METROPOLITAN COAL LONGWALLS 311-316

HERITAGE MANAGEMENT PLAN






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LONGWALLS 311-316

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Revision Status Register

Section/Page/ Annexure	Revision Number	Amendment/Addition	Distribution	DPHI Approval Date
All	HMP-R01-A	Original	Aboriginal Stakeholders, Heritage NSW, and DPHI	-
All	HMP-R01-B	To Address Aboriginal Stakeholder Comments on Version A of the Plan (for Heritage NSW Review)	Heritage NSW	-
All	HMP-R01-C	Updated to reflect amendments to the Longwalls 311-316 longwall layout and to address agency comments	Heritage NSW	-
All	HMP-R01-D	Updated to address IEAPM comments	DPHI	

May 2025

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1 INTRODUCTION

The Metropolitan Colliery (Metropolitan Coal Mine) is owned and operated by Metropolitan Collieries Pty Ltd (Metropolitan Coal), which is a wholly owned subsidiary of Peabody Energy Australia Pty Ltd (Peabody). The Metropolitan Coal Mine is located adjacent to the township of Helensburgh (Figure 1), approximately 30 kilometres (km) north of Wollongong in New South Wales (NSW).

Metropolitan Coal was granted approval for the Metropolitan Coal Project (the Project) under section 75J of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) on 22 June 2009. A copy of the Project Approval is available on the Peabody website (http://www.peabodyenergy.com).

The Project comprises the continuation, upgrade and extension of underground coal mining operations (Longwalls 20-27 and Longwalls 301-317) and surface facilities at the Metropolitan Coal Mine. Longwalls 311-316 are situated to the west of Longwalls 301-310 and define the next mining sub-domain within the Project underground mining area (Figure 2). Longwall 317 will be subject to future Extraction Plans.

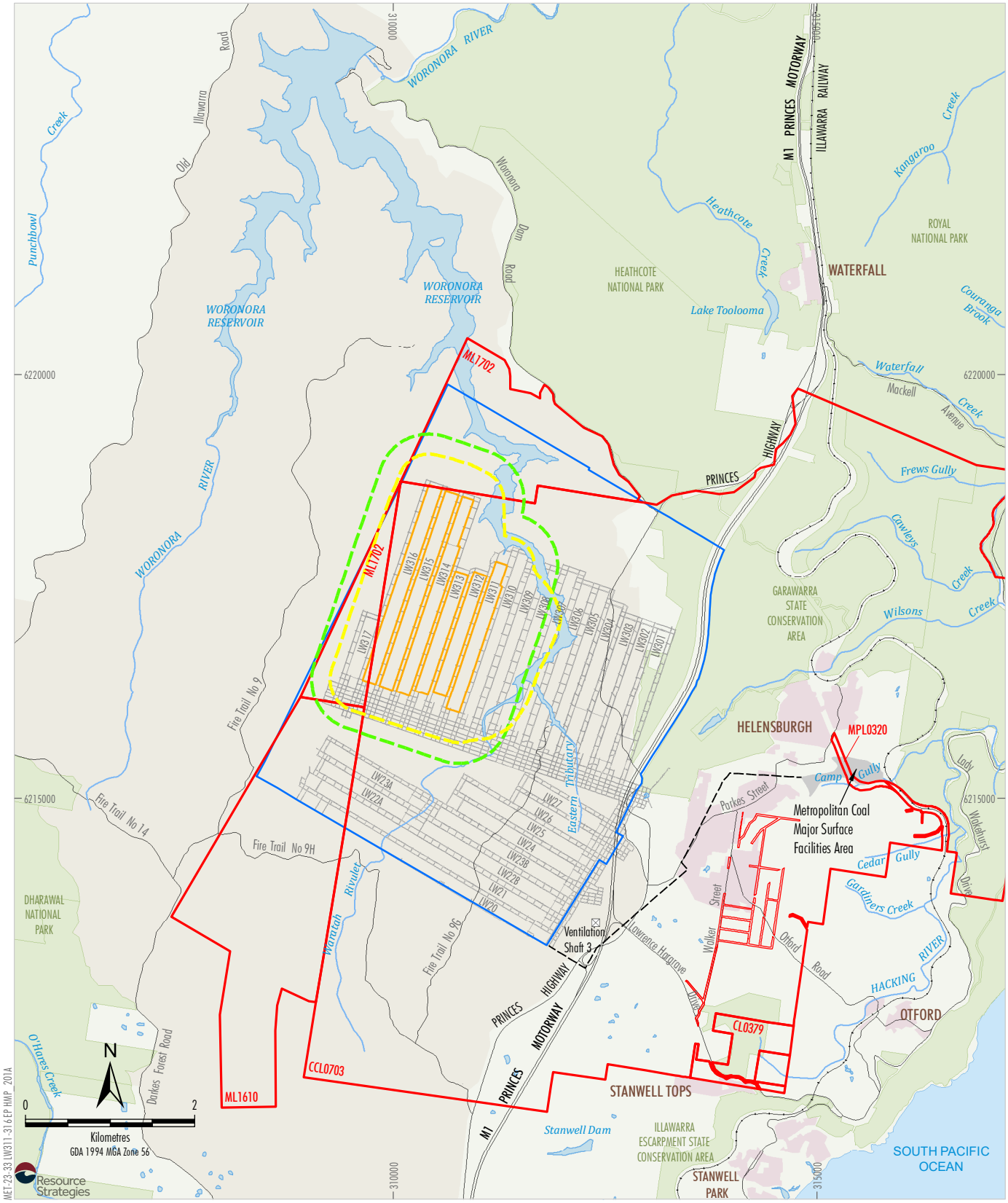
1.1 PURPOSE AND SCOPE

In accordance with Condition 6, Schedule 3 of the Project Approval, this Heritage Management Plan (HMP) has been prepared as a component of the Metropolitan Coal Longwalls 311-316 Extraction Plan to manage the potential environmental consequences of the Extraction Plan on Aboriginal heritage sites or values. The relationship of this HMP to the Metropolitan Coal Environmental Management Structure and to the Metropolitan Coal Longwalls 311-316 Extraction Plan is shown on Figure 3.

This HMP includes post-mining monitoring and management of Aboriginal heritage sites for Longwalls 20-22, 23-27, 301-303, 304, 305-307 and 308-310, subject to the previously approved Metropolitan Coal Longwall 308-310 HMP. Consistent with the recommended approach in the NSW Department of Planning and Environment (DPE [now known as Department of Planning, Housing and Infrastructure[1]]) (2022) *Extraction Plan Guideline*, the Metropolitan Coal Longwall 308-310 HMP will be superseded by this document following the completion of Longwall 310.

In accordance with Condition 6, Schedule 3 of the Project Approval, this HMP has been prepared by Metropolitan Coal, with assistance from Niche Environment and Heritage Pty Ltd (Niche) and Mine Subsidence Engineering Consultants Pty Ltd (MSEC).

[1] The former Department of Planning and Environment (DPE) was renamed to the Department of Planning, Housing and Infrastructure on 1 January 2024. References to DPE have been retained throughout the remainder of this document.



LEGEND

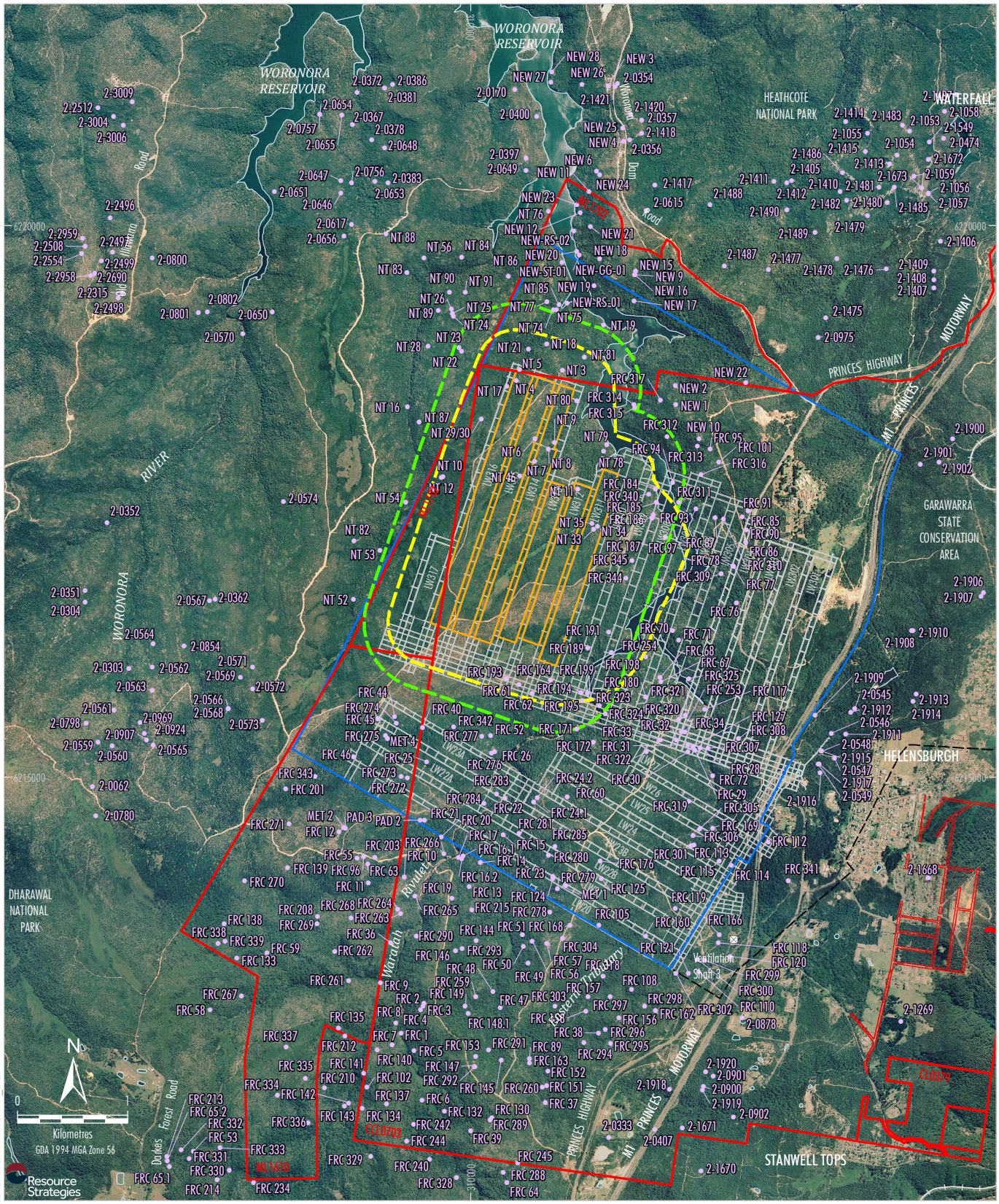
- Mining Lease Boundary
- Woronora Special Area
- Railway
- Project Underground Mining Area Longwalls 20-27 and 301-317
- Longwalls 311-316 Secondary Extraction
- Longwalls 311-316 35° Angle of Draw and/or Predicted 20 mm Subsidence Contour
- 600 m from Longwalls 311-316 Secondary Extraction
- Existing Underground Access Drive (Main Drift)

Source: Land and Property Information (2015); Department of Industry (2015); Metropolitan Coal (2023); MSEC (2024)

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Longwalls 311-316 and Project Underground Mining Area

Figure 1



MET-23-33 LW311-316 EP MAP 202A

LEGEND

- Mining Lease Boundary
- Railway
- Project Underground Mining Area
  Longwalls 20-27 and 301-317
- Longwalls 311-316 Secondary Extraction
- Longwalls 311-316 35° Angle of Draw and/or Predicted 20 mm Subsidence Contour
- 600 m from Longwalls 311-316 Secondary Extraction
- Existing Underground Access Drive (Main Drift)
- Aboriginal Heritage Site

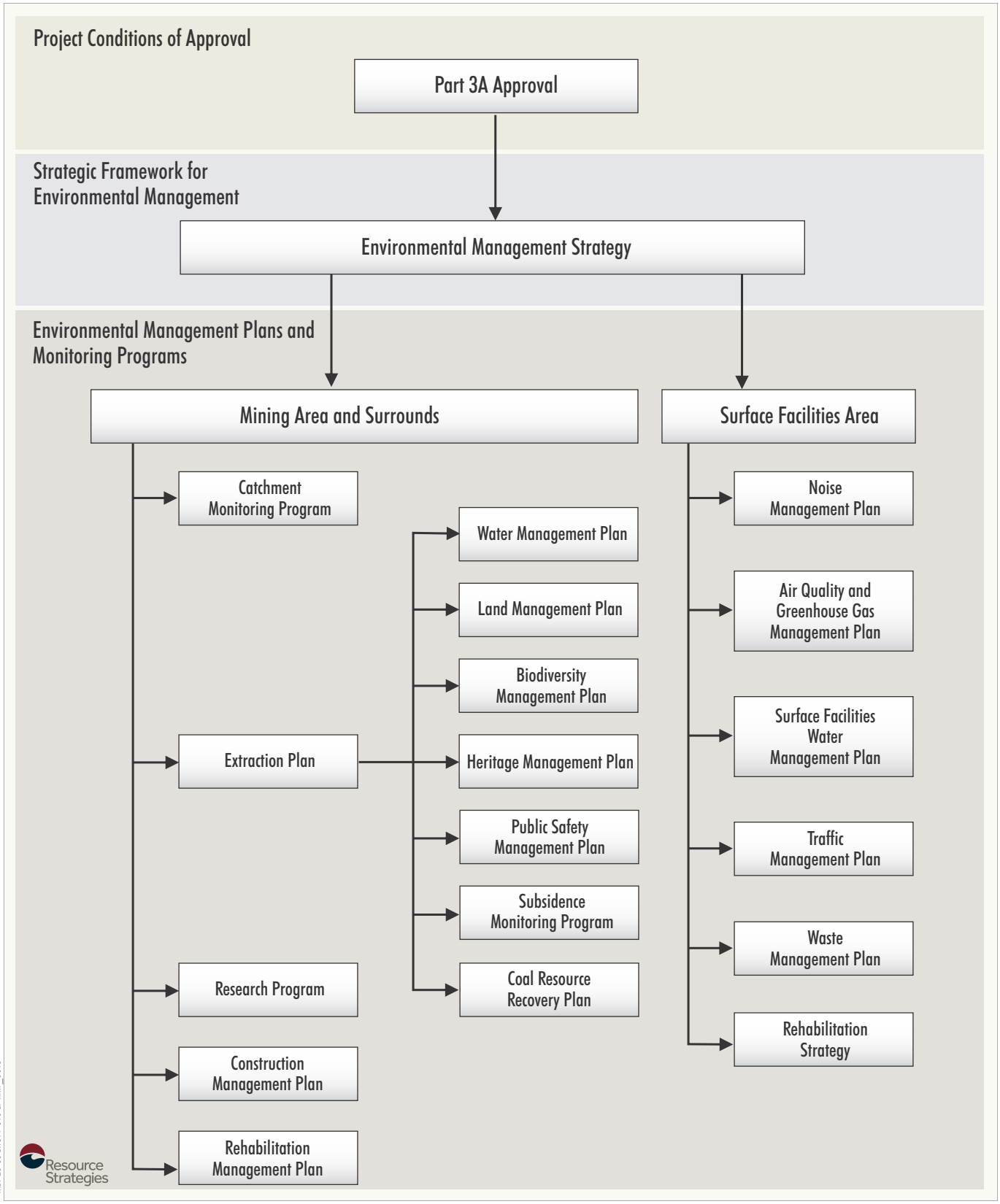
Source: Land and Property Information (2015); Date of Aerial Photography 1998; Department of Industry (2015); Metropolitan Coal (2023); MSEC (2024)

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Known Aboriginal Heritage Sites Within Project Underground Mining Area and Surrounds

Figure 2



MET-23-33 LW311-316 EP HMP_001B

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Environmental Management Structure

Figure 3

1.2 STRUCTURE OF THE HERITAGE MANAGEMENT PLAN

The remainder of this HMP is structured as follows:

Section 2: Describes the review and update of this HMP.

Section 3: Outlines the statutory requirements applicable to this HMP.

Section 4: Provides a revised assessment of the potential subsidence impacts and environmental consequences for Longwalls 311-316.

Section 5: Describes the consultation protocol.

Section 6: Details the performance measures and indicators that will be used to assess the Project.

Section 7: Outlines the baseline data for Aboriginal heritage sites.

Section 8: Describes supplementary fieldwork and pre-clearance surveys to be undertaken.

Section 9: Describes the monitoring program and provides the detailed Trigger Action Response Plan (TARP).

Section 10: Describes the management, remediation and mitigation measures that will be implemented to reduce potential impacts on Aboriginal heritage.

Section 11: Provides a Contingency Plan to manage any unpredicted impacts and their consequences.

Section 12: Describes the program to collect baseline data for future Extraction Plans.

Section 13: Describes the annual review and improvement of environmental performance.

Section 14: Outlines the management and reporting of incidents.

Section 15: Outlines the management and reporting of complaints.

Section 16: Outlines the management and reporting of non-compliances with statutory requirements.

Section 17: Lists the references cited in this HMP.

2 HERITAGE MANAGEMENT PLAN REVIEW AND UPDATE

In accordance with Condition 4, Schedule 7 of the Project Approval, this HMP will be reviewed within three months of the submission of:

- an audit under Condition 8, Schedule 7;
- an incident report under Condition 6, Schedule 7;
- an annual review under Condition 3, Schedule 7; and
- if necessary, revised to the satisfaction of the Director-General (now Secretary) of the DPE to ensure this HMP is updated on a regular basis and to incorporate any recommended measures to improve environmental performance.

This HMP will also be reviewed within three months of approval of any Project modification and if necessary, revised to the satisfaction of the DPE.

The revision status of this HMP is indicated on the title page of each copy. The distribution register for controlled copies of this HMP is described in Section 2.1.

2.1 DISTRIBUTION REGISTER

In accordance with Condition 10, Schedule 7 of the Project Approval, 'Access to Information', Metropolitan Coal will make this HMP publicly available on the Peabody website.

Metropolitan Coal recognises that various regulators have different distribution requirements, both in relation to whom documents should be sent and in what format.

An Environmental Management Plan and Monitoring Program Distribution Register have been established in consultation with the relevant agencies and infrastructure owners that indicates:

- to whom the Metropolitan Coal plans and programs, such as this HMP, will be distributed;
- the format (i.e. electronic or hard copy) of distribution; and
- the format of revision notification.

Metropolitan Coal will make the Distribution Register publicly available on the Peabody website.

Metropolitan Coal will be responsible for maintaining the Distribution Register and for ensuring that the notification of revisions is sent by email or post as appropriate.

In addition, Metropolitan Coal employees with local computer network access will be able to view the controlled electronic version of this HMP on the Metropolitan Coal local area network. Metropolitan Coal will not be responsible for maintaining uncontrolled copies beyond ensuring the most recent version is maintained on Metropolitan Coal's computer system and the Peabody website.

2.2 CONSULTATION ON THE HERITAGE MANAGEMENT PLAN

Consultation undertaken to date at the Metropolitan Coal Mine in relation to the management of Aboriginal heritage has been extensive, including consultation with the Aboriginal community in relation (but not limited) to the following:

- *Aboriginal Cultural Heritage Assessment Metropolitan Coal Project* (Kayandal Archaeological Services, 2008);
- Baseline Recordings for Longwalls 23-27 and Longwalls 301-316;
- Aboriginal cultural heritage impact assessments:
  - Archaeological Investigation of Longwall Application 8-13 (C.E. Sefton Pty Ltd [C.E. Sefton], 2001);
  - Archaeological Investigation of Future Mining Extensions Including Longwalls 13-17 and 20-22 (C.E. Sefton, 2004);
  - Monitoring of Sandstone Overhangs for the Effects of Mining Subsidence from Longwalls 8-13 (C.E. Sefton, 2006);
  - Longwalls 14-17 Aboriginal Cultural Heritage Assessment (HCPL, 2006);
  - Aboriginal Cultural Heritage Assessment for Longwalls 18-19A (Kayandel Archaeological Services, 2007);
  - Longwalls 20-22 Rounds 1, 2 and 3 Monitoring of Aboriginal Heritage Sites (Kayandel Archaeological Services, 2012; Niche, 2013 and 2015);
  - Longwalls 23-27 Round 1, 2, 3, 4 and 5 Monitoring of Aboriginal Heritage Sites (Niche, 2016a, 2016b, 2017a, 2017b and 2017c);
  - Longwall 301-303: Monitoring of Aboriginal Heritage Sites (Niche, 2019);
  - Monitoring of Aboriginal Cultural Heritage Sites Longwalls 304 (Niche, 2020a); and
  - Monitoring of Aboriginal Cultural Heritage Sites Longwalls 305-307 Round 1 and 2 (Niche, 2021 and 2023a);
  - Monitoring of Aboriginal Cultural Heritage Sites Longwall 308-310 (Regal Heritage Pty Ltd [Regal Heritage], 2023).

Metropolitan Coal undertook consultation as part of the previous iterations of the HMP which included:

- Metropolitan Coal Longwalls 20-22 Heritage Management Plan;
- Metropolitan Coal Longwalls 23-27 Heritage Management Plan;
- Metropolitan Coal Longwalls 301-303 Heritage Management Plan;
- Metropolitan Coal Longwall 304 Heritage Management Plan;
- Metropolitan Coal Longwalls 305-307 Heritage Management Plan; and
- Metropolitan Coal Longwalls 308-310 Heritage Management Plan.

Metropolitan Coal provided a copy of the draft Longwalls 311-316 Heritage Management Plan to Aboriginal stakeholders on 19 April 2024. Several Aboriginal stakeholders provided comments on the draft Longwalls 311-316 Heritage Management Plan. The comments have been considered in this updated version of the Longwalls 311-316 Heritage Management Plan, and a reconciliation table showing how the comments have been considered is provided in Appendix 1.

3 STATUTORY REQUIREMENTS

Metropolitan Coal's statutory obligations are contained in:

(i) the conditions of the Project Approval;

(ii) relevant licences and permits, including conditions attached to mining leases; and

(iii) other relevant legislation.

These are described below.

3.1 ENVIRONMENTAL PLANNING & ASSESSMENT ACT APPROVAL

Condition 6(f), Schedule 3 of the Project Approval requires the preparation of a HMP as a component of Extraction Plan(s) for second workings. Condition 6(f), Schedule 3 states:

> ***SECOND WORKINGS***
>
> ***Extraction Plan***
>
> *6. The Proponent shall prepare and implement an Extraction Plan for all second workings in the mining area to the satisfaction of the Director-General. This plan must:*
>
> *…*
>
> *(f) include a:*
>
> *…*
>
> - *Heritage Management Plan, which has been prepared in consultation with OEH[2] and the relevant Aboriginal groups, to manage the potential environmental consequences of the Extraction Plan on heritage sites or values;*

In addition, Condition 2, Schedule 7 and Condition 7, Schedule 3 of the Project Approval outline management plan requirements that are applicable to the preparation of this HMP. Table 1 indicates where each component of the conditions is addressed within this HMP.

[2] The heritage division within the NSW Office of Environment and Heritage (OEH) is now Heritage NSW.

Table 1
Management Plan Requirements

Project Approval Condition	HMP Section
Condition 2, Schedule 7	
2. The Proponent shall ensure that the management plans required under this approval are prepared in accordance with any relevant guidelines, and include:	
a) detailed baseline data;	Section 7
b) a description of:	
• the relevant statutory requirements (including any relevant approval, licence or lease conditions);	Section 3
• any relevant limits or performance measures/criteria;	Section 6
• the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the project or any management measures;	Section 6
c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;	Sections 6, 9, 10 and 11
d) a program to monitor and report on the:	Sections 9, 10 and 13
• impacts and environmental performance of the project;	
• effectiveness of any management measures (see c above);	
e) a contingency plan to manage any unpredicted impacts and their consequences;	Section 11
f) a program to investigate and implement ways to improve the environmental performance of the project over time;	Sections 9 and 13
g) a protocol for managing and reporting any;	
• incidents;	Section 14
• complaints;	Section 15
• non-compliances with statutory requirements; and	Section 16
• exceedances of the impact assessment criteria and/or performance criteria; and	Sections 10, 11 and 16
h) a protocol for periodic review of the plan.	Sections 2 and 13
Condition 7, Schedule 3	
7. In addition to the standard requirements for management plans (see condition 2 of schedule 7), the Proponent shall ensure that the management plans required under condition 6(f) above include:	
a) a program to collect sufficient baseline data for future Extraction Plans;	Section 12
b) a revised assessment of the potential environmental consequences of the Extraction Plan, incorporating any relevant information that has been obtained since this approval;	Section 4
c) a detailed description of the measures that would be implemented to remediate predicted impacts; and	Section 10
d) a contingency plan that expressly provides for adaptive management.	Section 11

3.2 LICENCES, PERMITS AND LEASES

In addition to the Project Approval, all activities at or in association with the Metropolitan Coal Mine will be undertaken in accordance with the following licences, permits and leases which have been issued or are pending issue:

- The conditions of mining leases issued by the NSW Division of Resources and Geoscience (now Mining, Exploration and Geoscience), under the NSW *Mining Act 1992* (e.g. Consolidated Coal Lease [CCL] 703, Mining Lease [ML] 1610, ML 1702, Coal Lease 379 and Mining Purpose Lease 320).
- The conditions of Environment Protection Licence (EPL) No. 767 issued by the NSW Environment Protection Authority under the NSW *Protection of the Environment Operations Act 1997*. Revision of the EPL will be required prior to the commencement of Metropolitan Coal activities that differ from those currently licensed.
- The prescribed conditions of specific surface access leases within CCL 703 for the installation of surface facilities as required.
- Water Access Licences (WALs) issued by the Department of Industry – Water (now DPE-Water) under the NSW *Water Management Act 2000,* including WAL 36475 under the *Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources 2023* and WAL 25410 under the *Water Sharing Plan for the Greater Metropolitan Region Unregulated River Water Sources 2023.*
- Mining and workplace health and safety related approvals granted by the Resources Regulator and WorkCover NSW.
- Supplementary approvals obtained from WaterNSW for surface activities within the Woronora Special Area (e.g. fire road maintenance activities).

3.3 OTHER LEGISLATION

Metropolitan Coal will conduct the Project consistent with the Project Approval and any other legislation that is applicable to an approved Part 3A Project under the EP&A Act.

The following Acts may be applicable to the conduct of the Project (Helensburgh Coal Pty Ltd [HCPL], 2008)[3]:

- *Biodiversity Conservation Act 2016;*
- *Biosecurity Act 2015;*
- *Contaminated Land Management Act 1997;*
- *Crown Land Management Act 2016;*
- *Dams Safety Act 2015;*
- *Dangerous Goods (Road and Rail Transport) Act 2008;*
- *Energy and Utilities Administration Act 1987;*
- *Fisheries Management Act 1994;*
- *Mining Act 1992;*
- *National Parks and Wildlife Act 1974;*

[3] The list of potentially applicable Acts has been updated to reflect changes to the Acts that were in force at the time of submission of the Metropolitan Coal Project Environmental Assessment (Project EA) (HCPL, 2008).

- *Protection of the Environment Operations Act 1997;*
- *Rail Safety (Adoption of National Law) Act 2012;*
- *Roads Act 1993;*
- *Water Act 1912;*
- *Water Management Act 2000;*
- *Water NSW Act 2014;*
- *Work Health and Safety Act 2011;* and
- *Work Health and Safety (Mines and Petroleum Sites) Act 2013.*

Relevant licences or approvals required under these Acts will be obtained as required.

4 REVISED ASSESSMENT OF POTENTIAL ENVIRONMENTAL CONSEQUENCES

4.1 LONGWALLS 311-316 EXTRACTION LAYOUT

Longwalls 311-316 and the area of land within 600 metres (m) of Longwalls 311-316 secondary extraction are shown on Figures 1 and 2. Longwall extraction will occur from north to south. The layout of Longwalls 311-316 includes both 163 m and 138 m panel widths (void) and 45 m and 70 m pillar widths (solid). As the mine progresses west of the reservoir it will transition to 163 m panel widths, with 138 m panel widths remaining at the northern commencing ends beneath the reservoir.

The provisional extraction schedule for Longwalls 311-316 is provided in Table 2.

Table 2
Provisional Extraction Schedule

Longwall	Estimated Start Date	Estimated Duration	Estimated Completion Date
Longwall 311	October 2024	8 Months	June 2025
Longwall 312	July 2025	7 Months	January 2026
Longwall 313	February 2026	7 Months	September 2026
Longwall 314	November 2026	10 Months	September 2027
Longwall 315	October 2027	11 Months	September 2028
Longwall 316	October 2028	11 Months	September 2029

The total cumulative predicted subsidence effects, subsidence impacts and/or environmental consequences at the completion of the Project are considered in the Metropolitan Coal Project Environmental Assessment (Project EA) (HCPL, 2008) and the Preferred Project Report (HCPL, 2009), and the cumulative subsidence effects, subsidence impacts and/or environmental consequences on Aboriginal heritage will be assessed in future Extraction Plans.

4.2 RELEVANT INFORMATION OBTAINED SINCE PROJECT APPROVAL

Aboriginal heritage monitoring programs have been implemented at the Metropolitan Coal Mine for Longwalls 20-22 (from 2010 to 2014; Round 1, 2 and 3 surveys) (Kayandel Archaeological Services, 2012; Niche, 2013 and 2015), Longwalls 23-27 (from 2015; Round 1, 2, 3, 4 and 5 surveys) (Niche, 2016a, 2016b, 2017a, 2017b and 2017c), Longwalls 301-303 (Niche, 2019), Longwall 304 (Niche, 2020a), Longwalls 305-307 (from 2021 to 2023; Round 1 and 2 surveys) (Niche, 2021 and 2023a) and Longwall 308 (2023; Round 1 surveys) (Regal Heritage Pty Ltd [Regal Heritage], 2023) to monitor the impacts and environmental consequences of Project related subsidence on Aboriginal heritage sites. The monitoring programs have been undertaken by a suitably qualified archaeologist (with experience in rock art recording and management) and representatives of the Aboriginal stakeholders.

Metropolitan Coal acknowledges that all Aboriginal heritage sites are culturally significant to the Aboriginal people who have a traditional connection to Country. All Aboriginal heritage sites have been monitored for subsidence impacts by the observation and recording of any and all changes at the sites over the monitoring period.

There are 144 Aboriginal heritage sites (141 identified in the Project EA, one new site [MET 4] identified during Round 2 monitoring for Longwalls 20-22 and two new sites [NEW-RS-01 and NEW-ST-01] identified during baseline recording for Longwalls 311-316) located within the mining area. The mining area is defined by the Project Approval and is shown on Figure 1 of this HMP (labelled as Project Underground Mining Area Longwalls 20-27 and 301-317). Thirteen (13) Aboriginal heritage sites have been determined to have changes due to mining induced subsidence.

Five Aboriginal heritage sites (FRC 15, FRC 281, FRC 283, FRC 284 and MET 1) have been determined to have changes due to mining induced subsidence from Longwalls 20-22 (Figure 2). The observed impacts at each site were as follows:

- Site FRC 15 – vertical cracking, not coincident with any art.
- Site FRC 281 – multiple cracks running either through or adjacent to the motifs (although the majority of art showed no damage or changes).
- Site FRC 283 – cracking of the rear wall of the shelter, not coincident with any art.
- Site FRC 284 – cracking of the rear wall of the shelter and exfoliation of rock spalls, not coincident with any art.
- Site MET 1 – two vertical cracks along the rear wall and ceiling of the shelter, not coincident with any art.

Seven Aboriginal heritage sites (FRC 28, FRC 29, FRC 34, FRC 60, FRC 176, FRC 275 and FRC 301) have been determined to have changes due to mining induced subsidence from Longwalls 23-27 (Figure 2). The observed impacts at each site were as follows:

- Site FRC 28 – vertical cracking of the rear shelter wall, opening of bedding planes and joints and movement of the rock shelf that is part of the shelter floor, not coincident with any art.
- Site FRC 29 – horizontal crack along the back wall and a joining vertical crack, not coincident with any art.
- Site FRC 34 – horizontal cracking along the roof of the shelter and cracking coincident with the most southern hand stencil on the back panel.
- Site FRC 60 – three vertical cracks along the back wall of the shelter, this shelter contains no art and the archaeological deposit was unchanged.
- Site FRC 176 – vertical cracking along the northern and southern ends of the shelter, not coincident with art.
- Site FRC 275 – opening of horizontal bedding plane at rear of the shelter, five vertical hairline cracks along the back wall of the shelter, not coincident with any art.
- Site FRC 301 – surface cracking on the rock platform, not coincident with the grinding grooves.

One Aboriginal heritage site, FRC 76, was determined to have changes due to mining induced subsidence from Longwalls 301-303. The observed impacts were as follows:

- Site FRC 76 – opening of the horizontal bedding plane along the back wall, not coincident with any art.

No changes due to mining induced subsidence were identified at the Aboriginal heritage sites surveyed following the completion of Longwall 304 and Longwalls 305-306 (Niche, 2020a; 2021 and 2023a).

The results of the monitoring program have been used to assess the Aboriginal heritage sites subsidence impact performance measure:

Less than 10% of Aboriginal heritage sites within the mining area are affected by subsidence impacts.

For the purpose of measuring performance against the Aboriginal heritage subsidence impact performance measure (Section 6), Aboriginal heritage sites are considered to be "affected by subsidence impacts" if they exhibit one or more of the following consequences that cannot be attributed to natural weathering or deterioration:

- overhang collapse;
- cracking of sandstone that coincides with Aboriginal art or grinding grooves; and/or
- rock fall that damages Aboriginal art.

Of the sites at which changes due to mining induced subsidence have occurred, only sites FRC 34 and FRC 281 have been affected by subsidence impacts as a result of cracking of sandstone that coincides with Aboriginal art. This means that less than 2 percent (%) of sites within the mining area have been affected by subsidence impacts (Niche, 2017c; 2019; 2020a; 2021 and 2023a) (Section 6).

In addition to the changes recorded as a result of mining induced subsidence, natural weathering processes can also result in changes/deterioration of Aboriginal heritage sites in the Southern Coalfield (Reeves and Regal, 2017). For example, a large block fall was recorded at the southern end of site FRC 24.1 during the Round 2 monitoring for Longwalls 23-27. This change was observed to be due to increased natural water seepage during a large rain event and vegetation growth (including *Todea Barbara* and *Microsorum scandens*) along the bedding plane where it joins to the roof of the shelter (Niche, 2016b). Other examples of natural weathering include micro- and macro-vegetation growth, chemical erosion, fire damage and exfoliation of surfaces (Niche, 2016b).

The results of the monitoring to date are consistent with the potential subsidence impacts and environmental consequences predicted in the Project EA and the Preferred Project Report, where it was expected that the majority of identified Aboriginal heritage sites would experience no significant change, particularly when compared to natural weathering processes unrelated to mining and given the conservative nature of the subsidence predictions.

Aboriginal heritage sites surveyed by Longwalls 301-303 included sites FRC 28, FRC 29, FRC 34, FRC 60, FRC 76, FRC 117, FRC 176 and MET 1. None of the Aboriginal heritage sites showed continued change, however, one site, FRC 76 was observed to have changes due to mining induced subsidence. During the Aboriginal heritage monitoring completed for Longwall 304 and Longwall 305, no further changes due to mining were observed at FRC 76.

Aboriginal heritage sites surveyed by Longwalls 305-307 included sites FRC 67, FRC 68, FRC 70, FRC 71, FRC 76, FRC 77, FRC 78, FRC 85, FRC 86, FRC 87, FRC 90, FRC 91, FRC 93, FRC 97, FRC 101, FRC 117, FRC 180, FRC 254, FRC 309, FRC 310, FRC 311, FRC 316, FRC 320, FRC 321 and FRC 325. None of the Aboriginal sites were observed to display changes or mining related impacts.

Aboriginal heritage sites surveyed by Longwall 308-310 (Round 1 monitoring of Longwall 308) included sites FRC 67, FRC 68, FRC 70, FRC 71, FRC 87, FRC 93, FRC 94, FRC 97, FRC 101, FRC 180, FRC 184, FRC 185, FRC 186, FRC 187, FRC189, FRC 191, FRC 194, FRC 195, FRC 198, FRC 199, FRC 254, FRC 310, FRC 311, FRC 313, FRC 316, FRC 323, FRC 324, FRC 340, FRC 344, FRC 345 and MET 6. None of the Aboriginal sites were observed to display changes or mining related impacts.

The potential for vehicle-generated dust in the Woronora Special Area or minor blasting underground (which is undertaken at significant depths) to impact on Aboriginal heritage sites in the underground mining area is very low. Vehicle access in the Woronora Special Area is via formed tracks and existing fire trails. Metropolitan Coal personnel and contractors are required to observe speed limits when using the fire trails, which limits the amount of dust generated. In most cases Aboriginal heritage sites are distant from the tracks and fire trails, and therefore are not subject to direct exposure to any dust generated by vehicles using the tracks and fire trails.

4.3 ENVIRONMENTAL RISK ASSESSMENT

An Environmental Risk Assessment (ERA) was conducted for four of the key component plans of the Metropolitan Coal Longwalls 311-316 Extraction Plan[4] *viz.* Water Management Plan, Biodiversity Management Plan, Land Management Plan and this HMP to give appropriate consideration to risk assessment and risk management in accordance with the DPE (2022) *Extraction Plan Guideline*.

The suitably qualified and experienced experts endorsed by the Secretary of the DPE for the preparation of the Metropolitan Coal Longwalls 311-316 Extraction Plan participated in the ERA[5]. The ERA process involved the key steps described below.

Review of Relevant Documentation and Risk Identification

In preparation for the ERA workshop, the ERA participants reviewed a number of documents relevant to the risk assessment. This included (but was not limited to):

- The 2008 *Environmental Risk Analysis* (SP Solutions, 2008) conducted for the Project EA (Appendix O of the Project EA).
- The Preferred Project Report (HCPL, 2009). During the NSW Government's assessment phase of the Project EA, and in recognition of concerns raised by key stakeholders during the formal Planning Assessment Commission assessment process, HCPL considered it appropriate to reduce the proposed extent of the original Project longwall mining area (i.e. Longwalls 20-44). This reduction in the extent of longwall mining resulted in a significant reduction to the extent of potential subsidence effects to the Waratah Rivulet and the Eastern Tributary and a reduction in the consequential potential environmental impacts.
- The Longwalls 308-310 Environmental Risk Assessment Report (Risk Mentor, 2021) (which included consideration of the Longwalls 301-303, Longwall 304 and Longwalls 305-307 Environmental Risk Assessment Reports).
- Figures showing the Longwalls 311-316 layout in relation to key surface features.
- Subsidence predictions for Longwalls 311-316 (including subsidence contours, Eastern Tributary, Waratah Rivulet, Woronora Reservoir, other streams, cliff sites, upland swamps and Aboriginal heritage sites).

The participants were asked to identify any additional (specific) issues/risks and/or changes to previously assessed levels of risk in preparation for the ERA workshop.

[4] A risk assessment has been undertaken separately in relation to the Metropolitan Coal Longwalls 311-316 Public Safety Management Plan.

[5] Participants included Mr Peter DeBono (MSEC, Subsidence and Land), Ms Ines Epari (SLR Consulting Australia Pty Ltd, Groundwater), Mr Anthony Marszalek and Dr Camilla West (ATC Williams Pty Ltd, Surface Water), Associate Professor Barry Noller (The University of Queensland, Surface Water Quality), Ms Elizabeth Norris (Ecoplanning Pty Ltd, Flora), Dr Sharon Cummins (Bio-Analysis Pty Ltd, Aquatic Fauna), Mr Jamie Reeves (Niche), Mr Jon Degotardi (Metropolitan Coal), Mr Stephen Love (Metropolitan Coal), Mr Nicolas Tucker (Metropolitan Coal), Mr Jamie Warwick (Resource Strategies), Ms Harper Mulloy (Resource Strategies) and Abigail Ashford (Resource Strategies).

ERA Workshop

The ERA workshop for Longwalls 311-316 was conducted on 18 August 2023, with all participants attending via video conferencing. The ERA workshop was facilitated by an independent specialist, Dr Peter Standish of Risk Mentor and conducted in accordance with AS/NZS ISO 31000: *2009 Risk Management – Principles and Guidelines.*

The general consensus of the workshop participants was the additional (specific) issues/risks identified for Longwalls 311-316 were broadly assessed and ranked as part of the 2008 Environmental Risk Analysis, Longwalls 301-303 ERA, Longwall 304 ERA, Longwalls 305-307 ERA and/or Longwalls 308-310 ERA. However, additional (specific) issues were identified by the workshop participants relevant to Longwalls 311-316. Each of the issues/risks were explained systematically by the relevant workshop participants and each carefully reviewed.

Loss scenarios for the key potential environmental issues were identified for upland swamps, aquatic biota, threatened amphibians, Waratah Rivulet and the Woronora Reservoir. The risk rankings are within the "low-medium" range and consequently the potential outcomes can be integrated into the existing management systems for effective review and monitoring.

ERA Report Review

All ERA participants were asked to review the draft Longwalls 311-316 ERA report that was prepared to summarise the outcomes of the risk assessment. Participants' comments were incorporated into the final Risk Mentor (2023) report.

This HMP has been prepared to provide for effective management of the identified subsidence risks.

4.4 ABORIGINAL HERITAGE SITES

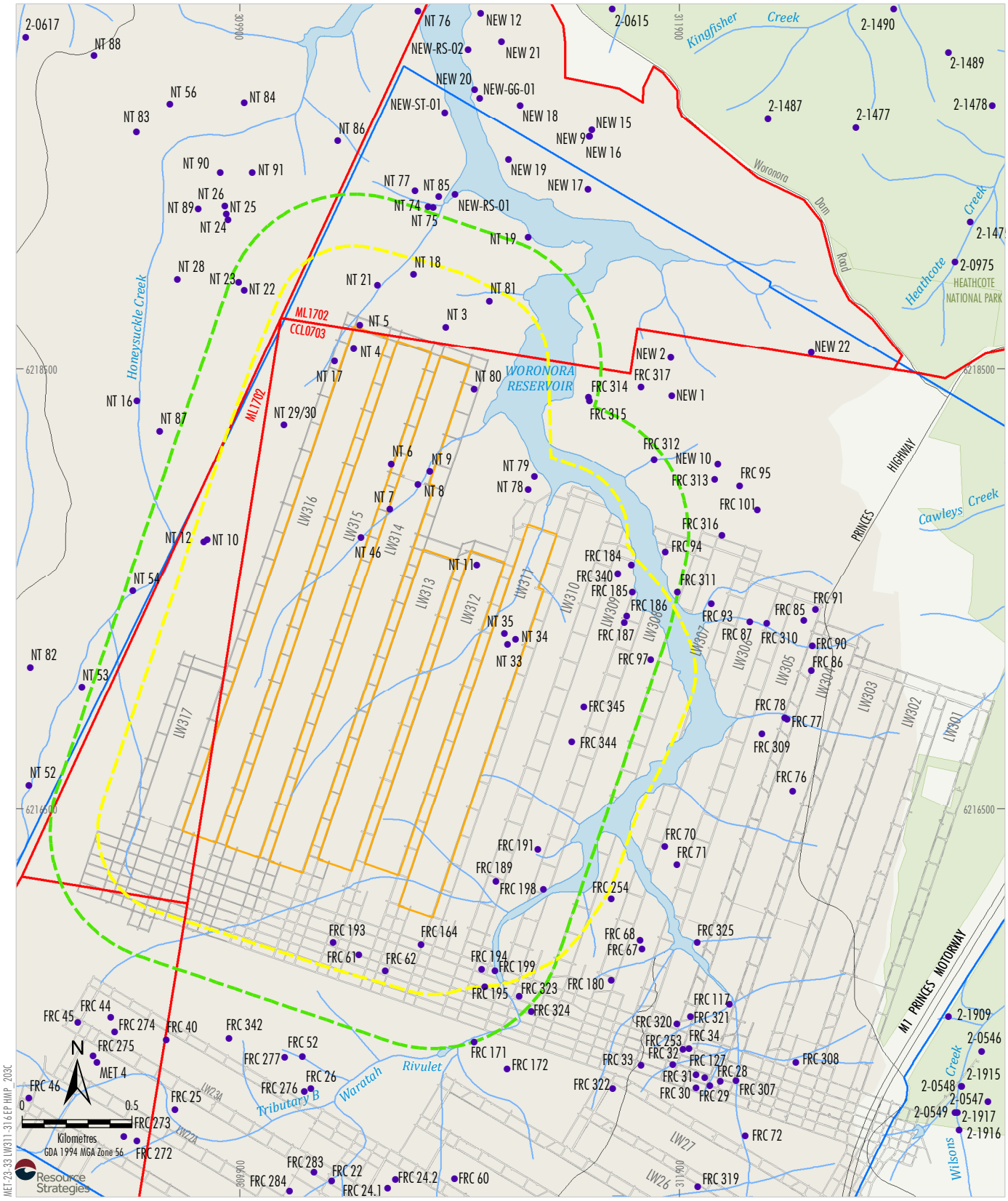
The Aboriginal heritage sites identified within 600 m of Longwalls 311-316 secondary extraction are shown on Figure 4 and a summary is provided in Table 3[6].

A total of 49 Aboriginal heritage sites are located within 600 m of Longwalls 311-316 secondary extraction, and a total of 39 sites are located within the Longwalls 311-316 35 degree (°) angle of draw and/or predicted 20 millimetres (mm) subsidence contour[7] (Figure 4).

Four sites within 600 m of Longwalls 311-316 secondary extraction (sites FRC 62, FRC 185, FRC 191 and FRC 195) are of high scientific (archaeological) significance (Figure 4 and Table 3). Three of these sites (sites FRC 62, FRC 185 and FRC 191) are also located within the Longwalls 311-316 35° angle of draw and/or predicted 20 mm subsidence contour.

[6] Site 2-0346 (AHIMS 52-2-0346) was described and assessed for potential subsidence impacts in the Project EA (HCPL, 2008; Kayandel Archaeological Services, 2008) and was reported as being located over Longwall 302. During the baseline recording for Longwalls 301-303, Niche undertook a detailed site inspection. Despite searches of all possible locations (based on descriptions in the AHIMS site card and previous assessment reports) and the surrounding area, the site was unable to be relocated in the area described by its previous recorded location. Niche has assessed the site record and determined that it refers to the same site as site FRC 93.

[7] MSEC (2024) has assessed subsidence impacts for 49 Aboriginal heritage sites including, 39 sites located within the Longwalls 311-316 35º angle of draw and/or 20 mm subsidence contour and three sites located outside of the Longwalls 311-316 35º angle of draw and/or 20 mm subsidence contour identified during the Longwall 311-316 Baseline Recording surveys.



LEGEND

- Mining Lease Boundary
- Woronora Special Area
- Project Underground Mining Area
  Longwalls 20-27 and 301-317
- Longwalls 311-316 Secondary Extraction
- Longwalls 311-316 35° Angle of Draw and/or Predicted 20 mm Subsidence Contour
- 600 m from Longwalls 311-316 Secondary Extraction
- Aboriginal Heritage Site

Source: Land and Property Information (2015); Department of Industry (2015); Metropolitan Coal (2023); MSEC (2024); Niche Heritage and Environment (2024)

Peabody
METROPOLITAN COAL

Longwalls 311-316
Known Aboriginal Heritage Sites

Figure 4

Table 3
Aboriginal Heritage Sites within 600 m of Longwalls 311-316 Secondary Extraction

AHIMS No.	Site Code	Site Type	Archaeological Significance Rating[1]
52-2-0152	FRC 61	Sandstone overhang with artefacts only	Low
52-2-0168	FRC 62	Sandstone overhang with art, artefacts, deposit and/or grinding grooves	High
52-2-0873	FRC 94	Sandstone overhang with art only	Low
52-2-0220 52-2-0337*	FRC 97	Sandstone overhang with art only	Moderate
52-2-0171	FRC 164	Open site with grinding grooves only	Low
52-2-0222	FRC 184	Sandstone overhang with artefacts and deposit	Low
52-2-0223 52-2-0307*	FRC 185	Sandstone overhang with art, artefacts and deposit	High
52-2-0224	FRC 186	Sandstone overhang with art and deposit	Low
52-2-0225	FRC 187	Sandstone overhang with art only	Low
52-2-0180	FRC 189	Sandstone overhang with art only	Low
52-2-0183	FRC 191	Sandstone overhang with art only	High
52-2-0263 52-2-0308*	FRC 193	Open site with grinding grooves only	Low
52-2-0263 52-2-0308*	FRC 194	Sandstone overhang with art only	Low
52-2-0264	FRC 195	Sandstone overhang with art only	High
52-2-0268 52-2-0404*	FRC 198	Sandstone overhang with art only	Low
52-2-0265 52-2-0415*	FRC 199	Sandstone overhang with art only	Low
52-2-3502	FRC 311	Sandstone overhang with artefacts and deposit	Low
52-2-3503	FRC 312	Sandstone overhang with artefacts and deposit	Low
52-2-3445	FRC 314	Sandstone overhang with art, artefacts and deposit	Low
52-2-3446	FRC 315	Sandstone overhang with artefacts and deposit	Low
52-2-3454	FRC 323	Sandstone overhang with artefacts and deposit	Low
52-2-3471	FRC 340	Sandstone overhang with art only	Low
52-2-3475	FRC 344	Sandstone overhang with artefacts and deposit	Low
52-2-3476	FRC 345	Sandstone overhang with artefacts and deposit	Low
52-2-0618	NT 3	Sandstone overhang with art and PAD	Low
52-2-0619	NT 4	Overhang with art, artefacts and deposit	Moderate
52-2-0620	NT 5	Sandstone overhang site	Moderate
52-2-0621	NT 6	Sandstone overhang with art and PAD	Low
52-2-0622	NT 7	Open site with grinding grooves only	Low
52-2-0623	NT 8	Open site with grinding grooves and petroglyphs	Moderate
52-2-0624	NT 9	Overhang with art and PAD	Low
52-2-0625	NT 10	Sandstone overhang site	Low
52-2-0626	NT 11	Sandstone overhand with art only	Moderate
52-2-0753	NT 12	Open site with grinding grooves only	Low
52-2-0629	NT 17	Open site with grinding grooves and petroglyphs	Moderate
52-2-0751	NT 18	Sandstone overhang site	Low

Table 3 (Continued)
Aboriginal Heritage Sites within 600 m of Longwalls 311-316 Secondary Extraction

AHIMS No.	Site Code	Site Type	Archaeological Significance Rating[1]
52-2-0630	NT 21	Open site with grinding grooves only	Low
52-2-0758	NT 22	Overhang with artefacts and deposit	Low
52-2-0631	NT 23	Overhang with art, artefacts and deposit	Low
52-2-0637[2]	NT 29/30	Open site with grinding grooves only	Low
52-2-0641	NT 33	Sandstone overhang with art, artefacts and deposit	Low
52-2-0642	NT 34	Sandstone overhang with art, artefacts, deposit and/or grinding grooves	Moderate
52-2-0643	NT 35	Sandstone overhang with art, artefacts, deposit and/or grinding grooves	Low
52-2-0755	NT 46	Open site with grinding grooves and petroglyphs	Low
52-2-0374	NT 54	Overhang with art, artefacts and deposit	Low
52-2-3440	NT 78	Sandstone overhang with art only	Low
52-2-3441	NT 79	Sandstone overhang with art only	Low
52-2-3442	NT 80	Overhang with artefacts and deposit	Low
52-2-3443	NT 81	Sandstone overhang with PAD only	Low

1 Sources include: Kayandel Archaeological Services (2006; 2007; 2008) and information available on the Heritage NSW Aboriginal Heritage Information Management System (AHIMS) Site Cards.

2 Single Aboriginal heritage site registered once on the AHIMS database, but recorded twice (NT 29 and NT 30) during assessments.

* Single Aboriginal heritage site registered more than once on the AHIMS database (Illawarra Prehistory Group, 2007).

PAD – Potential Archaeological Deposit.

Cultural Significance

Metropolitan Coal acknowledges that all Aboriginal heritage sites are culturally significant to the Aboriginal people who have a traditional connection to Country.

An extract regarding the cultural significance of the wider Metropolitan Coal Mine area from the Project Aboriginal Cultural Heritage Assessment is provided below (Kayandal Archaeological Services, 2008):

> *Aboriginal heritage sites within the study area and surrounds that have previously been identified as being of specific cultural interest to some Aboriginal community representatives include FRC 3 and FRC 4 (both located outside the study area), FRC 12, FRC 22, FRC 24.1, FRC 24.2 and FRC 26 (located within the study area) (C. E. Sefton Pty Ltd, 2004; HCPL, 2006). During the various recent surveys and site inspections undertaken in 2006 and 2007 (Sections 3.4 and 4), FRC 12 was noted by members of the Aboriginal community (i.e. representatives of the Woronora Plateau Gundungara Elders Council, La Perouse Botany Bay Aboriginal Corporation, Wadi Wadi Coomaditchie Aboriginal Corporation, Northern Illawarra Aboriginal Collective[8], KEJ Tribal Elders Corporation, Tharawal Local Aboriginal Land Council, Cubbitch Barta, Illawarra Local Aboriginal Land Council and Mr Gary Caines) as being of particular cultural significance. It was indicated that all Aboriginal heritage sites (both known and unknown), when considered collectively as a 'bundle', are culturally significant.*
>
> *The Illawarra Local Aboriginal Land Council previously commented (in regard to part of the study area) that: "This Traditional Site is of great importance to Aboriginal people; this land that is visited by our Ancestors must be preserved and protected".*
>
> *The Northern Illawarra Aboriginal Collective previously commented indicated* [sic] *that "more than fifty documented traditional stories of country (some from this exact place)" had been recorded nearly a century ago, "making it clear the very landscape itself, its flora and fauna, its water and earth, are all Traditional*

8 The Northern Illawarra Aboriginal Collective group has dissolved and no longer exists.

Materials (as defined in S203FCA of the Native Title Act [Commonwealth] 1993) having spiritual cultural and heritage values for Traditional Owners".

The Tharawal Local Aboriginal Land Council commented that "Aboriginal heritage sites provide evidence of our ancestry and links to past occupation. TLALC considers all Aboriginal heritage to be important to our people".

In addition, it has previously been noted by representatives of Northern Illawarra Aboriginal Collective that some motifs within Aboriginal heritage sites FRC 4 (located outside the area) and FRC 11 (located within the study area) were of fish, molluscs and shells that may indicate a relationship between the previous Aboriginal inhabitants and the ocean. Northern Illawarra Aboriginal Collective representatives previously indicated that this connection was further exampled by the presence of shells and shell fragments within sites FRC 7 and FRC 265 (both located outside the study area) (ibid).

The Project Aboriginal Cultural Heritage Assessment summarised all of the Aboriginal heritage sites specifically identified by the Aboriginal community representatives as having particular cultural significance as follows (Kayandal Archaeological Services, 2008):

Based on the above, the Aboriginal community consider all sites to be of some cultural significance. However, sites within the study area specifically identified by the Aboriginal community for their cultural significance include FRC 12, FRC 22, FRC 24.1, FRC 24.2, FRC 26, FRC 62, FRC 185, FRC 198, FRC 316, FRC 340, NT 8, NT 9, NT 35, NT 46, NEW 1, NEW 2 and NEW 17.

Eight sites identified as having particular cultural significance by the Aboriginal community representatives are located within 600 m of Longwalls 311-316 secondary extraction, namely sites FRC 62, FRC 185, FRC 198, FRC 340, NT 8, NT 9, NT 35 and NT 46. Notwithstanding, the broader cultural values described above are considered in relation to the monitoring and management of known Aboriginal heritage sites (e.g. when developing potential remediation or mitigation measures [Section 10]).

4.4.1 Revised Subsidence Predictions

The subsidence predictions for Longwalls 311-316 in relation to Aboriginal heritage sites within the 35º angle of draw and/or predicted 20 mm subsidence contour have been prepared by MSEC (2024). Table 4 compares the revised subsidence predictions for the Longwalls 311-316 Extraction Plan with the subsidence predictions for the Preferred Project Layout (at the completion of Longwall 316).

Of the 39 Aboriginal heritage sites within the Longwalls 311-316 35º angle of draw and/or predicted 20 mm subsidence contour, there is an increase in the maximum predicted vertical subsidence at 21 Aboriginal Heritage sites, based on the Extraction Plan Layout. The predicted tilt increases at 19 Aboriginal heritage sites, based on the Extraction Plan Layout. The hogging curvatures and sagging curvatures based on the Extraction Plan Layout, increase at ten sites and four sites, respectively.

Whilst the predicted subsidence parameters increase at a small number of Aboriginal heritage sites, the maxima are similar to or less than the maxima predicted for other Aboriginal heritage sites located above the previously extracted longwalls at the Metropolitan Coal Mine.

Based on the revised subsidence predictions, Section 4.4.2 provides a revised assessment of predicted subsidence impacts and environmental consequences on Aboriginal heritage sites.

Table 4
Revised Subsidence Predictions for Longwalls 311-316 Aboriginal Heritage Sites

Aboriginal Heritage Sites[1]	Maximum Predicted Subsidence[2] (mm)		Maximum Predicted Tilt[3] (mm/m)		Maximum Predicted Hogging Curvature[4] (km^{-1})		Maximum Predicted Sagging Curvature[4] (km^{-1})		Maximum Predicted Conventional Tensile Strain[5] (mm/m)		Maximum Predicted Conventional Compressive Strain[5] (mm/m)	
	PPL (LW316)[6]	EPL (LW316)[7]	PPL (LW316)[6]	EPL (LW316)[7]	PPL (LW316)[6]	EPL (LW316)[7]	PPL (LW316)[6]	EPL (LW316)[7]	PPL (LW316)[6]	EPL (LW316)[7]	PPL (LW316)[6]	EPL (LW316)[7]
FRC 164	150	100	1.5	0.5	0.02	<0.01	<0.01	<0.01	<0.5	<0.5	<0.5	<0.5
FRC 184	425	325	1.0	2.0	0.04	0.02	0.02	<0.01	1.0	<0.5	<0.5	<0.5
FRC 185	425	525	<0.5	1.5	<0.01	<0.01	0.02	0.02	<0.5	<0.5	<0.5	<0.5
FRC 186	450	675	<0.5	1.0	<0.01	0.01	<0.01	<0.01	<0.5	<0.5	<0.5	<0.5
FRC 187	450	700	<0.5	1.0	<0.01	<0.01	<0.01	<0.01	<0.5	<0.5	<0.5	<0.5
FRC 189	475	900	<0.5	2.5	0.02	0.03	0.02	0.02	<0.5	1.0	<0.5	<0.5
FRC 191	500	875	1.5	2.0	0.03	0.02	0.06	0.05	<0.5	<0.5	1.0	1.0
FRC 193	125	40	1.0	<0.5	<0.01	<0.01	<0.01	<0.01	<0.5	<0.5	<0.5	<0.5
FRC 194	70	70	0.5	0.5	<0.01	<0.01	<0.01	<0.01	<0.5	<0.5	<0.5	<0.5
FRC 198	450	700	<0.5	1.5	0.01	0.03	0.02	0.02	<0.5	<0.5	<0.5	<0.5
FRC 199	80	70	1.0	0.5	<0.01	<0.01	<0.01	<0.01	<0.5	<0.5	<0.5	<0.5
FRC 340	475	475	1.5	2.0	0.02	0.01	0.07	0.01	<0.5	<0.5	1.5	<0.5
FRC 344	525	925	<0.5	2.0	0.01	0.01	<0.01	0.02	<0.5	<0.5	<0.5	<0.5
FRC 345	525	950	<0.5	1.5	<0.01	0.01	0.02	0.02	<0.5	<0.5	<0.5	<0.5
FRC 61	90	30	0.5	<0.5	<0.01	<0.01	<0.01	<0.01	<0.5	<0.5	<0.5	<0.5
FRC 62	60	30	<0.5	<0.5	<0.01	<0.01	<0.01	<0.01	<0.5	<0.5	<0.5	<0.5
FRC 97	450	650	<0.5	<0.5	<0.01	<0.01	0.02	0.01	<0.5	<0.5	<0.5	<0.5
NT 10	<20	<20	<0.5	<0.5	<0.01	<0.01	<0.01	<0.01	<0.5	<0.5	<0.5	<0.5
NT 11	725	775	1.0	3.0	0.03	0.03	0.05	0.01	<0.5	<0.5	1.0	<0.5
NT 12	<20	<20	<0.5	<0.5	<0.01	<0.01	<0.01	<0.01	<0.5	<0.5	<0.5	<0.5
NT 17	30	200	<0.5	2.5	<0.01	0.03	<0.01	<0.01	<0.5	<0.5	<0.5	<0.5
NT 18	125	<20	1.5	<0.5	0.03	<0.01	<0.01	<0.01	<0.5	<0.5	<0.5	<0.5

Table 4 (Continued)
Revised Subsidence Predictions for Longwalls 311-316 Aboriginal Heritage Sites

Aboriginal Heritage Sites[1]	Maximum Predicted Subsidence[2] (mm)		Maximum Predicted Tilt[3] (mm/m)		Maximum Predicted Hogging Curvature[4] (km^{-1})		Maximum Predicted Sagging Curvature[4] (km^{-1})		Maximum Predicted Conventional Tensile Strain[5] (mm/m)		Maximum Predicted Conventional Compressive Strain[5] (mm/m)	
	PPL (LW316)[6]	EPL (LW316)[7]	PPL (LW316)[6]	EPL (LW316)[7]	PPL (LW316)[6]	EPL (LW316)[7]	PPL (LW316)[6]	EPL (LW316)[7]	PPL (LW316)[6]	EPL (LW316)[7]	PPL (LW316)[6]	EPL (LW316)[7]
NT 21	30	20	<0.5	<0.5	<0.01	<0.01	<0.01	<0.01	<0.5	<0.5	<0.5	<0.5
NT 29/30	20	80	<0.5	1.5	<0.01	0.01	<0.01	<0.01	<0.5	<0.5	<0.5	<0.5
NT 3	425	80	<0.5	0.5	0.03	<0.01	0.04	<0.01	<0.5	<0.5	1.0	<0.5
NT 33	950	1450	2.5	1.5	0.01	0.01	0.06	0.04	<0.5	<0.5	1.0	1.0
NT 34	850	1400	2.5	1.5	0.03	0.02	0.05	0.04	<0.5	<0.5	1.0	1.0
NT 35	925	1400	1.5	1.5	0.03	0.01	0.03	0.04	<0.5	<0.5	1.0	1.0
NT 4	40	275	<0.5	3.0	<0.01	0.01	<0.01	<0.01	<0.5	<0.5	<0.5	<0.5
NT 46	950	1150	1.0	1.0	0.03	0.02	0.04	0.02	<0.5	<0.5	1.0	1.0
NT 5	30	90	<0.5	1.0	<0.01	0.01	<0.01	<0.01	<0.5	<0.5	<0.5	<0.5
NT 6	525	1000	<0.5	<0.5	0.03	0.02	0.02	0.03	<0.5	<0.5	<0.5	1.0
NT 7	775	1100	<0.5	1.0	0.03	0.03	0.02	0.04	<0.5	<0.5	<0.5	1.0
NT 78	450	50	0.5	<0.5	0.04	<0.01	0.02	<0.01	1.0	<0.5	<0.5	<0.5
NT 79	450	30	0.5	<0.5	0.04	<0.01	0.02	<0.01	1.0	<0.5	<0.5	<0.5
NT 8	575	750	1.0	5.5	0.03	0.04	0.05	0.03	<0.5	1.0	1.0	<0.5
NT 80	475	80	1.0	1.0	0.04	0.02	0.02	<0.01	1.0	<0.5	<0.5	<0.5
NT 81	475	<20	0.5	<0.5	0.01	<0.01	<0.01	<0.01	<0.5	<0.5	<0.5	<0.5
NT 9	525	475	1.0	5.5	0.03	0.07	0.03	<0.01	1.0	1.5	<0.5	<0.5

Source: after MSEC (2024).

Site of High Archaeological Significance and/or Particular Cultural Significance.

1 Aboriginal heritage sites within the Longwalls 311-316 35° angle of draw and/or predicted 20 mm subsidence contour.

2 Subsidence refers to vertical displacements of the ground.

3 Tilt is the change in the slope of the ground as a result of differential subsidence, and is calculated as the change in subsidence between two points divided by the distance between those points.

4 Curvature is the second derivative of subsidence, the rate of change of tilt, and is calculated as the change in tilt between two adjacent sections of the tilt profile divided by average length of those sections.

5 Conventional strain based on 15 times curvature. Strain is the relative differential horizontal movements of the ground. Tensile strains occur where the distance between two points increases and compressive strains occur when the distance between two points decreases.

6 PPL – after completion of Longwall 316 of the Preferred Project Layout.

7 EPL – after completion of Longwall 316 of the Extraction Plan Layout.

mm = millimetres; mm/m = millimetres per metre; km^{-1} = 1/kilometre

4.4.2 Revised Assessment of Potential Subsidence Impacts and Environmental Consequences

The Project EA Subsidence Assessment (MSEC, 2008) provided a description of the general impacts on Aboriginal heritage sites (including open sites and sandstone overhang sites) in the Southern Coalfield as a consequence of longwall mining.

At some locations, the predicted subsidence parameters are higher than the parameters for the Preferred Project Layout, however are similar to or less than the maxima predicted for other Aboriginal heritage sites located above the previously extracted longwalls at the Metropolitan Coal Mine. As such, the potential impacts to these sites, based on the Extraction Plan Layout, do not change the impact assessment provided in the Project EA or the Preferred Project Report.

The following provides a summary of potential impact mechanisms and any changes to the predicted subsidence impacts and environmental consequences due to the revised subsidence predictions for Longwalls 311-316.

Open Sites

Nine open sites are located within the Longwalls 311-316 35° angle of draw and/or predicted 20 mm subsidence contour, namely sites FRC 164, FRC 193, NT 7, NT 8, NT 12, NT 17, NT 21, NT 29/30 and NT 46. Open sites have the potential to be impacted by the cracking of sandstone resulting from mine subsidence.

Based on the predicted subsidence parameters described in Section 4.4.1, potential subsidence impacts to open sites are considered to be low (MSEC, 2024).

Sandstone Overhang Sites

There are 30 sandstone overhang sites located within the 35° angle of draw and/or predicted 20 mm subsidence contour of Longwalls 311-316. Of the 30 sites with overhangs, 11 have art only and five have art and/or artefacts and/or a deposit/PAD. Overhang sites can potentially be impacted by the cracking of sandstone. Where cracking is coincident with an overhang, it is possible there could be cracking of art panels, isolated rock fall as the result of mining, or in extreme cases, overhang collapse.

A small number of the Aboriginal heritage sites within the 35° angle of draw and/or predicted 20 mm subsidence contour of Longwalls 311-316 are located above solid coal and based on the low magnitudes of the predicted subsidence parameters, impacts to these sites resulting from the extraction of Longwalls 311-316 are considered unlikely (MSEC, 2024). Surface fracturing of the bedrock can occur outside the longwall layouts, however such fracturing is minor and isolated and the likelihood of fracturing impacting the Aboriginal heritage sites outside the longwall layouts is considered to be low (MSEC, 2024).

The narrower longwall geometry of Longwalls 311-316, compared to Longwalls 20-27 and Longwalls 301-304, results in lower predicted subsidence impacts and associated risk of surface impacts to Aboriginal heritage sites, including the potential for fracturing and rock falls within overhangs (MSEC, 2024).

In addition to the above, Section 10.2 provides an additional assessment (including tabulation of additional risk factors) for Aboriginal heritage sites of high archaeological significance and/or particular cultural significance. Notwithstanding the above and the assessments presented in Sections 4.4.2 and 10.2, Section 9 describes a monitoring program that will be implemented to monitor the impacts and consequences of Project related subsidence on Aboriginal heritage sites. The monitoring includes Aboriginal heritage sites of low, moderate or high archaeological significance and sites of particular cultural significance.

5 CONSULTATION PROTOCOL

5.1 IDENTIFICATION OF ABORIGINAL STAKEHOLDERS

For the purpose of this HMP, Aboriginal stakeholders are defined as being those Aboriginal groups/parties who have previously registered an interest in being consulted in relation to the Project or who have been involved on an ongoing basis at Metropolitan Coal. These Aboriginal stakeholders include the following:

- Cubbitch Barta Native Title Claimants;
- Illawarra Local Aboriginal Land Council;
- Korewal Elouera Jerrungurah Tribal Elders Corporation;
- Mr Gary Caines;
- La Perouse Botany Bay Aboriginal Corporation;
- Woronora Plateau Gundungara Elders Councils;
- Tharawal Local Aboriginal Land Council; and
- Wodi Wodi Elders Corporation.

5.2 ABORIGINAL STAKEHOLDER PARTICIPATION

Metropolitan Coal is committed to maintaining ongoing consultation with Aboriginal stakeholders throughout the life of the Project; however, it is the responsibility of Aboriginal stakeholders to ensure that up-to-date contact details (full name, postal address, telephone number, and where possible, email address) are provided to Metropolitan Coal.

5.2.1 Involvement of Aboriginal Stakeholders in Fieldwork

The number of participants in an effective field team is governed by a number of safety, logistic and access considerations, including:

- **Safety:** A large group can be difficult to keep together when moving through dense vegetation in steep terrain, as is the case across the majority of the Project underground mining area. Large groups move slowly (especially through dense vegetation and in steep terrain) and can prevent a rapid response (i.e. evacuation) to imminent dangers that can often be encountered in the Project underground mining area (e.g. bush fire warnings and electrical storms).
- **Logistics:** Participant numbers are limited by vehicle availability and safety restrictions. The isolated nature of the area above the Project underground mining area requires the use of vehicles for efficient field work.
- **Access Restrictions:** Areas within the Project underground mining area are located within a WaterNSW Schedule One Special Area. Public access is controlled in this area to protect water quality and ecological integrity (WaterNSW and the Office for Environment and Heritage [OEH], 2015). Excessive access into this area is not consistent with the WaterNSW's *Special Areas Strategic Plan of Management* (WaterNSW and OEH, 2015).

Aboriginal stakeholders will be invited to attend relevant scheduled fieldwork in consideration of the above.

Scheduled fieldwork to which Aboriginal stakeholders may be invited to attend includes:

- Aboriginal heritage monitoring (Section 9);
- supplementary fieldwork (Section 8); and
- the planning for and/or implementation of management and mitigation measures (Section 10).

Invitations to attend scheduled fieldwork will be provided in writing with at least five (5) business days' notice. Dates for undertaking fieldwork will be subject to consultation with Aboriginal stakeholders and archaeologists.

Prior to undertaking fieldwork, all participating Aboriginal stakeholders and archaeologists will be required to comply with Metropolitan Coal's workplace health and safety requirements. These requirements include the provision of copies of current relevant insurances (i.e. public liability and workers compensation) and appropriate personal protection equipment.

All Metropolitan Coal staff and contractors (including Aboriginal stakeholders and archaeologists) may be subject to random drug and alcohol testing. All Metropolitan Coal staff and contractors (including Aboriginal stakeholders and archaeologists) must be able bodied and fit to undertake the work required.

5.2.2 Ongoing Consultation with Aboriginal Stakeholders

Metropolitan Coal will maintain a consultation log to record all correspondence with Aboriginal stakeholders (e.g. emails, telephone calls, letters, meeting minutes, etc.).

Aboriginal stakeholders will be invited to comment on relevant draft documentation regarding the management of Aboriginal cultural heritage, if and when required.

Aboriginal stakeholders will be notified of any material changes to the HMP. In the context of this HMP, a material change would include any change that affects the management of Aboriginal cultural heritage associated with Metropolitan Coal. Examples of a material change in the context of this HMP include:

- Any change to the monitoring program methodology (e.g. monitoring frequency or parameters).
- Any change to the available remediation or mitigation measures (e.g. proposed use of a new engineering technology to reduce potential consequences).
- Any change to the surface disturbance protocol.

5.3 ABORIGINAL STAKEHOLDER ACCESS PROTOCOL

In addition to scheduled field activities, Aboriginal stakeholders may apply to WaterNSW or other landholders for access to Aboriginal heritage sites within the larger Project area (e.g. for personal, spiritual or cultural reasons). Metropolitan Coal will endeavour to facilitate the requested access, consistent with personnel workplace health and safety requirements and associated landholder requirements.

6 PERFORMANCE MEASURES AND INDICATORS

The Project Approval requires Metropolitan Coal to achieve the Aboriginal heritage sites subsidence impact performance measure outlined in Table 1 of Condition 1, Schedule 3 of the Project Approval:

Less than 10% of Aboriginal heritage sites within the mining area are affected by subsidence impacts.

Metropolitan Coal will assess the Project against the following performance indicator to allow early recognition of mining impacts:

Less than 7% of Aboriginal heritage sites within the mining area are affected by subsidence impacts.

Aboriginal sites are subject to ongoing natural deteriorating processes unrelated to mining, including impacts from tree roots, natural weathering or deterioration, natural cracking of sandstone and inappropriate visitor behaviour (Lambert, 1989; Reeves and Regal, 2017). Limited long term studies have been undertaken on subsidence impacts to overhangs in the NSW Southern Coalfields and as the internal structures of overhangs (e.g. existing bedding planes, joints, cracking and seepage) are not always observable, not all risks to shelters from mining can be identified. This makes it sometimes problematic to clearly differentiate between subsidence impacts and natural impacts.

Section 9 describes the monitoring program and detailed TARP that will be used to assess the Project against the Aboriginal heritage sites performance indicator and Aboriginal heritage sites subsidence impact performance measure. As described in Section 9, a Heritage Management Plan – Subsidence Impact Register (provided in Appendix 3) will be used to progressively monitor the cumulative number and percentage of Aboriginal heritage sites affected by subsidence impacts.

For the purpose of measuring performance against the Aboriginal heritage sites performance indicator and subsidence impact performance measure, sites are considered to be “affected by subsidence impacts” if they exhibit one or more of the following consequences that cannot be attributed to natural weathering or deterioration:

- overhang collapse;
- cracking of sandstone that coincides with Aboriginal art or grinding grooves; and
- rock fall that damages Aboriginal art.

There are 144 Aboriginal heritage sites (141 sites identified in the Project EA, one new site [MET 4] identified during Round 2 monitoring for Longwalls 20-22 and two new sites [NEW-RS-01 and NEW-ST-01] identified during the baseline recording for Longwalls 311-316) within the mining area. The mining area is defined by the Project Approval and is shown on Figure 1 of this HMP (labelled as Project Underground Mining Area Longwalls 20-27 and 301-317).

As described in Section 10, in the event that any subsidence impact is recorded, consideration would be given to implementing appropriate management, remediation and/or mitigation measures in consultation with Heritage NSW and the Aboriginal stakeholders. In the event the Aboriginal heritage sites subsidence impact performance measure is exceeded, Metropolitan Coal will notify the DPE, Heritage NSW and Aboriginal stakeholders as soon as practicable after Metropolitan Coal becomes aware of the exceedance and the Contingency Plan (Section 11) will be implemented.

As indicated in Section 4.2, Metropolitan Coal acknowledges that all Aboriginal heritage sites are culturally significant to the Aboriginal people who have a traditional connection to Country.

7 BASELINE DATA

Baseline recording of Aboriginal heritage sites for Longwalls 20-27, 301-303, 304-306 and 310-316 has been conducted by Kayandel Archaeological Services or Niche. The sites that were subject to detailed baseline recording (where the sites were able to be relocated) are listed in Table 5.

Table 5
Aboriginal Heritage Sites Subject to Previous Baseline Recording

Sites Subject to Baseline Recording for Longwalls 20-22**				
FRC 10	FRC 12	FRC 13	FRC 14	FRC 15
FRC 16.1	FRC 16.2	FRC 17	FRC 19	FRC 20
FRC 21	FRC 22	FRC 23	FRC 24.1	FRC 24.2
FRC 25	FRC 26	FRC 40	FRC 44	FRC 45
FRC 46	FRC 49	FRC 50	FRC 51	FRC 52
FRC 55	FRC 56	FRC 60	FRC 63	FRC 96
FRC 105	FRC 108	FRC 110	FRC 113	FRC 114
FRC 115	FRC 118	FRC 119	FRC 120	FRC 121
FRC 124	FRC 125	FRC 156	FRC 157	FRC 160
FRC 162	FRC 166	FRC 176	FRC 203	FRC 215
FRC 265	FRC 266	FRC 272	FRC 273	FRC 274
FRC 275	FRC 276	FRC 277	FRC 278	FRC 279
FRC 280	FRC 281	FRC 283	FRC 284	FRC 285
FRC 297	FRC 298	FRC 299	FRC 300	FRC 301
FRC 302	FRC 304	FRC 318	FRC 342	FRC 343
MET 1	MET 2	PAD 2	PAD 3	MET 4*
Sites Subject to Baseline Recording for Longwalls 23-27**				
FRC 62	FRC 112	FRC 169	FRC 171	FRC 172
FRC 305	FRC 319	FRC 322	FRC 28	FRC 29
FRC 30	FRC 31	FRC 32	FRC 33	FRC 34
FRC 67	FRC 68	FRC 117	FRC 127	FRC 194
FRC 195	FRC 199	FRC 253	FRC 307	FRC 308
FRC 320	FRC 321	FRC 323	FRC 324	
Sites Subject to Baseline Recording for Longwalls 301-303				
FRC 70	FRC 71	FRC 76	FRC 77	FRC 78
FRC 85	FRC 86	FRC 87	FRC 90	FRC 91
FRC 93	FRC 309	FRC 310	FRC 325	
Sites Subject to Baseline Recording for Longwalls 304-306				
FRC 94	FRC 95	FRC 97	FRC 101	FRC 184
FRC 185	FRC 186	FRC 187	FRC 191	FRC 198
FRC 254	FRC 311	FRC 312	FRC 313	FRC 316
FRC 340	FRC 344	FRC 345	NEW 1	NEW 10
NEW 22				
Sites Subject to Baseline Recording for Longwalls 310-312				
FRC 61	FRC 164	FRC 189	FRC 314	FRC 315
FCR 317	NT 11	NT 33	NT 34	NT 35
NT 78	NT 79	NEW 2		

Table 5 (Continued)
Aboriginal Heritage Sites Subject to Previous Baseline Recording

Sites Subject to Baseline Recording for Longwalls 311-316				
NT 3	NT 4	NT 5	NT 6	NT 7
NT 8	NT 9	NT 10	NT 12	NT 17
NT 18	NT 19	NT 21	NT 22	NT 23
NT 29/30	NT 46	NT 54	NT 74	NT 75
NT 77	NT 80	NT 81	NT 85	NT 86
NEW 9	NEW 16	NEW 17	NEW 18	NEW 19

Sites located within 600 m of Longwalls 311-316 secondary extraction.

* Site MET 4 was recorded during Round 2 monitoring for Longwalls 20-22. This site has been registered on AHIMS and has been subject to monitoring.

** Despite extensive searches, sites FRC 57, FRC 168 and FRC 306 were unable to be relocated for baseline recording for Longwalls 20-22, and sites FRC 72 and FRC 180 were unable to be relocated for baseline recording for Longwalls 23-27.

A number of the Aboriginal heritage sites that have been subject to baseline recording for Longwalls 23-27, 301-303, 304-306 and 310-312 are located within 600 m of Longwalls 311-316 secondary extraction. These sites are shaded in Table 5. Aboriginal heritage sites FRC 193 and NEW 17 located over Longwall 308 were also subject to baseline recordings.

Four new Aboriginal cultural heritage sites were recorded during the Longwalls 311-316 Baseline Recording surveys (namely, sites NEW-RS-01, NEW-RS-02 NEW-ST-01 and NEW-GG-01) (Regal Heritage, 2023). These four Aboriginal cultural heritage sites are located more than 600 m from the Longwalls 311-316.

The baseline recording of Aboriginal heritage sites for Longwalls 20-27, 301-303, 304-306 and 310-312 have been previously provided to the DPE, Heritage NSW and Aboriginal stakeholders (and are available on request). The baseline recording of the 33 Aboriginal heritage sites for Longwalls 311-316 is provided in Appendix 2. The baseline records include:

- a photographic record of each Aboriginal heritage site;
- detailed scaled plans of each site including physical characteristics and features; and
- detailed information regarding the dimensions, composition and features of the site.

8 SUPPLEMENTARY FIELDWORK AND PRE-CLEARANCE SURVEYS

8.1 SUPPLEMENTARY FIELDWORK/INVESTIGATION

Supplementary Aboriginal heritage fieldwork may be undertaken over the life of the Project to inform the management and monitoring of Aboriginal heritage sites.

8.2 PRE-CLEARANCE SURVEYS

Pre-clearance surveys may be required to be undertaken in the Project underground mining area to identify the most appropriate location for required Project infrastructure. Pre-clearance surveys will involve the following:

1. Developing an inventory of surface infrastructure required and conducting an initial desktop risk assessment based on the location of known sites.
2. Undertaking a pre-clearance survey (if required[9]) of the proposed site(s) for surface infrastructure by an appropriately qualified and experienced archaeologist.
3. Assessing potential impacts to nearby Aboriginal heritage site(s) based on the results of the pre-clearance surveys and determining the most appropriate location for required surface infrastructure.
4. Where practicable, surface infrastructure will be located so as to avoid or minimise impacts to Aboriginal heritage sites. If impacts cannot be avoided, appropriate management and/or mitigation measures will be undertaken (Section 10).

Where Aboriginal heritage sites are located close to required surface disturbance works, the surface disturbance protocol (described in Section 10.3) will be undertaken.

8.3 RECORDING AND REGISTERING NEW ABORIGINAL HERITAGE SITES

Any previously unrecorded Aboriginal heritage sites identified during fieldwork (e.g. baseline recording, supplementary fieldwork, pre-clearance surveys, monitoring, follow-up inspections to assess the effectiveness of mitigation/management/remediation measures, etc.) would be recorded using the standard Heritage NSW site card. This information would be submitted to Heritage NSW for registration on the Aboriginal Heritage Information Management System (AHIMS) database. Any previously unrecorded sites would also be subject to archaeological and cultural significance assessment, in consultation with Aboriginal stakeholders. Any previously unrecorded sites would be managed in accordance with the requirements of this HMP.

[9] A pre-clearance survey would not be required if the area has been previously surveyed or if, in the opinion of an appropriately qualified archaeologist, it contains limited archaeological potential.

9 MONITORING PROGRAM

A monitoring program will be implemented to monitor subsidence impacts and environmental consequences of Project related subsidence on Aboriginal heritage sites.

Monitoring of the Longwalls 20-27, 301-303, 304, 305-307 and 308-310 Aboriginal heritage sites, at which previous monitoring indicates continued change due to mining induced subsidence following the completion of Longwalls 309 and 310, will be monitored as a component of this HMP.

As indicated in Section 4.2, none of the sites (FRC 28, FRC 29, FRC 34, FRC 60, FRC 76, FRC 117, FRC 176 and MET 1) have shown continued change due to mining induced subsidence following the completion of Longwall 303. One Aboriginal heritage site, FRC 76, was determined to have changes due to mining induced subsidence from Longwalls 301-303. Opening of the horizontal bedding plane along the back wall was observed, not coincident with any art.

Monitoring of Aboriginal heritage sites FRC 76, FRC 77, FRC 78, FRC 86, FRC 90 and FRC 309 was undertaken within three months of the completion of Longwall 304 (Figure 4). The Longwall 304 monitoring survey found that no further changes from mining were observed at site FRC 76, and that no subsidence related changes were observed at sites FRC 77, FRC 78, FRC 86, FRC 90 and FRC 309.

Monitoring of Aboriginal heritage sites FRC 67, FRC 68, FRC 70, FRC 71, FRC 76, FRC 77, FRC 78, FRC 85, FRC 86, FRC 87, FRC 90, FRC 91, FRC 93, FRC 117, FRC 309, FRC 310 and FRC 325 was undertaken within three months of the completion of Longwall 305 (Figure 4). No further mining related impacts were observed at FRC 76 during the Longwall 305 monitoring survey, and no subsidence related changes were noted at any of the remaining sites.

Monitoring of Aboriginal heritage sites FRC 67, FRC 68, FRC 70, FRC 71, FRC 76, FRC 77, FRC 78, FRC 85, FRC 86, FRC 87, FRC 90, FRC 91, FRC 93, FRC 117, FRC 309, FRC 310, FRC 97, FRC 101, FRC 180, FRC 254, FRC 311, FRC 316, FRC 320, FRC 321, and FRC 325 was undertaken following completion of Longwall 306. No further mining related impacts were observed at FRC 76 during the Longwall 306 monitoring survey, and no subsidence related changes were noted at any of the remaining sites.

Monitoring of Aboriginal heritage sites FRC 67, FRC 68, FRC 70, FRC 71, FRC 87, FRC 93, FRC 94, FRC 97, FRC 101, FRC 180, FRC 184, FRC 185, FRC 186, FRC 187, FRC 189, FRC 191, FRC 194, FRC 195, FRC 198, FRC 199, FRC 254, FRC 310,FRC 311, FRC 313, FRC 316, FRC 323, FRC 324, FRC 340, FRC 244, FRC 345 and MET 6 was undertaken following completion of Longwall 308. There were no subsidence related changes identified at any of the sites included in the Longwall 308 Round 1 monitoring survey (Regal Heritage, 2023).

Following the completion of Longwall 309 and Longwall 310, monitoring will be conducted in accordance with the Aboriginal heritage sites monitoring schedule described in the Metropolitan Coal Longwalls 308-310 HMP.

All[10] Aboriginal heritage sites located within the Longwalls 311-316 35° angle of draw and/or predicted 20 mm subsidence contour will be monitored for Longwalls 311-316 (Table 4 and Figure 4).

Round 1 monitoring will be undertaken within three months following the completion of Longwall 311 and will include all sites within the Longwall 311 35° angle of draw and/or predicted 20 mm subsidence contour (Table 6).

[10] Despite extensive searches, site FRC 180 (which is located within the Longwalls 308-310 35° angle of draw and/or predicted 20 mm subsidence contour) was unable to be relocated during baseline recording, and will not be monitored as part of this HMP.

Round 2 monitoring will be undertaken within three months following the completion of Longwall 312 and will include all sites within the Longwalls 312 35° angle of draw and/or predicted 20 mm subsidence contour (Table 6).

Round 3 monitoring will be undertaken within three months following the completion of Longwall 313 and will include all sites within the Longwalls 313 35° angle of draw and/or predicted 20 mm subsidence contour (Table 6).

Round 4 monitoring will be undertaken within three months following the completion of Longwall 314 and will include all sites within the Longwalls 314 35° angle of draw and/or predicted 20 mm subsidence contour (Table 6).

Round 5 monitoring will be undertaken within three months following the completion of Longwall 315 and will include all sites within the Longwalls 315 35° angle of draw and/or predicted 20 mm subsidence contour (Table 6).

Round 6 monitoring will be undertaken within three months following the completion of Longwall 316 and will include all sites within the Longwalls 316 35° angle of draw and/or predicted 20 mm subsidence contour (Table 6).

Monitoring of Aboriginal heritage sites located within the Longwalls 316 35° angle of draw and/or predicted 20 mm subsidence contour would be subject to suitable weather conditions, access to the Woronora Special Area and Registered Aboriginal Party availability.

Table 6
Longwalls 311-316 Aboriginal Heritage Sites Monitoring Schedule

Aboriginal Heritage Site	Round 1	Round 2	Round 3	Round 4	Round 5	Round 6
FRC 61			✓	✓	✓	✓
FRC 62			✓	✓	✓	✓
FRC 97	✓	✓	✓	✓	✓	✓
FRC 185	✓	✓	✓	✓	✓	✓
FRC 186	✓	✓	✓	✓	✓	✓
FRC 187	✓	✓	✓	✓	✓	✓
FRC 189	✓	✓	✓	✓	✓	✓
FRC 191	✓	✓	✓	✓	✓	✓
FRC 193	✓	✓	✓	✓	✓	✓
FRC 194	✓	✓	✓	✓	✓	✓
FRC 195			✓	✓	✓	✓
FRC 196	✓	✓	✓	✓	✓	✓
FRC 198	✓	✓	✓	✓	✓	✓
FRC 199	✓	✓	✓	✓	✓	✓
FRC 340	✓	✓	✓	✓	✓	✓
FRC 344	✓	✓	✓	✓	✓	✓
FRC 345	✓	✓	✓	✓	✓	✓
NT 3			✓	✓	✓	✓
NT 4					✓	✓

Table 6 (Continued)
Longwalls 311-316 Aboriginal Heritage Sites Monitoring Schedule

Aboriginal Heritage Site	Round 1	Round 2	Round 3	Round 4	Round 5	Round 6
NT 5				✓	✓	✓
NT 6				✓	✓	✓
NT 7			✓	✓	✓	✓
NT 8			✓	✓	✓	✓
NT 9			✓	✓	✓	✓
NT 10						✓
NT 11	✓	✓	✓	✓	✓	✓
NT 12						✓
NT 17						✓
NT 18			✓	✓	✓	✓
NT 21				✓	✓	✓
NT 29/30						✓
NT 33	✓	✓	✓	✓	✓	✓
NT 34	✓	✓	✓	✓	✓	✓
NT 35	✓	✓	✓	✓	✓	✓
NT 46				✓	✓	✓
NT 78	✓	✓	✓	✓	✓	✓
NT 79	✓	✓	✓	✓	✓	✓

Subsequent monitoring would be undertaken as part of future Extraction Plans (i.e. Longwalls 311 on) and would include any sites at which the Round 3 survey indicates continued change due to mining induced subsidence.

The monitoring team will include a suitably qualified archaeologist (with experience in rock art recording and management) and representatives of the Aboriginal stakeholders (where available) (Section 5.1). Specific details that will be recorded during the monitoring program include (but are not limited to):

- the date of monitoring;
- the location of longwall extraction (i.e. the longwall chainage) at the time of monitoring;
- comparison of the physical characteristics of the site at the time of monitoring against the previous monitoring and the baseline record (detail/quantify any changes observed);
- inspections of rock surfaces for cracking and/or exfoliation and/or blockfall since the previous monitoring and against the baseline record;
- inspection of art motifs for damage or deterioration since the previous monitoring and against the baseline record;
- identification of any natural weathering processes that may result in deterioration (e.g. fire, vegetation growth and water seepage);
- detailed description and quantification of any changes noted during the completion of the above tasks;
- a photographic record of any changes noted during monitoring (taken at the same position and distance as baseline record to allow comparison over time);

- whether any follow-up actions are required to be considered (e.g. implementation of management or initiation of the Contingency Plan, etc.); and
- any other relevant information.

An example monitoring *pro forma* detailing the minimum recording requirements during monitoring is provided as Table 7.

A summary of the information collected during monitoring will be recorded in the Heritage Management Plan – Subsidence Impact Register (provided in Appendix 3) and reported in accordance with the Project Approval conditions. At the completion of monitoring, a report will be prepared and distributed to Heritage NSW and each of the Aboriginal stakeholders. The report will include the following:

- a map of the area and the location of Aboriginal heritage sites monitored;
- a table outlining the dates on which each site was monitored and which Aboriginal stakeholders were present;
- a table outlining sites at which change has been noted and the nature and degree of change;
- a summary of comments made by Aboriginal stakeholders present during monitoring regarding:
  - the degree and nature of change to sites; and
  - proposed recommendations;
- general observations made during the monitoring; and
- recommendations for future monitoring.

The monitoring results will be used to assess the Project against the Aboriginal heritage sites performance indicator and subsidence impact performance measure (described in Section 6) in accordance with the detailed TARP provided in Table 8. The Heritage Management Plan - Subsidence Impact Register (provided in Appendix 3) will be used to progressively monitor and document the total number and cumulative percentage of Aboriginal heritage sites against the Aboriginal heritage sites performance indicator and subsidence impact performance measure (Table 8 and Section 6).

As described in Section 10, in the event that any subsidence impact is recorded during monitoring, consideration will be given to implementing appropriate management, remediation and/or mitigation measures in consultation with Heritage NSW and the Aboriginal stakeholders. In addition, the AHIMS site card for any Aboriginal cultural heritage site affected by subsidence impacts will be updated and submitted to Heritage NSW for registration on the AHIMS database. In the event the subsidence impact performance measure is exceeded, the Contingency Plan outlined in Section 11 will be implemented.

Table 7
Monitoring Pro-forma

Site Details						
Site Name			AHIMS Site Number			
Site Type						
GPS Details (GDA94)	Easting		Northing			
Recording Details						
Baseline Recording			Date/time			
Previous Monitoring			Date/time			
Current Monitoring			Date/time			
Archaeological Features						
Previously Identified						
Re-recorded						
Additional Located	(attach recording form)					
Site Condition						
Overall						
Rock surfaces						
Archaeological Feature/s						
Change in vegetation, erosion, soil level or hydrological features						
Observed Change						
Change Type	(e.g. cracking, collapse, exfoliation, segmented detachment, step cracking, platform separation, increased moisture flow)					
Location	(map location of damage within site)					
Dimensions (mm)	Length		Width		Depth/Height	
Comments	(e.g. has the archaeological feature been affected? is the damage new? has damage increased since previous monitoring?)					
Observed Natural Disturbance Processes						
Insects			Weathering			
Animals			Water-wash			
Vegetation			Exfoliation			
Microvegetals			Salts			
Siltation						
Comments						
Recommendations						
Further Monitoring						
Management						
Attach photographs and drawings of changes in site condition, subsidence damage, natural damage and any additional archaeological features. Photos should be taken from the same position and distance as the baseline record to allow comparison over time.						

Table 8
Trigger Action Response Plan – Aboriginal Heritage Sites Monitoring

Performance Measure	Performance Indicator	Monitoring Sites	Parameters	Frequency/ Sample Size	Analysis Methodology	Error Types	Baseline	Significance Levels/ Triggers		Action/Response
Less than 10% of Aboriginal heritage sites within the mining area are affected by subsidence impacts.	*Less than 7% of Aboriginal heritage sites within the mining area are affected by subsidence impacts*[1].	• Monitoring of Aboriginal heritage sites with the potential to be impacted by subsidence related to the extraction of LW311-316.	• Cracking of sandstone at open sites. • Cracking and/or exfoliation of sandstone, blockfall, displacement, breakage and/or collapse of sandstone overhang sites. • Damage or deterioration of art motifs.	Survey of Aboriginal heritage sites within three months of the completion of LW311, LW312, LW313, LW314, LW315 and LW316 (i.e. Round 1, 2, 3, 4, 5 and 6 surveys described in Section 9).	• Visual inspection. • Recording of parameters. • The Heritage Management Plan – Subsidence Impact Register will be used to progressively monitor the cumulative number and percentage of Aboriginal heritage sites affected by subsidence impacts.	• Misidentification of Natural weathering processes that may result in deterioration (e.g. fire, vegetation growth, pre-existing fissures, and water seepage) attributed to subsidence.	• Aboriginal heritage sites in variable condition, and in states of constant natural change. Some sites exhibit varying degrees of natural cracking, erosion, seepage, weathering etc. • Two sites, FRC 281 (over LW20-22) and FRC 34 (to the north of LW27) have been affected by subsidence impacts. • Baseline record for sites listed in Section 7 and documented in reports for LW20-22, LW23-27, LW301-303, LW304-306 LW 310-312 and/or LW311-316. [2, 3, 4, 5, 6, 7]	Level 1	Monitoring results indicate sites have been affected by subsidence impacts.	Continue monitoring. Six monthly reporting.
								Level 2	Monitoring results indicate less than 7% of Aboriginal heritage sites within the mining area are affected by subsidence impacts. Monitoring results indicate that a site of high scientific (archaeological) significance and/or particular cultural significance within the mining area are affected by subsidence impacts.	Consider the implementation of appropriate management, remediation and/or mitigation measures in consultation with Heritage NSW and Aboriginal stakeholders. Six monthly reporting.
								Level 3	Monitoring results indicate greater than 7% of Aboriginal heritage sites within the mining area are affected by subsidence impacts.	Assess against the performance measure. Consider the implementation of appropriate management, remediation and/or mitigation measures in consultation with Heritage NSW and Aboriginal stakeholders.

