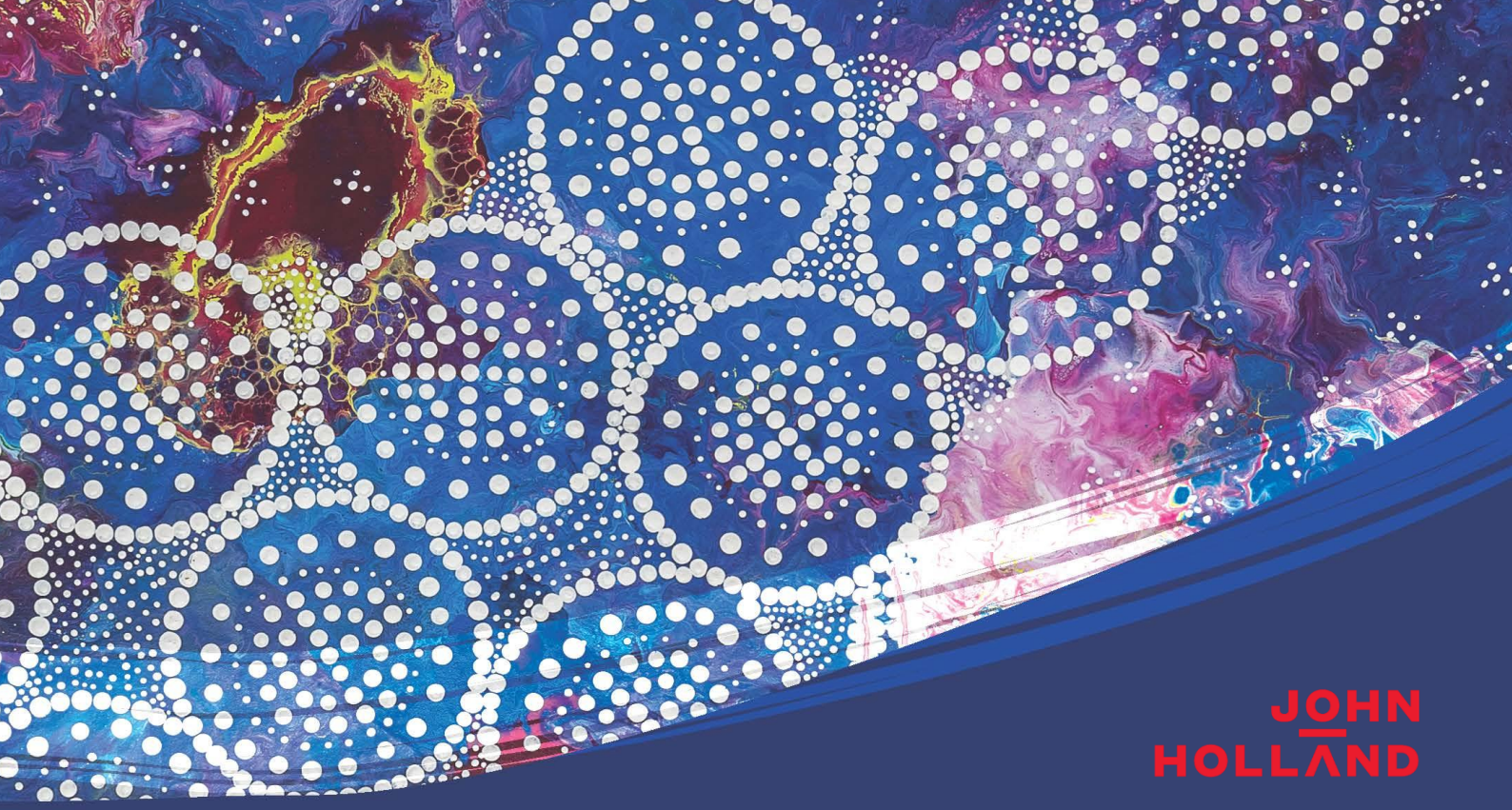


JOHN HOLLAND

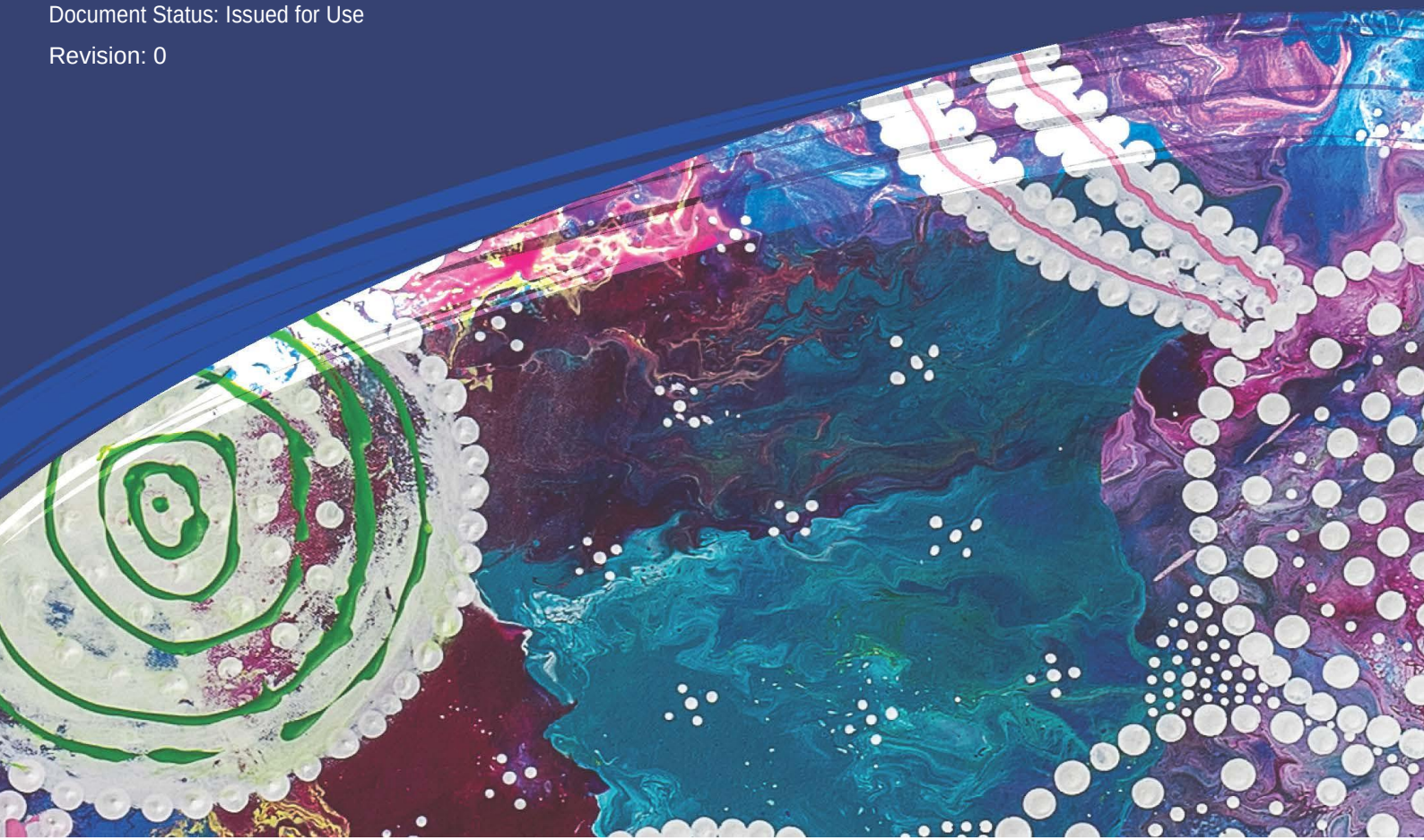
INLAND RAIL
ILLABO TO STOCKINBINGAL PROJECT

Additional Survey and Test Excavation Methodology

Document Number: 5-0019-220-PES-00-MS-0001

Document Status: Issued for Use

Revision: 0



Document Control

Document Title	Additional Survey and Test Excavation Methodology
IRPL Document No.	5-0019-220-PES-00-MS-0001
Prepared By	Jenni Bate (Apex Archaeology)
Document Owner	Andy Robertson
REVIEWED BY	
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Title	Environment Approvals Manager
Signature	Refer to Aconex Workflow dated 29/04/2025
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Revision History

REVISION	DATE ISSUED	DESCRIPTION
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ILLABO TO STOCKINBINGAL RAIL CORRIDOR PROJECT

Additional Survey and Test Excavation Methodology

LGAs: Cootamundra-Gundagai and Junee

April 2025

APEX ARCHAEOLOGY

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Revision No: 0
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Apex Archaeology would like to acknowledge the Aboriginal people who are the traditional custodians of the land in which this project is located. Apex Archaeology would also like to pay respect to Elders both past and present.

