Hill RA1

Site 4: Bolivia Hill RA1	
Location	56 J E: 395146 N:6757078 Bolivia Hill RA1 is a rock art site located on the face of a large boulder. The boulder is located on a ridgeline approximately 1.5km north-west of Bolivia Creek.
Vegetation	The rock art site is located in an open woodland environment.
Water	The closest source of permanent water is Bolivia Creek. The rock art site is located approximately 1.5km north-west of the creek. There are small unnamed drainage channels approximately 100m from Bolivia Hill RA1.
Site Description	The rock art is located on a the southern face of a large granite boulder. The estimated height of the boulder is about 5m and the width is 2m. The rock art is badly weathered and it was difficult to determine the number and type of motifs. A trident drawn in yellow ochre measured 180mm in length and 110mm in width. The motif was is very poor condition due to weathering. The rock art site is adjacent to a rock shelter known as 'Thunderbolt's Cave'. The rock shelter contains a small deposit (approx. 2m^2) which is level and may contain archaeological deposit.
Potential Archaeological Deposit	The site is located in an area with large granite boulders protruding from the ground surface. It is unlikely that there is subsurface deposit associated with the rock art.
Photo (s)	 Plate 10: Thunderbolts cave.  Plate 11: Bolivia RA1 rock art.

Table 13: Site Bolivia Hill PAD1

Site 5: Bolivia Hill PAD1	
Location	56 J E: 396730 N:6757802 Bolivia Hill PAD1 is an area of PAD located 30m south-east of Brickyard Creek
Vegetation	The PAD is located in a mostly cleared environment however some remnant open woodland exists in small clusters.
Water	The closest source of permanent water is Brickyard Creek. The PAD site is located approximately 30m south-east of the creek.
Site Description	Eroded banks of the creek should intact stratigraphy in deep (over 1.5m) alluvial soils. The PAD is located on a small sandy rise overlooking the creek. Surface visibility was less than 1%, therefore it could not be determined if surface artefacts were present. The total area of the PAD is 7289m^2.
Potential Archaeological Deposit	Site 5 has the high likelihood to contain PAD.
Photo (s)	 Plate 12: Overview of Bolivia Hill PAD1.

Table 14: Site Bolivia Hill PAD

Site 6: Bolivia Hill PAD2	
Location	56 J E: 396730 N:6757802 Bolivia Hill PAD2 is an area of PAD located on both sides of Brickyard Creek.
Vegetation	The PAD is located in a mostly cleared environment however some remnant open woodland exists in small clusters.
Water	The closest source of permanent water is BrickyardCreek. The PAD site is located both sides of the creek.
Site Description	Eroded banks of the creek should intact stratigraphy in deep (over 1.5m) alluvial soils. The PAD is located along both sides of the creek. Surface visibility was less than 1%, therefore it could not be determined if surface artefacts were present. The total area of the PAD is 11559m^2.
Potential Archaeological Deposit	Site 6 has the high potential to contain PAD.
Photo (s)	 Plate 13: Overview of Bolivia Hill PAD 2.

Table 15: Site Bolivia Hill PAD3

Site 7: Bolivia Hill PAD3	
Location	56 J E: 395990 N: 6756688 Bolivia Hill PAD3 is an area of PAD located 30m south-east of Bolivia Creek and is associated with site Bolivia Hill AS1.
Vegetation	The PAD is located in a mostly cleared environment however some remnant open woodland exists in small clusters.
Water	The closest source of permanent water is Bolivia Creek. The PAD site is located approximately 30m south-east of the creek.
Site Description	The PAD is located around site Bolivia Hill AS1 (an artefact scatter), most of the area is heavily eroded from surface water wash and a historic mining activity however some patches of residual soil remain and are likely to contain PAD. Eroded banks of the creek show intact stratigraphy in a moderately deep (0.75m) alluvial soils. Surface artefacts are present. The total area of the PAD is 4560m^2.
Potential Archaeological Deposit	Site 7 has the high potential to contain PAD.
Photo (s)	 Plate 14: Overview of Bolivia Hill PAD3.

Table 16: Site Bolivia Hill PAD4

Site 8: Bolivia Hill PAD4	
Location	56 J E: 395886 N: 6756743 Bolivia Hill PAD4 is an area of potential archaeological deposit (PAD) located 30m north-west of Bolivia Creek.
Vegetation	The PAD is located in a grassland environment with small clusters of open woodland.
Water	The closest source of permanent water is Bolivia Creek. The PAD site is located approximately 30m north-west of the creek.
Site Description	Eroded banks of the creek indicate intact stratigraphy in deep (over 1.5m) alluvial soils. The PAD is located on a moderately sized sandy rise overlooking the creek. Surface visibility was less than 1%, therefore it could not be determined if surface artefacts were present. The total area of the PAD is 7189m^2.
Potential Archaeological Deposit	Site 8 has the high potential to contain PAD.
Photo (s)	 Plate 15: Overview of Bolivia Hill PAD4.