1 Sites are considered to be "affected by subsidence impacts" if they exhibit one or more of the following consequences that cannot be attributed to natural weathering or deterioration: overhang collapse; cracking of sandstone that coincides with Aboriginal art or grinding grooves; and rock fall that damages Aboriginal art. There are 144 Aboriginal heritage sites (141 sites identified in the Project EA and one new site [MET 4] identified during Round 2 monitoring for Longwalls 20-22 and two new sites [NEW-RS-01 and NEW-ST-01] identified during baseline recording for Longwalls 311-316)) within the mining area. Metropolitan Coal acknowledges that all Aboriginal heritage sites are considered to be culturally significant to the Aboriginal people who have a traditional connection to Country.

2 Kayandel Archaeological Services (2010) *Longwalls 20-22 – Heritage Management Plan Baseline Record - Aboriginal Heritage Sites.* Report prepared for Metropolitan Coal.

3 Niche (2013; 2016) *Longwalls 23-27 Metropolitan Colliery - Baseline Recording.* Report prepared for Metropolitan Coal.

4 Niche 2016c) *Longwalls 301-303 Metropolitan Colliery - Baseline Recording.* Report prepared for Metropolitan Coal.

5 Niche (2018) *Longwalls 304-306 Metropolitan Colliery - Baseline Recording.* Report prepared for Metropolitan Coal.

6 Niche (2020b) *Baseline Recording Longwalls 310 to 312 Metropolitan Colliery*. Report prepared for Metropolitan Coal.

7 Niche (2023b) *Baseline Recording Longwalls 311 to 316 Metropolitan Colliery*. Report prepared for Metropolitan Coal.

10 MANAGEMENT, REMEDIATION AND MITIGATION MEASURES

10.1 MANAGEMENT AND REMEDIATION MEASURES

Following monitoring within three months of the completion of Longwalls 308, 309 and 310 and within three months of the completion of Longwall 311, Longwall 312, Longwall 313, Longwall 314, Longwall 315 and Longwall 316 (Section 9), Metropolitan Coal will assess the need for implementation of appropriate management and/or remediation measures.

Examples of potential management and remediation measures are provided in Table 9. Development and implementation of these measures will be assessed on a case-by-case basis and will acknowledge that whilst the measures may reduce the risk of impact and consequence, they can also have the potential to cause substantial damage to Aboriginal heritage sites and their settings.

Table 9
Potential Management and Remediation Measures

Consequence[1]	Potential Management and Remediation Measures	
	Measure	**Description**
Increased seepage with the potential to impact art.	Seepage control techniques.	• Installation of an artificial dripline (e.g. silicone dripline) to direct increased moisture/water seepage away from art panels.
Reduction in the stability of a sandstone overhang due to substantial cracking or block fall.	Stabilisation techniques.	• Installation of artificial rock support (e.g. rock bolts, cable bolts, cement sprays [e.g. shotcrete], injection of a binding agent [PUR or similar]). • Installation of standing supports (e.g. timber props, timber cogs, sandbags and metal [hydraulic] props). • Scaling/dislodgement/removal of remaining loose rock.
	Salvage.	• Salvage of artefacts for safekeeping and storage and/or display at a suitable location in consultation with the Aboriginal community.
Impacts on aesthetic values due to cracking.	Restoration of aesthetic values.	• Use of cosmetic treatments (e.g. in the form of coloured grout or similar) to restore aesthetic values.
Cracking of sandstone at open sites, threatening grinding grooves or engraved art.	Strain reduction techniques.	• Installation of a stress relief slot or stress focus notch.

[1] Consequences could also include the loss of site amenity and cultural and archaeological value to the community

The development of management and/or remediation measures will be determined in consultation with Heritage NSW and the Aboriginal stakeholders and with regard to the specific circumstances of the subsidence impact (e.g. the location, nature and extent of the impact) and the assessment of consequences.

If proposed, the implementation of any invasive techniques (e.g. stabilisation, stress relief slots/focus notch, use of material for aesthetic restoration, etc.) will also be developed in consultation with WaterNSW or other relevant landowners.

Follow-up inspections will be conducted to assess the effectiveness of implemented management and/or remediation measures and the requirement for any additional measures. The specific timing and nature of follow-up inspections/additional monitoring will be dependent on the nature of the management and/or remediation measures implemented. Any management and/or remediation measures implemented will be reported in the Annual Review (Section 13).

10.2 MITIGATION MEASURES

10.2.1 Mitigation Measure Consideration and Implementation Process

As part of the development of Extraction Plans (and on an ongoing basis during mining), Metropolitan Coal will consider the requirement for development and implementation of Aboriginal heritage mitigation measures. The aim of the mitigation measures is to reduce the potential for substantial impacts and consequences to Aboriginal heritage sites of high archaeological significance and/or particular cultural significance.

The development of mitigation measures will be determined with regard to the specific circumstances of individual sites, including accessibility, size and spatial extent, nature of predicted subsidence impacts and consequences, and level of damage or disturbance (to the site or its setting) associated with implementing the measure(s). The consideration of mitigation measures will acknowledge that while they may reduce the risk of consequence to the site, they also have the potential to cause substantial damage to the site and its settings (including impacts to cultural setting). Other potential environmental impacts associated with implementation of mitigation works (e.g. vegetation clearing) will also be considered.

Examples of potential mitigation measures currently available are provided in Table 10.

Table 10
Potential Consequences and Mitigation Measures

Consequence[1]	Potential Mitigation Measures	
	Measure	**Description**
Existing seepage with the potential to increase and threaten art due to subsidence movements.	Seepage control techniques.	• Installation of an artificial dripline (e.g. silicone dripline) to direct increased moisture/water seepage away from art panels if it eventuates.
Reduction in the stability of an overhang due to substantial cracking or block fall.	Stabilisation techniques.	• Installation of artificial rock support (e.g. rock bolts, cable bolts, cement sprays [e.g. shotcrete], injection of a binding agent [PUR or similar]). • Installation of standing supports (e.g. timber props, timber cogs, sandbags and metal [hydraulic] props). • Scaling/dislodgement/removal of remaining loose rock.
Potential cracking of sandstone associated with art or grinding grooves	Strain reduction techniques.	• Installation of a stress relief slot or stress focus notch.

[1] Consequences could also include the loss of site amenity and cultural and archaeological value to the community

Any proposed mitigation measures will be developed and implemented (if considered appropriate) in consultation with Heritage NSW, Aboriginal stakeholders and the relevant landowner (e.g. WaterNSW).

If mitigation measures are implemented, follow-up inspections will be conducted to assess the effectiveness of mitigation measures and to determine the requirement for any additional measures. The specific nature of follow-up inspections/additional measures will be dependent on the specific nature of the mitigation measure(s) implemented and their success.

A summary of the development process and success of implemented mitigation measures will be reported in the Annual Review (Section 13).

10.2.2 Consideration of Mitigation Measures for Longwalls 311-316

Nine (9) Aboriginal heritage sites of high scientific (archaeological) significance and/or particular cultural significance are located within the Longwalls 311-316 35° angle of draw and/or predicted 20 mm subsidence contour (Figure 4). Sites FRC 62 and FRC 185 are of high scientific (archaeological) significance and particular cultural significance. Site FRC 191 is of high scientific (archaeological) significance, and sites FRC 198, FRC 340, NT 8, NT 9, NT 35 and NT 46 are of particular cultural significance.

Metropolitan Coal acknowledges that all Aboriginal heritage sites are of cultural significance to the Aboriginal people who have a traditional connection to Country.

Previous monitoring, studies and experience from the Woronora Plateau and greater Southern Coalfield have identified several site characteristics/features as being most relevant when assessing the risk of environmental consequence to an Aboriginal heritage site from subsidence impacts. These characteristics include (Sefton, 2000 and 2004; Biosis Research, 2007 and 2009; MSEC, 2007 and 2008):

- overhang volume – > 50 cubic metres increases the risk of negative consequence;
- presence of existing water seepage – damage to art from water is more likely if existing seepage is present;
- location in relation to a drainage line – sites located in valley bottoms can experience valley closure mechanisms and increased risk of cracking;
- location in relation to goaf – location of sites relative to the goaf influences the level of subsidence impacts experienced;
- overhang formation process – block-fall type overhangs are more likely to have roof or rear wall damage due to subsidence impacts;
- depth of cover – increased depth of cover reduces subsidence impacts and consequences; and
- presence of existing joints and bedding planes – subsidence movements may be dissipated through existing joints and bedding planes rather than the creation of new cracks.

MSEC was engaged by Metropolitan Coal to conduct a geotechnical risk assessment of the Aboriginal heritage sites of high scientific (archaeological) significance and/or particular cultural significance in order to inform the potential implementation of mitigation measures to reduce the potential for substantial impacts and consequences to the Aboriginal heritage sites. The geotechnical risk assessment report by MSEC (2024) is provided in Appendix 5 and considers the above characteristics and the potential for damage at each site.

Based on the information provided in the geotechnical risk assessment and in consideration of the potential damage caused by the implementation of available techniques, mitigation measures are not proposed for Aboriginal heritage sites within the Longwalls 311-316 35º angle of draw and/or predicted 20 mm subsidence contour.

Future longwalls have the potential to result in additional subsidence movements at Aboriginal heritage sites associated with Longwalls 311-316 or the previous mining areas (i.e. Longwalls 23-27, Longwalls 301-307 and Longwalls 308-310). As part of the development of the future Extraction Plans, Metropolitan Coal will review the potential impacts and environmental consequences to Aboriginal heritage sites and re-consider the development and implementation of mitigation measures if required.

As described above, the development and implementation of any mitigation measures will be undertaken in consultation with Heritage NSW, the Aboriginal stakeholders and relevant landowners (e.g. WaterNSW).

10.3 SURFACE DISTURBANCE PROTOCOL

The surface disturbance protocol aims to avoid accidental damage to Aboriginal heritage sites located in close proximity to surface disturbance works. As described in Section 8, pre-clearance surveys will be undertaken (as needed) to identify the most appropriate location for required Project infrastructure.

This protocol will apply to surface disturbance works (e.g. exploration works, installation/operation/maintenance of surface infrastructure, construction/maintenance of access tracks, monitoring and stream restoration) proposed to be located close to any known Aboriginal heritage site(s).

Surface disturbance works will be undertaken in consideration of the following:

1. Avoidance of impact to Aboriginal heritage sites will be the primary management measure, where practicable.
2. To avoid accidental damage to Aboriginal heritage sites located close to surface disturbance works, appropriate demarcation will be implemented (e.g. fencing, sign-posting or temporary flagging).
3. Where avoidance is not practicable, a comprehensive baseline record will be developed and consideration of salvage will be undertaken in consultation with Aboriginal stakeholders prior to disturbance.

10.4 HUMAN SKELETAL MATERIAL PROTOCOL

Burial sites can have high cultural significance to Aboriginal communities and culturally appropriate management of burial sites is a high priority for the Aboriginal community. “Aboriginal remains” are defined in the *National Parks and Wildlife Act 1974* as:

> *… the body or the remains of the body of a deceased Aboriginal person, but does not include:*
>
> *(a) a body or the remains of a body buried in a cemetery in which non-Aboriginal persons are also buried, or*
>
> *(b) a body or the remains of a body dealt with or to be dealt with in accordance with a law of the State relating to medical treatment or the examination, for forensic or other purposes, of the bodies of deceased persons.*

No burial or potential burial sites have been identified in the Project underground mining area. Nor are they considered likely to be identified in the future due to the shallow soil profiles present on the Woronora Plateau. Notwithstanding, the following steps will be carried out in the event that suspected Aboriginal human skeletal material is encountered within the Project underground mining area:

- surface works in the immediate vicinity of the skeletal material will cease;
- the DPE, Heritage NSW, NSW Police and Aboriginal stakeholders will be informed as soon as practicable; and
- the identified skeletal remains will not be disturbed until the NSW Police and Heritage NSW have inspected the remains and authorised their disturbance.

10.5 CULTURAL AWARENESS PROGRAM

Metropolitan Coal will include a cultural awareness program as part of inductions aimed at minimising the potential for accidental damage to Aboriginal heritage. The cultural awareness program will provide:

- an overview of the cultural heritage management program;
- an overview of the consultation protocol (Section 5);
- an overview of the pre-clearance surveys (Section 8) and surface disturbance protocol (Section 10.3);
- an overview of mitigation, management and remediation measures (Section 10);
- simple criteria and procedures for artefact and human bone recognition;
- actions to follow if human skeletal material is encountered (Section 10.4); and
- personnel to contact for more information or assistance.

11 CONTINGENCY PLAN

In the event the Aboriginal heritage sites subsidence impact performance measure detailed in Section 6 of this HMP is considered to have been exceeded, Metropolitan Coal will implement the following Contingency Plan:

- The exceedance will be reported to the Technical Services Manager and/or the Environment & Community Superintendent within 24 hours.
- The exceedance will be recorded in the Heritage Management Plan – Subsidence Impact Register (provided in Appendix 3) consistent with the monitoring program described in Section 9 of this HMP.
- Metropolitan Coal will report the exceedance to the DPE, Heritage NSW and Aboriginal stakeholders as soon as practicable after Metropolitan Coal becomes aware of the exceedance.
- Metropolitan Coal will conduct an investigation to evaluate the potential contributing factors. The investigation will:
  - compare and critically analyse measured versus predicted subsidence parameters;
  - review measured subsidence parameters against the observed impact; and
  - review the subsidence monitoring program and update the program where appropriate, in consultation with Heritage NSW and the Aboriginal stakeholders.
- Metropolitan Coal will identify an appropriate course of action with respect to the identified impact(s), in consultation with specialists, relevant agencies and Aboriginal stakeholders, as necessary. For example:
  - proposed management and/or mitigation measures (Section 10); and
  - a program to review the effectiveness of the management and/or mitigation measures.
- Metropolitan Coal will submit the proposed course of action to the DPE for approval.
- Metropolitan Coal will implement the approved course of action to the satisfaction of the DPE.

In accordance with Condition 6, Schedule 6 of the Project Approval, Metropolitan Coal will provide a suitable offset to compensate for the impact to the satisfaction of the Secretary of DPE if either the contingency measures implemented by Metropolitan Coal have failed to remediate the impact or the Secretary of the DPE determines that it is not reasonable or feasible to remediate the impact.

A Contingency Plan Check List has been developed and is provided in Appendix 4.

12 FUTURE EXTRACTION PLANS

In accordance with Condition 7, Schedule 3 of the Project Approval, Metropolitan Coal will collect baseline data for future Extraction Plans. The collection of baseline data will include:

- photographic records;
- detailed scaled plans including physical characteristics and features; and
- detailed information regarding the dimensions, composition and features.

As described in Section 7, detailed baseline recording has been completed for an additional 33 Aboriginal heritage sites overlying or proximal to Longwalls 311-316 not previously subject to baseline recording. The baseline record for these sites is provided in Appendix 2.

Prior to the commencement of secondary extraction associated with the next Extraction Plan (i.e. Longwall 317), baseline data will be obtained for Aboriginal heritage sites located within the relevant 35º angle of draw and/or predicted 20 mm subsidence contour of the Extraction Plan longwall layout.

In addition to the baseline data collection, consideration of the environmental performance and management measures in accordance with the review(s) conducted as part of this HMP will inform the appropriate type and frequency of monitoring of the Aboriginal heritage sites relevant to the next Extraction Plan.

13 ANNUAL REVIEW AND IMPROVEMENT OF ENVIRONMENTAL PERFORMANCE

In accordance with Condition 3, Schedule 7 of the Project Approval, Metropolitan Coal will conduct an Annual Review of the environmental performance of the Project by the end of March each year.

The Annual Review will specifically address the environmental performance of the HMP and will:

- describe the works that were carried out in the past calendar year, and the works that are proposed to be carried out over the current calendar year;
- include a comprehensive review of the monitoring results and complaints records of the Project over the past year, including a comparison of these results against the:
  - relevant statutory requirements, limits or performance measures/criteria;
  - monitoring results of previous years; and
  - relevant predictions in the Project EA, Preferred Project Report and Extraction Plan;
- identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance;
- identify any trends in the monitoring data over the life of the Project;
- identify any discrepancies between the predicted and actual impacts of the Project, and analyse the potential cause of any significant discrepancies; and
- describe what measures will be implemented over the next year to improve the environmental performance of the Project.

As described in Section 2, this HMP will be reviewed within three months of the submission of an Annual Review, and revised where appropriate.
The Annual Review will be made publicly available on the Peabody website in accordance with Condition 10, Schedule 7 of the Project Approval.

14 INCIDENTS

An incident is defined as a set of circumstances that causes or threatens to cause material harm to the environment, and/or breaches or exceeds the limits or performance measures/criteria in the Project Approval.

The reporting of incidents will be conducted in accordance with Condition 6, Schedule 7 of the Project Approval. Metropolitan Coal will notify the Secretary of the DPE and any other relevant agencies of any incident associated with the Project as soon as practicable after Metropolitan Coal becomes aware of the incident. Within seven days of the date of the incident, Metropolitan Coal will provide the Secretary and any relevant agencies with a detailed report on the incident.

15 COMPLAINTS

A protocol for the managing and reporting of complaints has been developed as a component of Metropolitan Coal's Environmental Management Strategy and is described below.

The Environment & Community Superintendent is responsible for maintaining a system for recording complaints.

Metropolitan Coal will maintain public signage advertising the telephone number on which environmental complaints can be made. The Environment & Community Superintendent is responsible for ensuring that the currency and effectiveness of the service is maintained. Notifications of complaints received are to be provided as quickly as practicable to the Environment & Community Superintendent.

Complaints and enquiries do not have to be received via the telephone line and may be received in any other form. Any complaint or enquiry relating to environmental management or performance is to be relayed to the Environment & Community Superintendent as soon as practicable. All employees are responsible for ensuring the prompt relaying of complaints. All complaints will be recorded in a complaints register.

For each complaint, the following information will be recorded in the complaints register:

- date and time of complaint;
- method by which the complaint was made;
- personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect;
- nature of the complaint;
- the action(s) taken by Metropolitan Coal in relation to the complaint, including any follow-up contact with the complainant; and
- if no action was taken by Metropolitan Coal, the reason why no action was taken.

The Environment & Community Superintendent is responsible for ensuring that all complaints are appropriately investigated, actioned and that information is fed back to the complainant, unless requested to the contrary.

In accordance with Condition 10, Schedule 7 of the Project Approval, the complaints register will be made publicly available on the Peabody website and updated on a monthly basis. A summary of complaints received and actions taken will be presented to the Community Consultative Committee as part of the operational performance review.

16 NON-COMPLIANCES WITH STATUTORY REQUIREMENTS

A protocol for the managing and reporting of non-compliances with statutory requirements has been developed as a component of Metropolitan Coal's Environmental Management Strategy and is described below.

Compliance with all approvals, plans and procedures will be the responsibility of all personnel (staff and contractors) employed at or in association with the Metropolitan Coal Mine, and will be developed through promotion of Metropolitan Coal ownership under the direction of the General Manager.

The Technical Services Manager and/or Environment & Community Superintendent will undertake regular inspections, internal audits and initiate directions identifying any remediation/rectification work required, and areas of actual or potential non-compliance.

As described in Section 14, Metropolitan Coal will notify the Secretary of the DPE and any other relevant agencies of any incident associated with Metropolitan Coal as soon as practicable after Metropolitan Coal becomes aware of the incident. Within seven days of the date of the incident, Metropolitan Coal will provide the Secretary of the DPE and any relevant agencies with a detailed report on the incident.

A review of Metropolitan Coal's compliance with all conditions of the Project Approval, mining leases and all other approvals and licences will be undertaken prior to (and included within) each Annual Review. The Annual Review will be made publicly available on the Peabody website.

Additionally, in accordance with Condition 8, Schedule 7 of the Project Approval, an independent environmental audit was undertaken by the end of December 2011, and is undertaken a minimum of once every three years thereafter. A copy of the audit report will be submitted to the Secretary of the DPE and made publicly available on the Peabody website. The independent audit will be undertaken by an appropriately qualified, experienced and independent team of experts whose appointment has been endorsed by the Secretary of the DPE.

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APPENDIX 1

RECONCILIATION TABLE OF ABORIGINAL STAKEHOLDERS COMMENTS ON THE HERITAGE MANAGEMENT PLAN

Table A1-1
Reconciliation Table of Aboriginal Stakeholders Comments on the Heritage Management Plan

Registered Aboriginal Parties	Metropolitan Coal Response
Illawarra Local Aboriginal Land Council (ILALC)	
ILALC requests the definition of when sites are considered to be affected by subsidence impacts to be broadened to include impacts such as exfoliation of rock surfaces disruption to drip lines and water movement, rock fall disturbance causing impacts to deposits or Potential Archaeological deposits, altered drainage patterns, erosion or redirected water, changes in water availability and impacts that may occur due to erosions control measures (e.g. earth works, installation of coil logs, revegetation).	Project Approval (08_0149) for the Metropolitan Coal Project was granted in 2009 and includes specific conditions relevant to Aboriginal heritage sites including subsidence impact performance measures and the requirement for the preparation of a Heritage Management Plan (HMP) as part of an Extraction Plan to manage the potential environmental consequences of the Extraction Plan on heritage sites or values. The HMP required under Project Approval (08_0149) has been developed to ensures that the Metropolitan Coal Project does not cause any exceedances of the subsidence impact performance measures. Metropolitan Coal has undertaken an extensive monitoring and reporting program for the Metropolitan Coal Project to date, including baseline recordings of sites within areas to be subject to subsidence effects, and monitoring and inspection of Aboriginal heritage sites located above previously mined longwall panels. The baseline recordings and post-mining monitoring has been undertaken with the attendance of Aboriginal stakeholders since the commencement of the Metropolitan Coal Project. The HMP requires Metropolitan Coal to document all sites considered to be “affected by subsidence impacts” in the Heritage Management Plan – Subsidence Impact Register. The results of monitoring activities are reported and distributed to Heritage NSW and to each of the Aboriginal stakeholders. Detailed monitoring records have been collected as part of the monitoring program since grant of Project Approval (08_0149) in 2009 and will continue to be recorded during the HMP monitoring program, and would capture the items identified by the ILALC. These include (but are not limited to) the following: • the date of monitoring; • the location of longwall extraction (i.e. the longwall chainage) at the time of monitoring; • comparison of the physical characteristics of the site at the time of monitoring against the previous monitoring and the baseline record (detail/quantify any changes observed); • inspections of rock surfaces for cracking and/or exfoliation and/or blockfall since the previous monitoring and against the baseline record; • inspection of art motifs for damage or deterioration since the previous monitoring and against the baseline record; • identification of any natural weathering processes that may result in deterioration (e.g. fire, vegetation growth and water seepage); • detailed description and quantification of any changes noted during the completion of the above tasks; • a photographic record of any changes noted during monitoring (taken at the same position and distance as baseline record to allow comparison over time); • whether any follow-up actions are required to be considered (e.g. implementation of management or initiation of the Contingency Plan, etc.); and • any other relevant information. Consistent with all HMPs implemented under Project Approval (08_0149), sites are considered to be “affected by subsidence impacts” if they exhibit one or more of the following consequences that cannot be attributed to natural weathering or deterioration: overhang collapse; cracking of sandstone that coincides with Aboriginal art or grinding grooves; and rock fall that damages Aboriginal art. This has been described in the monitoring reports, which are distributed to Heritage NSW and each of the Aboriginal stakeholders, including ILALC. Metropolitan Coal is unaware of any concerns being raised by the Aboriginal stakeholders regarding the definition of what constitutes an impact to an Aboriginal site or the application of the Performance Indicator during the post-subsidence field surveys with Aboriginal stakeholders, and following the provision of the monitoring reports. Following completion of each longwall panel, Metropolitan Coal will assess the need for implementation of appropriate management and/or remediation measures. Where required, the development of management and/or remediation measures will be determined in consultation with Heritage NSW and the Aboriginal stakeholders. This may include measures such as seepage control techniques (installation of artificial driplines), stabilisation techniques (e.g. installation of supports), salvage of artefacts for safekeeping (in consultation with the Aboriginal community), restoration of aesthetic values and strain reduction techniques. These measures are outlined in Tables 9 and 10 of the HMP.

Table A1-1 (Continued)
Reconciliation Table of Aboriginal Stakeholders Comments on the Heritage Management Plan

Registered Aboriginal Parties	Metropolitan Coal Response
***ILALC* (Continued)**	
ILALC states that the significance ratings provided in Table 3 of the Longwalls 311-316 HMP are flawed and insufficient in accurately reflecting the genuine scientific value of these sites.	As part of the Aboriginal Cultural Heritage Assessment undertaken for the Metropolitan Coal Project Environmental Assessment, the existing Aboriginal heritage information available (e.g. site cards, photos, site plans, detailed baseline recordings, previous archaeological reports) was reviewed for each of the known Aboriginal heritage sites (Kayandel Archaeological Services, 2008). Based on this review and the site inspections undertaken in 2007 with representatives of the Aboriginal stakeholders, each site was assigned an archaeological significance ranking of low, moderate or high. This assessment was conducted by suitably qualified archaeologist (with experience in rock art recording and management) and representatives of the Aboriginal stakeholders. During this assessment a number of sites/areas located in the Project area were identified as being of high archaeological significance or of particular cultural significance. The significance rating of Aboriginal heritage sites detailed in the Longwalls 311-316 HMP is consistent with those development with Aboriginal stakeholders and suitability qualified archaeologists as part of the Aboriginal Cultural Heritage Assessment prepared for the Metropolitan Coal Project Environmental Assessment and subsequent Aboriginal heritage surveys including baseline recordings and end of panel surveys. Aboriginal stakeholders involved in surveys to date include representatives from the following Aboriginal groups: • Illawarra Local Aboriginal Land Council; • Cubbitch Barta Native Title Claimants; • Illawarra Aboriginal Corporation; • KEJ Tribal Elders Corporation; • Korewal Elouera Jerrungurah Tribal Elders Corporation; • Mr Gary Caines; • La Perouse Botany Bay Aboriginal Corporation; • Woronora Plateau Gundungara Elders Councils; • Tharawal Local Aboriginal Land Council; • Wodi Wodi Elders Corporation; and • Wadi Wadi Coomaditchie Aboriginal Corporation. Notwithstanding, the existing significance ratings are not fixed and can be updated where new information become available. During the Longwalls 311-316 Baseline Recording surveys, for example, Aboriginal heritage site NT 75 was classified as having high cultural significance, owing to the presence of a ground axe artefact located at the site (Niche, 2024). This has been considered in the Longwalls 311-316 HMP.
ILALC requests detailed information regarding the application of suitable management, remediation and/or mitigation measures to the Aboriginal heritage sites impacted by subsidence.	Consistent with the HMP, the need for the implementation of management and/or remediation measures such as the installation of artificial drip lines, stabilisation techniques and cosmetic treatments has been considered. The HMP also recognises that whilst these measures may reduce the risk of impact and consequence, they can also have the potential to cause substantial damage to Aboriginal heritage sites and their settings. For example, an artificial dripline has previously been suggested at FRC 275 to divert natural water flow away from art panels. However, there was no evidence that the art panels at FRC 275 had been affected by changed water flows, and it was concluded that further monitoring for any changes was preferable to an intervention which may not be necessary. Metropolitan will continue to consider appropriate mitigation measures on a case by case basis, and the inherent risk that any intervention may bring.
ILALC proposes thorough baseline data recording for all sites within a 600m radius of Longwalls 311 –316.	Metropolitan Coal agrees and has undertaken baseline recording of a number of Aboriginal heritage sites located within 600 m of Longwalls 311-316 secondary extraction. The baseline records include: • a photographic record of each Aboriginal heritage site; • detailed scaled plans of each site including physical characteristics and features; and • detailed information regarding the dimensions, composition and features of the site. The baseline recordings were undertaken by a suitably qualified archaeologist (with experience in rock art recording and management) and representatives of the Aboriginal stakeholders and is provided in Appendix 2 of the Longwalls 311-316 HMP. The information collected as part of the baseline recordings will be drawn upon during the ongoing monitoring program for Longwalls 311-316.

Table A1-1 (Continued)
Reconciliation Table of Aboriginal Stakeholders Comments on the Heritage Management Plan

Registered Aboriginal Parties	Metropolitan Coal Response
***ILALC* (Continued)**	
ILALC would advocate that a rock art conservation expert is engaged to develop a management and mitigation report that presents all options to mitigate and manage adverse impacts caused by subsidence.	Metropolitan Coal agrees with Illawarra Local Aboriginal Land Council's comment. As described in Section 9 of the Longwalls 311-316 HMP, monitoring of Aboriginal heritage sites within 600 m of Longwalls 311-316 secondary extraction will include a monitoring team consisting of a suitably qualified archaeologist (with experience in rock art recording and management) and representatives of the Aboriginal stakeholders (where available). Specific details that will be recorded during the monitoring program include (but are not limited to): • the date of monitoring; • the location of longwall extraction (i.e. the longwall chainage) at the time of monitoring; • comparison of the physical characteristics of the site at the time of monitoring against the previous monitoring and the baseline record (detail/quantify any changes observed); • inspections of rock surfaces for cracking and/or exfoliation and/or blockfall since the previous monitoring and against the baseline record; • inspection of art motifs for damage or deterioration since the previous monitoring and against the baseline record; • identification of any natural weathering processes that may result in deterioration (e.g. fire, vegetation growth and water seepage); • detailed description and quantification of any changes noted during the completion of the above tasks; • a photographic record of any changes noted during monitoring (taken at the same position and distance as baseline record to allow comparison over time); • whether any follow-up actions are required to be considered (e.g. implementation of management or initiation of the Contingency Plan, etc.); and • any other relevant information. A summary of the information collected during monitoring will be recorded in the Heritage Management Plan – Subsidence Impact Register (provided in Appendix 2 of the Longwall 311-316 HMP) and reported in accordance with the Project Approval conditions.
ILALC request that ILALC is also notified of any incident within seven days of the date of the incident.	An incident defined under Project Approval (08_014) is a set of circumstances that causes or threatens to cause material harm to the environment, and/or breaches or exceeds the limits or performance measures/criteria in Project Approval (08_0149). In accordance with Condition 6, Schedule 7 of Project Approval (08_0149), Metropolitan Coal is required to notify the Secretary of the Department of Planning, Housing and Infrastructure and any other relevant agencies of any incident associated with the Project as soon as practical after Metropolitan Coal becomes aware of the incident. Metropolitan Coal implements a monitoring program to monitor subsidence impacts and environmental consequences of the Project related subsidence on Aboriginal heritage sites. The monitoring results are used to assess the Project against the Aboriginal heritage sites and subsidence impact performance measures set out in Project Approval (08_0149). The monitoring will be undertaken by a suitably qualified archaeologist (with experience in rock art recording and management) and representatives of the Aboriginal stakeholders (where available). A summary of the information collected during monitoring will be recorded in the Heritage Management Plan – Subsidence Impact Register and reported in accordance with the Project Approval conditions. At the completion of monitoring, a report will be prepared and distributed to Heritage NSW and each of the Aboriginal stakeholders.
Woronora Plateau Gundungara Elders Council	
Woronora Plateau Gundungara Elders Council agrees there needs to be additional monitoring of Longwalls 311-316 with the addition of baseline surveys being conducted for the Aboriginal heritage sites identified. Woronora Plateau Gundungara Elders Council recommend that Aboriginal stakeholders are present during this process.	Metropolitan Coal acknowledges Woronora Plateau Gundungara Elders Council response and notes baseline recording of sites NEW-RS-01 and NEW-ST-01, within the Longwalls 311-316 35º angle of draw and/or 20 mm subsidence contours, will be carried out prior to the commencement of Longwall 311. Consistent with previous baseline recording surveys undertaken at the Metropolitan Coal Mine, the monitoring team will include a suitably qualified archaeologist (with experience in rock art recording and management) and representatives of the Aboriginal stakeholders (where available). Aboriginal stakeholders will be invited to attend relevant scheduled fieldwork in accordance with Section 5.2.1 of the Longwalls 311-316 HMP.
Cubbitch Barta Native Title Claimants	
Cubbitch Barta Native Title Claimants requests the Table of Contents includes page numbers for Tables and Figures.	Metropolitan Coal acknowledges Cubbitch Barta Native Title Claimants' comment. The formatting of the Longwalls 311-316 HMP, including the Table of Contents is consistent with previous iterations of the HMP.
Cubbitch Barta Native Title Claimants comments that pre-clearance surveys should always have Aboriginal representation present when this occurs, not just an archaeologist.	Acknowledged. Consistent with previous surveys undertaken at the Metropolitan Coal Mine, the monitoring team will include a suitably qualified archaeologist (with experience in rock art recording and management) and representatives of the Aboriginal stakeholders (where available). Aboriginal stakeholders will be invited to attend relevant scheduled fieldwork in accordance with Section 5.2.1 of the Longwalls 311-316 HMP. It is Metropolitan Coal's practice to situate any clearance works well away from heritage sites wherever possible, to eliminate the risk of impacts.

Table A1-1 (Continued)
Reconciliation Table of Aboriginal Stakeholders Comments on the Heritage Management Plan

Registered Aboriginal Parties	Metropolitan Coal Response
Cubbitch Barta Native Title Claimants **(Continued)**	
Cubbitch Barta Native Title Claimants states that the current monitoring program should continue, with the relevant Aboriginal organisations or persons, not the recently registered Aboriginal stakeholders.	Acknowledged. Metropolitan Coal is committed to maintaining ongoing consultation with Aboriginal stakeholders throughout the life of the Project. For the purpose of the Longwalls 311-316 HMP, Aboriginal stakeholders are defined as being those Aboriginal groups/parties who have previously registered an interest in being consulted in relation to the Project or who have been involved on an ongoing basis at Metropolitan Coal. The Aboriginal stakeholders for the Longwalls 311-316 HMP include the following: • Cubbitch Barta Native Title Claimants; • Illawarra Local Aboriginal Land Council; • Korewal Elouera Jerrungurah Tribal Elders Corporation; • Mr Gary Caines; • La Perouse Botany Bay Aboriginal Corporation; • Woronora Plateau Gundungara Elders Councils; • Tharawal Local Aboriginal Land Council; and • Wodi Wodi Elders Corporation.
Cubbitch Barta Native Title Claimants comment they are pleased to see such a detailed recording of the sites within the Longwalls 311-316 HMP as they are unable to participate in on-site surveys and this amount of detail allows them to see and understand the Country that these places are within.	Metropolitan Coal appreciates the Cubbitch Barta Native Title Claimants' comment and is pleased to facilitate a link between Cubbitch Barta and Country.

APPENDIX 2

LONGWALLS 311-316 BASELINE RECORD – ABORIGINAL HERITAGE SITES

Excellence in your environment

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Baseline Recording

Longwalls 311 to 316 Metropolitan Colliery – Aboriginal Heritage Baseline Recording

Metropolitan Colliery, Helensburgh, NSW

Wollongong City Council

Prepared for Metropolitan Coal Pty Ltd

Prepared by Niche Environment and Heritage | 28 March 2024



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Document control

Project number	Client	Project manager	LGA
8214	Metropolitan Coal Pty Ltd	Deirdre Lewis-Cook	Illawarra-South Coast

Version	Author	Review	Status	Comments	Date
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Acknowledgement of Country

We would like to pay our respects to the Elders past, present and emerging of the Dharawal on whose land this project was undertaken and acknowledge their continuing connection to the land, sea, and sky and care for Country.

Executive summary

Project outline

This report presents the baseline recording of 36 Aboriginal heritage sites undertaken by Niche Environment and Heritage Pty Ltd (Niche) for sites located within 600 m of Longwalls 311 to 316. These sites were previously reported on in the Aboriginal Cultural Heritage Assessment (ACHA) prepared by Kayandel Archaeological Services (2008) to support the Metropolitan Coal Project Environmental Assessment.

In accordance with Condition 7, Schedule 3 of the Project Approval (08_0149), and as required by the Metropolitan Coal Heritage Management Plan (HMP), these sites have been subject to baseline recording prior to secondary extraction of Longwalls 311-316.

In accordance with Condition 2, Schedule 7 of Project Approval (08_0149), the baseline data will inform the Metropolitan Coal Heritage Management Plans prepared in relation to Longwalls 311-316.

Additional baseline information such as photos, field notes and drawings are also kept in an electronic format by Metropolitan Coal and Niche.

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Table 54: Baseline recording data for monitoring points present within Blue Gum Forest; NT(R) 54 204

Table 55: Baseline recording data for Northern Trail 74 222

Table 56: Baseline recording data for monitoring points present within Northern Trail 74 223

Table 57: Baseline recording data for Northern Trail 75 228

Table 58: Baseline recording data for monitoring points present within Northern Trail 75 229

Table 59: Baseline recording data for Northern Trail 76 240

Table 60: Baseline recording data for monitoring points present within Northern Trail 76. 241

Table 61: Baseline recording data for Northern Trail 80 249

Table 62: Baseline recording data for monitoring points present within Northern Trail 80. 250

Table 63: Baseline recording data for Northern Trail 81 254

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Table 68: Baseline recording data for Northern Trail 86 275

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Table 70: Baseline recording data for Northeast Woronora 9 284

Table 71: Baseline recording data for art surfaces present within Northeast Woronora 9 285

Table 72: Baseline recording data for monitoring points present within Northeast Woronora 9 285

Table 73: Baseline recording data for Northeast Woronora 12 292

Table 74: Baseline recording data for art surfaces present within Northeast Woronora 12 293

Table 75: Baseline recording data for monitoring points present within Northeast Woronora 12. 293

Table 76: Baseline recording data for Northeast Woronora 15 302

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Table 88: Baseline recording data for art surfaces present within Northeast Woronora 20.....330

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1. Introduction

1.1 Background and need for the project

Metropolitan Coal (the 'Proponent') is a wholly owned subsidiary of Peabody Energy Australia Pty Ltd. The Metropolitan Coal Project (the 'Project') comprises the continuation, upgrade and extension of underground coal mining operations and surface facilities at the Metropolitan Colliery, near Helensburgh, New South Wales (NSW). Metropolitan Coal was granted approval for the Project under Section 75J of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) on 22 June 2009.

In accordance with Condition 7, Schedule 3 of the Project Approval (08_0149), and as required by the Metropolitan Coal Heritage Management Plan (HMP), these sites have been subject to baseline recording prior to secondary extraction of Longwalls 311-316.

In accordance with Condition 2, Schedule 7 of Project Approval (08_0149), the baseline data will inform the Metropolitan Coal HMPs prepared in relation to Longwalls 311-316.

1.2 Project methods

This report describes the methods and results of the baseline recording program that was undertaken from 4 September to 20 October 2023 by Deirdre Lewis-Cook (Associate Heritage Consultant), Riley Finnerty (Heritage Consultant) of Niche, Rebecca Chalker (Sub-consultant to Niche), and Rodney Lawson (Dharawal Heritage and Environment assistant) in partnership with representatives from Cubbitch Barta Native Title Claimants, Wodi Wodi Elders Corporation, Woronora Plateau Gundungara Elders Council, and Illawarra Local Aboriginal Land Council.

This report has been prepared by Riley Finnerty (Heritage Consultant) and Aimee Henderson (Heritage Consultant), with the internal review being undertaken by Deirdre Lewis-Cook (Associate Heritage Consultant).

An intensive pedestrian survey was undertaken to relocate known Aboriginal heritage sites requiring baseline recording for Longwalls 311-316. Once known sites were identified, they were checked against the original Aboriginal Heritage Information Management System (AHIMS) site card details to confirm their accuracy, their current condition noted, photographed, together with any additional features and/or artefacts.

The methods undertaken for the baseline recording program were consistent with the requirements outlined in Section 7 of the Metropolitan Coal HMP (2022:27), and were as follows:

- A photographic record of each of the Aboriginal heritage sites.
- Detailed scaled plans of each site including physical characteristics and features.
- Detailed information regarding the dimensions, composition and features of the site.

The baseline recording undertaken for Longwalls 311 to 316 included the use of the following methods:

- Shelter setting and context photography.
- Shelter and art panel panorama photography.
- Art panel detail off-set distance photography.
- Art panel key sketches and motif identification.
- Preparation of scale plans – sections and plans (multiple cross sections for complex sites).
- Shelter characteristic, features and monitoring points recording – position and detail photography.

- Post-processing including photo interpretation.
- Post-processing including compilation of site records.

The identification of motifs was undertaken by RAP representatives on site at the time of recording.

1.3 Project outcomes and sites subject to baseline recording

The Aboriginal heritage sites subject to baseline recording for Longwalls 311-316 are presented in Table 1.

Table 1: Sites within 600 m of Longwalls 311-316 subject to baseline recording.

Site name	AHIMS Site Number	Site types	Over Longwalls 311-316	Archaeological significance	Particular cultural significance
NT 3	52-2-0618	Shelter with Art, Artefacts and PAD*	X (315)	Low	
NT 4	52-2-0619	Shelter with Art, Artefacts and Midden	X (316)	Low	
NT 5	52-2-0620	Shelter with Art	X (316)	Moderate	
NT 6	52-2-0621	Shelter with Art and Artefacts	X (315)	Low	
NT 7	52-2-0622	Grinding Groove	X (314)	Low	
NT 8	52-2-0623	Grinding Groove and Rock Engraving	X (314)	Moderate	Yes[2]
NT 9	52-2-0624	Shelter with Art and Artefacts	X (314)	Low	Yes[2]
NT 10	52-2-0625	Shelter with Art and Artefacts		Low	
NT 12	52-2-0753	Grinding Groove		Low	
NT 17	52-2-0629	Grinding Grooves and Rock Engravings	X (316)	Moderate	
NT 18	52-2-0751	Shelter with Art	X (316)	Low	
NT 19	N/A	Shelter with Art		Low	
NT20	52-2-0749			-	
NT 21	52-2-0630	Grinding Groove	X (316)	Low	
NT 22	52-2-0758	Shelter with Art, Artefacts and PAD*		Low	
NT 23	52-2-0631	Shelter with Art and Artefacts		Low	
NT 29	52-2-0637			-	
NT 46	52-2-0755	Grinding Groove	X (315)	Low	Yes[2]
NT 54	52-2-0374	Shelter with Art and Artefacts		Low	
NT 74	52-2-0658	Shelter with Artefacts	X (316)	Low	
NT 75	52-2-0659	Shelter with Artefacts and PAD*	X (316)	Low	Yes[3]
NT 76	52-2-0660	Shelter with Artefacts		Low	
NT 80	52-2-3442	Shelter with Artefacts and PAD*	X (314)	Low	
NT 81	52-2-3443	Shelter with Artefacts and PAD*	X (314)	Low	
NT 85	52-2-3853	Shelter with Art		Low	
NT 86	52-2-3854	Shelter with Artefacts		Low	
NEW 9	52-2-0529	Shelter with Art		Low	
NEW 11	52-2-1238	Shelter with Art			
NEW 12	52-2-1236	Shelter with Art and PAD		N/A	
NEW 15	52-2-3511	Shelter with Art		Low	
NEW 16	52-2-3512	Shelter with Artefact		Low	
NEW 18	52-2-3514	Grinding Groove		Low	

NEW 19	52-2-3515	Shelter with Art and Artefact		Low	
NEW 20	52-2-3516	Shelter with Art		Low	
NEW 21	52-2-3517	Shelter with Art		N/A	
NEW 23	52-2-3519	Shelter with Art		N/A	

*Sources include: Kayandel Archaeological Services (2006, 2007, 2008), Metropolitan Coal (2022) and information available on NSW Office of Environment and Heritage AHIMS site cards.

1. Site not relocated during baseline recording.

2. Sites identified as having 'particular cultural interest' within Metropolitan Coal (2022). It is also noted in the HMP that 'all Aboriginal heritage sites are culturally significant to the Aboriginal people who have a traditional connection to Country'.

3. This site has been classified as having high cultural significance during from results of this baseline recording, owing to the presence of a ground axe artefact located at the site.

4. * Indicates sites with additional site features to be updated in AHIMS.

Of the 36 Aboriginal cultural heritage sites listed in Table 1, 34 were relocated and subject to detailed baseline recording during this assessment. Two Aboriginal cultural heritage sites, NT 20 (AHIMS ID# 52-2-0749) and NT 29 (AHIMS ID# 52-2-0637), could not be relocated during the baseline surveys undertaken for Longwalls 311-316. Extensive efforts were made by the team to relocate these Aboriginal cultural heritage sites during the survey, including confirming the recording data with the original AHIMS recording form, checking that the correct datum was being used and cross-checking against the information and descriptions provided in previous surveys and assessments.

Although NT 20 (AHIMS ID# 52-2-0749) and NT 29 (AHIMS ID# 52-2-0637) could not be relocated, despite the extensive survey effort, it is recommended that records of these Aboriginal cultural heritage sites are retained for future baseline recording or monitoring programs. This is because future environmental events may improve conditions for relocation (eg. burning of vegetation) and may assist with relocating the Aboriginal cultural heritage sites in the future.

Photographs depicting the Aboriginal cultural heritage sites, their condition and any relevant monitoring points have been taken for the relevant Aboriginal cultural heritage sites (Table 1). Copies of these photographs are held by Metropolitan Coal and Niche and are presented within this report to assist future monitoring efforts.

The baseline records for each of the Aboriginal cultural heritage sites listed in Table 1 are presented in Section 2 of this report.

1.3.1 AHIMS data

After initial unsuccessful attempts to relocate Aboriginal cultural heritage sites at the commencement of fieldwork, the AHIMS data was interrogated and found to contain errors. Error types included duplicate sites as well as incorrect site locations.

As fieldwork progressed and physical site locations were validated, it was confirmed that GPS points provided on the original site card recordings were correct and the GPS points provided in the AHIMS extensive search results were incorrect. Annex 2 provides correct Aboriginal cultural heritage site locations as confirmed during fieldwork.

The error in the AHIMS data may also have inadvertently resulted in at least seven Aboriginal cultural heritage sites (Flat Rock Creek 197 (AHIMS ID#52-2-0172); Blue Gum Forest; Flat Rock Creek 190 (AHIMS ID#52-2-0226); Northern Trail 1 (AHIMS ID#52-2-0616); Woronora Reservoir Northern Trail 20 (AHIMS ID#52-2-0749); Woronora Reservoir; Northern Trail 14 (AHIMS ID#52-2-0752); Northern Trail 77 (AHIMS ID#52-2-0692), and Woronora Reservoir; Northern Trail 13 (AHIMS ID#52-2-0754)) being updated to "not a

site". It is believed that when these sites were not able to be relocated during past archaeological surveys using the incorrect AHIMS data the site status was subsequently updated.

During the current fieldwork Northern Trail 77 (AHIMS ID#52-2-0692), one of the Aboriginal cultural heritage sites updated in AHIMS to "not a site", was relocated and confirmed to be a valid site. Details of this site can be found in Annex 1.

1.3.2 New AHIMS site cards and additional baseline recording

Four new Aboriginal cultural heritage sites were recorded during fieldwork (Table 2). Additional details of these sites can be found in Annex 1. These Aboriginal cultural heritage sites will require new AHIMS site cards. Baseline recording of these new Aboriginal cultural heritage sites was not undertaken as it was outside of the scope of works.

In accordance with Condition 7, Schedule 3 of the Project Approval (08_0149), and as required by the Metropolitan Coal Heritage Management Plan (HMP), these sites should be subject to baseline recording prior to secondary extraction of Longwalls 311-316.

In accordance with Condition 2, Schedule 7 of Project Approval (08_0149), the baseline data should be used to inform the Metropolitan Coal HMPs prepared in relation to Longwalls 311-316.

One Aboriginal cultural heritage site, NT19 (AHIMS ID# pending), previously recorded by C. Sefton (Illawarra Prehistory Group); does not appear to be registered on AHIMS.

Aboriginal cultural heritage sites presented in Table 2 will require AHIMS site cards to be submitted to Heritage NSW.

Table 2: Recommendations for sites requiring site card preparation

Site name	AHIMS Site Number	Site type	Recommended actions
NEW-GG-01	Pending	Rockshelter	Added to AHIMS and new site card prepared.
NEW-RS-01	Pending	Rockshelter	Added to AHIMS and new site card prepared.
NEW-RS-02	Pending	Grinding groove	Added to AHIMS and new site card prepared.
NEW-ST-01	pending	Scarred Tree	Added to AHIMS and new site card prepared
NT 19	Pending	Rockshelter	Added to AHIMS and new site card prepared.

1.3.3 Site card updates

Additional art was recorded at two Aboriginal cultural heritage sites, NT22 (AHIMS ID#52-2-0758) and NT3 (AHIMS ID#52-2-0618). The existing AHIMS site card will need to be updated to include the details of these additional motifs. Additional details of this site can be found in Annex 1.

The AHIMS site card for Aboriginal cultural heritage site Northern Trail 77 (AHIMS ID#52-2-0692) will need to be updated to reflect the status of the site from "not a site" to "valid".

2. Archaeological site baseline recording

2.1 Woronora Reservoir Northern Trail 3 (NT 3 AHIMS ID# 52-2-0618)

Woronora Reservoir Northern Trail 3 consists of two continuous sandstone shelters, forming one site. The site is located at 260 m AHD, 60 m NE of fire trail 9D under the first small cliff overhang. The shelters are formed out of Hawkesbury sandstone by cavernous weathering. Shelter #1 is located directly south-east of Shelter #2 along the same contour line. Both shelters have previously been recorded to contain art and artefacts; however, only Shelter #2 has had art and artefacts relocated. The art located in Shelter #2 consists of fifteen (15) art motifs, mostly of charcoal and ochre indeterminate line drawings and etchings along the backwall. The art is in a poor condition and has faded since last recording, however, additional art was identified during this recording. Shelter #2 contains visible surface artefacts and a grey sandy loam floor with a potential artefact deposit.

2.1.1 Woronora Reservoir Northern Trail 3 (Shelter #1) baseline recording data

Table 3: Baseline recording data for Woronora Reservoir Northern Trail 3 (Shelter #1)

Overview					
Site type	Shelter with Art	Corrected MGAE	310858	Corrected MGAN	6218671
Previous Recording	Illawarra Prehistory Group: C. Sefton	Date/s	1981; 2002		
Site Details					
Width	14.6 m	Depth	3.8 m	Height	1.4 m
Orientation	NE	Floor area	24 m^2	Floor condition	Eroding at dripline; inside stable.
Location in Landscape	Below upper ridge line.				
Shelter exterior/formation	Block fall.				
Shelter interior	Active weathering – Cavernous – Spalling Vertical cracking every 30 cm to 1 m along entire back wall.				
Distance to water	390 m of Waratah Rivulet.	Landform	Top ridge line – just below Slope - gentle		
Setting	Continuous overhang.				
Archaeological Deposit					
Deposit	Sandy.	**Describe**	N/A		
Visible artefacts?	Not able to relocate.	Where?	N/A	How many?	N/A
Art					
Art surfaces	See original site card. No art relocated (visible) during this baseline recording.				
Art Condition	N/A				
Art Overview	N/A				
Damage/threats					

Water wash	No.	**Graffiti**	No.	**Macro vegetals**	Black algae on roof. Green algae on base of back wall.
Animals	Yes – Small animals and wombat.	**Salt/granular loss**	Yes – Ceiling.	**Fissuring**	None.
Insects	Yes.	**Spalling/exfoliation**	Yes – Back wall and ceiling.	**Other**	N/A
Fire	No.	**Block fall**	Ancient.		

2.1.2 Woronora Reservoir Northern Trail 3 (Shelter #2) baseline recording data

Table 4: Baseline recording data for Woronora Reservoir Northern Trail 3 (Shelter #2)

Overview					
Site type	Shelter with Art, Artefacts and PAD	Corrected MGAE	310845	Corrected MGAN	6218697
Previous Recording	Caryll Sefton.	Date/s	1981; 2002		
Site Details					
Width	14.6 m	Depth	3.8 m	Height	1.4 m
Orientation	NE	Floor area	24 m^2	Floor condition	Good.
Location in Landscape	Elevation at 260 m, located 60 m northeast of fire trail 9D under first small cliff overhang.				
Shelter exterior/formation	Low sandstone overhang formed by cavernous weathering.				
Shelter interior	Sandy floor with low lying sandstone roof. Shelter tapers at both ends with a bend in the middle. Art on back wall and artefacts on surface of sandy floor.				
Distance to water	300 m of Waratah Rivulet.	Landform	Upper valley slope		
Setting	Continuous overhang.				
Archaeological Deposit					
Deposit	Grey sandy loam	**Describe**	50 cm deep with possible subsurface artefacts.		
Visible artefacts?	Yes	Where?	Shelter floor scattered.	How many?	Three
Art					
Art surfaces	Art on back walls consisting of 10 charcoal indeterminate drawings. See previous recordings. Additional art recorded: 15 charcoal and ochre indeterminate and infill drawings / etchings (1 x macropod, 1 x eel).				
Art Condition	Poor and faded since last recording.				
Art Overview	Indeterminate charcoal line drawings located along back wall of shelter. See original site card – photos don't represent each panel. See new panel sheet below.				
Damage/threats					
Water wash	No.	**Graffiti**	No.	**Macro vegetals**	Black algae lichen on roof and walls.

Animals	Yes, wombat hole in western corner.	**Salt/granular loss**	Yes, on roof	**Fissuring**	Yes.
Insects	No	**Spalling/exfoliation**	Yes. On lower back wall/roof (old + continuous)	**Other**	Monitoring points: #1 – 1150cm – 1190cm (active weathering around art – Panel #2, #3, #6).
Fire	No.	**Block fall**	Yes.		

Table 5: Baseline recording data for art surfaces present within Woronora Reservoir Northern Trail 3 (Shelter #2)

Motif No.	Type	Form	Media	Baseline (m)	Measurement
Panel 1					
1	Indeterminate	Incomplete	Charcoal	590 – 660 m	34 cm x 20 cm
2	Indeterminate	Incomplete	Charcoal		20 cm x 12 cm
Panel 2					
3	Indeterminate	Incomplete	Charcoal	670 – 720	47 cm x 40 cm
Panel 3					
4	Indeterminate	Incomplete	Charcoal with white ochre infill	670 - 695	20 cm x 15 cm
5	Indeterminate	Incomplete	Charcoal etched and scratching	700 – 756	56 cm x 30 cm
6	Indeterminate	Incomplete	Charcoal and etching	756 – 780	24 cm x 28 cm
7	Indeterminate	Incomplete	Charcoal and etching	780 – 810	35 cm x 20 cm
8	Indeterminate	Incomplete	Charcoal and etching	Motif 7 and 8 combined	Motif 7 and 8 combined
Panel 4					
9	Indeterminate (Possible macropod)	Incomplete	Charcoal with etching	810 – 845	35 cm x 2 cm
10	Indeterminate	Incomplete	Charcoal with etching	845 – 895	50 cm x 25 cm
11	Indeterminate	Incomplete	Charcoal possible red ochre	845 – 895	50 cm x 25 cm
12	Indeterminate	Incomplete	Charcoal	870 – 895	40 cm x 25 cm
Panel 5					
13	Indeterminate	Incomplete	Charcoal with etching	920 – 1010	90 cm x 50 cm
Panel 6					
14	Lines and infill	Incomplete	Charcoal	1120 – 1170	50 cm x 35 cm
15	Horizontal lines with infill	Incomplete	Charcoal	1160 – 1190	30 cm x 15cm

Table 6: Baseline recording data for monitoring points present within Woronora Reservoir Northern Trail 3.

Monitoring Points		
Number	**Location in shelter**	**Notes**
1	At 6.6 m – 7.1 m (Shelter #2)	Active weathering around art in Panel #2, #3 and #6.
2	At 11.5 m from base to roof at 11.9 m	Root jacking at back wall, centre of Panel #6.

2.1.3 Baseline recording images – site overview (Shelter #1)



Plate 1: Shelter #1 overview, SE aspect – Woronora Reservoir Northern Trail 3.



Plate 2: Shelter #1 overview, NW aspect – Woronora Reservoir Northern Trail 3.



Plate 3: Example of vertical cracking in back wall (example of entire back wall) – Woronora Reservoir Northern Trail 3.

2.1.4 Baseline recording images – site overview (Shelter #2)



Plate 4: Overview of Shelter #2, SE aspect – Woronora Reservoir Northern Trail 3



Plate 5: Overview of Shelter #2, W aspect – Woronora Reservoir Northern Trail 3.

2.1.5 Baseline recording plans – site overview (Shelter #1)

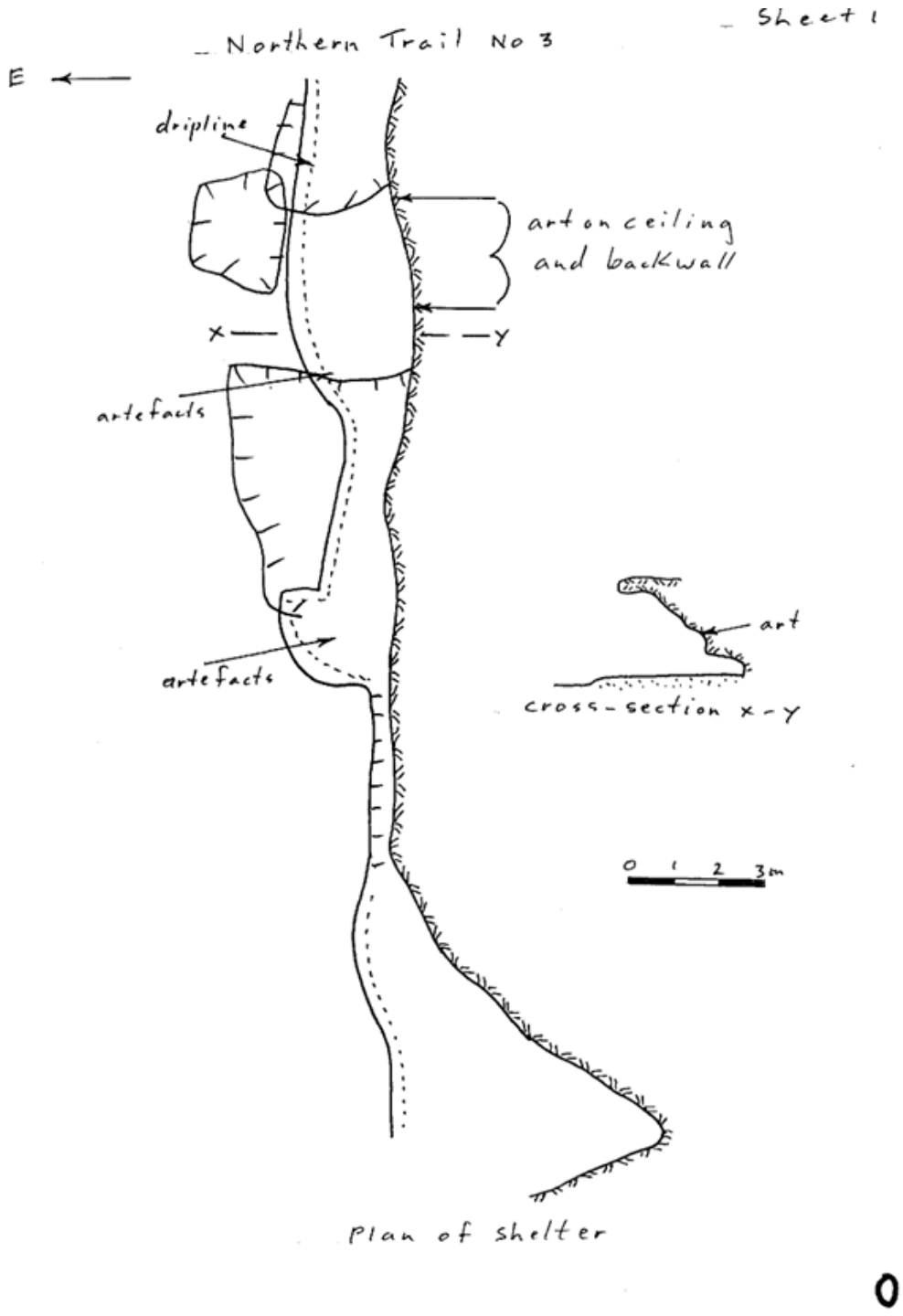


Figure 1: Plan and section of shelter #1 at Woronora Reservoir Northern Trail 3 (source: AHIMS site card. Drawn by K. Kort)

2.1.6 Baseline recording plans – site overview (Shelter #2)

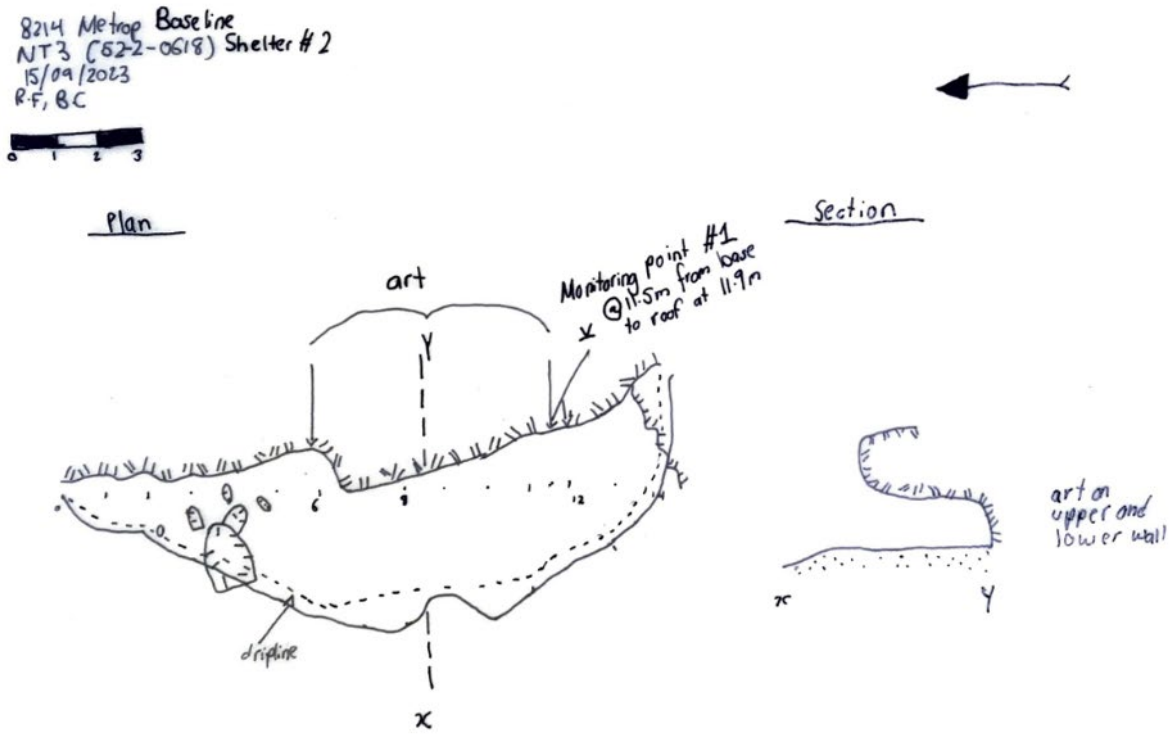


Figure 2: Plan and section of Shelter #2 at Woronora Reservoir Northern Trail 3 (source: AHIMS site card, original drawn by K. Kort)

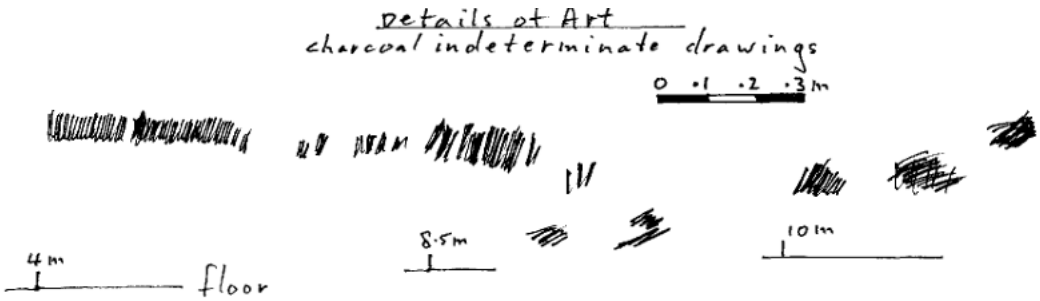


Figure 3: Art panels of Woronora Reservoir Northern Trail 3 (source: AHIMS site card, drawn by K. Kort)

2.1.7 Baseline recording images – detailed panel recording (Shelter #2)

Panel 1



Plate 6: Overview of art panel #1, motif #1 and motif #2 – Woronora Reservoir Northern Trail 3.



Plate 7: Art Panel #1 close up of art motif #2 on backwall - Woronora Reservoir Northern Trail 3.

Panel 2



Plate 8: Panel #2 overview – Woronora Reservoir Northern Trail 3.



Plate 9: Panel #2, motif #3 – Woronora Reservoir Northern Trail 3.

Panel 3

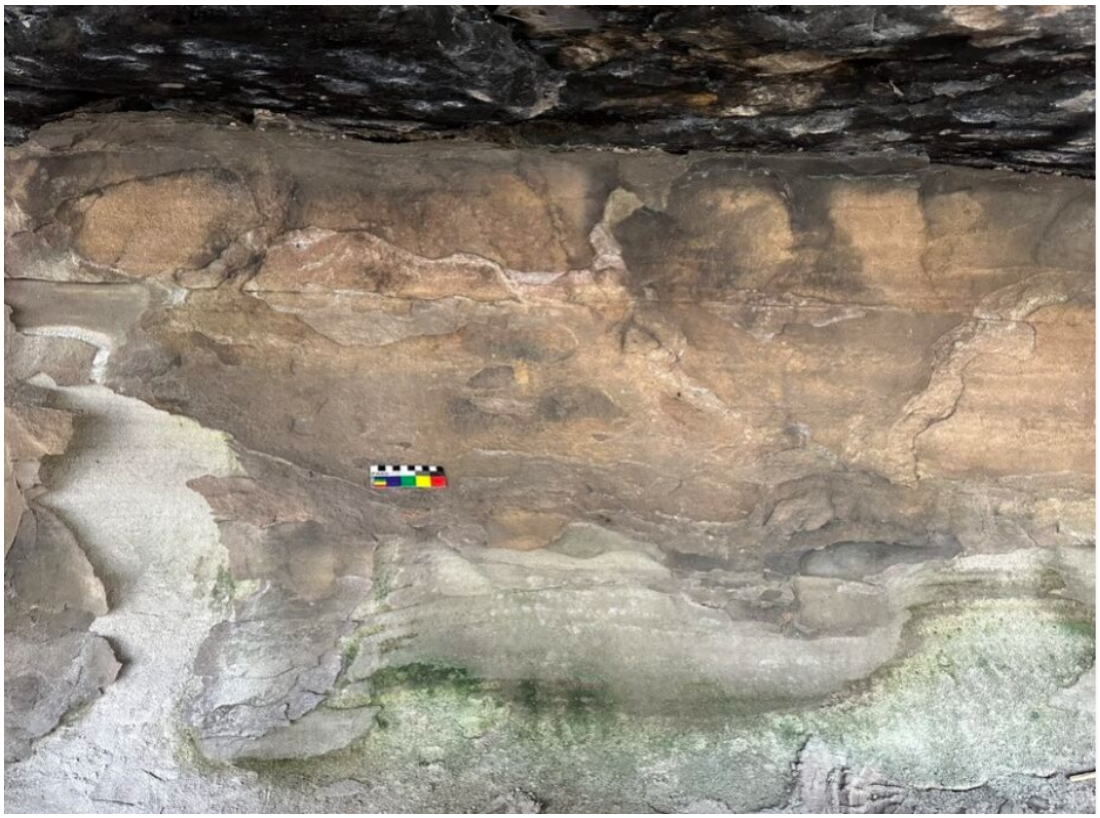


Plate 10: Art Panel #3, motifs #4 and #5 – Woronora Reservoir Northen Trail 3.

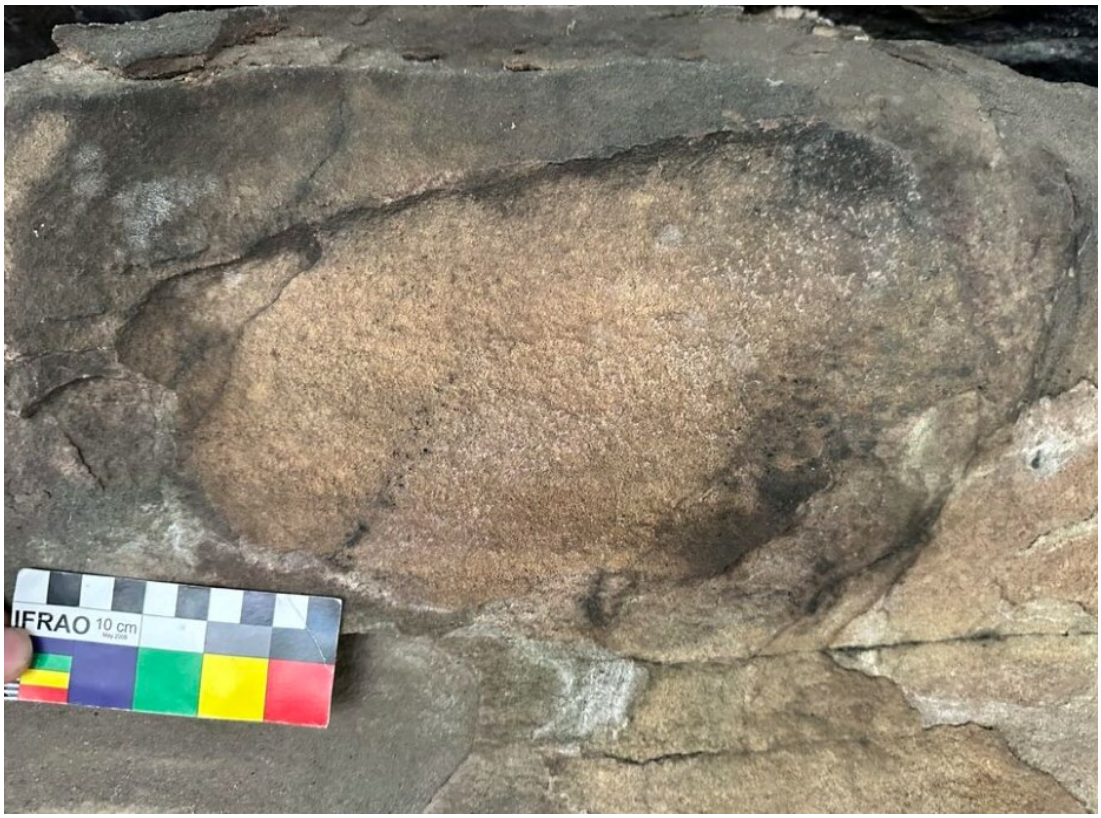


Plate 11: Art Panel #3, motif #5 – Woronora Reservoir Northern Trail 3.



Plate 12: Panel #3, motifs #6, #7 and #8 overview – Woronora Reservoir Northern Trail 3.

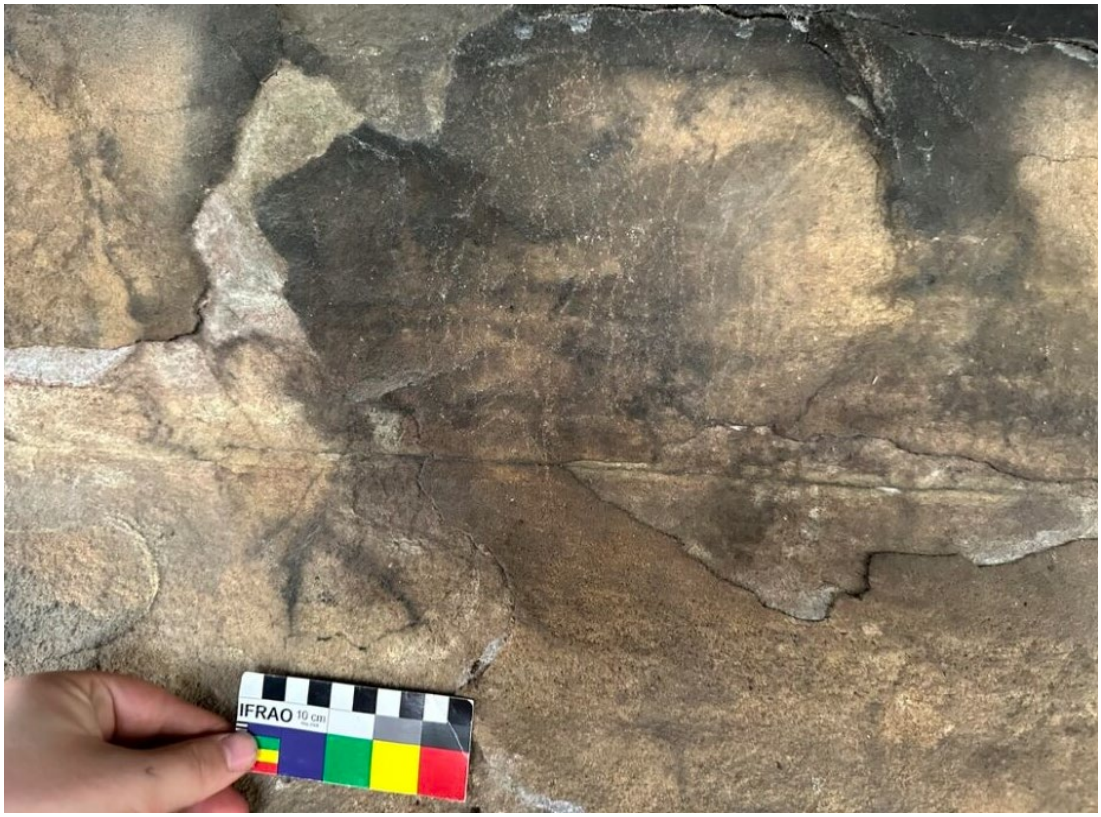


Plate 13: Panel #3, motif #6 close up – Woronora Reservoir Northern Trail 3.

Panel 4

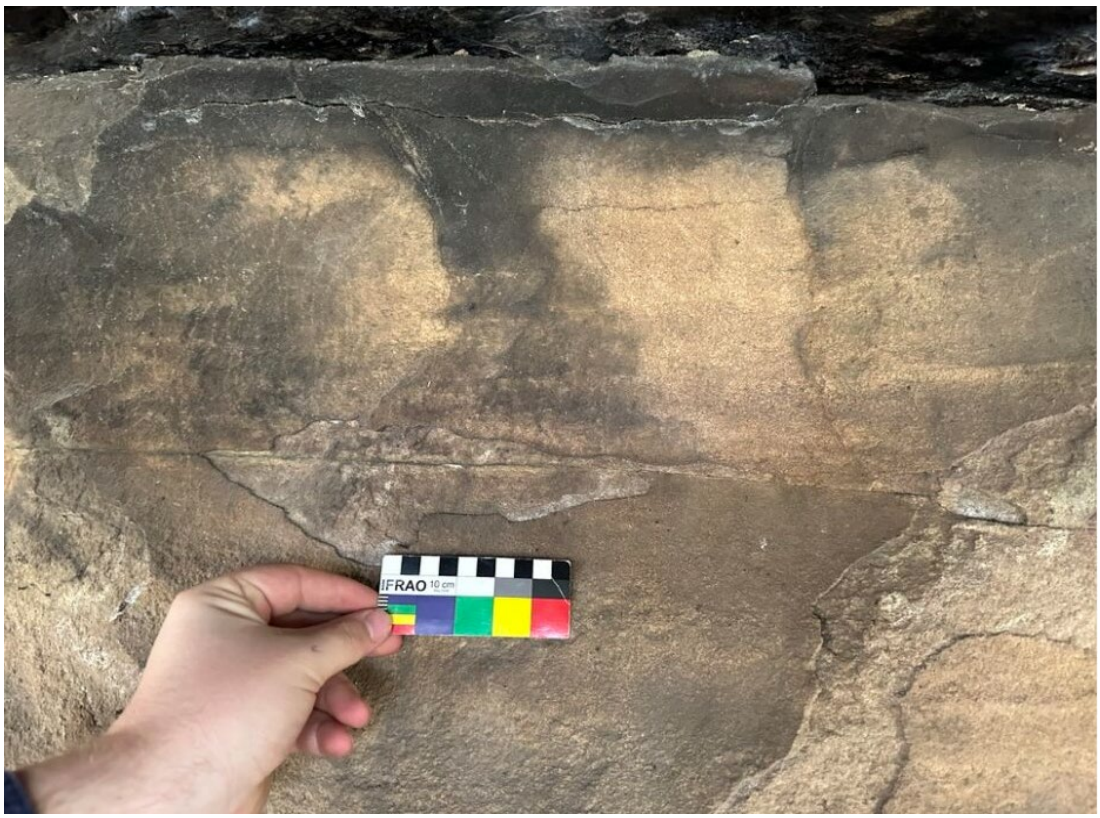


Plate 14: Panel #4 overview – Woronora Reservoir Northern Trail 3.

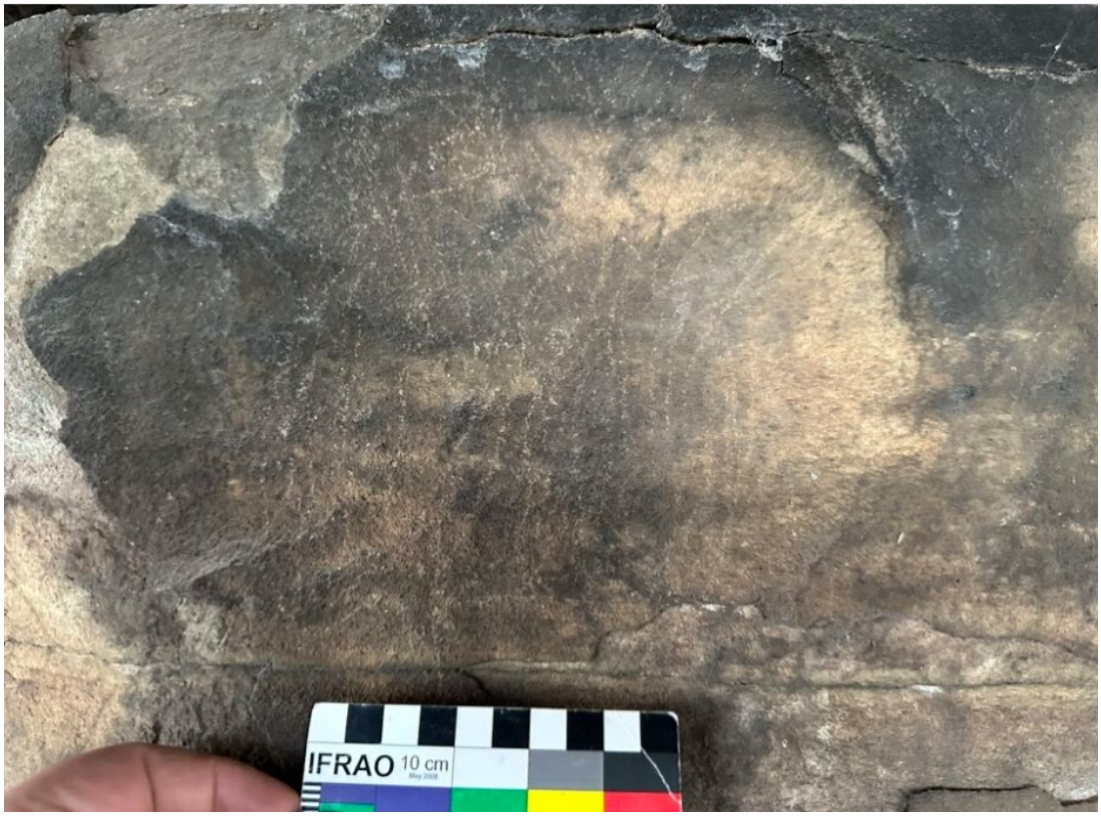


Plate 15: Panel #4, motif #9 – Woronora Reservoir Northern Trail 3.



Plate 16: Panel #, motif #10 – Woronora Reservoir Northern Trail 3.



Plate 17: Panel #4, motif #11 – Woronora Reservoir Northern Trail 3.

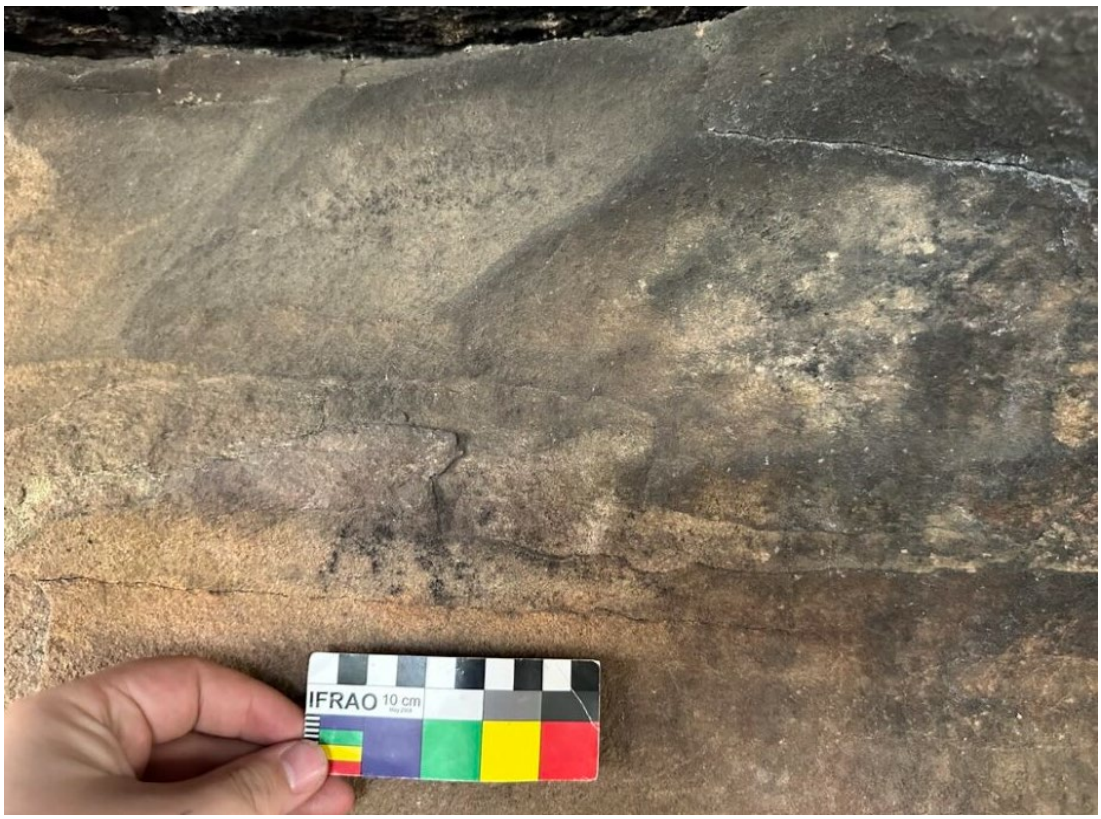


Plate 18: Panel #4, motif #12, showing active weathering - Woronora Reservoir Northern Trail 3.

Panel 5



Plate 19: Panel #5, motif #13 overview - Woronora Reservoir Northern Trail 3.

Panel 6



Plate 20: Panel #6 overview – Woronora Reservoir Northern Trail 3.



Plate 21: Panel #6, motif #14 – Woronora Reservoir Northern Trail 3.



Plate 22: Panel #6, motif #15 – Woronora Reservoir Northern Trail 3.



Plate 23: Root jacking (monitoring point) in the centre of Panel #6 – Woronora Reservoir Northern Trail 3.



Plate 24: Close up of monitoring point at Panel #6 – Woronora Reservoir Northern Trail 3.



Plate 25: Close up of Panel # 6 (centre of panel) – Woronora Reservoir Northern Trail 3.

Artefacts



Plate 26: Sample of surface artefacts located at Shelter #2 - Woronora Reservoir Northern Trail 3.

2.2 Woronora Reservoir Northern Trail 4 (NT 4 AHIMS # 52-2-0619)

Woronora Reservoir Northern Trail 4 consists of a sandstone shelter formed from cavernous weathering. Woronora Reservoir Northern Trail 4 is located 300 m south-west of the end of Fire Road 9D under the second ledge down from the road. The shelter has previously been recorded to contain midden material including artefacts of quartz and shell portions of Sydney cockle and a fresh water pippi 2 cm long, however only two artefacts were relocated. The shelter floor consists of a brown loamy sand with good condition. The shelter contains art and was previously recorded to contain 17 charcoal indeterminate drawings, white ochre hand stencils and red and white ochre drawings on the roof and walls. Only two indeterminate charcoal drawings were identified, with the remaining being very poor condition and heavily faded. Active erosion is present in the site where both the walls and roof are smoke blackened, and art is located in areas where this blackening has flaked off.

2.2.1 Woronora Reservoir Northern Trail 4 baseline recording data

Table 7: Baseline recording data for Woronora Reservoir Northern Trail 4

Overview					
Site type	Shelter with Art, Artefacts and Midden	Corrected MGAE	0310412	Corrected MGAN	6218595
Previous Recording	Illawarra Prehistory Group: C. Sefton	Date	1981		
Site Details					
Width	13 m	Depth	3 m	Height	1.65 m
Orientation	West	Floor area	Sandy loam	Floor condition	Littered with leaves – good deposit
Location in Landscape	Located 300m south-west of the end of Fire Road 9D under the second ledge down from the road.				
Shelter exterior/formation	Sandstone overhang formed by cavernous weathering.				
Shelter interior	Blackened walls from smoke. Blackening is flaking off in sections, potentially taking art with it.				
Distance to water	30 m south.	Landform	Upper slope of gully		
Setting	Isolated.				
Archaeological Deposit					
Deposit	Yes.	Describe	Brown sandy loam		
Visible artefacts?	Yes.	Where?	Southern end of overhang on floor.	How many?	2
Art					
Art surfaces	Original site recording notes traces of art - 17 charcoal indeterminate drawings, white ochre hand stencils and red and white ochre drawings, however, this art is not visible.				
Art Condition	Poor – barely visibly.				
Art Overview	Indeterminate figures (including possible left hand print). Charcoal scratching.				
Damage/threats					
Water wash	Yes.	Graffiti	No	Macro vegetals	Yes.
Animals	Yes.	Salt/granular loss	Yes.	Fissuring	Some.
Insects	-	Spalling/exfoliation	Yes.	Other	NA

Fire	Yes.	Block fall	Unspecified		

Table 8: Baseline recording data for art surfaces present within Woronora Reservoir Northern Trail 4

Motif No.	Type	Form	Media	Baseline (m)	Measurement
Panel 1					
1	Indeterminate	Incomplete	Charcoal scratching	8.5 m	1 m x 1.5 m
Panel 2					
3	Indeterminate	Incomplete	Charcoal scratching	8.0 m	1 m x 1 m

Table 9: Baseline recording data for monitoring points present within Woronora Reservoir Northern Trail 4

Monitoring Points		
Number	**Location in shelter**	**Notes**
Nil	-	-

2.2.2 Baseline recording images – site overview



Plate 27: External context image of Woronora Reservoir Northern Trail 4. View from north of shelter, facing south.



Plate 28: Interior context image of Woronora Reservoir Northern Trail 4, facing north.

2.2.3 Baseline recording plans – site overview

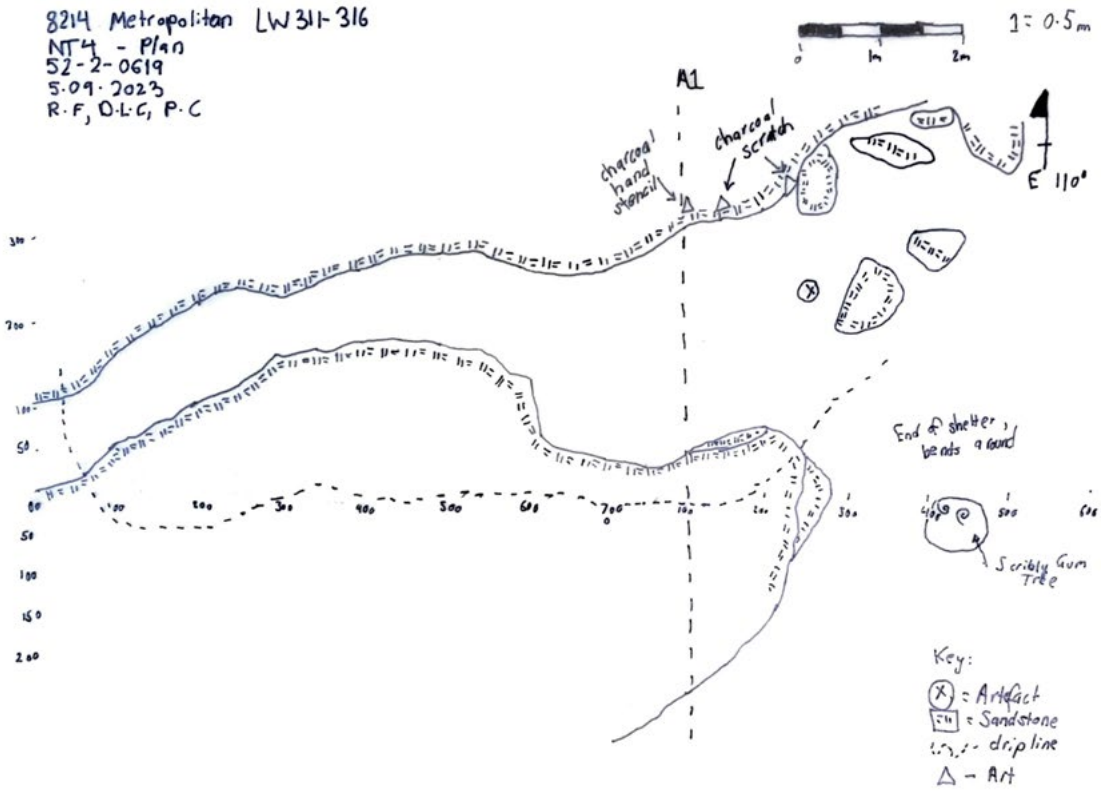


Figure 4: Plan of Woronora Reservoir Northern Trail 4.

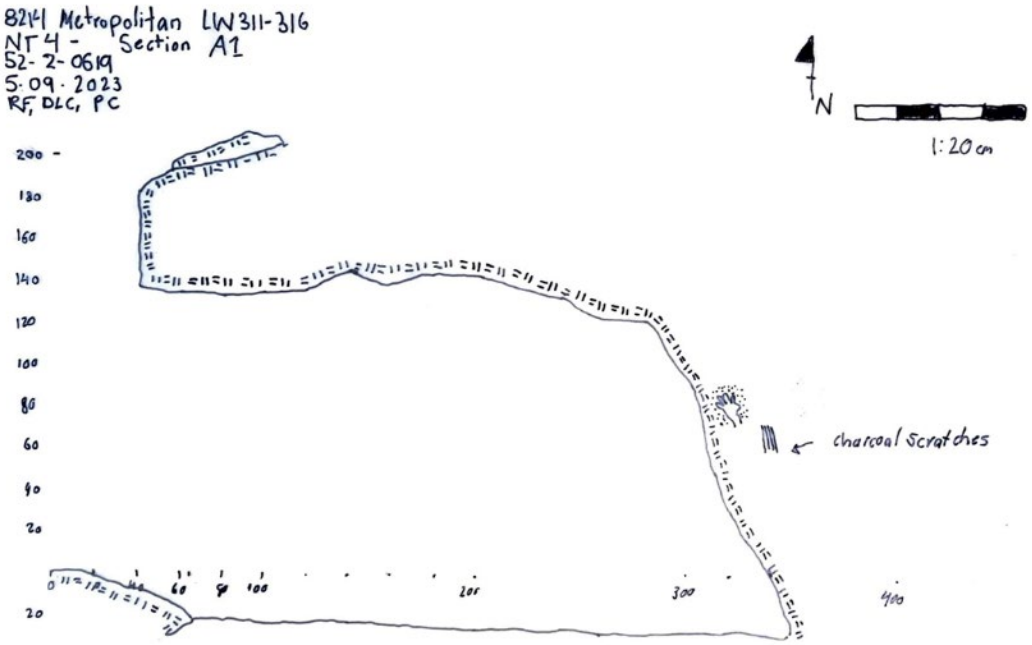


Figure 5: A1 Section, showing art motifs - Woronora Reservoir Northern Trail 4

2.2.4 Baseline recording images – detailed panel recording

Panel 1



Plate 29: Overview image of art Panel #1 on wall of Woronora Reservoir Northern Trail 4, facing east.



Plate 30: Close up of art Panel #1, Woronora Reservoir Northern Trail 4



Plate 31: Close up image of indeterminate charcoal drawing on Panel #1, Woronora Reservoir Northern Trail 4.

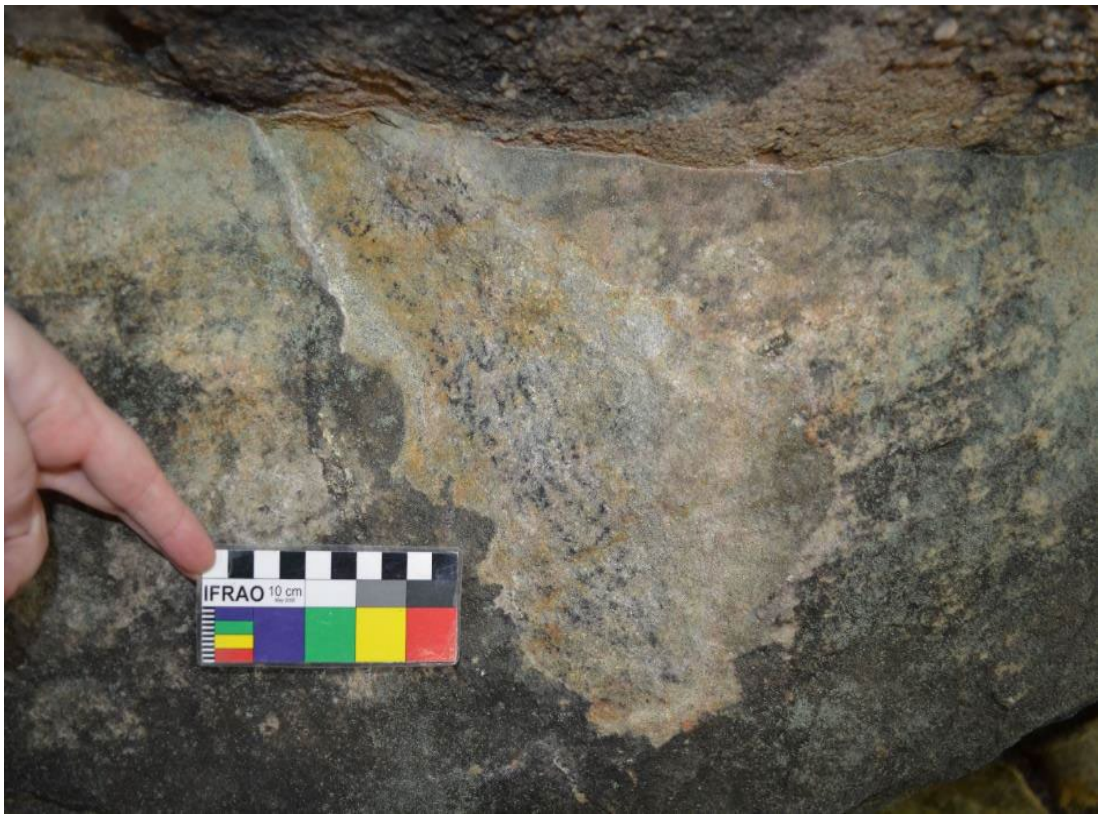


Plate 32: Close up image of indeterminate charcoal drawing on Panel #1, Woronora Reservoir Northern Trail 4.