Document Control

The following register documents the development and issue of the document entitled 'Inland Rail, Illabo to Stockinbingal: Draft Additional Survey and Test Excavation Methodology', prepared by Apex Archaeology in accordance with its quality management system.

Revision	Prepared	Reviewed	Comment	Issue Date
1 – Draft	Jenni Bate	Leigh Bate and Fiona Leslie, Mountains Heritage	Issue for client review	20 Dec 2024
2 – Draft	Jenni Bate	IRPL	Issue for client review	25 Feb 2025
3 – Draft	Jenni Bate	IRPL	Issue for RAP review	21 Mar 2025
4 – Final	Jenni Bate	RAPs	Issue of final	28 April 2025

GLOSSARY OF TERMS

Aboriginal Object	An object relating to the Aboriginal habitation of NSW (as defined in the NPW Act), which may comprise a deposit, object or material evidence, including Aboriginal human remains.
ACHA	Aboriginal Cultural Heritage Assessment
ACHAR	Aboriginal Cultural Heritage Assessment Report
ACHCRs	The DECCW April 2010 *Aboriginal cultural heritage consultation requirements for proponents 2010*
ACVP	Aboriginal Cultural Values Plan
AHIMS	Aboriginal Heritage Information Management System maintained by Heritage NSW, detailing known and registered Aboriginal archaeological sites and Aboriginal Places within NSW
BP	Before Present, defined as before 1 January 1950.
Code of Practice	The DECCW September 2010 *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales*
Consultation	Aboriginal community consultation in accordance with the DECCW April 2010 *Aboriginal cultural heritage consultation requirements for proponents 2010.*
CoA	Conditions of Approval
CSSI	Critical State Significant Infrastructure
DCCEEW	Department of Climate Change, Energy, the Environment, and Water
EIS	Environmental Impact Statement
GSV	Ground Surface Visibility
Heritage NSW	Heritage NSW in the Department of Climate Change, Energy, the Environment, and Water, responsible for heritage matters within NSW
Harm	To destroy, deface or damage an Aboriginal object; to move an object from land on which it is situated, or to cause or permit an object to be harmed
I2S	Illabo to Stockinbingal Project area
LALC	Local Aboriginal Land Council
LGA	Local Government Area
NPW Act	NSW *National Parks and Wildlife Act* 1974
OEH	Office of Environment and Heritage – now Heritage NSW
PAD	Potential Archaeological Deposit
RAP	Registered Aboriginal Party
RAPs	Registered Aboriginal Parties

CONTENTS

FIGURES

1.0 Introduction

Inland Rail Pty Ltd (IRPL - the Proponent) has engaged John Holland Group to undertake construction works for the Illabo to Stockinbingal (I2S) section of the Inland Rail Project (the project). Mountains Heritage and Apex Archaeology have joined together to assist John Holland Group in the additional archaeological work required for the project prior to construction commencing. This work builds on the work undertaken previously by GML Heritage Pty Ltd (GML) and is required to meet the conditions of consent for the project.

The I2S Rail Corridor is located between Illabo in the south and Stockinbingal in the north, and falls within two Local Government Areas (LGAs), being Junee LGA in the south and Cootamundra-Gundagai LGA in the north. It is located within the Wagga Wagga Local Aboriginal Land Council (LALC) boundaries to the south, and Young LALC to the north. The study area varies in width for operational reasons such as construction compounds and stockpiles.

Key features of the proposal include:

- Connection to other rail lines, including Stockinbingal to Parkes line, Lake Cargelligo line and Main Southern Railway;
- One crossing loop and maintenance siding;
- Level crossing and stock crossings;
- Bridges over river and other watercourses, floodplains and roads;
- Upgrade of around 3.5km of existing track for the tie-in works to the existing Main South Line at Illabo;
- New Track to maintain Lake Cargelligo line connection either side of the proposal;
- Realignment and road-over bridge for a section of the Burley Griffin Way at Stockinbingal;
- Realignment of Ironbong Road to allow for safe sight lines at the new active level crossing;
- Ancillary infrastructure to support the proposal, inclusive of signalling and communications, drainage, drainage control areas, signage and fencing and services and utilities; and
- Construction infrastructure, including ancillary facilities, and a temporary workforce accommodation facility.

1.1 Project Background

GML prepared an Aboriginal Cultural Heritage Assessment Report (ACHAR) to inform the Environmental Impact Statement (EIS) for the project in August 2022. As part of their assessment, they undertook consultation with the Aboriginal community, as well as surveying accessible portions of the study area, and completing test excavations