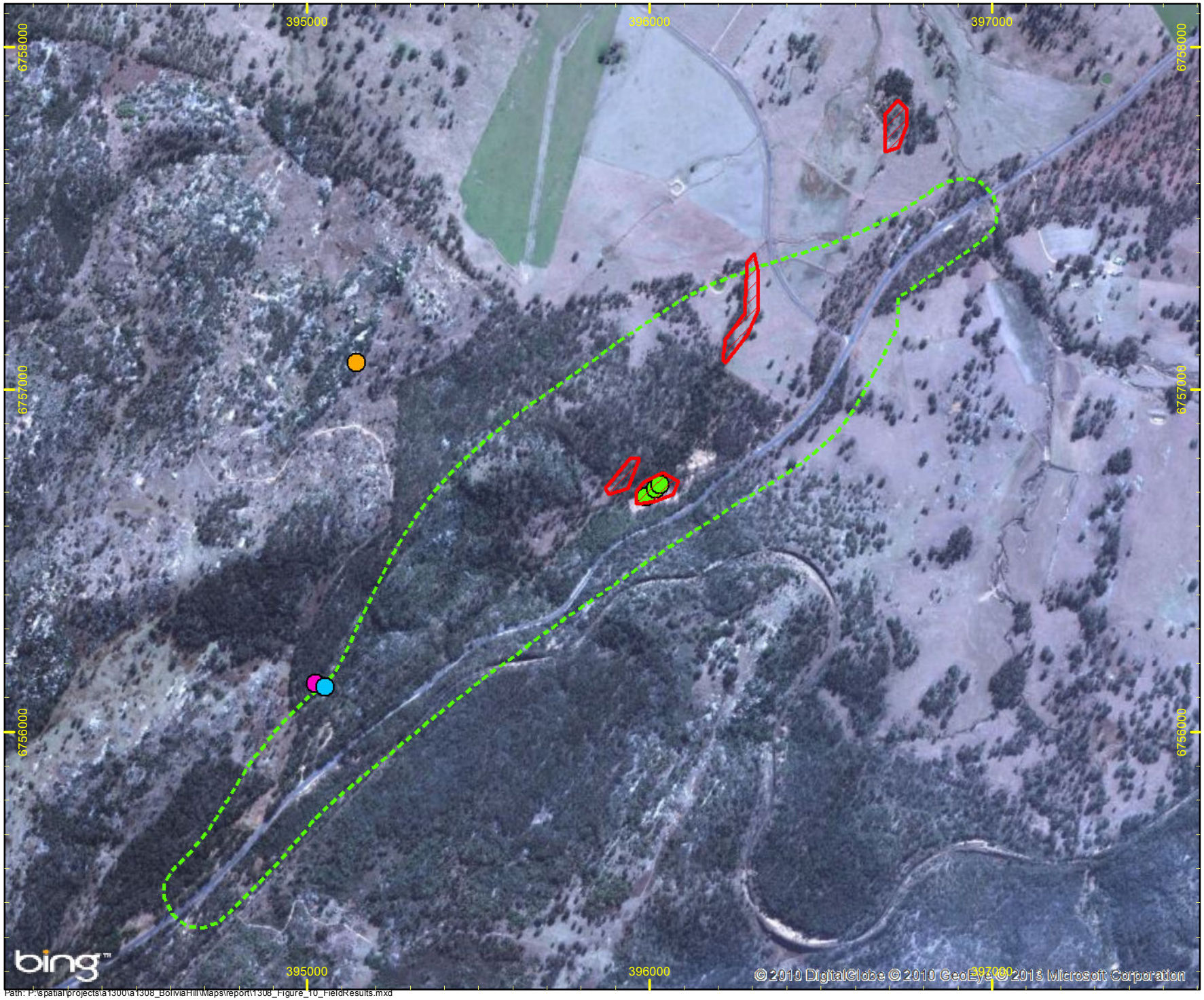

Figure 10: Field Results

1308 Bolivia Hill

Drawn by: RJ
Project Mgr: FJL

Date: 18/06/2013

Route Options Buffer
PAD
Field Results
- Artefact scatter
- Scarred tree
- Grinding grooves
- Rock art

N
W E
S

Metres
0 200 400 600

niche
Environment and Heritage

Horizontal Datum:
GDA 1994 MGA Zone 56

Path: P:\spatial\projects\a1300\a1308_BoliviaHill\Maps\report\1308_Figure_10_FieldResults.mxd