Panel 2



Plate 33: Overview image of art Panel #2 on wall of Woronora Reservoir Northern Trail 4, facing east.

2.3 Woronora Reservoir Northern Trail 5 (NT 5 AHIMS # 52-2-0620)

Woronora Reservoir Northern Trail 5 is a shelter formed out of Hawkesbury sandstone by block fall and chemical /cavernous weathering. The site is located approximately 350 m west of Fire Road 9, on the mid slope of gully at 236 m AHD. The shelter is 13 m in length, 4.2 m in width, 3.5 m in height and faces north-west. The shelter consists of charcoal and red ochre drawings along the back wall. The previous recoding notes artefacts present include quartz and fossilised wood and deposit; however, this was not present. The shelter floor has been eroded and consists of organic build up in dripline.

2.3.1 Woronora Reservoir Northern Trail 5 baseline recording data

Table 10: Baseline recording data for Woronora Reservoir Northern Trail 5

Overview					
Site type	Shelter with Art	Corrected MGAE	310455	Corrected MGAN	6218677
Previous Recording	Illawarra Prehistory Group: C. Sefton	Date	1981		
Site Details					
Width	14 m	Depth	4 m	Height	3 m
Orientation	NNW 330°	Floor area	20 m²	Floor condition	Stable
Location in Landscape	Located approximately 350 m west of Fire Road 9D, 236 m elevation, 50 m south of creek tributary.				
Shelter exterior/formation	Sandstone block fall.				
Shelter interior	Block fall and chemical weathering / cavernous. Floor slopes from south end to north end.				
Distance to water	50 m	Landform	Hillside southeast of creek. Mid-slope.		
Setting	Isolated.				
Archaeological Deposit					
Deposit	N/A	Describe	None relocated (organic build up in dripline).		
Visible artefacts?	N/A	Where?	N/A	How many?	N/A
Art					
Art surfaces	Located on backwall. Original recording identified 16 panels with some art on excellent condition and other in poor/obliterated conditions. This recording identified 6 panels with 41 motifs.				
Art Condition	Good – poor condition, with some art no longer identifiable. First recording fits description. Previous water wash has ceased with dry art panels visible, which may not have been visible during first recording.				
Art Overview	See art form below for details.				
Damage/threats					
Water wash	Yes. Slight in east corner.	Graffiti	No.	Macro vegetals	Yes - algae.
Animals	Yes – wombat	Salt/granular loss	Yes – roof and backwall.	Fissuring	No.
Insects	Yes.	Spalling/exfoliation	Yes – roof and backwall.	Other	N/A
Fire	Yes- roof.	Block fall	Ancient.		

Table 11: Baseline recording data for art surfaces present within Woronora Reservoir Northern Trail 5.

Motif No.	Type	Form	Colour	Measure	Notes
Panel 1	**2.4 m – 3.2 on baseline (80 cm x 60 cm)**				
1	Small male figure	Minus feet	Black	15 cm x 20 cm	Evidence of previous water wash over panel.
2	Possible emu	Minus head	Black	34 cm x 40 cm	Evidence of previous water wash over panel.
3	Small figure	Complete faded	Black	20 cm x 10 cm	Evidence of previous water wash over panel.
4	Human figure	Complete faded	Black	38 cm x 18 cm	Evidence of previous water wash over panel.
5	Male figure	Minus head	Black	42 cm x 15 cm	Evidence of previous water wash over panel.
6	Indeterminate		Black	20 cm x 18 cm	Evidence of previous water wash over panel.
Panel 2	**6 m – 6.8 m on baseline (80 cm x 80 cm)**				
7	Charcoal Indeterminate		Black	80cm x 80cm	Charcoal covers entire panel. Water wash present.
Panel 3	**6.5 – 8.9 m on baseline (240 cm x 90 cm) – all artwork in poor condition, spauling.**				
8	Indeterminate	Partial	Black	25 cm x 35 cm	spauling
9	Indeterminate	Partial	Black	40 cm x 65 cm	spauling
10	Indeterminate	Partial	Black	30 cm x 55 cm	spauling
11	Indeterminate	Partial	Black	25 cm x 45 cm	spauling
12	Indeterminate	Partial with infill	Black	40 cm x 70 cm	
13	Indeterminate	Partial with infill	Black	35 cm x 55 cm	Spauling and granular loss
Panel 4	**7.9 m – 9.3 m on baseline (140 cm x 90 cm) – Panel consists of small, cavernous, weathered holes.**				
14	Indeterminate	Partial	Black	20 cm x 15 cm	
15	Indeterminate	Partial	Black	14 cm x 15 cm	
16	Partial infill	Possible fish/dolphin	Black	47 cm x 26 cm	
17	Indeterminate	Partial with infill	Black	45 cm x 35 cm	
18	Indeterminate	Partial with infill – red and black outline	Black	55 cm x 45 cm	
19	Indeterminate	Partial	Black	40 cm x 29 cm	
20	Indeterminate	Partial	Black	20 cm x 8 cm	
21	Indeterminate	Partial	Black	40 cm x 30 cm	
Panel 5	**8.9 m – 9.5 m on baseline (70 cm x 65 cm)**				
22	Turtle	Partial head and front flippers, top of shell	Black	35 cm x 23 cm	

Motif No.	Type	Form	Colour	Measure	Notes
23	Traced left hand	Partial and ring finger visible.	Black	18 cm x 10 cm	
24	Bat	Partial outline and infill	Black	30 cm x 50 cm	Feet and wings visible
25	Indeterminate	Partial	Black	10 cm x 27 cm	
26	Traced left hand infill	Partial no fingertips	Black	27 cm x 20 cm	
27	Indeterminate	Partial	Black	26 cm x 6 cm	
28	Indeterminate	Partial	Black	13 cm x 11 cm	Black outline with salt built up
Panel 6	**9.1 m x 12.2 m on baseline (310 cm x 170 cm)**				
29	Indeterminate	Partial	Black	80 cm x 90 cm	Water wash and granular loss
30	Indeterminate - possible mixture	Partial with orange and black infill and scales	Black and orange	37 cm x 50 cm	Possible dolphin
31	Possible eel	Partial black with infill	Black	125 cm x 18 cm	Water wash and granular loss
32	Indeterminate	Partial	Black	40 cm x 10 cm	
33	Indeterminate	Partial	Black	10 cm x 12 cm	
34	Macropod	Partial	Black outline	35 cm x 24 cm	
35	Indeterminate	Partial	Black and orange infill	40 cm x 100 cm	Water wash
36	Indeterminate	Partial	Black	50 cm x 115 cm	
37	Indeterminate	Partial	Black with scale infill	40 cm x 10 cm	Water wash and dust build up
38	Indeterminate	Partial	Black with infill	60 cm x 99 cm	
39	Dancing woman	Partial	Black with infill	60 cm x 65 cm	Granular loss, fust and erosion
40	Indeterminate	Partial	Black outline	13 cm x 27 cm	
41	Indeterminate	Partial	Black	30 cm x 27 cm	

Table 12: Baseline recording data for monitoring points present within Woronora Reservoir Northern Trail 5.

Monitoring Points		
Number	**Location in shelter**	**Notes**
1	At 6.7 m – panel #2, motif #7.	Active water wash.
2	At 9.8 – panel #6, motif #29.	Active water wash.
3	At 13.10 and 14 m.	Recent water wash.

2.3.2 Baseline recording images – site overview



Plate 34: Interior context shot of Woronora Reservoir Northern Trail 5, facing west.



Plate 35: Interior context shot of Woronora Reservoir Northern Trail 5, facing east.

2.3.3 Baseline recording plans – site overview

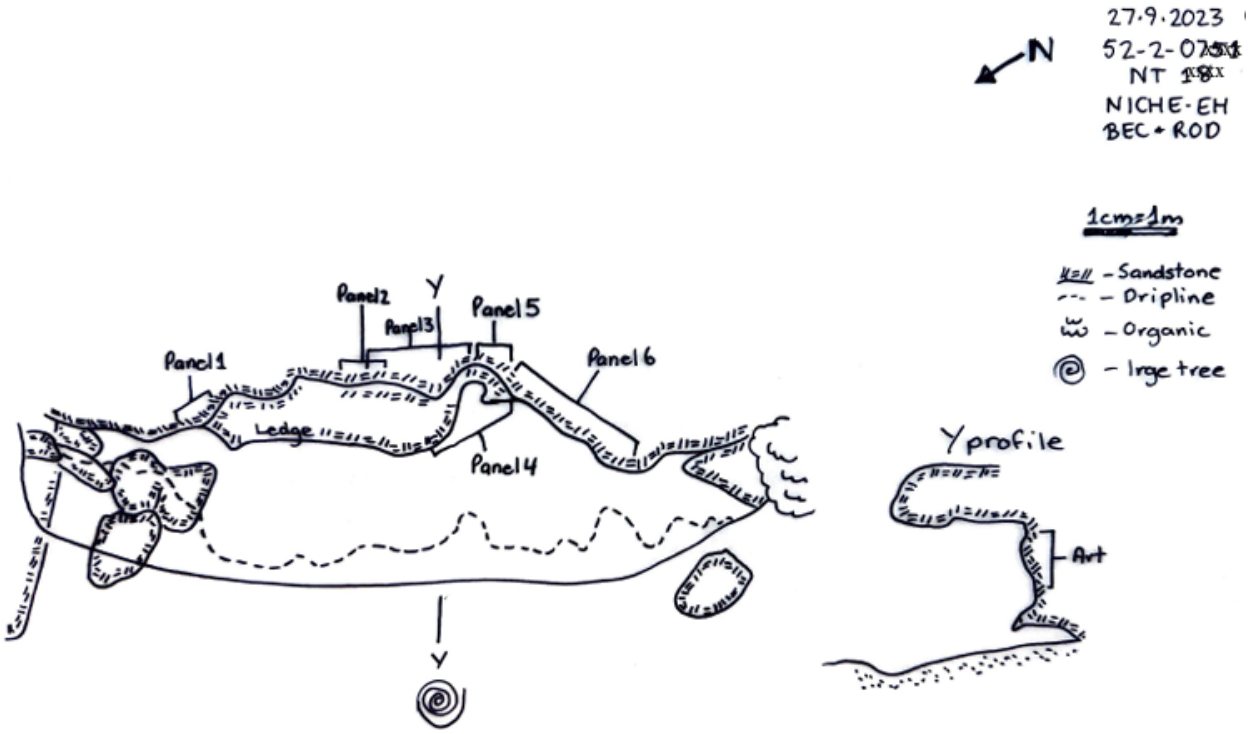


Figure 6: Plan of Woronora Reservoir Northern Trail 5 (52-2-0620) and Y profile.

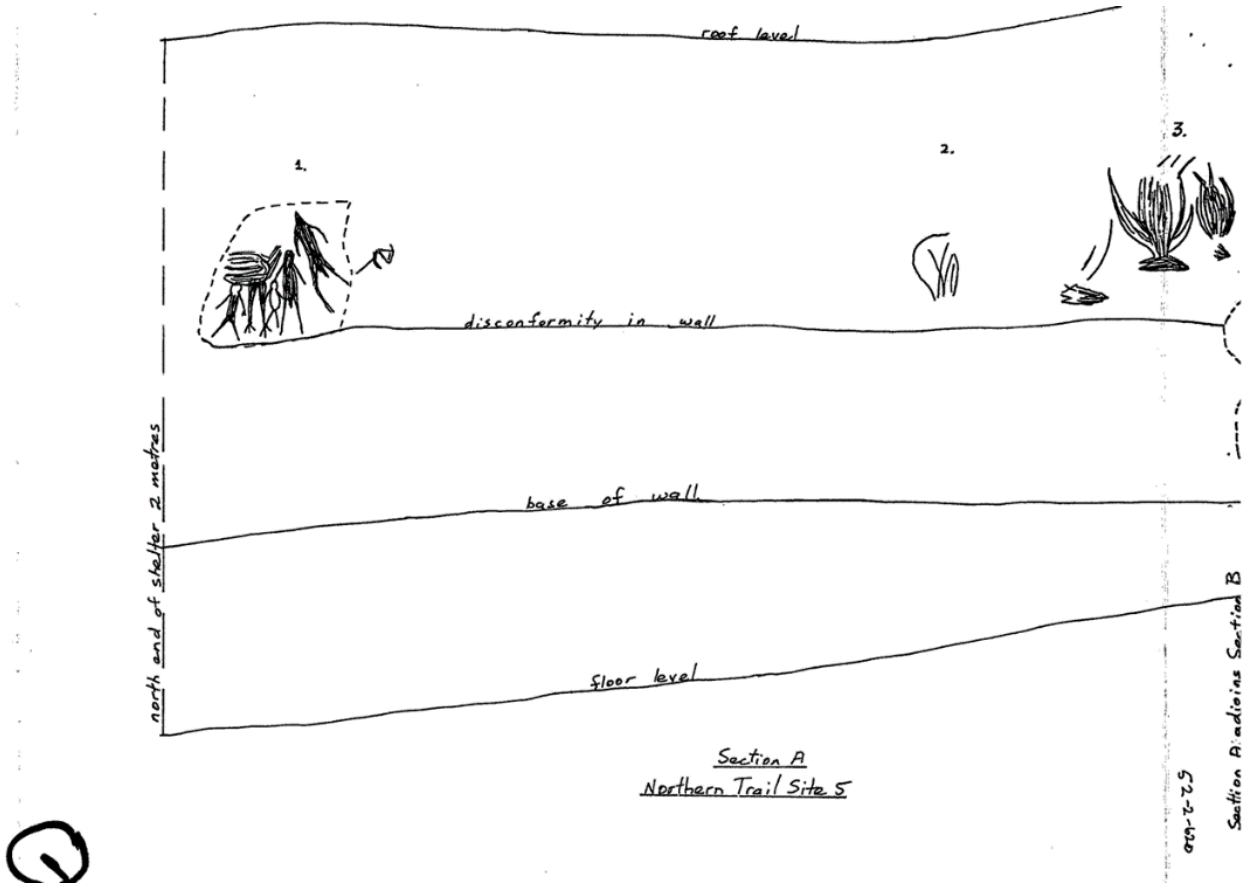


Figure 7: Art panel sketch - section A - Woronora Reservoir Northern Trail 5 (source: AHIMS site card. Drawn by C. Sefton)



Figure 8: Art panel sketch - section B - Woronora Reservoir Northern Trail 5 (source: AHIMS site card drawn by C. Sefton).

2.3.4 Baseline recording images – detailed panel recording

Panel 1



Plate 36: Overview shot of Woronora Reservoir Northern Trail 5 art Panel #1.



Plate 37: Art Panel #1, motif #1 – #6 – Woronora Reservoir Northern Trail 5.



Plate 38: Art Panel #1, motif #6 – Woronora Reservoir Northern Trail 5.

Panel 2



Plate 39: Art Panel #2 overview – Woronora Reservoir Northern Trail 5.

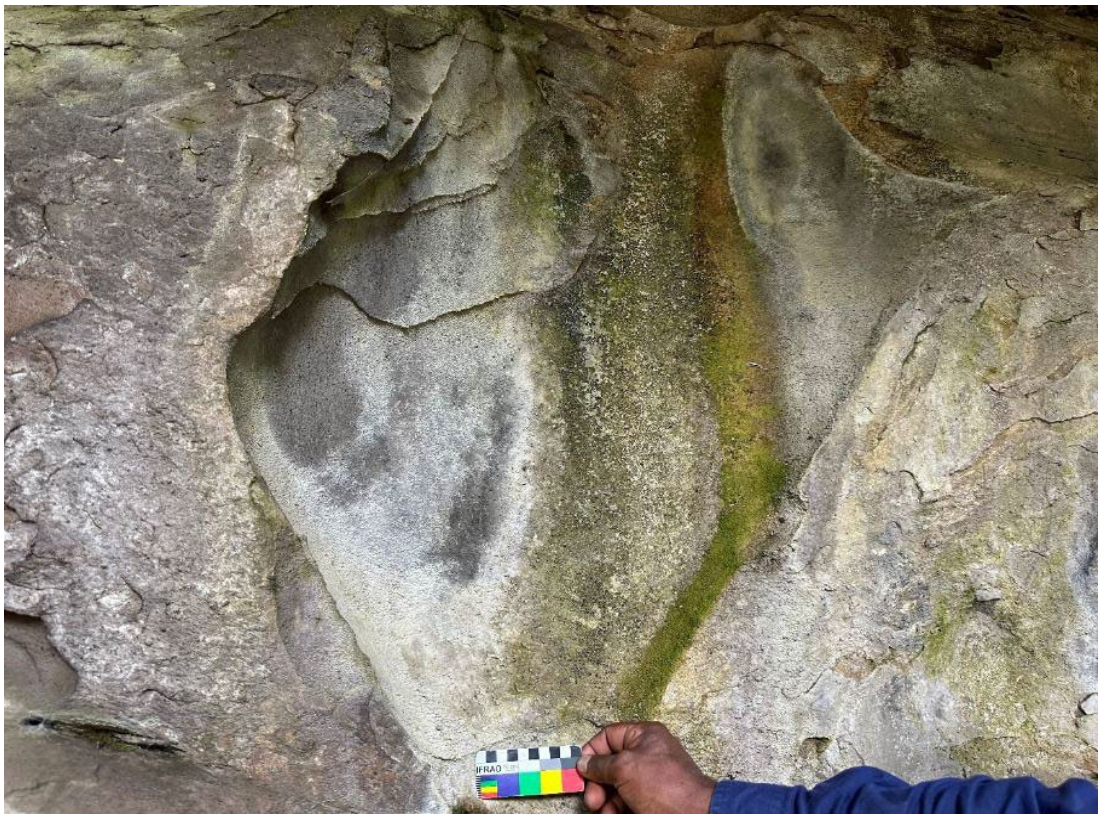


Plate 40: Art Panel #2, motif #7, showing water wash damage, no distinct lines – Woronora Reservoir Northern Trail 5.

Panel 3



Plate 41: Art Panel #3 overview – Woronora Reservoir Northern Trail 5.



Plate 42: Art Panel #3, motif #8 and #9 – Woronora Reservoir Northern Trail 5.



Plate 43: Art Panel #3, motif #10 and #11 – Woronora Reservoir Northern Trail 5.



Plate 44: Art Panel #3, motif #12 and #13 – Woronora Reservoir Northern Trail 5.

Panel 4



Plate 45: Panel #4 overview, consisting of several small, cavernous holes with art – Woronora Reservoir Northern Trail 5.

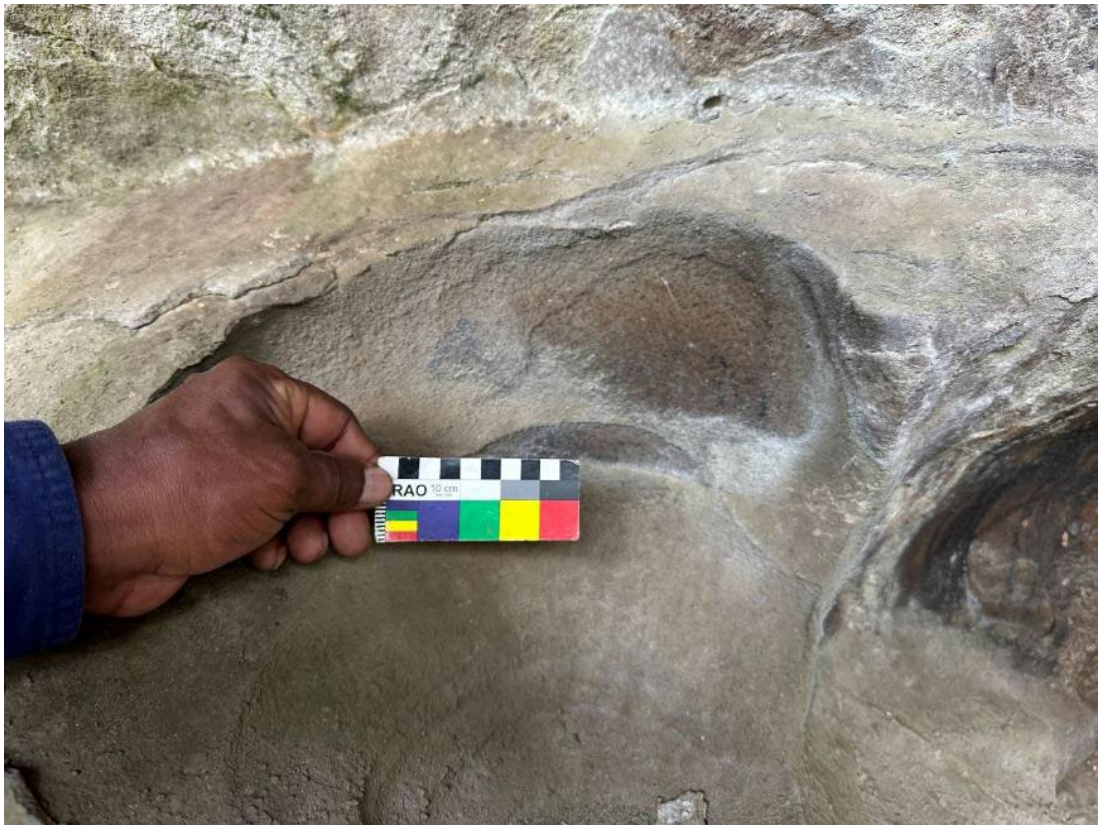


Plate 46: Panel #4, motif #14 – Woronora Reservoir Northern Trail 5.



Plate 47: Panel #4, motif #15 – Woronora Reservoir Northern Trail 5



Plate 48: Panel #4, motif #16 – Woronora Reservoir Northern Trail 5.



Plate 49: Panel #4, motif #17 – Woronora Reservoir Northern Trail 5.



Plate 50: Panel #4, motif #18 – Woronora Reservoir Northern Trail 5.



Plate 51: Panel #4, motif #19 – Woronora Reservoir Northern Trail 5.



Plate 52: Panel #4, motif #20 – Woronora Reservoir Northern Trail 5.



Plate 53: Panel #4, motif #21 – Woronora Reservoir Northern Trail 5.

Panel 5

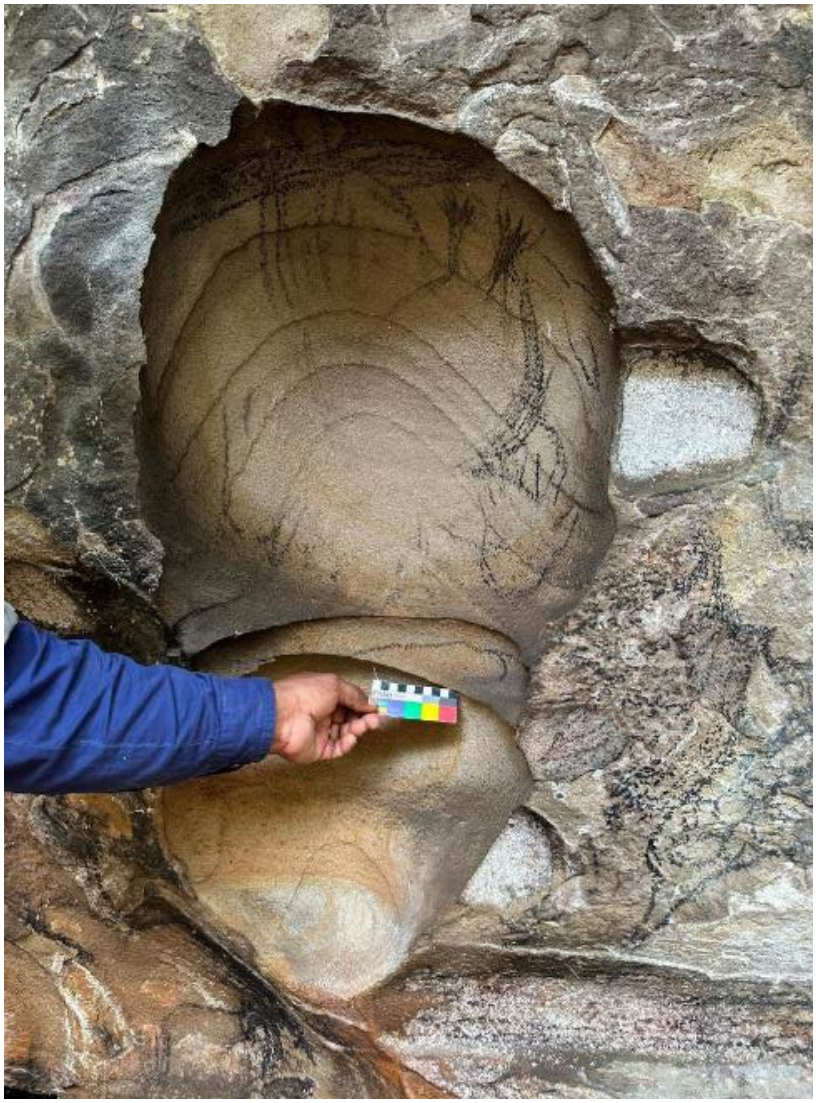


Plate 54: Panel #5 overview – Woronora Reservoir Northern Trail 5.



Plate 55: Panel #5, motif #22 (turtle - top of head/flipper/top shell) – Woronora Reservoir Northern Trail 5.



Plate 56: Panel #5, motif #23 (traced left hand – partial) – Woronora Reservoir Northern Trail 5.

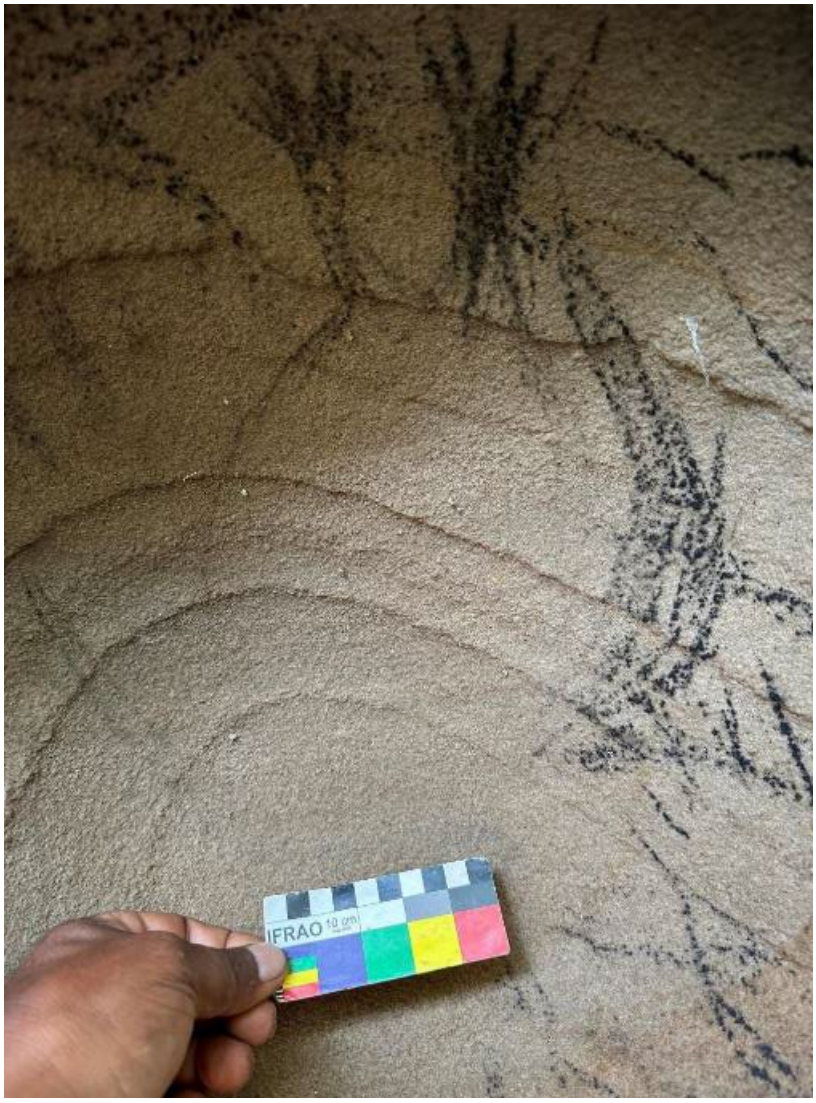


Plate 57: Panel #5, motif #24 (bat) – Woronora Reservoir Northern Trail 5.



Plate 58: Panel #5, motif #25 – Woronora Reservoir Northern Trail 5



Plate 59: Panel #5, motif #26 (traced left hand) – Woronora Reservoir Northern Trail 5.



Plate 60: Panel #5, motif #27 – NT 5.



Plate 61: Panel #5, motif #28 – Woronora Reservoir Northern Trail 5.

Panel 6



Plate 62: Panel #6 overview – Woronora Reservoir Northern Trail 5.



Plate 63: Panel #6, motif #29, showing water wash – Woronora Reservoir Northern Trail 5

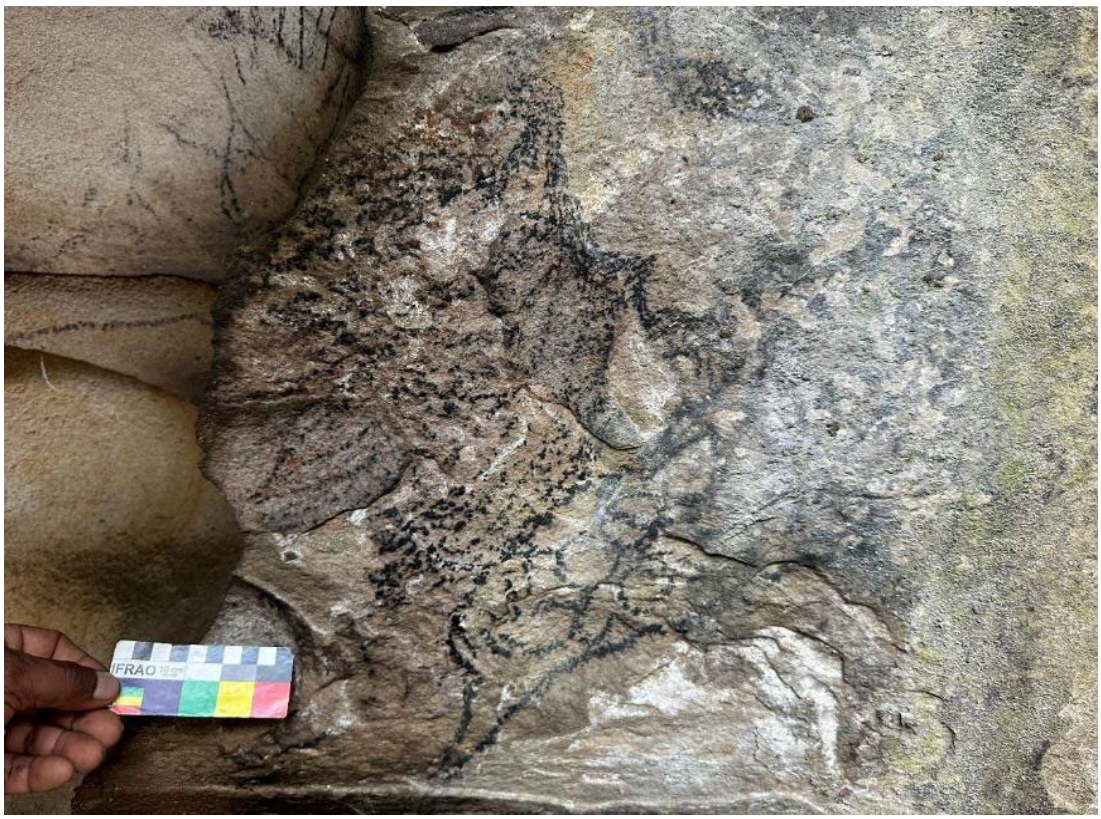


Plate 64: Panel #6, motif #30 – Woronora Reservoir Northern Trail 5.



Plate 65: Panel #6, motif #31 – Woronora Reservoir Northern Trail 5.



Plate 66: Panel #6, motif #32 and #33 – Woronora Reservoir Northern Trail 5.



Plate 67: Panel #6, motif #34 (macropod) – Woronora Reservoir Northern Trail 5.



Plate 68: Panel #6, motif #35 – Woronora Reservoir Northern Trail 5.



Plate 69: Panel #6, motif #36 – Woronora Reservoir Northern Trail 5.



Plate 70: Panel #6, motif #37 – Woronora Reservoir Northern Trail 5.



Plate 71: Panel #6, motif #38 – Woronora Reservoir Northern Trail 5



Plate 72: Panel #6, motif #38 – Woronora Reservoir Northern Trail 5.



Plate 73: Panel #6, motif #39 (dancing woman) – Woronora Reservoir Northern Trail 5



Plate 74: Panel #6, motif #40 – Woronora Reservoir Northern Trail 5.



Plate 75: Panel #6, motif #41 – Woronora Reservoir Northern Trail 5.

2.4 Woronora Reservoir Northern Trail 6 (NT 6 AHIMS # 52-2-0621)

This shelter has been formed by cavernous weathering and rockfall, located within an upper valley slope at 260 m elevation and 230 m south-east of fire trail 9D. There is evidence of water wash, with waterlines and salt build-up on the lower wall. Five previously recorded artefacts were located during the survey at the front of the shelter under the dripline. The art re-located at this shelter has become more faded since the last recording (especially along the bottom wall) and is poor condition from salt build up. Additional indeterminate charcoal art was recorded on the shelter roof.

2.4.1 Woronora Reservoir Northern Trail 6 baseline recording data

Table 13: Baseline recording data for Woronora Reservoir Northern Trail 6

Overview					
Site type	Shelter with Art and Artefacts	Corrected MGAE	310588	Corrected MGAN	6218070
Previous Recording	Illawarra Prehistory Group: Caryll Sefton	Date	1981; 2007		
Site Details					
Width	30 m	Depth	2.8 m	Height	2 m
Orientation	East	Floor area	3 m²	Floor condition	Poor
Location in Landscape	Upper valley slope, 260 m altitude, under small cliff line 230 m south-east of firetrail 9D.				
Shelter exterior/formation	Shelter formed by cavernous weathering, rockfall present on shelter floor. Low shelter with extensive weathering from water/spalling.				
Shelter interior	Shelter wall and roof natural erosion, evidence of water wash/spalling. Waterlines and salt build-up on lower wall. Little floor deposit <10 cm, extensive vegetation within/under dripline.				
Distance to water	150 m Side Creek	Landform	Upper valley slope.		
Setting	Continuous overhang.				
Archaeological Deposit					
Deposit	Yes	Describe	Cream sand, vegetation, roots and charcoal present.		
Visible artefacts?	Yes – x5 artefacts previously recorded. None identified during this recording.	Where?	Under dripline, front of shelter.	How many?	5
Art					
Art surfaces	Previously recorded x 10 indeterminate charcoal drawings on shelter wall and roof at the south end of the shelter (see previous recording on site card). Art has become more faded (especially along bottom wall) due to art within water line and salt built-up.				
Art Condition	Faded, poor from salt build up over art.				
Art Overview	See previous recording.				
Damage/threats					

Water wash	Yes – over art	Graffiti	No	Macro vegetals	Yes – lower shelter wall/floor
Animals	No	Salt/granular loss	Yes	Fissuring	No
Insects	No	Spalling/exfoliation	Yes	Other	N/A
Fire	Yes – smoke on walls	Block fall	Yes		

Table 14: Baseline recording data for art surfaces present within Woronora Reservoir Northern Trail 6.

Motif No.	Type	Form	Colour	Notes
Panel 1				
1	Indeterminate	Faded charcoal	Black, dark grey, medium grey and light grey.	Poor condition
2	Indeterminate	Faded charcoal	Black, dark grey, medium grey and light grey.	Poor condition
3	Indeterminate	Faded charcoal	Black, dark grey, medium grey and light grey.	Poor condition
4	Indeterminate	Faded charcoal	Black, dark grey, medium grey and light grey.	Poor condition
5	Indeterminate	Faded charcoal	Black and light grey.	Poor condition
6	Indeterminate	Faded charcoal	Black and light grey.	Poor condition
7	Indeterminate	Faded charcoal	Black and light grey.	Poor condition
8	Indeterminate	Faded charcoal	Black and light grey.	Poor condition
9	Indeterminate	Faded charcoal	Black and light grey.	Poor condition
10	Indeterminate	Faded charcoal	Black and light grey.	Poor condition

Table 15: Baseline recording data for monitoring points present within Woronora Reservoir Northern Trail 6.

Monitoring Points		
Number	**Location in shelter**	**Notes**
1	Back wall and ceiling	Water stains
2	Back wall and ceiling	Cracks
3	Back wall	Water leakage
4	1.4 m above floor and ~4 m on baseline.	Potentially un-noted art above other lines.

2.4.2 Baseline recording images – site overview



Plate 76: External context image of Woronora Reservoir Northern Trail 6, facing north.



Plate 77: Internal context image of Woronora Reservoir Northern Trail 6, facing south.

2.4.3 Baseline recording plans – site overview

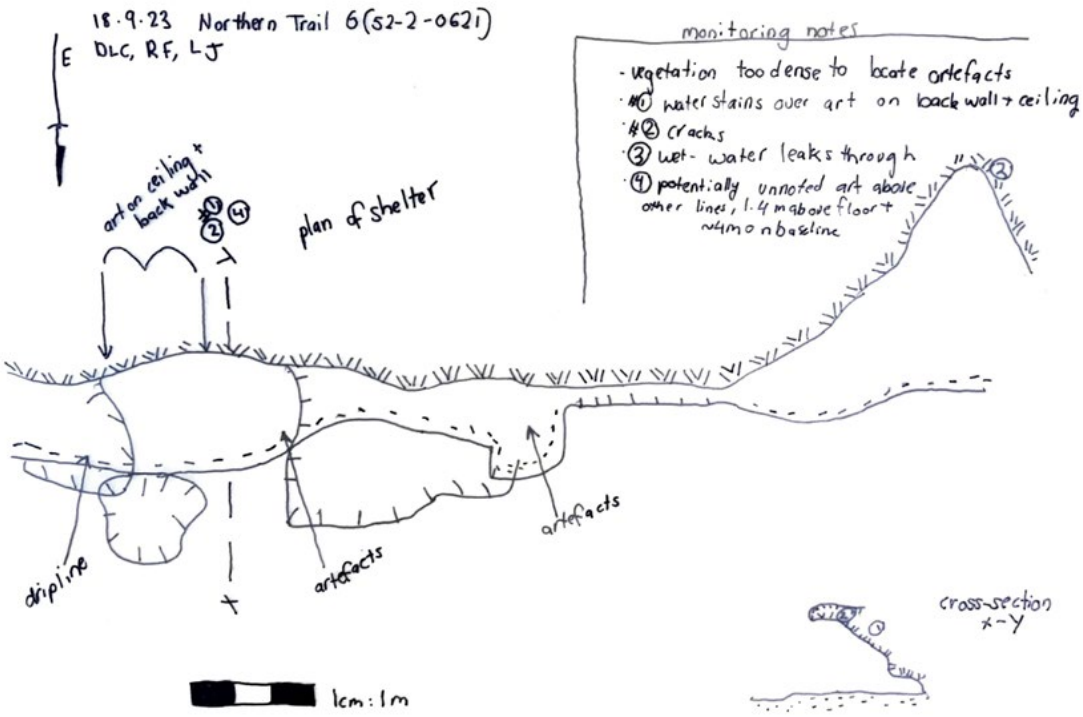


Figure 9: Plan and section of Woronora Reservoir Northern Trail 6.



Figure 10: Art panel of Woronora Reservoir Northern Trail 6. From AHIMS site card, drawn by C. Sefton.

2.4.4 Baseline recording images – detailed panel recording

Panel 1



Plate 78: Art Panel #1 overview - Woronora Reservoir Northern Trail 6.

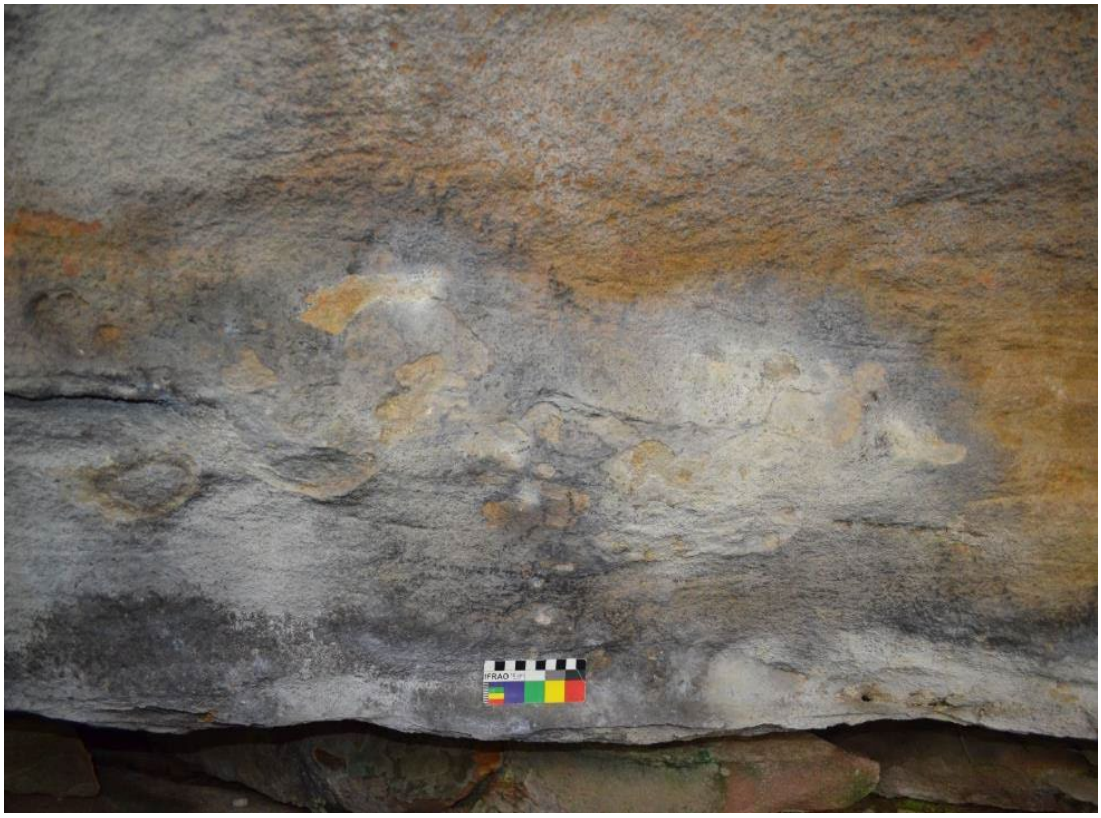


Plate 79: Overview of Panel #1, motif #1 – 4 – Woronora Reservoir Northern Trail 6.

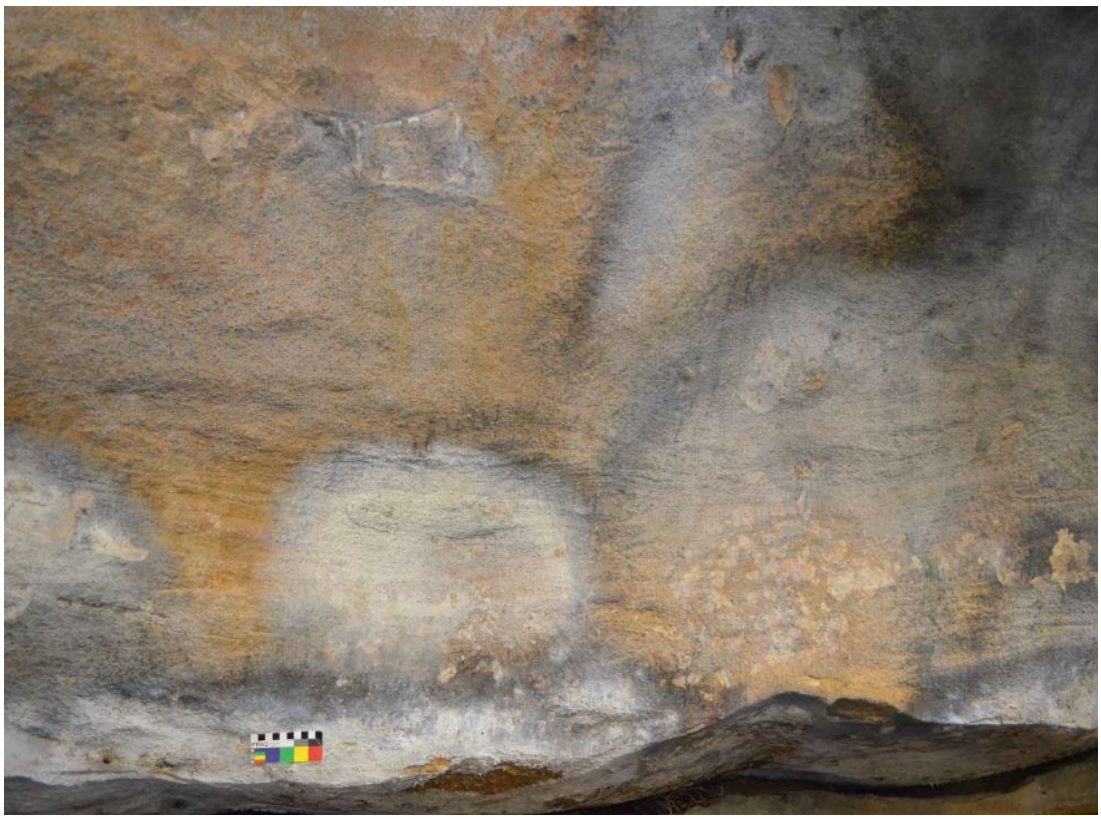


Plate 80: Overview of Panel #1, motif #5 – 10 – Woronora Reservoir Northern Trail 6.

2.5 Woronora Reservoir Northern Trail 7 (NT 7 AHIMS # 52-2-0622)

This site is situated on a creek line on a rock platform. It has been subjected to organic erosion and includes some unusual crossover grooves, possibly part of a petroglyph.

2.5.1 Woronora Reservoir Northern Trail 7 baseline recording data

Table 16: Baseline recording data for Woronora Reservoir Northern Trail 7

Overview					
Site type	Open site with Grinding Groove	Corrected MGAE	310582	Corrected MGAN	6217864
Previous Recording	Illawarra Prehistory Group: C. Sefton	Date	1981; 2007		
Location description					
Landform	Creek line / swamp.		Slope (deg)	Gentle	
Vegetation	Hakea/Bottlebrush.		Land use	Conservation / mining	
Disturbance	Organic erosion.		Aggrading/Stable/ Eroding	Eroding.	
Impacts	Organic erosion.		Proximity to water	On creek line.	
Visibility %	-		Exposure %	-	
Site Context					
Site Dimensions	See site plan.				
Context	Open				
Site Condition	Organic erosion present.				
Site Description					
Number of groups grooves	-				
Total number of grooves	33				
Type, Profile	Long oval symmetrical shaped grooves. Some grooves cross over.				
Function	Axe grinding grooves				
Condition	Visible.				
Orientation	See dimensions below.				

Table 17: Grinding groove recording data for Woronora Reservoir Northern Trail 7.

Number	Length (mm)	Width (mm)	Depth (mm)	Direction	Notes
Grinding Grooves					
Groove 1	200	40	2	S - N	
Groove 2	390	70	20	S - N	
Groove 3	340	50	5	S - N	
Groove 4	190	70	5	SW - NE	
Groove 5	240	60	5	SW - NE	

Number	Length (mm)	Width (mm)	Depth (mm)	Direction	Notes
Groove 6	320	50	3	SW - NE	
Groove 7	290	30	5	SE - NW	
Groove 8	170	40	10	SW - NE	
Groove 9	240	70	20	W - E	
Groove 10	180	10-60	30	E - W	Series of sharpening grooves in an area of 1000 mm x 500 mm on NE edge of rock platform.
Groove 11	250	34	20	S - N	Series of sharpening grooves in an area of 1000 mm x 500 mm on NE edge of rock platform.
Groove 12	70	15	5	S - N	Series of sharpening grooves in an area of 1000 mm x 500 mm on NE edge of rock platform.
Groove 13	70	17	5	S N	Series of sharpening grooves in an area of 1000 mm x 500 mm on NE edge of rock platform.
Groove 14	110	10	3	SE - NW	Series of sharpening grooves in an area of 1000 mm x 500 mm on NE edge of rock platform.
Groove 15	300	10	1-10	S - N	Series of sharpening grooves in an area of 1000 mm x 500 mm on NE edge of rock platform.
Groove 16	35	5	2	S - N	
Groove 17	35	5	2	S - N	
Groove 18	35	5	2	S - N	
Groove 19	35	5	2	S - N	
Groove 20	35	5	2	S - N	
Groove 21	210	50	10	S - N	
Groove 22	300	20	15	S - N	
Groove 23	100	10	5	S - N	
Groove 24	50	15	10	S- N	
Groove 25	50	25	10	S - N	
Groove 26a	90	10	3	S - N	
Groove 26b	60	15	4	S - N	
Groove 27	130	20	7	S - N	Three grooves crossing over.

Number	Length (mm)	Width (mm)	Depth (mm)	Direction	Notes
Groove 28	100	15	5	S - N	
Groove 29	80	10	5	S - N	
Groove 30	70	10	3	S - N	
Groove 31	50	20	10	SE - NW	Two grooves crossing over.
Groove 32	290	55	10	W - E	
Groove 33	280	170	18	W - E	Unusual cross over grooves, possibly part of petroglyphs in SE corner of site plan.

* Grooves and etchings from #10-33 are likely covered I organic matter.

Table 18: Baseline recording data for monitoring points present within Woronora Reservoir Northern Trail 7.

Monitoring Points		
Number	**Location**	**Notes**
#1	In rock platform.	Natural break/separation in rock platform.

2.5.2 Baseline recording images – site overview



Plate 81: Site photo, S aspect – Woronora Reservoir Northern Trail 7.

2.5.3 Baseline recording plans – site overview

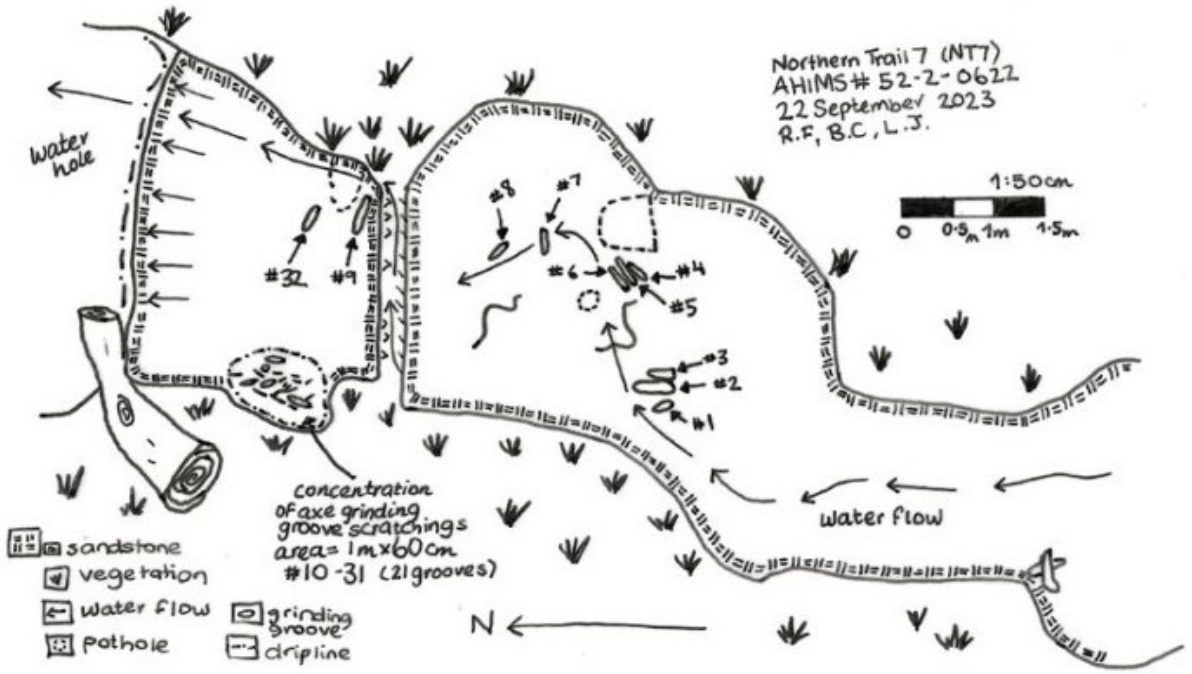


Figure 11: Plan of Woronora Reservoir Northern Trail 7.

2.5.4 Baseline recording images – detailed site recording



Plate 82: Grooves #1-3 – Woronora Reservoir Northern Trail 7



Plate 83: Grooves #4-6 – Woronora Reservoir Northern Trail 7



Plate 84: Grooves #7-8 – Woronora Reservoir Northern Trail 7



Plate 85: Groove #9 – Woronora Reservoir Northern Trail 7



Plate 85: Grooves #10-14 and #31 – Woronora Reservoir Northern Trail 7



Plate 86: Grooves #10-31 – Woronora Reservoir Northern Trail 7



Plate 87: Grooves #10-15 and #21 – Woronora Reservoir Northern Trail 7



Plate 88: Grooves #11, #14-29 - Woronora Reservoir Northern Trail 7



Plate 89: Grooves #27-30 – Woronora Reservoir Northern Trail 7



Plate 90: Grooves #10-14 and #31 – Woronora Reservoir Northern Trail 7



Plate 91: Groove #32 – Woronora Reservoir Northern Trail 7



Plate 92: Monitoring point – natural break/separation in rock platform.

2.6 Woronora Reservoir Northern Trail 8 (NT 8 AHIMS # 52-2-0623)

This site is situated upon a creek line landform, that moves into a stored water area. Features include two platforms with six petroglyphs and 52 grinding grooves. These are in a stable condition; however, some impacts are evident such as organic matter and environmental degradation and erosion.

2.6.1 Woronora Reservoir Northern Trail 8 baseline recording data

Table 19: Baseline recording data for grinding grooves and petroglyphs present at Woronora Reservoir Northern Trail 8

Overview					
Site type	Open site with Grinding Groove and Rock Engraving	Corrected MGAE	310710	Corrected MGAN	6217977
Previous Recording	Illawarra Prehistory Group: C. Sefton	Date	1981; 2006		

Location description			
Landform	Creekline	Slope (deg)	N/A
Vegetation	Hakea / Bottlebrush	Land use	Conservation/mining
Disturbance	-	Aggrading/Stable/ Eroding	Eroding
Impacts	Organic matter, environmental degradation.	Proximity to water	Located in creekline, moving into stored water.
Visibility %	-	Exposure %	-

Site Context	
Site Dimensions	See site plan. Site distinguished as Platforms 1 and 2. Platform 1 (Upper stream): • 3 x Petroglyphs (#1 – 3) • 19 x Grinding Grooves (#1-19) Platform 2 (Downstream): • 3 x Petroglyphs (#4-6) • 33 x grinding grooves (#20-52)
Context	Open
Site Condition	Platforms are stable with no visible cracking or signs of block breaking or eroding. Large build-up of organic matter over grooves and petroglyphs – edges.

Site Description	
Total number of rock engravings	6 petroglyphs – extremely degraded with parts not visible since last recording. (Previously recorded 6 engravings)
Total number of grooves	52 grinding grooves (Previously recorded 41 grinding grooves)
Type, Groove Profile	Long oval symmetrical shaped grooves.
Function	Axe grinding grooves
Condition	Visible
Orientation	North - south

Table 20: Grinding groove and rock engraving measurements at Woronora Reservoir Northern Trail 8

Number	Length (mm)	Width (mm)	Depth (mm)	Direction	Notes
Rock engravings					
1	2250	1080	1		Petro Platform 1
2	1400	940	1-2		Petro Platform 1
3	1960	1300	2-4		Petro Platform 1
4	1050	730	1		Petro Platform 2
5	1100	850	3		Petro Platform 2
6	300	240	3-5		Petro Platform 2
Grinding Grooves					
1	330	60	10	SE - NW	Platform 1
2	360	75	15	E - W	Platform 1
3	260	65	15	E – W	Platform 1
4	310	75	20	E - W	Platform 1
5	310	68	15	E - W	Platform 1
6	210	60	15	E - W	Platform 1
7	360	80	25	SE - NW	Platform 1
8	190	55	5	SE - NW	Platform 1
9	430	70	15	SE - NW	Platform 1
10	320	65	20	SE - NW	Platform 1
11	360	80	25	SE - NW	Platform 1
12	310	70	10	SE - NW	Platform 1
13	270	40	5	SE - NW	Platform 1
14	270	60	5	SE - NW	Platform 1
15	350	50	5	NW - SE	Platform 1
16	310	50	10	NW - SE	Platform 1
17	170	40	3	N -S	Platform 1. South end eroded in creek line.
18	190	40	3	N -S	Platform 1
19	140	25	3	N -S	Platform 1
20	260	30	3	N -S	Platform 2
21	410	35	2	N -S	Platform 2
22	370	45	3	N -S	Platform 2
23	280	45	2	N -S	Platform 2

Number	Length (mm)	Width (mm)	Depth (mm)	Direction	Notes
24	240	30	2	N -S	Platform 2
25	280	60	10	N -S	Platform 2
26	310	60	10	N -S	Platform 2
27	400	50	7	N -S	Platform 2
28	370	80	15	N -S	Platform 2
29	320	40	8	N -S	Platform 2
30	280	22	15	NE - SW	Platform 2
31	190	30	2	NE - SW	Platform 2
32	290	45	10	NE - SW	Platform 2
33	210	70	80	NE - SW	Platform 2
34	410	60	10	N - S	Platform 2
35	180	35	1	NE - SW	Platform 2. Very eroded.
36	180	35	1	NE - SW	Platform 2. Very eroded.
37	380	60	5	NE - SW	Platform 2
38	380	55	20	NE - SW	Platform 2
39	220	35	1	NE - SW	Platform 2. Very eroded.
40	360	60	15	NE - SW	Platform 2
41	350	60	15	NE - SW	Platform 2
42	350	70	20	NE - SW	Platform 2
43	260	55	5	NE - SW	Platform 2. Very eroded.
44	280	30	1	NE - SW	Platform 2. Very eroded.
45	276	50	5	NE - SW	Platform 2
46	240	45	2	NE - SW	Platform 2. Very eroded.
47	120	40	1-3	NE - SW	Platform 2. Very eroded.
48	120	40	1-3	NE - SW	Platform 2. Very eroded.
49	120	25	1	N - S	Platform 2. Very eroded.
50	360	30	2	N - S	Platform 2. Very eroded.
51	240	40	2	N - S	Platform 2. Very eroded.
52	330	60	20	E - W	Platform 2

Table 21: Baseline recording data for monitoring points present within Woronora Reservoir Northern Trail 8

Monitoring Points		
Number	**Location**	**Notes**
Nil	-	-

2.6.2 Baseline recording images – site overview



Plate 93: Site overview – Woronora Reservoir Northern Trail 8



Plate 94: Overview of grinding grooves (Platform 1) – Woronora Reservoir Northern Trail 8



Plate 95: Platform 2 overview, facing south – Woronora Reservoir Northern Trail 8



Plate 96: Overview of grinding grooves #1-14 – Woronora Reservoir Northern Trail 8.



Plate 97: Example overview of grinding grooves – Woronora Reservoir Northern Trail 8

2.6.3 Baseline recording plans – site overview

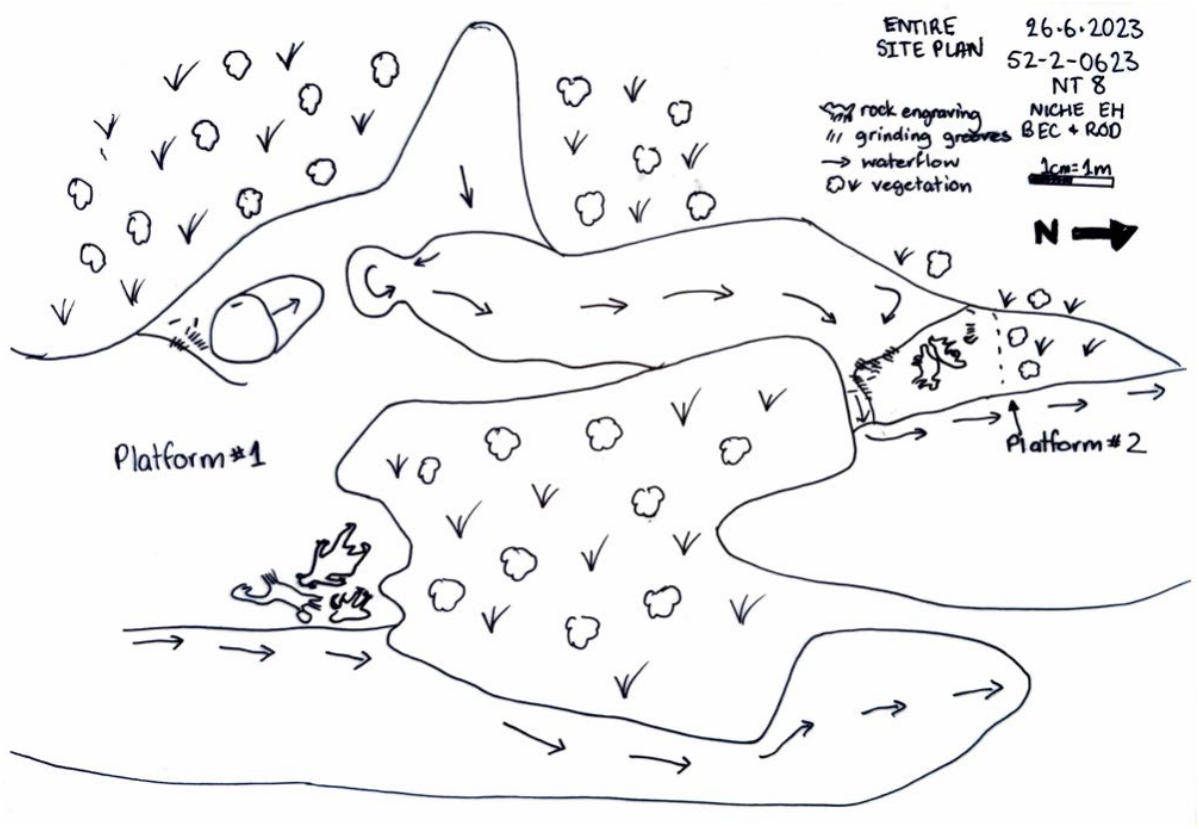


Figure 12: Plan of Woronora Reservoir Northern Trail 8 entire site plan.

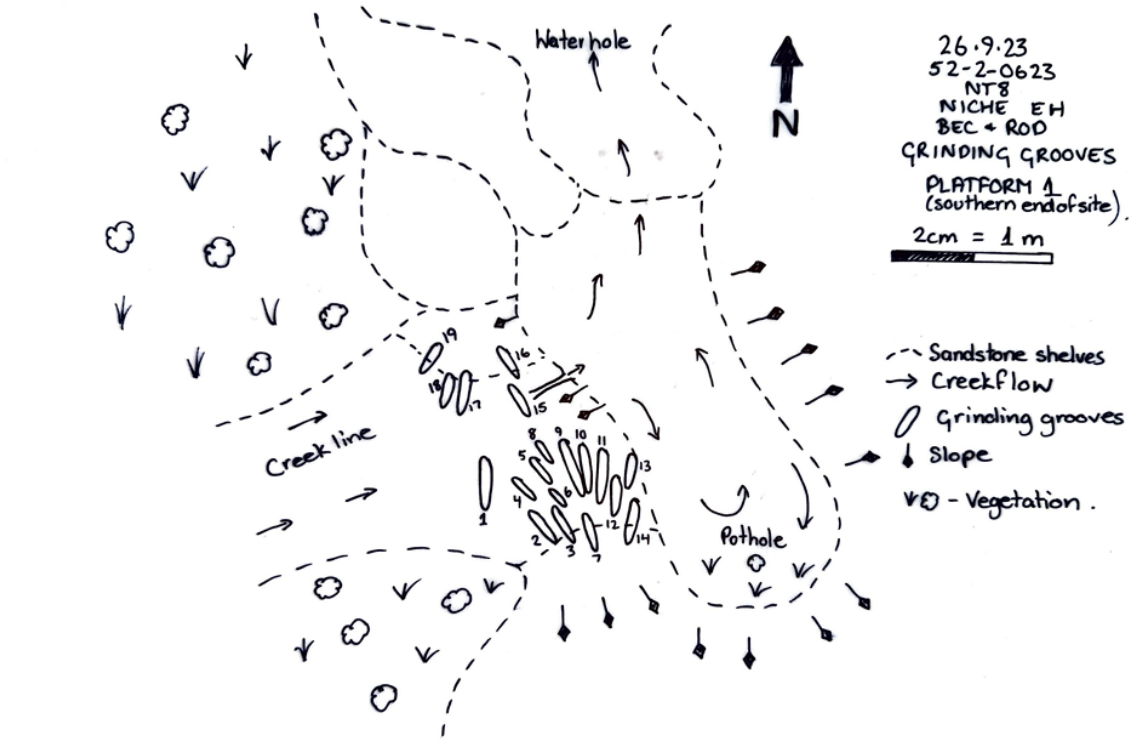


Figure 13: Plan of Platform 1 (southern end of site) at Woronora Reservoir Northern Trail 8.

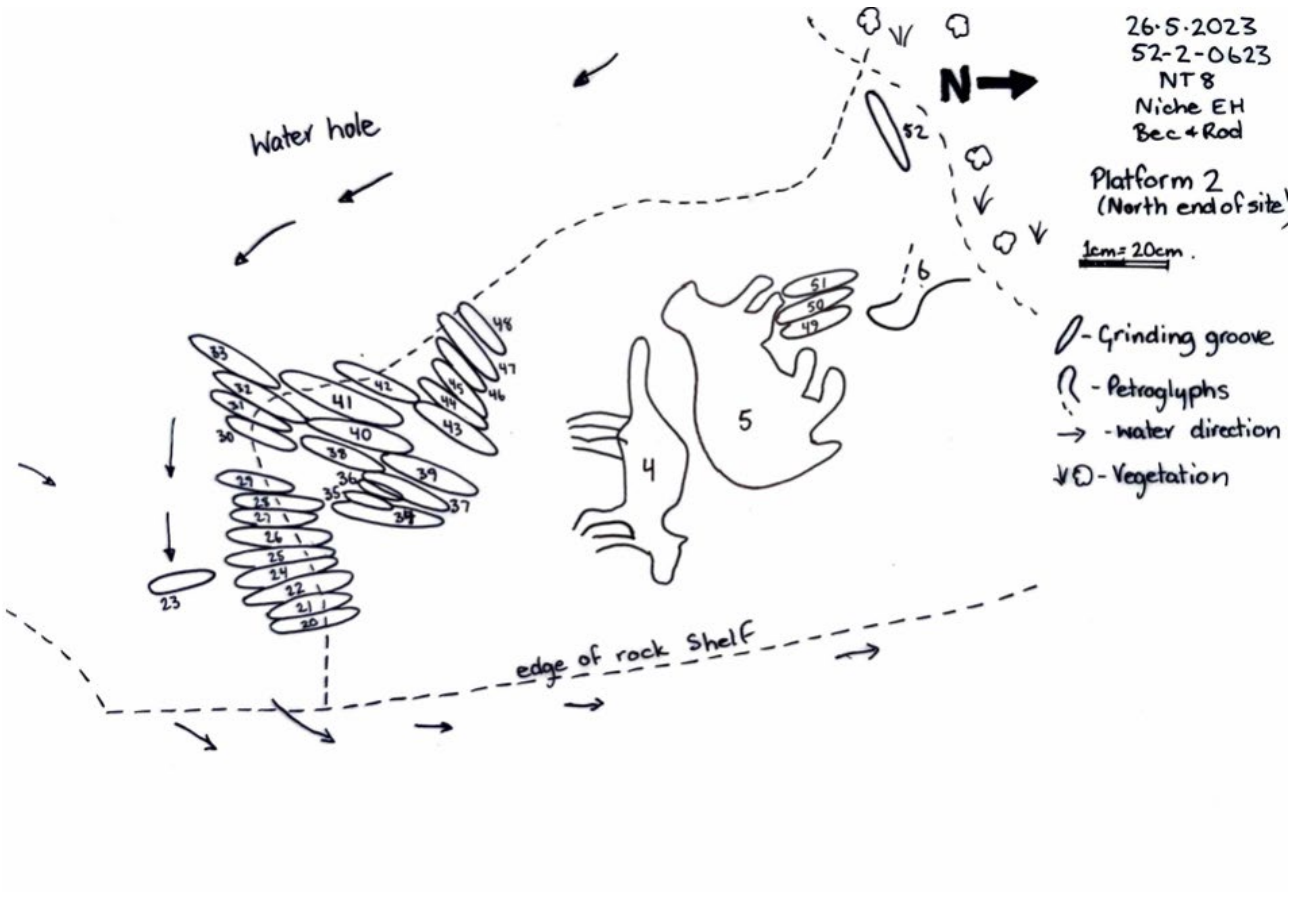


Figure 14: Plan of Platform 2 (northern end of site) at Woronora Reservoir Northern Trail 8

2.6.4 Baseline recording images – detailed site recording

Petroglyphs



Plate 98: Petroglyphs #1, #2 and #3, facing N – Woronora Reservoir Northern Trail 8



Plate 99: Petroglyphs #4, #5 and #6, facing N – Woronora Reservoir Northern Trail 8

Grinding Grooves



Plate 100: Grinding grooves #1-14 – Woronora Reservoir Northern Trail 8



Plate 101: Grinding grooves #15-19 – Woronora Reservoir Northern Trail 8



Plate 102: Grinding grooves #20-33 – Woronora Reservoir Northern Trail 8

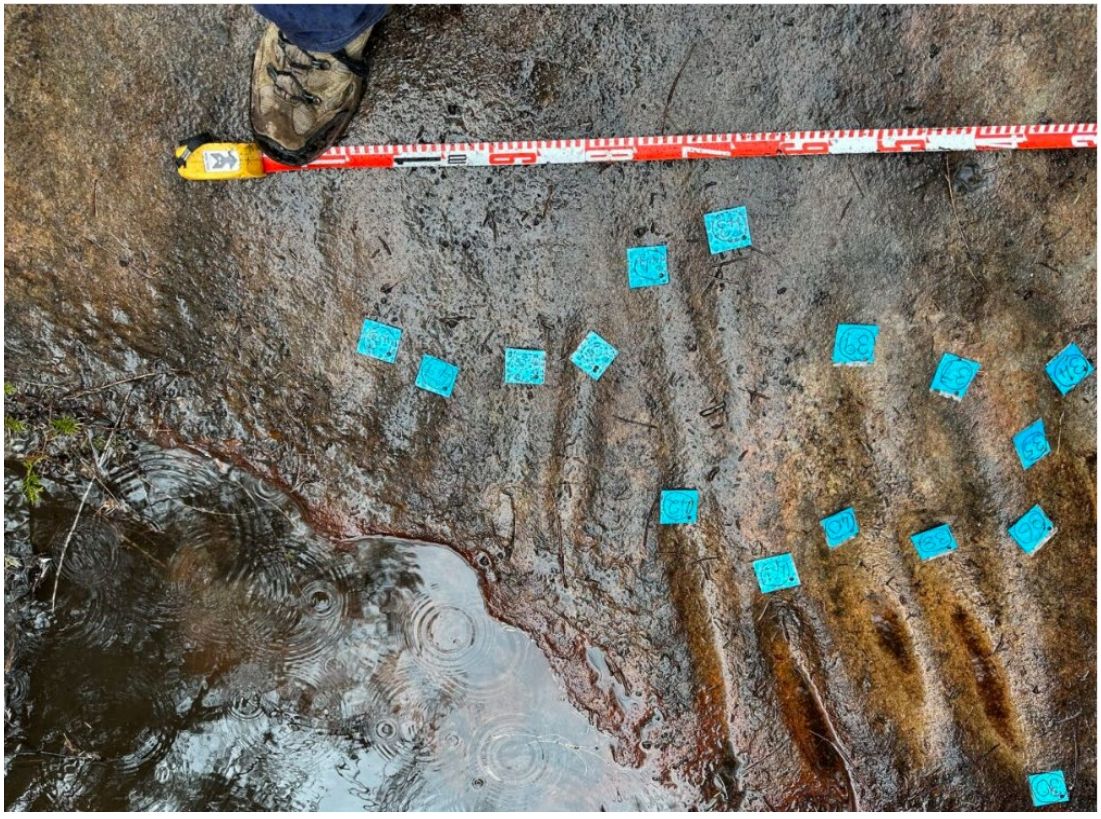


Plate 103: Grinding grooves #34-48 – Woronora Reservoir Northern Trail 8



Plate 104: Grinding grooves #49-52 – Woronora Reservoir Northern Trail 8

2.7 Woronora Reservoir Northern Trail 9 (NT 9 AHIMS # 52-2-0624)

This shelter is a continuous sandstone ridgeline that has been subject to active, chemical weathering and block fall. The shelter is located under a waterfall at 239 m elevation and measures 60 m x 6 m x 4.2 m. One weathered, partial charcoal macropod was recorded. No artefacts were relocated.

2.7.1 Woronora Reservoir Northern Trail 9 baseline recording data

Table 22: Baseline recording data for Woronora Reservoir Northern Trail 9

Overview					
Site type	Shelter with Art and Artefacts	Corrected MGAE	310764	Corrected MGAN	6218034
Previous Recording	Illawarra Prehistory Group: C. Sefton	Date	1981; 2007		
Site Details					
Width	60 m	Depth	6 m	Height	4.2 m
Orientation	North	Floor area	10m2	Floor condition	eroding
Location in Landscape	Under waterfall – Upper mid slope – 239 m elevation. There are shelters on top of each other and appear to be at the same location.				
Shelter exterior/formation	Continuous sandstone ridgeline.				
Shelter interior	Block fall – chemical weathering – active weathering.				
Distance to water	On Creek	Landform	Ridgeline below waterfall.		
Setting	Continuous				
Archaeological Deposit					
Deposit	Sandy	Describe	Original recording consisted of 4x flaked artefacts. No artefacts relocated.		
Visible artefacts?	No	Where?	N/A	How many?	N/A
Art					
Art surfaces	1 panel = 1 motif				
Art Condition	Weathered				
Art Overview	1 charcoal macropod – partial				
Damage/threats					
Water wash	Yes.	Graffiti	No.	Macro vegetals	Yes.
Animals	Yes.	Salt/granular loss	Yes.	Fissuring	No.
Insects	Yes.	Spalling/exfoliation	Yes.	Other	N/A
Fire	-	Block fall	Yes.		

Table 23: Baseline recording data for art surfaces present within Woronora Reservoir Northern Trail 9

Motif No.	Type	Form	Media	Colour	Measurement
Panel 1					
1	Wallaby	Partial	Charcoal outline and infill	Black	6m on baseline, 2.2 m high on wall. 40 cm x 50 cm

Table 24: Baseline recording data for monitoring points present within Woronora Reservoir Northern Trail 9

Monitoring Points		
Number	**Location in shelter**	**Notes**
#1	Backwall at 5.5m – 9 m on baseline	Active seepage
#2	Backwall at 10 m – 13 m on baseline	Active seepage
#3	Backwall at 13.5 m – 14.5 m on baseline	Active seepage
#4	Backwall at 15 m – 16 m on baseline	Active seepage and cracking
#5	Backwall to dripline on roof. Starts at 16.5 m (backwall) – 13 m (dripline) on baseline.	Roof crack

2.7.2 Baseline recording images – site overview



Plate 105: Overview of eastern end of shelter, from centre – Woronora Reservoir Northern Trail 9



Plate 106: Overview of the western end of shelter, from centre – Woronora Reservoir Northern Trail 9



Plate 107: Overview facing E from western end – Woronora Reservoir Northern Trail 9



Plate 108: Back wall / western end overview – Woronora Reservoir Northern Trail 9



Plate 109: Facing W from eastern end of shelter – Woronora Reservoir Northern Trail 9

2.7.3 Baseline recording plans – site overview

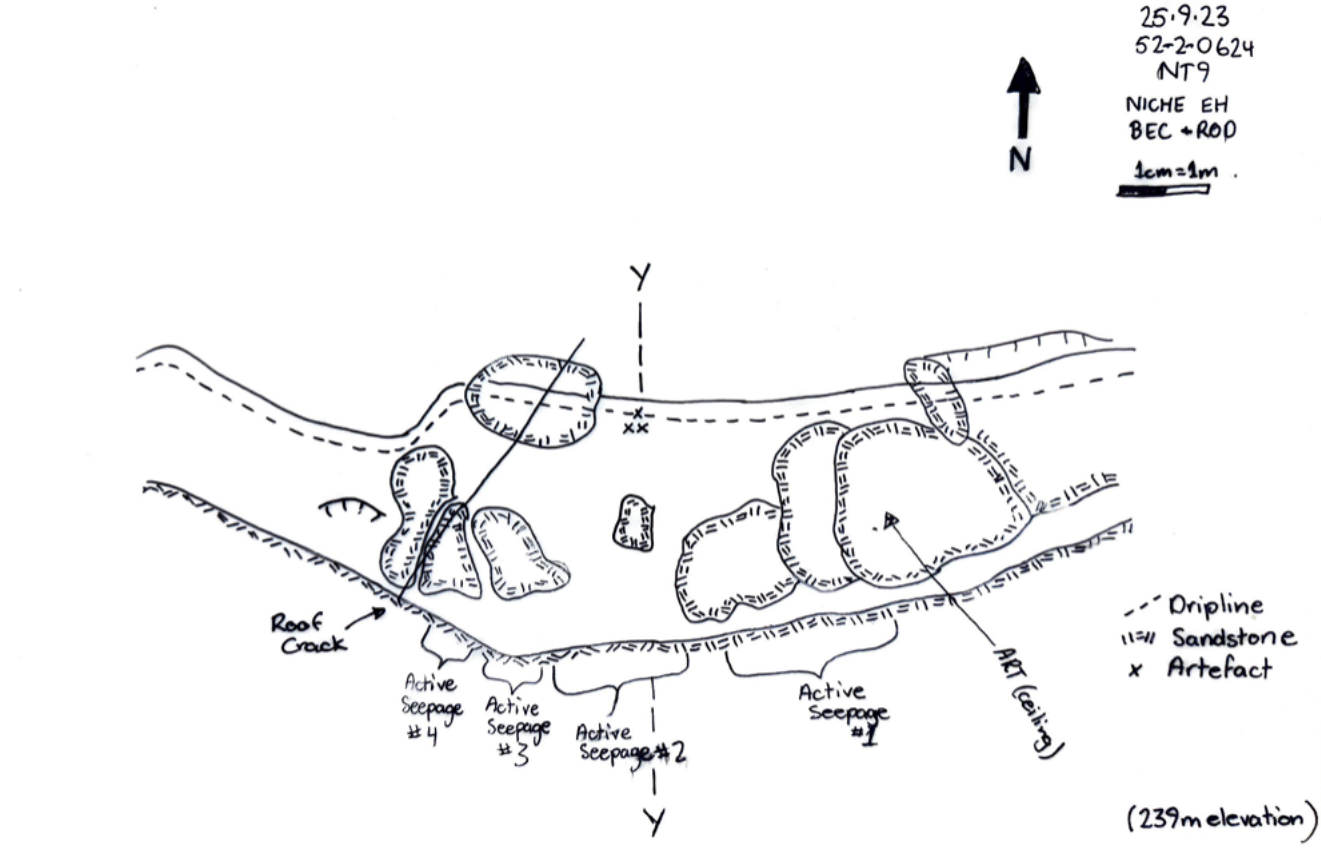


Figure 15: Plan of Woronora Reservoir Northern Trail 9

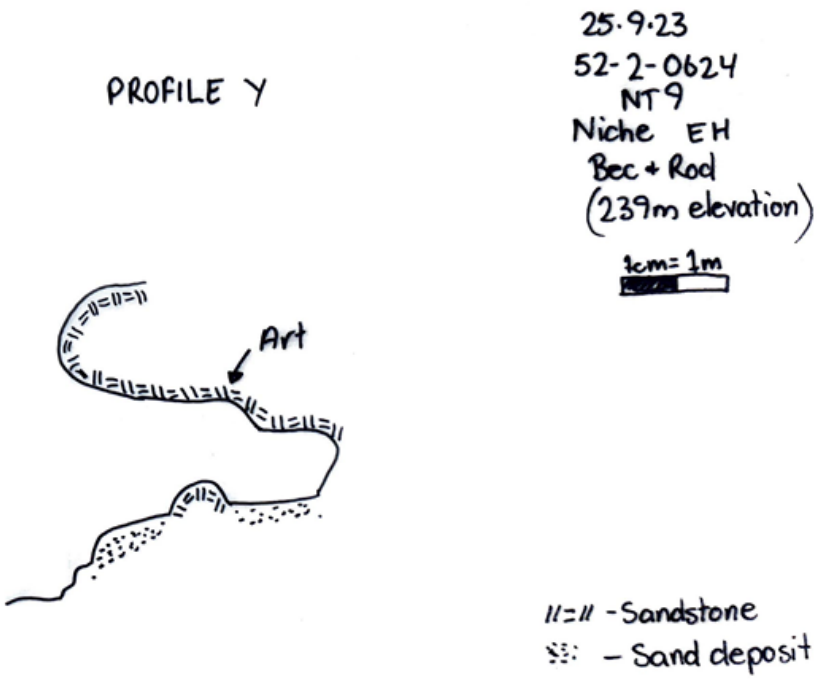


Figure 16: Y Section of Woronora Reservoir Northern Trail 9

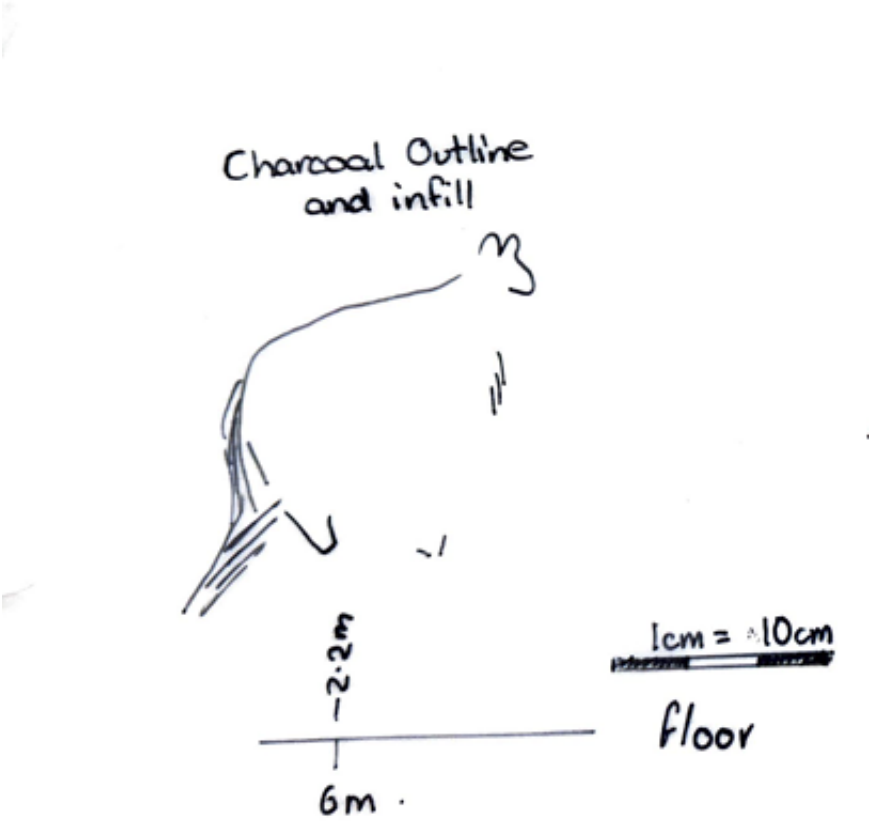


Figure 17: Art panel of Woronora Reservoir Northern Trail 9

2.7.4 Baseline recording images – detailed panel and site recording

Panel 1



Plate 110: Motif #1 – charcoal kangaroo (partial – roof – Woronora Reservoir Northern Trail 9



Plate 111: Active seepage (#1), back wall at 5.5 m – 9 m – Woronora Reservoir Northern Trail 9



Plate 112: Seepage (#2) at 10 m – 13 m – Woronora Reservoir Northern Trail 9



Plate 113: Seepage (#3) at 13.5 m and 14.5 m – Woronora Reservoir Northern Trail 9



Plate 114: Seepage (#4) and back wall crack at 15 m – 16 m – Woronora Reservoir Northern Trail 9



Plate 115: Roof crack (monitoring point #5) – Woronora Reservoir Northern Trail 9



Plate 116: Roof crack (monitoring point #5) – Woronora Reservoir Northern Trail 9



Plate 117: Roof crack (monitoring point #5) – Woronora Reservoir Northern Trail 9



Plate 118: Roof crack (monitoring point #5) – Woronora Reservoir Northern Trail 9



Plate 119: Roof crack (monitoring point #5) – Woronora Reservoir Northern Trail 9



Plate 120: Roof crack (monitoring point #5) – Woronora Reservoir Northern Trail 9

2.8 Northern Trail 10 (NT 10 AHIMS # 52-2-0625)

This shelter is formed from weathering and block fall. It is located on a hillside landform on a gentle slope at 270 m elevation, 150 m west of Honeysuckle Creek. Findings include a charcoal indeterminate partial drawing in weathered condition. Some artefacts were also located.

2.8.1 Northern Trail 10 baseline recording data

Table 25: Baseline recording data for Northern Trail 10

Overview					
Site type	Shelter with Art and Artefacts	Corrected MGAE	309747	Corrected MGAN	6217725
Previous Recording	Illawarra Prehistory Group: C. Sefton	Date	1981		
Site Details					
Width	21.5 m	Depth	3 m	Height	2.4 m
Orientation	West 251°	Floor area	40 m²	Floor condition	Stable
Location in Landscape	Elevation at 270 m AHD. Located on mid-hillside on gentle slope.				
Shelter exterior/formation	Block fall / weathering.				
Shelter interior	Sandy-loam floor with organics. Block fall and weathering present.				
Distance to water	150 m west to Honeysuckle Creek	Landform	Hillside.		
Setting	Isolated.				
Archaeological Deposit					
Deposit	PAD	Describe	-		
Visible artefacts?	Yes	Where?	-	How many?	-
Art					
Art surfaces	1 panel = 1 motif Charcoal indeterminate partial drawing at 18.6 m on baseline.				
Art Condition	Weathered				
Art Overview	1 motif present.				
Damage/threats					
Water wash	No.	Graffiti	No.	Macro vegetals	-
Animals	Small.	Salt/granular loss	On spalling most recent	Fissuring	None. Active, Yes.
Insects	Yes.	Spalling/exfoliation	Yes – backwall and roof.	Other	N/A
Fire	Yes – roof.	Block fall	Ancient.		

Table 26: Baseline recording data for art surfaces present within Northern Trail 10

Motif No.	Type	Form	Colour	Measurement (mm)	Notes
Panel 1					
1	Indeterminate	Partial - lines with infill	Black	350 mm x 240 mm	510 mm x 420 mm

Table 27: Baseline recording data for monitoring points present within Northern Trail 10

Monitoring Points		
Number	**Location in shelter**	**Notes**
#1	North end of art panel at 17.8 m on baseline.	Vertical crack. No other distinct monitoring points – shelter has usual bedding separation between back wall ledges and roof.

2.8.2 Baseline recording images – site overview



Plate 121: Shelter overview, facing S – Northern Trail 10



Plate 122: Shelter overview, facing N – Northern Trail 10

2.8.3 Baseline recording plans – site overview

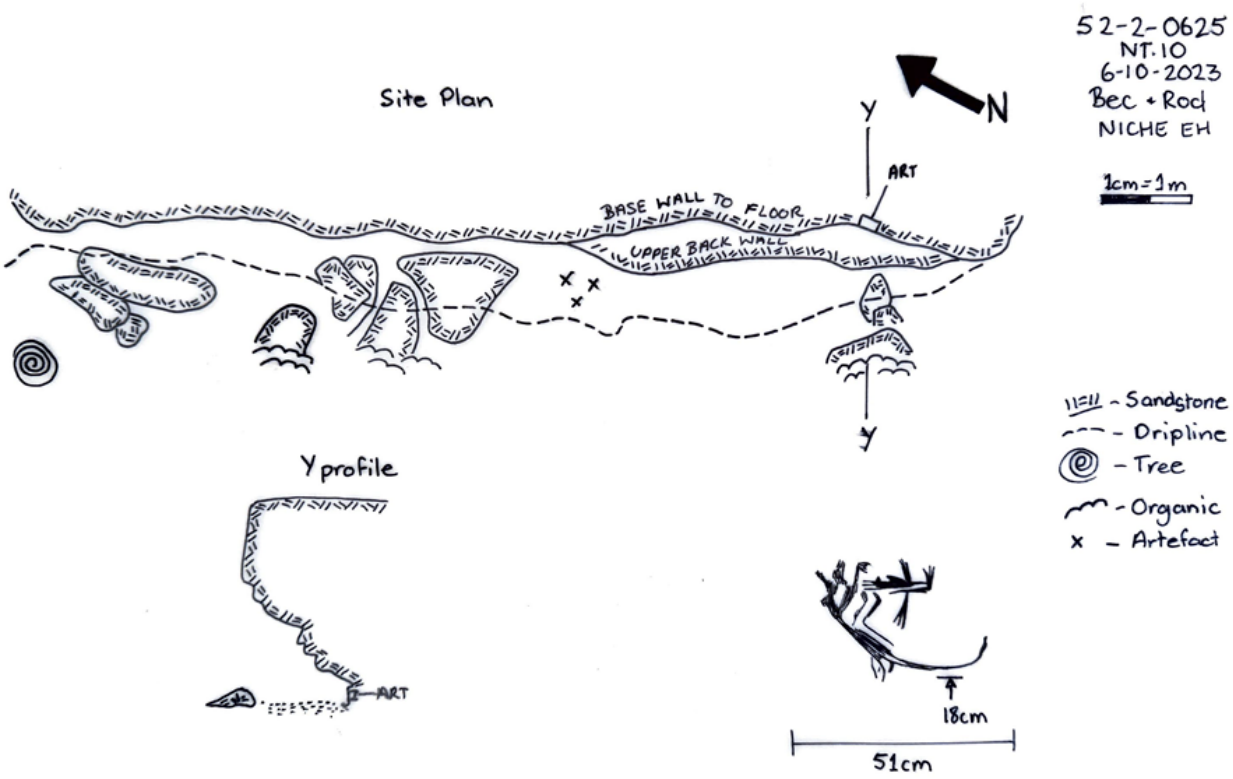


Figure 18: Plan, section and art panel of Northern Trail 10

2.8.4 Baseline recording images – detailed panel and site recording

Panel 1



Plate 123: Panel #1, motif #1 – Northern Trail 10



Plate 124: Back wall, facing E – Northern Trail 10



Plate 125: Back wall, from N to S – Northern Trail 10



Plate 126: Back wall, from N to S – Northern Trail 10



Plate 127: Back wall, from N to S – Northern Trail 10



Plate 128: Back wall, from N to S – Northern Trail 10



Plate 129: Monitoring point #1 on N side of art panel – Northern Trail 10

Artefacts



Plate 130: Artefacts located at Northern Trail 10

2.9 Woronora Reservoir Northern Trail 12 (NT 12 AHIMS # 52-2-0753)

This site is located within a sandstone outcrop landform and exhibits impacts of rock popping and erosion. It is situated 150 m east of Honeysuckle Creek and contains 44 grinding grooves. Some of these grooves appear to form a singular grooved dish, potentially used for water storage. Most of the grooves are in good condition.

2.9.1 Woronora Reservoir Northern Trail 12 baseline recording data

Table 28: Baseline recording data for Woronora Reservoir Northern Trail 12

Overview					
Site type	Open site with Grinding Groove	Corrected MGAE	309730	Corrected MGAN	6217713
Previous Recording	Illawarra Prehistory Group: C. Sefton	Date	1981		
Location description					
Landform	Sandstone outcrop.			Slope (deg)	Slight.
Vegetation	Angophora / Banksia.			Land use	Conservation / mining.
Disturbance	Rock popping / erosion.			Aggrading/Stable/ Eroding	Eroding.
Impacts	Rock popping / erosion.			Proximity to water	150 m east of Honeysuckle Creek.
Visibility %	Organic build up in on edges			Exposure %	N/A
Site Context					
Site Dimensions	See site plan. 44 grinding grooves, including 2 deep-grooved dishes (#37 and #40). Grooves #37 and #40 are possibly a series of grooves deepened over time to become a larger, one-grooved dish to hold water or other resources (water is still present in waterhole and grooves #37 and #40). Groove #32 is boomerang shaped. Grooves vary in length and depth.				
Context	Open				
Site Condition	Grooves #1-4 are impacted by rock-popping – southern ends of grooves are popped off, with groove #4 popped, but rock remaining in place (possible management needed). Other grooves are in good condition.				
Site Description					
Total number of rock engravings	N/A				
Total number of grooves	44 grinding grooves				
Type, Groove Profile	Long, oval and symmetrical, except grooves #7 and #40 (larger, curved shape) and groove #32 (boomerang shape).				
Function	Grinding – possible water reservoir for #37 and #40.				
Condition	Visible				
Orientation	Please see directions specified below.				

Table 29: Grinding groove and rock engraving measurements at Woronora Reservoir Northern Trail 12

Number	Length (mm)	Width (mm)	Depth (mm)	Direction	Notes
Grinding Grooves					
1	290	70	15	S	Southern end broken off.
2	200	30	5	S	Southern end broken off.
3	280	60	15	S	Southern end broken off.
4	290	50	10	S	Popped rock on southern side.
5	240	30	5	N	
6	190	30	3	NW	
7	430	70	20	NW	
8	420	80	25	NW	
9	280	40	5	NW	
10	330	70	10	NW	
11	160	40	8	S	
12	400	60	10	SW	
13	260	30	3	SW	
14	240	40	5	SW	
15	420	60	10	SW	
16	140	30	1	SW	
17	360	50	8	SW	
18	380	50	15	SW	
19	250	60	10	SW	
20	230	40	3	SW	
21	340	50	7	SW	
22	360	70	20	SW	
23	240	60	15	SW	
24	190	60	15	SW	
25	270	60	10	SW	
26	260	70	15	SW	
27	170	30	3	S	
28	140	30	3	SW	
29	240	50	7	SW	
30	340	60	10	SW	
31	310	40	3	S	

Number	Length (mm)	Width (mm)	Depth (mm)	Direction	Notes
32	310	40	3	S	Shaped like a boomerang.
33	260	50	7	S	
34	120	20	2	SW	
35	360	70	12	S	
36	230	50	3	S	
37	740	800	650	S	Grinding groove / waterhole.
38	90	20	1	S	
39	300	70	10	SE	
40	400	70	5	SW	
41	270	30	3	SE	
42	300	40	3	S	
43	270	50	5	SW	
44	240	30	5	N	Beside #5.