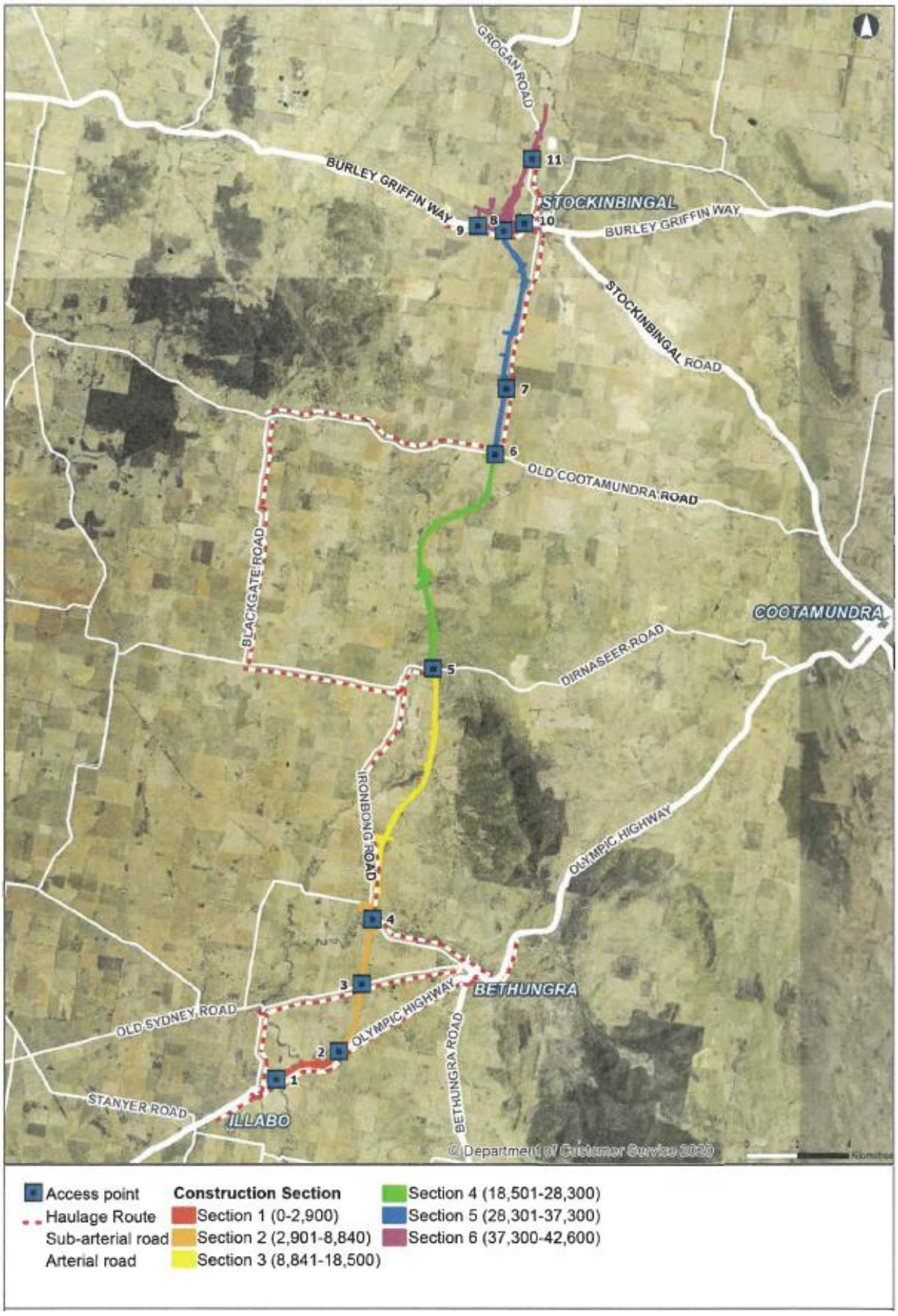

Figure 1: Study Area (Source: I2S EIS)

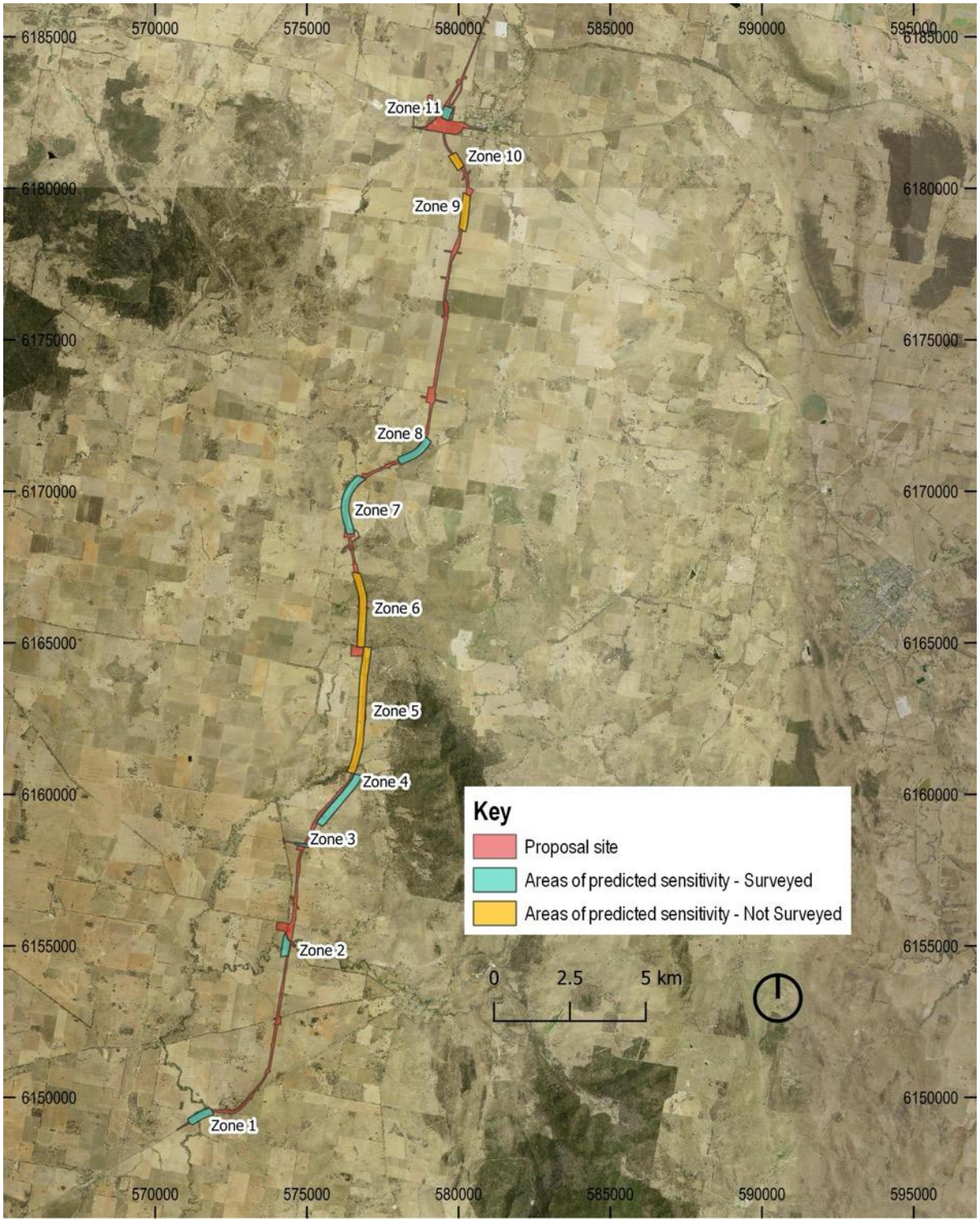

Figure 2: Survey Zones established by GML in 2022 (Source: Figure 5.1 of GML, 2022: 57). Note Zone 11 East is not shown on this figure and is located just west of Zone 11.

within areas that were considered likely to have subsurface potential archaeological deposits (PAD).

The study area has been separated into zones for assessment purposes, and GML undertook test excavations within Zones 1, 2, 4, 7 South, 7 North, 8, 11 and 11 East. Some parts of these zones and test excavation areas are located outside the formal EIS boundaries defined for the project as the ACHA considered a wider corridor that was later reduced to form the EIS curtilage.

Areas of sensitivity were predicted to be located within Zones 5 and 6 but were not tested due to lack of access.

A total of 231 test excavation units were excavated by GML within those zones, with 133 stone artefacts recovered from subsurface deposits during the test excavations. Zones 7 and 8 did not contain artefacts within the test excavation units excavated.

GML then finalised their ACHAR which detailed the assessment they had completed for the project. Subsequent to the submission of the ACHAR as a part of the EIS for the project, Heritage NSW reviewed the ACHAR and issued a letter of advice on 22 October 2022 with a number of concerns regarding the test excavation and surface collection that were undertaken.

During preparation of the ACHAR, the zones of sensitivity/PAD initially identified within Zones 5 and 6 were refined following completion of the GML test excavations in other zones, based on the results obtained within the other zones which allowed refinement of the predictive modelling within the entire area. Additionally, GML did not consider that Zones 9 and 10 were likely to contain areas of potential and this also contributed to this area not being subject to archaeological survey during preparation of the ACHAR as part of the EIS process.

Subsequent to completion and approval of the EIS, the NSW Department of Planning, Housing and Infrastructure issued Conditions of Approval (CoA) for the project on 6 September 2024. CoA E135 requires these zones to be archaeologically surveyed and test excavation undertaken as necessary within the zones to determine the nature and extent of any archaeological sites present within the areas.

Additional Survey and Test Excavation within Zones 5, 6, 9 and 10, which were not completed by GML due to access restrictions along with predictive modelling, will now need to be undertaken in order to completely assess the potential impact of the proposed works on the Aboriginal heritage values of the study area.