12. Analysis and Discussion

The subject area is located in an area rich in resources with plentiful water and shelter. An AHIMS search revealed very few registered Aboriginal heritage sites in proximity to the subject area, however, more extensive background research suggested that many site types were likely to occur within the subject area. A predictive model (Section 9 above), based on landform, hydrology, ethnographic and historic accounts and previously archaeological investigations was developed for the subject area. It is based on the archaeological and environmental context of a broader region as there are few previously registered Aboriginal heritage sites in proximity to the subject area. The predictive model suggests the site types most likely expected to occur within the subject area included, isolated finds, open camp sites (artefact scatter), rock art, scarred tree and ceremonial sites (either bora grounds or stone arrangements). The predictive model also suggests that other site types may be found in the subject including, burial sites, axe grinding groove sites, contact/historical sites and quarry sites. The surface survey validated these predications by locating an open camp site (artefact scatter), rock art site, a culturally modified tree and a grinding groove site. The sites located during the surface survey were also located in the expected landforms with past occupational activity focused on and around the creek lines and lower slopes. The rock art site was located in the granite clusters along the ridgeline in the upper slope.

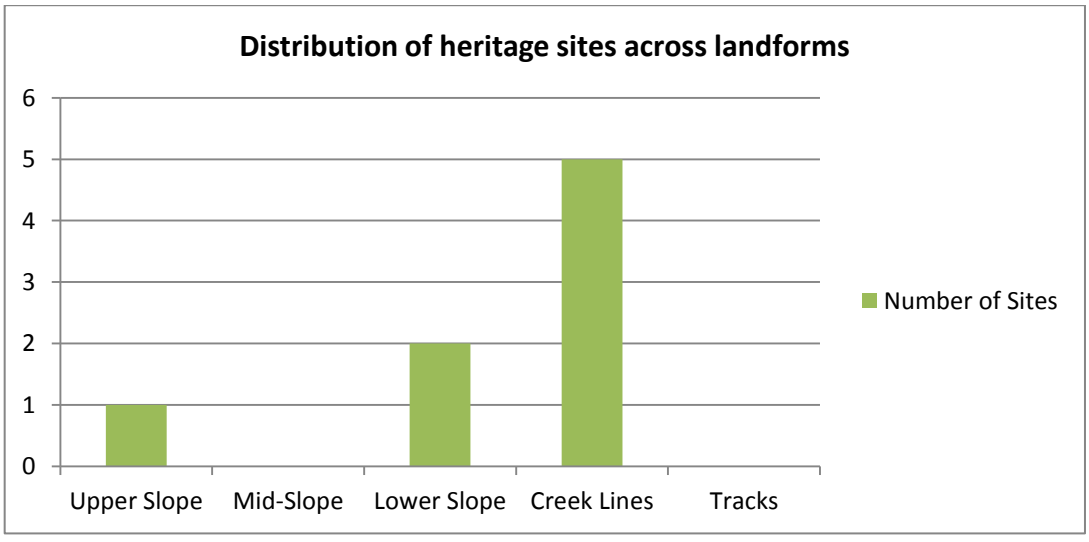

Figure 11: Distribution of heritage sites across landforms in the subject area.

The archaeological sites located during the field survey provide evidence of past Aboriginal occupation in the hinterlands environment. Archaeological predictive models usually place past occupation around waterways, such as rivers, or large bodies of water (e.g. lakes or the coastlines). However, there is a lot of evidence to suggest hinterland land use in times of climatic change or resource stress (Pardoe 2003).

It is suggested that the Ngurrabul people, local to the Bolivia area, moved through the New England region seasonally, occupying the hinterlands during times of plentiful resources (most likely the warmer months) and moving to the coast when fish and other sea foods were abundant (Bowdler and Coleman 1981:12-3; McBryde 1974:9; Kerr *et al* 1999:18-19). The rich resources of the subject area make it a likely location for Aboriginal people during time of hinterland occupation. This model of occupation is commonly used in other regions of NSW. Pardoe (2003) has developed a model in western NSW which suggest that hinterland areas may have been utilized by Aboriginal people while food and water resources were available, leaving substantial resources in the vicinity of major water bodies for times of resource stress. This model predicted more intensive use of hinterland areas, especially those associated with small or temporary water supplies. Historical accounts from the Bolivia region support Pardoe's (2003) model of movement through the landscape as well as the accounts by Bowdler and Coleman (1981), McBryde (1974) and Kerr *et al* (1999). Climate impacts may have also being a motive for people to have moved throughout the landscape as research indicates that the area surrounding the subject area can be very cold (less than 0^{o}C) in the winter months, while the coastal region had milder temperatures. The movement of people through the landscape relies heavily on historical accounts as little archaeological data exists in the Bolivia region to support the movement of people between hinterland and coastal environments. Further archaeological research is required to support historical accounts.