Table 30: Baseline recording data for monitoring points present within Woronora Reservoir Northern Trail 12

Monitoring Points		
Number	**Location**	**Notes**
1	Grinding grooves 1-4 and surrounding area.	Erosion and rock popping.

2.9.2 Baseline recording images – site overview



Plate 131: Overview of platform – Woronora Reservoir Northern Trail 12



Plate 132: Overview of grooves #1-10 in drainage line on northern end of platform.

2.9.3 Baseline recording plans – site overview

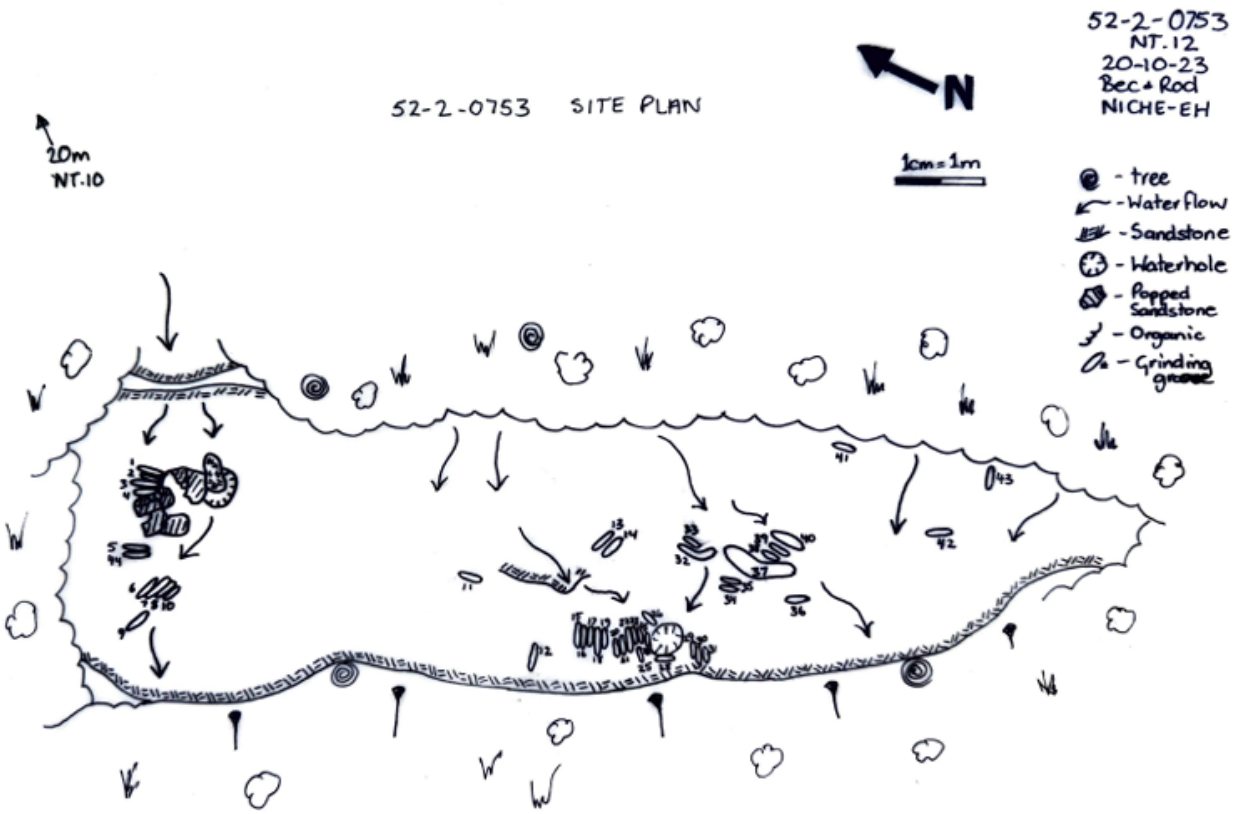


Figure 19: Plan of Woronora Reservoir Northern Trail 12

2.9.4 Baseline recording images – detailed site recording



Plate 133: Grooves #1-4 – Woronora Reservoir Northern Trail 12



Plate 134: Grooves #5-10 and #44 (beside #5) – Woronora Reservoir Northern Trail 12

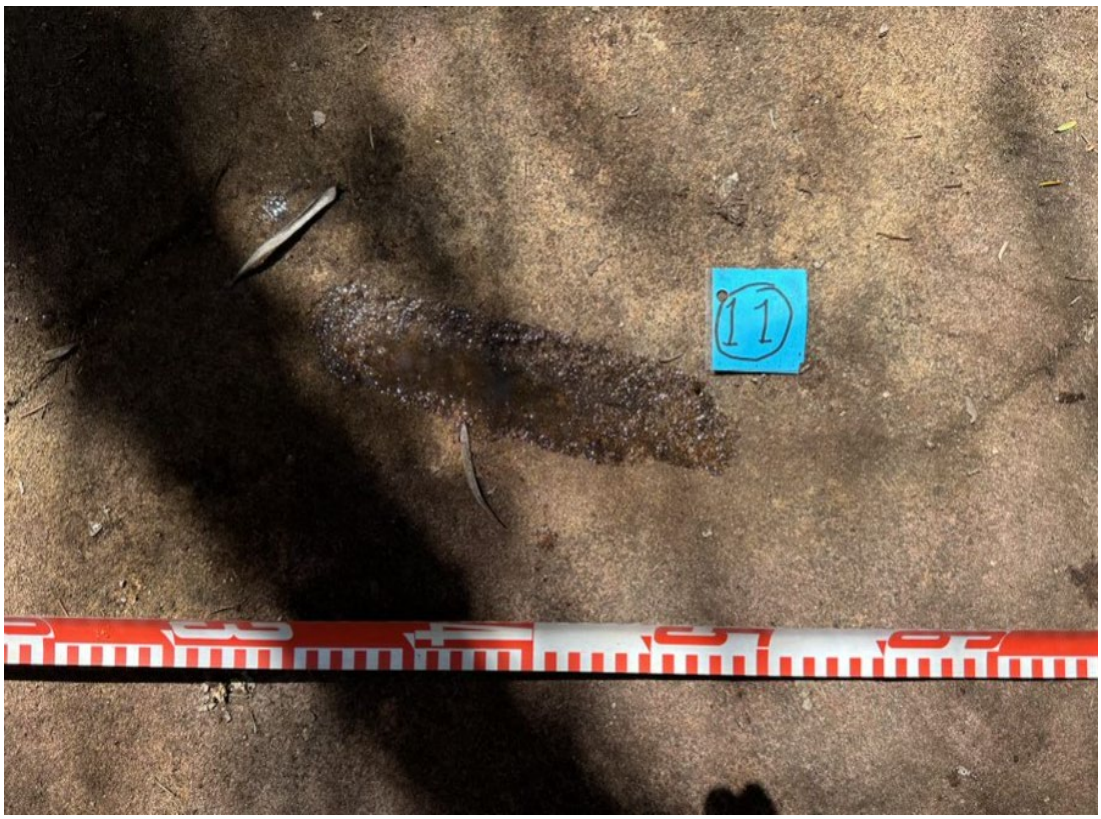


Plate 135: Groove #11 – Woronora Reservoir Northern Trail 12.



Plate 136: Groove #12 – Woronora Reservoir Northern Trail 12



Plate 137: Grooves #13 and #14 – Woronora Reservoir Northern Trail 12



Plate 138: Grooves #15-28 – Woronora Reservoir Northern Trail 12



Plate 139: Grooves #29-31 – Woronora Reservoir Northern Trail 12

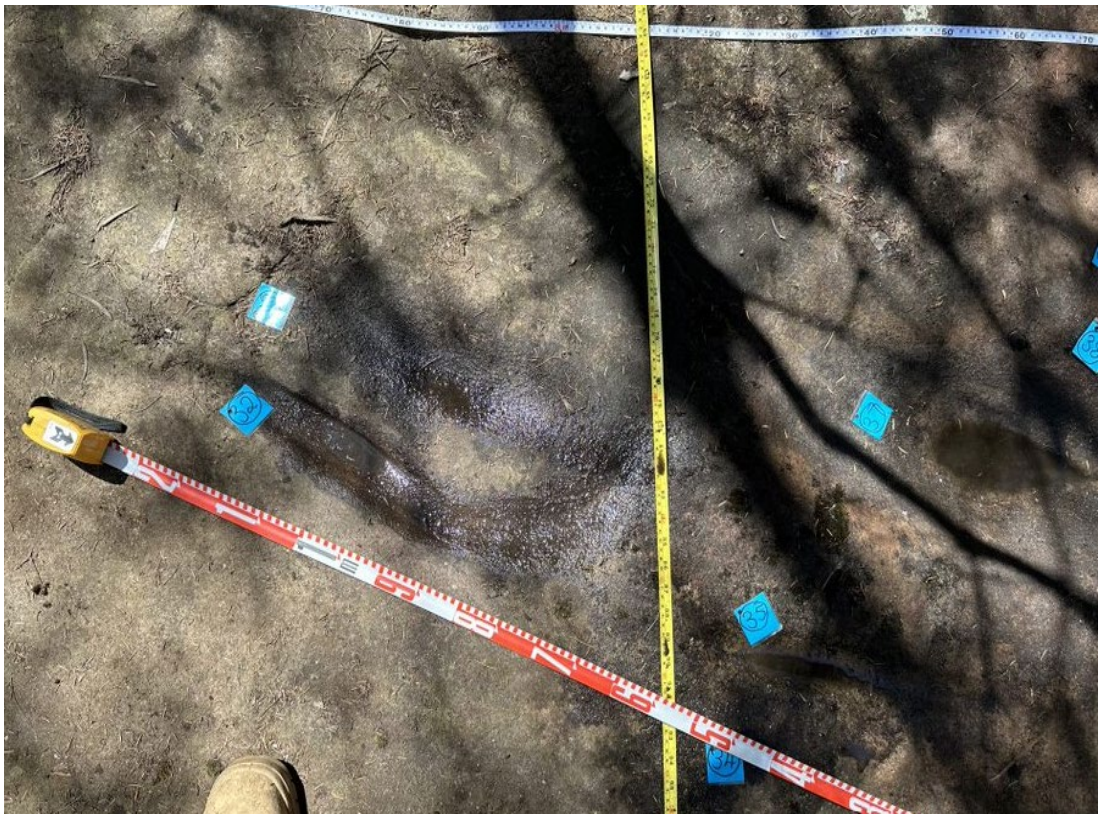


Plate 140: Grooves #32-35 and #37 – Woronora Reservoir Northern Trail 12



Plate 141: Grooves #34-40 – Woronora Reservoir Northern Trail 12



Plate 142: Groove #41 – Woronora Reservoir Northern Trail 12



Plate 143: Groove #42 – Woronora Reservoir Northern Trail 12



Plate 144: Groove #43 – Woronora Reservoir Northern Trail 12



Plate 145: Example evidence of damaged grooves (rock popping).

2.10 Woronora Reservoir Northern Trail 17 (NT 17 AHIMS # 52-2-0629)

This site is located on an upper swamp creek landform on an unnamed creek, at 251 m elevation. It is situated between Honeysuckle Creek and Fire trail 9D. One petroglyph and 53 grinding grooves were located during this survey. Overall, the site's condition is stable. At the time of recording, Aboriginal representation expressed their belief that the axe grinding grooves and rock burning observed were evidence of cultural modification.

2.10.1 Woronora Reservoir Northern Trail 17 baseline recording data

Table 31: Baseline recording data for Woronora Reservoir Northern Trail 17

Overview					
Site type	Grinding Grooves and Rock Engravings	Corrected MGAE	310321	Corrected MGAN	6218544
Previous Recording	Illawarra Prehistory Group: C. Sefton	Date	1981		
Location description					
Landform	Creek upper swamp.		Slop (deg)	Gentle to the north.	
Vegetation	Swamp – Teatree – Hakea - Banks		Land use	Conservation / Mining	
Disturbance	Organic build up erosion		Aggrading/Stable/ Eroding	Stable	
Impacts	Mining – Below – Organic growth.		Proximity to water	On unnamed creek. Parallel between Honeysuckle Creek and Firetrail 9D.	
Visibility %	Organic build up		Exposure %	N/A	
Site Context					
Site Dimensions	See site plan. Elevation 251 m AHD. Site is situated on the upper area of unnamed creek on a sandstone platform in centre of upland swamp area. 250 m west of 9D, entry opposite 120 m from the end of firetrail 9D.				
Context	Open				
Site Condition	Stable				
Site Description					
Total number of rock engravings	1 x Petroglyph				
Total number of grooves	53 x Grinding grooves.				
Type, Groove Profile					
Function	Axe grinding grooves				
Condition					
Orientation					
Notes	Evidence of burning and heat damage. There are no clear indications of natural cracking or bedding plane movement on the platform.				

Table 32: Baseline recording data for monitoring points present within Woronora Reservoir Northern Trail 17

Monitoring Points		
Number	**Location**	**Notes**
Nil	-	-

Table 33: Grinding groove and rock engraving measurements at Woronora Reservoir Northern Trail 17

Number	Length (mm)	Width (mm)	Depth (mm)	Direction	Notes
Grinding Grooves					
1	340	60	10	NW	
2	360	60	10	NW	
3	104	20	5	NW	
4	19	10	5	NW	
5	200	50	10	NW	
6	100	30	5	NW	
7	220	50	10	NW	
8	200	30	5	NW	
9	300	60	15	NW	
10	120	20	5	NW	
11	200	40	5	NW	
12	200	40	5	NW	
13	300	60	10	NW	
14	150	40	10	N	
15	190	70	10	N	
16	200	50	10	NE	
17	280	50	5	NE	
18	260	70	15	NE	
19	250	40	5	NE	
20	290	30	5	NE	
21	300	70	15	NE	
22	240	40	5	NE	
23	270	60	15	NE	
24	130	30	5	NE	
25	240	70	15	NE	
26	160	50	10	NE	

Number	Length (mm)	Width (mm)	Depth (mm)	Direction	Notes
27	290	60	20	NE	
28	300	70	10	NE	
29	210	40	5	NE	
30	360	50	10	NE	
31	250	30	5	NE	
32	90	50	5	NE	
33	290	80	5	N	
34	140	50	5	N	
35	270	40	10	NW	
36	140	40	5	NE	
37	260	40	10	NE	
38	140	30	5	NE	
39	100	30	5	NE	
40	280	60	10	NE	
41	270	50	10	NE	
42	340	60	10	NE	
43	360	50	10	NE	
44	360	40	5	NE	
45	300	50	10	NW	
46	230	40	5	NW	
47	100	30	3	NW	
48	270	50	5	NW	
49	260	60	10	NW	
50	300	60	10	NW	
51	200	40	5	NW	
52	240	40	5	NE	
53	300	40	10	NW	
Rock engravings					
1	790	630	1		Petroglyph – indeterminate.

2.10.2 Baseline recording images – site overview



Plate 146: Overview of site, S aspect – Woronora Reservoir Northern Trail 17

2.10.3 Baseline recording plans – site overview

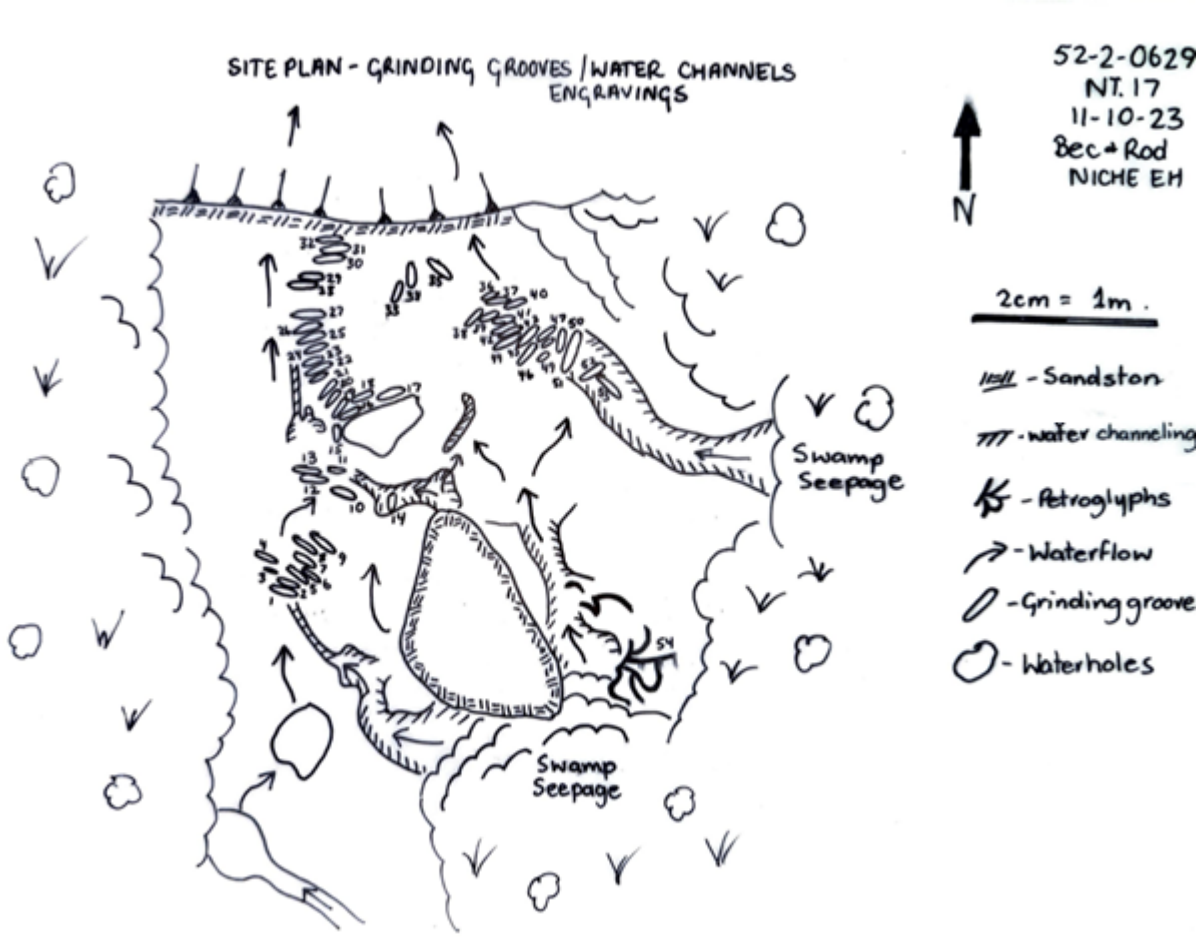


Figure 20: Plan of Woronora Reservoir Northern Trail 17

2.10.4 Baseline recording images – detailed site recording



Plate 147: Petroglyph – Woronora Reservoir Northern Trail 17



Plate 148: Grooves #19 – Woronora Reservoir Northern Trail 17



Plate 149: Grooves #10-13 – Woronora Reservoir Northern Trail 17



Plate 150: Groove #14 – Woronora Reservoir Northern Trail 17



Plate 151: Grooves #15-24 – Woronora Reservoir Northern Trail 17



Plate 152: Grooves #22-32 – Woronora Reservoir Northern Trail 17



Plate 153: Grooves #33-35 - Woronora Reservoir Northern Trail 17



Plate 154: Grooves #35-50 – Woronora Reservoir Northern Trail 17



Plate 155: Grooves #51-53 – Woronora Reservoir Northern Trail 17

2.11 Woronora Reservoir Northern Trail 18 (NT 18 AHIMS # 52-2-0751)

This shelter is formed out of sandstone by cavernous and chemical weathering. It is located within a hill / ridgeline landform area near closed woodland. The art located at this shelter is in very poor condition from water wash and weathering. No archaeological deposit was located during the survey.

2.11.1 Woronora Reservoir Northern Trail 18 baseline recording data

Table 34: Baseline recording data for Woronora Reservoir Northern Trail 18

Overview					
Site type	Shelter with Art	Corrected MGAE	310684	Corrected MGAN	6218937
Previous Recording	Illawarra Prehistory Group: C. Sefton	Date	1981		
Site Details					
Width	17.8 m	Depth	4.5 m	Height	3.755 m
Orientation	330° N-NW	Floor area	-	Floor condition	-
Location in Landscape	217 m				
Shelter exterior/formation	Sandstone block fall. Bottlebrush – Christmas Bush – Geebungs - Bluegums				
Shelter interior	Sandstone block fall, and cavernous and chemical weathering.				
Distance to water	60 m NE	Landform	Hills / ridgelines – closed woodland		
Setting	Continuous				
Archaeological Deposit					
Deposit	Shallow sandy loam	Describe	No archaeological deposit found.		
Visible artefacts?	N/A	Where?	N/A	How many?	N/A
Art					
Art surfaces	4 x panels and 8 x motifs (see art form).				
Art Condition	Poor, weathered, water wash.				
Art Overview	Unspecified.				
Damage/threats					
Water wash	None recent/active – some old (Panel #2 and #4).	Graffiti	No	Macro vegetals	Yes – back wall crack
Animals	Small	Salt/granular loss	Yes – back wall 0 – 3 m.	Fissuring	Yes – horizontal bedding plane cracks floor to wall, along back walls (entire length of shelter).
Insects	Yes	Spalling/exfoliation	Yes – current and continuous	Other	N/A
Fire	Smoke – old	Block fall	Ancient		

Table 35: Baseline recording data for art surfaces present within Woronora Reservoir Northern Trail 18.

Motif No.	Type	Form	Media	Colour	Measurement
Panel 1: 580 cm – 620 cm					
1	Fish	Faded/partial	-	Black	35 cm x 20 cm
Panel 2: 540 cm – 740 cm					
2	Possible fish	Faded/partial	-	Black	14 cm x 18 cm
3	Indeterminate – possible two, no distinct lines.	Lined with infill	-	Black	25 cm x 37 cm
4	Indeterminate	Lined with infill	-	Black	16 cm x 38 cm
5	Indeterminate – possible 2-3, no distinct lines.	Lined with infill	-	Black	37 cm x 35 cm
Panel 3: 11 cm – 1250 cm					
6	Indeterminate	Faded/partial	-	Black lines	23 cm x 12 cm
7	Indeterminate	Faded/partial	-	Black lines infill	10 cm x 15 cm
Panel 4: 1120 – 1170 cm					
8	Bat	Faded/partial charcoal	-	Black	25 cm x 40

Table 36: Baseline recording data for monitoring points present within Woronora Reservoir Northern Trail 18.

Monitoring Points		
Number	**Location in shelter**	**Notes**
#1	Back wall	Vertical crack at back wall, at 1.952 m – active weathering (cavernous).
#2	Start of Panel #2	Vertical crack at the start of Panel #2, at 5.261 m.
#3	Centre of Panel #2	Vertical crack at the centre of Panel #2, at 6.501 m. The crack at the top of the panel travels to 40 cm short of the floor.

2.11.2 Baseline recording images – site overview



Plate 156: Shelter overview, from northeastern end of shelter – Woronora Reservoir Northern Trail 18



Plate 157: Shelter overview, from western end of shelter – Woronora Reservoir Northern Trail 18



Plate 158: Overview of shelter, from southern end of shelter – Woronora Reservoir Northern Trail 18



Plate 159: Monitoring point #1 – Woronora Reservoir Northern Trail 18

2.11.3 Baseline recording plans – site overview

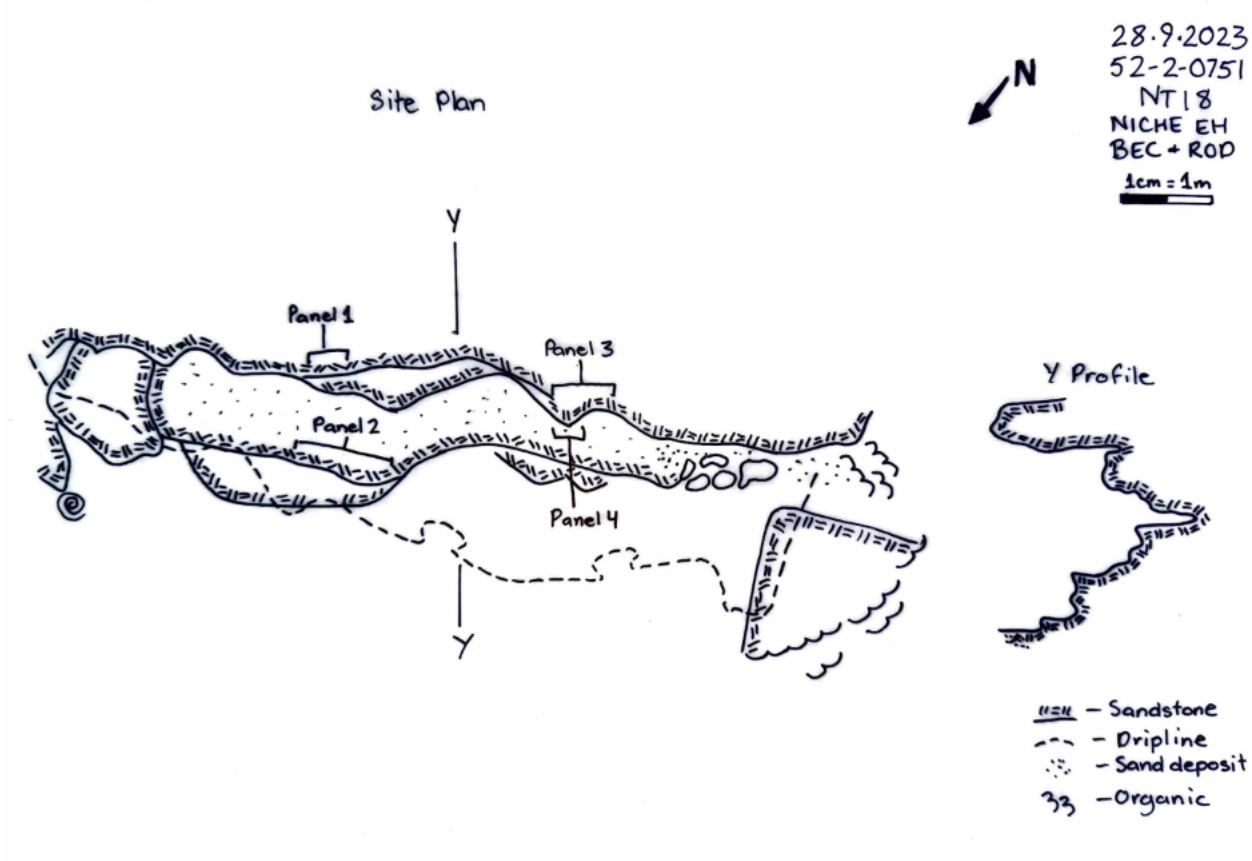


Figure 21: Plan and Y profile section of Woronora Reservoir Northern Trail 18

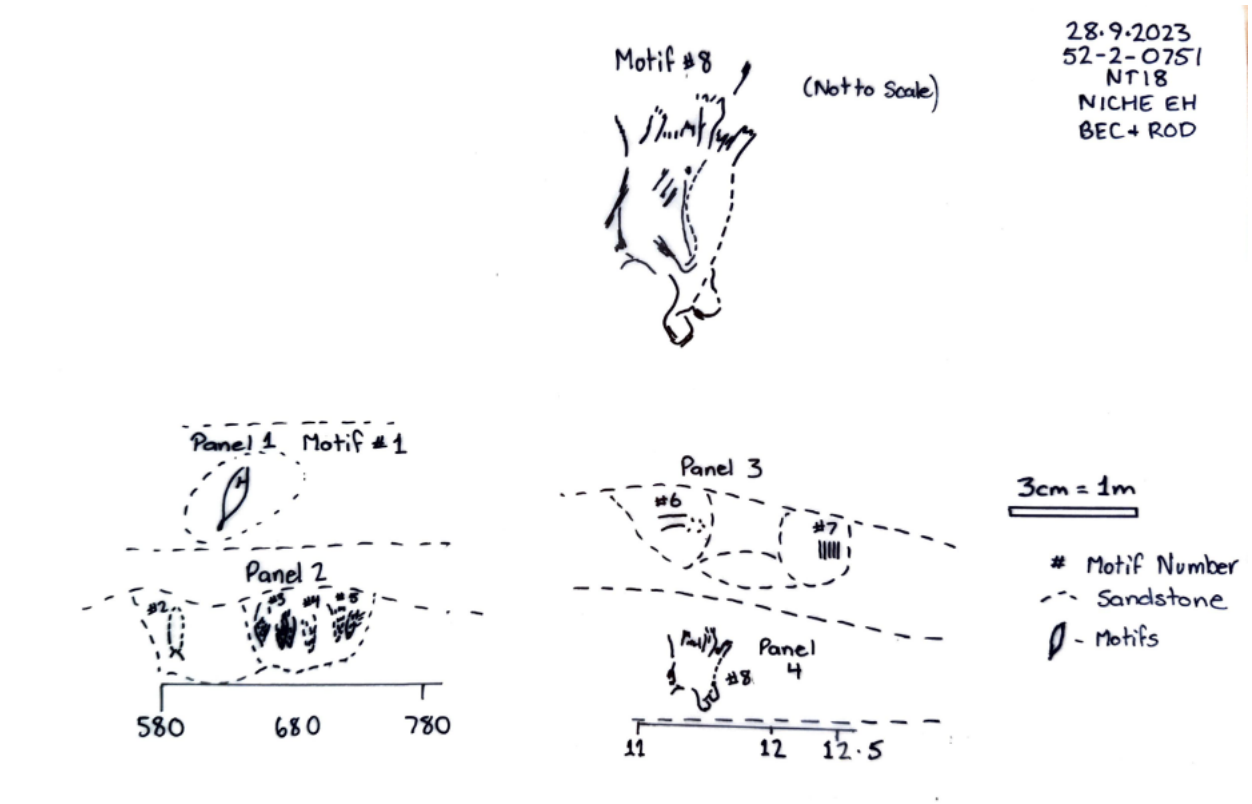


Figure 22: Art panels of Woronora Reservoir Northern Trail 18

2.11.4 Baseline recording images – detailed panel recording

Panel 1



Plate 160: Panel #1, motif #1 - Woronora Reservoir Northern Trail 18

Panel 2

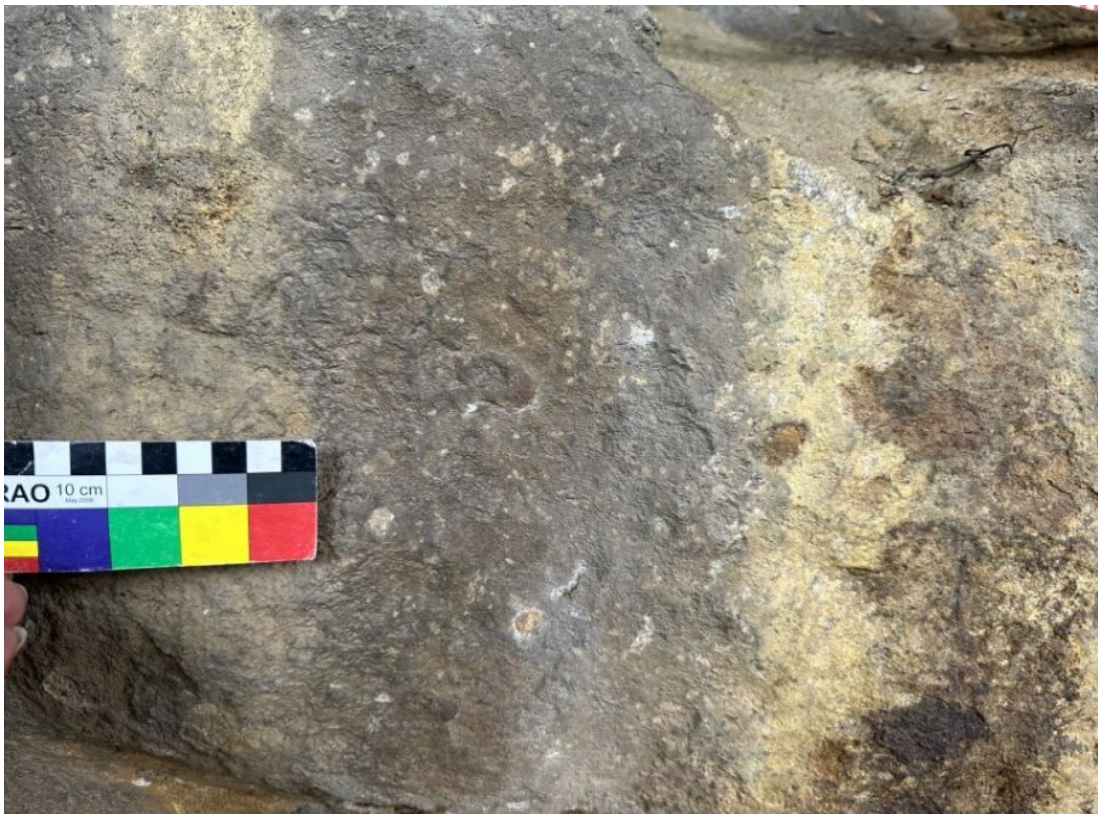


Plate 161: Panel #2, motif #2 – Woronora Reservoir Northern Trail 18



Plate 162: Panel #2, motif #3 – Woronora Reservoir Northern Trail 18



Plate 163: Panel #2, motif #4 – Woronora Reservoir Northern Trail 18

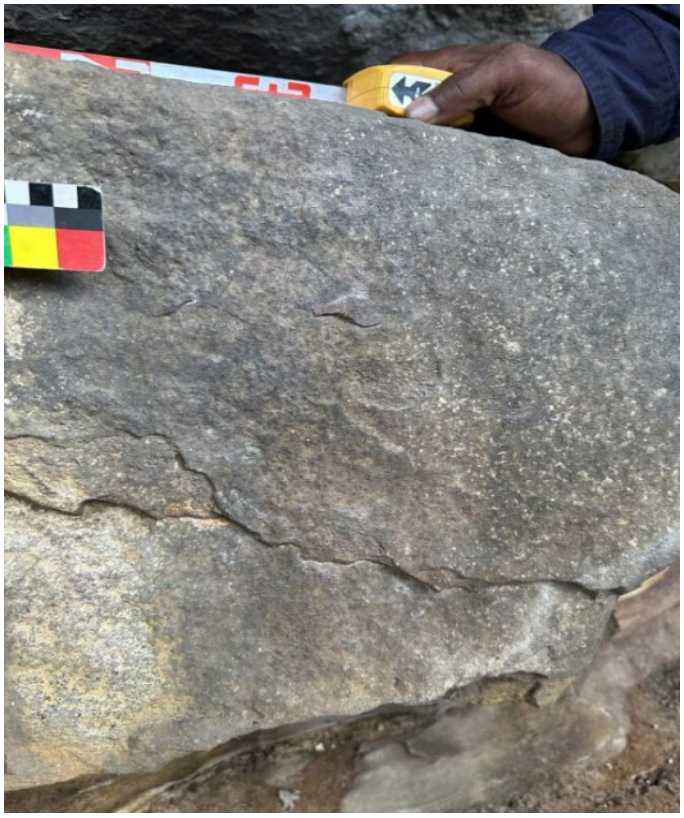


Plate 164: Panel #2, motif #5 – Woronora Reservoir Northern Trail 18



Plate 165: Monitoring point #2 – Woronora Reservoir Northern Trail 18



Plate 166: Monitoring point #3 – Woronora Reservoir Northern Trail 18



Plate 167: Monitoring point #3 – Woronora Reservoir Northern Trail 18



Plate 168: Monitoring point #3 – Woronora Reservoir Northern Trail 18

Panel 3



Plate 169: Panel #3, motif #6 – Woronora Reservoir Northern Trail 18



Plate 170: Panel #3, motif #7 - Woronora Reservoir Northern Trail 18

Panel 4



Plate 171: Panel #4, motif #8 – Woronora Reservoir Northern Trail 18

2.12 Northern Trail 19 (NT 19 AHIMS # pending)

This ridgeline shelter is formed out of sandstone by block fall, erosion and cavernous weathering. It is located on the closest ridgeline to stored water, at 190 m elevation. No visible artefacts were located during this survey. The art located at this shelter weathered and faded.

2.12.1 Northern Trail 19 baseline recording data

Table 37: Baseline recording data for Northern Trail 19

Overview					
Site type	Shelter with Art	Corrected MGAE	311210	Corrected MGAN	6219100
Previous Recording	Illawarra Prehistory Group: C. Sefton	Date	-		
Site Details					
Width	9 m	Depth	2 m	Height	1.7 m
Orientation	NE 30°	Floor area	8 m^2	Floor condition	
Location in Landscape	Below closest ridgeline to stored water edge – 190 m elevation				
Shelter exterior/formation	Sandstone ridgeline erosion and block fall.				
Shelter interior	Stable sandy loam floor with large block fall and cavernous weathering.				
Distance to water	30 m	Landform	Lower ridge		
Setting	Continuous				
Archaeological Deposit					
Deposit	Sandy loam	Describe	PAD		
Visible artefacts?	No	Where?	N/A	How many?	N/A
Art					
Art surfaces	4 x panels				
Art Condition	Faded and weathering				
Art Overview	See forms completed, art log and updated drawings.				
Damage/threats					
Water wash	Yes – old and active	Graffiti	No	Macro vegetals	yes
Animals	Small	Salt/granular loss	Upper back wall and roof	Fissuring	no
Insects	Yes	Spalling/exfoliation	Active and old	Other	N/A
Fire	Yes	Block fall	Yes - ancient		

Table 38: Baseline recording data for art surfaces present within Northern Trail 19

Motif No.	Type	Form	Media	Colour	Measurement
Panel 1					
1	Animal feature	Partial	-	Black	51cm x 51cm
Panel 2					
2	Indeterminate	Partial	-	Black	25cm x 29cm
3	Indeterminate	Partial	-	Black	26cm x 35cm
Panel 3					
4	Indeterminate	Partial	-	Black	37cm x 26cm
Panel 4					
5	Indeterminate	Partial	-	Black	48cm x 39cm

Table 39: Baseline recording data for monitoring points present within Northern Trail 19

Monitoring Points		
Number	**Location in shelter**	**Notes**
#1	At 0 m	Water wash.
#2	At 1.5m	Vertical crack.
#3	Floor to shelf at 2 m	Vertical crack.
#4	At 2 m	Active cavernous weathering.
#5	At 4 m	Vertical jault/crack.
#6	At 5.5 m	Large vertical crack – block fall and separation.
#7	At 6 m	Active water wash.

2.12.2 Baseline recording images – site overview



Plate 172: Shelter overview, S aspect – Northern Trail 19



Plate 173: Shelter overview, W aspect - Northern Trail 19



Plate 174: Evidence of historical camping at Northern Trail 19

2.12.3 Baseline recording plans – site overview

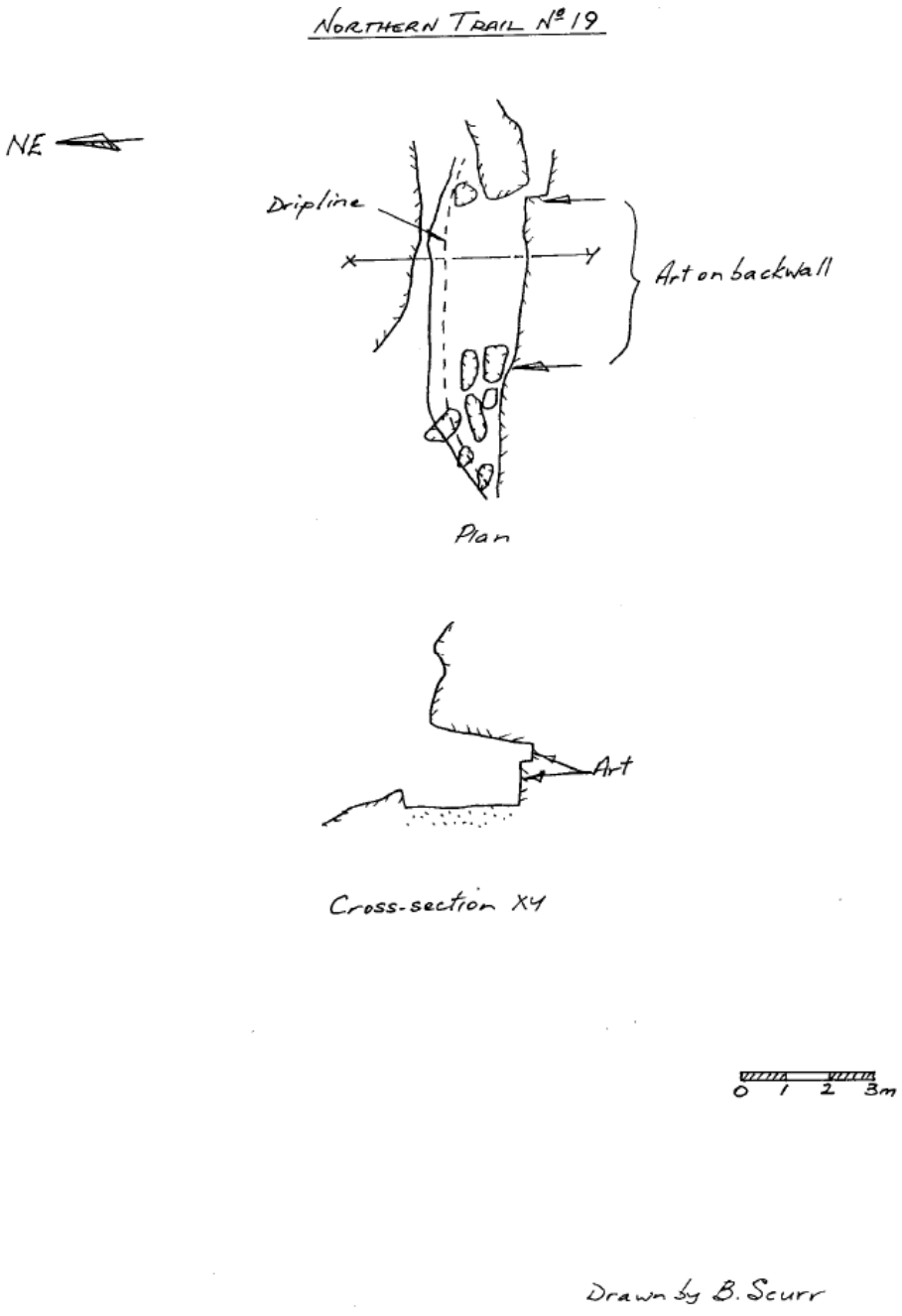


Figure 23: Plan and section of Northern Trail 19 (source: AHIMS site card, drawn by B. Scurr)

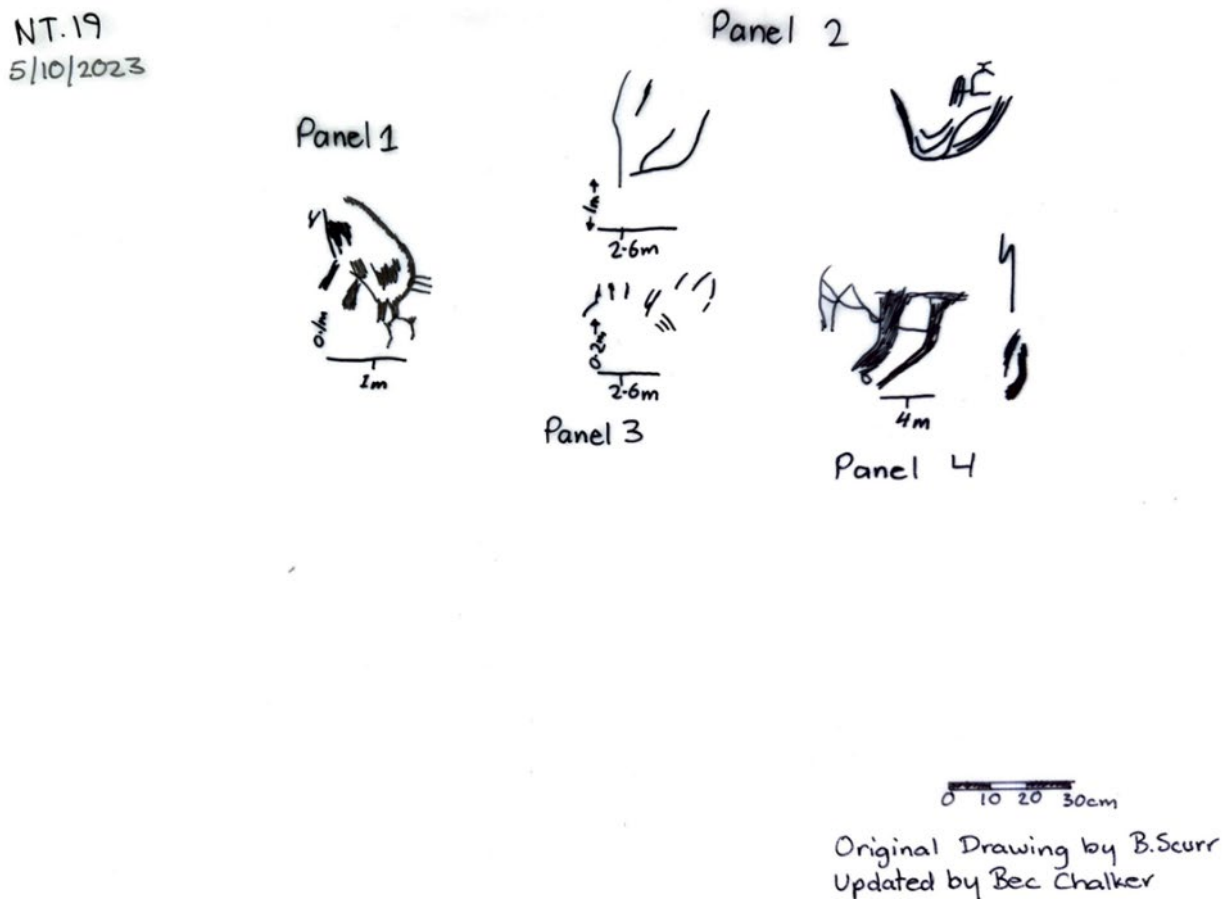


Plate 175: Art panels of Northern Trail 19. Reproduced from the AHIMS site card, original drawing by B. Scurr.

2.12.4 Baseline recording images – detailed panel recording

Panel 1



Plate 176: Panel #1 overview – Northern Trail 19



Plate 177: Panel #1, motif #1 – Northern Trail 19



Plate 178: Monitoring point #1 – Northern Trail 19



Plate 179: Monitoring point #2 – Northern Trail 19



Plate 180: Monitoring point #3 – Northern Trail 19



Plate 181: Monitoring point #4 – Northern Trail 19



Plate 182: Monitoring point #5 – Northern Trail 19



Plate 183: Monitoring point #6 – Northern Trail 19



Plate 184: Monitoring point #7 – Northern Trail 19

Panel 2



Plate 185: Panel #2 overview – Northern Trail 19

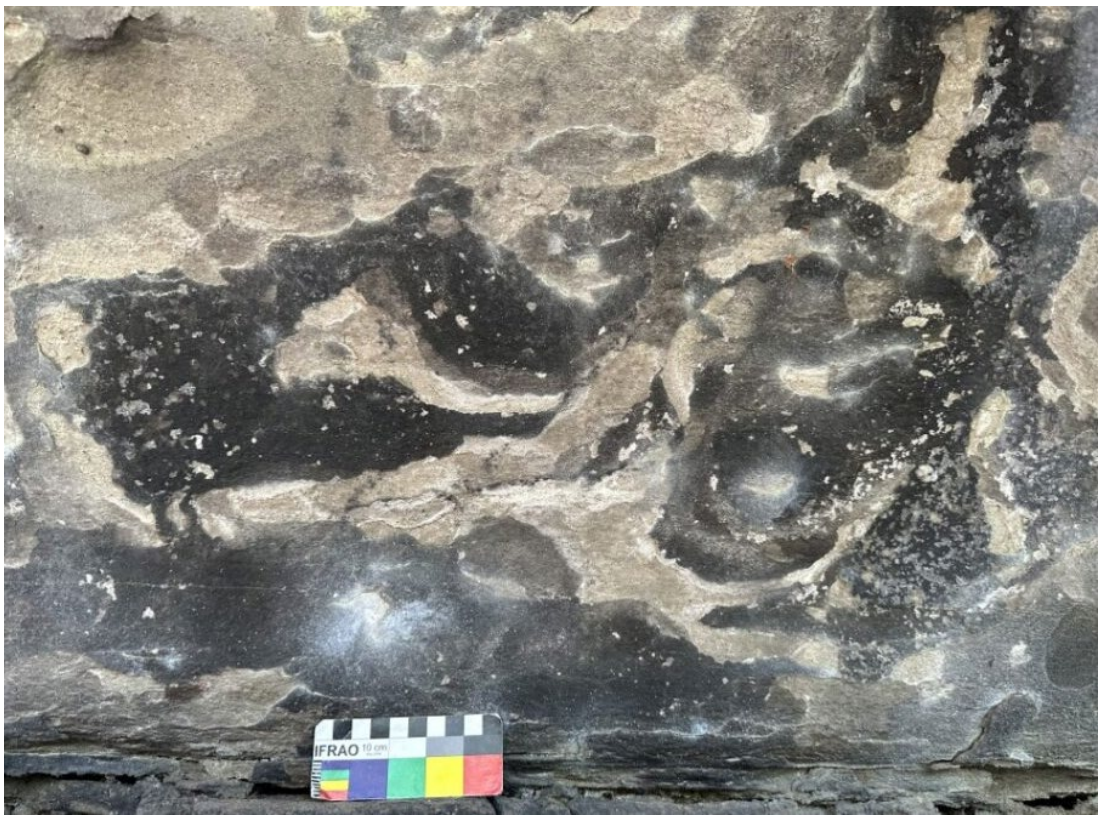


Plate 186: Panel #2, motif #2 – Northern Trail 19

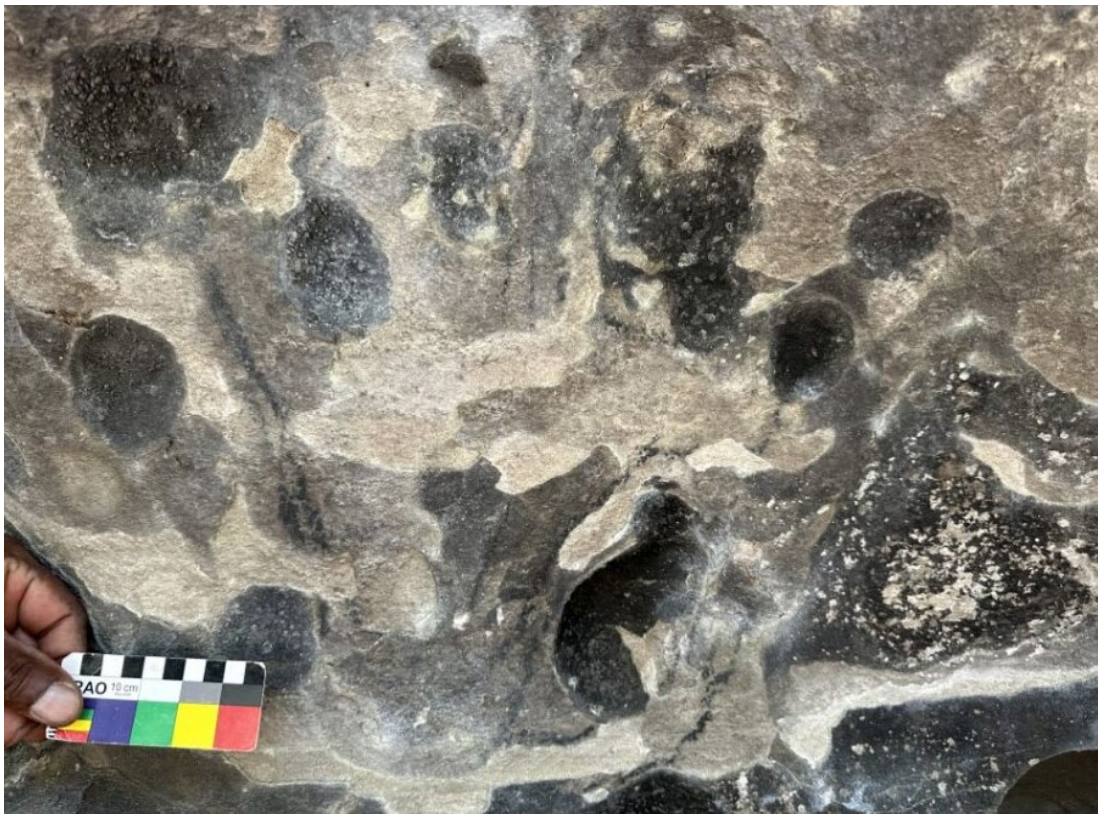


Plate 187: Panel #2, motif #3 – Northern Trail 19

Panel 3



Plate 188: Panel #3 overview – Northern Trail 19



Plate 189: Panel #3, motif #4 – Northern Trail 19

Panel 4



Plate 190: Panel #4 overview – Northern Trail 19



Plate 191: Panel #4, motif #5 – Northern Trail 19

2.13 Woronora Reservoir Northern Trail 21 (NT 21 AHIMS # 52-2-0630)

This site is located on a sandstone platform near an unnamed creek line. Six grinding grooves were relocated from the original 10 previously recorded in 1976, and some possible ground dishes were also located. The site is in a stable condition.

2.13.1 Woronora Reservoir Northern Trail 21 baseline recording data

Table 40: Baseline recording data for Woronora Reservoir Northern Trail 21

Overview					
Site type	Open site with Grinding Groove	Corrected MGAE	310522	Corrected MGAN	6218880
Previous Recording	Illawarra Prehistory Group: C. Sefton	Date	1981		
Location description					
Landform	Creek line – sandstone platform.		Slope (deg)	Gentle creek slope – N.	
Vegetation	Eucalypt/ Christmas bush and Gymea lilly dominated		Land use	Conservation/mining.	
Disturbance	Organic build-up		Aggrading/Stable/ Eroding	Stable	
Impacts	Organic and water erosion		Proximity to water	On water – unnamed creek.	
Visibility %	NA		Exposure %	NA	
Site Context					
Site Dimensions	See site plan.				
Context	Open				
Site Condition	Stable				
Site Description					
Total number of rock engravings	N/A				
Total number of grooves	Six grinding grooves relocated from the original 10 recorded in 1976.				
Type, Groove Profile	Long, oval shaped.				
Function	Axe grooves– possible ground dishes near grinding grooves.				
Condition	Visible – is susceptible to organic (chemical) weathering from covering and uncovering during different flows in creek line.				
Orientation	See detailed recording table.				

Table 41: Baseline recording data for grinding grooves present within Woronora Reservoir Northern Trail 21

Number	Length (mm)	Width (mm)	Depth (mm)	Direction	Notes
Grinding Grooves					
1	170	50	3	NW	
2	280	50	5	SW	
3	330	60	10	SW	
4	300	50	5	W	

Number	Length (mm)	Width (mm)	Depth (mm)	Direction	Notes
5	230	30	3	W	
6	300	30	3	NW	

Table 42: Baseline recording data for monitoring points present within Woronora Reservoir Northern Trail 21

Monitoring Points		
Number	**Location**	**Notes**
Nil	-	-

2.13.2 Baseline recording images – site overview



Plate 192: Site overview – Woronora Reservoir Northern Trail 21



Plate 193: Site overview, S aspect – Woronora Reservoir Northern Trail 21



Plate 194: Site overview, N aspect – Woronora Reservoir Northern Trail 21

2.13.3 Baseline recording plans – site overview

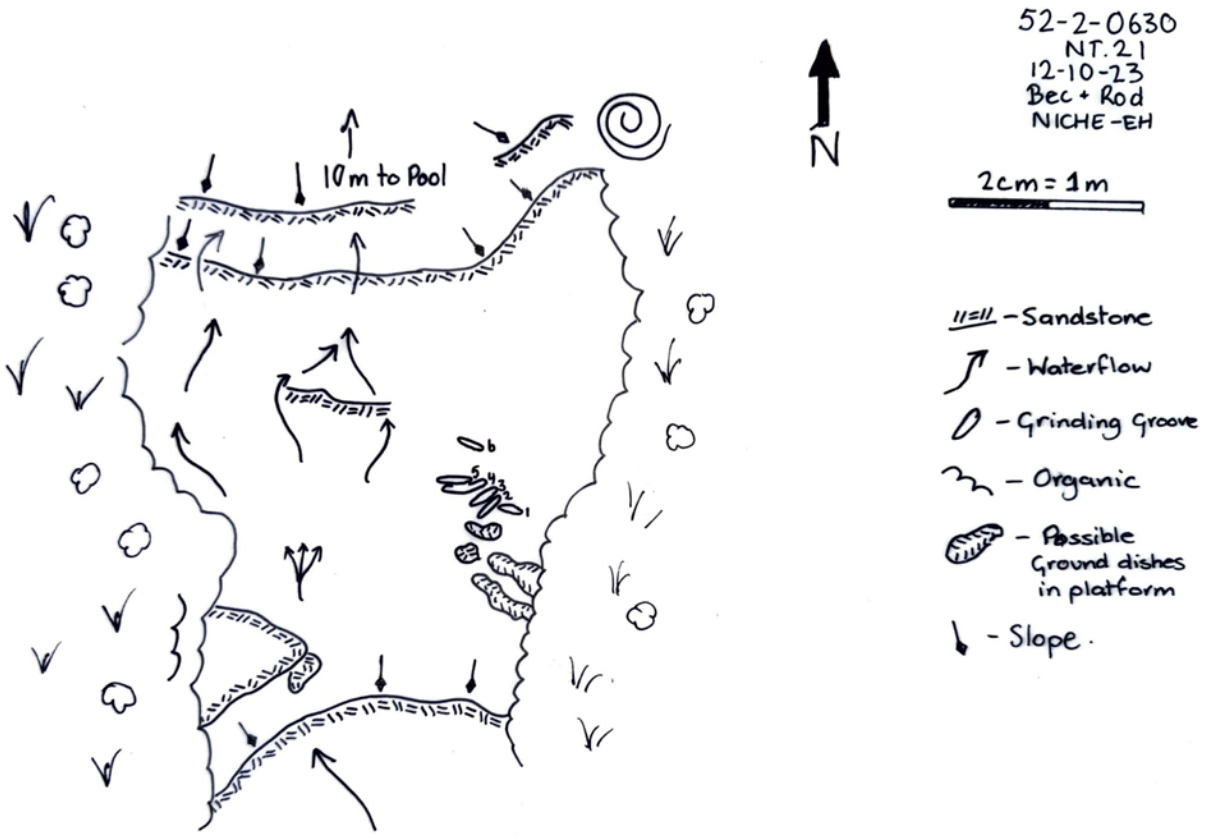


Figure 24: Plan of Woronora Reservoir Northern Trail 21

2.13.4 Baseline recording images – detailed site recording



Plate 195: Grooves #1-6 – Woronora Reservoir Northern Trail 21



Plate 196: Possible ground dishes in creek near grinding grooves - Woronora Reservoir Northern Trail 21

2.14 Woronora Reservoir Northern Trail 22 (NT 22 AHIMS # 52-2-0758)

This shelter is located under the ledge of a sandstone platform, at 267 m altitude and 450 m east of Honeysuckle Creek. It has been affected by cavernous and chemical weathering, along with ancient block fall. A quartzite core was located during the survey. No distinct monitoring points were located.

2.14.1 Woronora Reservoir Northern Trail 22 baseline recording data

Table 43: Baseline recording data for Woronora Reservoir Northern Trail 22

Overview					
Site type	Shelter with Art Artefact and PAD	Corrected MGAE	309923	Corrected MGAN	6218862
Previous Recording	Illawarra Prehistory Group: C. Sefton	Date	1981		
Site Details					
Width	12 m	Depth	3.43 m	Height	4.12 m
Orientation	SW 212°	Floor area	12m^2	Floor condition	stable
Location in Landscape	267 m altitude – north of a large swamp under the ledge of a sandstone platform.				
Shelter exterior/formation	Uplift / weathering.				
Shelter interior	Cavernous and chemical weathering, ancient block fall.				
Distance to water	450 m east of Honeysuckle Creek	Landform	Ridgeline		
Setting	Continuous				
Archaeological Deposit					
Deposit	Sandy loam with ash.	Describe	Possible subsurface deposit		
Visible artefacts?	Yes – quartzite core.	Where?	Centre of floor area.	How many?	1
Art					
Art surfaces	Charcoal indeterminate, 45 cm from ground at 6 m.				
Art Condition	-				
Art Overview	No distinct monitoring points.				
Damage/threats					
Water wash	Yes – not active	Graffiti	No	Macro vegetals	Yes
Animals	Small	Salt/granular loss	Yes	Fissuring	Yes
Insects	Small	Spalling/exfoliation	Yes – back wall	Other	N/A
Fire	Yes – ash and smoke present	Block fall	Yes - ancient		

Table 44: Baseline recording data for art surfaces present within Woronora Reservoir Northern Trail 22

Motif No.	Type	Form	Media	Colour	Measurement
Panel 1					
1	Indeterminate	-	Charcoal	Black	40 cm x 10 cm

Table 45: Baseline recording data for monitoring points present within Woronora Reservoir Northern Trail 22

Monitoring Points		
Number	**Location in shelter**	**Notes**
Nil	-	-

2.14.2 Baseline recording images – site overview



Plate 197: Overview of shelter, N aspect – Woronora Reservoir Northern Trail 22



Plate 198: Overview of shelter, SE aspect – Woronora Reservoir Northern Trail 22 .

2.14.3 Baseline recording plans – site overview

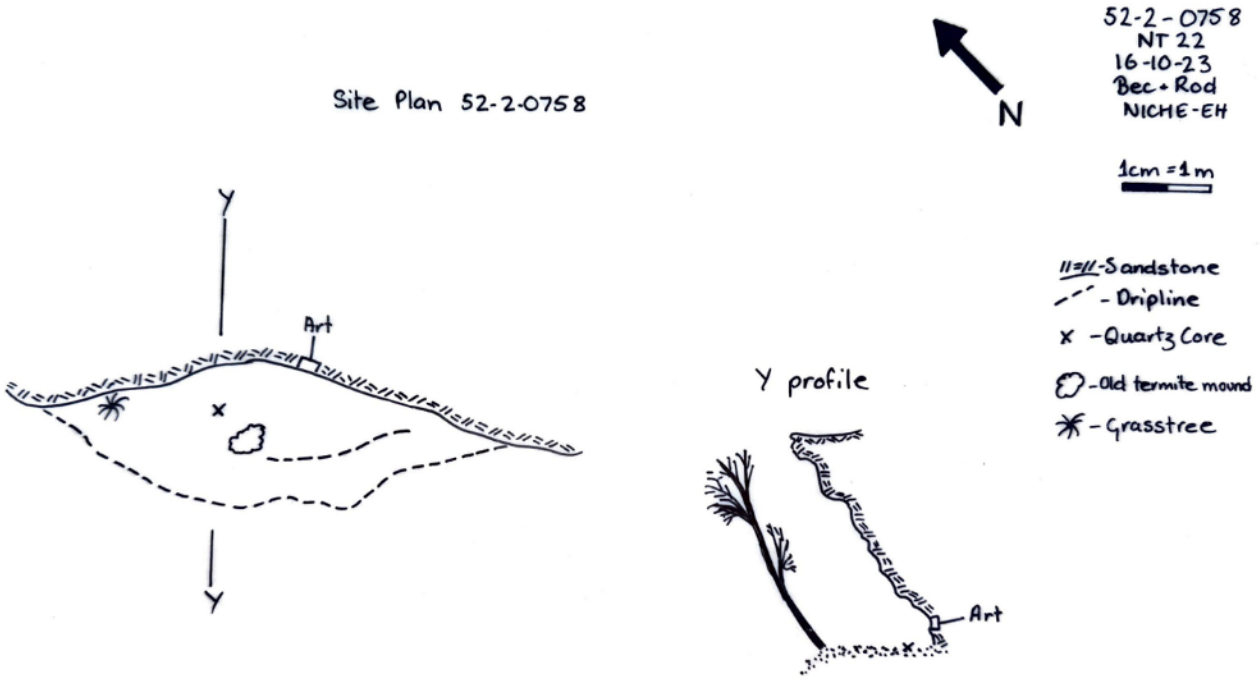


Figure 25: Plan and Y profile section of Woronora Reservoir Northern Trail 22

2.14.4 Baseline recording images – detailed panel recording

Panel 1



Plate 199: Panel #1, motif #1 – Woronora Reservoir Northern Trail 22

Artefacts



Plate 200: Quartzite core located at Woronora Reservoir Northern Trail 22

2.15 Woronora Reservoir Northern Trail 23 (NT 23 AHIMS # 52-2-0631)

This shelter has been affected by block fall, and cavernous and chemical weathering. It is located at 268 m elevation, under a ridgeline and north of a large swamp. Three art panels and eight motifs were located. The art located at this shelter has been affected by weathering and spalling, particularly the red ochre stencils. More than 20 artefacts were located within the inner dripline area.

2.15.1 Woronora Reservoir Northern Trail 23 baseline recording data

Table 46: Baseline recording data for Woronora Reservoir Northern Trail 23

Overview					
Site type	Shelter with Art and Artefacts	Corrected MGAE	309903	Corrected MGAN	6218891
Previous Recording	Illawara Prehistory Group: C. Sefton	Date	1981		
Site Details					
Width	20 m	Depth	5.8 m	Height	4 m
Orientation	196° S	Floor area	20 m^2	Floor condition	Stable
Location in Landscape	268 m elevation, under top ridgeline. North of large swamp. 40 m NW of NT 22.				
Shelter exterior/formation	-				
Shelter interior	Block fall, cavernous and chemical weathering.				
Distance to water	410 m SE of Honeysuckle Creek.	Landform	Ridgeline		
Setting	-				
Archaeological Deposit					
Deposit	Sandy	Describe	Unspecified.		
Visible artefacts?	Yes	Where?	Inner dripline.	How many?	>20
Art					
Art surfaces	3 x panels (see art form), 8 x motifs (5 x charcoal (indeterminate – previously identified as kangaroos; 2 x indeterminate red ochre stencils; 1 x partial left hand stencil – red ochre).				
Art Condition	Weathered and spalling (particularly the red ochre stencils).				
Art Overview	-				
Damage/threats					
Water wash	Yes	Graffiti	No	Macro vegetals	Yes – in water wash and between bedding (separation plane).
Animals	Small	Salt/granular loss	Yes	Fissuring	No
Insects	Small	Spalling/exfoliation	Yes – affecting artwork	Other	Active weathering – recent small block fall
Fire	Yes	Block fall	Yes - ancient and recent.		

Table 47: Baseline recording data for art surfaces present within Woronora Reservoir Northern Trail 23

Motif No.	Type	Form	Media	Colour	Measurement
Panel 1: 1300 mm x 590 mm					
1	Indeterminate	Partial	-	Black	560 mm x 250 mm
2	Indeterminate	Partial	-	Black	590 mm x 150 mm
3	Indeterminate	Partial	-	Black	530 mm x 140 mm
4	Indeterminate	Partial	-	Black	500 mm x 100 mm
5	Indeterminate	Partial	-	Black	450 mm x 400 mm
Panel 2: 560 mm x 210 mm					
6	Hand stencil	Partial	Red ochre	Red	150 mm x 120 mm
7	Indeterminate	Partial	Red ochre	Red	180 mm x 100 mm
Panel 3: 100 mm x 100 mm					
8	Indeterminate	Stencil	Red ochre	Red	100 mm x 100 mm

Table 48: Baseline recording data for monitoring points present within Woronora Reservoir Northern Trail 23

Monitoring Points		
Number	**Location in shelter**	**Notes**
#1	At 4 - 5 m	Active weathering - horizontal and vertical cracks.
#2	At 6.5 m	Active weathering.
#3	At 9 m	Active water wash and vertical crack.
#4	At 12 m	Active weathering.
#5	At 13 m	Active weathering.
#6	At 14.5 – 16.5 m	Active weathering.

2.15.2 Baseline recording images – site overview



Plate 201: Overview of site, NW end of shelter – Woronora Reservoir Northern Trail 23



Plate 202: Overview of site, E end of shelter – Woronora Reservoir Northern Trail 23 .



Plate 203: Example overview of back wall panels, N aspect – Woronora Reservoir Northern Trail 23



Plate 204: Monitoring point #1 – Woronora Reservoir Northern Trail 23



Plate 205: Monitoring point #2 – Woronora Reservoir Northern Trail 23



Plate 206: Monitoring point #3 – Woronora Reservoir Northern Trail 23



Plate 207: Monitoring point #4 – Woronora Reservoir Northern Trail 23



Plate 208: Monitoring point #5 - Woronora Reservoir Northern Trail 23



Plate 209: Monitoring point #6 – Woronora Reservoir Northern Trail 23.

2.15.3 Baseline recording plans – site overview

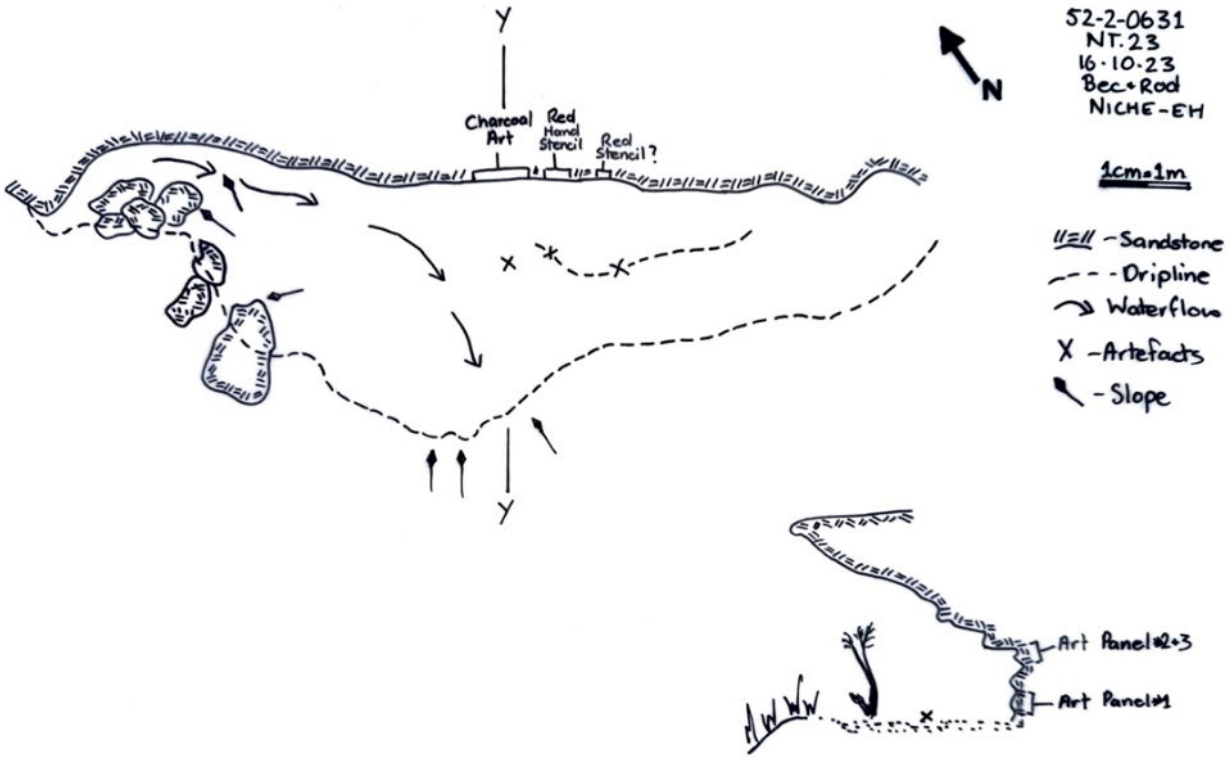


Figure 26: Plan and profile section of Woronora Reservoir Northern Trail 23

2.15.4 Baseline recording images – detailed panel recording

Panel 1



Plate 210: Panel #1 overview – Woronora Reservoir Northern Trail 23



Plate 211: Panel #1, motif #1 – Woronora Reservoir Northern Trail 23

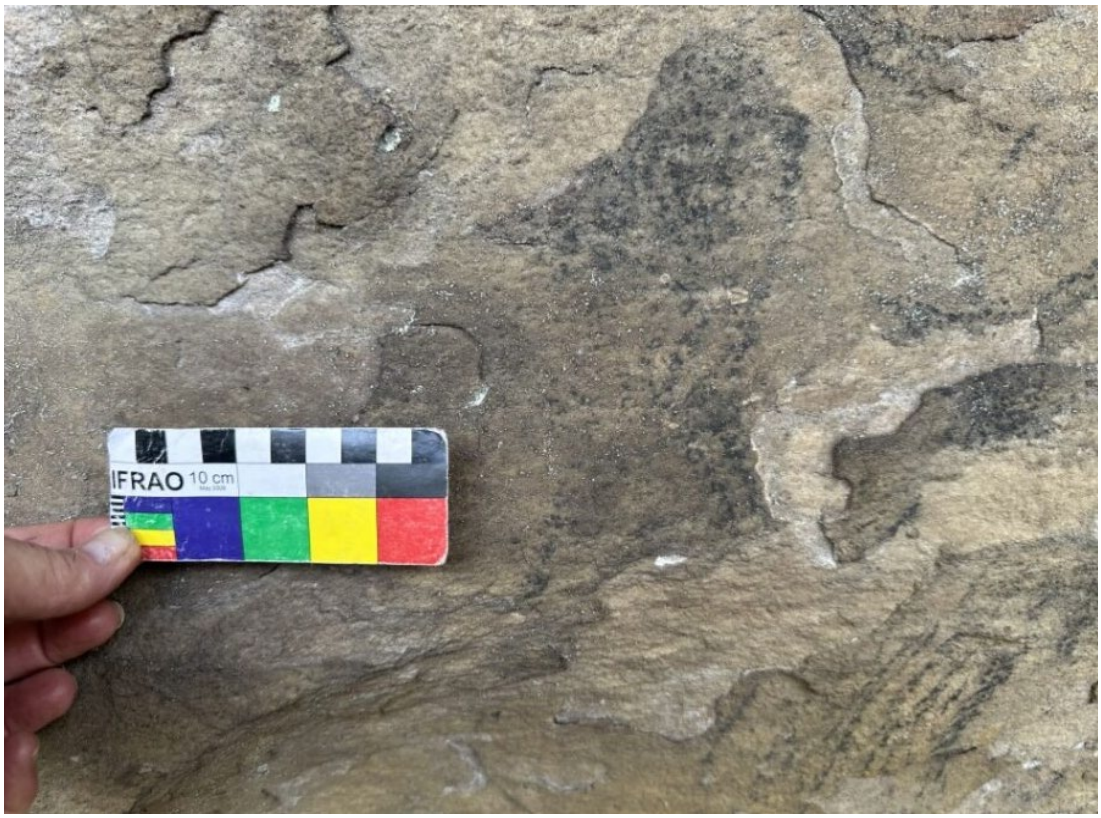


Plate 212: Panel #1, motif #2 – Woronora Reservoir Northern Trail 23

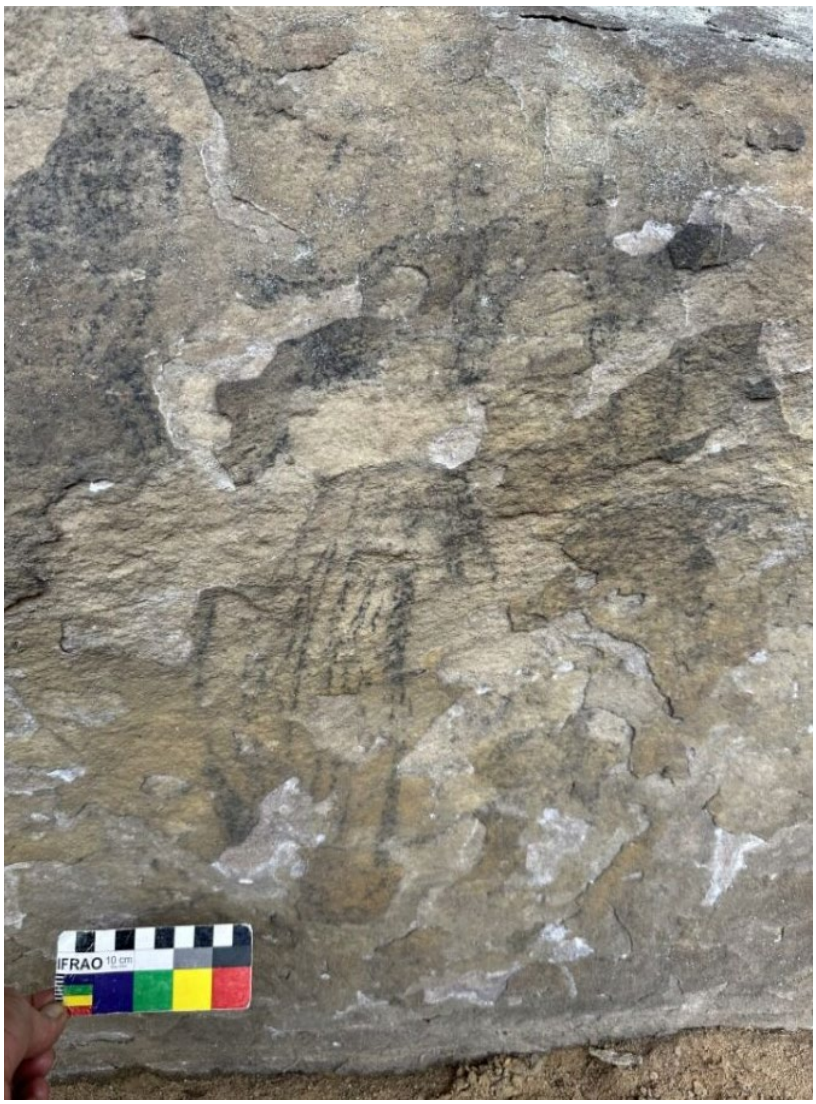


Plate 213: Panel #1, motif #3 – Woronora Reservoir Northern Trail 23



Plate 214: Panel #1, motif #4 – Woronora Reservoir Northern Trail 23

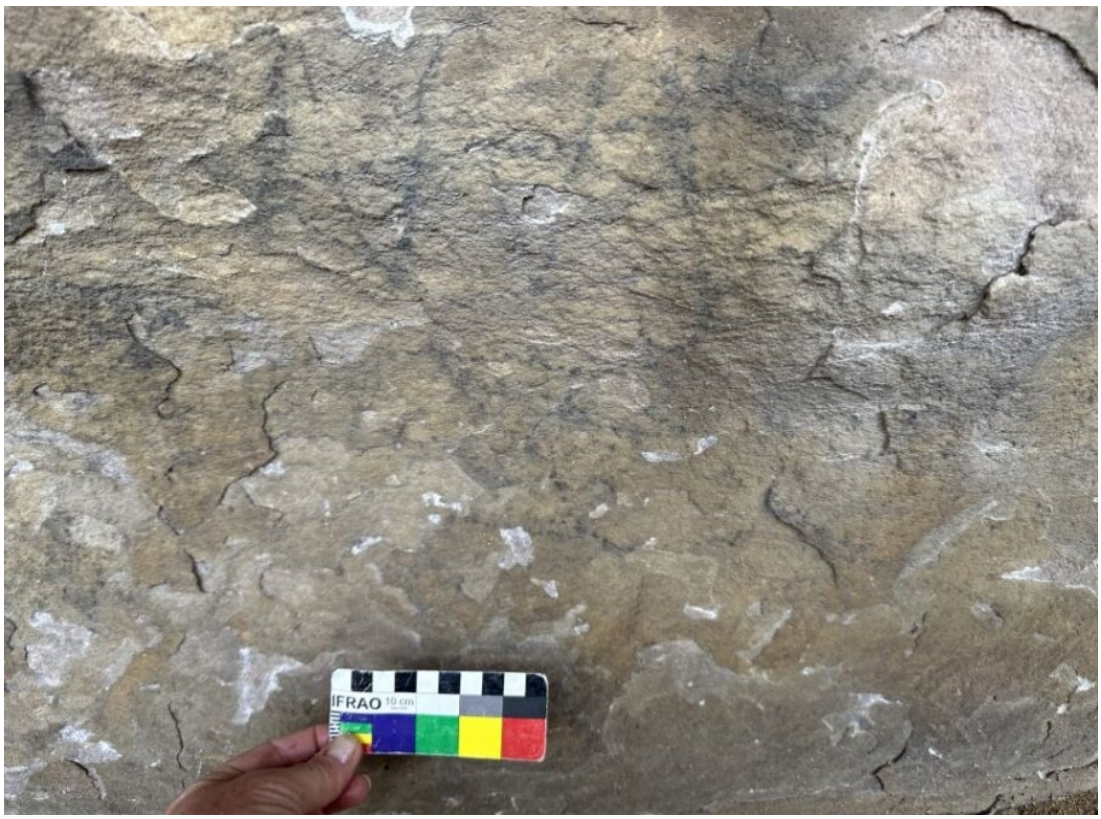


Plate 215: Panel #1, motif #5 – Woronora Reservoir Northern Trail 23

Panel 2



Plate 216: Panel #2 overview – Woronora Reservoir Northern Trail 23



Plate 217: Panel #2, motif #6 – Woronora Reservoir Northern Trail 23

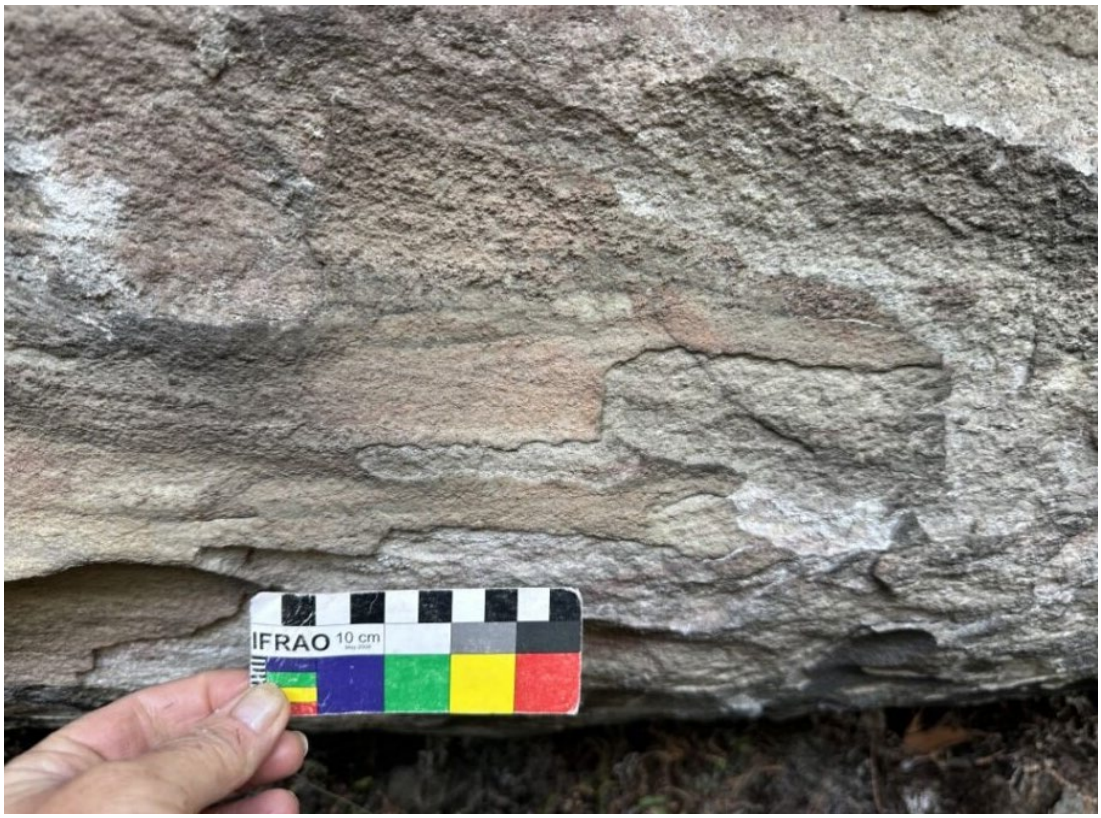


Plate 218: Panel #2, motif #7 – Woronora Reservoir Northern Trail 23

Panel 3



Plate 219: Panel #3 overview – Woronora Reservoir Northern Trail 23



Plate 220: Panel #3, motif #8 – Woronora Reservoir Northern Trail 23



Plate 221: Example of artefacts located at Woronora Reservoir Northern Trail 23



Plate 222: Example of artefacts located at Woronora Reservoir Northern Trail 23



Plate 223: Artefact location – Woronora Reservoir Northern Trail 23

2.16 Woronora Reservoir Northern Trail 46 (NT 46 AHIMS # 52-2-0755)

This site is located in a swamp area on a sandstone ridge and is situated on a creek line in the swamp. Sixteen grinding grooves were located at the site. The site and some grooves have been subjected to erosion and weathering.

2.16.1 Woronora Reservoir Northern Trail 46 baseline recording data

Table 49: Baseline recording data for Woronora Reservoir Northern Trail 46

Overview					
Site type	Open site with Grinding Grooves	Corrected MGAE	310451	Corrected MGAN	6217734
Previous Recording	Illawarra Prehistory Group: C. Sefton	Date	1981; 2007		
Location description					
Landform	Sandstone ridge – swamp			Slope (deg)	Gentle
Vegetation	Hakea / bottlebrush			Land use	Conservation/mining
Disturbance	Overgrown vegetation			Aggrading/Stable/ Eroding	Eroding
Impacts	Eroding grooves			Proximity to water	On creek line – natural spring in swamp.
Visibility %	-			Exposure %	-
Site Context					
Site Dimensions	See site plan.				
Context	Open – western side of Waratah Rivulet off the 9D trail.				
Site Condition	-				
Site Description					
Total number of rock engravings	-				
Total number of grooves	16				
Type, Groove Profile	-				
Function	-				
Condition	Eroding				
Orientation	See groove recording table.				

Table 50: Baseline recording data for monitoring points present within Woronora Reservoir Northern Trail 46

Monitoring Points		
Number	**Location in shelter**	**Notes**
Nil	-	-

Table 51: Baseline recording data for grinding grooves present within Woronora Reservoir Northern Trail 46

Number	Length (mm)	Width (mm)	Depth (mm)	Direction	Notes
Grinding Grooves					
1	410	60	3	W - E	Active weathering.
2	290	31	2-3	W - E	
3	720	40	30	W - E	Groove channel
4	240	50	7	W - E	
5	160	25	3	SW - NE	
6	130	25	3	SW - NE	
7	420	60	10	SW - NE	
8	420	70	20	SW - NE	
9	330	50	5	W - E	
10	360	50	20	W - E	
11	390	160	50	NW - SE	Dish with distinct grooves.
12	390	45	10	NW - SE	
13	260	50	22	NW - SE	
14	150	60	20	S - N	
15	130	35	4	S - N	
16	150	40	7	S - N	

2.16.2 Baseline recording images – site overview



Plate 224: Overview of site, NE aspect – Woronora Reservoir Northern Trail 46

2.16.3 Baseline recording plans – site overview

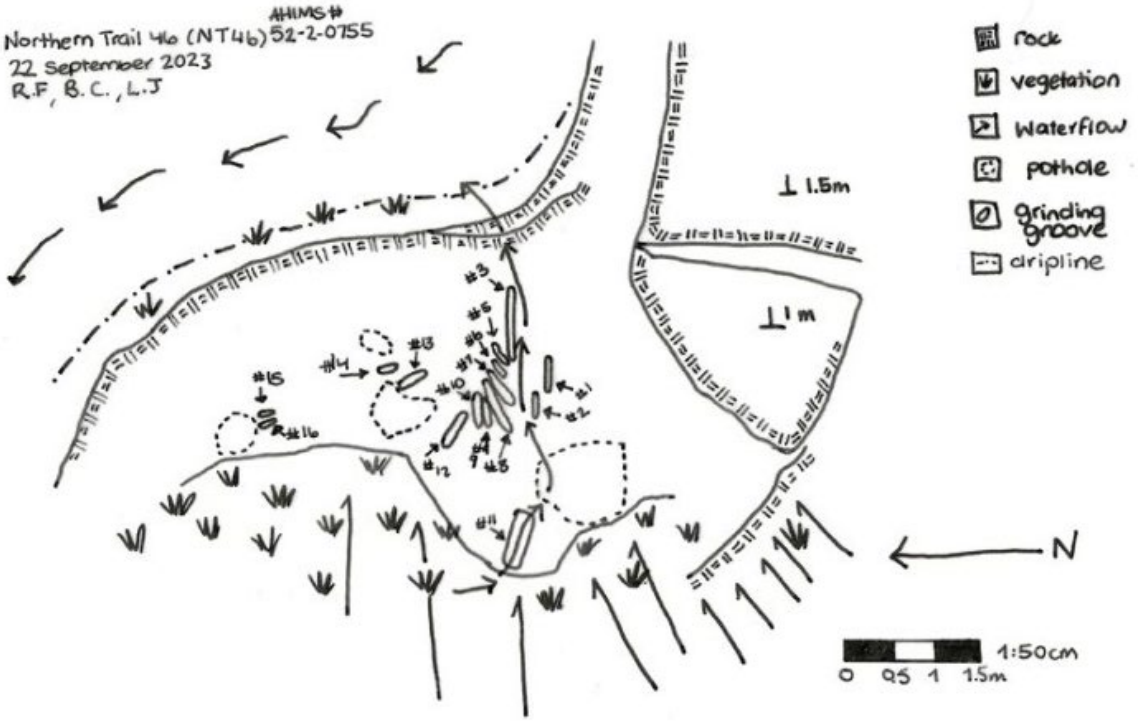


Figure 27: Plan of Woronora Reservoir Northern Trail 46

2.16.4 Baseline recording images – detailed site recording



Plate 225: Grooves #1 and #2 – Woronora Reservoir Northern Trail 46.



Plate 226: Groove #3 – Woronora Reservoir Northern Trail 46.



Plate 227: Grooves #4-10 – Woronora Reservoir Northern Trail 46.



Plate 228: Groove #11 (grind dish) – Woronora Reservoir Northern Trail 46.



Plate 229: Groove #12 – Woronora Reservoir Northern Trail 46.



Plate 230: Grooves #13 and #14 – Woronora Reservoir Northern Trail 46



Plate 231: Grooves #15 and #16 – Woronora Reservoir Northern Trail 46

2.17 Blue Gum Forest; NT(R) 54 (NT 54 AHIMS # 52-2-0374)

This small, continuous shelter has been affected by block fall, and chemical and cavernous weathering. It is located on a creek bend ridge landform, 5 m north of Honeysuckle Creek, at 251 m altitude. There is a large swamp opposite the creek and shelter. No artefacts were relocated, but two art panels and six motifs were located. These were found to be weathered and in very poor condition. This shelter is fragile and is at risk of collapse and/or further block fall.

2.17.1 Blue Gum Forest; NT(R) 54 baseline recording data

Table 52: Baseline recording data for Blue Gum Forest; NT(R) 54

Overview					
Site type	Shelter with Art and Artefacts	Corrected MGAE	309419	Corrected MGAN	6217491
Previous Recording	F. Wright	Date	1977 (found date).		
Site Details					
Width	-	Depth	-	Height	-
Orientation	53° S	Floor area	7 m^2	Floor condition	Mostly rock bed – 7m^2 living area.
Location in Landscape	251 m altitude – large swamp opposite creek and shelter.				
Shelter exterior/formation	Block fall – sheet wash weathering				
Shelter interior	Block fall – chemical/cavernous weathering				
Distance to water	5 m north of Honeysuckle Creek (west side).	Landform	Creek verge / creek bend ridge		
Setting	Small continuous				
Archaeological Deposit					
Deposit	Sandy	Describe	Original recording identified 1x black chert artefact.		
Visible artefacts?	None relocated	Where?	N/A	How many?	N/A
Art					
Art surfaces	2 x panels, 6 x motifs (see art log sheet) – charcoal indeterminates and red ochre figure (indeterminate).				
Art Condition	Weathered – very poor condition.				
Art Overview	-				
Damage/threats					
Water wash	Yes – backwall centre	Graffiti	-	Macro vegetals	Yes
Animals	Yes	Salt/granular loss	Yes	Fissuring	Yes
Insects	Yes	Spalling/exfoliation	Yes – on art panel.	Other	Shelter has several vertical roof and back wall cracks. Shelter is fragile before mining commences.

					Very fragile roof – susceptible to further block fall/shelter collapse.
Fire	Yes	Block fall	Yes		

Table 53: Baseline recording data for art surfaces present within Blue Gum Forest; NT(R) 54

Motif No.	Type	Form	Media	Colour	Measurement
Panel 1: 900 mm at 10.2 m – 11.10 m					
1	Indeterminate	Partial	Charcoal	Black	50 mm x 60 mm
2	Indeterminate	Lines	Red ochre	Red	800 mm x 400 mm
Panel 2: 1000 mm – 500 mm at 13.10 m – 13.55 m					
3	Indeterminate	Partial	Red ochre	Red	450 mm x 400 mm
4	Indeterminate	Partial	Charcoal	Black	40 mm x 140 mm
5	Human shape	Partial – head partial – no feet or arm.	Red ochre	Red	200 mm x 460 mm
6	Indeterminate	Partial	Red ochre	Red	100 mm x 230 mm

Table 54: Baseline recording data for monitoring points present within Blue Gum Forest; NT(R) 54

Monitoring Points		
Number	**Location in shelter**	**Notes**
#1	Bottom ledge of roof – at .40 cm	Vertical crack.
#2	At 7 m – 7.70 m	Two Vertical cracks on back wall, extending to roof cavity. - one dominant crack extending across entire roof line to outer edge, with separation. - One less dominant hairline crack extending parallel to other crack to outer edge. - One hairline crack in roof cavity – not to outer edge. 70 cm short of outer edge and water wash, and soil leaching.
#3	On art panel #1	- Vertical roof cracks - Small hole in roof cavity, with three cracks extending from hole. - One crack extending to outer edge roof line - Two hairline cracks extending to back of shelter over art panel (red ochre lines). Not connecting to back wall.

2.17.2 Baseline recording images – site overview



Plate 232: Overview of shelter, SW aspect – Blue Gum Forest; NT(R) 54 .