The following document provides information about the project, and outlines the detailed methodology for field survey and test excavation that Apex Archaeology are proposing to undertake with the support of Mountains Heritage, along with the proposed heritage management activities. Apex Archaeology and Mountains Heritage will also be preparing a Heritage Management Sub-Plan to provide

guidance prior to, during, and after construction of the new rail line, in order to meet CoA C12.

1.2 Conditions of Approval

As part of the project approval, a number of CoA relating to Aboriginal heritage were included, with these required to be met prior to construction works commencing within specific zones. The CoAs relevant to Aboriginal cultural heritage are outlined below.

CoA #	CoA Requirement
E133	An Aboriginal Cultural Values Plan must be prepared to inform how Aboriginal Cultural Values will be integrated into the broader design of the SSI including design elements (form and fabric), landscaping (the collection, propagation and replanting of traditional plant resources), language; and cultural design principles. The Plan must identify how interpretive themes and cultural values will be implemented and provide a timeframe for their provision during construction. The Plan must recognise the spiritual, intangible, linguistic and cultural values of the sites to Aboriginal people and address the full story of the place (s) (i.e. landscape through the eyes of Aboriginal people); Aboriginal design and story elements, patterns and motifs or other appropriate visual interpretations. The Plan will be developed in conjunction with the Aboriginal Community and Stakeholder Engagement Strategy. The Strategy will detail the consultation process with Aboriginal stakeholders and identify the Aboriginal Cultural Values to be incorporated into the design of the CSSI. The Aboriginal Cultural Values Plan shall be submitted for the approval of the Planning Secretary one (1) month prior to commencing construction. The Aboriginal Cultural Values Plan must be implemented.
E134	Aboriginal cultural heritage artefacts and culturally modified trees that are to be retained within the rail corridor are to be protected during routine maintenance and repair activities during operation in accordance with ARTC's standard operational environmental management procedures.
E135	Prior to the commencement of any ground disturbance work within areas identified as requiring archaeological investigation or salvage identified in documents listed in Condition A1, the Proponent must prepare and implement an Additional Aboriginal Archaeological Survey Methodology and an Aboriginal Archaeological Test Excavation Methodology. The methodology must include procedures for additional archaeological survey of Zones 5, 6, 9, and 10, and management protocols including consultation with the Registered Aboriginal Parties, for any Aboriginal objects and sites identified during the survey.
E136	Following analysis of the test excavation results, the Proponent must prepare and implement an Aboriginal Archaeological Salvage Excavation Methodology.
E137	Following additional survey, test and salvage excavation, if sites are identified that exceed the expected level of significance identified in the Aboriginal Cultural Heritage Assessment Report, further consultation with Heritage NSW and the RAPs must be undertaken and consideration given, where feasible, for avoidance by the project.
E138	The Additional Aboriginal Archaeological Survey Methodology, Aboriginal Archaeological Test Excavation Methodology and Aboriginal Archaeological Salvage Methodology must be prepared by a suitably qualified expert in consultation with Heritage NSW and RAPs, and provided to the Planning Secretary for information at least one month prior to test or salvage excavation.

E139	At the completion of Aboriginal cultural heritage survey and test and salvage excavations, an Aboriginal Cultural Heritage Excavation Report(s) must be prepared by a suitably qualified expert. The Aboriginal Cultural Heritage Excavation Report(s) must: a) Be prepared in accordance with the Guide to Investigating, assessing and reporting on Aboriginal cultural heritage in NSW, OEH 2011 and the Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales, DECCW 2010a; and b) Document the results of the archaeological survey and test excavations and any subsequent salvage excavations (with artefact analysis and identification of a final repository for finds). The RAPs must be given a minimum of 28 days to consider the report and provide comments before the report is finalised. The final report must be provided to the Planning Secretary, Heritage NSW, the relevant Councils, relevant LALCs and the RAPs within 24 months of the completion of the Aboriginal archaeological excavations (both test and salvage).
E140	Ground disturbance works and construction work may not commence in those areas where archaeological excavation and surface collection of Aboriginal objects is required (including areas identified as requiring further assessment) until the archaeological works described int eh Aboriginal Cultural Heritage Assessment reports listed in Condition A1 have been completed.
E141	At the completion of surface collection, test excavations, and salvage excavations, Aboriginal Site Impact Recording Forms (ASIRF) must be submitted to the Aboriginal Heritage Information Management System (AHIMS) and evidence provided of submission to the AHIMS Registrar.
E142	Where previously unidentified Aboriginal objects or Aboriginal Places are discovered, all work must immediately stop in the vicinity of the affected area. Works potentially affecting the previously unidentified objects or places must not recommence until Heritage NSW has been informed. The measures to consider and manage this process must be specified in the Unexpected Heritage Finds and Human Remains Procedure required by Condition E143 and include registration int eh Aboriginal Heritage Information Management System.
E143	An Unexpected Heritage Finds and Human Remains Procedure must be prepared to manage unexpected heritage finds in accordance with any guidelines and standards prepared by Heritage NSW and submitted to the Planning Secretary for information before the commencement of Work.
E144	The Unexpected Heritage Finds and Human Remains Procedure, as submitted to the Planning Secretary, must be implemented for the duration of Work.

This methodology has been prepared in accordance with Conditions of Approval E135, E139, E140, and E141, and CoAs E136, E137 and E138 are also relevant to this methodology as well as future works.

2.0 ADDITIONAL ARCHAEOLOGICAL METHODOLOGIES

In accordance with the Critical State Significant Infrastructure (CSSI) CoA for the project, both an additional Aboriginal Archaeological Survey Methodology and Aboriginal Archaeological Test Excavation Methodology is required for Zones 5, 6, 9 and 10, as they have not yet been subject to detailed Aboriginal archaeological assessment. This section outlines the proposed methodologies for both aspects of the project, along with methodologies for recording various other site types if encountered.

2.1 SURVEY METHODOLOGY

As required by the CoA for the project, additional archaeological survey of Zones 5, 6, 9 and 10 is required. These zones are shown in Figure 2 above. The survey of these areas would cover the entirety of the EIS disturbance footprint so as to inform management recommendations for the project, and to provide recommendations as to the requirement for test excavation within the area. None of these four zones have been surveyed during the original ACHA process, although areas of predicted archaeological sensitivity have been identified based on predictive modelling for the area (GML 2022). As these zones have not yet been surveyed, the entirety of the zones would be surveyed to identify any Aboriginal objects or places within these zones.

Survey of the four separate zones would be undertaken in accordance with *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (the Code of Practice – DECCW 2010a); and the *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* (April 2011). The field survey is not necessarily intended to be an opportunity for gathering information regarding the cultural significance of the area, but rather is a scientific inspection of the area to determine the current state and archaeological potential of the site. However, should any RAPs in attendance choose to share cultural knowledge they wish recorded and incorporated into the assessment, this will occur in line with the RAP's wishes.

There will be subsequent site visits with RAPs to visit sites within the study area to discuss their cultural heritage values. This forms part of a separate Aboriginal Cultural Values Plan (ACVP) being undertaken by Mountains Heritage and Navin Officer. This report will be prepared for JHG on behalf of IRPL. A methodology for the ACVP will be sent in due course, for review and comment. Preparation of this plan is in accordance with CoA E133.