The site types located during the field survey indicate long term occupation and camping rather than evidence of traversing through the landscape or simply a transport corridor. The grinding groove site particularly, provides evidence of a manufacture site. McBryde (1974) states that grinding groove sites in the New England region are often associated with open camp sites or rock shelters with evidence of occupation. Site Bolivia Hill CMST1, a culturally modified scar tree, is located nearby the grinding groove site (c. 30m north-west) providing more evidence of occupation and activity surrounding the grinding grooves. The artefact scatter provides further evidence of manufacture, although it is not possible to determine the longevity of occupation based on the small surface assemblage at Bolivia Hill AS1. The source of the raw material, dolerite, is unknown although stone artefacts in the local area are commonly manufactured from this type of stone (*pers. comm.* Daley). The following aspects of this small assemblage are indicative of extended occupation:

- The artefacts are manufactured using good quality raw material from distant sources (Lurie 1989:47-48);
- the artefacts exhibit late stage reduction (Veth 1993:81); and
- there is a high flake to core ratio.

The examination and analysis of a much larger assemblage would be required to confirm the length of occupation at Bolivia Hill AS1. The chronology of the site, and therefore occupation of the area, is unknown although some of the artefacts at site Bolivia Hill AS1 are manufactured from telegraph line

insulators suggesting that occupation has extended into the recent past. Bolivia Hill AS1 contains some areas of residual soil, which have been designated as PAD. These residual soils may have retained intact stratigraphy. If this is the case, and datable material is recovered from the subsurface deposits, it may be possible to obtain a chronology of past occupation in the subject area.

Other areas of PAD (Bolivia Hill PAD1, PAD2 and PAD4) exist in the subject area. These are areas of similar landform and proximity to water as Bolivia Hill AS1, however there was very limited to non-existent surface visibility and archaeological exposure at the time of the surface survey. It is possible that these areas contain subsurface archaeological material, however the presence, and subsequently the significance, of any archaeological material in these areas is unknown.

The rock art site, located just outside of the subject area, is a single motif depicting an emu track (trident) drawn using yellow ochre. Aboriginal rock art often depicts events, people or animals seen in everyday life. Emus were commonly found in the subject area and surrounding areas, therefore it is not unusual that an emu track would be painted/drawn by Aboriginal people occupying the local area. The rock art site is located adjacent to 'Thunderbolts Cave', which is a known hideout of the bushranger known as Thunderbolt. It is not known whether the rock art was drawn before, during or after Thunderbolt's occupation of the adjacent rock shelter. The adjacent rock shelter contains a small PAD. The level floor space covers an area of approximately $2m^2$ and has the potential to contain both Aboriginal artefacts and historical relics.

The Aboriginal heritage sites and areas of potential archaeological deposit, which were identified during the surface survey, verify the expectations of the predictive model. The sites provide evidence of Aboriginal occupation in a hinterland environment in the New England tablelands, an occupation which is supported by historic accounts. However, little is known about this occupation other than its presence and that Aboriginal people were manufacturing tools in that environment. To understand the chronology, longevity and patterns of occupation more archaeological research, including subsurface testing of PADs, is required.

13. Scientific Values and Significance Assessment

The *Burra Charter* (Australia ICOMOS 1999) defines the basic principles and procedures to be observed in the conservation of important places. It provides the primary framework within which decisions about the management of heritage sites in Australia should be made. The *Burra Charter* defines cultural significance as being derived from the following values:

Aesthetic value

Aesthetic value includes aspects of sensory perception for which criteria can and should be stated. Such criteria may include consideration of the form, scale, colour, texture and material of the fabric; the smells and sounds associated with the place and its use.

Historic value

Historic value encompasses the history of aesthetics, science and society, and therefore to a large extent underlies all of the terms set out in this section.

A place may have historic value because it has influenced, or has been influenced by, a historic figure, event, phase or activity. It may also have historic value as the site of an important event. For any given place the significance will be greater where evidence of the association or event survives in situ, or where the settings are substantially intact, than where it has been changed or evidence does not survive. However, some events or associations may be so important that the place retains significance regardless of subsequent treatment.

Scientific value

The scientific or research value of a place will depend upon the importance of the data involved, on its rarity, quality or representativeness, and on the degree to which the place may contribute further substantial information.

Social value

Social value embraces the qualities for which a place has become a focus of spiritual, political, national or other cultural sentiment to a majority or minority group.