Plate 233: Overview of shelter, NE aspect – Blue Gum Forest; NT(R) 54



Plate 234: Monitoring point #1 – Blue Gum Forest; NT(R) 54



Plate 235: Monitoring point #2 – Blue Gum Forest; NT(R) 54



Plate 236: Monitoring point #2 – Blue Gum Forest; NT(R) 54



Plate 237: Monitoring point #2 – Blue Gum Forest; NT(R) 54



Plate 238: Monitoring point #2 – Blue Gum Forest; NT(R) 54



Plate 239: Monitoring point #2 – Blue Gum Forest; NT(R) 54



Plate 240: Monitoring point #2 – Blue Gum Forest; NT(R) 54



Plate 241: Monitoring point #2 – Blue Gum Forest; NT(R) 54



Plate 242: Monitoring point #2 – Blue Gum Forest; NT(R) 54



Plate 243: Monitoring point #2 – Blue Gum Forest; NT(R) 54



Plate 244: Monitoring point #2 – Blue Gum Forest; NT(R) 54



Plate 245: Monitoring point #2 – Blue Gum Forest; NT(R) 54



Plate 246: Monitoring point #2 – Blue Gum Forest; NT(R) 54



Plate 247: Monitoring point #2 – Blue Gum Forest; NT(R) 54



Plate 248: Monitoring point #2 – Blue Gum Forest; NT(R) 54



Plate 249: Monitoring point #3 – Blue Gum Forest; NT(R) 54



Plate 250: Monitoring point #3 – Blue Gum Forest; NT(R) 54



Plate 251: Monitoring point #3 – Blue Gum Forest; NT(R) 54



Plate 252: Monitoring point #3 – Blue Gum Forest; NT(R) 54



Plate 253: Monitoring point #3 – Blue Gum Forest; NT(R) 54



Plate 254: Monitoring point #3 – Blue Gum Forest; NT(R) 54

2.17.3 Baseline recording plans – site overview

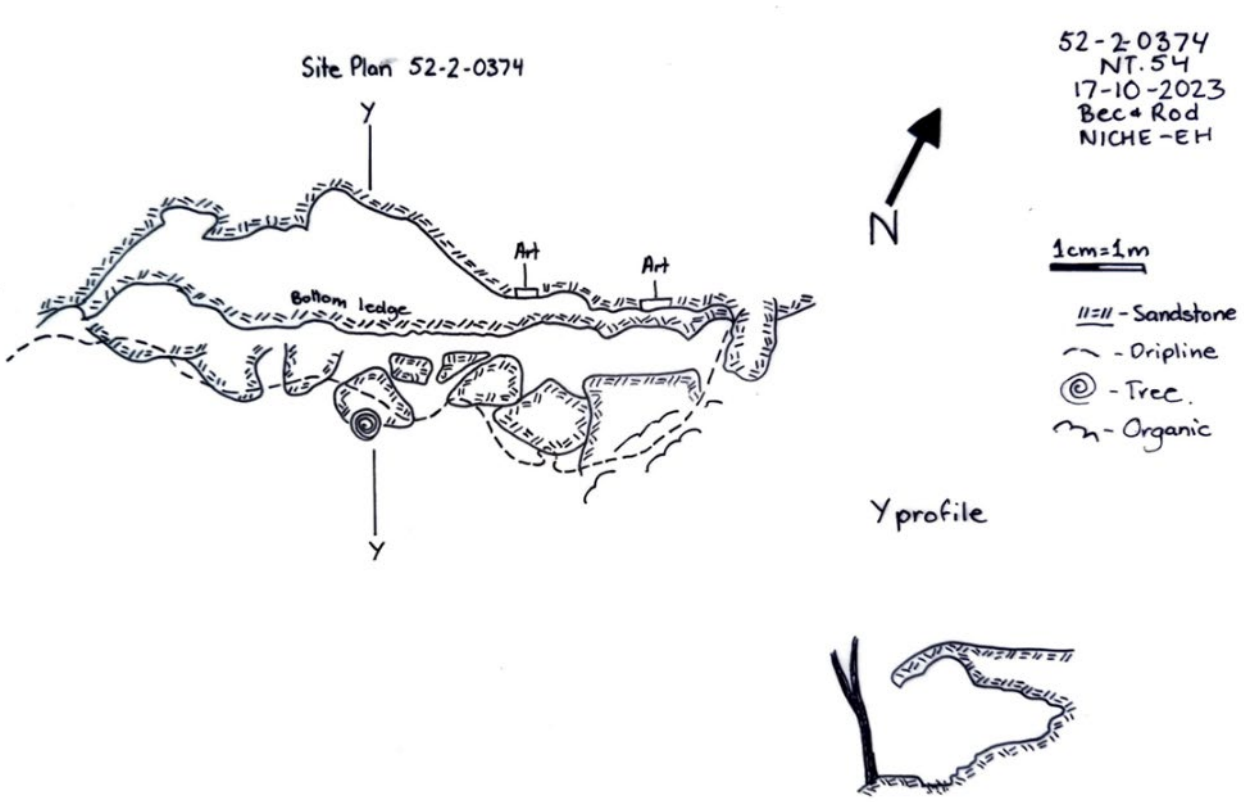


Figure 28: Plan and Y profile section of Blue Gum Forest; NT(R) 54

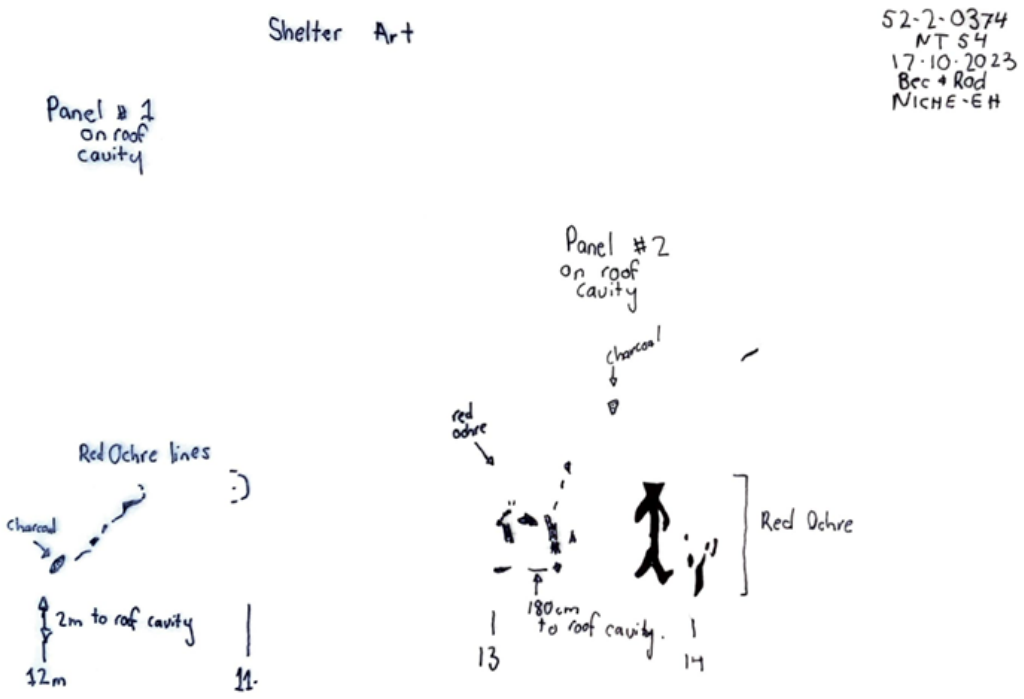


Figure 29: Art panel of Blue Gum Forest; NT(R) 54

2.17.4 Baseline recording images – detailed panel recording

Panel 1



Plate 255: Panel #1 overview – Blue Gum Forest; NT(R) 54



Plate 256: Panel #1, motif #1 – Blue Gum Forest; NT(R) 54



Plate 257: Panel #1, motif #2 – Blue Gum Forest; NT(R) 54

Panel 2



Plate 258: Panel #2 overview – Blue Gum Forest; NT(R) 54

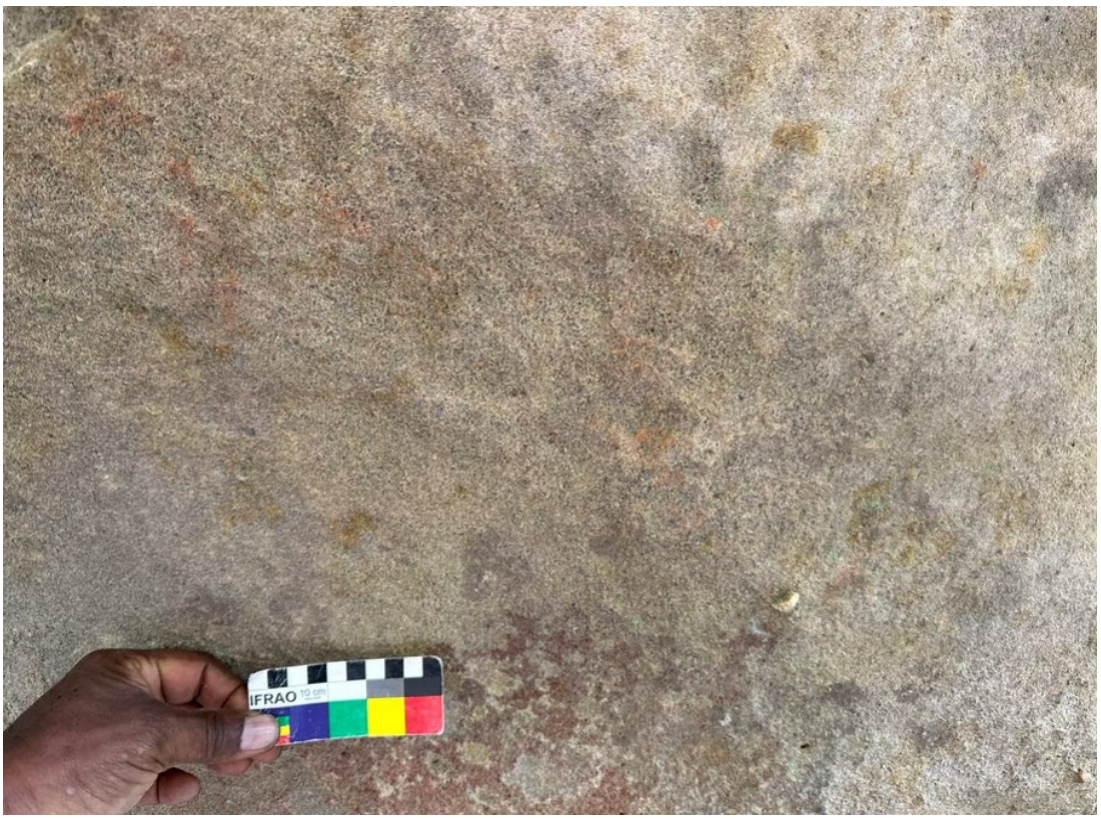


Plate 259: Panel #2, motif #3 – Blue Gum Forest; NT(R) 54



Plate 260: Panel #2, motif #5 – Blue Gum Forest; NT(R) 54



Plate 261: Panel #2, motif #6 – Blue Gum Forest; NT(R) 54

2.18 Northern Trail 74 (NT 74 AHIMS # 52-2-0658)

This shelter is located within a sandstone ridgeline that has been affected by ancient block fall and cavernous weathering. It is 30 m west of an unnamed creek line, flowing east into Waratah Rivulet. No art surfaces were located during the survey; however, one chert flake was located.

2.18.1 Northern Trail 74 baseline recording data

Table 55: Baseline recording data for Northern Trail 74

Overview					
Site type	Shelter with Artefacts	Corrected MGAE	310769	Corrected MGAN	6219229
Previous Recording	Illawarra Prehistory Group: C. Sefton	Date	1981		
Site Details					
Width	-	Depth	-	Height	-
Orientation	East 79°	Floor area	6 m^2	Floor condition	-
Location in Landscape	185 m (below first ridge line) – 30 m west from unnamed creek line flowing east into Waratah Rivulet.				
Shelter exterior/formation	Sandstone ridgeline.				
Shelter interior	Ancient block fall and cavernous weathering.				
Distance to water	60 m	Landform	-		
Setting	Continuous				
Archaeological Deposit					
Deposit	Small patches	Describe	On southern end and at drip line.		
Visible artefacts?	1 x bi-polar chert flake	Where?	Sandy deposit (5 m)	How many?	1
Art					
Art surfaces	None				
Art Condition	-				
Art Overview	-				
Damage/threats					
Water wash	None	Graffiti	No	Macro vegetals	No
Animals	Small	Salt/granular loss	None recent	Fissuring	Yes - roof
Insects	Small	Spalling/exfoliation	None active	Other	N/A
Fire	No	Block fall	Ancient		

Table 56: Baseline recording data for monitoring points present within Northern Trail 74

Monitoring Points		
Number	**Location in shelter**	**Notes**
#1	Back shelf from floor to roof, at 11.36 m	
#2	Back shelf from floor to roof, at 11.36 m	
#3	Back shelf from floor to roof, at 14.8 m	
#4	At 16.35 m	Weak brittle break in back wall, likely to fall with any ground / shelter disturbance.

2.18.2 Baseline recording images – site overview



Plate 262: Overview of northern end of shelter, from southern end – Northern Trail 74



Plate 263: Monitoring point #1 – Northern Trail 74



Plate 264: Monitoring points #2 and #3 – Northern Trail 74



Plate 265: Monitoring point #4 – Northern Trail 74

2.18.3 Baseline recording plans – site overview

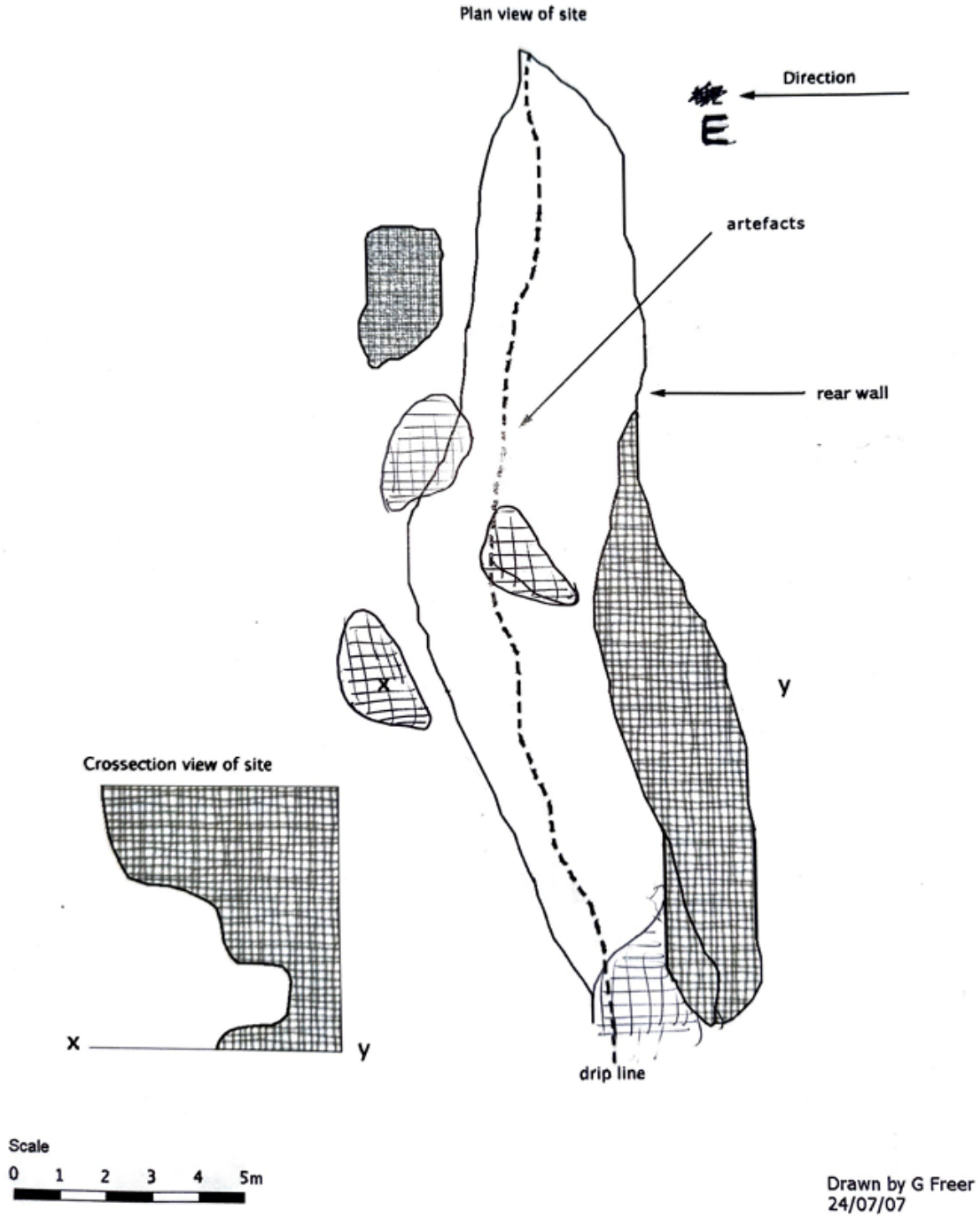


Figure 30: Plan and section of Northern Trail 74 (source; AHIMS site card, drawn by G. Freer)

2.18.4 Baseline recording images – detailed site recording

Artefacts



Plate 266: Chert artefact located at Northern Trail 74



Plate 267: Location of artefacts at Northern Trail 74

2.19 Northern Trail 75 (NT 75 AHIMS # 52-2-0659)

This shelter is formed out of sandstone by cavernous and chemical weathering. It is located in a ridge landform, under the first ledge above stored water between NT 85 and NT 74 and at 188.7 m elevation. It has been subjected to block fall. Five artefacts were located; however, no art surfaces were found during this survey.

2.19.1 Northern Trail 75 baseline recording data

Table 57: Baseline recording data for Northern Trail 75

Overview					
Site type	Shelter with Artefacts and PAD	Corrected MGAE	310790	Corrected MGAN	6219239
Previous Recording	Illawarra Prehistory Group: C. Sefton	Date	1981		
Site Details					
Width	-	Depth	-	Height	-
Orientation	SE 130°	Floor area	-	Floor condition	Stable, organic
Location in Landscape	Under first ledge above stored water between NT 85 and NT 74; elevation is 188.7 m. Small stream waterfall between NT 75 and NT 74.				
Shelter exterior/formation	Sandstone uplift, block fall and weathering, angophora / grass trees.				
Shelter interior	Block fall, and cavernous and chemical weathering.				
Distance to water	20-30 m	Landform	Hills/Ridges		
Setting	Continuous				
Archaeological Deposit					
Deposit	Yes	Describe	1 x ground edge axe/hammerstone with use-wear on all edges, 2 x quartz cores, 1 x ground flaked basalt core, 1 x basalt flake.		
Visible artefacts?	Yes	Where?	3.6-6.5 m	How many?	5
Art					
Art surfaces	None				
Art Condition	N/A				
Art Overview	N/A				
Damage/threats					
Water wash	Yes	Graffiti	No	Macro vegetals	Yes
Animals	Yes	Salt/granular loss	Yes - #5 water wash	Fissuring	Not active
Insects	Yes	Spalling/exfoliation	Not active	Other	N/A
Fire	No	Block fall	Ancient		

Table 58: Baseline recording data for monitoring points present within Northern Trail 75

Monitoring Points		
Number	**Location in shelter**	**Notes**
1	Near roof, follows roof, at 1.70 m.	Vertical crack
2	At 4 m – 5 m.	Vertical to horizontal along rock ledge – crack and seepage on ledge where ground axe lies underneath in the hollow.
3	From floor to half wall, at 5.90 m and 6.30 m.	Seepage, (water wash) and crack (vertical).
4	At 14.30 m	Seepage – algae (active).
5	At 22.50 m	Water wash – active.

2.19.2 Baseline recording images – site overview



Plate 268: Northern end of shelter, from centre – Northern Trail 75



Plate 269: Southern end of shelter, from centre – Northern Trail 75



Plate 270: Back wall – Northern Trail 75



Plate 271: Centre of shelter – Northern Trail 75



Plate 272: Monitoring point #1 – Northern Trail 75



Plate 273: Monitoring point #1 – Northern Trail 75



Plate 274: Monitoring point #2 – Northern Trail 75. Note ground axe in situ on bottom left corner.



Plate 275: Monitoring point #3 – Northern Trail 75



Plate 276: Monitoring point #4 – Northern Trail 75



Plate 277: Monitoring point #5 – Northern Trail 75

2.19.3 Baseline recording plans – site overview

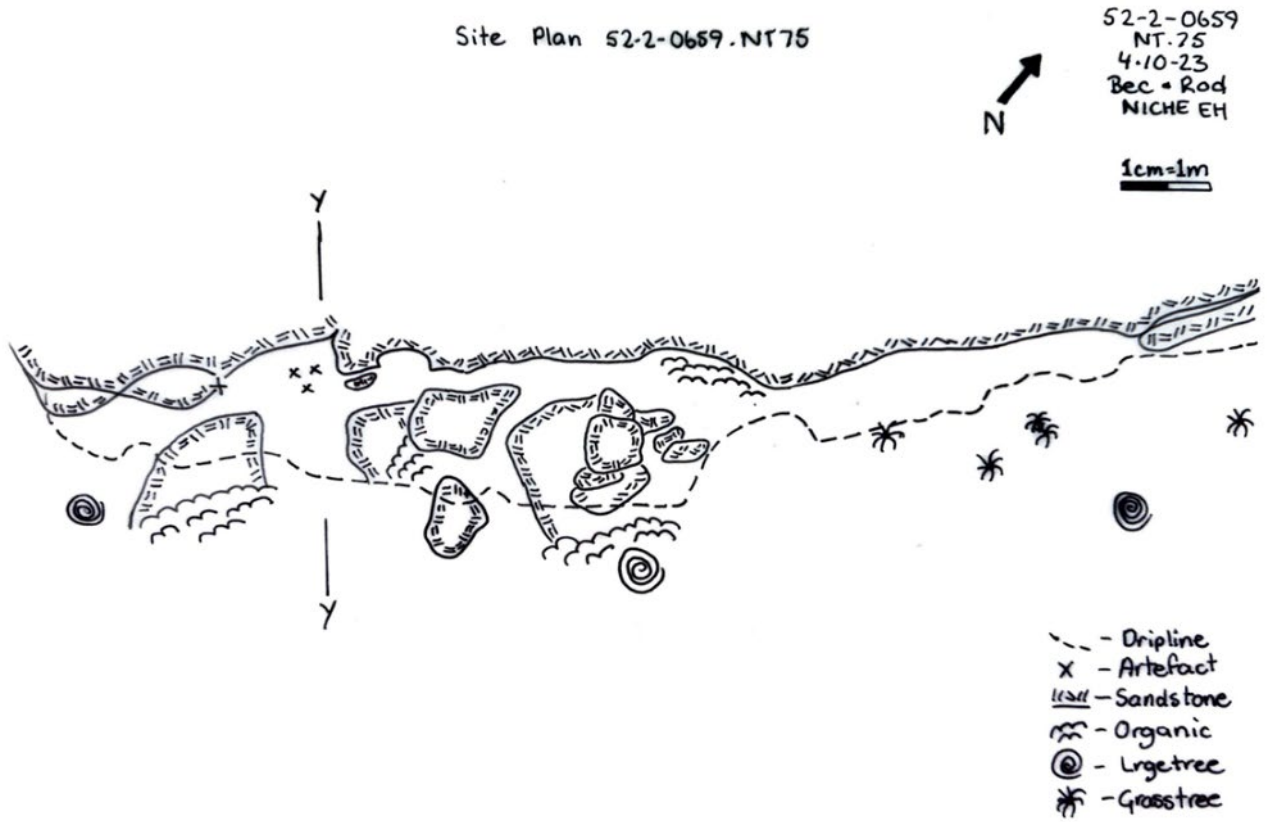


Figure 31: Plan of Northern Trail 75

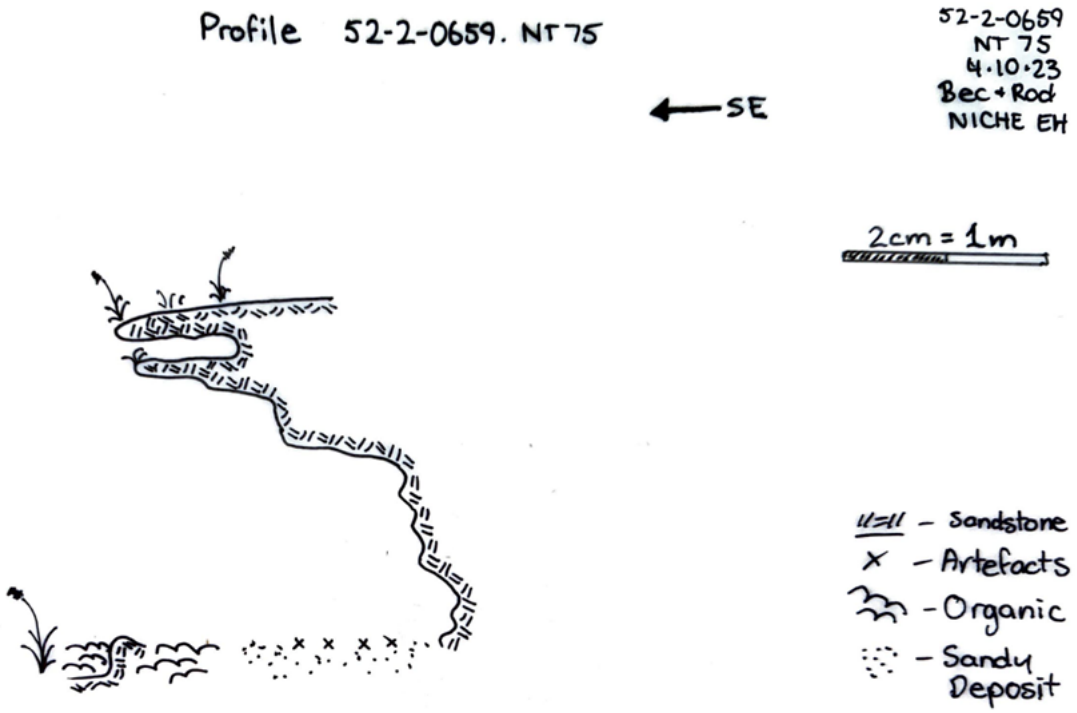


Figure 32: Section profile of Northern Trail 75

2.19.4 Baseline recording images – detailed site recording

Artefacts



Plate 278: Overview of artefact location from southern end, facing north – Northern Trail 75.



Plate 279: Overview of ground axe location – Northern Trail 75.



Plate 280: Ground axe location – Northern Trail 75



Plate 281: Ground axe located at Northern Trail 75



Plate 282: Ground axe located at Northern Trail 75



Plate 283: Basalt ground flake/core located at Northern Trail 75



Plate 284: Quartz cores and basalt flake located at Northern Trail 75



Plate 285: Artefacts in situ – Northern Trail 75

2.20 Northern Trail 76 (NT 76 AHIMS # 52-2-0660)

This shelter is situated on a ridgeline landform and has been affected by block fall from cavernous weathering. It is located at 179 m elevation, 20 m from stored water and 25 m east of Honeysuckle Creek. The shelter is in stable condition and no artefacts or art surfaces were found during this survey.

2.20.1 Northern Trail 76 baseline recording data

Table 59: Baseline recording data for Northern Trail 76

Overview					
Site type	Shelter with Artefacts	Corrected MGAE	310716	Corrected MGAN	6220128
Previous Recording	Illawarra Prehistory Group: C. Sefton	Date	1981		
Site Details					
Width	10 m	Depth	3 m	Height	3 m
Orientation	E 114°	Floor area	10 m^2	Floor condition	Stable
Location in Landscape	179 m elevation under first ledge – 20 m from stored water, 250 m east from Honeysuckle Creek.				
Shelter exterior/formation	Block fall – cavernous weathering.				
Shelter interior	Block fall – weathering.				
Distance to water	20 m	Landform	Ridgeline		
Setting	Continuous				
Archaeological Deposit					
Deposit	Sandy floor	Describe	Organic, sparse.		
Visible artefacts?	None found this time.	Where?	N/A	How many?	N/A
Art					
Art surfaces	None visible.				
Art Condition	N/A				
Art Overview	N/A				
Damage/threats					
Water wash	Yes – none active, but recent	Graffiti	None	Macro vegetals	Yes – back wall
Animals	Small	Salt/granular loss	None active	Fissuring	Roof – not active
Insects	Small	Spalling/exfoliation	None active	Other	N/A
Fire	None	Block fall	Ancient		

Table 60: Baseline recording data for monitoring points present within Northern Trail 76.

Monitoring Points		
Number	**Location in shelter**	**Notes**
1	At 3 m	Vertical crack - back wall to roof to lower shelf.
2	At 4 m	Water wash – not active.
3	At 7.3 m	Water seepage and vertical crack.
4	4 m to the north of the shelter (approximately).	Large boulder.

2.20.2 Baseline recording images – site overview



Plate 286: Shelter overview – Northern Trail 76.



Plate 287: Shelter overview – Northern Trail 76.a

2.20.3 Baseline recording plans – site overview

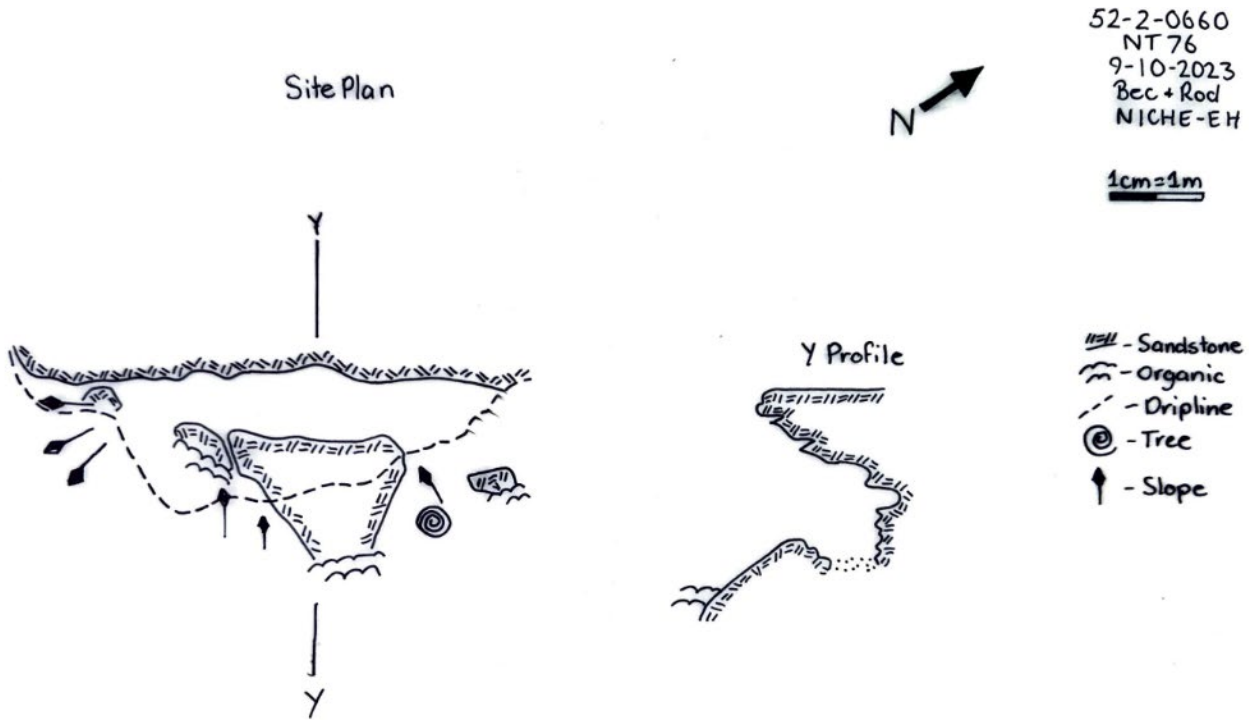


Figure 33: Plan and Y profile section of Northern Trail 76.

2.20.4 Baseline recording images – detailed site recording



Plate 288: Monitoring point #1 and #2 overview – Northern Trail 76.



Plate 289: Monitoring point #1 – Northern Trail 76.



Plate 290: Monitoring point #1 – Northern Trail 76.



Plate 291: Monitoring point #1 – Northern Trail 76.



Plate 292: Monitoring point #2 – Northern Trail 76.



Plate 293: Monitoring point #2 – Northern Trail 76.



Plate 294: Monitoring point #3 – Northern Trail 76.



Plate 295: Monitoring point #3 – Northern Trail 76.



Plate 296: Monitoring point #3 – Northern Trail 76.



Plate 297: Monitoring point #4, large boulder overhanging 4 m N of shelter – Northern Trail 76.

2.21 Northern Trail 80 (NT 80 AHIMS # 52-2-3442)

This isolated, non-continuous sandstone shelter has been affected by block fall and cavernous weathering. It is located on a mid-slope landform at 210 m altitude from stored water, below the end of fire trail 9D. The mid-lower valley slope is near Waratah Rivulet. No artefacts or art surfaces were relocated during the survey.

2.21.1 Northern Trail 80 baseline recording data

Table 61: Baseline recording data for Northern Trail 80

Overview					
Site type	Shelter with Artefacts and PAD.	Corrected MGAE	310966	Corrected MGAN	6218409
Previous Recording	Illawarra Prehistory Group: C. Sefton	Date	2007		
Site Details					
Width	17 m	Depth	4 m	Height	1.8 m
Orientation	65° NE	Floor area	5 m^2	Floor condition	Good – some animal disturbance / wash.
Location in Landscape	On mid-slope, 210 m altitude from stored water (western side), at/below end of fire trail 9E.				
Shelter exterior/formation	Shelter formed from cavernous weathering and block fall on either sides, non-continuous, located at 210 m contour.				
Shelter interior	Shelter floor deposit is an orange, loamy sand, eroded from the shelter. Deposit depth at least 35 cm, with some exposed sandstone block fall present.				
Distance to water	120 m	Landform	Mid-lower valley slope to Waratah Rivulet		
Setting	Non-continuous overhang – isolated.				
Archaeological Deposit					
Deposit	Yes	Describe	35 cm orange, loamy sand – artefacts present in the dripline (likely wash down). 2 x artefacts recorded previously in dripline – unable to relocate.		
Visible artefacts?	No – unable to relocate.	Where?	N/A	How many?	N/A
Art					
Art surfaces	Nil				
Art Condition	N/A				
Art Overview	N/A				
Damage/threats					
Water wash	Yes	Graffiti	No	Macro vegetals	Yes – lichen
Animals	Yes – wombats and others.	Salt/granular loss	Yes – along water lines.	Fissuring	No
Insects	Minor	Spalling/exfoliation	Yes – along back wall / roof	Other	N/A

Fire	No	Block fall	Yes – on sides of shelter.		

Table 62: Baseline recording data for monitoring points present within Northern Trail 80.

Monitoring Points		
Number	**Location in shelter**	**Notes**
1	Runs from SW corner of shelter.	Faultline/crack
2	Runs from back wall, up ceiling in NE direction.	Start of crack/wear point.
3	Ceiling	Portion of ceiling lifted – ready to break off.
4	Back of shelter	Natural fissure.

2.21.2 Baseline recording images – site overview



Plate 298. Northern Trail 80 shelter overview, S aspect.



Plate 299: Northern Trail 80 shelter overview, N aspect.

2.21.3 Baseline recording plans – site overview

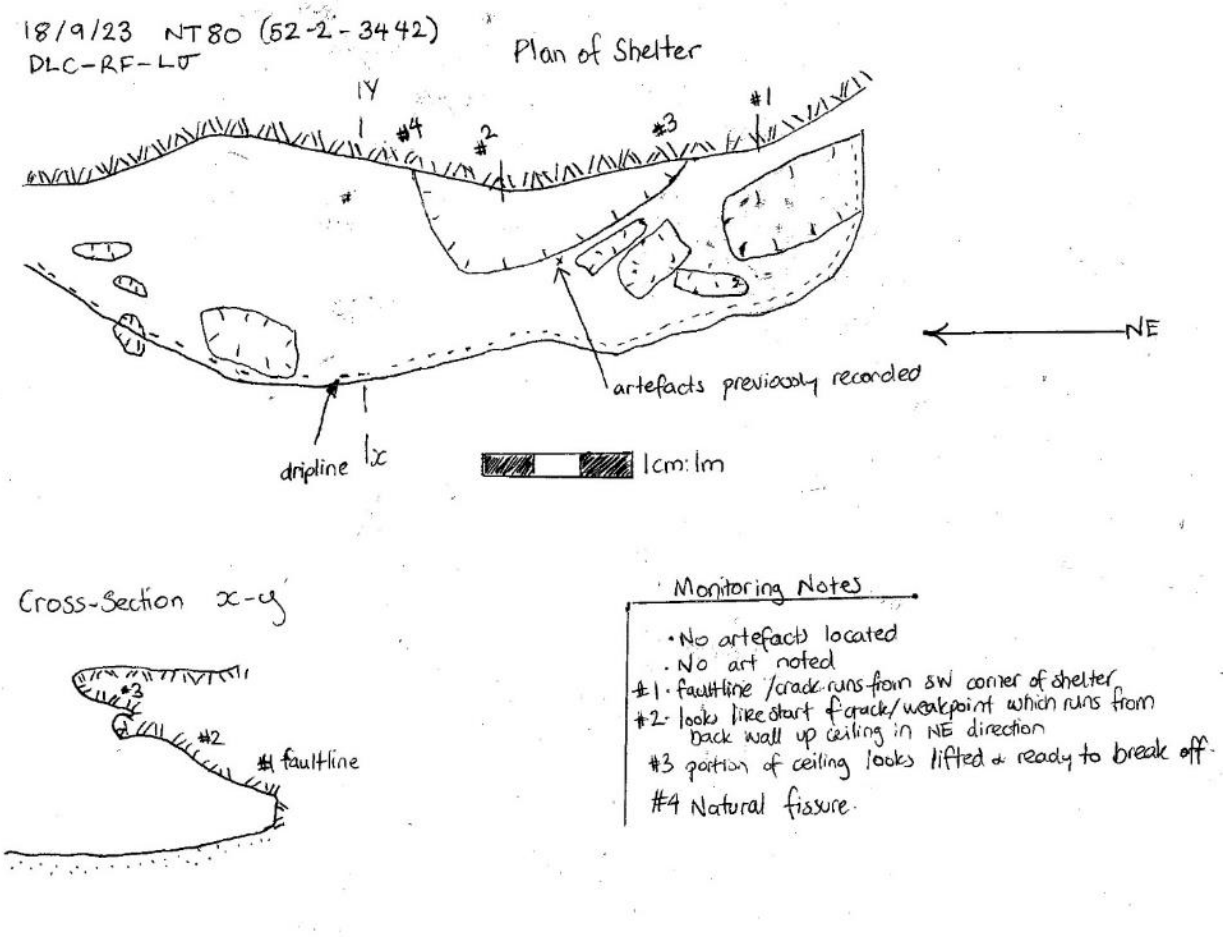


Figure 34: Plan and section of Northern Trail 80.

2.21.4 Baseline recording images – detailed site recording



Plate 300: Northern Trail 80 monitoring Point # 1, SW corner of shelter.



Plate 301: Northern Trail 80 overview of monitoring Points # 2-4, backwall and ceiling.

2.22 Northern Trail 81 (NT 81 AHIMS # 52-2-3443)

This continuous overhang shelter has been affected by block fall and cavernous weathering. It is located on a lower valley slope landform at 210 m altitude, 500 m NE of the end of fire trail 9D. Twelve previously recorded artefacts and one additional artefact, were located, however no art surfaces were relocated during the survey. Extensive water wash, smoke and salt build-up was found to be present on the shelter walls and roof.

2.22.1 Northern Trail 81 baseline recording data

Table 63: Baseline recording data for Northern Trail 81

Overview					
Site type	Shelter with Artefacts and PAD.	Corrected MGAE	311035	Corrected MGAN	6218810
Previous Recording	Illawarra Prehistory Group: C. Sefton	Date	2007		
Site Details					
Width	26 m	Depth	10 m	Height	1.7 m
Orientation	E	Floor area	15 m^2	Floor condition	Good – eroding and aggrading.
Location in Landscape	Lower valley slope, 210 m altitude, 500 m NE of end of fire trail 9D, 30 m S of side creek, running east to Waratah Rivulet.				
Shelter exterior/formation	Large, continuous overhang with block fall on either side. Formed by cavernous weathering. Dense vegetation outside of shelter with water channel running through shelter to outside.				
Shelter interior	Shelter floor slopes up to backwall with decent (>50 cm) sandy loam deposit. Evidence of animals / insects. Extensive water wash and smoke on shelter walls and roof. Build-up of black smoke and salts on roof.				
Distance to water	30 m side creek	Landform	Lower valley slope		
Setting	Continuous overhang				
Archaeological Deposit					
Deposit	Yes – 30 cm to 100 cm of brown sandy loam.	Describe	1 x additional bi-polar cobble flake – 33 mm (L) x 12 mm (W) x 20 mm (T).		
Visible artefacts?	Yes	Where?	Dripline	How many?	x 12, previously recorded.
Art					
Art surfaces	Nil				
Art Condition	Nil				
Art Overview	Nil				
Damage/threats					
Water wash	Yes – extensive	Graffiti	No	Macro vegetals	No
Animals	Yes	Salt/granular loss	Yes	Fissuring	No
Insects	Yes	Spalling/exfoliation	Yes – on roof and back wall.	Other	N/A

Fire	Yes – blackened from smoke.	Block fall	Yes		

Table 64: Baseline recording data for monitoring points present within Northern Trail 81.

Monitoring Points		
Number	**Location in shelter**	**Notes**
Nil	-	-

2.22.2 Baseline recording images – site overview



Plate 302: Northern Trail 81 shelter overview of interiors, facing south.



Plate 303: Northern Trail 81 shelter overview of interiors, facing north.

2.22.3 Baseline recording plans – site overview

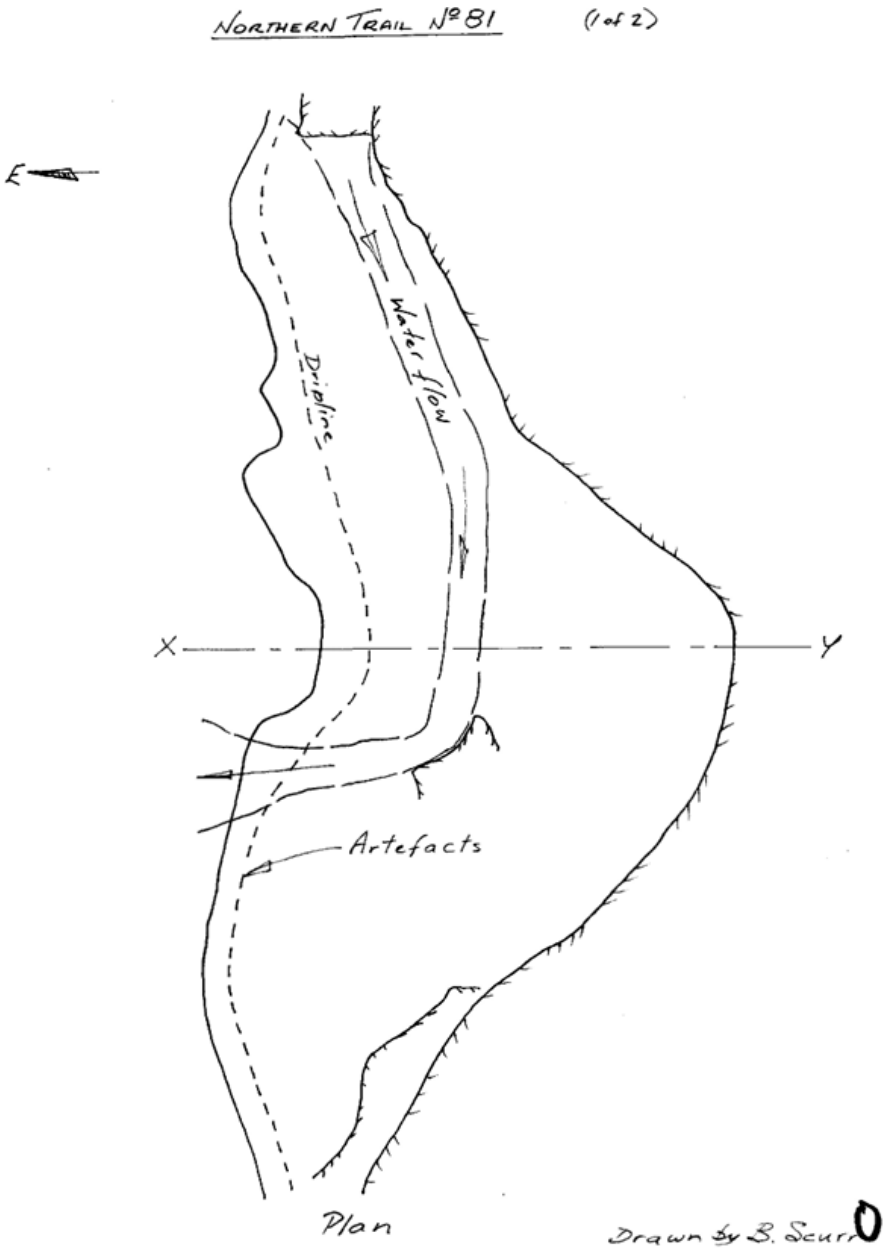


Figure 35: Plan of Northern Trail 81. From AHIMS site card, drawn by B. Scurr.

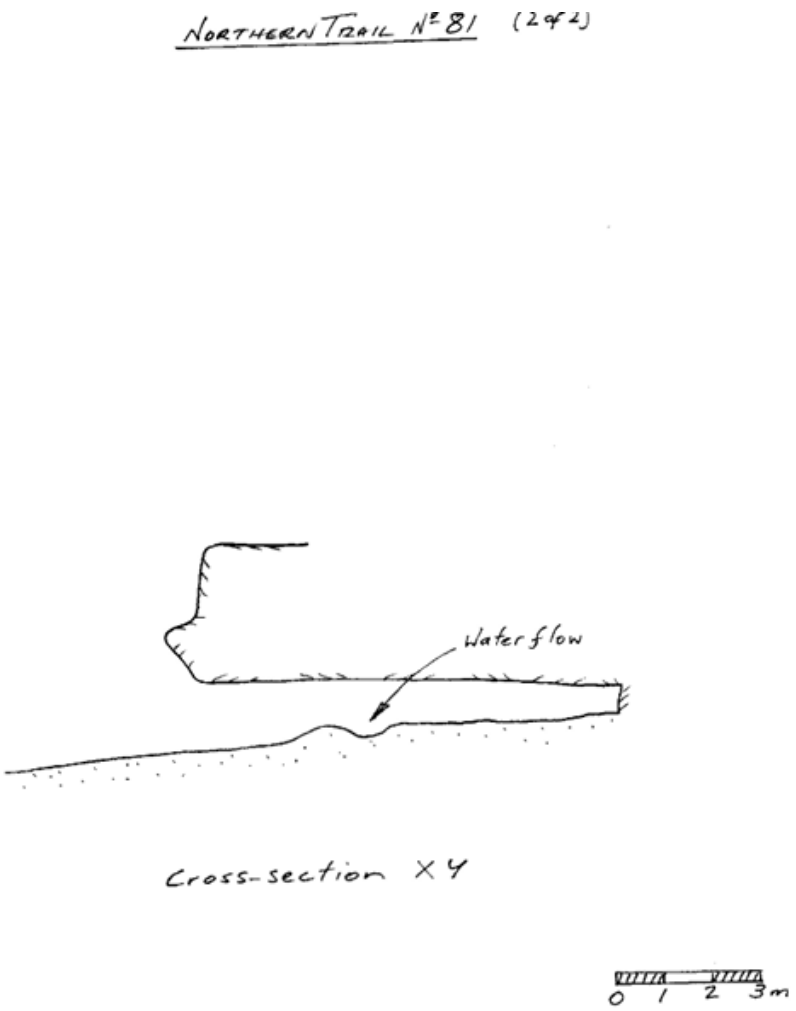


Figure 36: Section sketch of Northern Trail 81. From AHIMS site card, drawn by B. Scurr.

2.22.4 Baseline recording images – detailed site recording



Plate 304: Detail of waterflow through shelter where artefacts located at Northern Trail 81, facing south.

2.23 Northern Trail 85 (NT 85 AHIMS # 52-2-3853)

This shelter has been affected by cavernous weathering and block fall. The shelter is continuous and located at 185 m elevation, 50 m west of water. The art panel located at this shelter is faded and weathered. It was located on a lower rock shelf at the southern end.

2.23.1 Northern Trail 85 baseline recording data

Table 65: Baseline recording data for Northern Trail 85

Overview					
Site type	Shelter with Art	Corrected MGAE	310769	Corrected MGAN	6219229
Previous Recording	Illawarra Prehistory Group: C. Sefton	Date	2007		
Site Details					
Width	23 m	Depth	3 m	Height	3.6 m
Orientation	108° east	Floor area	36 m^2	Floor condition	Poor – active erosion
Location in Landscape	Elevation 185 m				
Shelter exterior/formation	Block fall – uplift.				
Shelter interior	Block fall and cavernous weathering.				
Distance to water	50 m west	Landform	Ridgeline		
Setting	Continuous				
Archaeological Deposit					
Deposit	Nil	Describe			
Visible artefacts?	Nil	Where?		How many?	
Art					
Art surfaces	1 x panel, 4 x motifs.				
Art Condition	Faded – weathered.				
Art Overview	See art form – art panel is on lower rock shelf on southern end.				
Damage/threats					
Water wash	Yes – active.	Graffiti	No	Macro vegetals	Yes – ferns and algae.
Animals	Wombats and small animals.	Salt/granular loss	Yes – northern wall.	Fissuring	N/A
Insects	Yes	Spalling/exfoliation	Back wall	Other	N/A
Fire	Northern roof.	Block fall	Ancient		

Table 66: Baseline recording data for art surfaces present within Northern Trail 85.

Motif No.	Type	Form	Media	Colour	Measurement
Panel 1: 1200 mm x 520 mm at 3.1 m – 4.3 m.					
1	Indeterminate	One line.	Charcoal	Black	70 mm x 50 mm
2	Indeterminate	Two lines.	Charcoal	Black	90 mm x 40 mm
3	Indeterminate	Lines and infill/hatching.	Charcoal	Black	200 mm x 350 mm
4	Macropod	Charcoal with infill.	Charcoal	Black	390 mm x 290 mm

Table 67: Baseline recording data for monitoring points present within Northern Trail 85.

Monitoring Points		
Number	**Location in shelter**	**Notes**
1	At 1.7 m.	Seepage and crack.
2	At 3.7 m to 5.02 m.	Seepage (changing on and off art surface). Possible dripline diversions management. Crack runs to roof line.
3	At 6.49 m to 11.3 m.	Active erosion and seepage.
4	At 15m	Vertical crack and active erosion.
5	Roof to back wall – 7.19 m – 11.68 m (4.70 m)	On roof crack – follows to back wall and adjoins monitoring point #2 (opens to seepage).

2.23.2 Baseline recording images – site overview



Plate 305: Shelter overview from northern end – Northern Trail 85.



Plate 306: Shelter overview from southern end – Northern Trail 85.



Plate 307: Monitoring point #1, seepage – Northern Trail 85.



Plate 308: Monitoring point #2, seepage on artwork – Northern Trail 85.



Plate 309: Monitoring point #2, seepage on art work – Northern Trail 85.



Plate 310: Monitoring point #2, seepage on art work – Northern Trail 85.



Plate 311: Monitoring point #3, active erosion and seepage – Northern Trail 85.



Plate 312: Monitoring point #4, active erosion and vertical crack – Northern Trail 85.



Plate 313: Monitoring point #4, active erosion and vertical crack – Northern Trail 85.



Plate 314: Monitoring point #4, active erosion and vertical crack – Northern Trail 85.



Plate 315: Monitoring point #5 – Northern Trail 85.



Plate 316: Monitoring point #5 – Northern Trail 85.

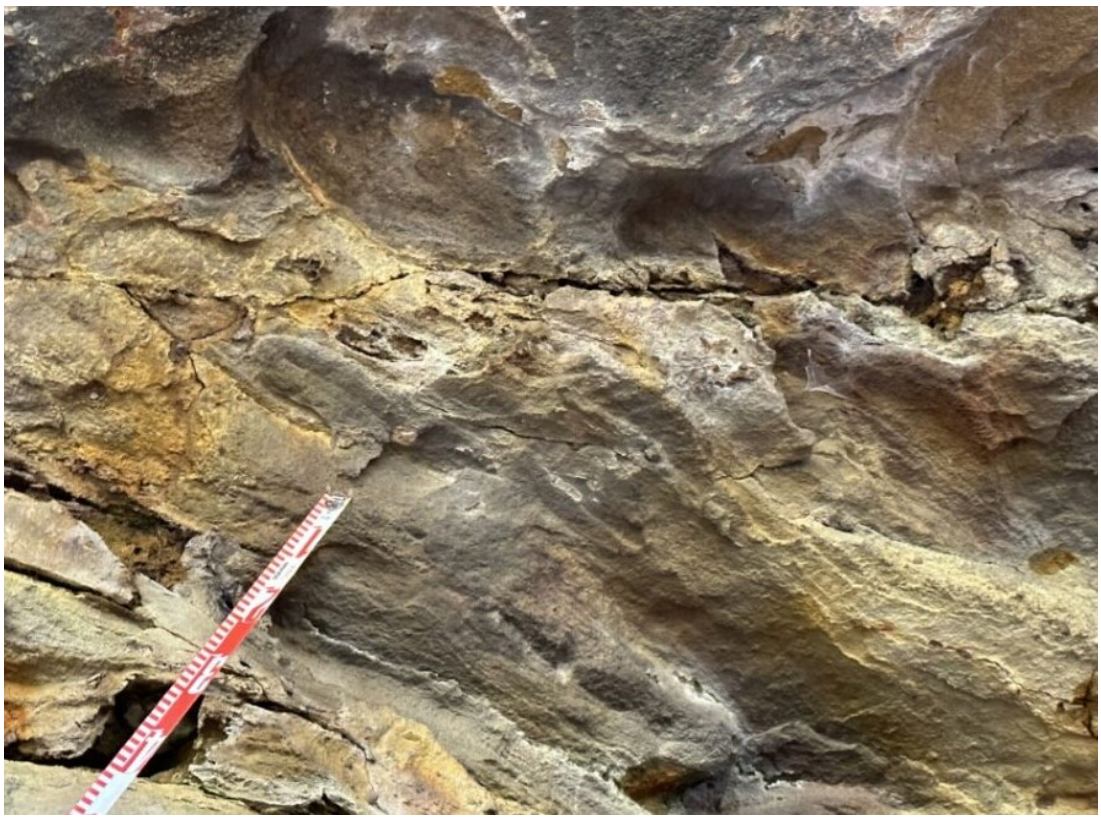


Plate 317: Monitoring point #5 – Northern Trail 85.



Plate 318: Monitoring point #5 – Northern Trail 85.



Plate 319: Monitoring point #5 – Northern Trail 85.

2.23.3 Baseline recording plans – site overview

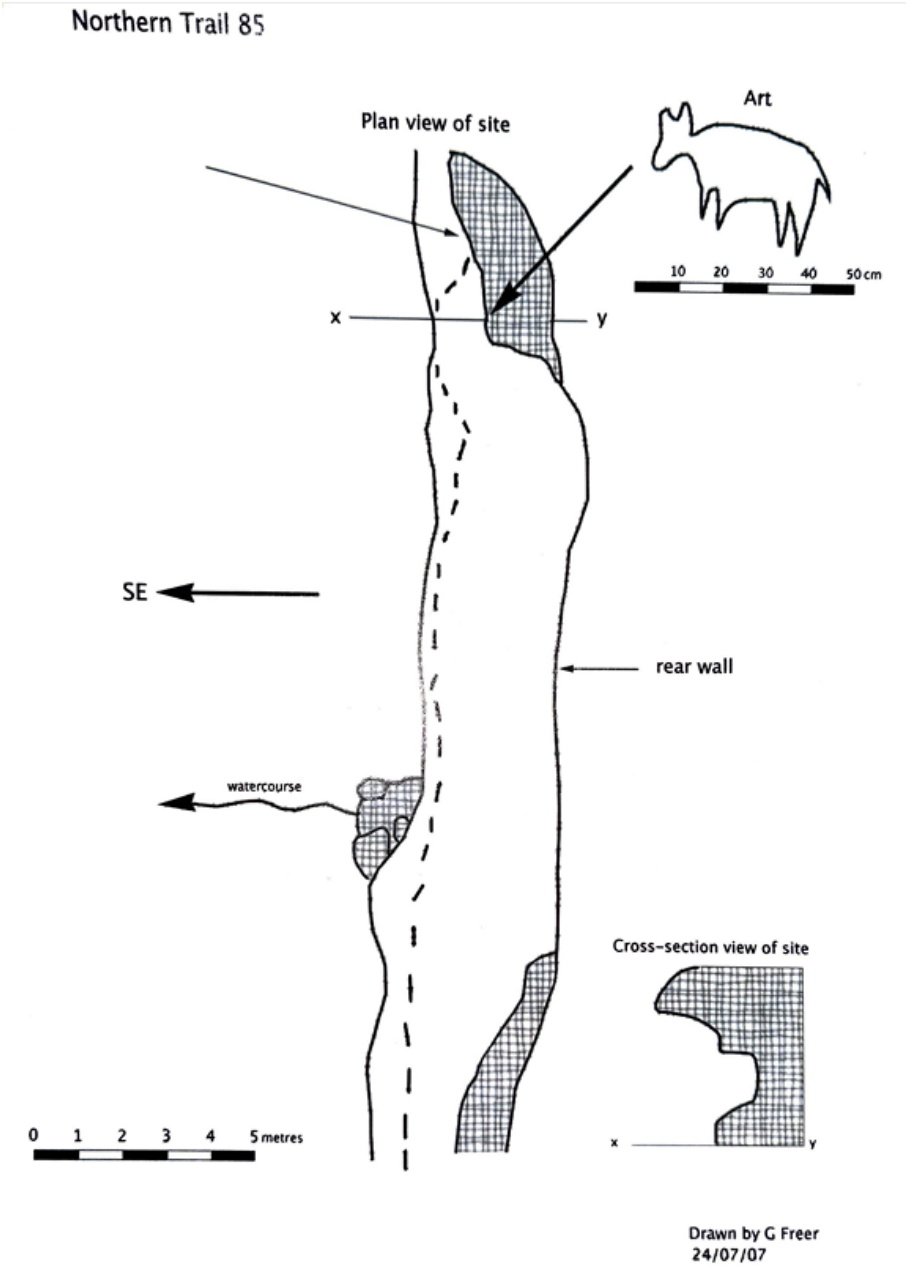


Figure 37: Plan, section and visible art (motif #4) of Northern Trail 85. From AHIMS site card.

2.23.4 Baseline recording images – detailed panel and site recording

Panel 1



Plate 320: Panel #1 overview – Northern Trail 85.



Plate 321: Panel #1, motif #1 – Northern Trail 85.



Plate 322: Panel #1, motif #2 – Northern Trail 85.



Plate 323: Panel #1, motif #3 – Northern Trail 85.



Plate 324: Panel #1, motif #4 – Northern Trail 85.



Plate 325: Possible grinding groove – Northern Trail 85.

2.24 Northern Trail 86 (NT 86 AHIMS # 52-2-3854)

This continuous, mid-ridgeline shelter has been affected by cavernous weathering and block fall. It is located at 237 m altitude, 230 m west of Honeysuckle Creek. Three artefacts were located during the survey within the dripline. No art surfaces were recorded during the survey.

2.24.1 Northern Trail 86 baseline recording data

Table 68: Baseline recording data for Northern Trail 86

Overview					
Site type	Shelter with Artefacts	Corrected MGAE	310345 (same coordinate – correct)	Corrected MGAN	6219540
Previous Recording	Illawarra Prehistory Group: C. Sefton	Date	2000's?		
Site Details					
Width	6 m	Depth	3.4 m	Height	2.5 m
Orientation	354° N	Floor area	12 m^2	Floor condition	Stable
Location in Landscape	237 m altitude				
Shelter exterior/formation	Block fall / weathering				
Shelter interior	Block fall / weathering				
Distance to water	230 m NW of Honeysuckle Creek	Landform	Ridgeline - mid		
Setting	Continuous				
Archaeological Deposit					
Deposit	Sandy loam	Describe	Stable with organic build-up.		
Visible artefacts?	Yes	Where?	Dripline	How many?	3 – 1 x black chert, 2 x cream quartzite.
Art					
Art surfaces	None.				
Art Condition	N/A				
Art Overview	N/A				
Damage/threats					
Water wash	Yes	Graffiti	No	Macro vegetals	Yes
Animals	Yes	Salt/granular loss	Yes	Fissuring	No
Insects	Yes	Spalling/exfoliation	Yes	Other	N/A
Fire	Yes	Block fall	Yes		

Table 69: Baseline recording data for monitoring points present within Northern Trail 86.

Monitoring Points		
Number	**Location in shelter**	**Notes**
1	At 1.5 m	Old water wash with vertical spauling.
2	At 3 m – upper wall.	Vertical spauling – upper wall with vertical spauling crack - lower wall.
3	At 4.5 m – lower back wall.	Vertical crack – lower back wall.
4	At 5.5 m – Upper back wall.	Vertical crack – upper back wall.
5	At 4 m – Lower roof.	Vertical crack – lower roof.

2.24.2 Baseline recording images – site overview



Plate 326: Shelter overview, SW aspect – Northern Trail 86.



Plate 327: Shelter overview, E aspect – Northern Trail 86.



Plate 328: Monitoring point #1 – Northern Trail 86.



Plate 329: Monitoring point #2 – Northern Trail 86.



Plate 330: Monitoring point #2 – Northern Trail 86.



Plate 331: Monitoring point #2 – Northern Trail 86.



Plate 332: Monitoring point #3 – Northern Trail 86.



Plate 333: Monitoring point #4 – Northern Trail 86.



Plate 334: Monitoring point #5 – Northern Trail 86.

2.24.3 Baseline recording plans – site overview

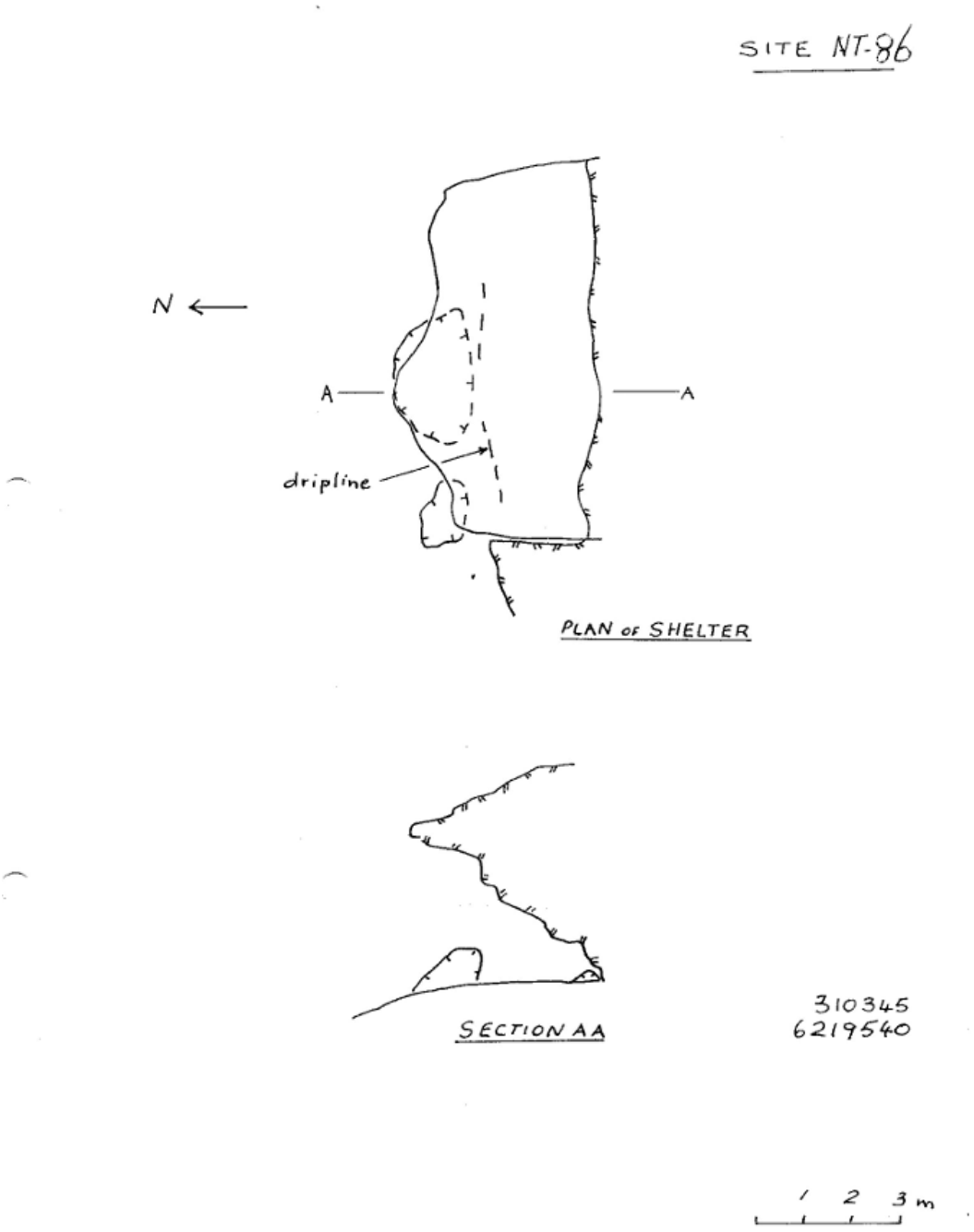


Figure 38: Plan and section sketch of Northern Trail 86. From AHIMS site card, drawn by C. Sefton.

2.24.4 Baseline recording images – detailed site recording

Artefacts



Plate 335: Sample of artefacts located at Northern Trail 86.

2.25 Northeast Woronora 9 (NEW 9 AHIMS # 52-2-0529)

This continuous shelter is situated on a ridgeline landform at 263 m elevation, 220 m southwest from 4WD track off Woronora Dam Road. It is 420 m northeast of Waratah Rivulet. Ancient block fall, and chemical and cavernous weathering has occurred, and art located is barely visible. No artefacts were located at this site during this recording.

2.25.1 Northeast Woronora 9 baseline recording data

Table 70: Baseline recording data for Northeast Woronora 9

Overview					
Site type	Shelter with Art	Corrected MGAE	311500	Corrected MGAN	6219620
Previous Recording	Illawarra Prehistory Group: C. Sefton	Date	1980; 2007		
Site Details					
Width	6 m	Depth	1.4 m	Height	1.4 m
Orientation	E 90°	Floor area	10 m^2	Floor condition	Stable
Location in Landscape	263 m elevation – 220 m SW from 4WD track off Woronora Dam Road.				
Shelter exterior/formation	Ancient block fall and chemical weathering.				
Shelter interior	Ancient block fall, and chemical and cavernous weathering.				
Distance to water	420 m NE of Waratah Rivulet	Landform	Ridgeline		
Setting	Continuous				
Archaeological Deposit					
Deposit	Sandy loam	Describe	-		
Visible artefacts?	None found	Where?	N/A	How many?	N/A
Art					
Art surfaces	3 x panels and 9 x motifs – this survey could not distinguish between individual motifs as the charcoal is barely visible.				
Art Condition	As above, also see original site card.				
Art Overview	As above, also see original site card.				
Damage/threats					
Water wash	None recent, not active – monitoring point #1.	Graffiti	No	Macro vegetals	Yes
Animals	Small	Salt/granular loss	Lower back wall/roof – very sparse.	Fissuring	No
Insects	Yes	Spalling/exfoliation	Back wall near monitoring point #2.	Other	N/A
Fire	No	Block fall	Ancient		

Table 71: Baseline recording data for art surfaces present within Northeast Woronora 9.

Motif No.	Type	Form	Media	Colour	Measurement
Panel 1					
1	Indeterminate	Faded	Charcoal	Black	-
2	Indeterminate	Faded	Charcoal	Black	-
3	Indeterminate	Faded	Charcoal	Black	-
Panel 2					
4	Macropod	Faded	Charcoal	Black	-
5	Indeterminate	Faded	Charcoal	Black	-
6	Indeterminate	Faded	Charcoal	Black	-
Panel 3					
7	Indeterminate	Faded	Charcoal	Black	-
8	Indeterminate	Faded	Charcoal	Black	-
9	Indeterminate	Faded	Charcoal	Black	-

Table 72: Baseline recording data for monitoring points present within Northeast Woronora 9.

Monitoring Points		
Number	**Location in shelter**	**Notes**
1	At 3.5 m to 3 m	Vertical cracking on roof – x 2 parallel cracks 23 cm apart, runs to external rock face.

2.25.2 Baseline recording images – site overview



Plate 336: Shelter overview, NW aspect - Northeast Woronora 9.



Plate 337: Shelter overview, SW aspect – Northeast Woronora 9.



Plate 338: Monitoring point #1 – Northeast Woronora 9.



Plate 339: Monitoring point #1 – Northeast Woronora 9.

2.25.3 Baseline recording plans – site overview

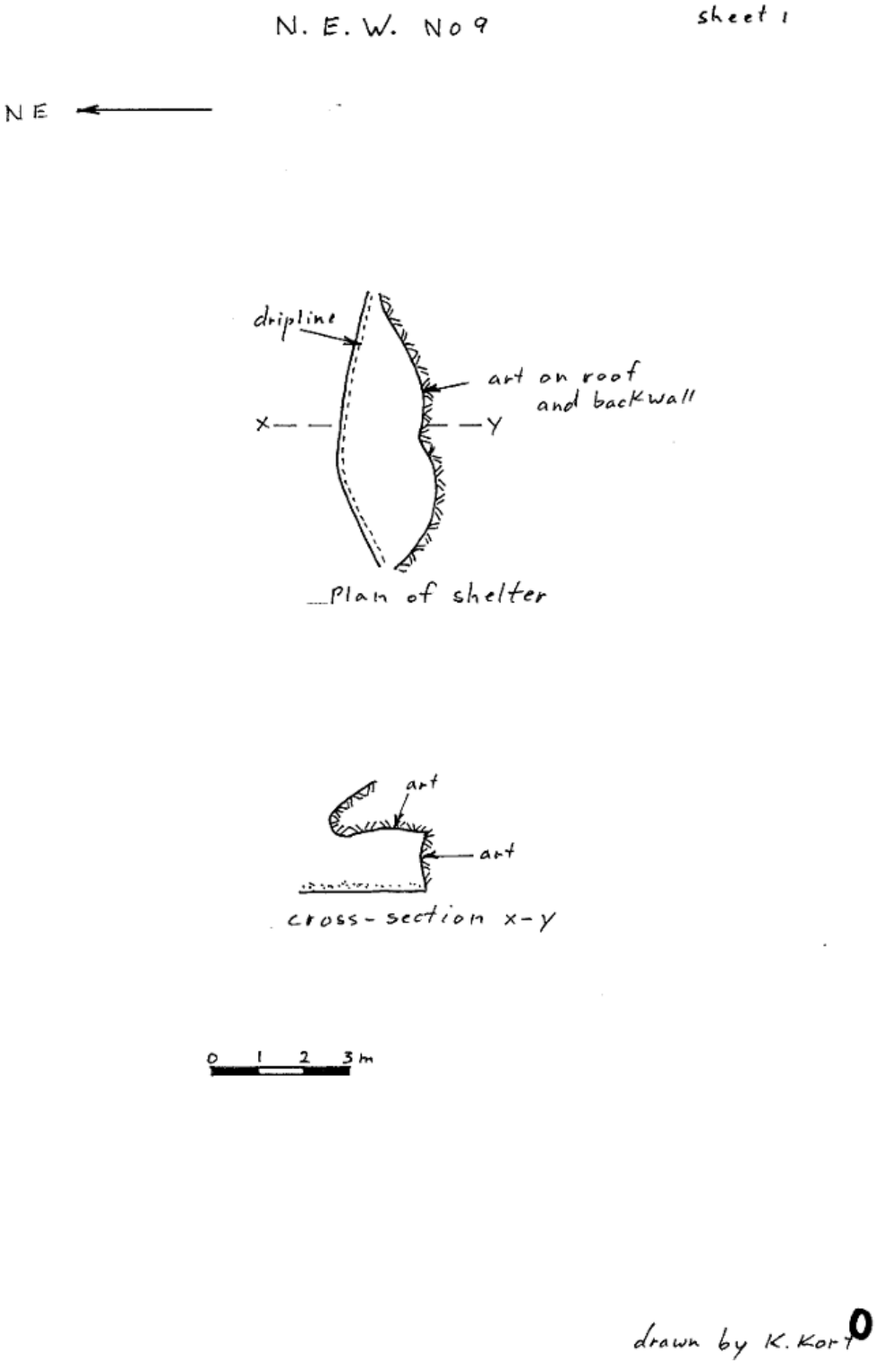


Figure 39: Plan and section of Northeast Woronora 9. From AHIMS site card, drawn by K. Kort.

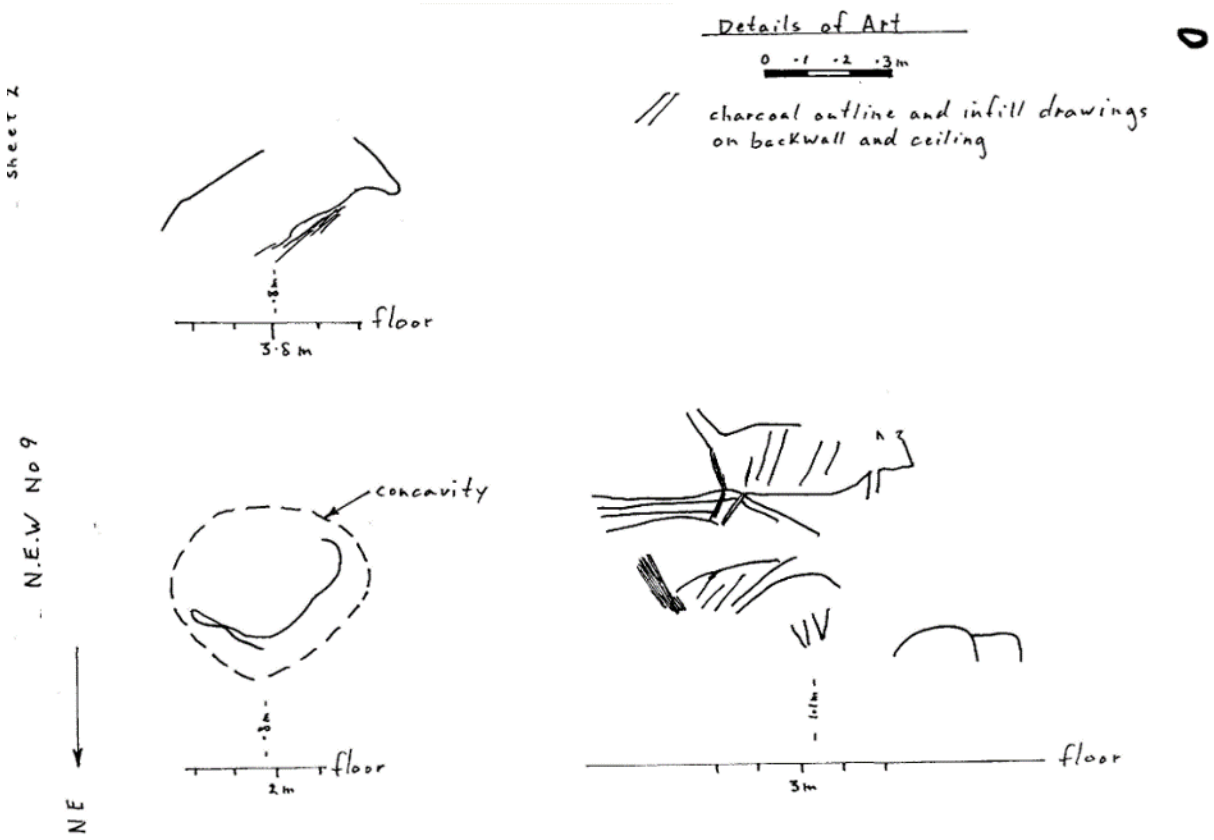


Figure 40: Art panel of Northeast Woronora 9. From AHIMS site card, drawn by K. Kort.

2.25.4 Baseline recording images – detailed panel recording

Panel 1



Plate 340: Art panel #1 – Northeast Woronora 9.

Panel 2

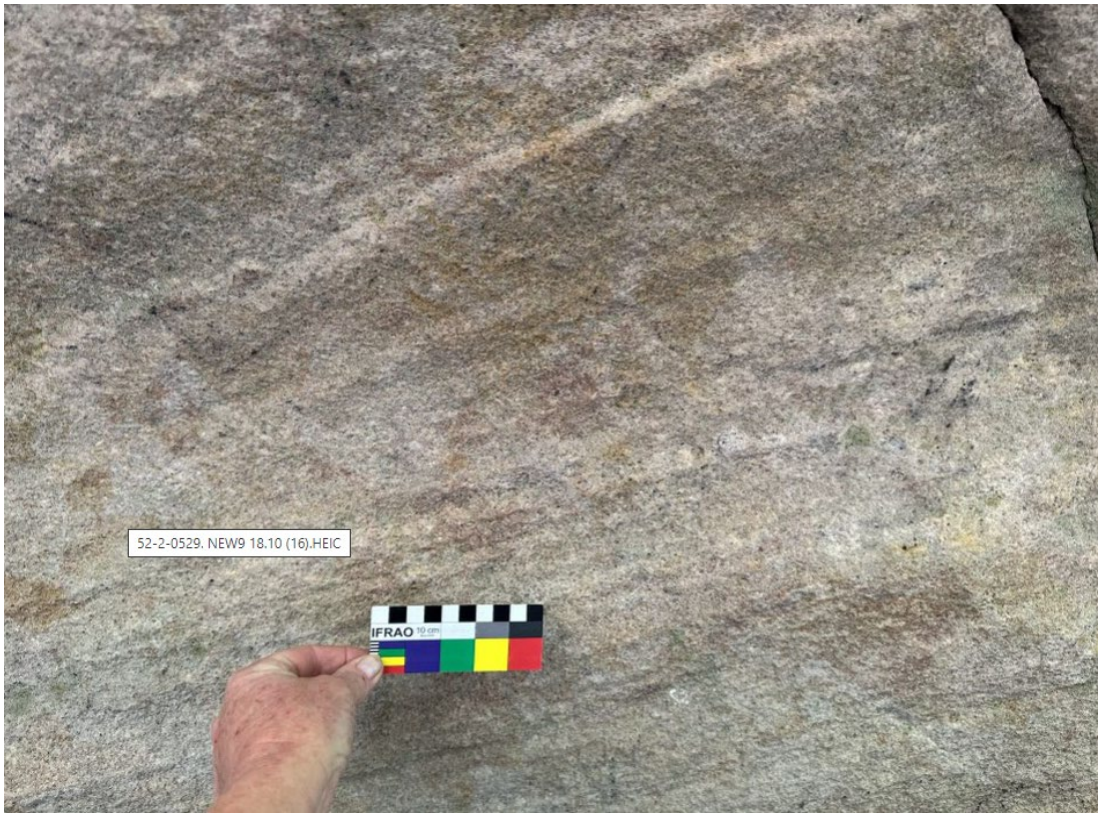


Plate 341: Panel #2 – Northeast Woronora 9.

Panel 3



Plate 342: Panel #3 – Northeast Woronora 9.

2.26 Northeast Woronora 12 (NEW 12 AHIMS # 52-2-1236)

This isolated shelter is formed within an ancient sandstone ridgeline that has been affected by block fall and erosion. It is located at 190 m elevation. No artefacts were located during the survey. The art located at this shelter has been weathered and the exact location of the art has been found to be 230 m away from the original recorded coordinate.

2.26.1 Northeast Woronora 12 baseline recording data

Table 73: Baseline recording data for Northeast Woronora 12

Overview					
Site type	Shelter with Art and PAD	Corrected MGAE	310987	Corrected MGAN	6220106
Previous Recording	Illawarra Prehistory Group: C. Sefton	Date	1988; 2002		
Site Details					
Width	9 m	Depth	4 m	Height	3.5 m
Orientation	South	Floor area	3 x 5 m	Floor condition	Eroding, organic.
Location in Landscape	Elevation 190 m – 305° NW				
Shelter exterior/formation	Ancient sandstone ridgeline – block fall.				
Shelter interior	Block fall – erosion – continuous.				
Distance to water	6 m	Landform	-		
Setting	Isolated				
Archaeological Deposit					
Deposit	Sand PAD	Describe	-		
Visible artefacts?	No	Where?	N/A	How many?	N/A
Art					
Art surfaces	2 x panels. #1: charcoal indeterminate (faded) and #2: charcoal x 3 indeterminate (partial) – vertical parallel lines.				
Art Condition	Weathered				
Art Overview	Original co-ordinate 230 m of exact location.				
Damage/threats					
Water wash	-	Graffiti	-	Macro vegetals	-
Animals	-	Salt/granular loss	-	Fissuring	-
Insects	-	Spalling/exfoliation	-	Other	N/A
Fire	-	Block fall	-		

Table 74: Baseline recording data for art surfaces present within Northeast Woronora 12.

Motif No.	Type	Form	Media	Colour	Measurement
Panel 1					
1	Indeterminate	With infill	Charcoal	Black	20 cm x 45 cm
Panel 2					
2	Indeterminate	Partial	Charcoal	Black	10 cm x 15 cm

Table 75: Baseline recording data for monitoring points present within Northeast Woronora 12.

Monitoring Points		
Number	**Location in shelter**	**Notes**
1	At 2.95 m	Vertical crack from floor to art panel #2. Horizontal bedding separation from ground to art panels height. Active weathering above art panel #2.

2.26.2 Baseline recording images – site overview



Plate 343: Sandstone outcrop, checked for grinding grooves – Northeast Woronora 12.



Plate 344: Sandstone outcrop, checked for grinding grooves – Northeast Woronora 12.



Plate 345: Shelter overview – Northeast Woronora 12.



Plate 346: Shelter overview, W aspect – Northeast Woronora 12.



Plate 347: Shelter overview, W aspect – Northeast Woronora 12.



Plate 348: Shelter overview, E aspect – Northeast Woronora 12.



Plate 349: Recent water wash – Northeast Woronora 12.



Plate 350: Monitoring point #1, vertical cracking – Northeast Woronora 12.

2.26.3 Baseline recording plans – site overview

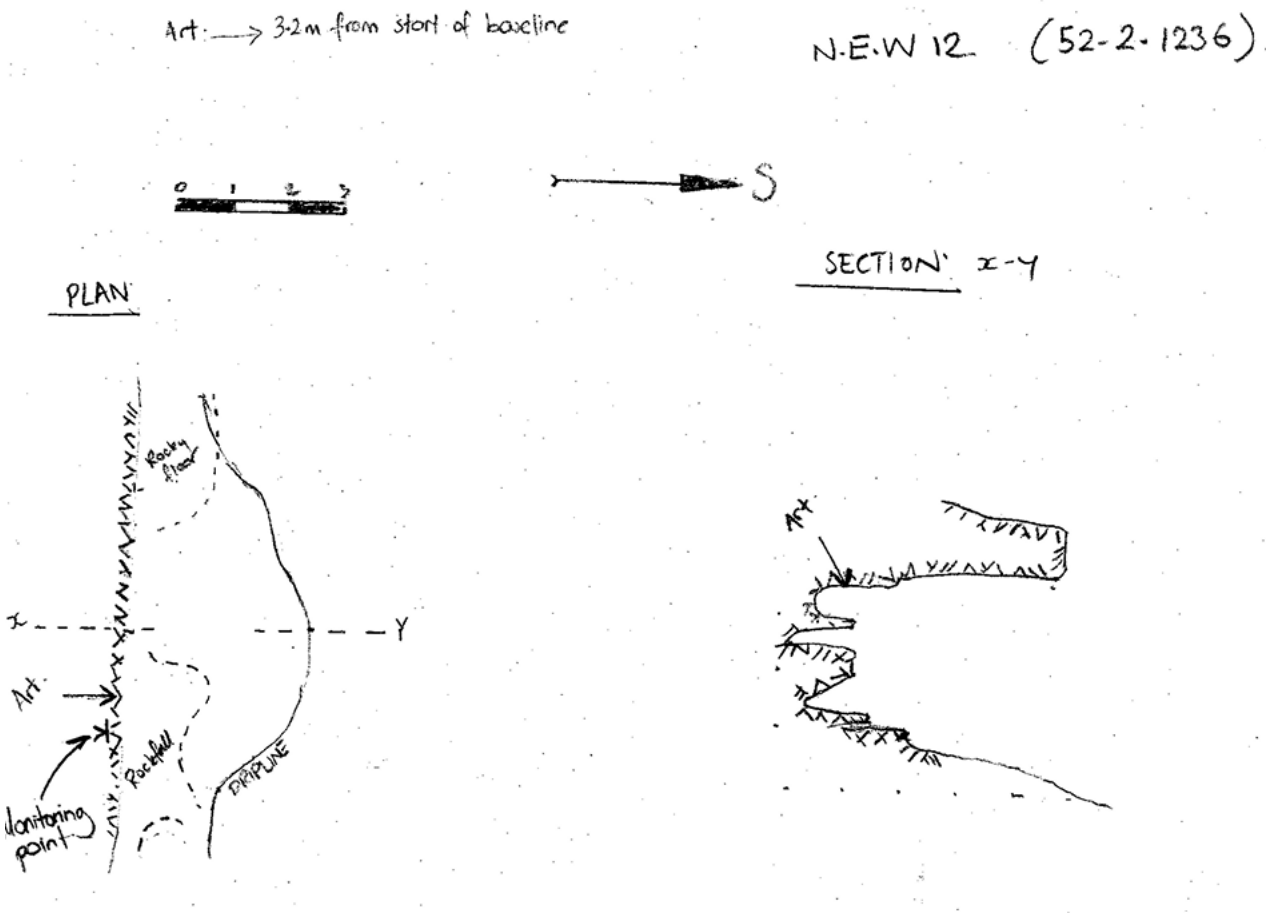


Figure 41: Plan and Y profile section of Northeast Woronora 12. Reproduced from AHIMS site card, original drawn by H.W Bronneberg.

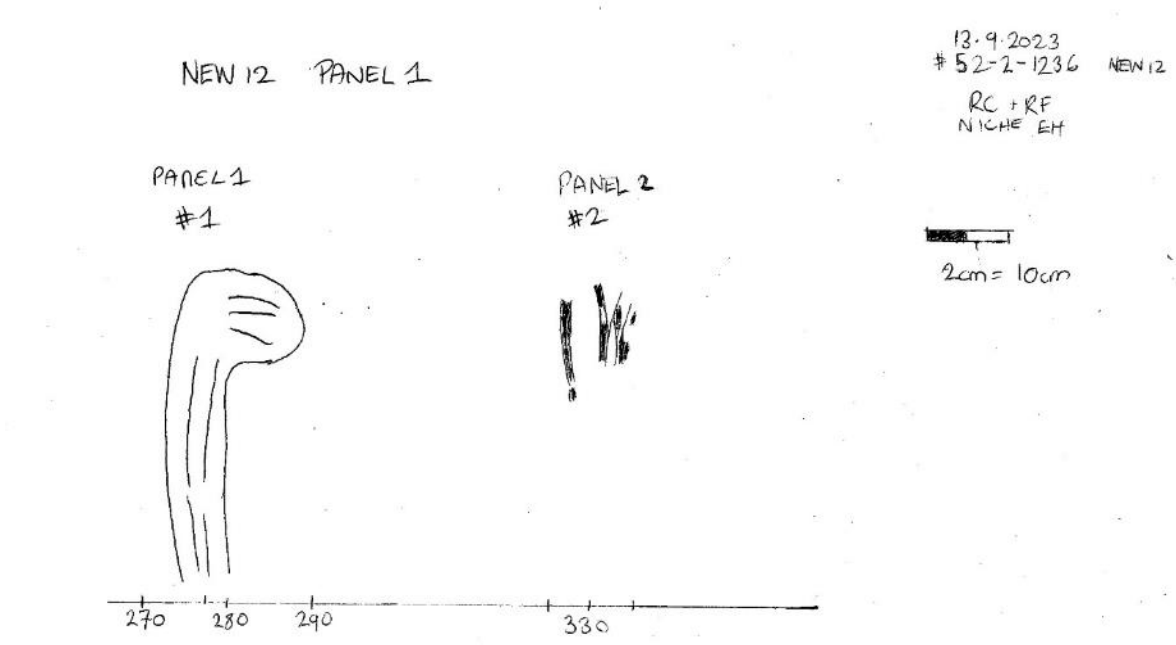


Figure 42: Art panel 1 and panel 2 of Northeast Woronora 12.

2.26.4 Baseline recording images – detailed panel recording

Panel 1



Plate 351: Art panel #1, motif #1 – Northeast Woronora 12.

Panel 2



Plate 352: Panel #2, motif #2 – Northeast Woronora 12.

2.27 Northeast Woronora 15 (NEW 15 AHIMS # 52-2-3511)

This shelter (continuous) is situated at 262 m elevation on a ridgeline landform. It is 420 m NE of Waratah Rivulet and has been affected by ancient block fall, and chemical and cavernous weathering. The site overall is stable, but some monitoring points have been recorded.

2.27.1 Northeast Woronora 15 baseline recording data

Table 76: Baseline recording data for Northeast Woronora 15

Overview					
Site type	Shelter with Art	Corrected MGAE	311500	Corrected MGAN	6219590
Previous Recording	Illawarra Prehistory Group: C. Sefton	Date	2007		
Site Details					
Width	16m	Depth	4.6m	Height	4.6m
Orientation	E 90°	Floor area	4m²	Floor condition	Stable
Location in Landscape	262m elevation, 220m SW from 4WD track off Woronora Dam Road				
Shelter exterior/formation	Ancient block fall				
Shelter interior	Ancient block fall and chemical / cavernous weathering				
Distance to water	420 m NE of Waratah Rivulet	Landform	Ridgeline		
Setting	Continuous				
Archaeological Deposit					
Deposit	Sandy loam PAD	Describe	-		
Visible artefacts?	None	Where?	N/A	How many?	N/A
Art					
Art surfaces	1 panel at 9.5m with 1 charcoal indeterminate drawing				
Art Condition	Poor				
Art Overview	1x indeterminate charcoal drawing				
Damage/threats					
Water wash	Yes, at 8m (not active, but recent)	Graffiti	No	Macro vegetals	Yes
Animals	Small	Salt/granular loss	Roof / minimal back wall	Fissuring	Back upper wall
Insects	Yes	Spalling/exfoliation	Yes, above art panel	Other	N/A
Fire	Roof	Block fall	Ancient		

Table 77: Baseline recording data for art surfaces present within Northeast Woronora 15.

Motif No.	Type	Form	Media	Colour	Measurement
Panel 1					
1	Indeterminate	Poor	Charcoal	Black	10cm x 30cm

Table 78: Baseline recording data for monitoring points present within Northeast Woronora 15.

Monitoring Points		
Number	**Location in shelter**	**Notes**
1	Exterior wall at 2m	Vertical crack (bedding separation)
2	Back wall at 3-5m	Vertical / horizontal bedding separation at back wall (likely to join #1)
3	Mid back wall 2m above floor	Vertical crack in the mid back wall
4	Back wall at 8m (3m down and 2.5-3m above floor)	Water wash and vertical crack at back wall. The crack is approx. 50cm in length
5	Back wall at 9.5-6.5m	Vertical crack in back wall
6	Art panel at 9.5m	Chip damage to the upper left of charcoal art
7	Back wall at 11-15m	Vertical and horizontal crack and bedding separation on the back wall. Early stages of block fall, and naturally occurring

2.27.2 Baseline recording images – site overview



Plate 353: Overview of shelter (southern end) – Northeast Woronora 15.



Plate 354: Overview of shelter (northern end) – Northeast Woronora 15

2.27.3 Baseline recording plans – site overview

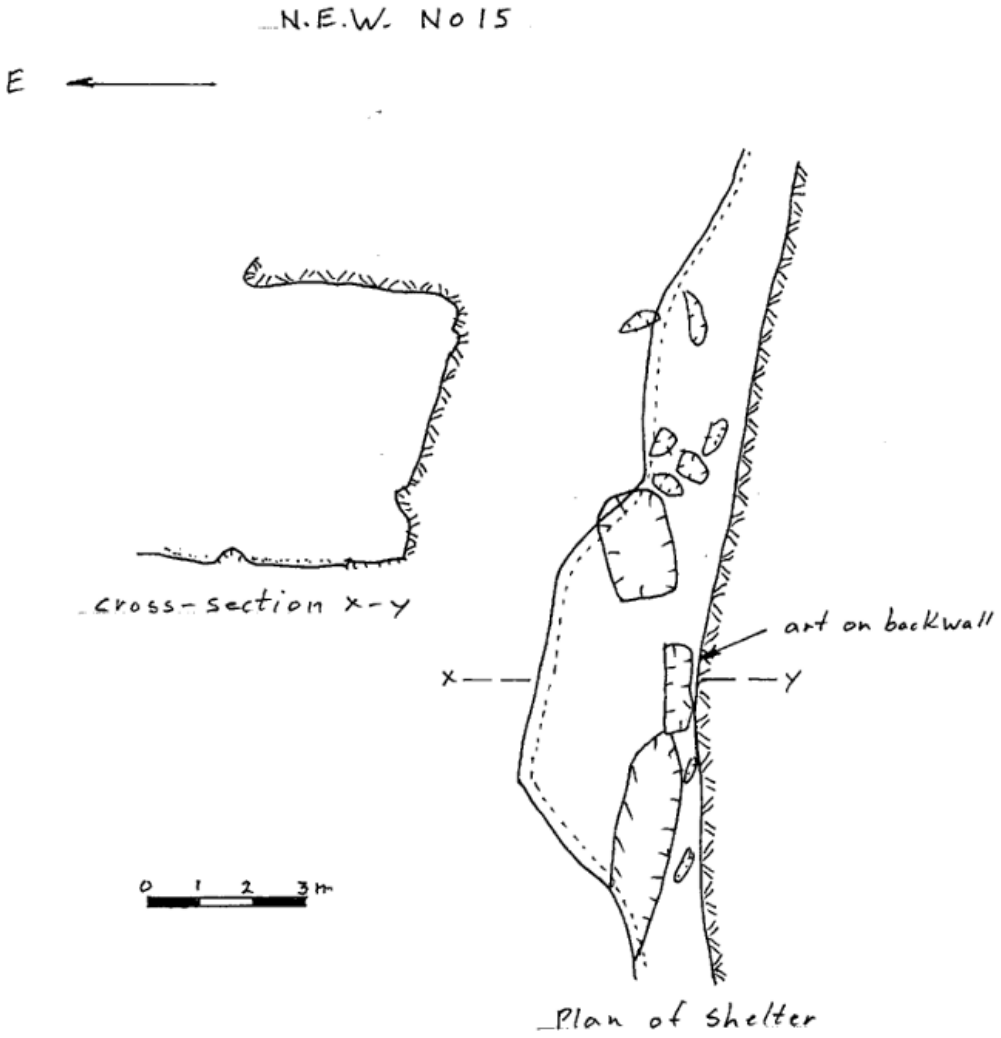


Figure 43: Plan and section of Northeast Woronora 15 (source: AHIMS site card, drawn by K. Kort)

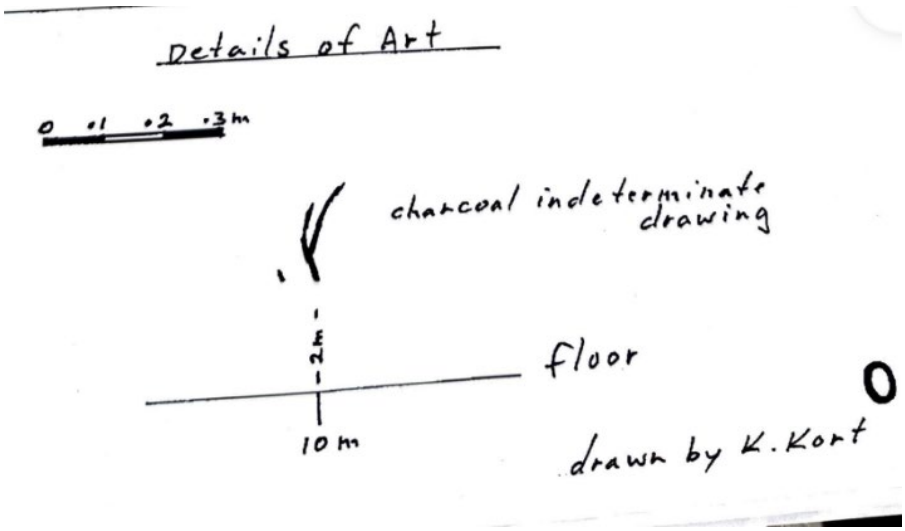


Figure 44: Art panel of NEW 15 (source: AHIMS site card, drawn by K. Kort)

2.27.4 Baseline recording images – detailed panel recording

Panel 1



Plate 355: Indeterminate charcoal drawing – Northeast Woronora 15



Plate 356: Monitoring point #1 – Northeast Woronora 15



Plate 357: Monitoring Point #2 – Northeast Woronora 15



Plate 358: Monitoring Point #3 – Northeast Woronora 15



Plate 359: Monitoring Point #4 – Northeast Woronora 15



Plate 360: Monitoring Point #5 – Northeast Woronora 15



Plate 361: Monitoring Point #6 (chipping to the upper left of art) – Northeast Woronora 15



Plate 362: Monitoring Point #7 – Northeast Woronora 15

2.28 Northeast Woronora 16 (NEW 16 AHIMS # 52-2-3512)

This shelter is located 420 m NE of Waratah Rivulet on a ridgeline landform at 256 m altitude. The single grey chert core artefact originally identified by Sefton (during the initial recording of the site) was not relocated during this baseline recording. No new artefacts were identified, and no art surfaces were found. Overall, the site is described as stable, but some monitoring points have been recorded.