The archaeological survey will be undertaken in accordance with the following methodology:

- The start and end points of survey transects, along with their length, will be recorded by handheld GPS;
- Each zone will be visually inspected by pedestrian survey;
- Appropriate metric scales will be used for all photography in line with the Code of Practice requirements;
- If stone artefacts are identified on the ground each item will have a flag placed at its location;
- The archaeologist and RAPs will record each item as per the lithic site recording form and lithic item recording form detailed below;
- The study area will be recorded using survey recording forms. The following is a list of attributes that will be recorded for each area surveyed:
    - Survey area;
    - Recorder name;
    - Date;
    - Landform element;
    - Slope;
    - Soils;
    - Distance to watercourse;
    - Vegetation;
    - Land surface;
    - Rock outcrops;
    - Detection limiting factors; and
    - Ground disturbance.
- The zones will be divided into survey units based on landform and given ratings in the following categories:
    - Survey area (as defined by the length of area surveyed multiplied by two. A participant in this instance can only see 1m either side at a time. Survey area covered increases when more participants are added);
    - Total area surveyed;
    - Percentage of sample inspected;
    - Archaeological visibility (this is a percentage of potential within the landform);
    - Surface visibility;
    - Exposure type; and
    - Effective survey coverage
- Photos of each survey unit will be taken.
- Aboriginal lithic site recording forms will be used to record artefact scatters and isolated finds. The following list of attributes will be recorded for each site:
    - Site Number;
    - Survey Area;
    - Date;
    - Recorder name;
    - Total number of artefacts recorded;
    - Visible extent of artefacts;
    - Extent of surface exposure;
    - GPS reading;
    - Sub-surface potential;

- Research potential;
- Raw stone material available;
- Ground Disturbance;
- Vegetation;
- Photographs of site; and
- Site plan.

- Each artefact will be recorded using a lithic item recording form with the following attributes recorded:
  - Artefact number;
  - Locus;
  - Colour;
  - Stone material;
  - Lithic item type;
  - Length, Width & Thickness (mm);
  - Cortex Percentage;
  - Cortex type; and
  - Comments.
- Artefacts will be retained on site and no surface artefacts will be moved or relocated from their original location; and
- Relevant site recording forms will be utilised for any other site type identified during the survey (modified tree, stone arrangement, etc) in accordance with the below methodologies.

2.2 Modified Tree Methodology

During the survey, or as appropriate at any point while on site, mature trees will be assessed for the presence of potential cultural modification. Any trees considered to exhibit cultural modification (or potential to be culturally modified) will have their attributes recorded on a Modified Tree Recording Form, including the following information:

- GPS coordinate location of the tree will be taken;
- Photographs of the tree in context and of the modification, utilising an appropriate scale;
- The number of visible scars;
- The condition of the tree, including its status (standing/felled etc);
- Estimated age of the tree or circumference of the tree at chest height to assist in determining age;
- The context of the tree including:
  - Land form;
  - Distance to water;
  - Surrounding vegetation;
  - Approximate slope
- The visible height, width and depth of the scar;
- The estimated original height width and depth of the scar;
- The shape of the scar;

- The height of the scar from the ground;
- Whether axe marks are visible on scars;
- The species of the tree;
- Scale drawings of the modification as appropriate.

This will be recorded in line with the AHIMS site card requirements.

It is noted that previous research has identified the following:

> *Based on a failure by most people to understand both the rate of tree and wound growth and also the many natural causes that can lead to scarring, the age and cause of scarring are often frequently misinterpreted. As a result, both trees and scars present in live trees today are most likely much younger than most people consider. This make the likelihood of scarring being [cultural] related unlikely.*
>
> *In addition, it should be noted that a tree would initially have had to have been of a reasonable size to have been used (scarred) for Aboriginal purpose. Hence, scar age is normally much younger than tree age which makes the probability of scarring being of Aboriginal origin even lower (Burns 2014).*

Criteria for assessing trees for cultural modification in the form of scars is based on the criteria developed by Kamminga and Grist (2000), Irish (2004), and Long (2005) as follows:

- Culturally modified scars do not generally reach the ground;
- Culturally modified scars which do reach the ground generally have roughly parallel sides;
- Culturally modified scars are usually symmetrical, and have parallel sides or are concave in form;
- Regrowth is generally regular around all edges of the scar;
- The ends of the scar are usually squared or tapered;
- The presence of axe or adze marks shows the scar is likely to be of human origin;
- The age of the scar must be appropriate for the area – for example, trees needed to be a certain age for modification to occur; the original age must be considered when assessing the current age and potential for the modification to be cultural in origin;
- The tree exhibiting the scar must be endemic to the area in which it is located;
- The heartwood (ie xylem) of the tree is generally exposed and flat, but it is noted that older scars can be completely occluded by regrowth;
- The grain pattern visible on the xylem is usually parallel to the trunk or branch on which it is located;
- Association with other Aboriginal cultural objects such as artefacts or hearths generally increases the likelihood of a scar being of cultural origin;

- Consideration of the form of scars on nearby trees may assist in determining whether a scar is natural or cultural in origin;
- Consider whether the scar may have been a surveyor's mark or similar and whether it was formed by European actions rather than Aboriginal.

Consideration of the above will guide assessment of whether a tree is likely to have been culturally modified or if scars may be natural in origin.

Questions that would also assist in identifying Aboriginal culturally modified trees compared to naturally occurring scars include the following (Long 2005):

- What has happened in the local environment?
- What impacts have occurred in the vicinity of the scar?
- How old is the tree on which the scar occurs, and how long has the scar been there?
- What impacts have occurred to the tree, and can you work out the order in which they occurred?
- Can you identify the form and size of the original scar on the tree?
- Is the tree providing enough opportunity to determine the origin of the scar from a surface inspection only?

Specialist advice from an arborist may be sought as appropriate to provide additional advice and guidance.

2.3 Stone Arrangement Methodology

Stone arrangements may identify culturally significant areas, such as bora or corroboree grounds, or other special places. Where identified, the following will be recorded:

- GPS coordinate location will be taken, generally in the centre of the arrangement when entry does not cause damage to the arrangement;
- Extent of the arrangement (ie length x width);
- Type of stone used to create the arrangement;
- Landscape context;
- Distance to water;
- Photographs of the context of the arrangement and the arrangement itself will be taken with an appropriate scale;
- Measured drawings will be produced as appropriate.

2.4 Burial Methodology

In the event that suspected or identified human remains are identified during the survey, test excavations, or salvage works, John Holland Group's Unexpected Finds and Human Remains Procedure will be followed. The NSW Police and the Coroner's Office will be notified. If the finds are confirmed to be human and of Aboriginal

origin, further assessment by an archaeologist experienced in the assessment of human remains, including engagement of a bioarchaeologist or forensic archaeologist if necessary. Avoidance and protection of the remains would be the highest priority; although the nature of this protection would be guided by the Aboriginal community, Heritage NSW, John Holland Group and Inland Rail.

2.5 Defining Site Boundaries

In accordance with Requirement 6 of the Code of Practice, any identified sites will be described as follows:

- The spatial extend of the visible objects will be recorded;
- Obvious physical boundaries will be described;
- Cultural information provided by the RAPs regarding the extent of sites will be recorded where appropriate and where RAPs are comfortable sharing such.
- All identified sites will be recorded utilising appropriate recording forms which consider the attributes listed on the AHIMS recording form for new sites.

2.6 Test Excavation

In accordance with CoA E135, it is necessary to undertake test excavation **as appropriate and necessary** within Zones 5, 6, 9, and 10. As such, we are proposing to undertake the necessary test excavations within these zones to determine the nature and extent of any identified areas of sensitivity within each of these zones, subsequent to completion of survey. GML (2022) identified areas of sensitivity within Zones 5 & 6 (Figure 3) but were unable to undertake test excavation within these areas due to access restrictions.

It is noted that GML predict that Zones 9 and 10 are unlikely to contain areas of sensitivity, sites or artefacts; and the need for test excavation within these two zones will be determined following completion of the site survey. However, indicated zones of sensitivity were identified by GML within Zones 5 and 6 and these will be investigated as part of the test excavation proposed, with the areas refined as appropriate following completion of the site survey. Indicative test pit maps based on the GML sensitivity assessment are shown on Figures 6 to 8. However, it is not possible to provide indicative test pit locations within Zones 9 and 10 as no areas of sensitivity have yet been identified within those areas. Test pit locations would be determined on completion of the site survey, and would only be located within areas considered to have archaeological potential.