Other approaches

The categorisation into aesthetic, historic, scientific and social values is one approach to understanding the concept of cultural significance. However, more precise categories may be developed as understanding of a particular place increases.

The NSW OEH (formally DECCW) guidelines for the significance assessment of Aboriginal archaeological sites are contained within the *Aboriginal Cultural Heritage Standards and Guidelines Kit* (National Parks and Wildlife Service 1997). The Kit identifies with two main streams in the overall significance

assessment process: the assessment of cultural/social significance to Aboriginal people and the assessment of scientific significance to archaeologists.

This approach encapsulates those aspects of the Burra Charter that are relevant to Aboriginal archaeological sites. The guidelines specify the following criteria for archaeological significance, as paraphrased below:

Research Potential

It is the potential to elucidate past behaviour which gives significance under this criterion rather than the potential to yield collections of artefacts. Matters considered under this criterion include:

- ❒ the intactness of a site;
- ❒ the potential for the site to build a chronology; and
- ❒ the connectedness of the site to other sites in the archaeological landscape.

Representativeness

As a criterion, representativeness is only meaningful in relation to a conservation objective. Presumably all sites are representative of those in their class or they would not be in that class. What is at issue is the extent to which a class of sites is conserved and whether the particular site being assessed should be conserved in order to ensure that we retain a representative sample of the archaeological record as a whole. The conservation objective which underwrites the 'representativeness' criteria is that such a sample should be conserved.

Rarity

This criterion cannot easily be separated from that of representativeness. If a site is 'distinctive' then it will, by definition, be part of the variability which a representative sample would represent. The criteria might best be approached as one which exists within the criteria of representativeness, giving a particular weighting to certain classes of site. The main requirement for being able to assess rarity will be to know what is common and what is unusual in the site record but also the way that archaeology confers prestige on certain sites because of their ability to provide certain information.

The criterion of rarity may be assessed at a range of levels: local, regional, state, national, and global.

Educational Potential

Heritage sites and areas should be conserved and managed in relation to their value to people. It is assumed that archaeologists have the ability to speak of the value of sites to members of their own profession. Where archaeologists or others carrying out assessments are speaking for the educational value of sites to the public, the onus is on them to go to the public for an assessment of this value, or to reputable studies which have canvassed public demand for education. The danger, otherwise, is that

archaeologists would be projecting their values onto a public which is itself given no voice on the matter.

Aesthetics

Archaeologists are not expected to include an assessment of aesthetic significance along with their assessment of scientific significance. In relation to heritage places, aesthetic significance is generally taken to mean the visual beauty of the place. Aesthetic value is not inherent in a place, but arises in the sensory response people have to it.

Although the guidelines provide no expectation for archaeologists to consider *aesthetic values* it is often the case that a site's or a landscape's aesthetic is a significant contributory value to significance. Examples of archaeological sites that may have high aesthetic values would be rock art sites, or sites located in environments that evoke strong sensory responses. For this reason we consider it appropriate to include aesthetic values as part of the significance assessment below.

Assessment of Archaeological Significance – Aboriginal Archaeological Sites

The subject area contains 4 Aboriginal heritage sites and 4 areas of PAD and is therefore concluded to have Aboriginal heritage significance.

Individual significance assessments are included below.

Table 17: Summary of the significance of sites in the subject area

Site Name	Cultural Significance	Archaeological Significance	Historical Significance	Aesthetic Significance	Overall Significance
Bolivia Hill AS1	Unknown	Moderate	Low	Low	Moderate
Bolivia Hill GG1	Unknown	Moderate	Low	Low	Moderate
Bolivia Hill CMST1	Unknown	Moderate	Low	Low	Moderate
Bolivia Hill RA1	Unknown	Moderate	Low	Moderate	Moderate
Bolivia Hill PAD1	Unknown	Unknown	Unknown	Unknown	Unknown
Bolivia Hill PAD 2	Unknown	Unknown	Unknown	Unknown	Unknown
Bolivia Hill PAD 3	Unknown	Unknown	Unknown	Unknown	Unknown
Bolivia Hill PAD 4	Unknown	Unknown	Unknown	Unknown	Unknown

Site Bolivia Hill AS1

Archaeological value

The archaeological value of this site is considered to be moderate due to the disturbed context in which it is found, however areas of residual soil (PAD3) may contain intact deposit. The stone and ceramic artefact appear to be no longer *in situ* however the artefacts can provide information about the procurement of raw material, the manufacture of tools and intra-site patterns. The location of the site reinforces the predictive model of site location and types in the area. The residual soil (PAD3) may

contain subsurface deposit which could contribute to the understanding of chronology and occupation of the hinterland environment in the broader region.