2.28.1 Northeast Woronora 16 baseline recording data

Table 79: Baseline recording data for Northeast Woronora 16

Overview					
Site type	Shelter with Artefact	Corrected MGAE	311490	Corrected MGAN	6219565
Previous Recording	Illawarra Prehistory Group: C. Sefton	Date	2007		
Site Details					
Width	7 m	Depth	2 m	Height	1.6 m
Orientation	SE 124°	Floor area	5 m^2	Floor condition	Stable
Location in Landscape	256 m altitude, 22m SW from 4WD track off Woronora Dam Road.				
Shelter exterior/formation	Ancient block fall.				
Shelter interior	Chemical and cavernous weathering, ancient block fall.				
Distance to water	420m NE of Waratah Rivulet	Landform	Ridgeline		
Setting	Continuous				
Archaeological Deposit					
Deposit	Sandy loam	Describe	-		
Visible artefacts?	None relocated.	Where?	Previously in dripline.	How many?	N/A
Art					
Art surfaces	None visible.				
Art Condition	N/A				
Art Overview	N/A				
Damage/threats					
Water wash	Leaching through horizontal bedding (not active or recent)	Graffiti	No	Macro vegetals	Back wall
Animals	Small	Salt/granular loss	Roof	Fissuring	No
Insects	Yes	Spalling/exfoliation	None active	Other	N/A
Fire	No	Block fall	Ancient		

Table 80: Baseline recording data for monitoring points present within Northeast Woronora 16.

Monitoring Points		
Number	**Location in shelter**	**Notes**
1	At 0.5 – 1 m	Non-active water wash.
2	At 4m – southern end of shelter over rockface at 3m	Vertical crack from back wall – roof. Follows the entire roof line to outer edge and entire exterior shelter rock face.

2.28.2 Baseline recording images – site overview



Plate 363: Shelter Overview, SW aspect – Northeast Woronora 16.



Plate 364: Shelter Overview, N aspect – Northeast Woronora 16.

2.28.3 Baseline recording plans – site overview

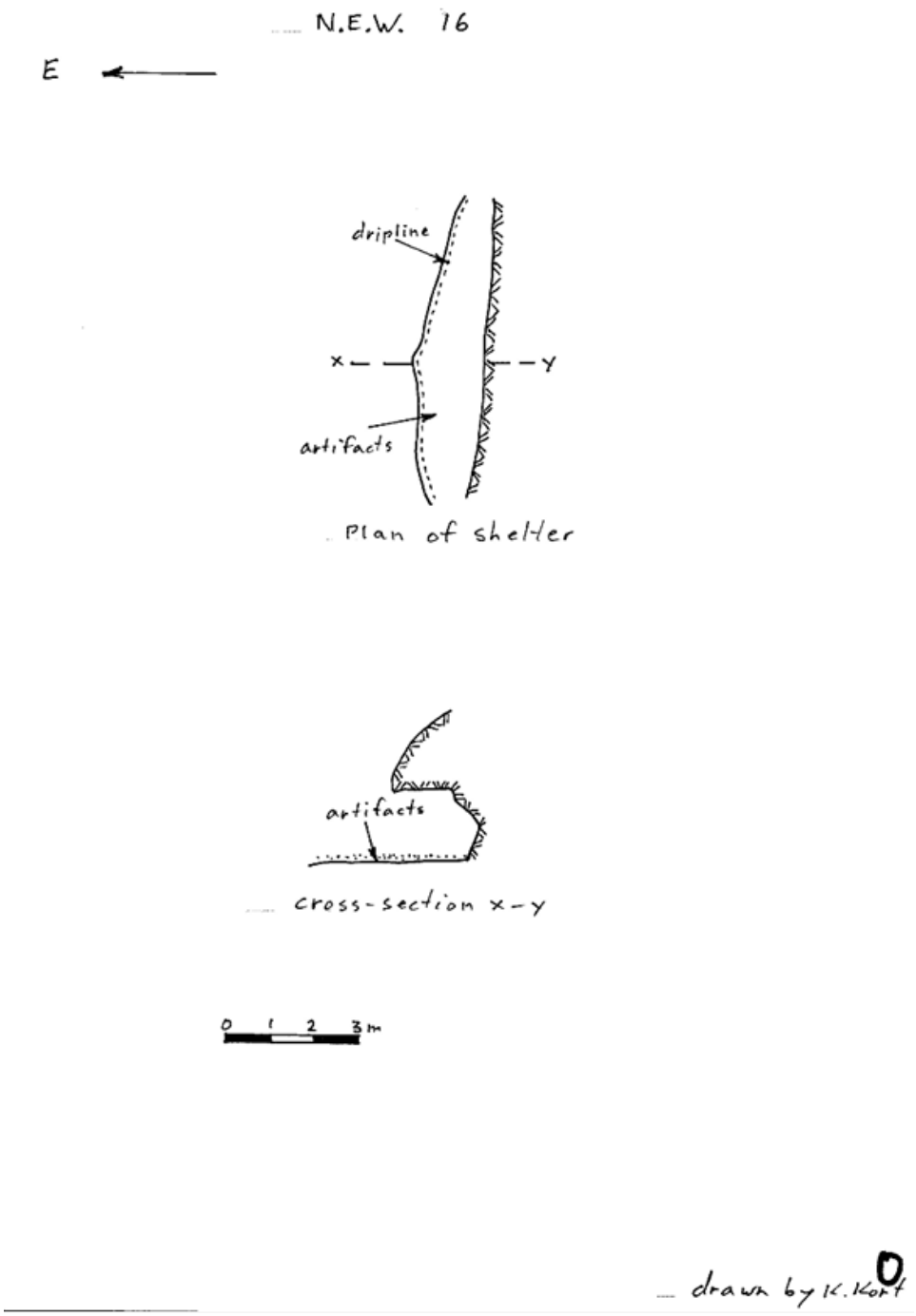


Figure 45: Plan and section of Northeast Woronora 16 (source: AHIMS site card, drawn by K. Kort)

2.28.4 Baseline recording images – detailed site recording



Plate 365: Monitoring point #1, NW aspect – Northeast Woronora 16.



Plate 366: Monitoring point #2, NW aspect – Northeast Woronora 16.



Plate 367: Monitoring point #2 showing exterior rock surface, NW aspect – Northeast Woronora 16.

2.29 Northeast Woronora 18 (NEW 18 AHIMS # 52-2-3514)

This site is located in a gully flowing east to west into the Woronora storage water and contains one grinding groove. The site is located on a platform 280 m east of the Woronora storage, with an elevation of 241 m. The site has been affected by sheet weathering and erosion.

2.29.1 Northeast Woronora 18 baseline recording data

Table 81: Baseline recording data for Northeast Woronora 18

Overview					
Site type	Open site with Grinding Grooves	Corrected MGAE	311175	Corrected MGAN	6219700
Previous Recording	Illawarra Prehistory Group: C. Sefton	Date	2007		
Location description					
Landform	Gully – ridgeline (E → W)			Slope (deg)	Slight
Vegetation	Tea tree, Hakea, bottlebrush			Land use	Conservation – undermining
Disturbance	Organic build-up			Aggrading/Stable/ Eroding	Stable
Impacts	Sheet weathering and erosion			Proximity to water	280 m E of Woronora, elevation 241 m
Visibility %	NA			Exposure %	NA
Site Context					
Site Dimensions	Platform 3 m x 2 m – see site plan.				
Context	1 single grinding groove in gully flowing east to west into Woronora storage water				
Site Condition	Visible				
Site Description					
Total number of rock engravings	0				
Total number of grooves	1				
Type, Profile	Long oval groove				
Function	Axe grinding groove				
Condition	Visible				
Orientation	South – west				

Table 82: Baseline recording data for grinding grooves present within Northeast Woronora 18.

Number	Length (mm)	Width (mm)	Depth (mm)	Direction	Notes
Grinding Grooves					
1	304	60	10	SW	Single groove on gully sandstone ledge.

Table 83: Baseline recording data for monitoring points present within Northeast Woronora 18.

Monitoring Points		
Number	**Location in shelter**	**Notes**
Nil	-	-

2.29.2 Baseline recording images – site overview



Plate 368: Site platform overview, E aspect – Northeast Woronora 18.



Plate 369: Site platform overview, W aspect – Northeast Woronora 18.

2.29.3 Baseline recording plans – site overview

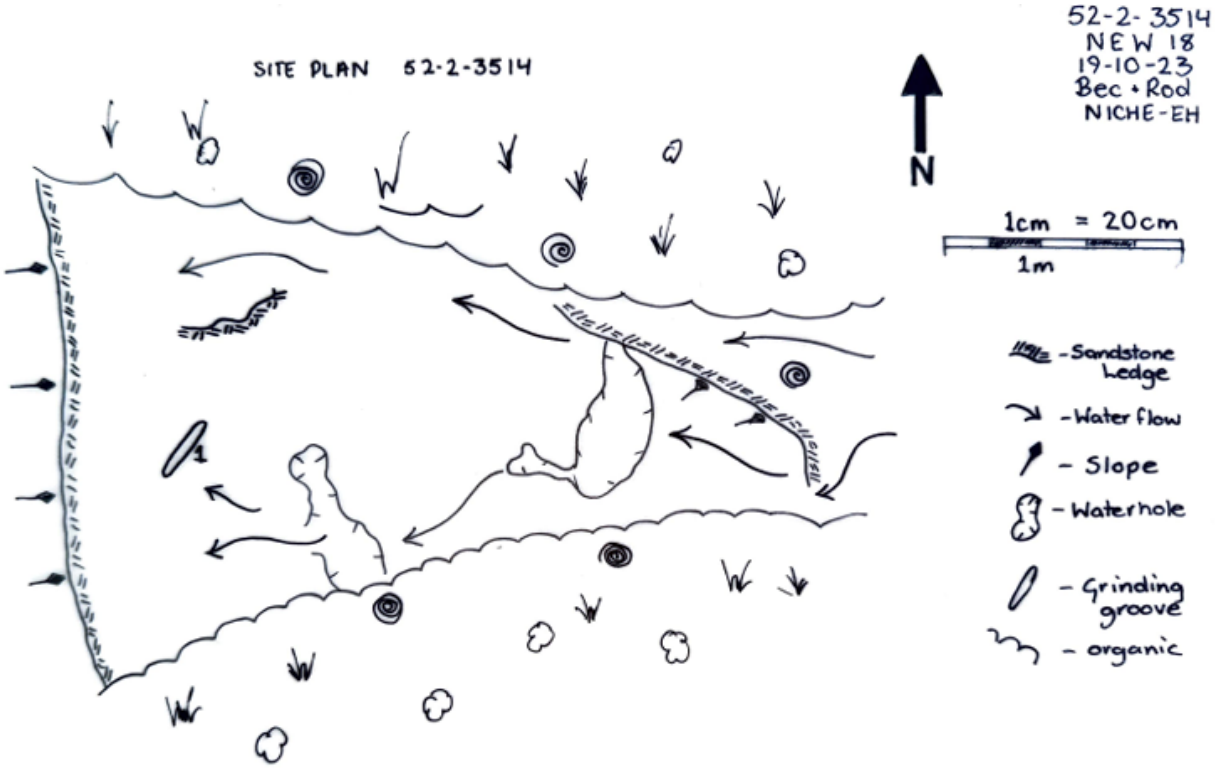


Figure 46: Plan of Northeast Woronora 18.

2.29.4 Baseline recording images – detailed site recording



Plate 370: Groove #1, E aspect – Northeast Woronora 18.



Plate 371: Groove #1, W aspect – Northeast Woronora 18.

2.30 Northeast Woronora 19 (NEW 19 AHIMS # 52-2-3515)

This shelter is located on a continuous high sandstone ridgeline, at 196 m elevation, and has been subjected to cavernous weathering. The three indeterminate charcoal drawings originally identified were relocated during this baseline recording but are in very poor condition and heavily faded. The quartz flake previously recorded was unable to be relocated, and no other artefacts were visible.

2.30.1 Northeast Woronora 19 baseline recording data

Table 84: Baseline recording data for Northeast Woronora 19

Overview					
Site type	Shelter with Art and Artefact	Corrected MGAE	311122	Corrected MGAN	6219456
Previous Recording	Illawarra Prehistory Group: C. Sefton	Date	2007		
Site Details					
Width	8.2 m	Depth	4.4 m	Height	2.2 m
Orientation	SW	Floor area	6 m^2	Floor condition	Mostly sandstone
Location in Landscape	Under second ridgeline from stored water, 196 m elevation.				
Shelter exterior/formation	Formed by cavernous weathering.				
Shelter interior	Block fall, art surface is case hardened with water damage and granular loss.				
Distance to water	70 m	Landform	Ridgeline		
Setting	Continuous high ridge				
Archaeological Deposit					
Deposit	-	Describe	-		
Visible artefacts?	None relocated	Where?	-	How many?	N/A
Art					
Art surfaces	Panel #1 has 2 motifs and Panel #2 has 1 motif.				
Art Condition	Poor				
Art Overview	3x indeterminate charcoal motifs.				
Damage/threats					
Water wash	Yes (not active)	Graffiti	No	Macro vegetals	No
Animals	Small	Salt/granular loss	Roof	Fissuring	No
Insects	Yes	Spalling/exfoliation	Non active	Other	N/A
Fire	Old	Block fall	Ancient		

Table 85: Baseline recording data for art surfaces present within Northeast Woronora 19.

Motif No.	Type	Form	Media	Colour	Measurement
Panel 1					
1	Indeterminate lines	Partial	Charcoal	Black	620 x 40 mm
2	Indeterminate lines	Partial	Charcoal	Black	340 x 40 mm
Panel 2					
3	Indeterminate lines	Partial	Charcoal	Black	170 x 30 mm

Table 86: Baseline recording data for monitoring points present within Northeast Woronora 19.

Monitoring Points		
Number	**Location in shelter**	**Notes**
1	Back centre of entire shelter	Vertical crack / separation running through the back centre of the entire shelter from the floor to the ceiling

2.30.2 Baseline recording images – site overview



Plate 372: Shelter Overview, N/NW aspect – Northeast Woronora 19.



Plate 373: Shelter Overview, E aspect – Northeast Woronora 19.

2.30.3 Baseline recording plans – site overview

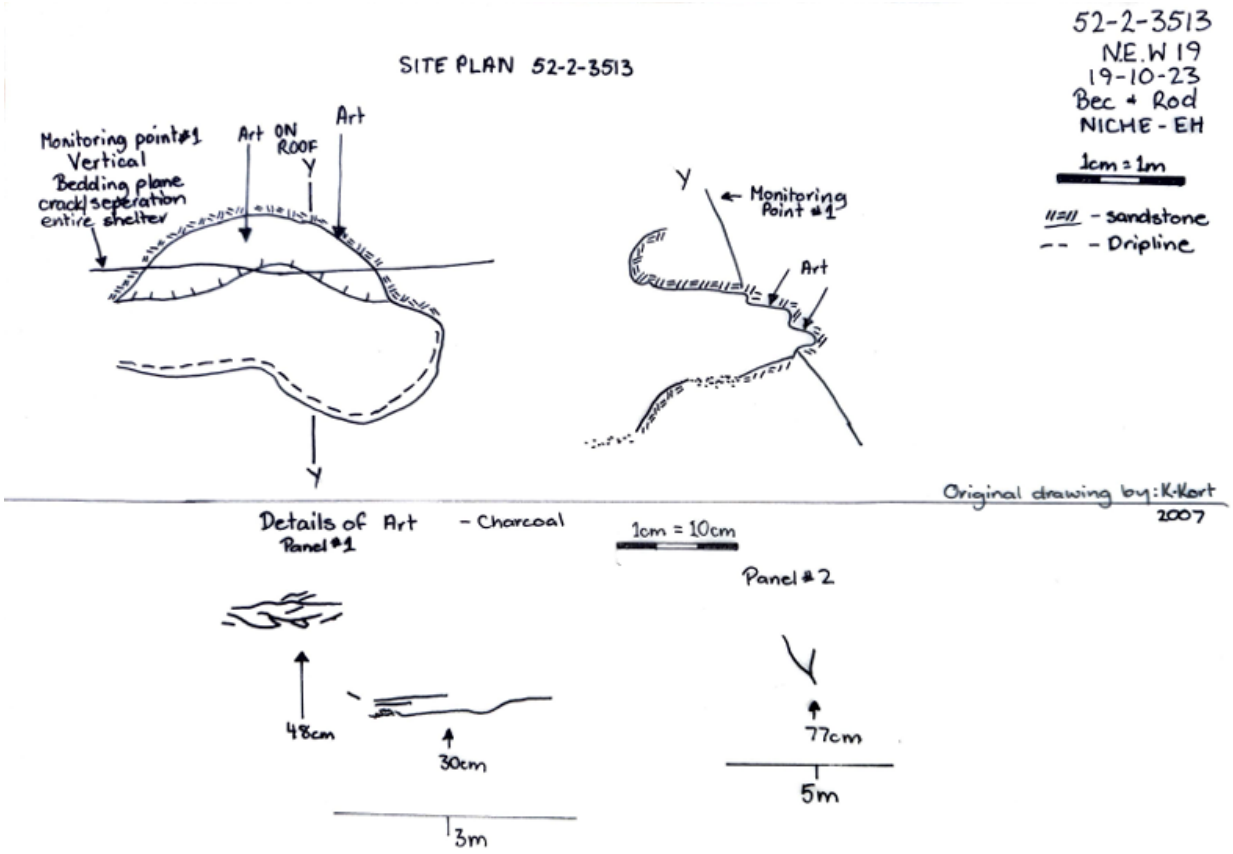


Figure 47: Plan, section and art sketch of Northeast Woronora 19. Reproduced from AHIMS site card, original drawn by K. Kort

2.30.4 Baseline recording images – detailed panel recording

Panel 1



Plate 374: Monitoring Point #1 Vertical Crack – Northeast Woronora 19.



Plate 375: Motif #1– Northeast Woronora 19



Plate 376: Motif #2– Northeast Woronora 19

Panel 2



Plate 377: Motif #3 – Northeast Woronora 19

2.31 Northeast Woronora 20 (NEW 20 AHIMS # 52-2-3516)

This continuous sandstone overhang shelter has been formed by weathering. It is located on a lower slope landform at 182 m elevation under a cliff line, just above Woronora Dam. It has some water damage but is otherwise in fair condition. No artefacts were located during the survey. All art previously recorded was located during the survey and was identifiable. The art is in poor to fair condition.

2.31.1 Northeast Woronora 20 baseline recording data

Table 87: Baseline recording data for Northeast Woronora 20

Overview					
Site type	Shelter with Art	Corrected MGAE	310980	Corrected MGAN	6219772
Previous Recording	Illawarra Prehistory Group: C. Sefton	Date	2007		
Site Details					
Width	12 m	Depth	2.7 m	Height	3.8 m
Orientation	SW	Floor area	-	Floor condition	Fair
Location in Landscape	Elevation – 182 m. On lowest contour under cliff line just above Woronora Dam.				
Shelter exterior/formation	Sandstone overhang formed by weathering.				
Shelter interior	Some water damage, but deposit is fairly good.				
Distance to water	50 m	Landform	Lower slopes.		
Setting	Continuous cliff.				
Archaeological Deposit					
Deposit	15 m	Describe	Loamy sand		
Visible artefacts?	No	Where?	N/A	How many?	N/A
Art					
Art surfaces	Some wear and water damage – monitoring points noted on plan attached.				
Art Condition	Poor – fair.				
Art Overview	Previous recording noted 5 charcoal drawings consisting of 2 x kangaroo and 3 x indeterminate. All art is identifiable from original recording.				
Damage/threats					
Water wash	No	Graffiti	No	Macro vegetals	Yes
Animals	Yes	Salt/granular loss	Yes	Fissuring	-
Insects	Yes	Spalling/exfoliation	-	Other	N/A
Fire	No	Block fall	Yes – NW side		

Table 88: Baseline recording data for art surfaces present within Northeast Woronora 20.

Motif No.	Type	Form	Media	Colour	Measurement
Panel 1					
1	Indeterminate	Poor – fair	Charcoal outline and infill	Black	30 cm x 20 cm
2	Indeterminate	Poor – fair	Charcoal outline and infill	Black	20 cm x 20 cm
3	Indeterminate	Poor – fair	Charcoal outline and infill	Black	35 cm x 10 cm
4	Kangaroo	Poor – fair	Charcoal outline and infill	Black	50 cm x 40 cm
Panel 2					
5	Kangaroo	Poor – fair	Charcoal outline and infill	Black	60 cm x 30 cm

Table 89: Baseline recording data for monitoring points present within Northeast Woronora 20.

Monitoring Points		
Number	**Location in shelter**	**Notes**
1	Unspecified	Waterline under shelf with macropod
2	1.4m above ground, reaches the ceiling. 6.5m from dripline.	Vertical fault line
3	Up approx. 70cm from ground	Fissure under lowest shelf from ground

2.31.2 Baseline recording images – site overview



Plate 378: Overview of shelter, facing south – Northeast Woronora 20.



Plate 379: Overview of shelter, facing north – Northeast Woronora 20.



Plate 380: Overview of shelter, back wall, facing east – Northeast Woronora 20.

2.31.3 Baseline recording plans – site overview

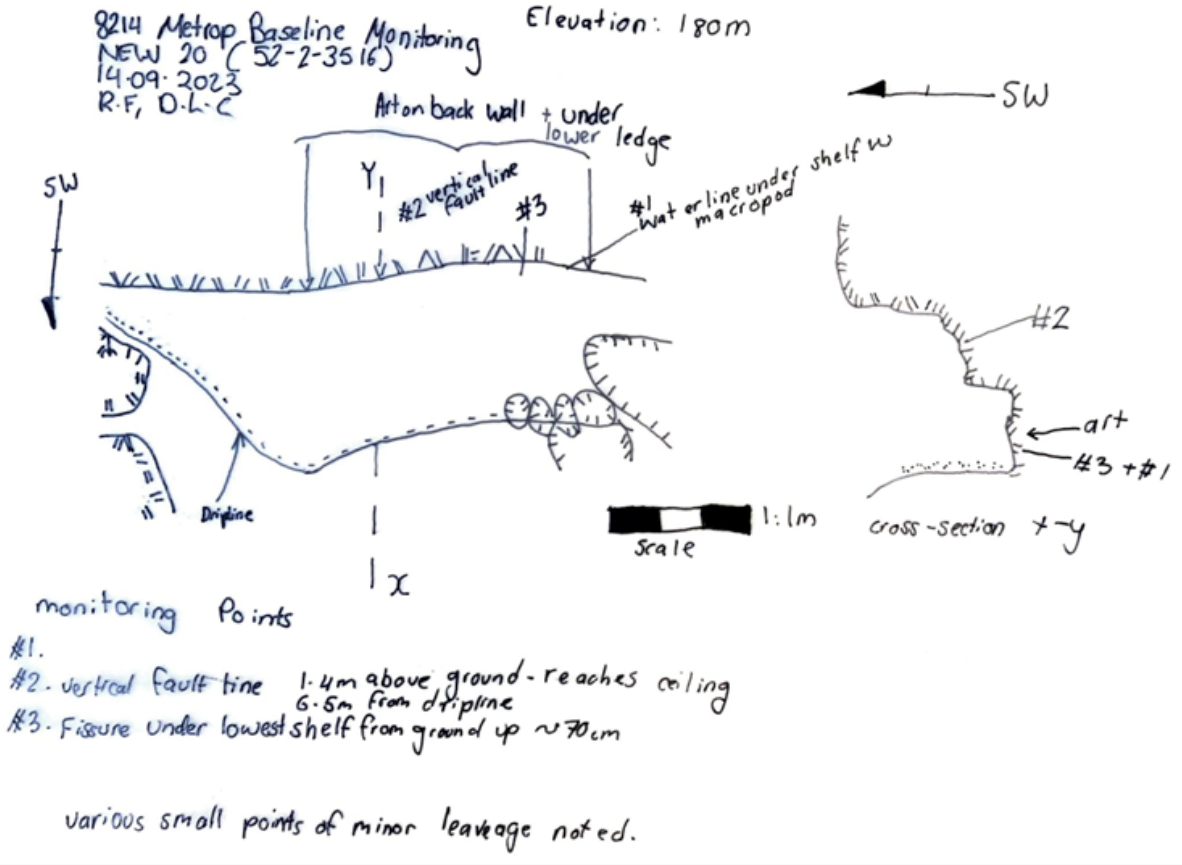


Figure 48: Plan and section of Northeast Woronora 20.

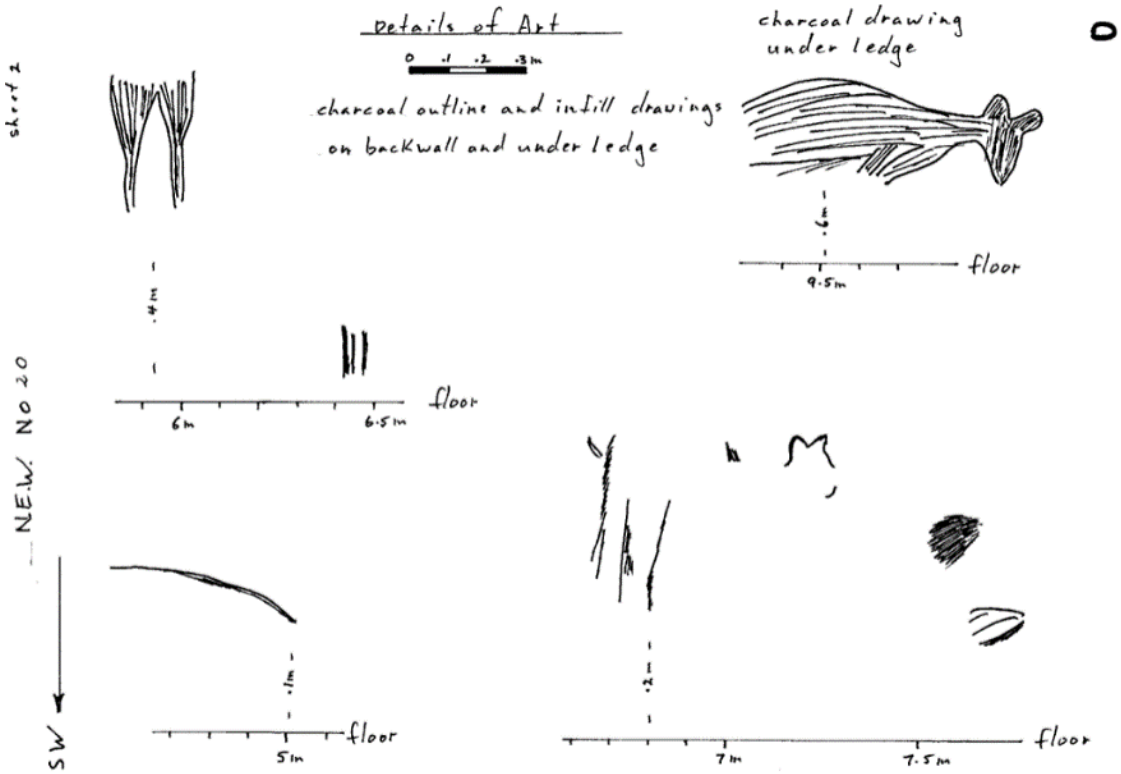


Figure 49: Art panels #1 and #2 of Northeast Woronora 20. Reproduced from the AHIMS site card, drawn by K. Kort.

2.31.4 Baseline recording images – detailed panel recording

Panel 1



Plate 381: Monitoring point #1 – Northeast Woronora 20.



Plate 382: Monitoring point #2 – Northeast Woronora 20.



Plate 383: Monitoring point #3 – Northeast Woronora 20.



Plate 384: Motif #1, charcoal outline and infil on back wall – Northeast Woronora 20.



Plate 385: Panel 1, motif#2 – Northeast Woronora 20.



Plate 386: Overview art panel #1, motifs 2 - 4 – Northeast Woronora 20.



Plate 387: Close up panel 1, motif #4 - Northeast Woronora 20.

Panel 2



Plate 388: Panel 2, motif #1 (charcoal drawing under ledge) – Northeast Woronora 20.

2.32 Northeast Woronora 21 (NEW 21 AHIMS # 52-2-3517)

This isolated sandstone overhang shelter has been formed by weathering and erosion. No artefacts were located during the survey. The art was relocated at this shelter during the survey, but it is in poor condition and visibility has become reduced.

2.32.1 Northeast Woronora 21 baseline recording data

Table 90: Baseline recording data for Northeast Woronora 21

Overview					
Site type	Shelter with Art	Corrected MGAE	0311091	Corrected MGAN	6219993
Previous Recording	Illawarra Prehistory Group: C. Sefton	Date	2007		
Site Details					
Width	10 m	Depth	3 m	Height	2.5 m
Orientation	W	Floor area	12 m²	Floor condition	Good.
Location in Landscape	182 m E of Woronora Dam.				
Shelter exterior/formation	Original site card coordinates correct. Sandstone overhang formed by weathering.				
Shelter interior	Floor has little deposit.				
Distance to water	182 m	Landform	Slope		
Setting	Isolated				
Archaeological Deposit					
Deposit	Yes	Describe	Small amount of deposit consisting of sand erosion.		
Visible artefacts?	No	Where?	N/A	How many?	N/A
Art					
Art surfaces	Original recording noted 5 charcoal drawings along back wall of shelter.				
Art Condition	Poor condition and partially faded.				
Art Overview	Art consists of 2 x kangaroo and 3 x indeterminate charcoal drawings. Art can be relocated, but it is less visible.				
Damage/threats					
Water wash	Yes	Graffiti	No.	Macro vegetals	Yes
Animals	Yes	Salt/granular loss	Yes	Fissuring	Yes.
Insects	No.	Spalling/exfoliation	Yes.	Other	N/A
Fire	No.	Block fall	Yes – south corner		

Table 91: Baseline recording data for art surfaces present within Northeast Woronora 21.

Motif No.	Type	Form	Media	Colour	Measurement
Panel 1					
1	Indeterminate	Barely visible	Charcoal outline and infill	Black	20 cm x 30 cm
2	Kangaroo	Barely visible	Charcoal outline and infill	Black	10 cm x 20 cm
3	Kangaroo	Barely visible	Charcoal outline and infill	Black	15 cm x 10 cm
4	Indeterminate	Barely visible	Charcoal outline and infill	Black	15 cm x 50 cm
5	Indeterminate	Barely visible	Charcoal outline and infill	Black	30 cm x 30 cm

Table 92: Baseline recording data for monitoring points present within Northeast Woronora 21.

Monitoring Points		
Number	**Location in shelter**	**Notes**
1	3.4m on baseline, 1.5m from ground.	Crack on shelf with vegetation growing out.
2	3.4m on baseline, 0.9m from ground.	Crack adjoining point #1.
3	6.2m on baseline, 1.95m from ground.	Water line & fissuring above art.

2.32.2 Baseline recording images – site overview



Plate 389: Overview of shelter – Northeast Woronora 21.

2.32.3 Baseline recording plans – site overview

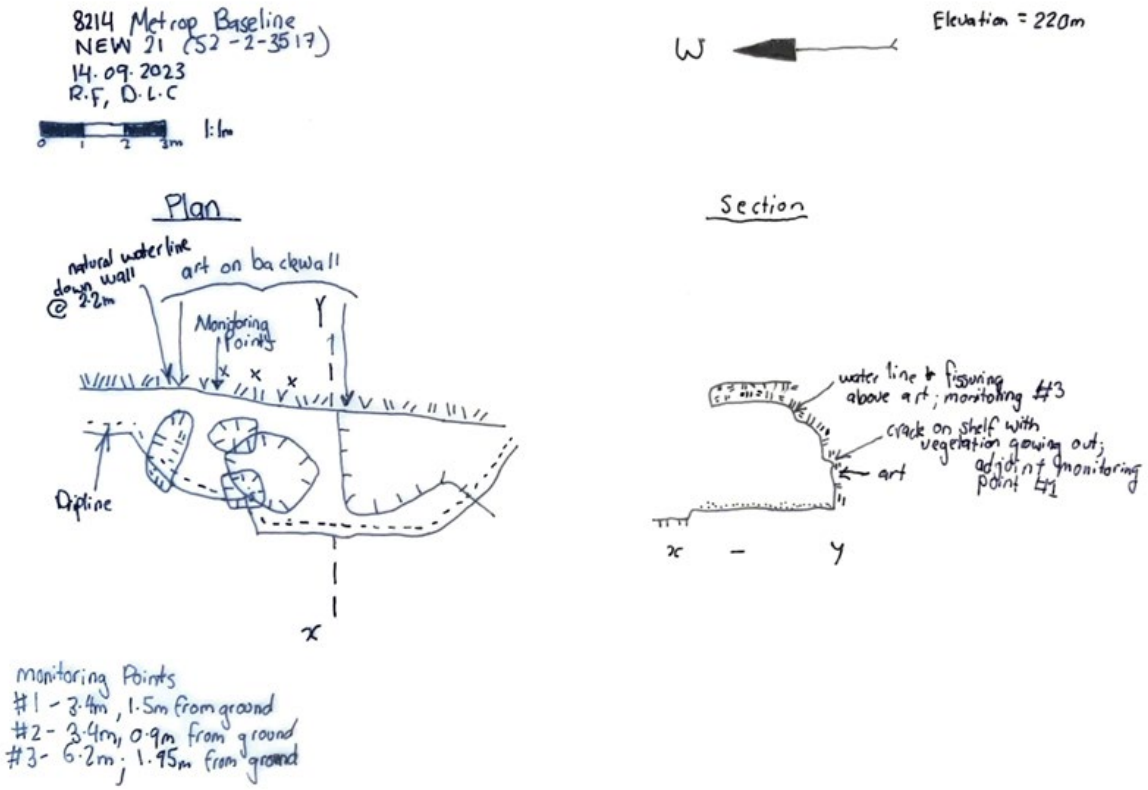


Figure 50: Plan and section of Northeast Woronora 21

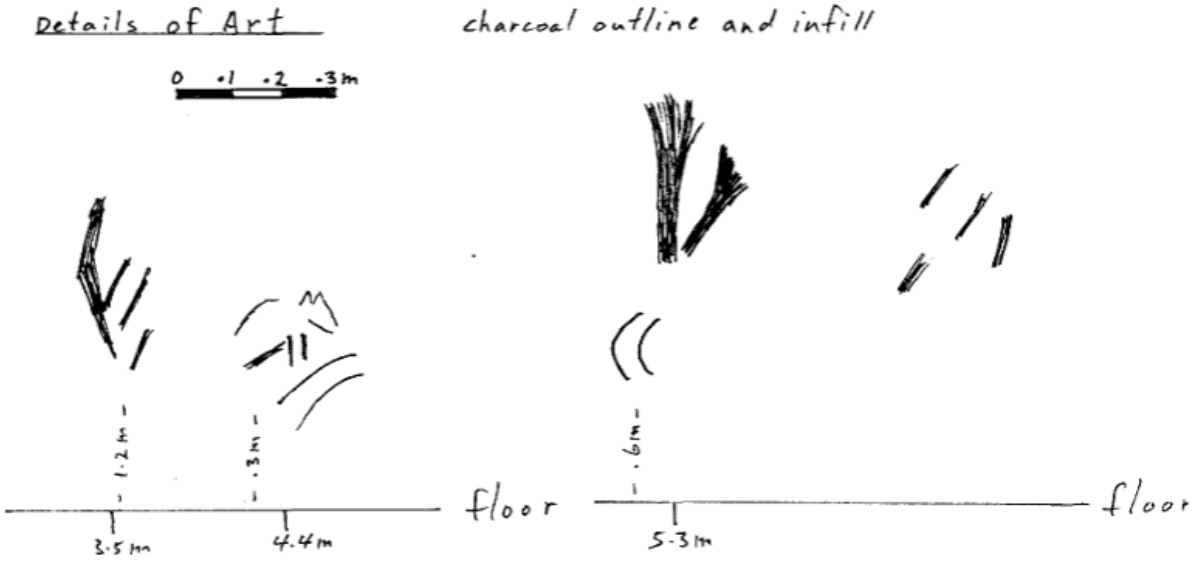


Figure 51: Art panel of Northeast Woronora 21. Reproduced from the AHIMS site card, drawn by K. Kort.

2.32.4 Baseline recording images – detailed panel recording



Plate 390: Northeast Woronora 21 monitoring point #1 - crack running along shelf with vegetation.



Plate 391: Northeast Woronora 21 monitoring point #2 - vertical fissure under shelf adjoining point #1.



Plate 392: Northeast Woronora 21 monitoring point #3 - water wash and vertical fissuring above art panel.

Panel 1



Plate 393: Northeast Woronora 21 overview of Panel #1.



Plate 394: Close up motif #5 - Northeast Woronora 21.



Plate 395: Close up motif #4 - Northeast Woronora 21.



Plate 396: Close up motif #3 - Northeast Woronora 21.



Plate 397: Close up motif #2 - Northeast Woronora 21.



Plate 398: Close up motif #1 - Northeast Woronora 21.

2.33 Northeast Woronora 23 (NEW 23 AHIMS # 52-2-3519)

This shelter is formed out of sandstone and is located in a gully under a sandstone platform (190 m elevation), part of a continuous ridgeline and 50 m east of Woronora Storage. The shelter has been recorded as being damp and disturbed, with some mineral leaching and fungal growth. The charcoal outline and infill frontal human drawing originally recorded was relocated during this baseline recording. However, it is in very poor condition, faded and barely visible.

2.33.1 Northeast Woronora 23 baseline recording data

Table 93: Baseline recording data for Northeast Woronora 23

Overview					
Site type	Shelter with Art	Corrected MGAE	310968	Corrected MGAN	6220202
Previous Recording	Illawarra Prehistory Group: C. Sefton	Date	2007		
Site Details					
Width	12 m	Depth	2.6 m	Height	1.6 m
Orientation	SW 240°	Floor area	4 m²	Floor condition	Wet / disturbed
Location in Landscape	190 m elevation under sandstone platform in drainage line.				
Shelter exterior/formation	-				
Shelter interior	Shelter is very damp directly under the wet drainage line. There is mineral leaching and white fungal growth, and lichen on the roof.				
Distance to water	50m east of Woronora Storage	Landform	Ridgeline		
Setting	Continuous ridgeline (gully)				
Archaeological Deposit					
Deposit	Sandy	Describe	-		
Visible artefacts?	None	Where?	N/A	How many?	N/A
Art					
Art surfaces	1x motif recorded in the original recording.				
Art Condition	Barely visible, extensive algae growth and mineral leaching.				
Art Overview	-				
Damage/threats					
Water wash	Extensive	Graffiti	No	Macro vegetals	Yes
Animals	No	Salt/granular loss	None recent	Fissuring	No
Insects	Yes	Spalling/exfoliation	None recent	Other	N/A
Fire	No	Block fall	Ancient		

Table 94: Baseline recording data for art surfaces present within Northeast Woronora 23.

Motif No.	Type	Form	Media	Colour	Measurement
Panel 1					
1	Human figure (frontal)	Barely visible	Charcoal outline and infill	Black	30 cm x 20 cm

Table 95: Baseline recording data for monitoring points present within Northeast Woronora 23.

Monitoring Points		
Number	**Location in shelter**	**Notes**
1	5.5m	Vertical crack in back roof.
2	7.5-8m	Vertical crack at the art panel.

2.33.2 Baseline recording images – site overview



Plate 399: Overview of shelter, SE aspect – Northeast Woronora 23.



Plate 400: Overview of shelter, NE aspect – Northeast Woronora 23.

2.33.3 Baseline recording plans – site overview

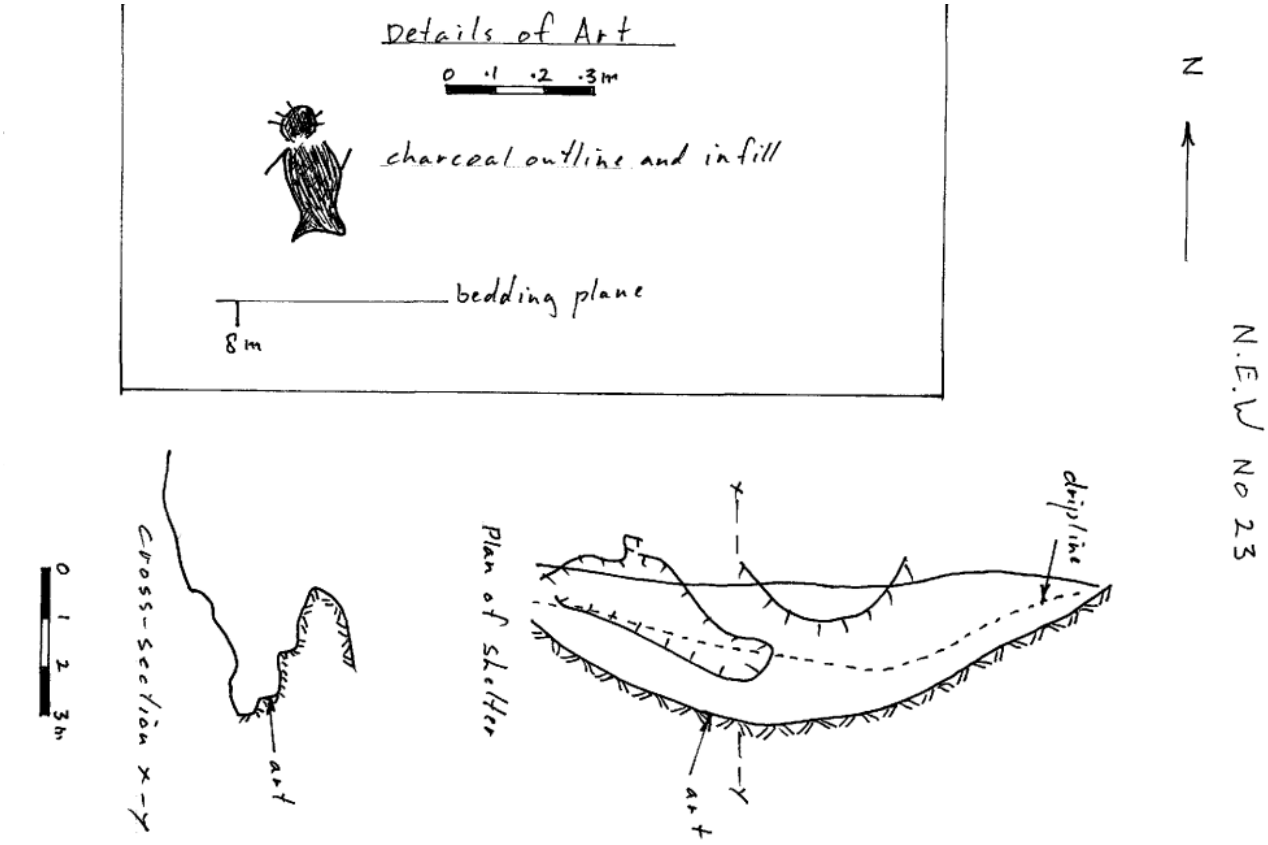


Figure 52: Plan, Section and art details of Northeast Woronora 23 (source: AHIMS site card, drawn by K. Kort)

2.33.4 Baseline recording images – detailed panel recording

Panel 1



Plate 401: Back wall mineral / water leeching over art panel – Northeast Woronora 23.



Plate 402: Art Panel #1, motif #1 – Northeast Woronora 23.



Plate 403: Art panel #1, motif #1 – Northeast Woronora 23.



Plate 404: Vertical crack, monitoring point #1 – Northeast Woronora 23.



Plate 405: Vertical crack at art panel, monitoring #2 – Northeast Woronora 23.

References

Kayandel Archaeological Services (2008) Metropolitan Coal Project: Environmental Assessment.

Metropolitan Coal (2022) Longwalls 308 – 310 Heritage Management Plan.

2.34 Northern Trail 77; Woronora Catchment Area (NT 77 AHIMS # 52-2-0692)

This shelter is formed out of sandstone and has been affected by block fall, and chemical and cavernous weathering. It is located between two waterfall ledges, 20 m of an unnamed main creek inlet. Art is no longer visible at this shelter, aside from some potential art at 8 m (red ochre lines). The site overall is in stable condition.

2.34.1 Northern Trail 77; Woronora Catchment Area baseline recording data

Table 96: Baseline recording data for Northern Trail 77; Woronora Catchment Area

Overview					
Site type	Shelter with Art	Corrected MGAE	310 697	Corrected MGAN	6219313
Previous Recording	Illawarra Prehistory Group: C. Sefton	Date	1981		
Site Details					
Width	12 m	Depth	2.5 m	Height	2 m
Orientation	220 m altitude – mid slope.	Floor area	20 m^2	Floor condition	Stable
Location in Landscape	20 m north of main creek inlet, between 2 waterfall ledges. Faces 94° E.				
Shelter exterior/formation	Block fall, uplift weathering.				
Shelter interior	Sandstone - block fall, cavernous and chemical weathering.				
Distance to water	20 m from creek inlet. 120 m west from main creek (un-named), flowing into Woronora Catchment.	Landform	Ridgeline.		
Setting	Midslope ridge line				
Archaeological Deposit					
Deposit	Yes – sandy.	Describe	PAD		
Visible artefacts?	None	Where?	NA	How many?	NA
Art					
Art surfaces	Art no longer visible – possibly present at 8 m mark (joint red ochre lines).				
Art Condition	-				
Art Overview	-				
Damage/threats					
Water wash	Yes	Graffiti	No	Macro vegetals	Yes
Animals	Small	Salt/granular loss	Yes	Fissuring	No
Insects	Yes	Spalling/exfoliation	Yes	Other	N/A
Fire	Yes	Block fall	Wall, roof		

Table 97: Baseline recording data for art surfaces present within Northern Trail 77; Woronora Catchment Area.

Motif No.	Type	Form	Media	Colour	Measurement
Panel 1					
1	Faded – no longer visible.	Possible joint lines	Red ochre	Red	At 8 m (art was barely visible).

Table 98: Baseline recording data for monitoring points present within Northern Trail 77; Woronora Catchment Area.

Monitoring Points		
Number	**Location in shelter**	**Notes**
1	From 2.10 m – 2.6 m	Vertical separation – floor to roof.
2	At 3.7 m	Mid wall starts at horizontal separation plane.
3	Starts at 6.70 m – 5.80 m	Vertical and horizontal crack / separation – floor to roof and horizontal separation plan.
4	Joins point #3 at 6.70 m – starts at 7.30 m (floor) and connects to roof at 7.20 m.	
5	At 9 m	Vertical crack – starts at floor – runs 40 mm short of roof separation.

2.34.2 Baseline recording images – site overview



Plate 406: Shelter overview, S aspect – Northern Trail 77; Woronora Catchment Area.



Plate 407: Monitoring point #1, vertical separation from floor to roof – Northern Trail 77; Woronora Catchment Area.



Plate 408: Monitoring point #2, water wash – Northern Trail 77; Woronora Catchment Area.



Plate 409: Monitoring point #3 – Northern Trail 77; Woronora Catchment Area.



Plate 410: Monitoring point #4 – Northern Trail 77; Woronora Catchment Area.



Plate 411: Monitoring point #5 – Northern Trail 77; Woronora Catchment Area.

2.34.3 Baseline recording plans – site overview

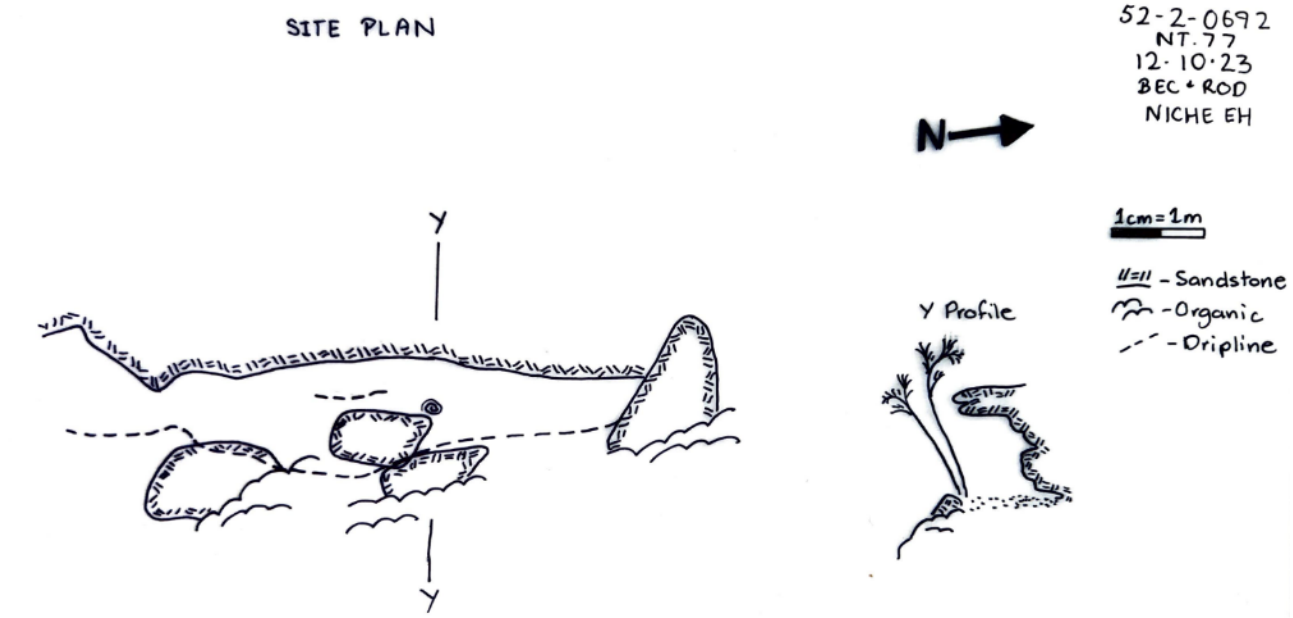


Figure 53: Plan and Y profile section of Northern Trail 77; Woronora Catchment Area.

2.34.4 Baseline recording images – detailed panel recording

Panel 1



Plate 412: Possible art panel, no longer visible – Northern Trail 77; Woronora Catchment Area.

2.35 Northeast Woronora Rock Shelter 02 (NEW-RS-02, AHIMS # TBA)

This shelter is situated within a low ridgeline landform at 180 m altitude. It has been subjected to ancient sandstone block fall and is 50 m away from Waratah Rivulet. The three indeterminate charcoal motifs located at this shelter are in poor condition.

2.36 Northeast Woronora Grinding Groove 01 (NEW-GG-01, AHIMS # TBA)

This site contains one grinding groove within the waterline and is situated within a steep sandstone outcrop landform. It is within <10 m of Woronora Dam water storage and has been subjected to natural water erosion.

2.36.1 Site overview



Plate 413: Site overview – Northeast Woronora Grinding Groove 01.



Plate 414: Site overview – Northeast Woronora Grinding Groove 01.

2.36.2 Plans – site overview

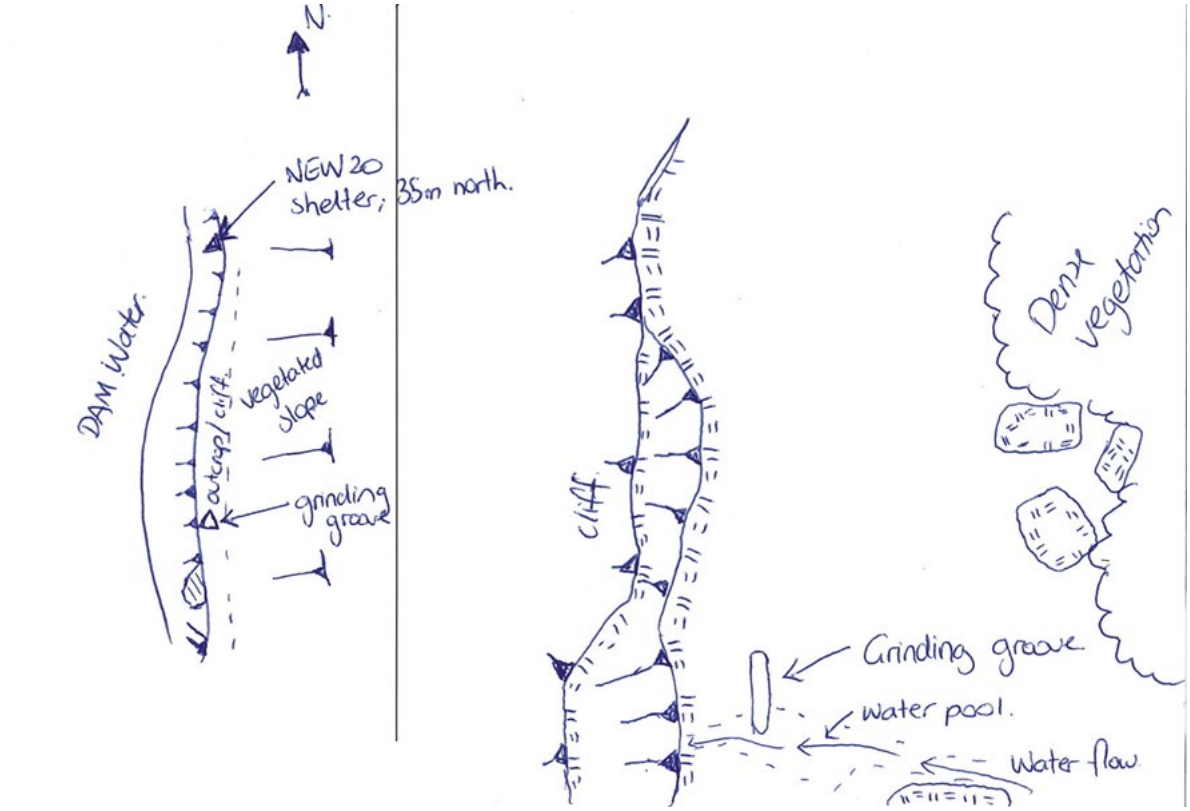


Figure 54: Plan of Northeast Woronora Grinding Groove 01 – not to scale.

2.37 Northern Trail Rock Shelter 01 (NT-RS-01 AHIMS # TBA)

This ridgeline shelter is formed out of sandstone and has been affected by cavernous weathering and block fall. It is located 10 m SE of stored water at creek inlet, under the first ridge in this area. There were no monitoring points to be recorded. The partial art located at this shelter has been affected by chemical weathering.

Site overview



Plate 415: Shelter overview, E aspect – Northern Trail Rock Shelter 01.



Plate 416: Shelter overview – Northern Trail Rock Shelter 01.



Plate 417: Back wall of shelter – Northern Trail Rock Shelter 01.



Plate 418: Shelter overview, SW aspect – Northern Trail Rock Shelter 01.

2.37.1 Plans – site overview

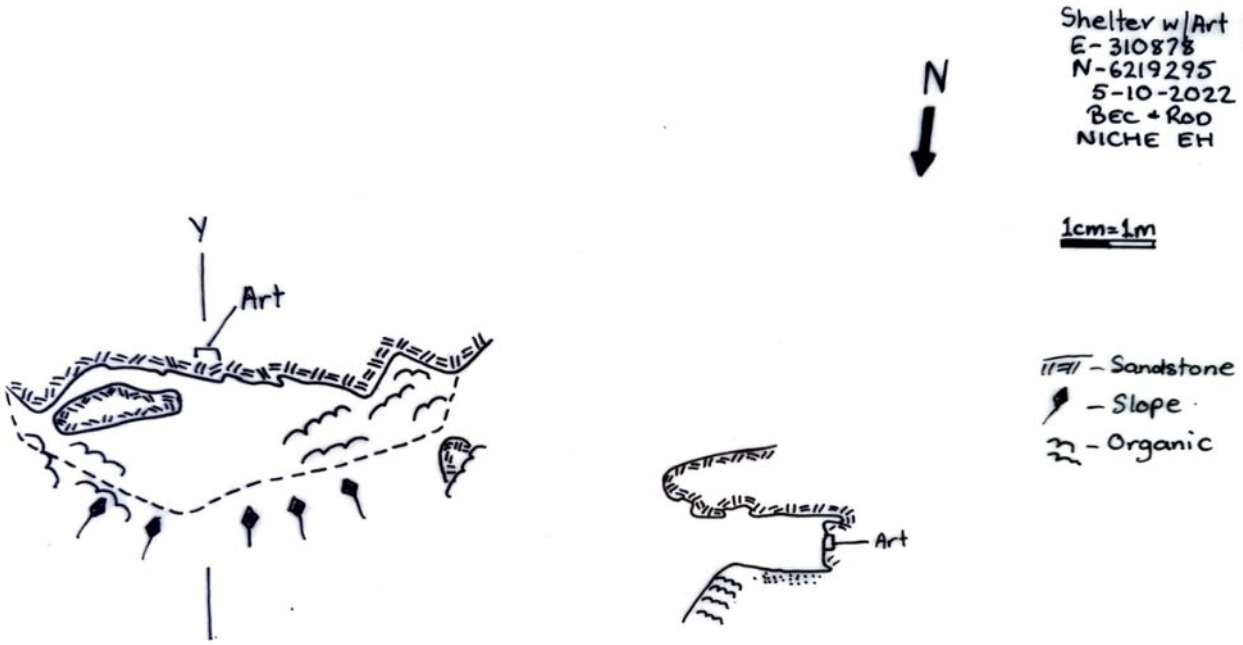


Figure 55: Plan and section profile section of Northern Trail Rock Shelter 01.

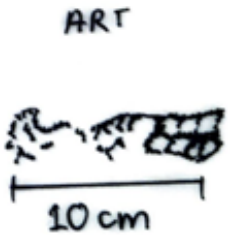


Figure 56: Art panel of Northern Trail Rock Shelter 01.

2.38 Potential Scarred Tree (AHIMS # TBA)

This site contains one potential scarred tree, with a 78 cm x 28 cm scar. It is located on a hillside, between stored water and the first ridgeline ledge and 720 m south of Honeysuckle Creek.

2.38.1 Site overview



Plate 419: Potential scarred tree – site context.



Plate 420: Potential scarred tree - site context.



Plate 421: Potential scarred tree – scar.

Annex 2 – Updated site location details

Site name	AHIMS Site Number	Site types	Datum	Eastings	Northings
NT 3	52-2-0618	Shelter with Art, Artefacts and PAD*	MGA 56	310836	6218692
NT 4	52-2-0619	Shelter with Art, Artefacts and Midden	MGA 56	310410	6218410
NT 5	52-2-0620	Shelter with Art	MGA 56	310448	6218700
NT 6	52-2-0621	Shelter with Art and Artefacts	MGA 56	310588	6218070
NT 7	52-2-0622	Grinding Groove	MGA 56	310583	6217865
NT 8	52-2-0623	Grinding Groove and Rock Engraving	MGA 56	310710	6217977
NT 9	52-2-0624	Shelter with Art and Artefacts	MGA 56		
NT 10	52-2-0625	Shelter with Art and Artefacts	MGA 56	309747	6217725
NT 12	52-2-0753	Grinding Groove	MGA 56	309610	6217630
NT 17	52-2-0629	Grinding Grooves and Rock Engravings	MGA 56	310300	6218510
NT 18	52-2-0751	Shelter with Art	MGA 56	310684	6218937
NT 19	N/A	Shelter with Art	MGA 56	311210	6219100
NT20	52-2-0749		MGA 56	310200	6218310
NT 21	52-2-0630	Grinding Groove	MGA 56	310510	6218800
NT 22	52-2-0758	Shelter with Art, Artefacts and PAD*	MGA 56	310020	6218710
NT 23	52-2-0631	Shelter with Art and Artefacts	MGA 56	309900	6218700
NT 29	52-2-0637		MGA 56	310100	6218250
NT 46	52-2-0755	Grinding Groove	MGA 56		
NT 54	52-2-0374	Shelter with Art and Artefacts	MGA 56	309419	6217491
NT 74	52-2-0658	Shelter with Artefacts	MGA 56	310639	6219229
NT 75	52-2-0659	Shelter with Artefacts and PAD*	MGA 56	310790	6219239
NT 76	52-2-0660	Shelter with Artefacts	MGA 56	310600	6219630
NT 80	52-2-3442	Shelter with Artefacts and PAD*	MGA 56	310965	6218410
NT 81	52-2-3443	Shelter with Artefacts and PAD*	MGA 56	311035	6218810
NT 85	52-2-3853	Shelter with Art	MGA 56	310769	6219229
NT 86	52-2-3854	Shelter with Artefacts	MGA 56	310345	6219540
NEW 9	52-2-0529	Shelter with Art	MGA 56	311500	6219620
NEW 11	52-2-1238	Shelter with Art	MGA 56	310995	6220120
NEW 12	52-2-1236	Shelter with Art and PAD	MGA 56	311500	6219590
NEW 15	52-2-3511	Shelter with Art	MGA 56	311500	6219590
NEW 16	52-2-3512	Shelter with Artefact	MGA 56	311175	6219700
NEW 18	52-2-3514	Grinding Groove	MGA 56	311175	6219700
NEW 19	52-2-3515	Shelter with Art and Artefact	MGA 56	311175	6219700
NEW 20	52-2-3516	Shelter with Art	MGA 56		
NEW 21	52-2-3517	Shelter with Art	MGA 56	310967	6220188
NEW 23	52-2-3519	Shelter with Art	MGA 56	310836	6218692
Additional sites from Annex 1					
NEW-GG-01	Pending	Grinding grooves	MGA 56	310990	6219733
NEW-RS-01	pending	Rockshelter with art	MGA 56	310878	6219295
NEW-RS-02	Pending	Shelter with art	MGA 56		

NEW-ST-01	Pending	Potential scarred tree	MGA 56	310831	6219666
NT 19	Pending	rockshelter	MGA 56	310831	6219666
NT 77	52-2-0692	shelter	MGA 56	310697	6219313

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Newcastle
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Cairns
Canberra
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Gold Coast
Melbourne

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Our services

Natural capital and offsetting
Biodiversity offset strategy
Credit origination and supply
Offset credit brokerage
Naturetech and data management

Ecology
Terrestrial ecology
Aquatic ecology
Biodiversity offsetting and environmental offsetting

Heritage management
Heritage planning and advisory
Archaeology
Cultural heritage management

Environmental planning, approvals and management
Planning and advisory
Assessment and approvals
Management and compliance

Geospatial and knowledge management
Spatial visualisation, storage and analysis
Insight and risk management
Field operations support

APPENDIX 3

HERITAGE MANAGEMENT PLAN
SUBSIDENCE IMPACT REGISTER AND ASSESSMENT FORM

Heritage Management Plan - Subsidence Impact Register

Impact Register Number[1]	Aboriginal Heritage Site	Description of changes due to mine subsidence[2]	Cumulative number of sites with changes due to mine subsidence[3]	Has the site been affected by subsidence impacts? [4]	Cumulative number of sites affected by subsidence impacts [5]	Cumulative percentage of sites affected by subsidence impacts [6, 9]	Management or Contingency Measures Implemented? (Yes/No) [7]	Were Measures Effective? (Yes/No)[8]
1	FRC 281	Multiple cracks ranging from large, medium and small recorded in the shelter wall either running through or next to motifs (Longwalls 20-22 Round 1 Survey)	1	Yes	1	1/144 sites = <1%	No	N/A
2	FRC 284	Fractured corner or a buttress like formation on the rear wall (Longwalls 20-22 Round 1 Survey)	2	No	1	1/144 sites = <1%	No	N/A
3	FRC 284	Exfoliated section associated with the cracking has slumped (Longwalls 20-22 Round 2 Survey)	2	No	1	1/144 sites = <1%	No	N/A
4	FRC 15	Cracking of shelter wall (Longwalls 20-22 Round 2 Survey)	3	No	1	1/144 sites = <1%	No	N/A
5	FRC 15	Increased cracking of shelter wall (Longwalls 20-22 Round 3 Survey)	3	No	1	1/144 sites = <1%	No	N/A
6	MET 1	Cracking in roof of shelter and vertical cracking (Longwalls 20-22 Round 3 Survey)	4	No	1	1/144 sites = <1%	No	N/A
7	FRC 283	Opening of joints and silica forming over art panel (Longwalls 20-22 Round 3 Survey)	5	No	1	1/144 sites = <1%	No	N/A
8	FRC 176	Vertical cracking observed along the northern and southern ends of the shelter (Longwalls 23-27 Round 1 Survey)	6	No	1	1/144 sites = <1%	No	N/A
9	FRC 176	Widening (by 5 mm) of previously identified cracking located along the northern end of the shelter (Longwalls 23-27 Round 3 survey)	6	No	1	1/144 sites = <1%	No	N/A
10	FRC 275	Opening of the horizontal bedding plane and five vertical hair line cracks along the back wall of the shelter (Longwalls 23-27 Round 3 survey)	7	No	1	1/144 sites = <1%	No	N/A
11	FRC 301	A large surface crack was observed running east to west along the rock platform. Crack is approximately 3 m to the north of the grinding groove and is approximately 25m long and continues past the rock platform (Longwalls 23-27 Round 4 survey)	8	No	1	1/144 sites = <1%	No	N/A

Heritage Management Plan - Subsidence Impact Register

Impact Register Number[1]	Aboriginal Heritage Site	Description of changes due to mine subsidence[2]	Cumulative number of sites with changes due to mine subsidence[3]	Has the site been affected by subsidence impacts? [4]	Cumulative number of sites affected by subsidence impacts [5]	Cumulative percentage of sites affected by subsidence impacts [6, 9]	Management or Contingency Measures Implemented? (Yes/No) [7]	Were Measures Effective? (Yes/No)[8]
12	FRC 28	Vertical cracking of the rear shelter wall, opening of horizontal planes/joints and movement of the rock shelf that is part of the shelter floor (Longwalls 23-27 Round 5 survey)	9	No	1	1/144 sites = <1%	No	N/A
13	FRC 29	Horizontal crack along the back wall of the shelter and a joining vertical crack (Longwalls 23-27 Round 5 survey)	10	No	1	1/144 sites = <1%	No	N/A
14	FRC 60	Three vertical cracks along the back wall of the shelter (Longwalls 23-27 Round 5 survey)	11	No	1	1/144 sites = <1%	No	N/A
15	FRC 34	Horizontal cracking along the roof of the shelter and cracking over the most southern hand stencil on the back panel (Longwalls 23-27 Round 5 survey)	12	Yes	2	2/144 sites = <2%	No	N/A
16	FRC 76	Opening of the horizontal bedding plane along the back wall, not coincident with any art (Longwalls 301-303 Survey)	13	No	2	2/144 sites = <2%	No	N/A

Notes:

1. Fill out all details in the Subsidence Impact Register Assessment Form and record the register number here.
2. Description of changes observed due to mine subsidence. (e.g. cracking of shelter wall, opening of joints).
3. Cumulative number of sites with changes due to mine subsidence.
4. Has the site been affected by subsidence impacts? Sites are considered to be 'affected by subsidence impacts' if they exhibit one or more of the following consequences that cannot be attributed to natural weathering or deterioration: overhang collapse; cracking of sandstone that coincides with Aboriginal art or grinding grooves; and rock fall that damages Aboriginal art).
5. Cumulative number of sites affected by subsidence impacts.
6. If the cumulative percentage of sites affected by subsidence impacts equals or exceeds 10%, notify General Manager. If less than 10%, notify the Technical Services Manager or Environment & Community Superintendent of the cumulative percentage.
7. Indicate whether management or contingency measures were implemented (yes or no).
8. Indicate whether the implemented management or contingency measures were considered to be effective (yes or no).
9. There are 144 Aboriginal heritage sites (141 sites identified in the Project EA and one new site [MET 4] identified during Round 2 monitoring for Longwalls 20-22 and two new sites [NEW-RS-01 and NEW-ST-01] identified during baseline recording for Longwalls 311-316) within the mining area.

Heritage Management Plan – Subsidence Impact Register
Assessment Form

Date:

Observer (Name and position):

Register Number (i.e. Number 1, 2, etc.):

Longwall Number and Chainage:

Location of Observed Change Due to Mine Subsidence:

Description of Change Due to Mine Subsidence:

Description of Potential Consequences:

Examples:

- cracking through art or grinding groove;
- burial of artefacts and deposit; and
- complete loss of site due to collapse.

Attach photographs

Description of Photographs:

Has the site been affected by subsidence impacts?

What is the cumulative percentage of sites affected by subsidence impacts?

Person Notified:	Manager – Safety & Environment	☐
	Technical Services Manager	☐
	General Manager	☐

Actions Required:	Management/Remediation Measures	☐
	Contingency Plan Initiated	☐
	Incident Notification	☐
	Safety Measures/Public Safety Management Plan Requirements	☐

Management/Remediation Measures Implemented:

Contingency Measures Implemented:

Effectiveness of Contingency or Management Measures:

APPENDIX 4

CONTINGENCY PLAN CHECK LIST

Contingency Plan Check List

Contingency Plan Component	Yes/No	Comment
Observation reported to the Technical Services Manager or the Manager – Safety & Environment (within 24 hours).		
Observation recorded in the Heritage Management Plan - Subsidence Impact Register.		
Reporting of any Aboriginal heritage performance measure exceedance to DPE and Heritage NSW (as soon as practicable after Metropolitan Coal becomes aware of the exceedance).		
Conduct investigation to evaluate the potential contributing factors. Investigation to: • compare and critically analyse measured versus predicted subsidence parameters; • review measured subsidence parameters against the observed impact; and • review the Subsidence Monitoring Program and update the program where appropriate.		
Identification of appropriate course of action with respect to the identified impact(s) in consultation with specialists, relevant agencies and Aboriginal stakeholders, as necessary. For example: • proposed management/mitigation measures; • a program to review the effectiveness of the management/mitigation measures.		
Submission of the proposed course of action to the DPE for approval.		
Implementation of the approved course of action to the satisfaction of the DPE.		
Provision of a suitable offset - if either the contingency measures implemented by Metropolitan Coal have failed to remediate the impact or the Secretary of the DPE determines that it is not reasonable or feasible to remediate the impact.		

APPENDIX 5

ABORIGINAL HERITAGE SITES GEOTECHNICAL RISK ASSESSMENT FOR LONGWALLS 311-316

msec mine subsidence ENGINEERING CONSULTANTS

Peabody

METROPOLITAN COAL PROJECT:

Metropolitan Mine – Longwalls 311 to 316

Geotechnical Risk Assessment for Aboriginal Heritage Sites in Support of the Extraction Plan

DOCUMENT REGISTER

Revision	Description	Author	Checker	Date
01	Draft Issue	PD		Jan 2024
A	Final Issue	PD		Mar 2024

Report produced to:- Support the Extraction Plan for submission to the Department of Planning, Industry and Environment (DPIE).

Associated reports:-

Background reports available at *www.minesubsidence.com*:-

Introduction to Longwall Mining and Subsidence (Revision A)

General Discussion of Mine Subsidence Ground Movements (Revision A)

Mine Subsidence Damage to Building Structures (Revision A)

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3 Risk Assessment 13

4 Mitigation Measures 15

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1 Introduction

Metropolitan Coal is a wholly owned subsidiary of Peabody Energy Pty Limited (Peabody) and operates Metropolitan Colliery (the Colliery), which is located in the Southern Coalfield of New South Wales (NSW). Metropolitan Coal has extracted Longwalls 1 to 27 and 301 to 308 under Project Approval 08_0149, and is currently mining Longwall 309.

Metropolitan Coal is currently preparing an extraction plan for Longwalls 311 to 316. As part of the Heritage Management Plan, Metropolitan Coal have requested a geotechnical risk assessment for Aboriginal cultural heritage sites of high archaeological significance and/or particular cultural significance relevant to the Longwalls 311-316 Extraction Plan.

A total of 11 Aboriginal cultural heritage sites of high archaeological significance and/or particular cultural significance have been included in this risk assessment for Longwalls 311 to 316. The list of Aboriginal cultural heritage sites is provided in Table 1.1.

Table 1.1 Aboriginal cultural heritage sites of high significance and/or particular cultural significance relevant to Longwalls 311-316

Site Reference	Description	Easting (MGA)	Northing (MGA)	Significance	Particular Cultural Interest
FRC 185	Sandstone overhang with art, artefacts and deposit	311685	6217490	High	Yes
FRC 191	Sandstone overhang with art only	311280	6216300	High	-
FRC 195	Sandstone overhang with art only	311015	6215695	High	-
FRC 198	Sandstone overhang with art only	311280	6216135	Low	Yes
FRC 340	Sandstone overhang with art only	311620	6217570	Low	Yes
FRC 62	Sandstone overhang with art and PAD and/or grinding grooves	310562	6215765	High	Yes
NT 35	Sandstone overhang with art and PAD and/or grinding grooves	311103	6217300	Low	Yes
NT 46	Open site with grinding grooves and engravings	310452	6217735	Low	Yes
NT 75	Sandstone overhang site	310780	6219236	Low	Yes
NT 8	Open site with grinding grooves and engravings	310710	6217977	Moderate	Yes
NT 9	Sandstone overhang with art and PAD	310765	6218035	Low	Yes

PAD = potential archaeological deposit

The locations of the Aboriginal cultural heritage sites are shown in a layout plan in Fig. 1.1 and on an aerial photo in Fig. 1.2.

The layout plan in Fig. 1.1 and Fig. 1.2 shows a Study Area boundary in black around Longwalls 311 to 316 which is based on the further extent of a 35° angle of draw line and predicted 20 millimetres (mm) subsidence contour. Of the 11 Aboriginal cultural heritage sites, eight are located directly above the Longwalls 311 to 316 panels and chain pillars. It can be seen from Fig. 1.2 that the sites are located in areas of dense vegetation.

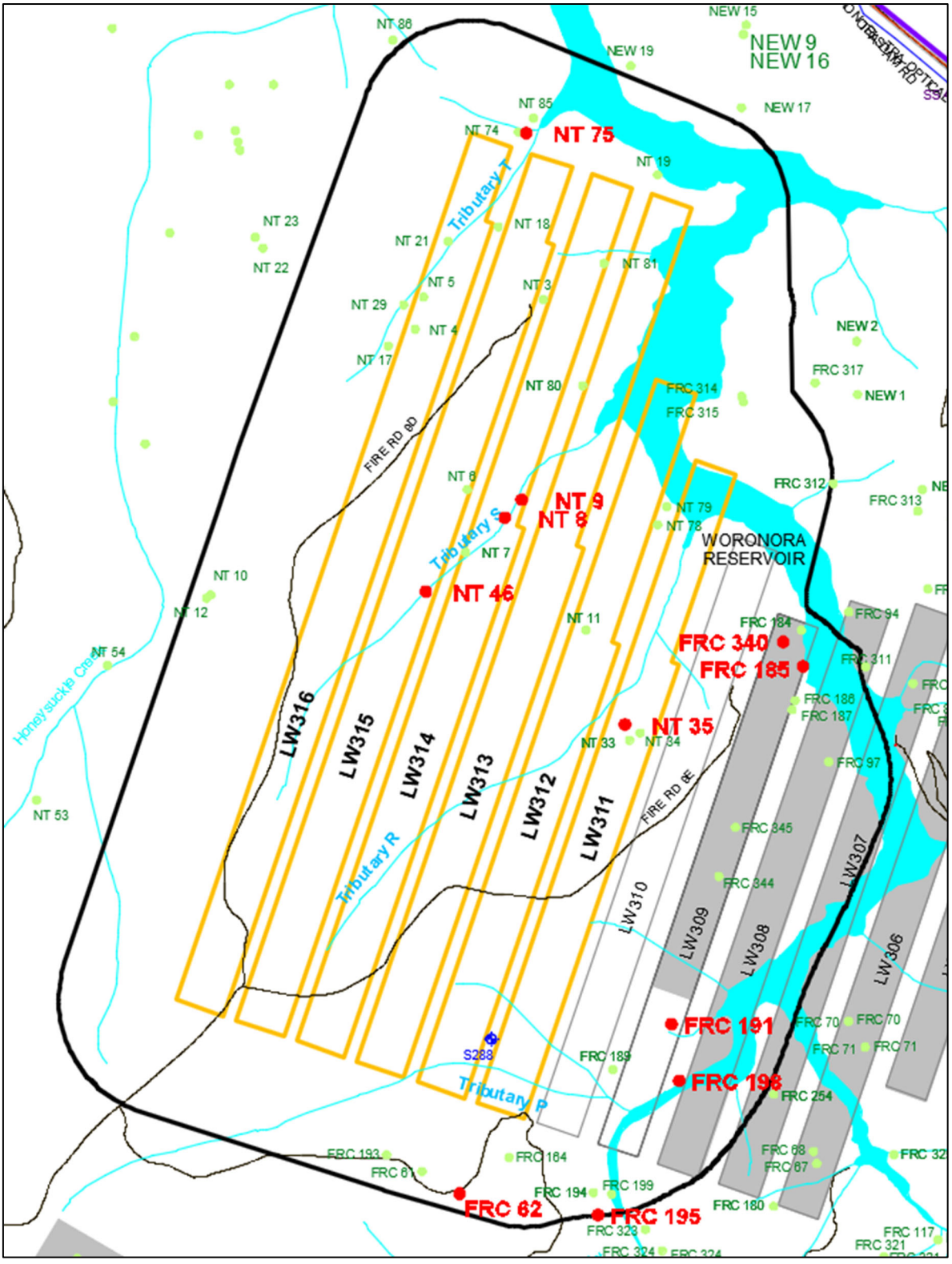


Fig. 1.1 Plan showing Aboriginal cultural heritage sites of high significance and/or particular cultural significance relevant to Longwalls 311-316

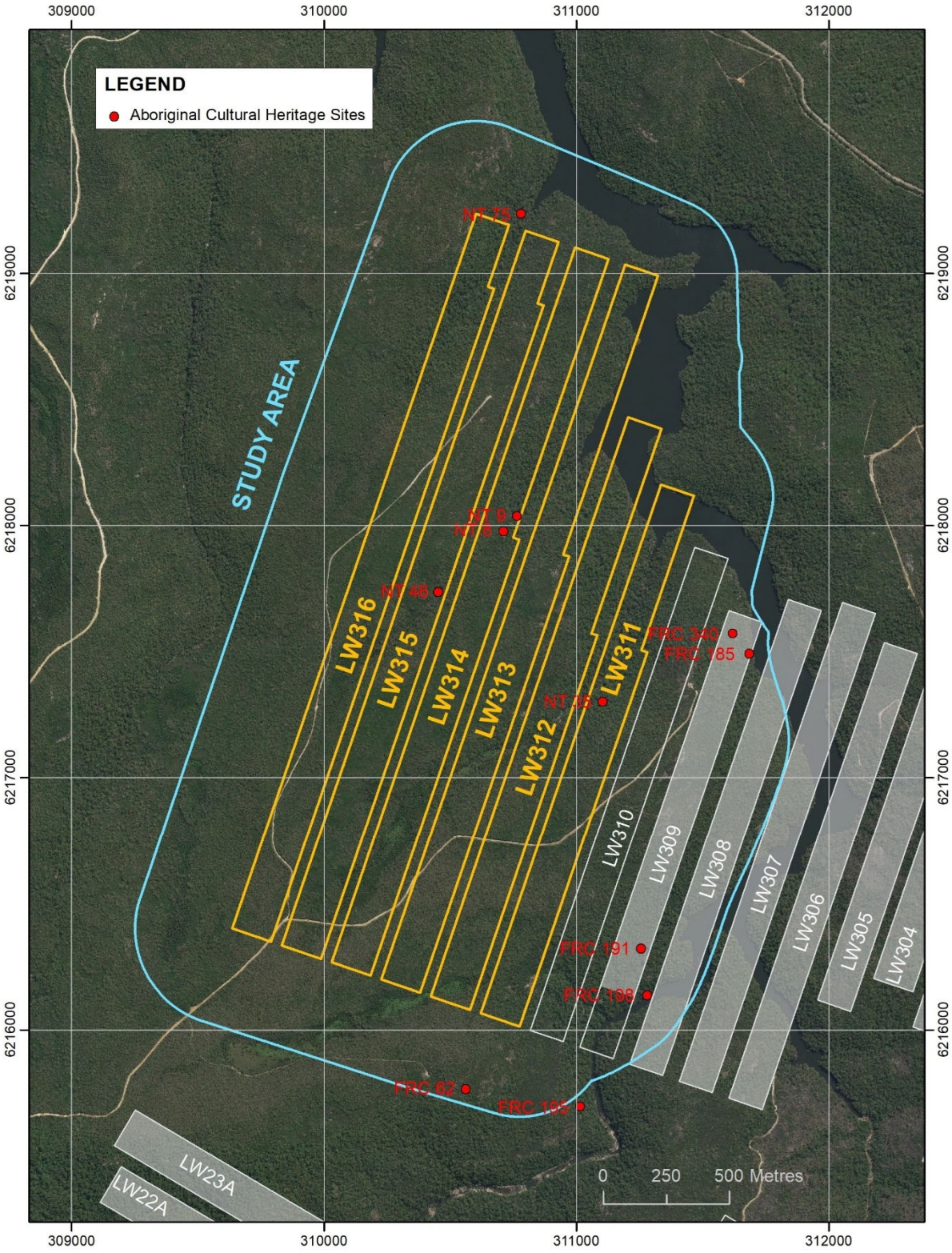


Fig. 1.2 Aerial photo showing Plan showing Aboriginal cultural heritage sites of high significance and/or particular cultural significance relevant to Longwalls 311-316

2 Site locations

A brief description of each of the Aboriginal cultural heritage sites is provided below. The descriptions include a photograph of the shelter and a plan showing a shaded relief image of the location, overlaid with contours at 1 metre (m) interval. Faults identified at seam level are shown in red and surface lineaments are shown in blue. More detailed descriptions of the sites are provided in the baseline records (Niche 2018) or site cards (Kayandel 2008) in Appendix B.

FRC 185

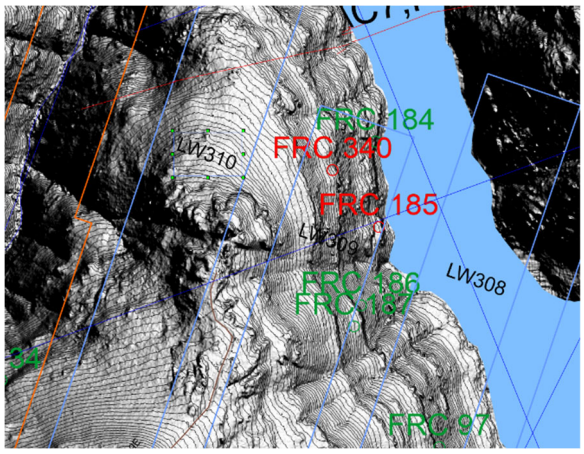


Fig. 2.1 Location of site FRC 185



Fig. 2.2 Photograph of site FRC 185

FRC 185 is located above Longwall 309 towards the base of a steep slope at a ledge oblique to the longwall alignment. Block falls are present outside the shelter. Minor seepage is observed in the back wall. Vegetation is present within a weathered layer at the base of the back wall. The outside face of the sandstone roof exposes weathered bedding.

FRC 191

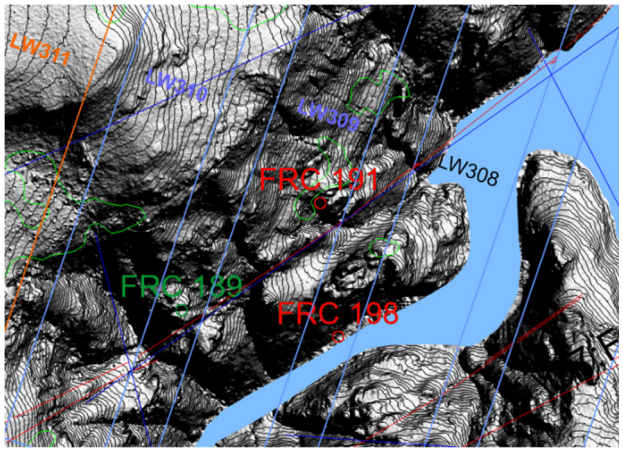


Fig. 2.3 Location of site FRC 191



Fig. 2.4 Photograph of site FRC 191

FRC 191 is located above Longwall 309. The shelter is mid slope and to the north of a surface lineament. Block falls are present outside the shelter. The shelter is formed in a layer of weathered cross-bedded sandstone with significant erosion of the back wall. Numerous block falls are present within the shelter.

FRC 195

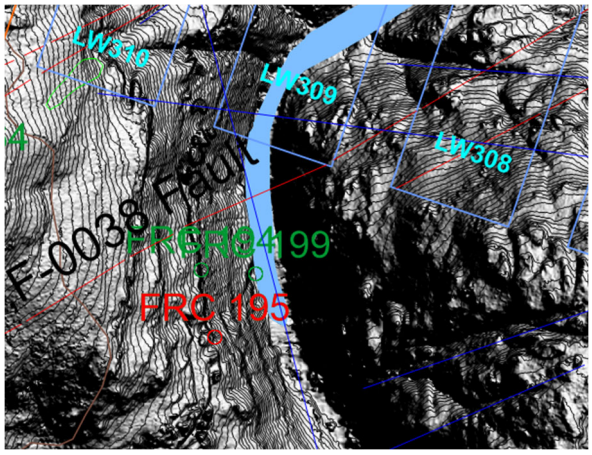


Fig. 2.5 Location of site FRC 195



Fig. 2.6 Photograph of site FRC 195

FRC 195 is located on a north-east facing steep slope above the Waratah Rivulet and is approximately 220 m to the south of Longwall 309. The site is approximately mid slope within a series of ledges. The shelter has a stepped and sloping back wall. A weathered band infilled with clayey sand is observed near the base of the back wall. Active seepage is evident at step changes. Large fallen blocks are present within the shelter.

FRC 198

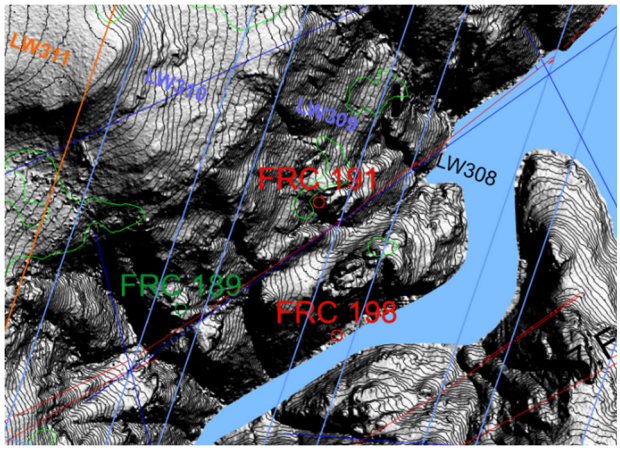


Fig. 2.7 Location of site FRC 198



Fig. 2.8 Photograph of site FRC 198

FRC 198 is located above the chain pillar between Longwalls 308 and 309 at the base of a steep slope. The shelter has a low roof height and is formed in weathered cross-bedded sandstone.

FRC 340

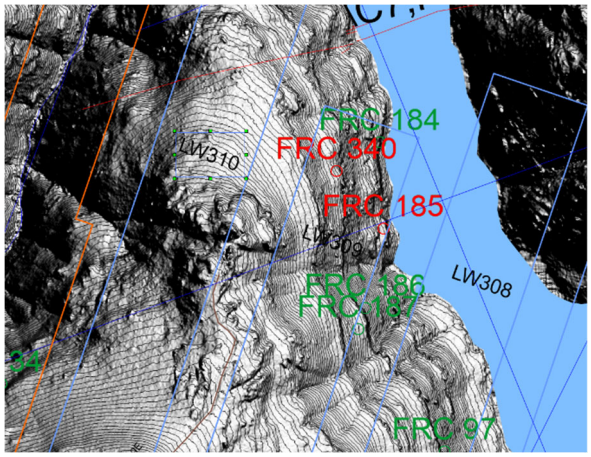




Fig. 2.9 **Location of site FRC 340** **Fig. 2.10** **Photograph of site FRC 340**

FRC 340 is located above Longwall 309 on a north-east facing steep slope above the Woronora Reservoir. The site is on the upper slope within a series of ledges. The shelter has a stepped back wall and thin roof profile. The main upper section of the back wall comprises weathered cross-bedded sandstone. Steps at joint planes are present at shallow angle to the face along the lower wall. Minor active seepage is evident between the upper and lower wall. Block falls are present outside the shelter.

FRC 62

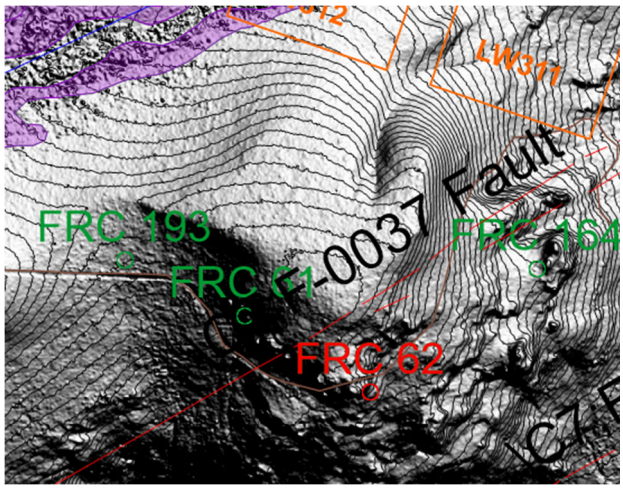




Fig. 2.11 **Location of site FRC 62** **Fig. 2.12** **Photograph of site FRC 62**

FRC 62 is located near the top of a south facing slope, 300 m to the south-west of Longwall 311. The site is near a topographical peak. The shelter comprises a stepped and sloping roof and back wall with a main eroded bedding layer near the base of the back wall containing vegetation. The eastern end comprises a sloping roof with prominent steps at five bedding planes. Minor sandstone cobbles and boulders are present in the floor.

NT 35

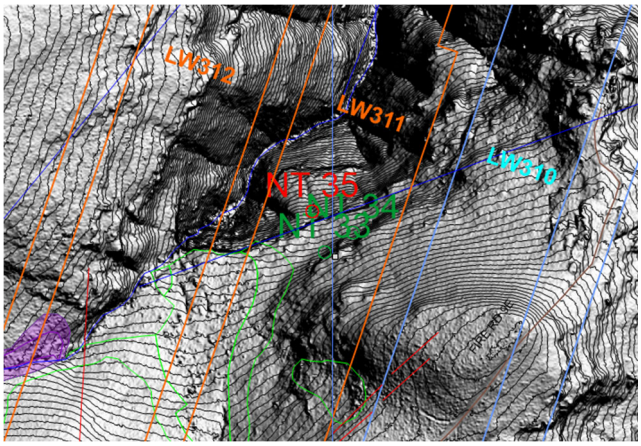




Fig. 2.13 **Location of site NT 35** **Fig. 2.14** **Photograph of site NT 35**

NT 35 is located near the base of a north-west facing slope above Longwall 311. The shelter comprises a sloping thin roof and curved back wall with significant erosion. Some conglomerate and iron induration is present in the back wall at the western end of the shelter. A prominent joint is present in the upper section of the back wall. Block falls are present outside the shelter.

NT 46

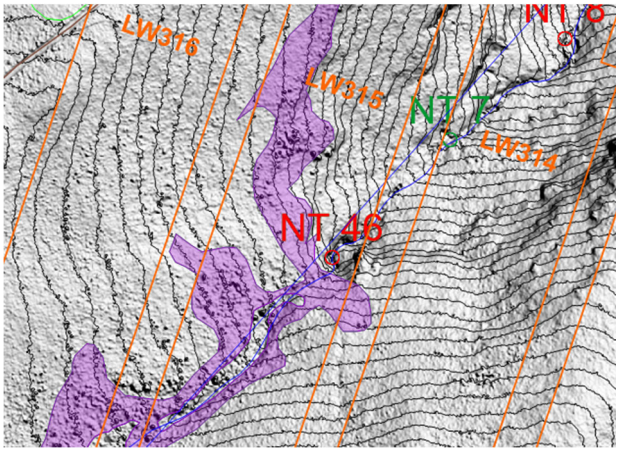




Fig. 2.15 **Location of site NT 46** **Fig. 2.16** **Photograph of site NT 46**

NT 46 is located along a shallow graded drainage line, sloping to the north-east, above Longwall 315. The site is open and near level with no identified joints. Large slabs and boulders surround the location.

NT 75

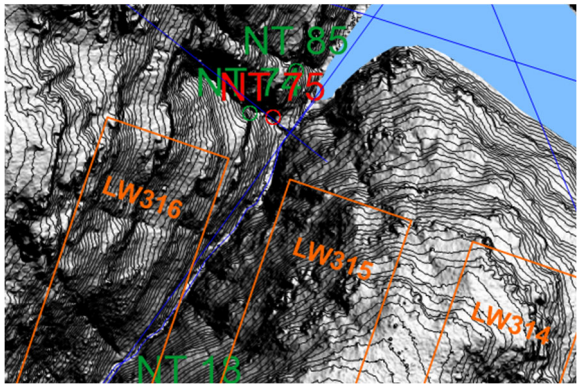




Fig. 2.17 Location of site NT75 **Fig. 2.18 Photograph of site NT75**

NT75 is located near the base of a south facing slope 65 m to the north east of Longwall 316. The site is close to Tributary S which flows to the Woronora Reservoir. The shelter is formed in weathered cross bedded sandstone. Block falls are present within the shelter.