Excavation Permits

As the project is an approved SSI project, with CoA issued, no permits from Heritage NSW are required for undertaking archaeological test excavation. This document, once reviewed by the RAPs, forms the basis of undertaking these works in accordance with the CoA.

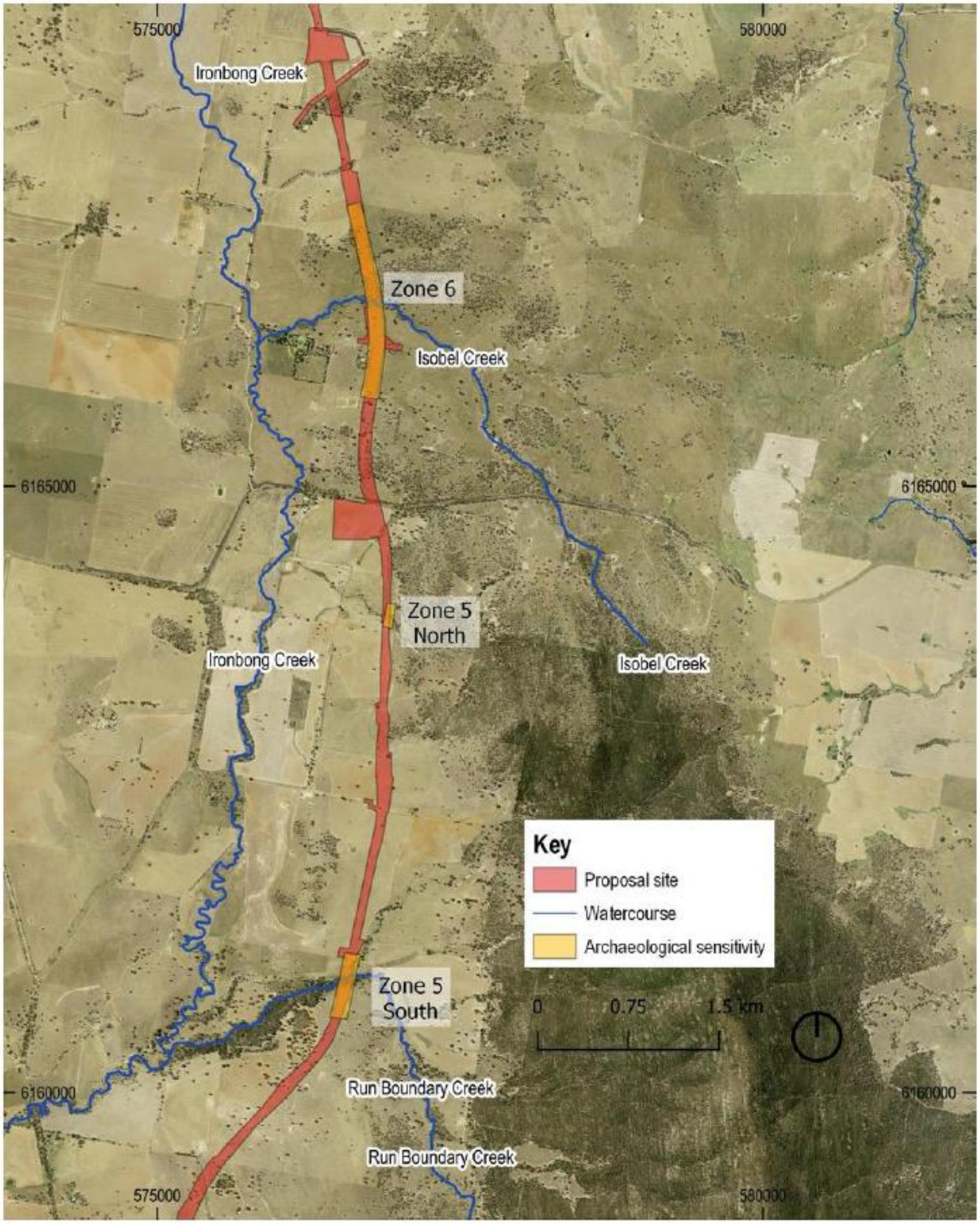

Figure 3: Revised, indicative areas of sensitivity within Zones 5 & 6, based on results of GML (2022) assessment (Source: Figure 6.2 of GML 2022)

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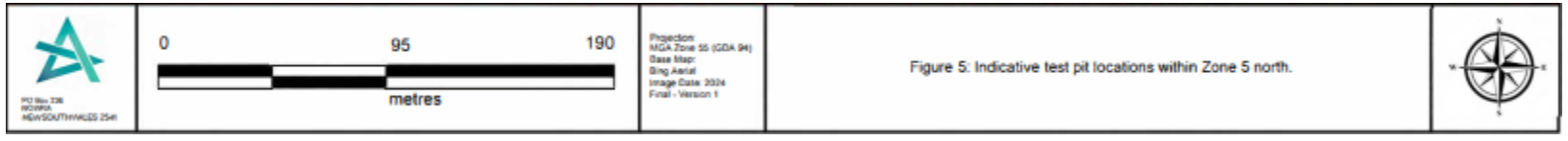

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Undertaking a Dial Before You Dig (DBYD) assessment is the responsibility of the proponent as archaeological test and salvage excavations are undertaken in areas considered to have archaeological integrity. Areas clearly disturbed or with evidence of subsurface services would be avoided as these are unlikely to have archaeological potential. Further, archaeological excavation is undertaken by hand and as such, is able to rapidly identify subsurface disturbance such as that created by construction of subsurface services, and excavation can cease prior to any potential impact occurring.

RESEARCH QUESTIONS

The purpose of undertaking archaeological test excavations is to define the nature and extent of any potential archaeological deposits identified within the area of interest. In order to allow analyses to be comparable between different stages of the assessment process (ie the original GML 2022 assessment and the current additional works), the research questions posited by GML to assist in defining the nature and extent of the areas of sensitivity will also guide the test excavations undertaken as part of the current assessment. These questions are as follows and are reproduced verbatim from the GML 2022 ACHAR:

1) *What are the characteristics of soil horizons across the study area?*
   a) *How has the land use history impacted the study area and survival of soils and thus archaeological material?*
   b) *At each location, is the deposit consistent? Or does it possess characteristics that tell of different depositional or formation events?*
2) *Are there archaeological deposits present?*
   a) *Are the deposits stratified?*
   b) *Is there archaeological evidence which can be dated (both through scientific methods, carbon dating, OSL and/or relative dating)?*
   c) *Do the deposits have different degrees of archaeological potential with depth?*
   d) *What evidence—if any—other than stone artefacts is present for Aboriginal occupation and/or use of the study area?*
   e) *How do the archaeological deposits relate to the predictive modelling?*
   f) *Is there variation in the nature of the archaeological deposits across different areas of the study corridor?*
3) *What is the general nature of stone artefacts recovered from the study area? How can the stone artefact assemblage be characterised?*
   a) *What raw materials are represented in the stone artefact assemblage?*
   b) *Can any information be ascertained from the stone artefact assemblage regarding the intensity of stone artefact reduction and discard?*
   c) *Can a difference between stone artefact deposits be identified by different strata in the assemblage over time? If so, what is the nature of that difference?*
   d) *Can a difference between stone artefact deposits be identified across different areas of the study corridor?*
4) *How can the deposit be interpreted?*
   a) *Is there any evidence for variation in landscape use and selection strategies?*
   b) *Can deposits or features be dated? What is the antiquity of the evidence?*

c) *Does the archaeological deposit vary spatially within one location/site? How?*
d) *What does the archaeological deposit tell us about Aboriginal use of this landscape?*