Cultural value

- ❒ Consultation with Aboriginal stakeholder groups did not form part of the scope of this project. It is therefore not possible to comment on the cultural values of the site.

Social value

- ❒ Consultation with Aboriginal stakeholder groups did not form part of the scope of this project. It is therefore not possible to comment on the social values of the site.

Historic value

Is the subject area important to the cultural or natural history of the local area and/or region and/or state?

- ❒ No. The subject area is representative of the broader geographic area.

Scientific (archaeological) value

Does the subject area have potential to yield information that would contribute to an understanding of the cultural or natural history of the local area and/or region and/or state?

- ❒ Yes Bolivia Hill AS1 has the potential to provide information about the occupation of the region. There is potential for further archaeological material to exist subsurface which could provide information about land use patterns and chronology of occupation in the area.

Aesthetic value

Is the subject area important in demonstrating aesthetic characteristics in the local area and/or region and/or state?

- ❒ No. Bolivia Hill AS1 does not have important aesthetic qualities or characteristics which are important in the local area and/or state.

Site Bolivia Hill GG1

Archaeological value

The archaeological value of this site is considered to be moderate as the grinding grooves are in very good condition and provide information about the type of tool manufacture occurring in the region. However, beyond this information the grinding groove can provide little additional information about the occupation of the subject area or broader region.

Cultural value

- ❒ Consultation with Aboriginal stakeholder groups did not form part of the scope of this project. It is therefore not possible to comment on the cultural values of the site.

Social value

- Consultation with Aboriginal stakeholder groups did not form part of the scope of this project. It is therefore not possible to comment on the social values of the site.

Historic value

Is the subject area important to the cultural or natural history of the local area and/or region and/or state?

- No. The subject area is representative of the broader geographic area.

Scientific (archaeological) value

Does the subject area have potential to yield information that would contribute to an understanding of the cultural or natural history of the local area and/or region and/or state?

- Bolivia Hill GG1 provides evidence of tool manufacture in the local area, however the site is limited in providing more detailed information about the occupation of the region. There is no potential for the site to provide any information about the chronology of occupation, resources utilised by people or movement through the landscape. It is unlikely that any residue, which could provide evidence of specific resource use, exists in the grinding grooves.

Aesthetic value

Is the subject area important in demonstrating aesthetic characteristics in the local area and/or region and/or state?

- No. The subject area is representative of the broader geographic area.

Site Bolivia Hill CMST1

Archaeological value

The archaeological value of this site is considered to be moderate as it provides evidence of resource use in the landscape and is possibly associated with site Bolivia Hill GG1, located nearby. The tree is in good condition and could be dated which may provide limited information about the chronology of occupation in the region. The function of the removed bark is not likely to be determined.

Cultural value

- Consultation with Aboriginal stakeholder groups did not form part of the scope of this project. It is therefore not possible to comment on the cultural values of the site.

Social value

- Consultation with Aboriginal stakeholder groups did not form part of the scope of this project. It is therefore not possible to comment on the social values of the site.

Historic value

Is the subject area important to the cultural or natural history of the local area and/or region and/or state?

- ❒ No. The subject area is representative of the broader geographic area.

Scientific (archaeological) value

Does the subject area have potential to yield information that would contribute to an understanding of the cultural or natural history of the local area and/or region and/or state?

- ❒ The scar tree provides evidence of resource use in the landscape. It is spatially close to site Bolivia Hill GG1 and possibly indicates an area of more intense occupation. It is possible to date scar trees and therefore this site has the potential to provide limited information about the chronology of occupation in the local area. It is not likely that the function of the removed bark can be determined.

Aesthetic value

Is the subject area important in demonstrating aesthetic characteristics in the local area and/or region and/or state?

- ❒ No. The subject area is representative of the broader geographic area.

Site Bolivia Hill RA1

Archaeological value

The archaeological value of this site is considered to be moderate due as it provides evidence of artistic style in the local area. A PAD located in an adjacent rock shelter has the potential to yield further information about the past occupation of the local area and hinterland land use.

Cultural value

- ❒ Consultation with Aboriginal stakeholder groups did not form part of the scope of this project. It is therefore not possible to comment on the cultural values of the site.

Social value

- ❒ Consultation with Aboriginal stakeholder groups did not form part of the scope of this project. It is therefore not possible to comment on the social values of the site.

Historic value

Is the subject area important to the cultural or natural history of the local area and/or region and/or state?

- ❒ No. The subject area is representative of the broader geographic area.

Scientific (archaeological) value

Does the subject area have potential to yield information that would contribute to an understanding of the cultural or natural history of the local area and/or region and/or state?