NT 8

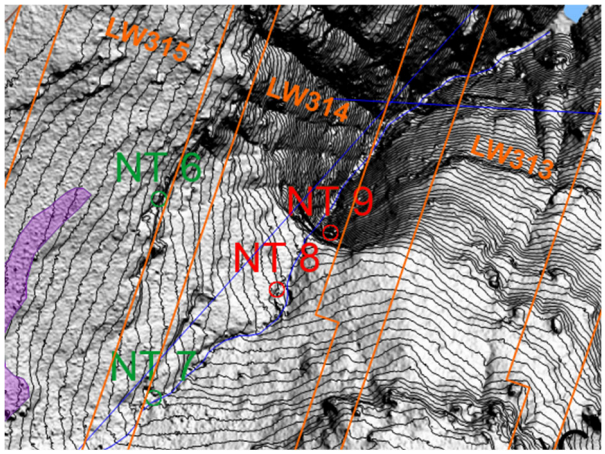




Fig. 2.19 Location of site NT 8 **Fig. 2.20 Photograph of site NT 8**

NT 8 is located along a shallow grade drainage line, sloping to the north-east, above Longwall 314. The site is open and near level with no identified joints. Large slabs and boulders surround the location. The sandstone with engraving is partly undercut by water flow along its eastern edge with a step down of 1 m to 1.5 m.

NT 9

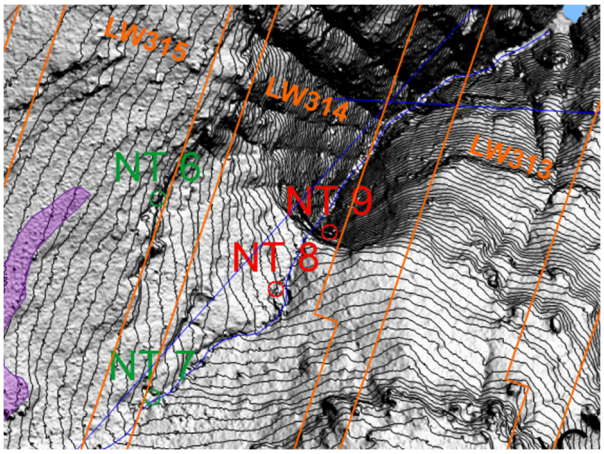


Fig. 2.21 Location of site NT 9



Fig. 2.22 Photograph of site NT 9

NT 9 is located beneath a waterfall along a drainage line, sloping to the north-east, above Longwall 314. The shelter comprises a sloping roof with a step roughly midway. The back wall is low height and the floor slopes steeply to the front of the shelter. The site has active seepage and vegetation growth. A prominent joint is observed in the roof. Large fallen slabs are present in the eastern end of the shelter and block falls are present in the western end. The shelter is approximately 25m east of Tributary S and to the east of a large overhang (COH19).

3 Risk Assessment

The risk assessment for the Aboriginal cultural heritage sites is a qualitative assessment based on classifications consistent with previous risk assessments by Sheppard (2004) and Strata Control (2019).

Data on site characteristics and position have been included to identify key features of the Aboriginal cultural heritage sites that are considered significant when assessing potential risks of impact from mine subsidence at Metropolitan Colliery. The following list of characteristics and positional information have been outlined in previous reports (Metropolitan Coal 2022) and have been included in this assessment:

- overhang volume – >50 cubic metres (m^3) increases the risk of negative consequence;
- presence of existing water seepage – damage to art from water is more likely if existing seepage is
- present;
- location in relation to a drainage line – sites located in valley bottoms can experience valley closure
- mechanisms and increased risk of cracking;
- location in relation to goaf – location of sites relative to the goaf influences the level of subsidence
- impacts experienced;
- overhang formation process – block-fall type overhangs are more likely to have roof or rear wall damage due to subsidence impacts;
- depth of cover – increased depth of cover reduces subsidence impacts and consequences; and
- presence of existing joints and bedding planes – subsidence movements may be dissipated through
- existing joints and bedding planes rather than the creation of new cracks.

The risk assessment is based on the following five qualitative impact risk rankings:

A Most probable

B Possible

C Unlikely

D Highly Unlikely

E Practically impossible

The summary of site characteristics, positional information, subsidence predictions and risk ranking for each site is provided in Table 3.1. Eight of the sites are ranked B (Possible), being sites located above the longwall panels or pillars (FRC 185, FRC 191, FRC 198, FRC 340, NT 46, NT 75, NT 8, and NT9) . The narrow longwall geometry and depth of cover generally results in low magnitudes of subsidence and differential movement. The site characteristics and positional data did not identify features that would result in a higher risk ranking for the low magnitudes of subsidence parameters. Sites located in the floor of a valley may experience valley closure movements resulting from longwall extraction. Three sites, NT 8, NT 9 and NT 46 are located in valley floors. Sites NT46 and NT8 are located in very shallow valley profiles and the predicted valley closure is low at these locations. The sites are also offset or isolated from the main sandstone exposure across the valley profiles and have therefore been ranked as a possible risk of impact.

Table 3.1 Aboriginal Cultural Heritage Sites - Longwalls 311-316 Risk Assessment

Site ID	Description	Significance rating	Particular cultural interest	Characteristics								Position					Subsidence predictions				Impact risk ranking for LW311-316
				Length (m)	Depth (m)	Height (m)	Overhang >50 m^3	Aspect[1]	Seepage	Formation type	Prominent joint trend	Valley slope position	Nearest longwall	Distance to nearest longwall (m)	Angle to LW311-316 retreat (degrees)	Near significant fault/ lineament	Maximum predicted total subsidence after LW316	Maximum predicted total tilt after LW316	Maximum predicted total tensile strain after LW316	Maximum predicted total comp. Strain after LW316	
FRC 185	Sandstone overhang with art, artefacts and deposit	High	Yes	29	5	3	Yes	E	Yes	Block Fall	-	Lower	309	Above	30	Yes	550	1	< 0.5	< 0.5	B
FRC 191	Sandstone overhang with art only	High	-	18	5	3.4	Yes	NNW	No	Cavernous	70	Mid	309	Above	50	No	875	2	< 0.5	1	B
FRC 195	Sandstone overhang with art only	High	-	14	4	2	Yes	NE	Yes	Block Fall	-	Mid	309	220	-	No	40	< 0.5	< 0.5	< 0.5	D
FRC 198	Sandstone overhang with art only	Low	Yes	36	4.4	1.4	Yes	SE	No	Cavernous	170	Base	308	Above Pillar	30	No	700	1.5	< 0.5	< 0.5	B
FRC 340	Sandstone overhang with art only	Low	Yes	15	2.7	2.3	Yes	NNE	Yes	Block Fall	55	Upper	309	Above	35	Yes	550	2	< 0.5	< 0.5	B
FRC 62	Sandstone overhang with art and PAD and/or grinding grooves	High	Yes	27	3.7	2.8	Yes	SSE	Yes	Block Fall	-	Top	311	300	-	No	30	< 0.5	< 0.5	< 0.5	D
NT 35	Sandstone overhang with art and PAD and/or grinding grooves	Low	Yes	17	3	3	Yes	NW	No	Cavernous	-	Lower	311	Above	30	No	1450	1	< 0.5	1	B
NT 46	Open site with grinding grooves and engravings	Low	Yes	-	-	-	-	-	-	Surface Erosion	200	Floor	315	Above	-	No	1150	1	< 0.5	< 0.5	B
NT 75	Sandstone overhang site	Low	Yes	29	4.7	2.6	Yes	SE	No	Block Fall	-	Floor	316	65	-	Yes	60	0.5	< 0.5	< 0.5	D
NT 8	Open site with grinding grooves and engravings	Moder ate	Yes	-	-	-	-	E	-	Surface Erosion		Floor	314	Above	-	No	1250	2	< 0.5	1	B
NT 9	Sandstone overhang with art and PAD	Low	Yes	30	6	3.1	Yes	N	Yes	Cavernous	250	Floor	314	Above	90	No	1100	2.5	1	< 0.5	B

4 Mitigation Measures

Impacts to Aboriginal cultural heritage sites at Metropolitan colliery have generally been of an isolated and minor nature. Large scale failure of shelters or sandstone exposures at Aboriginal cultural heritage sites has not been observed at Metropolitan Colliery. Expected impacts may include the following:

- cracking of exposed sandstone, in floor, wall or roof of shelters. Cracking could be either new or a change in existing cracking;
- spalling;
- minor rockfalls;
- opening of bedding planes or joints or differential movement across bedding planes or joints;
- increased seepage.

To date, sites FRC 34 and FRC 281 have been affected by subsidence impacts as a result of the cracking of sandstone that coincides with Aboriginal art, meaning that the cumulative percentage of sites affected by subsidence impacts is less than 2% of the 189 sites within the mining area (Niche 2020).

The longwall panel geometry of below most of the sites is narrower, with wider pillars, compared with previously extracted longwalls (20 to 27 and 301 to 304). The narrow longwall geometry commenced at Longwall 305. The result of the narrower panel geometry is significantly lower predicted subsidence parameters and associated risk of surface impacts.

Based on recorded impacts from the previously extracted longwalls, a summary of assessed impact risks is provided below for the eight sites with risk ranking B.

FRC 185

The artwork at FRC 185 comprises two main panels on the back wall with some artwork located beneath minor seepage locations. The sandstone in the back wall appears medium to high strength. Only one significant joint was identified, near the middle of the back wall. Impact risks include cracking and seepage.

FRC 191

The artwork at FRC 191 includes two main panels on the back wall. The back wall comprises weathered cross-bedded sandstone with significant erosion. Impact risks include cracking and minor spalling/rock fall.

FRC 198

The artwork at FRC 198 is located on the rear roof and upper back wall. The artwork appears to be located above the weathered cross-bedded sandstone. Impact risks include cracking and minor spalling/rock fall.

FRC 340

The artwork at FRC 340 is located on the lower and upper face of the back wall. Sandstone steps are present along the lower face from breakages where joint planes intersect the face at shallow angles. Impact risks include cracking and minor spalling/rock fall.

NT46

NEW 1 is an open site with grinding grooves. Impact risk includes cracking.

NT 75

Site NT 75 contains artefacts and PAD. The risk of impact includes minor spalling/rock fall.

NT 8

NT 8 is an open site with grinding grooves and engraving. The risk of impact includes cracking coincident with the site feature locations.

NT 9

The artwork at NT 9 is located on the roof of the overhang the shelter. Impact risks include cracking and minor spalling/rock fall.

Mitigation measures adopted for Aboriginal cultural heritage sites need to consider accessibility and the potential disturbance created by the proposed mitigation measures. Mitigation measures could include avoidance (coal sterilisation), salvage, or protection of sites. Some options for protective measures include:

- Seepage control/diversion to protect art or features beneath the seepage area. Seepage control/diversion is relatively easy to implement where required with a suitable monitoring program to identify where measures were required.
- Stabilisation would generally require significant equipment and engineering design and likely result in significant disturbance to a site if access were possible. Given no large scale shelter collapses have occurred at Metropolitan Colliery and the expected site disturbance, stabilisation measures are generally not adopted.
- Stress reduction involves isolating a feature from the surrounding stress changes generated by longwall mining. Similar to stabilisation, stress reduction requires significant site disturbance and is generally not preferred.

The potential for seepage impact to sites was identified only at Site FRC 185. The seepage observed within the shelter was non-active with minor traces along the back wall. Consideration could be given to monitoring for active seepage during longwall extraction and implementing mitigation if seepage and risk of damage to artwork were identified.

The assessed potential impact risks for the remaining sites included cracking and/or spalling/rock fall. As identified above, implementation of protective mitigation for these impact risks are generally not practical. Similarly, selective protection measures are generally difficult to implement as the locations of potential cracking or spalling/rock fall cannot generally be predicted with suitable accuracy.

The historical impacts to date show that the likelihood of impacts coinciding with Aboriginal heritage features is extremely low. The narrow longwall mining geometry further reduces this likelihood.

APPENDIX A. REFERENCES

References

Kayandel 2008. Kayandel Archaeological Services, *Aboriginal Cultural Heritage Assessment – Metropolitan Coal Project Appendix H,* July 2008

Niche 2018. Niche Environment and Heritage, *Longwalls 304 to 306 Metropolitan Colliery – Baseline Recording. Report prepared for Metropolitan Coal Heritage Management Plan.*

Niche 2020, Niche Environment and Heritage, *Monitoring of Aboriginal Cultural Heritage Sites Longwalls 304. Prepared for Peabody Energy Australia – Metropolitan Colliery.*

Niche 2024. Niche Environment and Heritage, *Baseline Recording - Longwalls 311 to 316 Metropolitan Colliery – Aboriginal Heritage Baseline Recording. Prepared for Metropolitan Coal Pty Ltd.*

Metropolitan Coal 2022. *Metropolitan Coal - Longwalls 308 to 310 Heritage Management Plan,* reference HMP-R01-A, February 2022.

Sheppard 2004. Shepherd Mining Geotechnics Pty Ltd, *Geotechnical and Risk Assessment of Archaeological Sites for Longwall Extraction Blocks 14-17 and 20-22. Metropolitan Colliery Longwall 14-17 Subsidence Management Plan, Attachment H,* reference SMG810/1 September 2004.

Strata Control (2019). Strata Control, *Metropolitan Mine Aboriginal Heritage Sites – Geotechnical Risk Assessment for Longwalls 305 to 307*, 29 August 2019.

APPENDIX B. BASELINE RECORDS / SITE CARDS

FRC 185

2.7 Flat Rock Creek 185 (FRC 185, AHIMS# 52-2-0223/ 52-2-0307)

This shelter is formed out of Hawkesbury sandstone by cavernous weathering and blockfall in antiquity. The art located at this shelter is in poor condition and has been affected by heavy exfoliation and water wash since it was recorded by Sefton (during the initial site recording). The artefacts recorded on the AHIMS site card were not relocated during this assessment. They were listed as:

- 1 flake broken into two (33x18x10mm)
- 1 complete flake (54x39x18mm)
- 1 broken pebble (104x84x32mm).

FRC 185 baseline recording data

Table 13: Baseline recording data for FRC 185.

Overview					
Site type	Shelter with Art and Deposit	Corrected MGAE	0311685	Corrected MGAN	6217490
Previous Recording	Site Card- Caryll Sefton Illawarra Prehistory Group	Date	Not specified		
Site Details					
Width	21m	Depth	5m	Height	3m
Orientation	NE	Floor area	24m²	Floor condition	Good
Location in Landscape	First ridgeline above stored water in Waratah Rivulet section of Woronora Dam, opposite Garrawarra under a large cliffline.				
Shelter exterior/formation	Cavernous weathering and block fall				
Shelter interion	Water wash, chemical weathering, exfoliation.				
Distance to water	<100m	Landform	Lower ridgeline		
Setting	Continuous overhang				
Archaeological Deposit					
Deposit	Yes	**Describe**	Yellow loamy sand of 10cm depth		
Visible artefacts?	No- Artefacts on site card, not relocated during assessment	Where?	N/A	How many?	
Art					
Art Surfaces	Poor, heavy exfoliation, water wash				
Art Condition	Poor				
Art Overview	Two panels: 5 human figures, 12 macropods, 1 kangaroo track motif, 21 indeterminate, 1 eel, 2 fish, 1 possum.				
Damage/threats					
Water wash	Yes	**Graffiti**	No	**Macro vegetals**	Yes
Animals	Yes - wallaby	**Salt/granular loss**	Yes	**Fissuring**	No
Insects	Yes - spider	**Spalling/exfoliation**	Yes	**Other**	
Fire	No	**Block fall**	Yes		

Table 14: Baseline recording data for art surfaces present within FRC 185.

Motif No.	Type	Form	Media	Colour	Measurement
Panel 1					
1	Macropod	Partial/line	Charcoal	Black	123 x 150cm
2	Indeterminate	Line	Charcoal	Black	7 x 0.5cm
3	Indeterminate	2x lines	Charcoal	Black	8 x 1cm/L9x 1cm
4	Indeterminate	Infill	Charcoal	Black	35 x 14cm
5	2x Indeterminate	Infill x2	Charcoal	Black	54 x 2cm/20 x 2cm
6	Indeterminate	Infill line	Charcoal	Black	9 x 26cm
7	Indeterminate	Line	Charcoal	Black	30 x 1cm
8	Kangaroo Tracks	Infill	Charcoal	Black	25 x 20cm
9	Indeterminate	Infill	Charcoal	Black	20 x 7cm
10	Fish	Outline/infill	Charcoal	Black	20 x 10cm
11	Indeterminate/Claw	Line/infill	Charcoal	Black	13 x 4cm
12	Indeterminate	Line	Charcoal	Black	20 x 10cm
13	Eel	Line/infill	Charcoal	Black	40 x 13cm
14	Human top half upside down	Line/infill	Charcoal	Black	30x 38cm
15	Macropod front legs	Line/infill	Charcoal	Black	44x 19cm
16	Half fish	Line/infill	Charcoal	Black	19 x 7cm
17	Indeterminate	Line	Charcoal	Black	60 x 33cm
18	Macropod	Infill	Ochre	Orange	105 x 196cm
19	Macropod/partial top	Line	Ochre	Orange	20 x 33cm
20	Bottom half macropod	Line/infill	Charcoal	Black	120 x 25cm
21	Bottom half macropod	Line/infill	Charcoal	Black	79 x 26cm
22	Frontal male hands raised	Line/hatching	Charcoal	Black	80 x 21cm
23	Kangaroo print	Line/infill	Charcoal	Black	10 x 5cm
24	Eel	Red ochre outline, charcoal infill	Ochre/charcoal	Orange/Black	150 x 30cm
25	Indeterminate	Infill	Charcoal	Black	35 x 12cm
26	Indeterminate	Infill	Charcoal	Black	10 x 10cm
27	Indeterminate	Line	Charcoal	Black	30 x 15cm
28	Frontal female	Line	Charcoal	Black	42 x 16cm
29	Indeterminate	Lines	Charcoal	Black	22 x 13cm
30	Possum	Line/infill	Charcoal	Black	63 x 38cm
31	Macropod?	Line/infill	Charcoal	Black	10 x 60cm
32	Macropod?	Line/infill	Charcoal	Black	55 x 25cm
33	Macropod?	Line/infill	Charcoal	Black	59 x 23cm
34	Indeterminate	Line/infill	Charcoal	Black/red	29 x 67cm

Motif No.	Type	Form	Media	Colour	Measurement
35	Macropod	Line/infill	Charcoal	Black	49 x 72cm
36	Bottom half macropod	Line/infill	Charcoal	Black	26 x 43cm
37	Bottom half macropod	Line/infill	Charcoal	Black	35 x 54cm
Panel 2					
1	Indeterminate	Lines	Charcoal	Black	17 x 24cm
2	Indeterminate	Lines	Charcoal	Black	10 x 5cm
3	Frontal male, head remaining	Lines	Charcoal	Black	20 x 15cm
4	Frontal male, head remaining	Lines	Charcoal	Black	15 x 10cm
5	Indeterminate humans?	Lines	Charcoal	Black	24 x 17cm
6	Indeterminate humans?	Lines	Charcoal	Black	15 x 17cm
7	Indeterminate	Lines	Charcoal	Black	6 x 4cm

Baseline recording images – site overview



Plate 24: Overview of shelter at FRC 185. View looking North.

Baseline recording plans – site overview

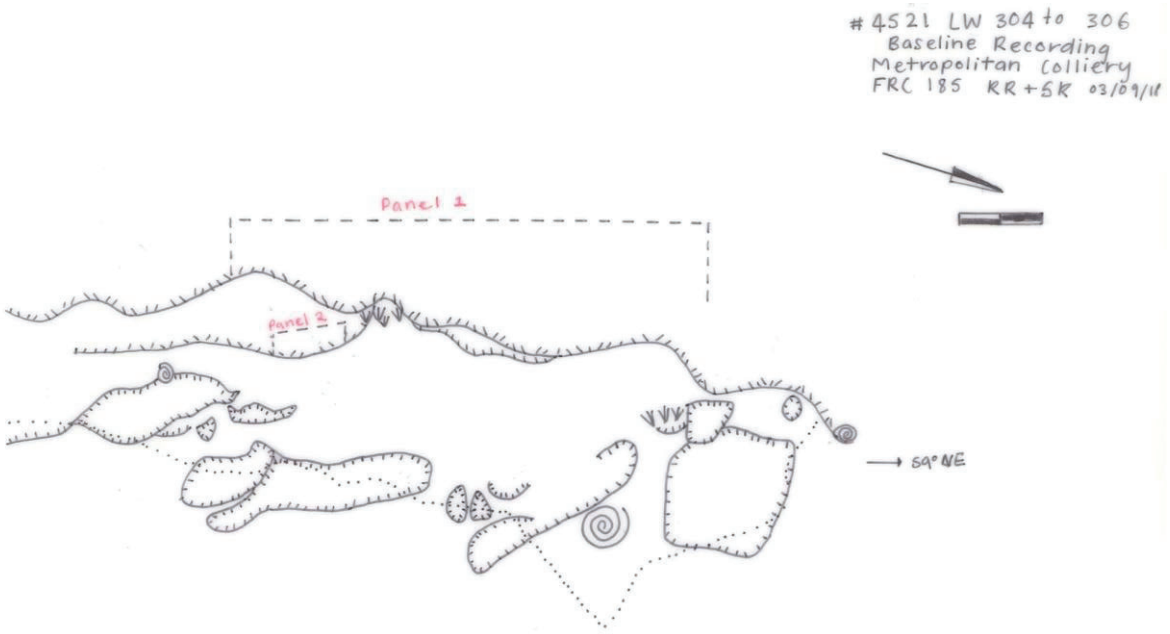


Figure 11: Plan of FRC 185.

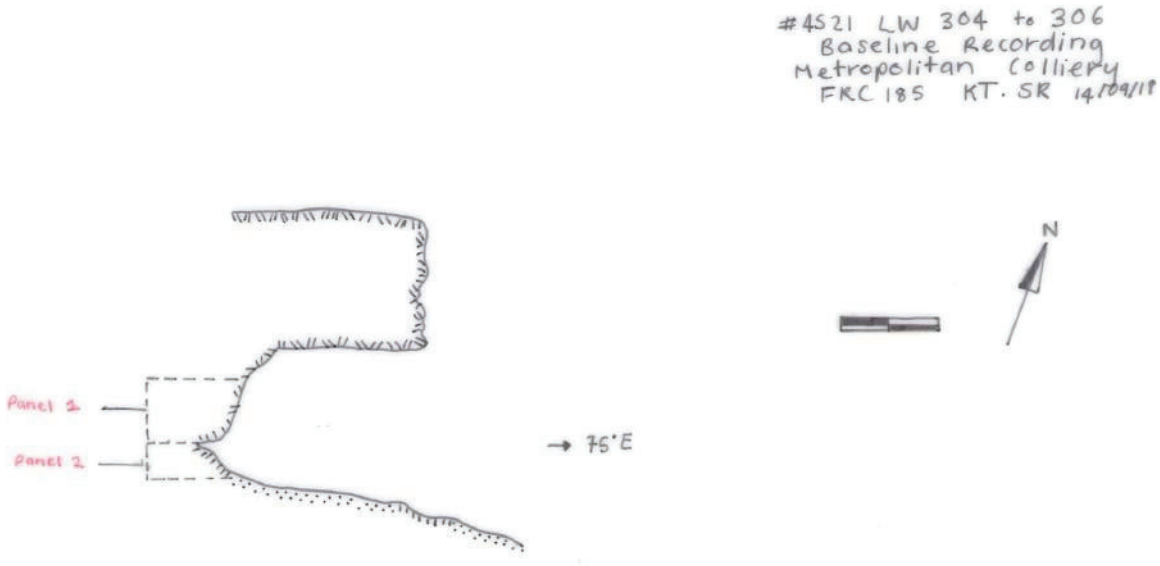


Figure 12: A1 Section of FRC 185.

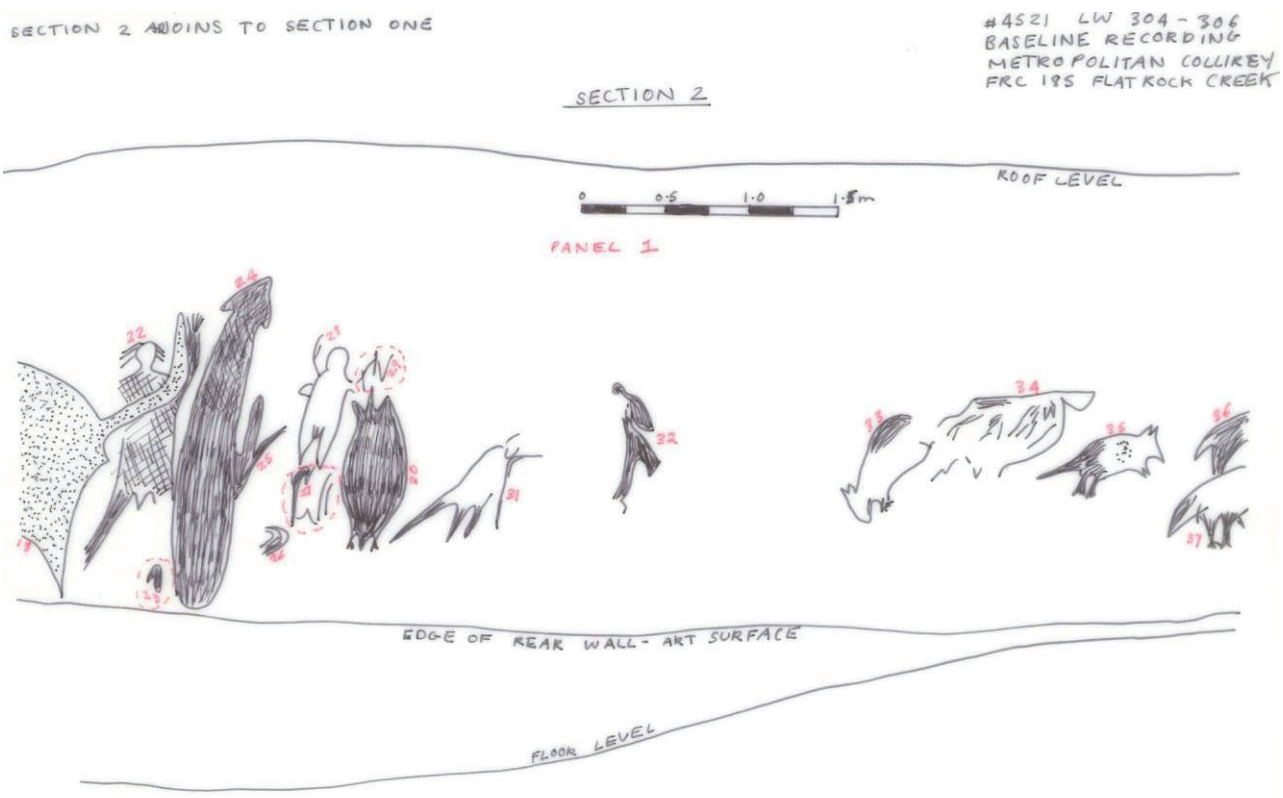


Figure 13: Artform drawing of FRC 185, Panel 1. Reproduced from the AHIMS site card.

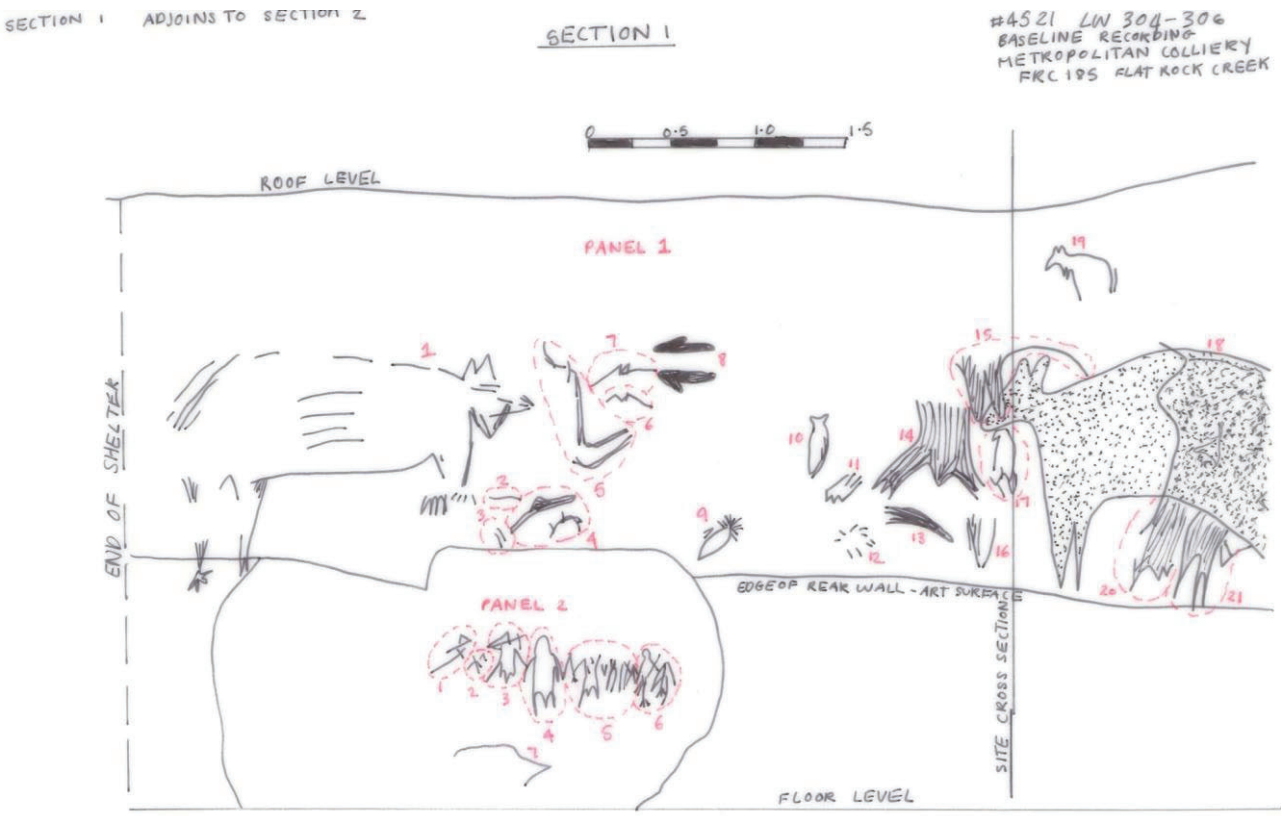


Figure 14: Artform drawing of FRC 185, Panel 1, 2. Reproduced from the AHIMS site card

Baseline recording images – detailed recording

Panel 1



Plate 25: Overview of Panel 1 at FRC 185. Panel 1, Motif 1.



Plate 26: Overview of Panel 1 at FRC 185. Panel 1; Motifs 2, 3, 4.



Plate 27: Overview of Panel 1 at FRC 185. Panel; Motifs 5, 6, 7, 8.

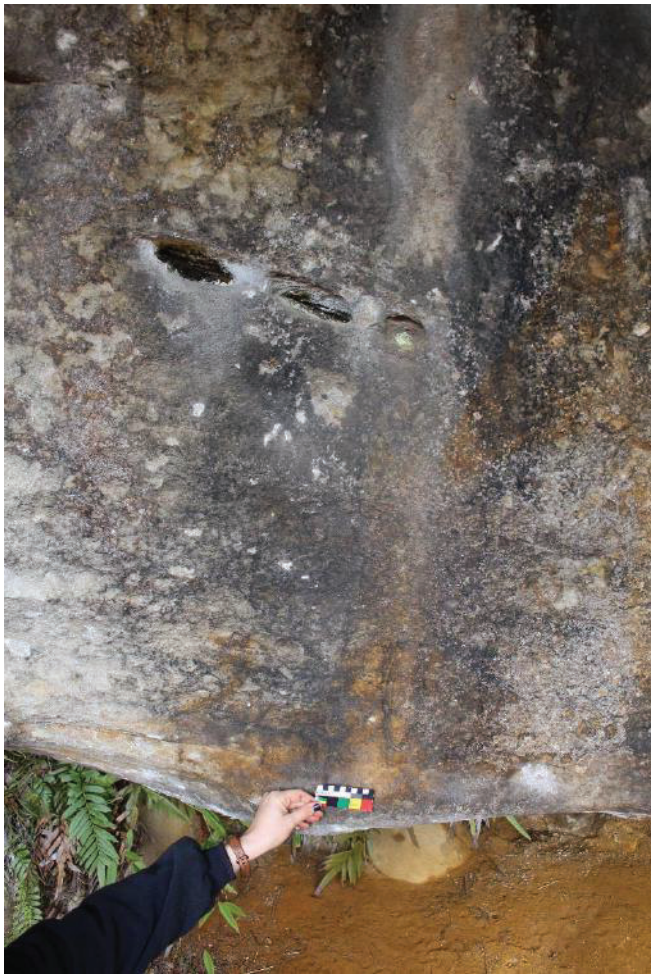


Plate 28: Overview of Panel 1 at FRC 185. Panel 1; Motifs 10, 11, 12, 13, 14, 16.



Plate 29: Overview of Panel 1 at FRC 185. Panel 1; Motifs 18, 15, 20, 21.



Plate 30: Overview of Panel 1 at FRC 185. Panel 1; Motifs 10, 24, 23, 27, 25, 26.



Plate 31: Overview of Panel 1 at FRC 185. Panel 1; Motifs 33, 34, 35, 36, 37.

Panel 2



Plate 32: Overview of Panel 2 at FRC 185. Panel 2; Motif 1 to 4.

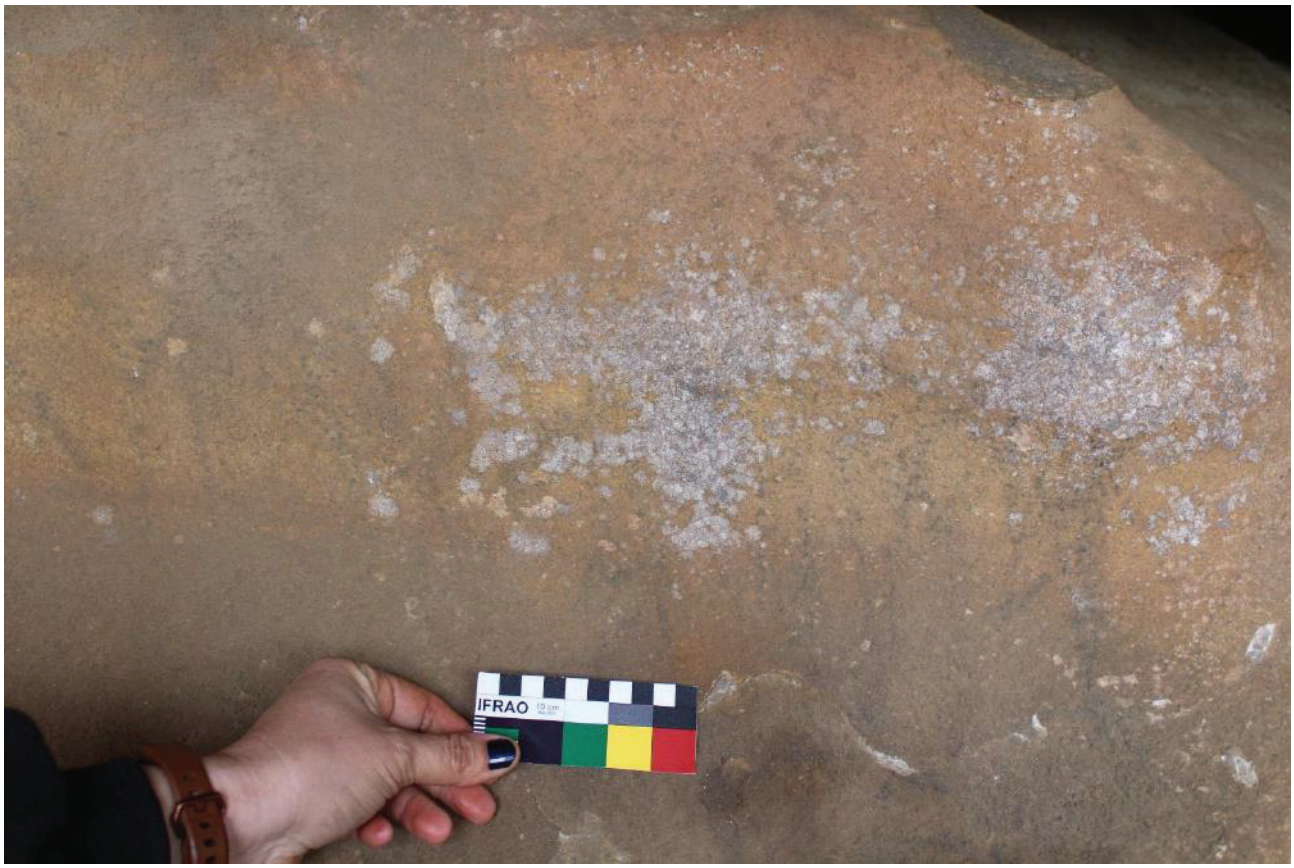


Plate 33: Overview of Panel 2 at FRC 185. Panel 5 to 6.

FRC 191

2.10 Flat Rock Creek 191 (FRC 191, AHIMS# 52-2-0183)

This shelter is formed out of Hawkesbury sandstone by cavernous weathering and heavy blockfall in antiquity. The art recorded by Sefton were relocated during this baseline recording, however the condition was very poor. The art has been impacted by granular loss, and exfoliation of the rock surface, and there is evidence of block fall from the roof and outside the shelter. Algae growth is also present.

FRC 191 baseline recording data

Table 17: Baseline recording data for FRC 191.

Overview					
Site type	Shelter with Art and Deposit	Corrected MGAE	0311298	Corrected MGAN	6216248
Previous Recording	Site card – Caryll Sefton Illawarra Prehistory Group	Date	Not specified		
Site Details					
Width	21.5m	Depth	1.8m	Height	2m
Orientation	NNW	Floor area	21.5m x 2m	Floor condition	Good
Location in Landscape	On the southern side of a small unnamed tributary running E-W on the western side of the stored water of Woronora Dam, on the first ridgeline up from the creek.				
Shelter exterior/formation	The shelter has been formed by cavernous weathering and heavy blockfall.				
Shelter interior	Chemical weathering on roof of shelter, exfoliation and algae growth on back panel. Block fall out of dripline. Salt/granular loss on back wall. Wombat scat noticed on floor of shelter.				
Distance to water	30m North	Landform	First ridgeline up from creek line on the side of a small gully.		
Setting	Continuous overhang				
Archaeological Deposit					
Deposit	Yes	**Describe**	Grey sand approximately 50cm deep		
Visible artefacts?	None visible	Where?	N/A	How many?	N/A
Art					
Art surfaces	Panel 1: Motif 1: has completely faded. Motif 2: the total of the macropod is barely visible and very patchy. Motif 3: Partial lines only visible, Motif 4: one complete macropod has faded and partial outline and the legs of the other macropod are visible. Motif 5: the head of the macropod is barely visible and the rest has faded and not visible. Motif 6: Partial line visible. Motif 7: partial lines visible. Motif 8: is completely gone. Panel 2: Motif 9: barely visible, nearly faded away. Motif 10: heavy fading since last recording barely visible. Motif 11: heavy fading since last recording barely visible. Motif 12 comprises of a human figure, Motif 13 through to 16 are heavily faded since their original recording.				
Art Condition	Very poor				
Art Overview	1 human figure frontal, 2 kangaroo, 1 snake, 3 indeterminate and 1 fish.				
Damage/threats					
Water wash	No	**Graffiti**	N/A	**Macro vegetals**	Yes – Algae growth
Animals	Yes	**Salt/granular loss**	Yes – Back panel	**Fissuring**	N/A
Insects	No	**Spalling/exfoliation**	Yes – Back panel	**Other**	N/A
Fire	No	**Block fall**	Yes – from roof and outside of dripline.		

Table 18: Baseline recording data for art surfaces present within FRC 191.

Motif No.	Type	Form	Media	Colour	Measurement
Panel 1					
1	Completely faded	N/A	N/A	N/A	N/A
2	Partial macropod (only tail showing – rest is faded)	Infill – partial	Charcoal	Black	30 x 7 cm
3	Indeterminate	Outline – partial	Charcoal	Black	12 x 1 cm
4	Legs of macropod	Outline – partial	Charcoal	Black	80 x 1cm
5	Head of macropod (poor condition)	Outline – partial	Charcoal	Black	10 x 25cm
6	Macropod	Outline – partial	Charcoal	Black	25 x 25cm
7	Macropod	Infill of back – partial	Charcoal	Black	25 x 15cm
Panel 2					
9	Indeterminate	Partial	Charcoal	Black	15 x 25cm
10	Indeterminate	Partial	Charcoal	Black	10 x 20cm
11	Indeterminate	Infill – partial	Charcoal	Black	9 x 12cm
12	Human figure	Outline – complete	Charcoal	Black	32 x 23cm
13	Snake	Outline/infill - complete	Charcoal	Black	2.15 x 9cm
14	Indeterminate	Outline/infill – partial	Charcoal	Black	46 x 22cm
15	Macropod	Outline - partial	Charcoal	Black	22 x 13cm
16	Indeterminate	outline/infill - complete	Charcoal	Black	20 x 11cm

Baseline recording images – site overview



Plate 40: Overview of site FRC 191. View looking East.



Plate 41: Overview of site FRC 191. View looking Southwest.

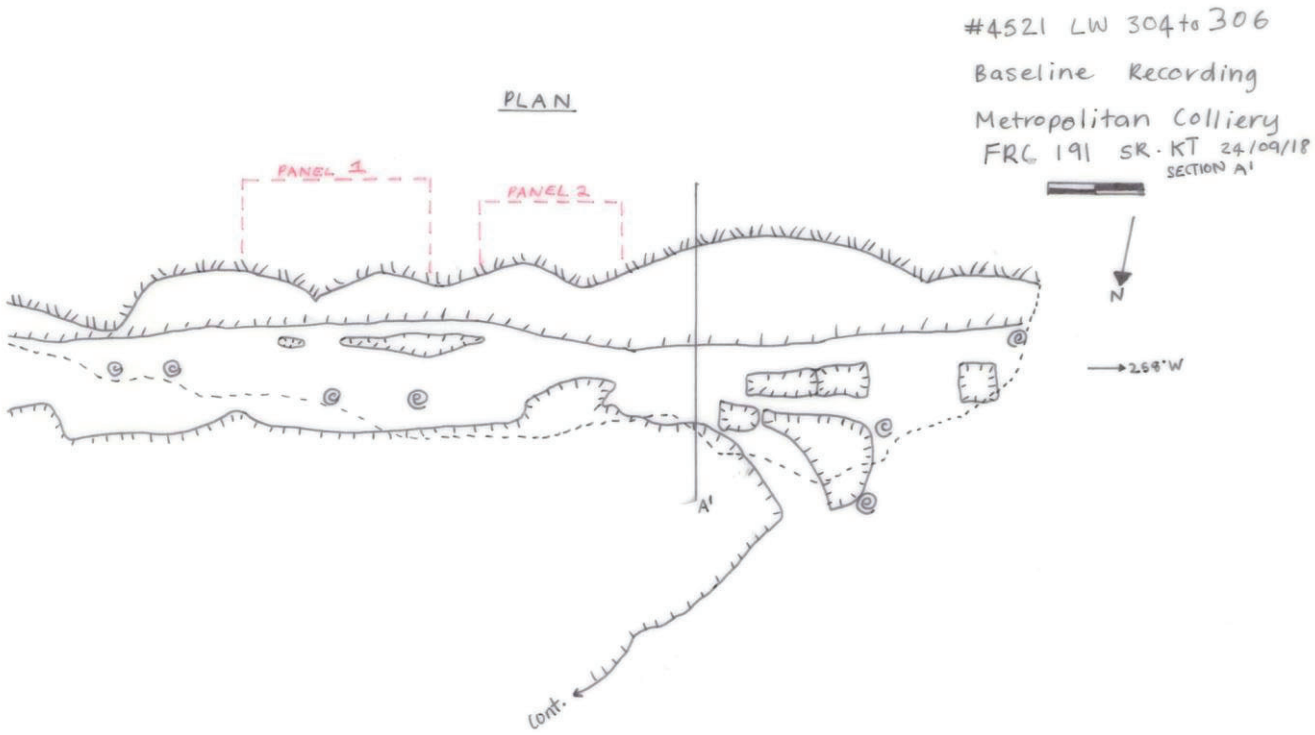


Figure 20: Plan of FRC 191.



Figure 21: A1 Section of FRC 191.

Baseline recording images – detailed panel recording

Panel 1



Plate 42: Detail of Panel 1 at FRC 191. Panel 1, Motif 2.



Plate 43: Detail of Panel 1 at FRC 191. Panel 1, Motif 3.



Plate 44: Detail of Panel 1 at FRC 191. Panel 1, Motif 4.



Plate 45: Detail of Panel 1 at FRC 191. Panel 1, Motif 5.



Plate 46: Detail of Panel 1 at FRC 191. Panel 1, Motif 6.



Plate 47: Detail of Panel 1 at FRC 191. Panel 1, Motif 7.

Panel 2



Plate 48: Detail of Panel 2 at FRC 191. Panel 2; Motif 9, 10.



Plate 49: Detail of Panel 2 at FRC 191. Panel 2; Motif 11.



Plate 50: Overview of Panel 2 at FRC 191. Panel 2; Motif 10, 12, 13, 14, 15.

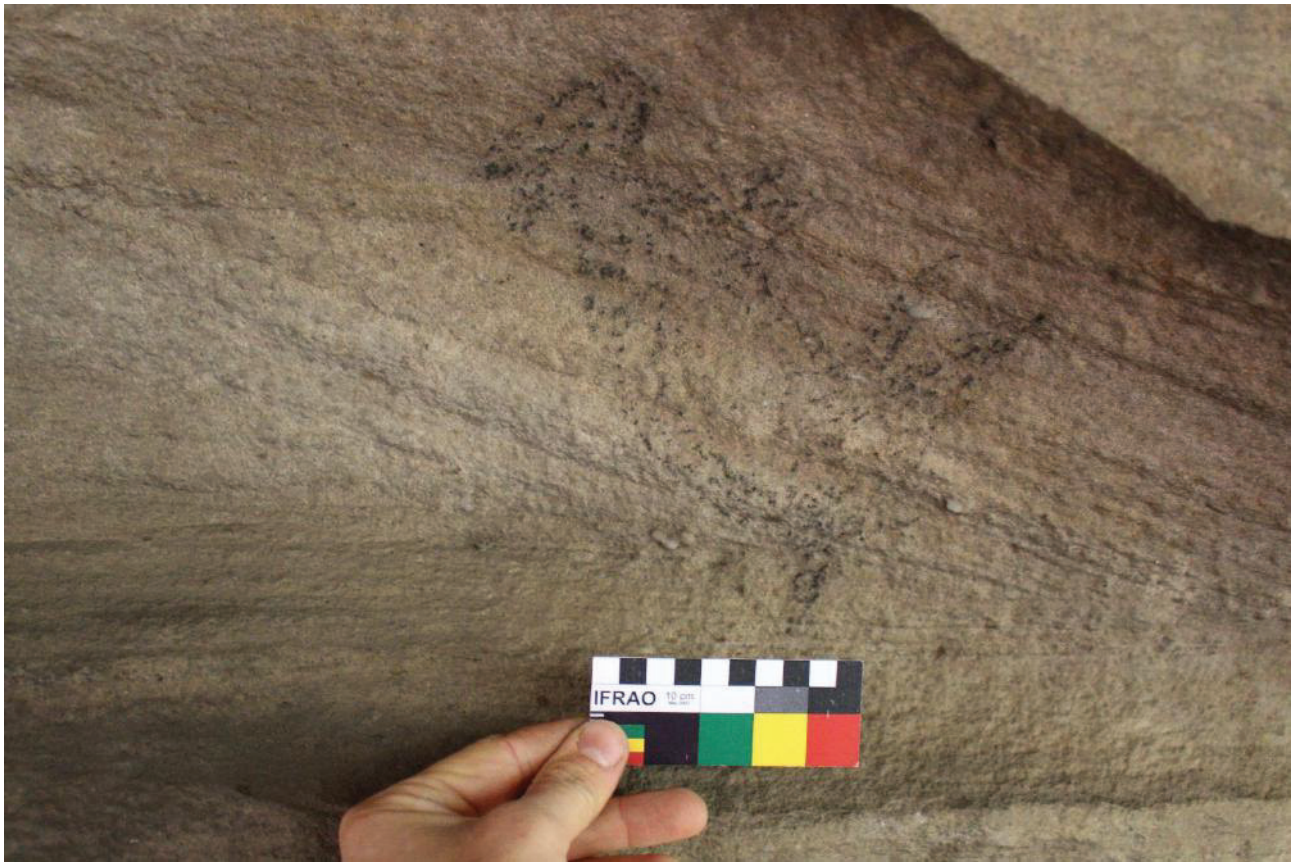


Plate 51: Detail of Panel 2 at FRC 191. Panel 2; Motif 16.

FRC 195

2.18 Flat Rock Creek 195 (FRC 195, AHIMS# 52-2-0264)

This shelter is formed out of Hawkesbury sandstone by cavernous weathering and block fall in antiquity. The AHIMS site card describes 93 charcoal motifs at the site these comprised of:

- 64 Human figures frontal.
- 16 Indeterminates.
- 5 Eels.
- 3 Kangaroos.
- 2 Boomerangs.
- 1 Bird.
- 1 Lizard.
- 1 Human figure profile.

There has been heavy damage over Panel 1 due to water wash and exfoliation which has caused many of these motifs to fade and wear away. Only 70 motifs remain visible at the time of this baseline recording. Figure 26 and Figure 27 are a reproduction of the original Sefton site card drawings demonstrating the loss of motifs at the site due to natural processes.

2.18.51 Baseline recording data

Table 36: Baseline recording data for FRC 195.

Overview					
Site type	Shelter with Art	**Corrected MGAE**	311015	**Corrected MGAN**	6215695
Previous Recording	Site card – Caryll Sefton Illawarra Prehistory Group	**Date**	Unspecified		
Site Details					
Width	14m	**Depth**	4m	**Height**	2m
Orientation	50°	**Floor area**	56m^2	**Floor condition**	Mostly rock, limited deposit.
Location in Landscape	80m from Waratah Rivulet, close to Woronora Dam.				
Shelter exterior/formation	Block fall in antiquity and cavernous weathering.				
Shelter interior	Very damp, with water seeping along the rear wall and along the roof. Microvegetals are present on every surface.				
Distance to water	80m	**Landform**	Continuous ridgeline.		
Setting	Continuous ridgeline.				
Archaeological Deposit					
Deposit	Yes	**Describe**	Deposit, where present, comprises of a creamy loaming sand approximately 6 cm deep.		
Visible artefacts?	n/a	**Where?**	n/a	**How many?**	n/a
Art					
Art surfaces	Art is exfoliating.				
Art Condition	Condition is poor, being heavily deteriorated due to water seepage and vegetal growth.				
Art Overview	Four panels of art are present. See the site card motif table for details. The majority of the motifs are full frontal males with eels, with only one macropod represented.				
Damage/threats					
Waterwash	Yes- water seepage at the northern end along the back wall and roof	**Graffiti**	No	**Macrovegetals**	Yes- along back wall at northern end
Animals	No	**Salt/granular loss**	Yes-entire shelter	**Fissuring**	No
Insects	Yes-spiders	**Spalling/exfoliation**	Yes-along art surfaces	**Other**	n/a
Fire	No	**Block fall**	Yes-In antiquity		

Table 37: Baseline recording data for art surfaces present within FRC 195.

Motif No.	Type	Form	Media	Colour	Measurement
Panel 1					
1	Male-full frontal	Complete	Charcoal outline	Black	25 x 66cm
2	Male-partial side view	Partial	Charcoal outline	Black	30 x 33cm
3	Male-partial fill frontal	Partial	Charcoal outline	Black	56 x 27cm
4	Male-full frontal	Left hand side remaining	Charcoal outline	Black	34 x 7cm
5	Male- Full frontal	Complete	Charcoal infill	Black	49 x 15cm
6	Indeterminate line	Partial	Charcoal	Black	22 cm long
7	Male- Bottom half	Partial	Charcoal	Black	38 cm x 15cm
8	Male- Full frontal	Complete	Charcoal	Black	47 x 21cm
9	Indeterminate lines	Partial	Charcoal	Black	40 x 15cm
10	Male- Full frontal	Complete	Charcoal outline	Black	47 x 15cm
11	Male- Full frontal	Complete	Charcoal outline	Black	41 x 13cm
12	Male- Full frontal	Complete	Charcoal outline	Black	38 x 18cm
13	Male- Full frontal	Complete	Charcoal outline	Black	36 x 17cm
14	Male-Full frontal	Complete	Charcoal outline	Black	25 x 9cm
15	Male- Full frontal	Complete	Charcoal outline	Black	20 x 14cm
16	Male- Full frontal	Complete	Charcoal outline	Black	26 x 10cm
17	Indeterminate	Partial	Charcoal outline	Black	28 x 29cm
18	Male- side view	Complete	Charcoal outline	Black	22 x 17cm
19	Human	Complete	Charcoal outline	Black	26 x 14cm
20	Human	Partial- top half	Charcoal outline	Black	10 x 20cm
21	Human	Partial-top half	Charcoal outline	Black	19 x 12cm
22	Male- full frontal	Complete	Charcoal outline	Black	30 x 12cm
23	Male- full frontal	Complete	Charcoal infill	Black	34 x 18 cm
24	Male- full frontal	Complete	Charcoal outline	Black	20 x 10cm
25	Male- full frontal	Complete	Charcoal outline	Black	17 x 14cm

Motif No.	Type	Form	Media	Colour	Measurement
26	Human- full frontal	Complete	Charcoal outline	Black	29 x 10cm
27	Female- full frontal	Complete	Charcoal infill	Black	30 x 29cm
28	Frontal human	Complete	Charcoal infill	Black	24 x 18cm
29	Indeterminate line	Partial	Charcoal	Black	10 x 6cm
30	Human?	Partial	Charcoal hatched	Black	36 x 19cm
31	Cleverman (man with 'rays' drawn out of his head)	Complete	Charcoal- Herringbone	Black	36 x 20cm
32	Cleverman- full frontal (man with 'rays' drawn out of his head)	Complete	Charcoal	Black	26 x 18cm
33	Male- full frontal	Complete	Charcoal infill	Black	35 x 15cm
34	Male- full frontal	Complete	Charcoal infill	Black	25 x 12cm
35	Male- full frontal	Complete	Charcoal infill	Black	27 x 9cm
36	Male- full frontal in a circle?	Complete	Charcoal outline	Black	29 x 15cm
37	Male- full frontal	Complete	Charcoal outline	Black	30 x 14cm
38	Male full frontal	Partial- bottom half	Charcoal outline	Black	8 x 10cm
39	Indeterminate	Partial	Charcoal outline	Black	17 x 6cm
40	Cleverman- full frontal	Complete	Charcoal outline	Black	30 x 15cm
41	Male- full frontal	Partial- bottom half	Charcoal infill	Black	18 x 6cm
42	Male- full frontal	Partial- feet and penis only	Charcoal infill	Black	19 x 7cm
43	Indeterminate	Lines- exfoliating	Charcoal	Black	148 x 40cm
Panel 2					
1	Male- full frontal	Complete	Charcoal outline	Black	23 x 12 cm
2	Male- full frontal	Complete	Charcoal outline	Black	23 x 8 cm
3	Human legs	Partial	Charcoal infill	Black	9 x 8cm
4	Macropod	Complete	Charcoal infill	Black	72 x 70cm
5	Human	Partial- no legs	Charcoal outline	Black	10 x 5 cm
6	Male- full frontal	Complete	Charcoal infill	Black	34 x 13cm
7	Eel tail	Partial	Charcoal infill	Black	50 x 12cm
8	Full eel	Complete	Charcoal infill	Black	105 x 23cm
9	Male- Full frontal	Complete	Charcoal outline	Black	26 x 10cm

Motif No.	Type	Form	Media	Colour	Measurement
10	Eel	Partial- head and body	Charcoal outline	Black	50 x 7cm
11	Eel	Complete	Charcoal infill	Black	110 x 26cm
12	Eel	Partial- part missing	Charcoal infill	Black	59 x 26cm
13	Male- full frontal	Complete	Charcoal infill	Black	48 x 14cm
14	Cleverman- full frontal (man with 'rays' drawn out of his head)	Complete	Charcoal outline	Black	30 x 15cm
15	Male- full frontal	Complete	Charcoal outline	Black	27 x 13cm
16	Male- full frontal	Complete	Charcoal outline	Black	28 x 16cm
17	Male in a goanna	Complete	Charcoal outline	Black	30 x 14cm
18	Goanna	Complete	Charcoal outline	Black	120 x 38cm
19	Cleverman- full frontal (man with 'rays' drawn out of his head)	Complete	Charcoal outline	Black	40 x 24cm
20	Indeterminate	Partial- lines	Charcoal lines	Black	13 x 5 cm
Panel 3					
1	Indeterminate	Partial	Charcoal infill	Black	28 x 20 cm
2	Bird?	Partial	Charcoal infill	Black	80 x 30 cm
3	Indeterminate	Partial line	Charcoal line	Black	77cm
4	Bird?	Partial	Charcoal outline	Black	44 x 33 cm
5	Indeterminate	Partial	Charcoal line	Black	24 x 18cm
Panel 4					
1	Boomerang	Complete	Charcoal outline	Black	28 x 7 cm
2	Boomerang	Complete	Charcoal outline	Black	39 x 10cm[1]

1. A sample of photographs has been included below. All of the photographs taken during the baseline recording have been provided to the colliery for future monitoring programs.

2.18.52 Baseline recording images – site overview



Plate 115: External context of FRC 195. View east.



Plate 116: External context of FRC 195. View north.



Plate 117: External context of FRC 195. View north.

2.18.53 Baseline recording plans – site overview

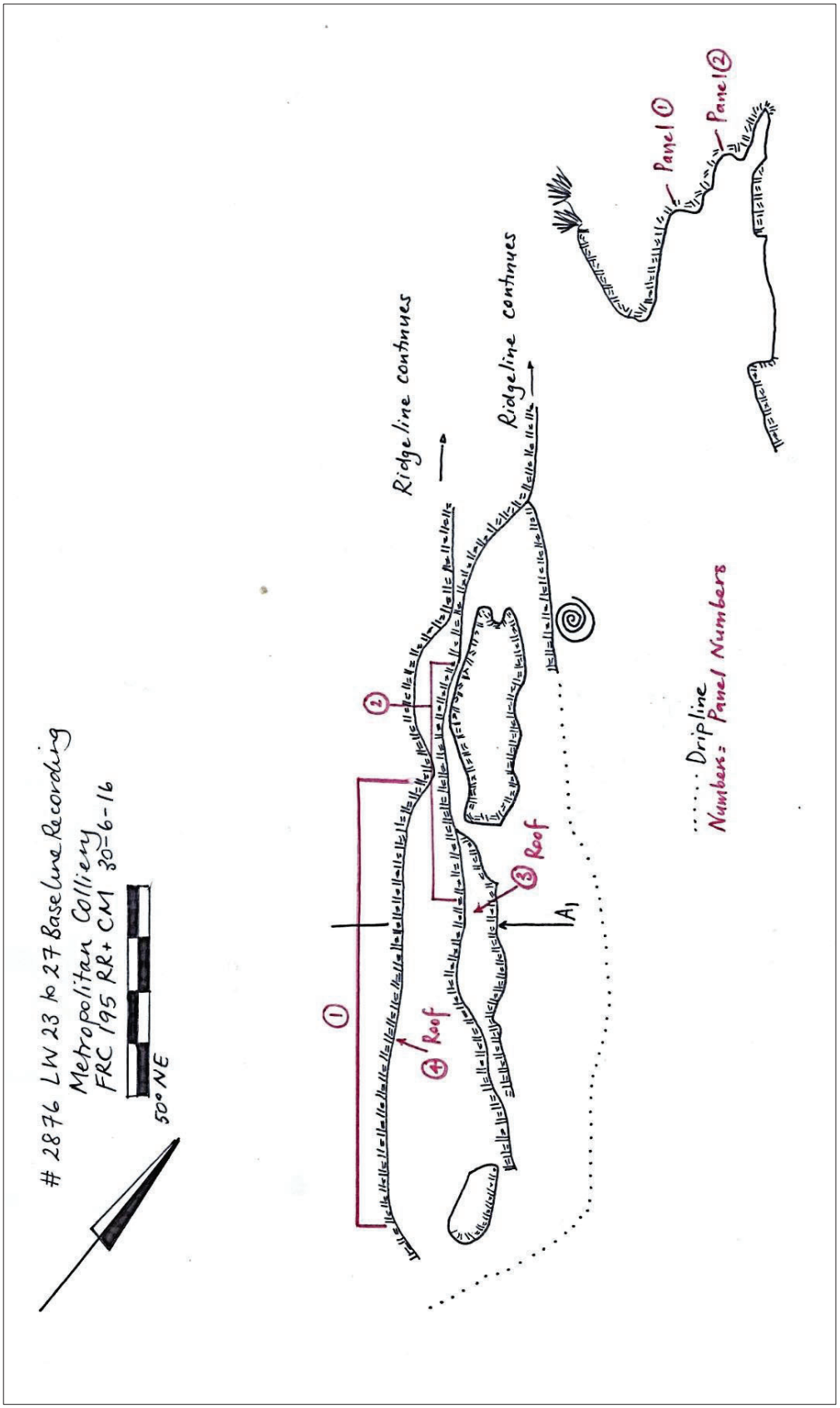


Figure 26: Plan of FRC 195.

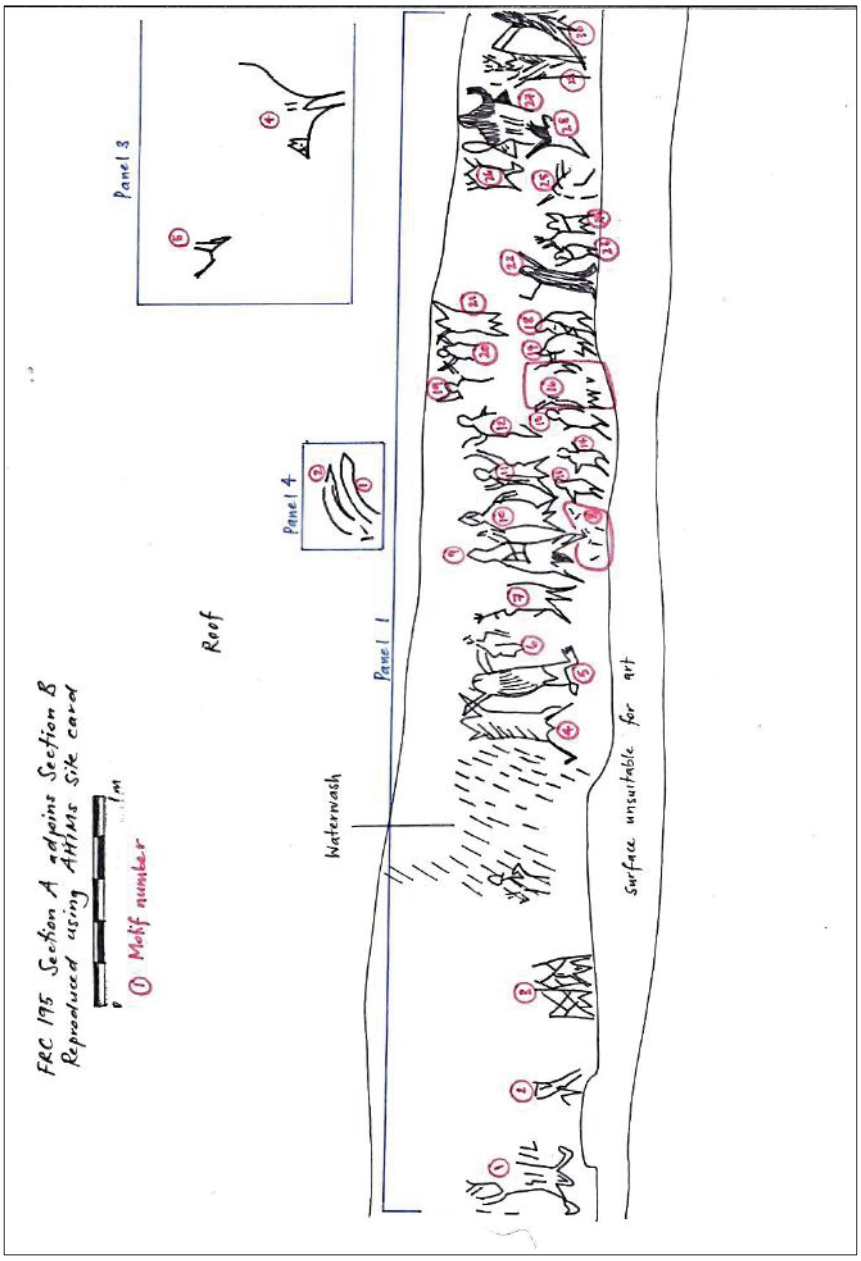


Figure 27: Section A adjoins Section B Plan of art remaining at FRC 195, see original AHIMS card for original art recording.

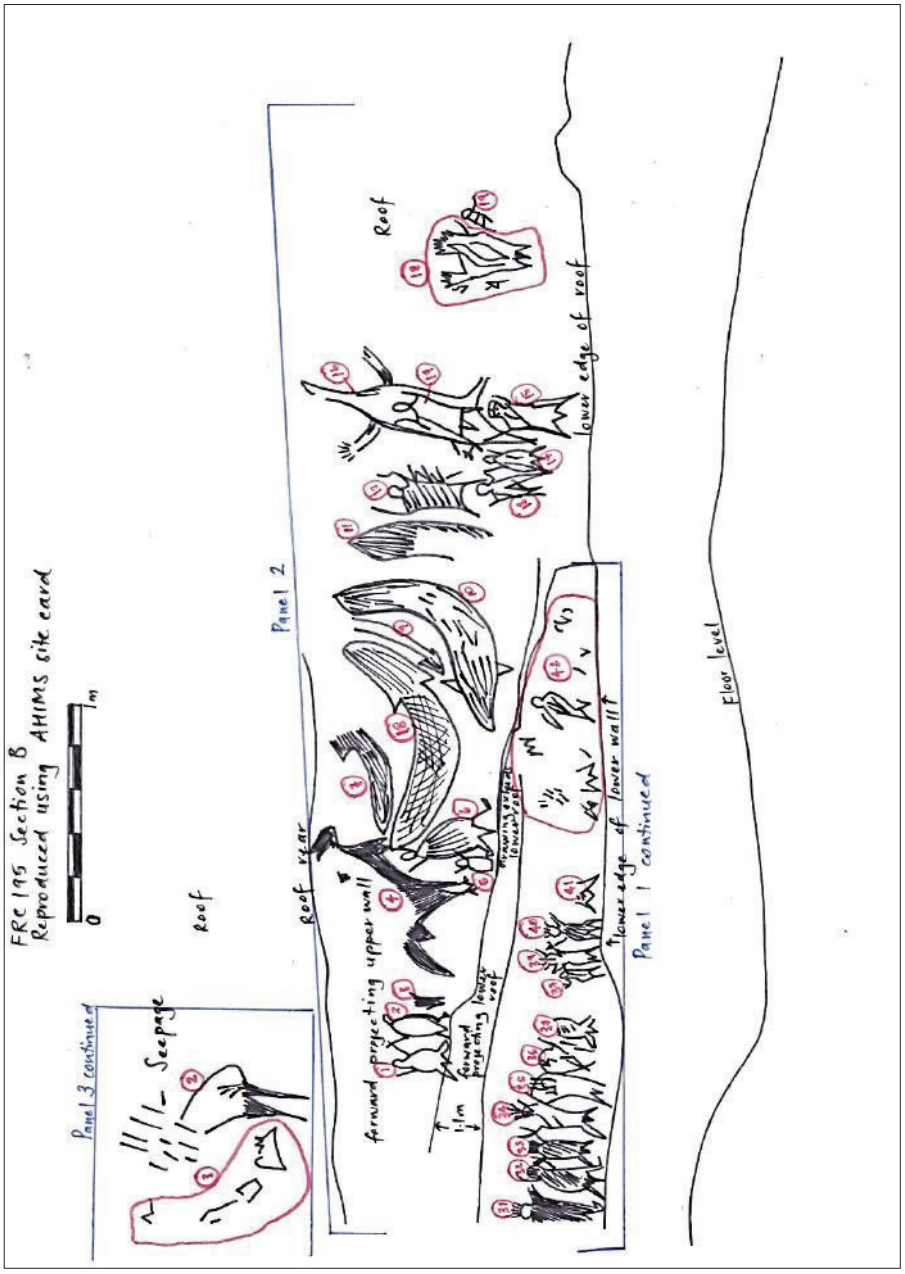


Figure 28: Section B adjoins Section A Plan of art remaining at FRC 195, see original AHIMS card for original art recording.

2.18.54 Baseline recording images – detailed panel recording

Panel 1

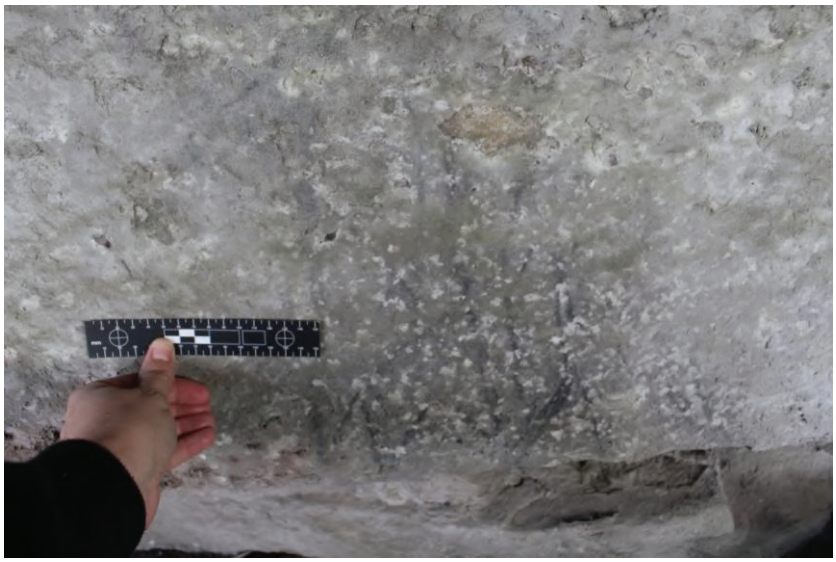


Plate 118: Image of Panel 1, view west.

Panel 2



Plate 119: Image of Panel 2, Motif 7 to Motif 11. View west.



Plate 120: Image of Panel 2, Motif 19. View west.

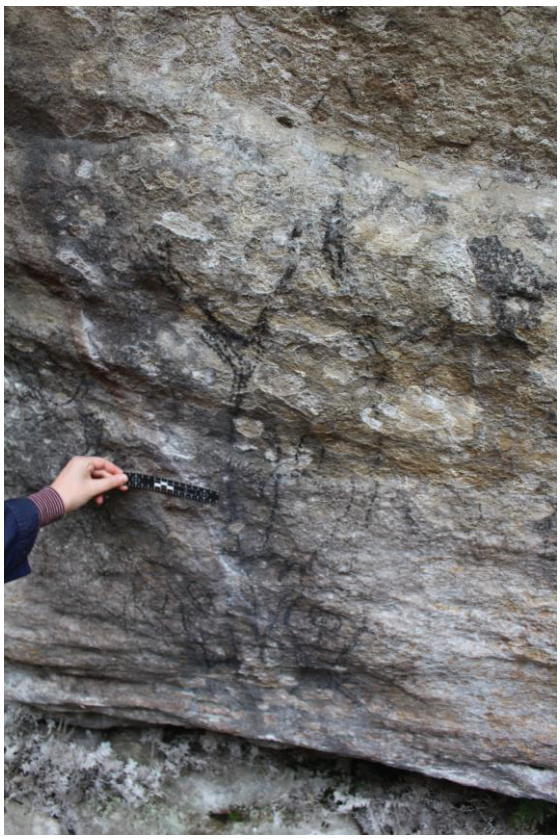


Plate 121: Image of Panel 2, Motif 17 (full frontal man in goanna) to Motif 18 (goanna). View west.

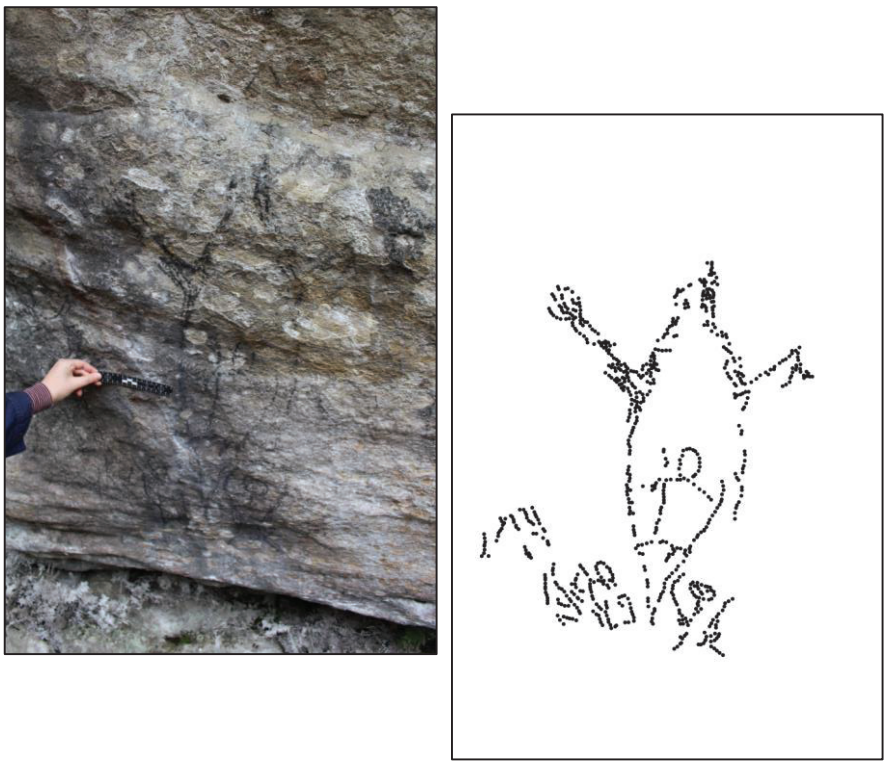


Plate 122: Scaled interpretive drawing of Panel 2, Motif 17 (full frontal man in goanna) to Motif 18 (goanna). View west.

Panel 4



Plate 123: Image of Panel 4, Motif 1 and Motif 2 (boomerangs). View west.

FRC 198

2.11 Flat Rock Creek 198 (FRC 198, AHIMS # 52-2-0268/ 52-2-0404)

This shelter is formed out of Hawkesbury sandstone by cavernous weathering and blockfall in antiquity. The art is in poor condition and has been impacted by water wash, fading, white algae, silica accretion since it was first described by Sefton on the AHIMS site card. There was evidence of a person occupying the shelter, with fire damage and rubbish present. Fissuring was also present on the roof of the shelter.

FRC 198 baseline recording data

Table 19: Baseline recording data for FRC 198.

Overview					
Site type	Shelter with Art and Deposit	Corrected MGAE	0311280	Corrected MGAN	6216135
Previous Recording	Site card – Caryll Sefton Illawarra Prehistory Group	Date	Not specified		
Site Details					
Width	78m	Depth	6m	Height	1.4m
Orientation	S-SE	Floor area	4m x 78m	Floor condition	Good
Location in Landscape	Shelter is on Waratah Rivulet at the high water level of Woronora Dam. It is on the northern side of the rivulet facing SE and 500m from the start of the stored water				
Shelter exterior/formation	Block fall and cavernous weathering. Chemical weathering on roof. Algae growth on roof and back panel. Block fall from roof and outside of dripline.				
Shelter interior	Fissure line on roof. Disturbance from person living in shelter: fire damage, rubbish. Water wash on back panel around art surfaces. Exfoliation on roof through shelter. Wombat scat throughout shelter.				
Distance to water	20m	Landform	Lower slope: base of ridgeline, first overhang from the stored water.		
Setting	Continuous overhang.				
Archaeological Deposit					
Deposit	Yes	**Describe**	Brown loamy sand approximately 15cm deep		
Visible artefacts?	No – Noted on site card (though not described) but not found during site assessment.	Where?	N/A	How many?	N/A
Art					
Art surfaces	Art sample in very poor condition and very faded. Panel 1: water wash, white algae and silica over motif 1 and 2. Panel 2: water wash, white algae and silica over motif – extremely faded. Panel 3 – extremely faded, algae growth. Panel 4: faded, white algae.				
Art Condition	Poor condition.				
Art Overview	2 charcoal indeterminate drawings, 1 kangaroo charcoal drawing and 1 fish charcoal drawing. Panel 1: Motif 1 and 2 are drawn upside-down on site card. Panel 2 – multiple sections of motif 3 are faded and missing/two additional indeterminate lines noticed on return – (panel in wrong location on site drawing). Multiple indeterminate lines missing from motif 4. Indeterminate lines partially faded on motif 5. Fish partially faded on motif 6. Part of motif 7 is missing and one indeterminate line has completely faded.				
Damage/threats					
Water wash	Yes	**Graffiti**	N/A	**Macro vegetals**	Yes
Animals	Yes	**Salt/granular loss**	No	**Fissuring**	Yes
Insects	No	**Spalling/exfoliation**	Yes	**Other**	N/A
Fire	Yes	**Block fall**	Yes		

Table 20: Baseline recording data for art surfaces present within FRC 198.

Motif No.	Type	Form	Media	Colour	Measurement
Panel 1					
1	Indeterminate (14 parallel lines)	Partial	Charcoal	Black	25 x 15cm
2	Indeterminate	Partial - infill	Charcoal	Black	15 x 25cm
Panel 2					
3	Indeterminate (7 parallel lines)	Partial	Charcoal	Black	1.5m x 60cm
4	Indeterminate	Partial – outline/infill	Charcoal	Black	20 x 15cm
5	Indeterminate (5 parallel lines)	Partial	Charcoal	Black	15 x 10cm
6	Fish	Partial – outline/infill	Charcoal	Black	35 x 20cm
7	Indeterminate (4 lines)	Partial	Charcoal	Black	20 x 10cm

Baseline recording images – site overview



Plate 52: Overview of site FRC 198. View looking east.



Plate 53: Overview of site FRC 198. View looking west.

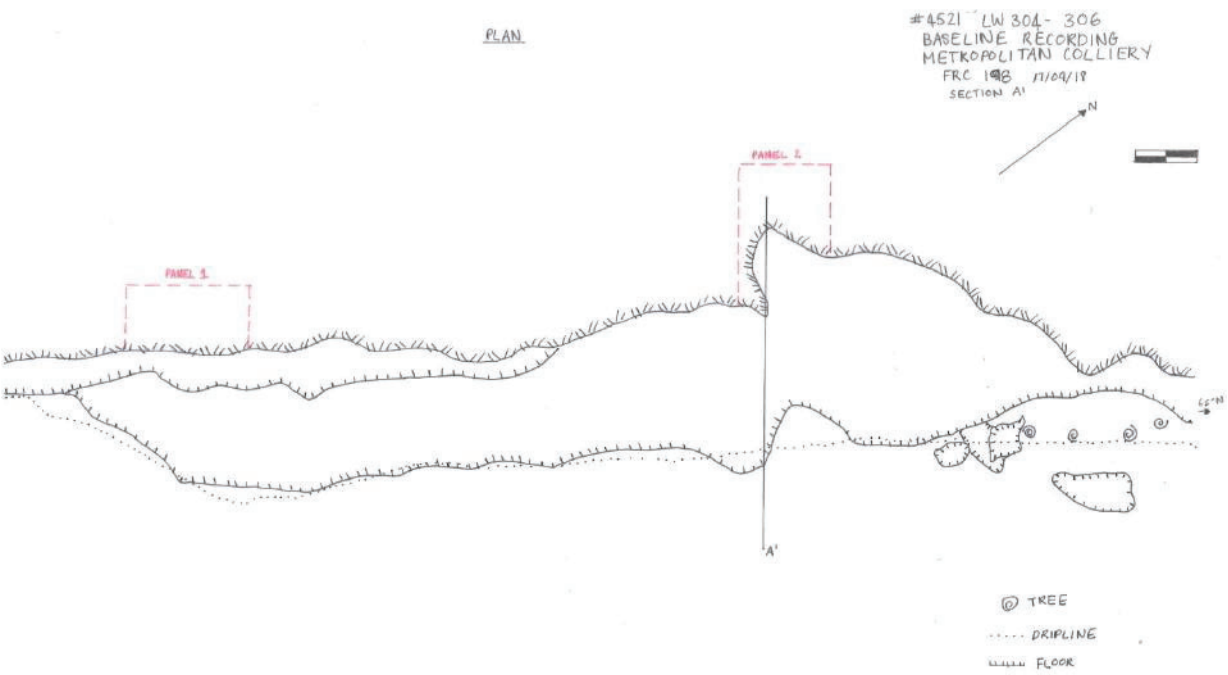


Figure 22: Plan of FRC 198.

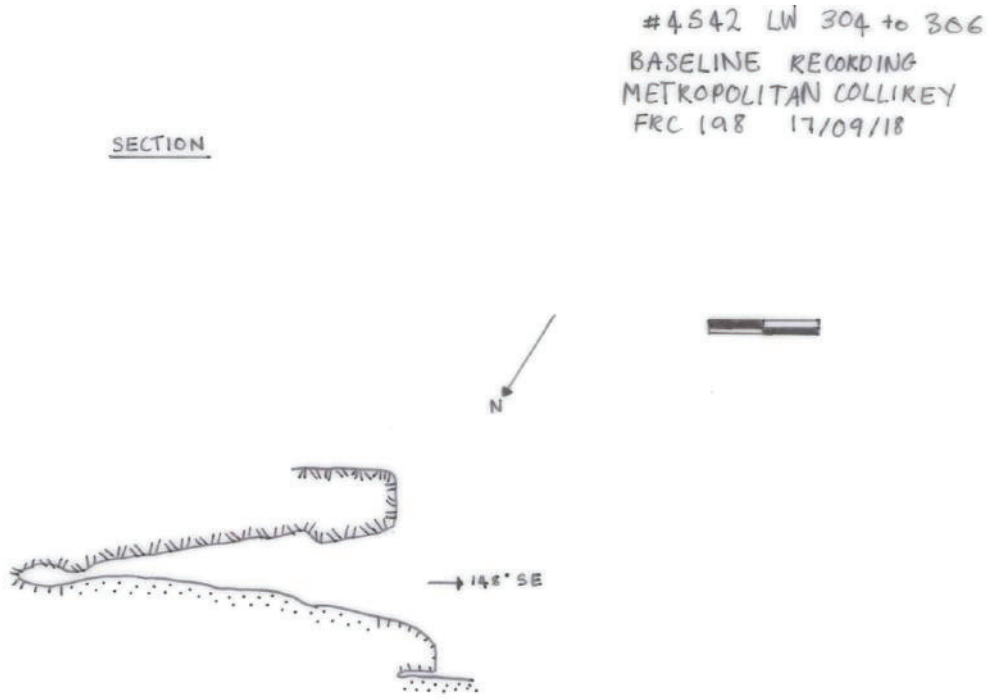


Figure 23: A1 Section of FRC 198.

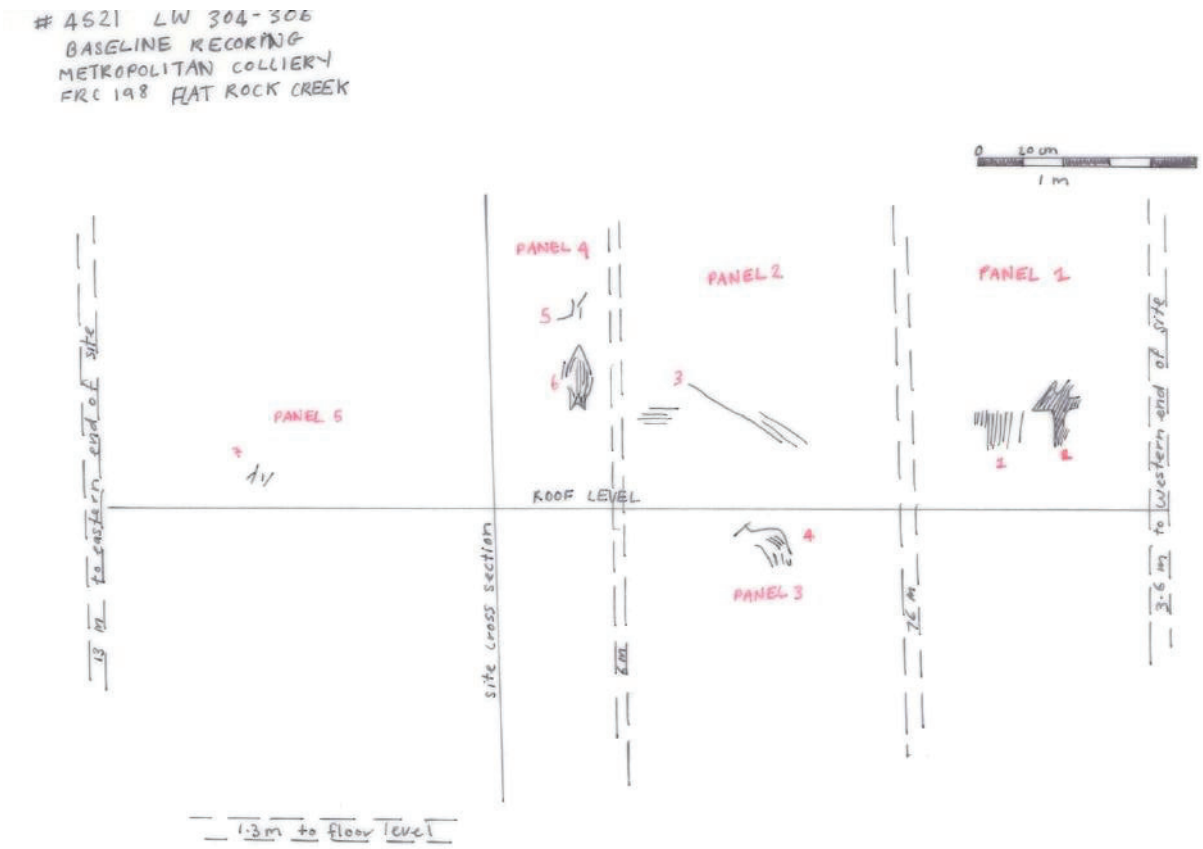


Figure 24: Artform drawing of FRC 198. Reproduced from the AHIMS site card.

Baseline recording images – detailed panel recording

Panel 1



Plate 54: Detail of Panel 1 at FRC 198. Panel 1, Motif 1, 2.

Panel 2



Plate 55: Detail of Panel 2 at FRC 198. Panel 2, Motif 3.

Panel 3



Plate 56: Detail of Panel 3 at FRC 198. Panel 3, Motif 4.

Panel 4



Plate 57: Detail of Panel 4 at FRC 198. Panel 4, Motif 5, 6.

Panel 5



Plate 58: Detail of Panel 5 at FRC 198. Panel 5, Motif 7.

FRC 340

2.17 Flat Rock Creek 340 (FRC 340, AHIMS # 52-2-3471)

This shelter is formed out of Hawkesbury sandstone by cavernous weathering and blockfall in antiquity. The art is in poor condition and has been impacted by water wash, and chemical weathering since it was first described by Sefton on the AHIMS site card. There was evident seepage from the bedding planes, exfoliation on the roof, and block fall near the dripline and the southern end of the shelter.

FRC 340 baseline recording data

Table 26 Baseline recording data for FRC 340.

Overview					
Site type	Shelter with Art and Deposit	Corrected MGAE	0311619	Corrected MGAN	6217570
Previous Recording	Site card – Caryll Sefton Illawarra Prehistory Group	Date	Not specified		
Site Details					
Width	15m	Depth	2.3m	Height	2.3m
Orientation	N-NE	Floor area	15 x 2.3m	Floor condition	Good
Location in Landscape	The shelter is 70m west from the stored water, 210m NE of the Fire Trail 9E – under second cliffline up from stored water.				
Shelter exterior/formation	Cavernous weathering and block fall.				
Shelter interior	Chemical weathering on roof, minimal macro vegetation between bedding plane. Seepage from bedding planes on back panel, exfoliation visible on roof. Block fall near dripline and at southern end of shelter. Water wash on back panel around art surfaces.				
Distance to water	70m	Landform	Mid to Lower Valley Slope, mid ridgeline.		
Setting	Continuous overhang.				
Archaeological Deposit					
Deposit	Yes	**Describe**	Cream Sand approx. 45cm deep		
Visible artefacts?	N/A	Where?	N/A	How many?	N/A
Art					
Art Surfaces	Poor, seepage points and chemical weathering on back panel between art panels. Some art has been removed by water wash.				
Art Condition	Poor				
Art Overview	Panel 1 comprises of motif 1 stingray, motif 2 and 3 charcoal indeterminates and motif 4 macropod outline with indeterminate lines and infill. Panel 2 comprises of one charcoal indeterminate. Panel 3 comprises of charcoal macropod paw prints.				
Damage/threats					
Water wash	Yes	**Graffiti**	N/A	**Macro vegetals**	Yes
Animals	No	**Salt/granular loss**	No	**Fissuring**	No
Insects	Yes – spiders	**Spalling/exfoliation**	Yes	**Other**	N/A
Fire	No	**Block fall**	Yes		

Table 27 Baseline recording data for art surfaces present within FRC 340

Motif No.	Type	Form	Media	Colour	Measurement
Panel 1					
1	Stingray	Complete	Charcoal	Black	38 x 26cm
2	Indeterminate infill/outline	Partial?	Charcoal	Black/water wash over	18 x 40cm
3	Indeterminate outline	Partial?	Charcoal	Black/water wash	50 x 20cm
4	Macropod outline/infill with indeterminate lines and indeterminate infill	Partial	Charcoal	Black/water wash	70 x 40cm
5	Indeterminate line/infill	Partial	Charcoal	Black/water wash	32 x 28cm
Panel 2					
6	Indeterminate line/infill	Partial	Charcoal	Black/case hardening	32 x 12cm
Panel 3					
7	Macropod paw prints infill	Complete	Charcoal	Black/case hardening	10 x 8cm

Baseline recording images – Site Overview



Plate 69: Overview of FRC 340. View looking West.



Plate 70: Overview of FRC 340. View looking East

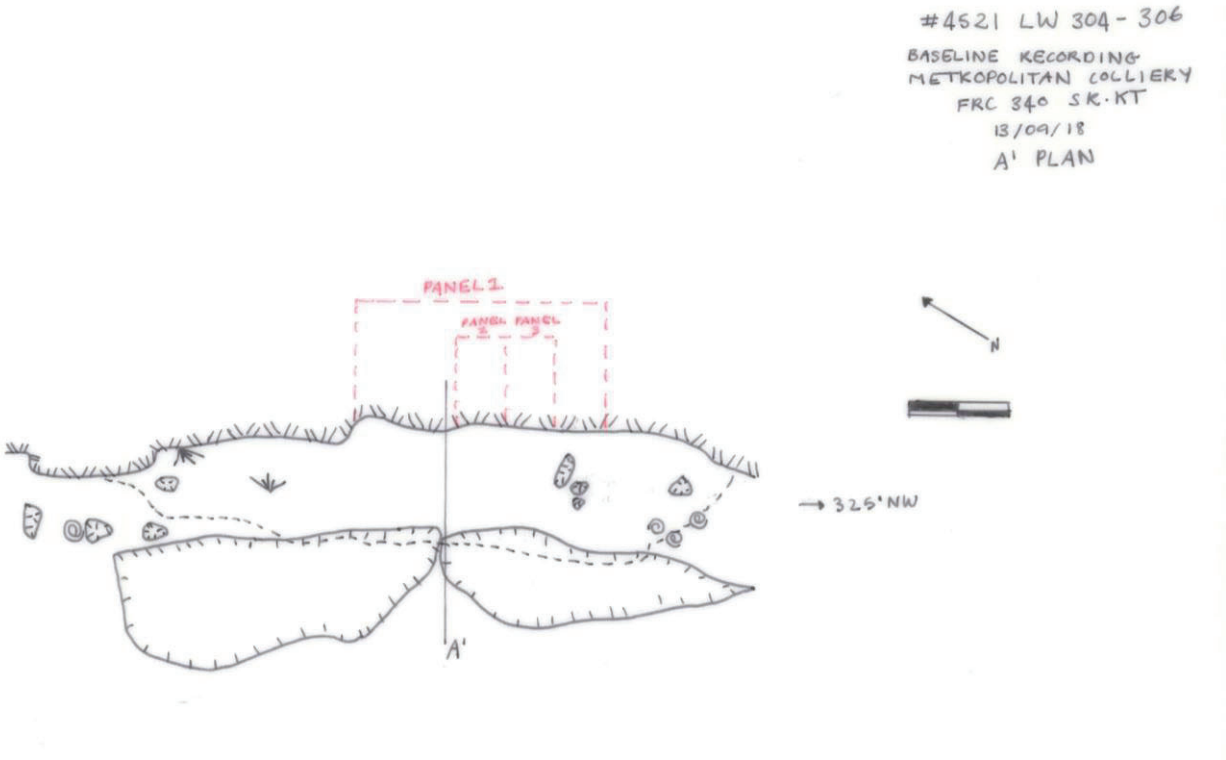


Figure 35: Plan of FRC 340.

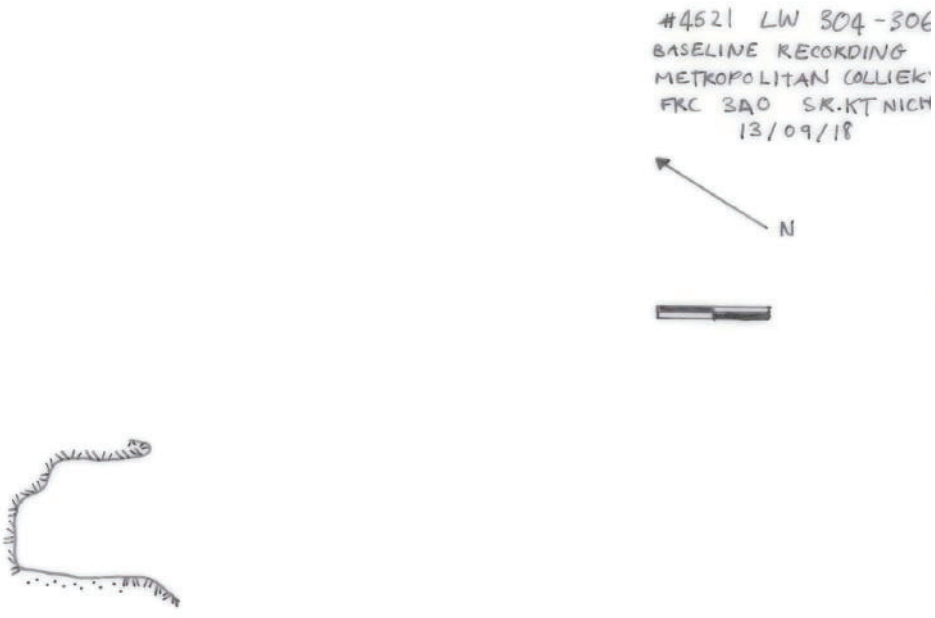


Figure 36: A1 Section of FRC 340.