5) *Can the archaeology be interpreted in a regional context?*
   a) *What is the source of the artefactual stone? How does this correlate with current regional research and knowledge of stone resources?*
      i) *Is raw stone material for artefact manufacture readily present within or near the study corridor?*
      ii) *Has stone been brought into the study corridor? From how far away has the stone been brought?*
      iii) *What is the main discard and reduction strategy pattern that can be observed for different raw materials across the study corridor?*
   b) *Do the archaeological deposits within this study corridor conform to the distance from water regional predictive model and theories or not?*
6) *Is the archaeological deposit culturally significant?*
   a) *What is the heritage value of the deposit, both scientifically and culturally?*
   b) *How does the Aboriginal community view and value the deposit identified?*
7) *Is there a deposit worthy of conservation or of future research?*
   a) *Where and what deposits should be conserved for future generations?*
   b) *Which deposits should be subject to more extensive investigations?*

TEST PIT LAYOUT

Test pits will be placed in relation to the identified PAD extent. The exact locations of the test pits will be determined on completion of the field survey and will take into account existing disturbance or obstacles within the site, which will be avoided. At this stage, 71 test pits are proposed within Zone 5 south; 33 within Zone 5 north and approximately 190 within Zone 6. It is not yet possible to estimate where test excavation may be required within Zones 9 and 10.

The following methodology would be implemented during the completion of test excavations within the areas of sensitivity within each zone:

- Transects will be spaced at 20m intervals, in a 'checkerboard' arrangement, in accordance with the method described in Orton (2000:90) whereby a staggered square grid is considered more efficient than a square grid for undertaking subsurface sampling;
- Notwithstanding the nominated appropriate spacing outlined above, test pits will be separated by at least 5m where altered spacing is required;
- Test pits will be oriented north – south using a handheld compass for accuracy;
- Test pits will avoid clearly disturbed areas, with transects avoiding disturbance in the first instance, and individual test pits moved no more than 2m in any direction from their original location to avoid discrete disturbance;
- If moving the test pit 2m in any direction from its original location does not avoid the disturbance, that test pit location will be abandoned and the next pit in the transect excavated as appropriate;
- Test pits will not exceed a maximum surface area of more than 0.5% of the entire PAD area identified;

- The location of the north west corner of the first test pit will be recorded by GPS (or alternative accurate system as available and appropriate), and following pits will be tied into the transect using the distance and bearing technique. This method requires a 60m or 100m tape measure and compass to measure from the initial test pit. The tape is run out from the first pit and subsequent pits laid out at 20m intervals; and
- Each test pit will have a flag placed in the north-west corner with the test square number in sequence and Easting and Northing of its location written on it, taken from the GPS coordinate for the initial pit and extrapolated based on the location of the pit in relation to the initial pit.

Excavation Methodology

- Test pits will be 50 x 50cm;
- All test pits will be excavated in 5cm spits by hand using a shovel, mattock and trowel. Spit depths will be consistently checked with a hand tape measure to ensure accuracy of excavation depth. Once the first test pit has been excavated and an understanding of the stratigraphy has been obtained, following test pits for that transect may be excavated stratigraphically or in 10cm spits, as considered appropriate for the site;
- Notwithstanding the above, 5cm spits are considered appropriate to assist in obtaining as much stratigraphical information as possible from a site which may assist in answering research questions, including assessment of site integrity and distribution of archaeological material;
- Test pit excavation will cease on reaching basal clay, bedrock or a culturally sterile layer, or at the discretion of the archaeologist;
- Test pits may be combined to form 1m² squares by digging four contiguous 50 x 50 cm test pits to determine if artefact concentrations continue (ie 5 or more artefacts in a single 50x50 test pit; identification of a hearth, heat treatment pit, knapping floor, etc);
- If artefact concentrations warrant further expansion (ie 20 or more artefacts in a single 1m² pit; identification of a hearth, heat treatment pit, knapping floor, etc), continuation of 1m² test pits into a 3m² open area may also be necessary. This is the maximum open area allowed for under the Code of Practice and assumes this is not more than 0.5% of the total PAD area. If artefact concentrations are still high once a 3m² area has been excavated then this area would be prioritised for salvage during a subsequent stage of the project;
- If cultural features (e.g. hearths, heat treatment pits, knapping floors) are identified during excavation, excavation with hand tools (e.g. mattock and shovel) will cease and continue with trowel and small hand tools only, with these pits expanded as outlined above;
- Charcoal samples may be taken from half sectioned hearths, leaving at least half of the hearth intact and in situ, with the charcoal sent for carbon dating as appropriate;
- Locations of identified features will be planned onto 1mm graph paper. X, Y and Z coordinates of individual artefacts from in-situ knapping floors will be recorded prior to removal (where possible) and continuation of excavation;
- Under no circumstances will artefacts be deliberately removed from the section of a test pit;

- The soil from each spit will be placed in 10L plastic buckets and transported to the sieving station;
- To ensure sufficient control of each spit excavated, a bag and tag will be written to accompany the buckets from each spit. The following information will be recorded on each bag and tag: site name, date, pit location (easting & northing) and name of excavator;
- All material from each test pit will be dry sieved where possible however should the soil matrix preclude dry sieving (high clay content/moist or wet from rain fall) then wet sieving will be required. All soil will be sieved through table sieves (1 x 1m) with a wire mesh aperture gauge of 5mm and depending on the soil matrix and recovery of micro debitage we may switch to 3mm gauge;
- All material recovered from the sieving process will be checked by a qualified archaeologist with experience in artefact identification prior to being placed into the spit bag; and
- Artefact counts will be recorded for each spit.

RECORDING

- Each test pit will be recorded on a pit sheet with the following information:
  - site name;
  - date;
  - excavator name;
  - spit number;
  - spit depth;
  - pit location (easting & northing)/pit number;
  - start levels & end levels;
  - section drawing and/or photographs of sections clearly demonstrating stratigraphy/the soil profile;
  - bucket count and end total bucket count;
  - soil description;
  - description of disturbance;
  - description of artefacts (material type & artefact type if in situ);
  - in situ recording of artefacts where possible (xyz coordinates); and
  - photograph details (from surface and of each section).
- A record of Aboriginal objects will be kept to allow an up to date comparison between areas subject to test excavation.

ARTEFACTS AND CHAIN OF CUSTODY

Any artefacts that are recovered from the test excavation will be analysed by an archaeologist experienced in artefact analysis and interpretation. Artefacts will be temporarily held at Apex Archaeology's office during the analysis and stored in a lockable safe. Artefacts may be analysed by Dr Beth White or another suitably qualified lithics expert, and would be securely transported to their office for analysis if required. The temporary location of the artefacts must be notified to AHIMS as soon as practicable on completion of works, through submission of a site card or ASIRF. At the conclusion of the project all artefacts will be reburied on site in accordance with Requirement 26 of the Code of Practice. In the event salvage

excavation is required, all artefacts will be reburied at the same time. Once the artefacts are reburied, the location will be recorded and provided to AHIMS. It is likely that reburial cannot occur until the development has been completed and a suitable location identified. The final location of the artefacts may be determined in consultation with the RAPs and could include an alternative Keeping Place. The final location would be recorded and provided to AHIMS.

Cessation of Excavation

Excavations will cease upon reaching basal clay, bedrock or a culturally sterile layer, or at the discretion of the archaeologist (for example, if it becomes unsafe to continue excavation due to depth).

Backfill

At the conclusion of the testing program, all test pits will either be backfilled (by collapsing the sides of the test pit in with a shovel or mattock where pits are very shallow, and/or filling with spoil or clean fill to return the pit to original ground level). Back fill may also take place by sieving back into the test pits if possible. If a test pit has yielded a significant artefact deposit requiring further salvage, then the pit will be lined with geofab or similar material, and backfilled until salvage can be completed, so that expansion (open area excavation) can be undertaken more easily.