- Bolivia Hill RA1 and the adjacent PAD have the potential to provide information about land use in the hinterland environment. The PAD may contain subsurface deposit which could inform research questions relating to chronology, land use patterns and resource use.

Aesthetic value

Is the subject area important in demonstrating aesthetic characteristics in the local area and/or region and/or state?

- The rock art contributes to the understanding of artistic style in the region however it is comparative to other rock art sites recorded in the broader region. The art is in very poor condition and it is difficult to see.

Site Bolivia Hill PAD1, PAD 2 and PAD4

Archaeological value

The archaeological value of these sites is unknown. Until these sites are excavated it is not possible to determine the presence or absence or archaeological material and subsequently the significance of any archaeological material which might be present.

Cultural value

- Consultation with Aboriginal stakeholder groups did not form part of the scope of this project. It is therefore not possible to comment on the cultural values of the site

Social value

- Consultation with Aboriginal stakeholder groups did not form part of the scope of this project. It is therefore not possible to comment on the social values of the site

Historic value

Is the subject area important to the cultural or natural history of the local area and/or region and/or state?

- Unknown. The historical value of these sites is unknown.

Scientific (archaeological) value

Does the subject area have potential to yield information that would contribute to an understanding of the cultural or natural history of the local area and/or region and/or state?

- There is potential for subsurface Aboriginal archaeological deposit to be located in PAD 1, PAD2 and PAD 4. Due to the dense secondary regrowth vegetation cover, it was not possible to determine if any surface expression of these potential sites were manifested.

Aesthetic value

Is the subject area important in demonstrating aesthetic characteristics in the local area and/or region and/or state?

- Unknown. The aesthetic value of these sites is unknown.

14. Impact Assessment

A detailed surface survey was undertaken within the subject area, focussing on areas of visibility and areas of potential sensitivity, such as along the creek line. Eight Aboriginal heritage sites were identified as a result, site descriptions are included in section 10.2, and the site locations are shown in Figure 10.

Areas of archaeological sensitivity associated with the creek line were also located during the surface survey and are located within the proposed impact area (Figure 2). If the proposed route options are not altered, the proposed activities would result in direct harm to these areas of archaeological potential.

As the preferred route option has not been determined, it is not possible to determine which sites would or would not be impacted by the proposed development. Table 18 below outlines potential the impacts on all sites identified in this assessment of all four proposed route options, including a 100m buffer zone around each route option.

Table 18: Summary of Impact Assessment

Site Name	Type of Harm (Direct / Indirect / None)	Degree of Harm (Total / Partial / None)	Consequence of Harm (Total loss of value / Partial loss of value / No loss of value)
Bolivia Hill AS1	Direct (Options 6,7,7b)	Total	Total loss of value
Bolivia Hill CMST1	Direct (Options 6,7,10)	Total	Total loss of value
Bolivia Hill RA1	None	None	No loss of value
Bolivia Hill GG1	Direct (Options 6,7,10)	Total	Total loss of value
Bolivia Hill PAD 1	None	None	No loss of value
Bolivia Hill PAD 2	Direct (Option 10)	Partial	Partial loss of value
Bolivia Hill PAD 3	Direct (Options 6,7,7b)	Total	Total loss of value
Bolivia Hill PAD 4	Direct (Options 6,7)	Total	Total loss of value

15. Management and Mitigation Measures

The *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* (OEH 2011) requires that both direct and indirect harm be considered. Generally, direct harm refers to occasions where an activity physically impacts a site or objects and therefore affects the heritage values possessed by the site or objects. Indirect harm is usually taken to mean harm stemming from secondary consequences of the activity, and may affect sites or objects as a consequence of the activity. Examples of such indirect harm are increased visitors to a site or increased erosion in an area.

The two founding principles behind the *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* (OEH 2011:12) are ecologically sustainable development and intergenerational equity. These principles hold that "the present generation should make every effort to ensure the health, diversity and productivity of the environment – which includes cultural heritage – is available for the benefit of future generations". The strong emphasis, as in the Burra Charter, is to quantify and understand the heritage values of a place, a site, or an object and exhaust avenues of avoiding harm to those values. If harm cannot be avoided then there must be consideration and implementation of strategies to minimise harm (OEH 2011:13).

It follows that the hierarchy for consideration in regards to management strategies available for surface stone artefacts and subsurface stone artefacts and areas of archaeological potential fall into four general categories, in order of preference from a conservation perspective:

- avoidance and *in-situ* conservation;
- partial avoidance and partial *in-situ* conservation (includes partial harm);
- harm with mitigating circumstances such as collection or salvage; and
- unmitigated harm.