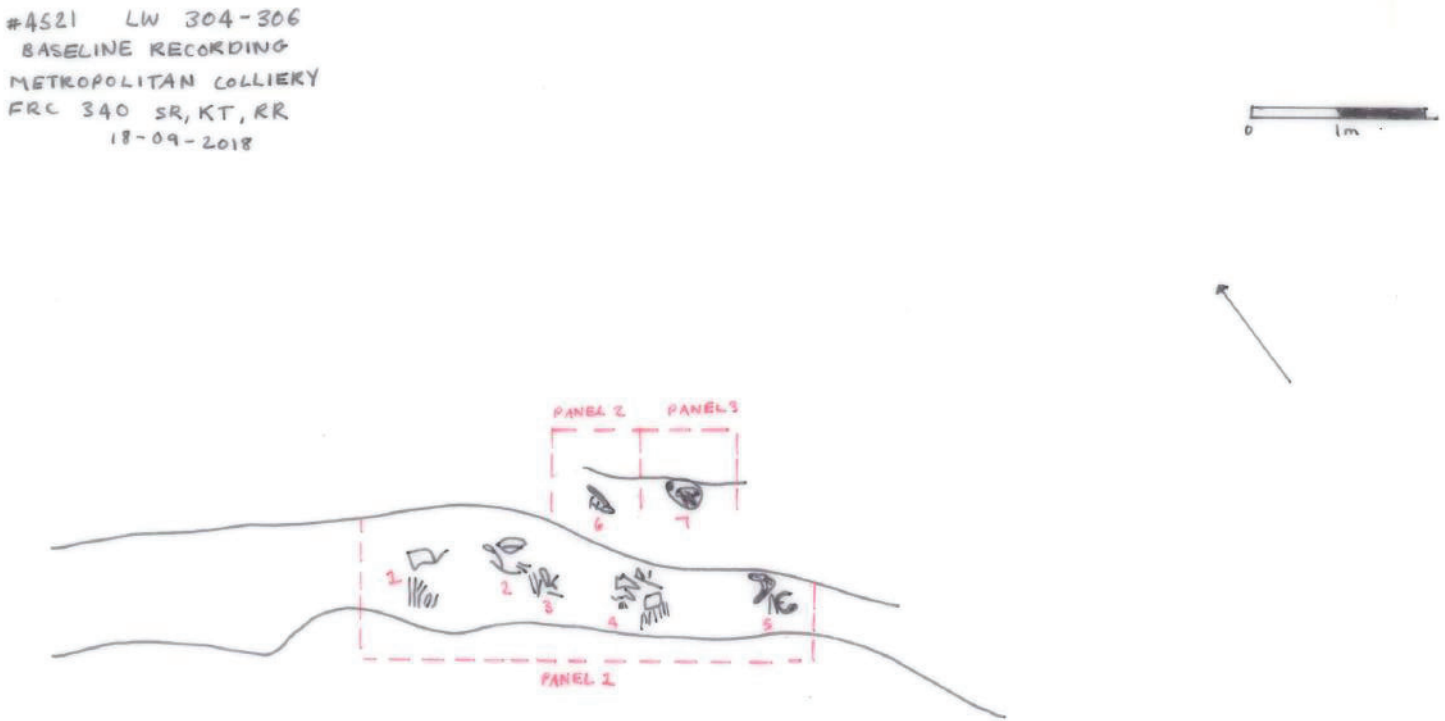


Figure 37: Art at FRC 340. Reproduced from the AHIMS site card.



Plate 71: Detail of Panel 1 at FRC 340. Panel 1, Motif 1.

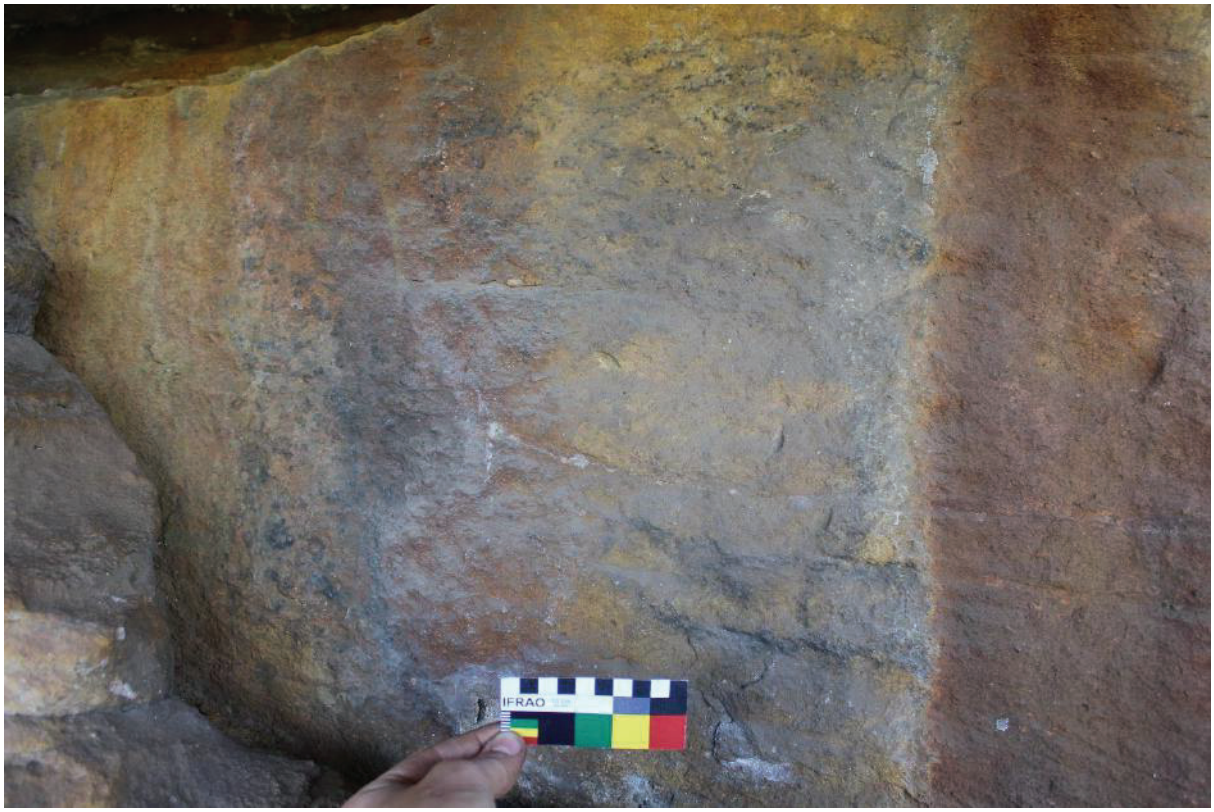


Plate 72: Detail of Panel 1 at FRC 340. Panel 1, Motif 2.



Plate 73: Detail of Panel 1 at FRC 340. Panel 1, Motif 3.



Plate 74: Detail of Panel 1 at FRC 340. Panel 1, Motif 4.



Plate 75: Detail of Panel 1 at FRC 340. Panel 1, Motif 5.



Plate 76: Detail of Panel 2 at FRC 340. Panel 2 Motif 6.



Plate 77: Detail of Panel 3 at FRC 340. Panel 3, Motif 7.

FRC 62

Aboriginal Sites Register of NSW

NPWS, PO Box 1967, Hurstville NSW 2220

Standard Site Recording Form

New Recording ☐ Additional information ☑

SITE IDENTIFICATION

Site name	FLAT ROCK CREEK No 62	NPWS Site Number	
Owner/manager	Sydney Catchment Authority		
Owner Address	PO Box 323 Penrith Business Centre NSW 2751		

LOCATION

Location	Woronora Catchment Area				
How to get to the site	Site location : A shelter is on the northern side and alongside the old fire trail running from Fire Trail 9E. It is facing S and overlooks Waratah Rivulet. It is 1.4km From the beginning of the old trail. Site position : under the first cliff line up from the road.				
1:250,000 map name	Wollongong			NPWS map code	52
AMG Zone XXX MGA	56	AMG Easting XXX MGA	310562	AMG Northing XXX MGA	6215765
Method for grid reference	Hand-held GPS (GDA94 datum)	Map scale (if method = map)		Map name	APPIN
NPWS District Name (see map)	Southern Metropolitan			NPWS Zone (see map)	Sydney Zone
Portion no.				Parish	Heathcote

SITE DESCRIPTION

Site type(s)	Art Shelter/Archaeol.Deposit/Grind.Grooves	Site type code (NPWS use only)	

Description of site and contents
CHECKLIST: eg. length, width, depth, height of site, shelter, deposit, structure, element eg. tree scar, grooves in rock.
DEPOSIT: colour, texture, estimated depth, stratigraphy, contents-shell, bone, stone, charcoal, density & distribution of these, stone types, artefact types.
ART area of decorated surface, motifs, colours, wet./dry pigment, engraving technique, no. of figures, sizes, patination
BURIALS: number & condition of bone, position, age, sex, associated artefacts.
TREES: number, alive, dead, likely age, scar shape, position, size, patterns, axe marks, regrowth.
QUARRIES: rock type, debris, recognisable artefacts, percentage quarried

Closed Site Size : L (m): 27 W (m): 3.7 H (m): 2.8 Site Faces: S
Living Area (sq m): 28 Site Formed By : Cavernous Weathering : Y Blockfall : Y
Deposit : Depth (cm): 40 Deposit Colour: Cream Texture: Loamy Sand
Open Site Size(m) Grinding Grooves: 9 Groove Size (cm):34x8x2 Condition: Distinct
Artefacts Present: 21 FGS: Silcrete: Quartz: 7 Quartzite: 1 Chalcedony:
Chert: 13 Jasper: Fossilised Wood: Igneous: Artefact Location : Dripline
Art Condition : Fair Art Surface: Case hardnd,Granlr loss,Flakng,ConcWeathrng

ART/DEPOSIT COMMENTS

There is considerable art in the shelter. All drawings are charcoal outline with infill unless otherwise stated.
1. On the Back wall above a seepage crack- in a small alcove are 2 indeterminate drawings, 2 bats, 2 indeterminate drawings, 1 large eel (1.2m long), 1 large eel(cross hatch infill-1m long), 1 kangaroo,
1 indeterminate drawing, 5 indeterminate drawings, 1 upside down kangaroo,
2 indeterminate drawings, 1 indeterminate area 1m long.
2. Under the back wall are 2 indeterminate drawings, 1 human foot
3. On the ceiling are 3 outline kangaroos (1 with infill), (Cont. on attached sheet)

Further comments ? As attachment to NPWS Site Recording form

ART SUMMARY

Art Method	Art Motif	Art Nos
Charcoal Drawings	Human Figure Frontal	1
Charcoal Drawings	Snake	1
Charcoal Drawings	Eel	3
Charcoal Drawings	Possum	5
Charcoal Drawings	Bat	2
Charcoal Drawings	Indeterminate	32
Charcoal Drawings	Kangaroo	11
Charcoal Drawings	Foot Other	1
Charcoal Drawings	Paved Figure	1
Charcoal Drawings	Line	4
Red Stencils	Hand Adult Left	1
	Total Art :	62

REPRESENTATIVE ARTEFACTS

Type	Material	LxWxTmm
Bipolar Flake	Chert	19x10x5
Flake	Silcrete	28x20x6
Bipolar Core	Chert	20x13x6
Bipolar Core	Chert	15x14x7
Flake	Quartz	24x8x5

Attach photographs and sketches, eg. plan & section of shelter.
DO NOT dig, disturb or damage site or contents.

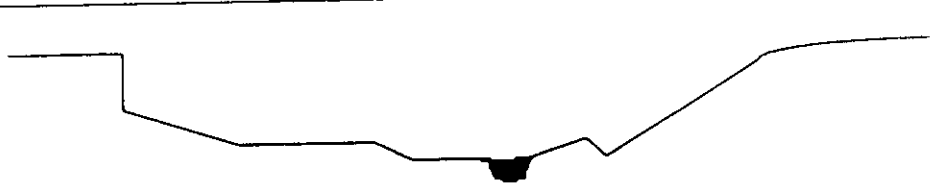
Version: June 1998 Data entered by: Date entered:

Aboriginal Sites Register of NSW

NPWS, PO Box 1967, Hurstville NSW 2220

Standard Site Recording Form

SITE ENVIRONMENT

Land form	Upper Valley Slope	Aspect	S	Slope	Gradual
Mark position of the site					
Local rock type	Hawkesbury sandstone	Land use/effect	Undeveloped catchment area		
Distance from drinking water	0 (m)	Source	Seepage		
Resource zone (eg. estuarine, river, forest)	Open Woodland	Vegetation	Eucalyptus gummifera Banksia serrata Doryanthes excelsa ~~Petrophile pulchella~~		
Edible plants		Faunal resources (include shellfish)	Shell : No		
Other exploitable resources (eg. ochre)	Ochre Source:		Ochre Colour:		
Are there other sites in the locality	Yes	Are they in the Sites Register	Yes	Other site types include	Shelters with art/deposits,grinding grooves, rock engravings

SITE MANAGEMENT

Site condition	Disturbed	Site Disturbance: Y	Type : Wombat: Y Rubbish: Feral: Fireplace Graffiti: Y Other:
Management recommendations			
Have artefacts been removed from site	No	When	
By whom		Deposited at	
Consent applied for	☐	Consent issued	☐
Date of issue		Consent number	

SITE INSPECTION AND RECORDING

Reason for investigation	Routine survey by Illawarra Prehistory Group		
Were local Aborigines contacted or present for the recording	☐ Not contacted ☐ Contacted and present ☒ Contacted but not present	Names and addresses	Jim Davis,Senior Sites Officer, Illawarra Local Aboriginal Land Council 484 Northcliffe Dr., Berkeley NSW 2506
Is the site important to local Aborigines	Yes		
Verbal/written reference sources	Illawarra Prehistory Group diary	ASR report number(s) (or title)	C- C-
Photographs taken	Yes	No. of Photos attached	
Site recorded by	Caryll Sefton	Date of recording	
Address/Institution	Illawarra Prehistory Group 12 Chenhall St WOONONA NSW 2517 Tel 02 4284 2004		

Version: June 1998 Data entered by: Date entered:

Aboriginal Sites Register of NSW

NPWS, PO Box 1967, Hurstville NSW 2220

Standard Site Recording Form

New Recording ☐ Additional information ☐

SITE IDENTIFICATION

Site name	FLAT ROCK CREEK No 62	NPWS Site Number	
Owner/manager			
Owner Address			

LOCATION

Location					
How to get to the site					
1:250,000 map name				NPWS map code	
AMG Zone		AMG Easting		AMG Northing	
Method for grid reference		Map scale (if method = map)		Map name	
NPWS District Name (see map)				NPWS Zone (see map)	
Portion no.				Parish	

SITE DESCRIPTION

Site type(s)	Art Shelter/Archaeol.Deposit/Grind.Grooves	Site type code (NPWS use only)	

Description of site and contents
CHECKLIST. eg. length, width, depth, height of site, shelter, deposit, structure, element eg. tree scar, grooves in rock.
DEPOSIT: colour, texture, estimated depth, stratigraphy, contents-shell, bone, stone, charcoal, density & distribution of these, stone types, artefact types.
ART: area of decorated surface, motifs, colours, wet./dry pigment, engraving technique, no. of figures, sizes, patination.
BURIALS: number & condition of bone, position, age, sex, associated artefacts.
TREES: number, alive, dead, likely age, scar shape, position, size, patterns, axe marks, regrowth.
QUARRIES: rock type, debris, recognisable artefacts, percentage quarried

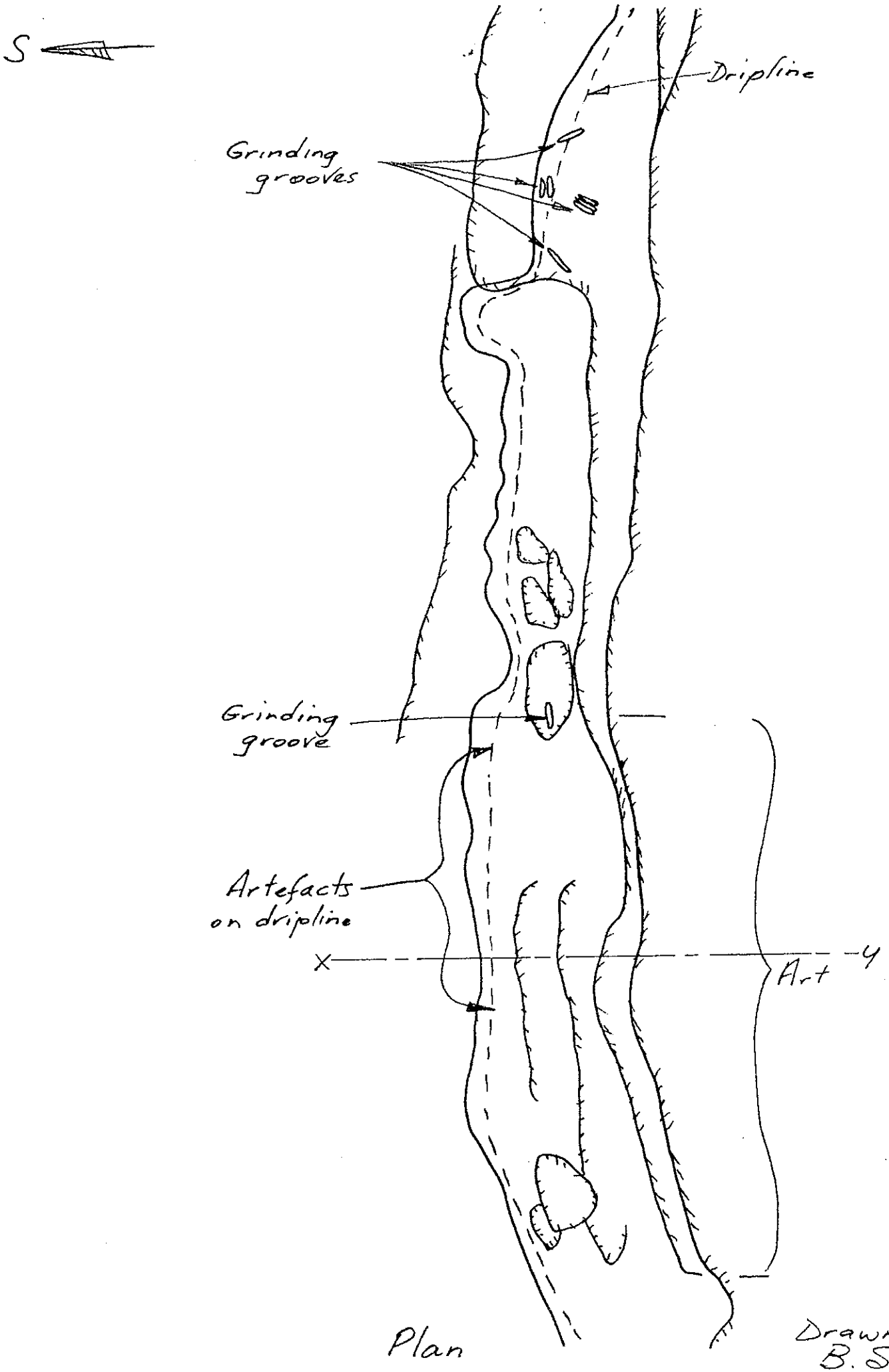
FURTHER COMMENTS (continued from ART/DEPOSIT COMMENTS on attached Site Card

(Cont. from Site Card)1 snake (outline only), 1 kangaroo(1m long), 1 frontal human (outline only), 2 indeterminate drawings, 1 kangaroo, 1 small kangaroo, 5 indeterminate drawings, 1 kangaroo, 1 large indeterminate drawing (eel?), 3 indeterminate drawings, 5 possums, 1 head with rays coming out and an upper body (outline only), 3 indeterminate drawings, 1 kangaroo (outline only), 1 eel, 4 parallel lines, 1 small kangaroo (outline only), 3 indeter. drawings.
4. On a small front wall above the ceiling line is one patch of red ochre with 1 left hand stencil.
Artefacts found inside the shelter on the drip line were 1 red/grey/white chert bipolar flake (19 x 10 x 5mm), 1 grey silcrete flake (28 x 20 x 6mm) with 5% pebble cortex, 1 buff chert bipolar core (20 x 13 x 8mm), 1 red chert bipolar core (15 x 14 x 7mm), 1 white quartz flake (24 x 8 x 5mm).
There are 9 grinding grooves on floor rock in the shelter. One area had permanent seepage dripping into a pool on the floor with one groove associated with this area. Other groups were 1,1,5 and 1 on a separate rock.

Attach photographs and sketches, eg. plan & section of shelter.
Do NOT dig, disturb or damage site or contents.

Caryll Bolton
12 Chenhall St WOONONA NSW 2517 Tel 02 4284 2004

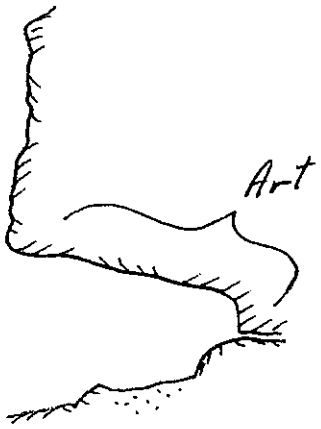
FLAT ROCK CREEK N° 62 (1 of 2)



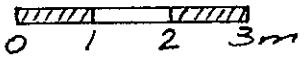
Plan

Drawn by B. Scurr

FLAT ROCK CREEK Nº 62 (2 of 2)



Cross-section XY



Drawn by BScurr

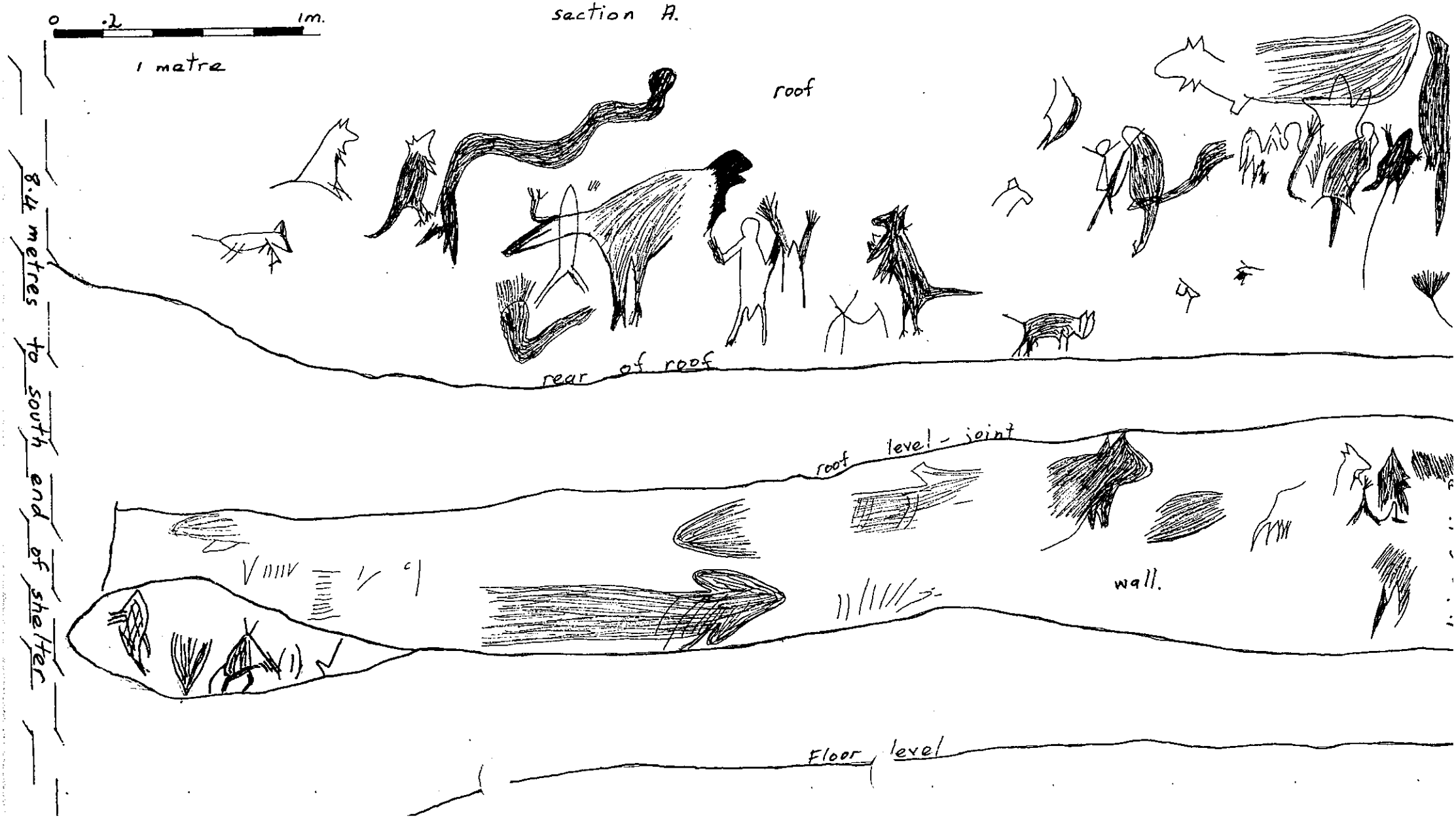
FLAT ROCK CREEK site 62.

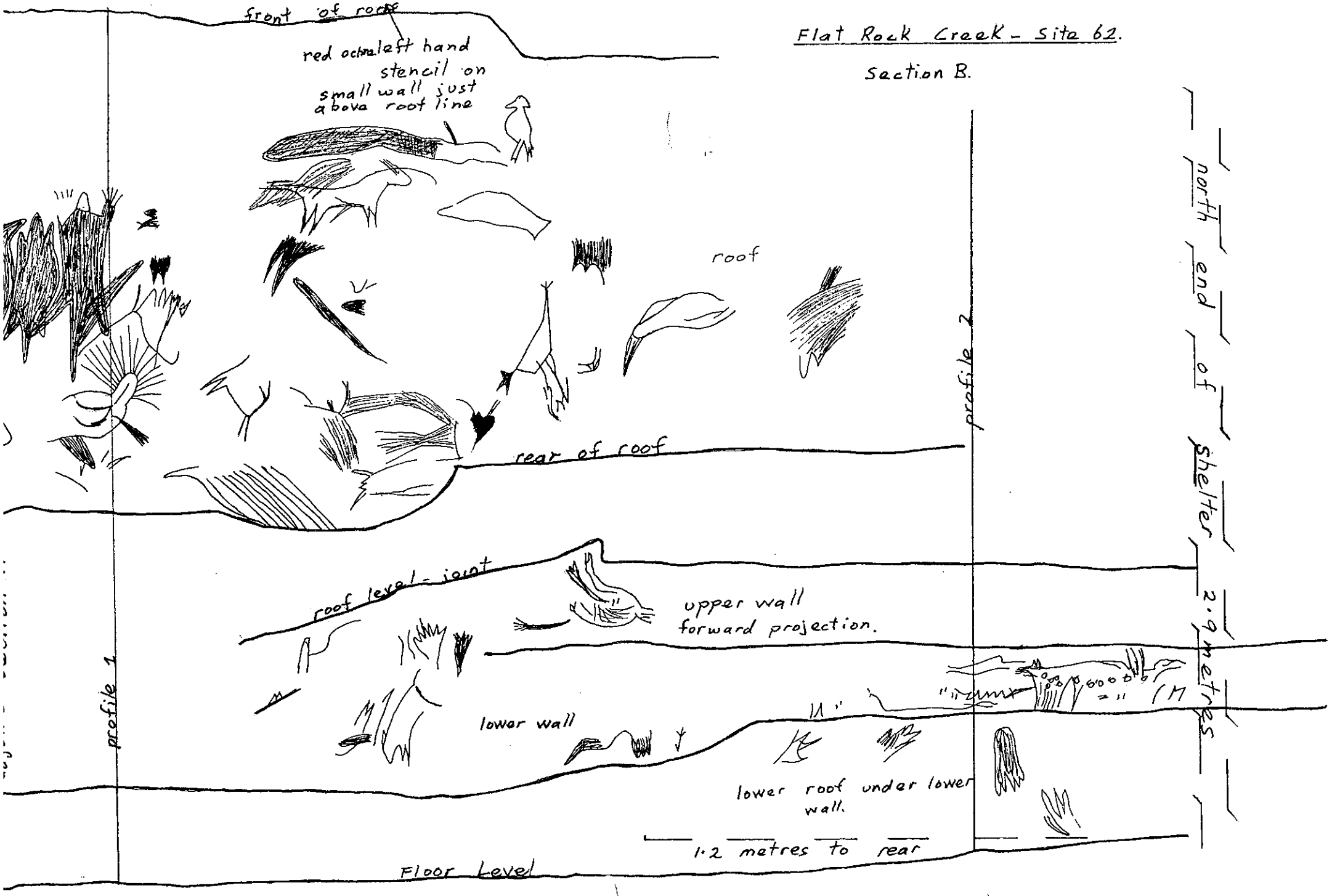
scale

0 .2 1m.

1 metre

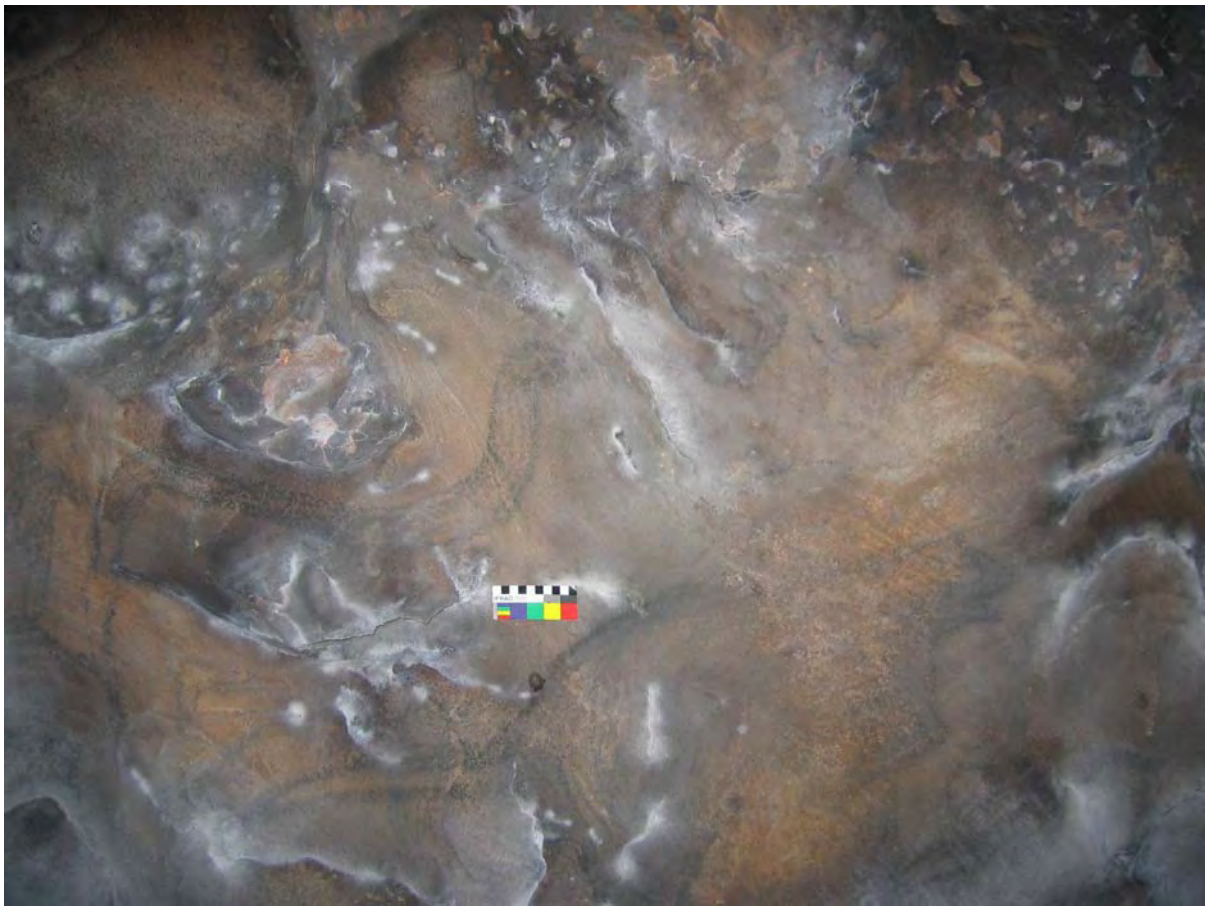
section A.




Flat Rock Creek - Site 62.
Section B.
front of roof
red ochre left hand stencil on small wall just above roof line
roof
rear of roof
profile 2
north end of shelter
2.9 metres
roof level - joint
upper wall forward projection.
profile 1
lower wall
lower roof under lower wall.
1.2 metres to rear
Floor Level









NT 35

Aboriginal Sites Register of NSW

NPWS, PO Box 1967, Hurstville NSW 2220

Standard Site Recording Form

New Recording ☐ Additional information ☒

SITE IDENTIFICATION

Site name	NORTHERN TRAIL No 35	NPWS Site Number	
Owner/manager	Sydney Catchment Authority		
Owner Address	PO Box 323 Penrith Business Centre NSW 2751		

LOCATION

Location	Woronora Catchment Area				
How to get to the site	Site location : A shelter 350m SW of the end of Fire Road 9E, and 50m SE of the NE-flowing creek parallel to and N of that road. Site position : under the third cliffline down from the road, and 80m E of FRC34.				
1:250,000 map name	Wollongong			NPWS map code	52
AMG Zone XXX MGA	56	AMG Easting XXX MGA	311103	AMG Northing XXX MGA	6217300
Method for grid reference	Hand-held GPS (GDA94 datum)	Map scale (if method = map)		Map name	APPIN
NPWS District Name (see map)	Southern Metropolitan			NPWS Zone (see map)	Sydney Zone
Portion no.				Parish	Heathcote

SITE DESCRIPTION

Site type(s)	Art Shelter/Archaeol.Deposit/Grind.Grooves	Site type code (NPWS use only)	

Description of site and contents
CHECKLIST eg length, width, depth, height of site, shelter, deposit, structure, element eg. tree scar, grooves in rock.
DEPOSIT: colour, texture, estimated depth, stratigraphy, contents-shell, bone, stone, charcoal, density & distribution of these, stone types, artefact types.
ART area of decorated surface, motifs, colours, wet./dry pigment, engraving technique, no. of figures, sizes, patination
BURIALS: number & condition of bone, position, age, sex, associated artefacts.
TREES: number, alive, dead, likely age, scar shape, position, size, patterns, axe marks, regrowth.
QUARRIES: rock type, debris, recognisable artefacts, percentage quarried

Closed Site Size : L (m): 12 W (m): 3.6 H (m): 1.7 Site Faces: NW
Living Area (sq m): 10 Site Formed By : Cavernous Weathering : Y Blockfall : Y
Deposit : Depth (cm): 30 Deposit Colour: Cream Texture: Sandy Loam
Open Site Size(m) Grinding Grooves: 1 Groove Size (cm):40x9x2 Condition: Indistinct
Artefacts Present: 1 FGS: Silcrete: Quartz: Quartzite: Chalcedony:
Chert: 1 Jasper: Fossilised Wood: Igneous: Artefact Location : Dripline
Art Condition : Fair/poor Art Surface: Fungal grwth, water damage

ART/DEPOSIT COMMENTS

Art is present in fair to poor condition, as follows;
1.:On an upper slanting back wall : 1 outline and infill charcoal kangaroo with joey, 1 outline only charcoal drawing of a pointy nosed marsupial (bandicoot?).
2.:On the lower back wall : 1 charcoal outline drawing of a fish.
1 grinding groove is on a rock surface in front of the western end of the shelter.
An artefact was found on the drip line : 1 grey chert flake (13 x 9 x 3mm

Further comments ? No

ART SUMMARY

Art Method	Art Motif	Art Nos
Charcoal Drawings	Kangaroo	1
Charcoal Drawings	Bandicoot	1
Charcoal Drawings	Fish	1
	Total Art :	3

REPRESENTATIVE ARTEFACTS

Type	Material	LxWxT (mm)
Flake	Chert	13x9x3

Attach photographs and sketches, eg. plan & section of shelter.
Do NOT dig, disturb or damage site or contents.

Data entered by: Date entered:

Aboriginal Sites Register of NSW

NPWS, PO Box 1967, Hurstville NSW 2220

Standard Site Recording Form

SITE ENVIRONMENT

Land form	Lower Valley Slope	Aspect	NW	Slope	Gradual
Mark position of the site					
Local rock type	Hawkesbury sandstone	Land use/effect		Undeveloped catchment area	
Distance from drinking water	75 (m)	Source		Tributary creek	
Resource zone (eg. estuarine, river, forest)	Woodland	Vegetation	Angophora costata Ceratopelalum gummiferu	Eucalyptus piperita Doryanthes excelsa	
Edible plants		Faunal resources (include shellfish)		Shell : No	
Other exploitable resources (eg. ochre)	Ochre Source: No			Ochre Colour:	
Are there other sites in the locality	Yes	Are they in the Sites Register	Yes	Other site types include	Shelters with art/deposits,grinding grooves, rock engravings

SITE MANAGEMENT

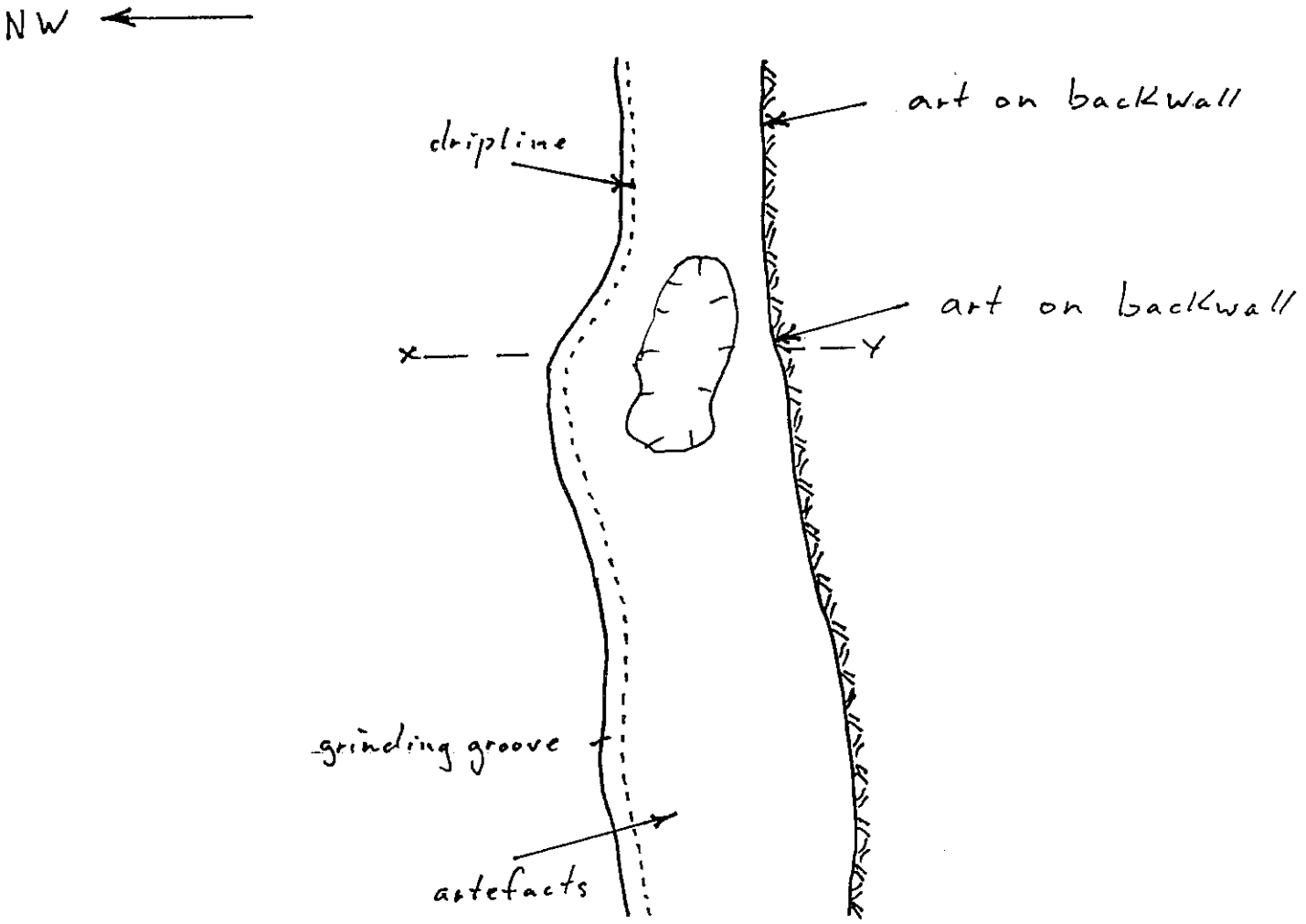
Site condition	Disturbed	Site Disturbance: Yes Type :	Wombat: Y Rubbish: Feral: Fireplace Graffiti: Other:
Management recommendations			
Have artefacts been removed from site	No	When	
By whom		Deposited at	
Consent applied for	☐	Consent issued	☐
Date of Issue		Consent number	

SITE INSPECTION AND RECORDING

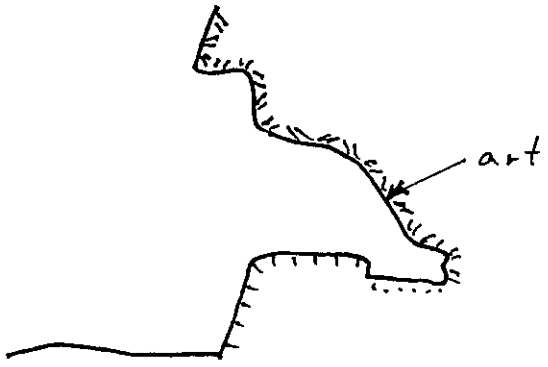
Reason for Investigation	Routine survey by Illawarra Prehistory Group		
Were local Aborigines contacted or present for the recording	☐ Not contacted ☐ Contacted and present ☒ Contacted but not present	Names and addresses	Jim Davis,Senior Sites Officer, Illawarra Local Aboriginal Land Council 484 Northcliffe Dr., Berkeley NSW 2506
Is the site important to local Aborigines	Yes		
Verbal/written reference sources	Illawarra Prehistory Group diary	ASR report number(s) (or title)	C- C-
Photographs taken	Yes	No. of Photos attached	
Site recorded by	Caryll Sefton	Date of recording	
Address/institution	Illawarra Prehistory Group 12 Chenhall St WOONONA NSW 2517 Tel 02 4284 2004		

Version: June 1998 Data entered by: Date entered:

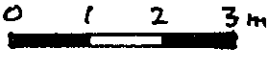
Northern Trail NO 35



Plan of shelter

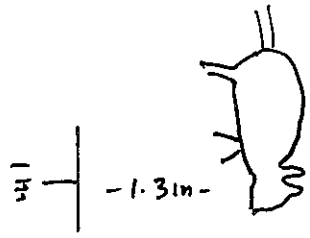


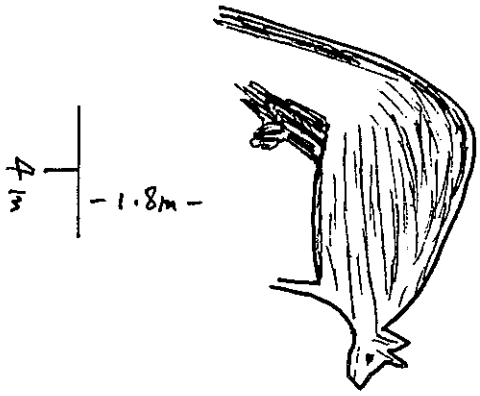
cross-section

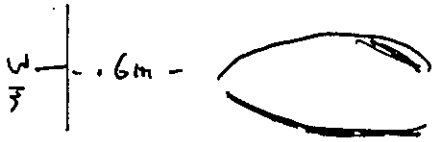


Northern Trail No 35

NW ←







Details of Art

charcoal outline and infill drawings



drawn by K. Kort






IFRAO 10 cm


IFRAO

NT 46

2.16 Woronora Reservoir Northern Trail 46 (NT 46 AHIMS # 52-2-0755)

This site is located in a swamp area on a sandstone ridge and is situated on a creek line in the swamp. Sixteen grinding grooves were located at the site. The site and some grooves have been subjected to erosion and weathering.

2.16.1 Woronora Reservoir Northern Trail 46 baseline recording data

Table 49: Baseline recording data for Woronora Reservoir Northern Trail 46

Overview					
Site type	Open site with Grinding Grooves	Corrected MGAE	310451	Corrected MGAN	6217734
Previous Recording	Illawarra Prehistory Group: C. Sefton	Date	1981; 2007		
Location description					
Landform	Sandstone ridge – swamp			Slope (deg)	Gentle
Vegetation	Hakea / bottlebrush			Land use	Conservation/mining
Disturbance	Overgrown vegetation			Aggrading/Stable/ Eroding	Eroding
Impacts	Eroding grooves			Proximity to water	On creek line – natural spring in swamp.
Visibility %	-			Exposure %	-
Site Context					
Site Dimensions	See site plan.				
Context	Open – western side of Waratah Rivulet off the 9D trail.				
Site Condition	-				
Site Description					
Total number of rock engravings	-				
Total number of grooves	16				
Type, Groove Profile	-				
Function	-				
Condition	Eroding				
Orientation	See groove recording table.				

Table 50: Baseline recording data for monitoring points present within Woronora Reservoir Northern Trail 46

Monitoring Points		
Number	**Location in shelter**	**Notes**
Nil	-	-

Table 51: Baseline recording data for grinding grooves present within Woronora Reservoir Northern Trail 46

Number	Length (mm)	Width (mm)	Depth (mm)	Direction	Notes
Grinding Grooves					
1	410	60	3	W - E	Active weathering.
2	290	31	2-3	W - E	
3	720	40	30	W - E	Groove channel
4	240	50	7	W - E	
5	160	25	3	SW - NE	
6	130	25	3	SW - NE	
7	420	60	10	SW - NE	
8	420	70	20	SW - NE	
9	330	50	5	W - E	
10	360	50	20	W - E	
11	390	160	50	NW - SE	Dish with distinct grooves.
12	390	45	10	NW - SE	
13	260	50	22	NW - SE	
14	150	60	20	S - N	
15	130	35	4	S - N	
16	150	40	7	S - N	

2.16.2 Baseline recording images – site overview



Plate 224: Overview of site, NE aspect – Woronora Reservoir Northern Trail 46

DRAFT

2.16.3 Baseline recording plans – site overview

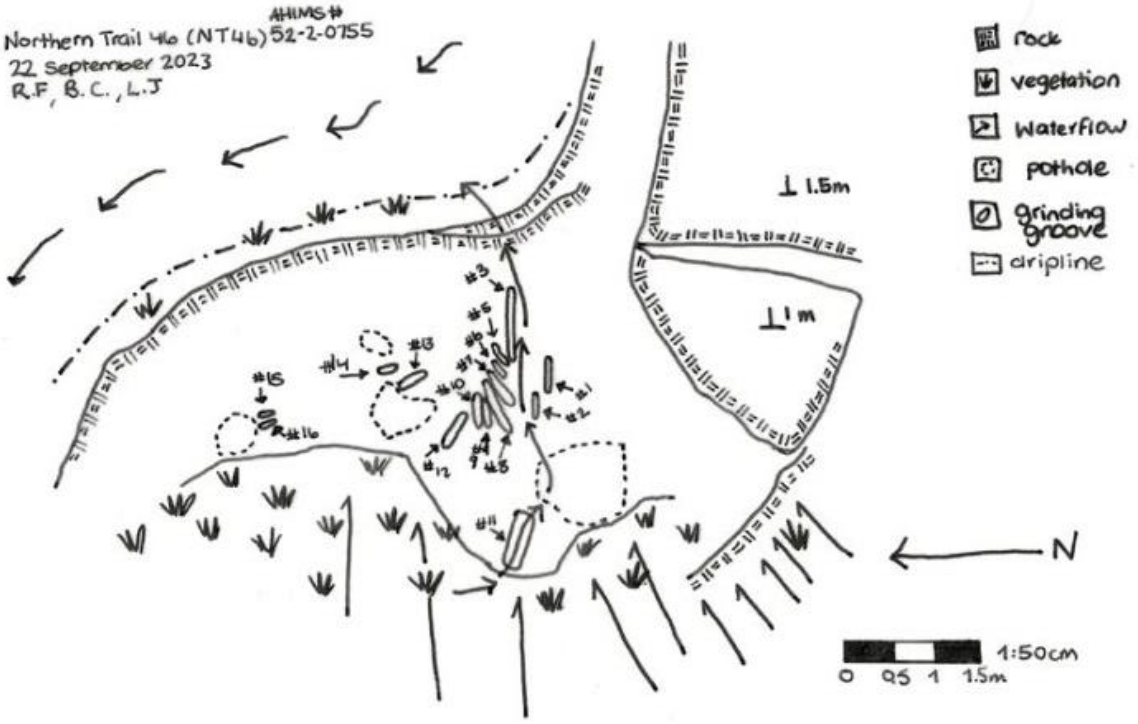


Figure 27: Plan of Woronora Reservoir Northern Trail 46

2.16.4 Baseline recording images – detailed site recording



Plate 225: Grooves #1 and #2 – Woronora Reservoir Northern Trail 46.



Plate 226: Groove #3 – Woronora Reservoir Northern Trail 46.



Plate 227: Grooves #4-10 – Woronora Reservoir Northern Trail 46.



Plate 228: Groove #11 (grind dish) – Woronora Reservoir Northern Trail 46.



Plate 229: Groove #12 – Woronora Reservoir Northern Trail 46.

DRAFT



Plate 230: Grooves #13 and #14 – Woronora Reservoir Northern Trail 46

DRAFT



Plate 231: Grooves #15 and #16 – Woronora Reservoir Northern Trail 46

DRAFT

NT 75

2.19 Northern Trail 75 (NT 75 AHIMS # 52-2-0659)

This shelter is formed out of sandstone by cavernous and chemical weathering. It is located in a ridge landform, under the first ledge above stored water between NT 85 and NT 74 and at 188.7 m elevation. It has been subjected to block fall. Five artefacts were located; however, no art surfaces were found during this survey.

2.19.1 Northern Trail 75 baseline recording data

Table 57: Baseline recording data for Northern Trail 75

Overview					
Site type	Shelter with Artefacts and PAD	Corrected MGAE	310790	Corrected MGAN	6219239
Previous Recording	Illawarra Prehistory Group: C. Sefton	Date	1981		
Site Details					
Width	-	Depth	-	Height	-
Orientation	SE 130°	Floor area	-	Floor condition	Stable, organic
Location in Landscape	Under first ledge above stored water between NT 85 and NT 74; elevation is 188.7 m. Small stream waterfall between NT 75 and NT 74.				
Shelter exterior/formation	Sandstone uplift, block fall and weathering, angophora / grass trees.				
Shelter interior	Block fall, and cavernous and chemical weathering.				
Distance to water	20-30 m	Landform	Hills/Ridges		
Setting	Continuous				
Archaeological Deposit					
Deposit	Yes	Describe	1 x ground edge axe/hammerstone with use-wear on all edges, 2 x quartz cores, 1 x ground flaked basalt core, 1 x basalt flake.		
Visible artefacts?	Yes	Where?	3.6-6.5 m	How many?	5
Art					
Art surfaces	None				
Art Condition	N/A				
Art Overview	N/A				
Damage/threats					
Water wash	Yes	Graffiti	No	Macro vegetals	Yes
Animals	Yes	Salt/granular loss	Yes - #5 water wash	Fissuring	Not active
Insects	Yes	Spalling/exfoliation	Not active	Other	N/A
Fire	No	Block fall	Ancient		

Table 58: Baseline recording data for monitoring points present within Northern Trail 75

Monitoring Points		
Number	**Location in shelter**	**Notes**
1	Near roof, follows roof, at 1.70 m.	Vertical crack
2	At 4 m – 5 m.	Vertical to horizontal along rock ledge – crack and seepage on ledge where ground axe lies underneath in the hollow.
3	From floor to half wall, at 5.90 m and 6.30 m.	Seepage, (water wash) and crack (vertical).
4	At 14.30 m	Seepage – algae (active).
5	At 22.50 m	Water wash – active.

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2.19.2 Baseline recording images – site overview



Plate 268: Northern end of shelter, from centre – Northern Trail 75



Plate 269: Southern end of shelter, from centre – Northern Trail 75



Plate 270: Back wall – Northern Trail 75



Plate 271: Centre of shelter – Northern Trail 75



Plate 272: Monitoring point #1 – Northern Trail 75

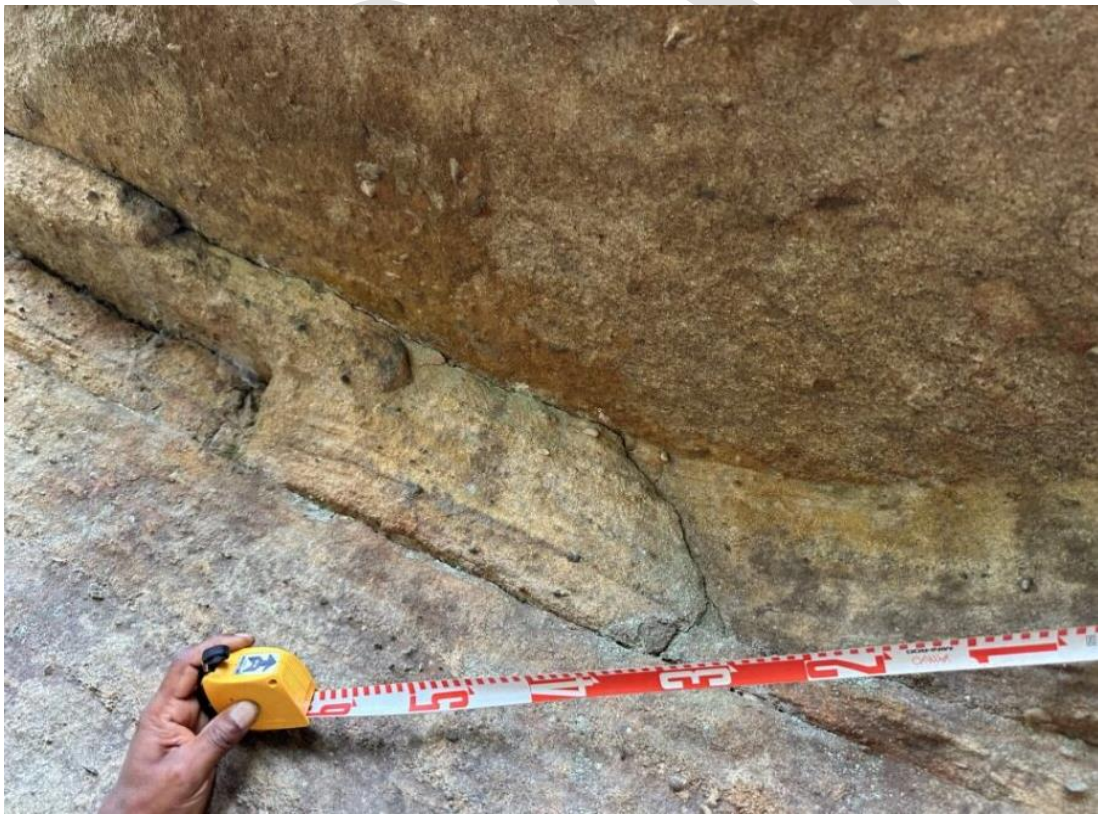


Plate 273: Monitoring point #1 – Northern Trail 75



Plate 274: Monitoring point #2 – Northern Trail 75. Note ground axe in situ on bottom left corner.



Plate 275: Monitoring point #3 – Northern Trail 75



Plate 276: Monitoring point #4 – Northern Trail 75



Plate 277: Monitoring point #5 – Northern Trail 75

2.19.3 Baseline recording plans – site overview

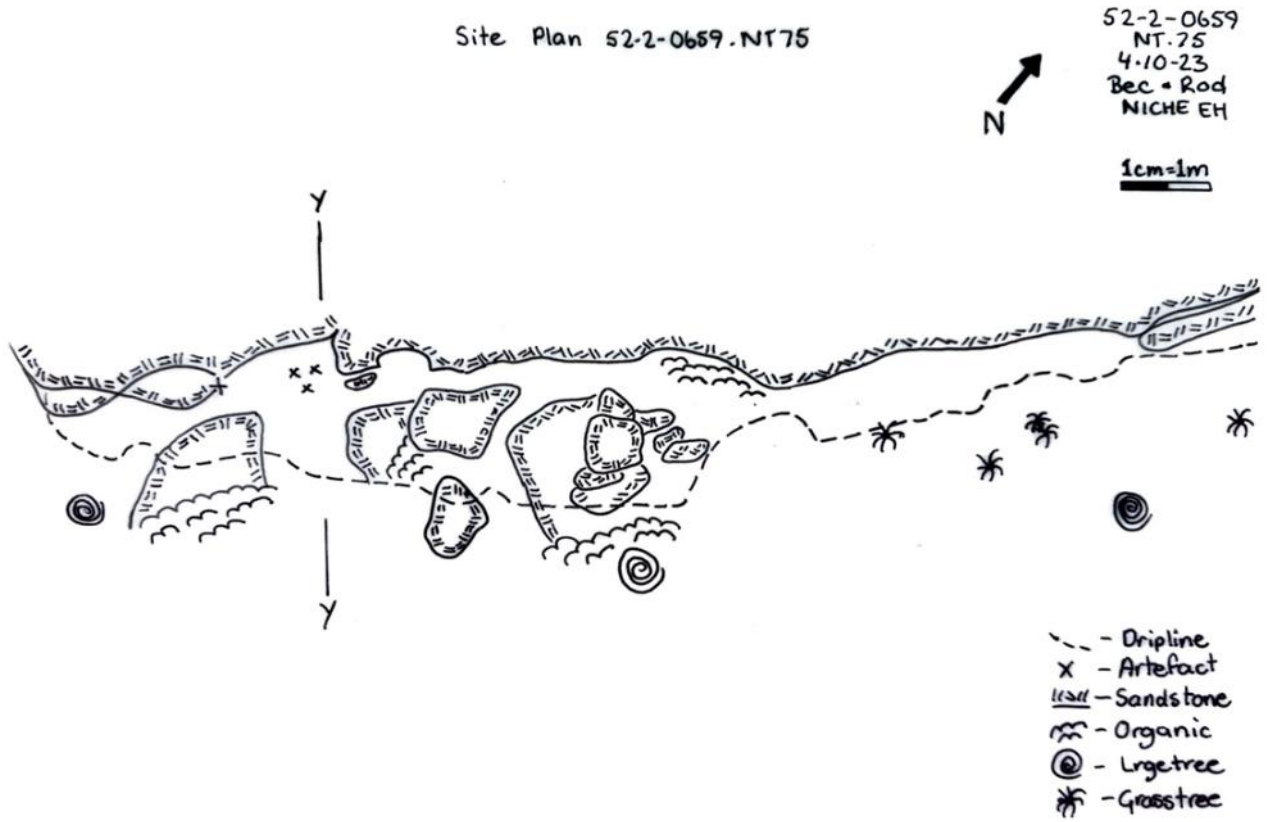


Figure 31: Plan of Northern Trail 75

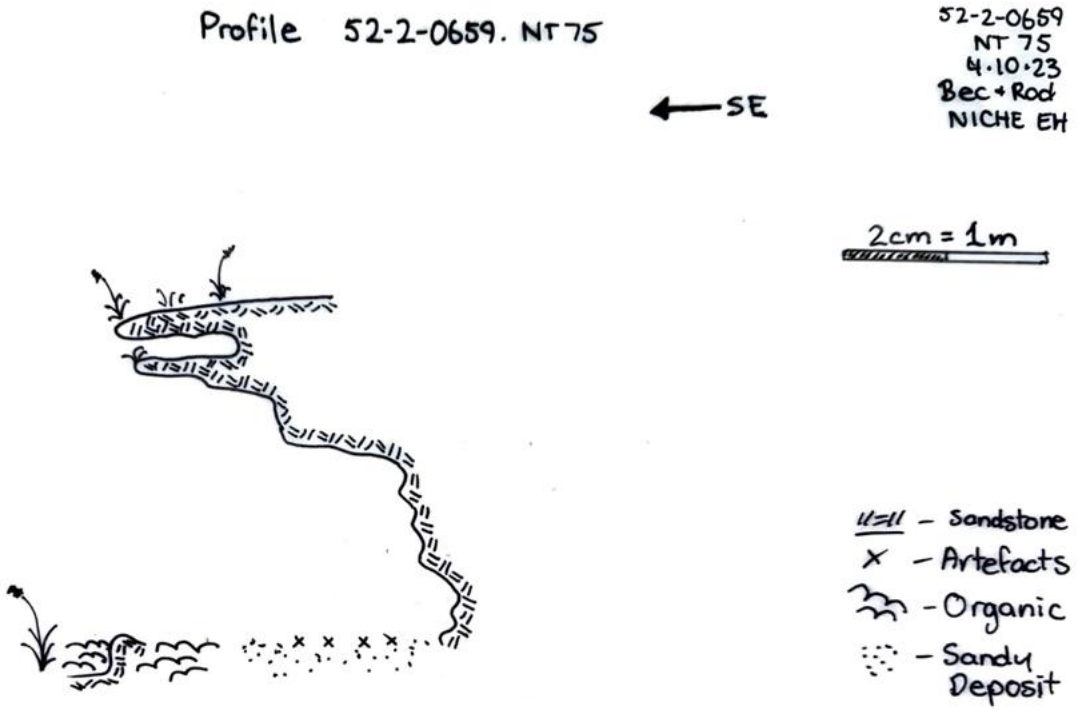


Figure 32: Section profile of Northern Trail 75

2.19.4 Baseline recording images – detailed site recording

Artefacts



Plate 278: Overview of artefact location from southern end, facing north – Northern Trail 75.



Plate 279: Overview of ground axe location – Northern Trail 75.



Plate 280: Ground axe location – Northern Trail 75



Plate 281: Ground axe located at Northern Trail 75



Plate 282: Ground axe located at Northern Trail 75



Plate 283: Basalt ground flake/core located at Northern Trail 75



Plate 284: Quartz cores and basalt flake located at Northern Trail 75



Plate 285: Artefacts in situ – Northern Trail 75

NT 8

2.6 Woronora Reservoir Northern Trail 8 (NT 8 AHIMS # 52-2-0623)

This site is situated upon a creek line landform, that moves into a stored water area. Features include two platforms with six petroglyphs and 52 grinding grooves. These are in a stable condition; however, some impacts are evident such as organic matter and environmental degradation and erosion.

2.6.1 Woronora Reservoir Northern Trail 8 baseline recording data

Table 19: Baseline recording data for grinding grooves and petroglyphs present at Woronora Reservoir Northern Trail 8

Overview					
Site type	Open site with Grinding Groove and Rock Engraving	Corrected MGAE	310710	Corrected MGAN	6217977
Previous Recording	Illawarra Prehistory Group: C. Sefton	Date	1981; 2006		
Location description					
Landform	Creekline	Slope (deg)	N/A		
Vegetation	Hakea / Bottlebrush	Land use	Conservation/mining		
Disturbance	-	Aggrading/Stable/ Eroding	Eroding		
Impacts	Organic matter, environmental degradation.	Proximity to water	Located in creekline, moving into stored water.		
Visibility %	-	Exposure %	-		
Site Context					
Site Dimensions	See site plan. Site distinguished as Platforms 1 and 2. Platform 1 (Upper stream): • 3 x Petroglyphs (#1 – 3) • 19 x Grinding Grooves (#1-19) Platform 2 (Downstream): • 3 x Petroglyphs (#4-6) • 33 x grinding grooves (#20-52)				
Context	Open				
Site Condition	Platforms are stable with no visible cracking or signs of block breaking or eroding. Large build-up of organic matter over grooves and petroglyphs – edges.				
Site Description					
Total number of rock engravings	6 petroglyphs – extremely degraded with parts not visible since last recording. (Previously recorded 6 engravings)				
Total number of grooves	52 grinding grooves (Previously recorded 41 grinding grooves)				
Type, Groove Profile	Long oval symmetrical shaped grooves.				
Function	Axe grinding grooves				
Condition	Visible				
Orientation	North - south				

Table 20: Grinding groove and rock engraving measurements at Woronora Reservoir Northern Trail 8

Number	Length (mm)	Width (mm)	Depth (mm)	Direction	Notes
Rock engravings					
1	2250	1080	1		Petro Platform 1
2	1400	940	1-2		Petro Platform 1
3	1960	1300	2-4		Petro Platform 1
4	1050	730	1		Petro Platform 2
5	1100	850	3		Petro Platform 2
6	300	240	3-5		Petro Platform 2
Grinding Grooves					
1	330	60	10	SE - NW	Platform 1
2	360	75	15	E - W	Platform 1
3	260	65	15	E – W	Platform 1
4	310	75	20	E - W	Platform 1
5	310	68	15	E - W	Platform 1
6	210	60	15	E - W	Platform 1
7	360	80	25	SE - NW	Platform 1
8	190	55	5	SE - NW	Platform 1
9	430	70	15	SE - NW	Platform 1
10	320	65	20	SE - NW	Platform 1
11	360	80	25	SE - NW	Platform 1
12	310	70	10	SE - NW	Platform 1
13	270	40	5	SE - NW	Platform 1
14	270	60	5	SE - NW	Platform 1
15	350	50	5	NW - SE	Platform 1
16	310	50	10	NW - SE	Platform 1
17	170	40	3	N -S	Platform 1. South end eroded in creek line.
18	190	40	3	N -S	Platform 1
19	140	25	3	N -S	Platform 1
20	260	30	3	N -S	Platform 2
21	410	35	2	N -S	Platform 2
22	370	45	3	N -S	Platform 2
23	280	45	2	N -S	Platform 2

Number	Length (mm)	Width (mm)	Depth (mm)	Direction	Notes
24	240	30	2	N -S	Platform 2
25	280	60	10	N -S	Platform 2
26	310	60	10	N -S	Platform 2
27	400	50	7	N -S	Platform 2
28	370	80	15	N -S	Platform 2
29	320	40	8	N -S	Platform 2
30	280	22	15	NE - SW	Platform 2
31	190	30	2	NE - SW	Platform 2
32	290	45	10	NE - SW	Platform 2
33	210	70	80	NE - SW	Platform 2
34	410	60	10	N - S	Platform 2
35	180	35	1	NE - SW	Platform 2. Very eroded.
36	180	35	1	NE - SW	Platform 2. Very eroded.
37	380	60	5	NE - SW	Platform 2
38	380	55	20	NE - SW	Platform 2
39	220	35	1	NE - SW	Platform 2. Very eroded.
40	360	60	15	NE - SW	Platform 2
41	350	60	15	NE - SW	Platform 2
42	350	70	20	NE - SW	Platform 2
43	260	55	5	NE - SW	Platform 2. Very eroded.
44	280	30	1	NE - SW	Platform 2. Very eroded.
45	276	50	5	NE - SW	Platform 2
46	240	45	2	NE - SW	Platform 2. Very eroded.
47	120	40	1-3	NE - SW	Platform 2. Very eroded.
48	120	40	1-3	NE - SW	Platform 2. Very eroded.
49	120	25	1	N - S	Platform 2. Very eroded.
50	360	30	2	N - S	Platform 2. Very eroded.
51	240	40	2	N - S	Platform 2. Very eroded.
52	330	60	20	E - W	Platform 2

Table 21: Baseline recording data for monitoring points present within Woronora Reservoir Northern Trail 8

Monitoring Points		
Number	**Location**	**Notes**
Nil	-	-

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2.6.2 Baseline recording images – site overview



Plate 93: Site overview – Woronora Reservoir Northern Trail 8



Plate 94: Overview of grinding grooves (Platform 1) – Woronora Reservoir Northern Trail 8



Plate 95: Platform 2 overview, facing south – Woronora Reservoir Northern Trail 8



Plate 96: Overview of grinding grooves #1-14 – Woronora Reservoir Northern Trail 8.



Plate 97: Example overview of grinding grooves – Woronora Reservoir Northern Trail 8

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2.6.3 Baseline recording plans – site overview

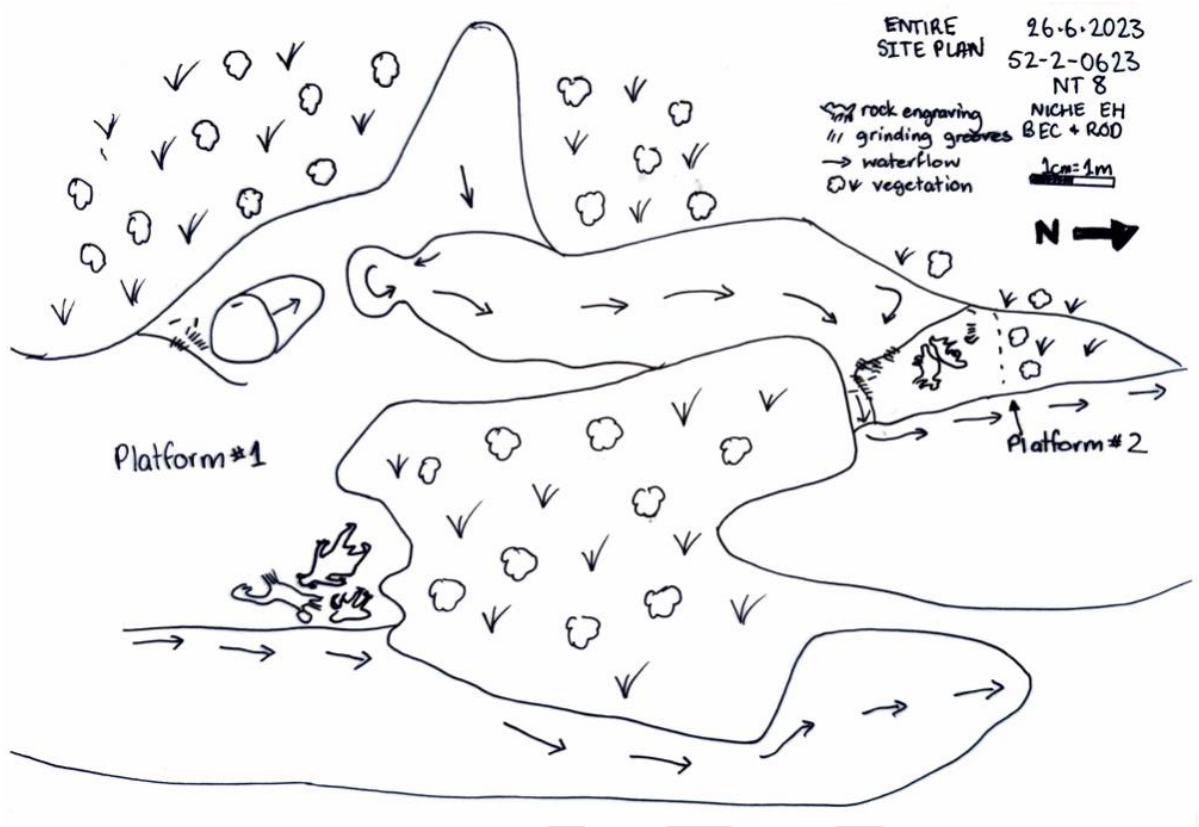


Figure 12: Plan of Woronora Reservoir Northern Trail 8 entire site plan.

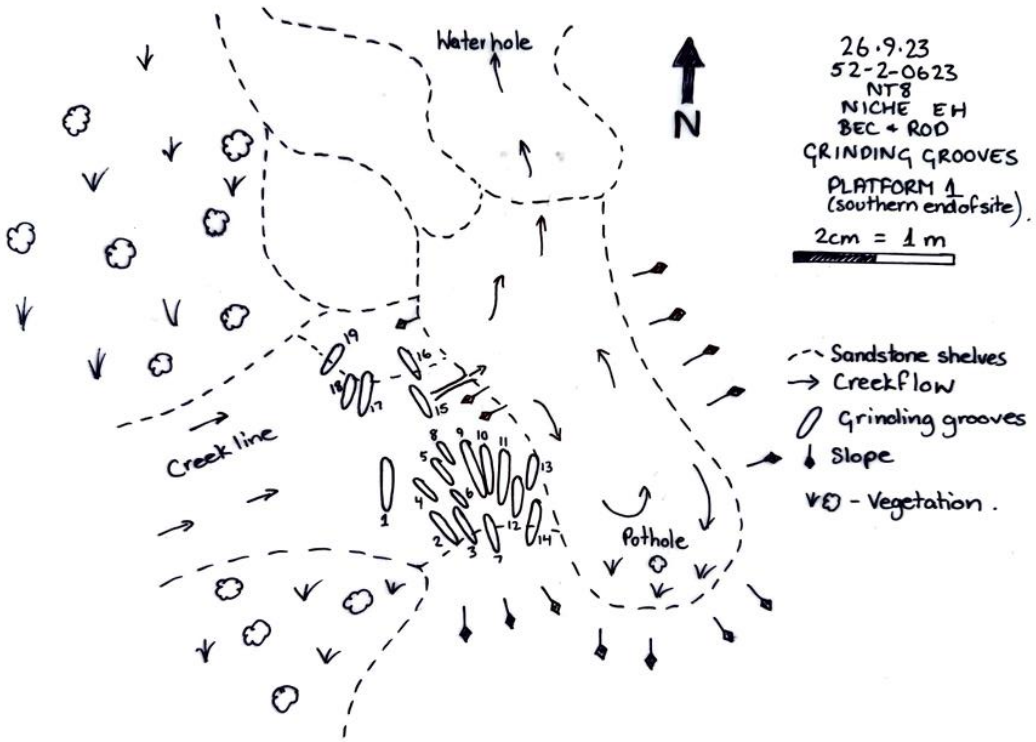


Figure 13: Plan of Platform 1 (southern end of site) at Woronora Reservoir Northern Trail 8.

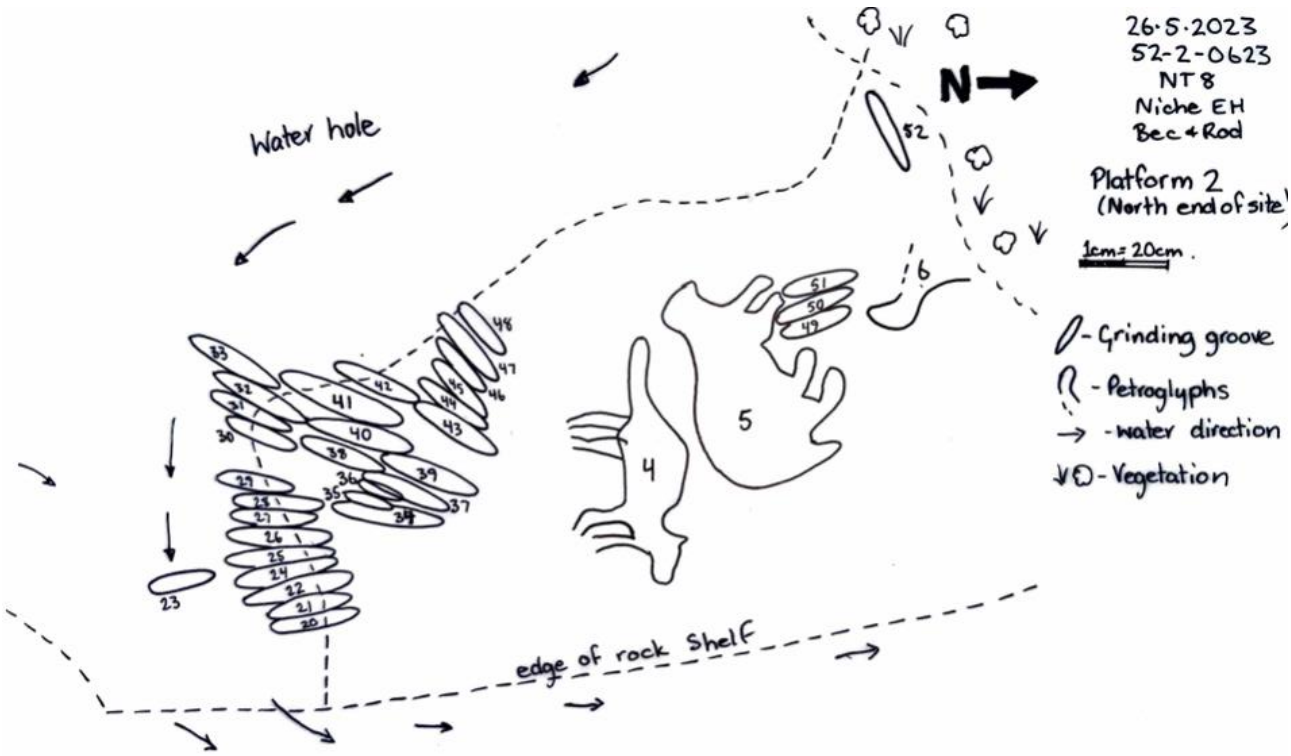


Figure 14: Plan of Platform 2 (northern end of site) at Woronora Reservoir Northern Trail 8

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2.6.4 Baseline recording images – detailed site recording

Petroglyphs



Plate 98: Petroglyphs #1, #2 and #3, facing N – Woronora Reservoir Northern Trail 8



Plate 99: Petroglyphs #4, #5 and #6, facing N – Woronora Reservoir Northern Trail 8

Grinding Grooves



Plate 100: Grinding grooves #1-14 – Woronora Reservoir Northern Trail 8



Plate 101: Grinding grooves #15-19 – Woronora Reservoir Northern Trail 8



Plate 102: Grinding grooves #20-33 – Woronora Reservoir Northern Trail 8

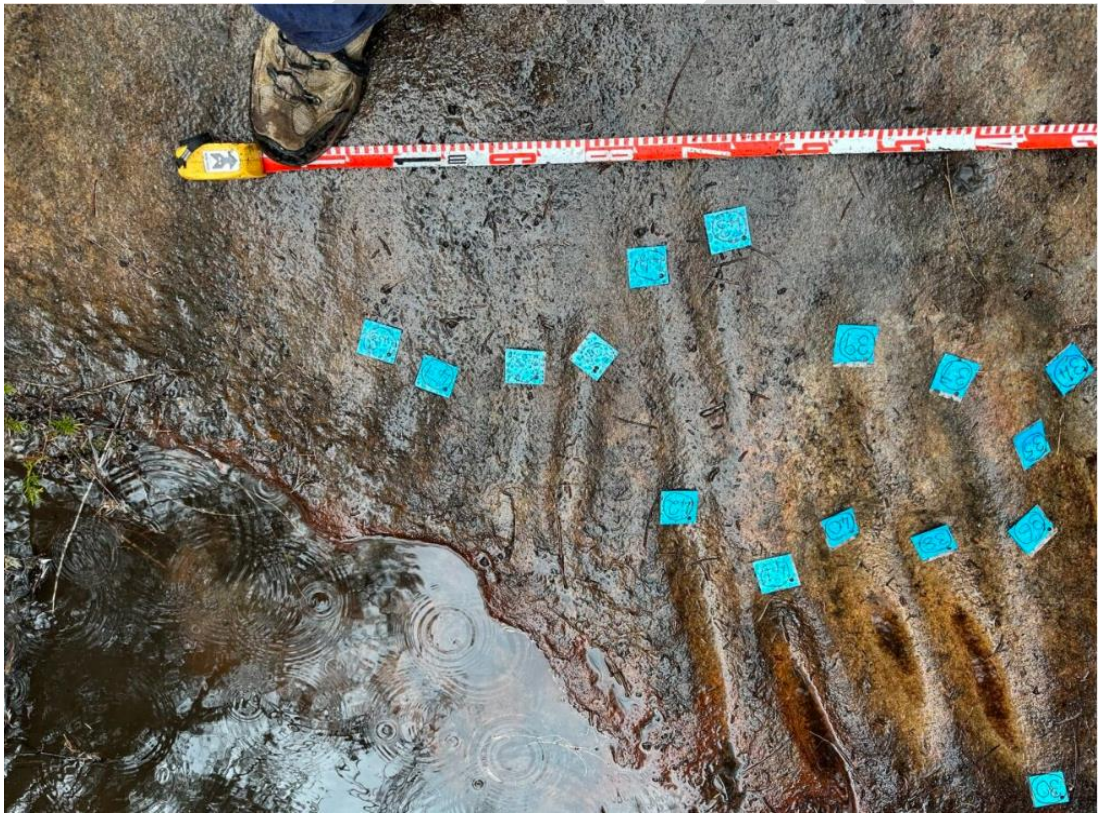


Plate 103: Grinding grooves #34-48 – Woronora Reservoir Northern Trail 8

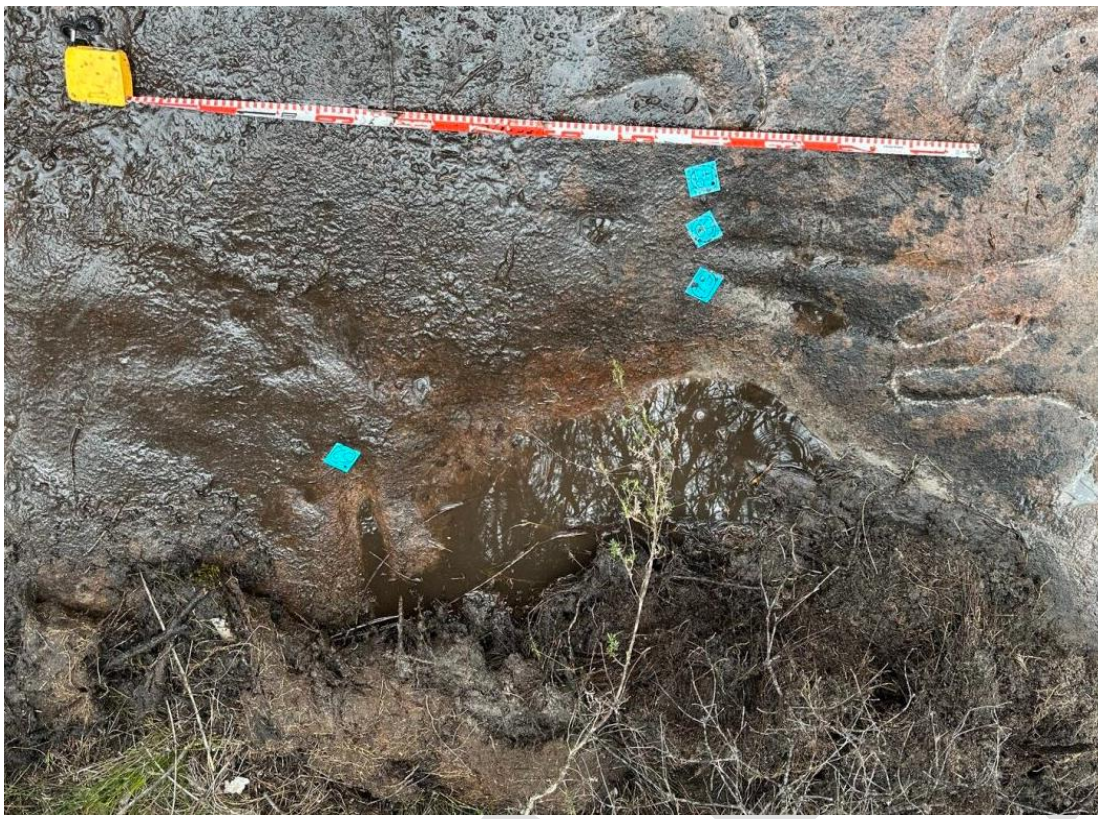


Plate 104: Grinding grooves #49-52 – Woronora Reservoir Northern Trail 8

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NT 9

2.7 Woronora Reservoir Northern Trail 9 (NT 9 AHIMS # 52-2-0624)

This shelter is a continuous sandstone ridgeline that has been subject to active, chemical weathering and block fall. The shelter is located under a waterfall at 239 m elevation and measures 60 m x 6 m x 4.2 m. One weathered, partial charcoal macropod was recorded. No artefacts were relocated.

2.7.1 Woronora Reservoir Northern Trail 9 baseline recording data

Table 22: Baseline recording data for Woronora Reservoir Northern Trail 9

Overview					
Site type	Shelter with Art and Artefacts	Corrected MGAE	310764	Corrected MGAN	6218034
Previous Recording	Illawarra Prehistory Group: C. Sefton	Date	1981; 2007		
Site Details					
Width	60 m	Depth	6 m	Height	4.2 m
Orientation	North	Floor area	10m2	Floor condition	eroding
Location in Landscape	Under waterfall – Upper mid slope – 239 m elevation. There are shelters on top of each other and appear to be at the same location.				
Shelter exterior/formation	Continuous sandstone ridgeline.				
Shelter interior	Block fall – chemical weathering – active weathering.				
Distance to water	On Creek	Landform	Ridgeline below waterfall.		
Setting	Continuous				
Archaeological Deposit					
Deposit	Sandy	Describe	Original recording consisted of 4x flaked artefacts. No artefacts relocated.		
Visible artefacts?	No	Where?	N/A	How many?	N/A
Art					
Art surfaces	1 panel = 1 motif				
Art Condition	Weathered				
Art Overview	1 charcoal macropod – partial				
Damage/threats					
Water wash	Yes.	Graffiti	No.	Macro vegetals	Yes.
Animals	Yes.	Salt/granular loss	Yes.	Fissuring	No.
Insects	Yes.	Spalling/exfoliation	Yes.	Other	N/A
Fire	-	Block fall	Yes.		

Table 23: Baseline recording data for art surfaces present within Woronora Reservoir Northern Trail 9

Motif No.	Type	Form	Media	Colour	Measurement
Panel 1					
1	Wallaby	Partial	Charcoal outline and infill	Black	6m on baseline, 2.2 m high on wall. 40 cm x 50 cm

Table 24: Baseline recording data for monitoring points present within Woronora Reservoir Northern Trail 9

Monitoring Points		
Number	**Location in shelter**	**Notes**
#1	Backwall at 5.5m – 9 m on baseline	Active seepage
#2	Backwall at 10 m – 13 m on baseline	Active seepage
#3	Backwall at 13.5 m – 14.5 m on baseline	Active seepage
#4	Backwall at 15 m – 16 m on baseline	Active seepage and cracking
#5	Backwall to dripline on roof. Starts at 16.5 m (backwall) – 13 m (dripline) on baseline.	Roof crack

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2.7.2 Baseline recording images – site overview



Plate 105: Overview of eastern end of shelter, from centre – Woronora Reservoir Northern Trail 9



Plate 106: Overview of the western end of shelter, from centre – Woronora Reservoir Northern Trail 9



Plate 107: Overview facing E from western end – Woronora Reservoir Northern Trail 9



Plate 108: Back wall / western end overview – Woronora Reservoir Northern Trail 9



Plate 109: Facing W from eastern end of shelter – Woronora Reservoir Northern Trail 9

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2.7.3 Baseline recording plans – site overview

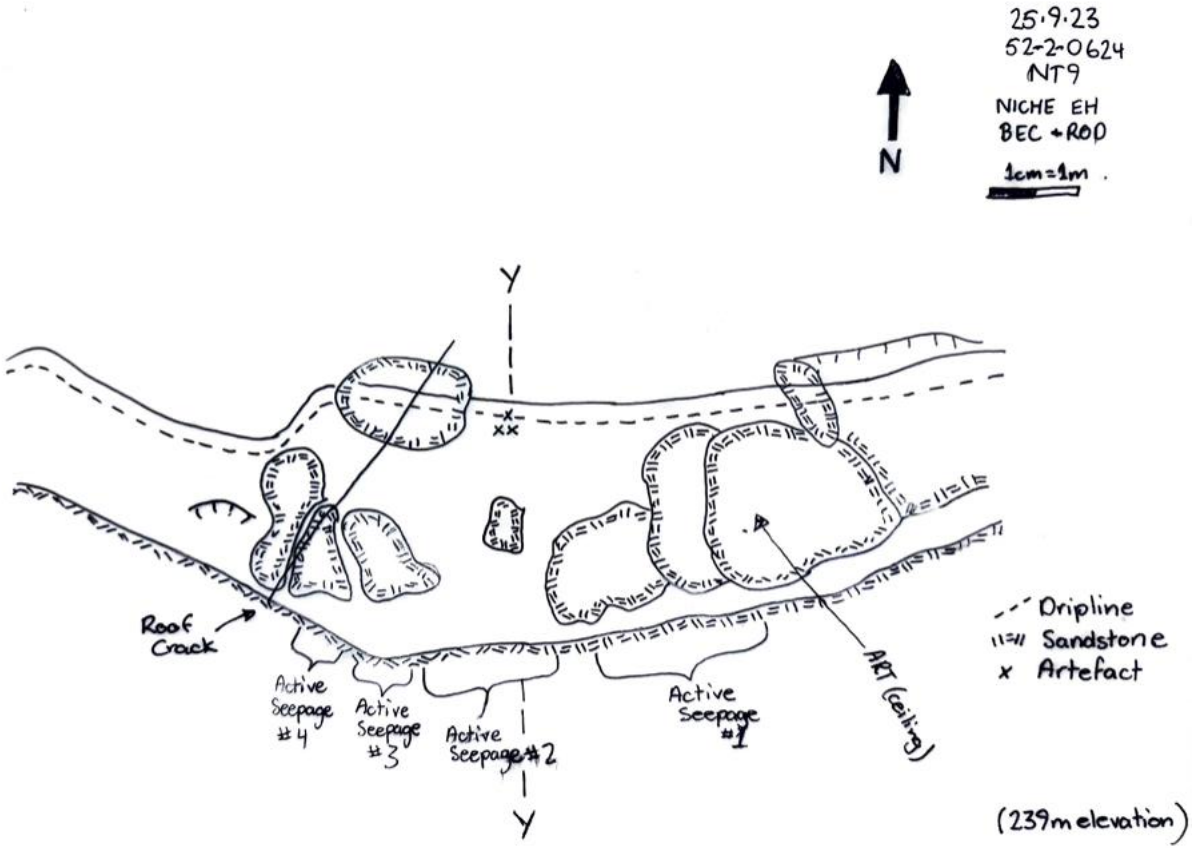


Figure 15: Plan of Woronora Reservoir Northern Trail 9

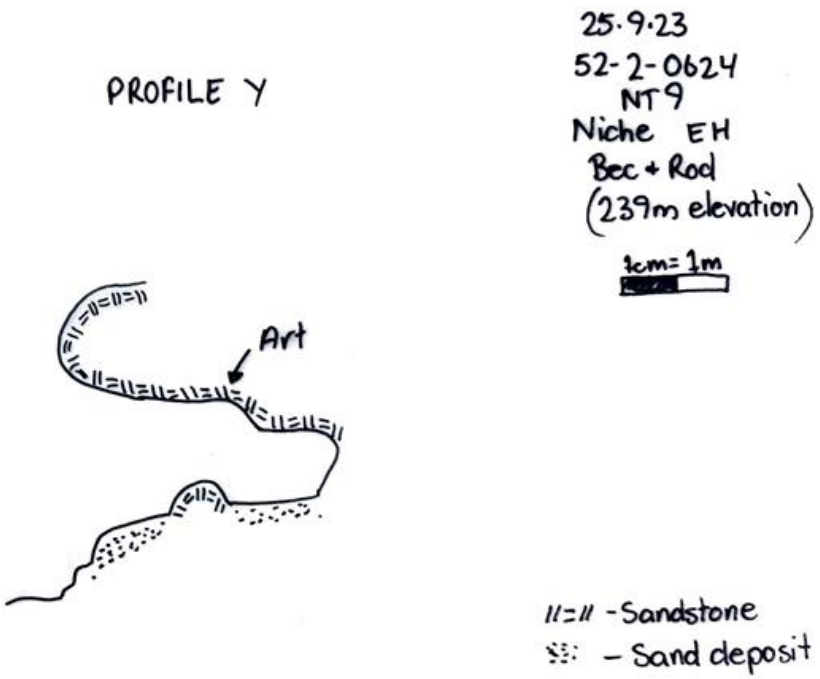


Figure 16: Y Section of Woronora Reservoir Northern Trail 9

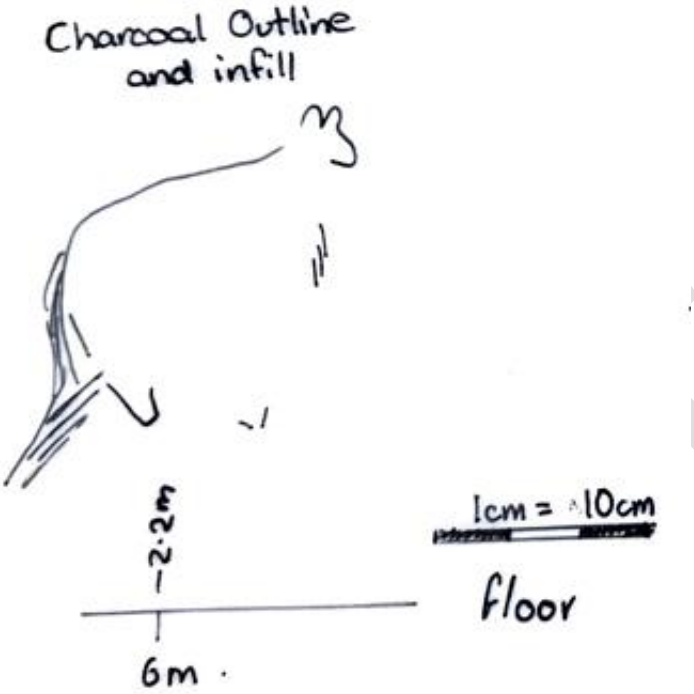


Figure 17: Art panel of Woronora Reservoir Northern Trail 9

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2.7.4 Baseline recording images – detailed panel and site recording

Panel 1



Plate 110: Motif #1 – charcoal kangaroo (partial – roof – Woronora Reservoir Northern Trail 9



Plate 111: Active seepage (#1), back wall at 5.5 m – 9 m – Woronora Reservoir Northern Trail 9



Plate 112: Seepage (#2) at 10 m – 13 m – Woronora Reservoir Northern Trail 9



Plate 113: Seepage (#3) at 13.5 m and 14.5 m – Woronora Reservoir Northern Trail 9



Plate 114: Seepage (#4) and back wall crack at 15 m – 16 m – Woronora Reservoir Northern Trail 9



Plate 115: Roof crack (monitoring point #5) – Woronora Reservoir Northern Trail 9



Plate 116: Roof crack (monitoring point #5) – Woronora Reservoir Northern Trail 9



Plate 117: Roof crack (monitoring point #5) – Woronora Reservoir Northern Trail 9



Plate 118: Roof crack (monitoring point #5) – Woronora Reservoir Northern Trail 9



Plate 119: Roof crack (monitoring point #5) – Woronora Reservoir Northern Trail 9



Plate 120: Roof crack (monitoring point #5) – Woronora Reservoir Northern Trail 9

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