Post Archaeological Assessment Works

On completion of test excavations, an Aboriginal Site Impact Recording Form (ASIRF) must be submitted to AHIMS for each AHIMS site subject to test excavation. Additionally, site cards must be submitted to AHIMS for any newly identified sites from the survey or test excavation process. These forms must be submitted as soon as practicable following completion of the relevant activity.

2.7 Works in Remaining Zones

It is necessary to undertake some works within the project area prior to undertaking additional survey and subsequent archaeological works, as outlined below.

Geotechnical Activities

Within certain parts of the Project area, geotechnical activities are required to be completed, including undertaking the following:

- Bore holes
- Test pits
- Auger holes
- Survey
- Geophysics
- Pot holing
- Slot trenching
- Pavement cores

At present, ground disturbing geotechnical activities are only planned outside the Zones of Aboriginal Sensitivity as identified by GML (2022), and will not occur within Zones 5, 6, 9 and 10 prior to survey and further archaeological investigation (as appropriate) of these areas. Geotech works will also avoid known Aboriginal sites located outside of the Zones of Aboriginal Sensitivity. Furthermore, mitigation measures have been proposed for activities outside of Zones of Aboriginal Sensitivity, as outlined below:

- The Zones of Aboriginal Sensitivity will be identified on the ground with a 25m buffer. Bollards will be placed to temporarily delineate these no-ground disturbance zones. This will be defined by accurate geospatial data to ensure accurate identification and marking of no-go zones.
- All site personnel will be inducted to the Project before the commencement of geotechnical activities. This induction will include a visual depiction of the no-ground disturbance zones and their restrictions.
- On-site personnel will be regularly briefed on the exact locations of the no-ground disturbance zones.
- Har-copies of maps showing the no-ground disturbance zones will be placed in site utes and provided to all JHG and subcontractor site personnel via email.
- Site personnel will be provided access to geospatial data which show the no-ground disturbance zones (including the 25m buffer).
- The Unexpected and Incidental Fines Procedures for Heritage are available in all site utes and provided to all JHG and subcontractor site personnel via email.

It is noted that vehicular and pedestrian access will be required within Zones of Aboriginal Sensitivity to validate and visually assess these areas for future geotechnical investigations. As these will not result in any ground disturbance, these works are permissible within all Zones. Existing vehicle tracks should be used wherever possible to reduce any potential ground disturbance.

Works outside of Zones of Aboriginal Sensitivity will likely occur prior to the commencement of survey works in accordance with this methodology. Within Zones 4, 8 and 11 East, ground disturbing geotechnical works will be undertaken concurrently with survey and test excavation works, as these zones were assessed by GML (2022) to have low potential for PAD or archaeological sensitivity, with no further archaeological assessment recommended for those three zones.

Surface Artefact Collection

Within Zones 7 and 11, four isolated artefacts were identified but could not be relocated by GML during their assessment. It is proposed to collect these artefacts during the survey if they can be relocated. This will occur prior to the commencement of ground disturbing geotechnical works in these zones. No further archaeological work is recommended for those zones. All collected artefacts would be recorded

using GPS (or appropriate alternative) and placed into robust ziplock bags with their site name, AHIMS number, and project name recorded on the bag in indelible pen. The attributes of each item would be recorded in line with the requirements of AHIMS and ASIRFs would be submitted for each site. The items would be safely stored at the temporary storage location until they can be safely returned to site, likely on completion of salvage excavation works and/or construction works for the Project.

Tree Protection

Protection measures for registered scarred trees or suspected culturally modified trees must be established prior to any geotechnical activities or other works occurring in the vicinity of the tree. This would include identification of the tree and placement of bollards with a 5m radius buffer around the tree trunk to ensure no ground disturbing works occur in the immediate vicinity of the tree.

2.8 Subsequent Salvage Excavation and Ongoing Management

On completion of the additional survey and test excavation, a separate Aboriginal Archaeological Salvage Methodology will be prepared and distributed to RAPs for review and comment. This report will:

- detail the results of the survey and testing program;
- outline the scope and methodology for subsequent archaeological salvage within all zones that have been identified as requiring mitigation; and
- provide management strategies to be implemented prior to, during, and after construction works, as appropriate. These strategies will include avoidance or conservation of sites, along with the surface collection of objects on the ground surface. These strategies will be developed in consultation with all RAPs for the project, the proponent, and Heritage NSW.

On completion of the salvage excavation, an Aboriginal Cultural Heritage Excavation Report will be prepared to detail the results. All RAPs would be provided with a copy of the draft report and would have an opportunity to comment on the results, prior to its finalisation. A copy of the final Aboriginal Cultural Heritage Excavation Report will be sent to all RAPs within 24 months of completing the salvage excavation and all RAPs would have 28 days to comment on the report prior to its finalisation. The final report would also be provided to the Planning Secretary, Heritage NSW, AHIMS, relevant Councils, and IRPL within 24 months of completion of archaeological excavation works.

3.0 FEEDBACK REQUESTED

This methodology was provided to all RAPs for their review and comment on 21 March 2025, with comments initially accepted until 18 April 2025. When it was noted that 18 April 2025 was a public holiday, the comment period was extended to 23 April 2025.

The following feedback was requested: We would like to respectfully request that you provide any questions or comments you may have on the methodology so that it can be incorporated into the final methodology. Please let us know if there are any alternative policies or procedures you wish to see incorporated into the methodology.

In addition to the archaeological investigations, an Aboriginal Cultural Values Plan (ACVP) is being prepared. RAPs are asked to consider the answer to the following questions:

If you have lived or worked on this country:

- *What do you think are the cultural values associated with the archaeological sites in the project area?*
- *Do any particular sites stand out as having cultural values, other than their archaeological or scientific value?*
- *Do you know of any important places that are not also archaeological sites in the project area? If so, can you describe those places?*
- *What cultural values (apart from archaeological ones) in the project area do you think are important to maintain for future generations?*
- *Can you suggest local people/ Elders from this area that you believe would be able to provide information relating to the cultural values of the project area?*

We look forward to working with you on this project.

3.1 COMMENTS RECEIVED

Comments were received from two RAPs, being Young LALC and Yurwang Gundana.

Young LALC provided feedback on representatives able to assist with fieldwork. No formal comments on the methodology were provided.

Yurwang Gundana advised that they had “read the report and agree with how this project is being handled”. They also advised that they wish to be part of the fieldwork.

No other comments were received. Copies of all correspondence are attached to this methodology.

4.0 BIBLIOGRAPHY

Burns, M. 2014, *Scar tree report 2. Appraisal of 18 scar trees in Leard State Forest – Maules Creek Mine Project.* Report to UQ Culture and Heritage Unit, School of Social Science, University of Queensland.

DECCW 2010a. *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales.* DECCW, Sydney South.

DECCW 2010b. *Aboriginal cultural heritage consultation requirements for proponents 2010*. DECCW, Sydney South.

GML Heritage. 2022, *Inland Rail – Illabo to Stockinbingal: Aboriginal Cultural Heritage Assessment Report.* Report for ARTC.

Irish, P. 2004, 'When is a scar a scar? Evaluating scarred and marked trees at Sydney Olympic Park. *Australian Archaeology* 59:59-61

Kamminga, J. and M. Grist. 2000, *Yarriambiack Creek. Aboriginal Heritage Study.* Report to Aboriginal Affairs Victoria.

Long, A. 2005, *Aboriginal scarred trees in New South Wales: a field manual.* Department of Environment and Conservation (NSW), Hurstville.

OEH 2011. *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW.* OEH, Sydney South.

Orton, C, 2000. *Cambridge Manuals in Archaeology: Sampling in Archaeology.* Cambridge University Press, Cambridge.