The proposed route options may impact and harm both Aboriginal heritage sites and areas of PAD. As the preferred route option has not yet been determined, the impact to sites of the preferred option cannot be confirmed.

Consultation with Aboriginal stakeholder groups did not form part of the scope of this project. It is therefore not possible to comment on the cultural and social values of the site and subsequently develop management strategies which mitigate the impact to cultural or intangible values of the place.

16. Recommendations

The following recommendations are made in relation to the subject area;

1. In the first instance, RMS should seek to avoid all areas of archaeological potential and all identified Aboriginal archaeological sites. Within the subject area, these include:
    a. Bolivia Hill AS1 (and PAD 3) as well as lands within 100m of the site;
    b. Bolivia Hill GG1 as well as lands within 100m of the site;
    c. Bolivia Hill CMST1 as well as lands within 100m of the site;
    d. Bolivia Hill RA1 as well as lands within 100m of the site; and
    e. Areas of archaeological potential recorded as Bolivia Hill PAD 1, Bolivia Hill PAD 2 and Bolivia Hill PAD 4.
2. If these areas cannot be avoided, additional works would be required before any impacts could occur. This would include the following:
    a. The implementation of RMS PACHI Stage 3: Formal consultation and preparation of a cultural heritage assessment report.
    b. Subsurface testing of Bolivia Hill PAD 1, Bolivia Hill PAD 2, Bolivia Hill PAD 3 and Bolivia Hill PAD 3 under the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW, 2010). Results of the testing would be used to inform RMS of the nature, extent and significance of any subsurface deposits within these areas.
    c. Additional salvage excavations may be required if any identified sites are subsequently assessed to be of high archaeological significance.
3. In the event the proposed development, and/or its ancillary works, impacts any archaeological site the RMS should implement PACHI Stage 3. PACHI Stage 3 includes the following steps:
    a. Seek the names of Aboriginal people with cultural knowledge by letter and notify native title holders;
    b. Notify Aboriginal people with cultural knowledge by letter;
    c. Notify Aboriginal people with cultural knowledge by advertisement;
    d. Engage an archaeologist to implement the archaeological methodology and prepare a cultural heritage assessment report;
    e. Prepare register of Aboriginal parties;
    f. Send the names of registered parties to OEH and local Aboriginal land council(s);
    g. Send invitation to attend an Aboriginal focus group meeting and draft methodology for review;
    h. Hold an Aboriginal focus group meeting;

i. Provide meeting minutes to Aboriginal parties;
j. Finalise AHIP methodology;
k. Engage Aboriginal site officers
l. Implement archaeological testing methodologies;
m. Prepare draft archaeological excavation report;
n. Finalise Cultural Heritage Assessment report.

4. Continued consultation with the Aboriginal stakeholders is recommended to ensure they are kept informed about the project.

17. References

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Appendix I

AHIMS Search Results

Search Number: 82030

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : I

Client Service

Note: This Excel report shows the sites found in AHIMS on the 08/10/2012. If this date is not the same as the original date of the Search Results letter obtained during the Search, then the search results might be different. The PDF version of this report will always coincide with the Basic Search Results letter.

SiteID	SiteName	Contact	Datum	Zone	Easting	Northing	Context	SiteStatus	SiteFeatures	SiteTypes	Permits	Reports
12-1-0005	Bolivia		AGD	56	399000	6758400	Open	Valid	Ceremonial Ring	Bora/Cere		

Report generated by AHIMS Web Service on 08/10/2012 for Mandy Atkinson for the following area at Datum :GDA, Zone : 56, Eastings : 390000 - 399000, Northings : 6750000 - 6759000 with a B 1000 meters.Additional Info : Required for archaeological assessment. Number of Aboriginal sites and Aboriginal objects found is 1

Appendix 2

Site card for Bolivia (12-1-0005)

N II 9239 GRAFTON SH/56-6

BOLIVIA 12-1-5 Locality CEREMONIAL GROUNDS

Military map/other reference Grafton 1:250.000 SH/56-6. dot out

3990 7584

Pastoral or other property, park

Description of site There is a reference to 300 natives taking part in a corroboree at Bolivia in the 'seventies;this may be a reference to use of the Sandy Flat sites,which are quite close to Bolivia.

Hist. ref.

12-1-0005

Length of site **Width**

State of preservation

Nearest water supply

Vegetation

Associated with rock engravings, rock paintings, carved trees, stone arrangements, axe grooves, quarry, campsite, other relics

12-1-5

Photo record by **Where deposited**

Scale chart by **Where deposited**

History Reminiscences of W.Bates.Tenterfield Historical Society Records Vol.II

Aboriginal meaning and name

Published reference Isabel McBryde:Aboriginal Prehistory in New England.1974.p.60

Remarks