

## 8 Field investigation

### 8.1 Key findings

The following provides a summary of key activities and/or findings of this Chapter:

- On-site validation consisted of archaeological field surveys and test excavations undertaken by EMM archaeologists, subcontractors and representatives of 15 of the registered Aboriginal parties. The archaeological field survey was largely completed over a 12-week period between July 2022 and April 2023, while the test excavations consisted of a six-week program between November and December 2022. The field activities completed ultimately totalled over 90 days of investigation on-site.
- The archaeological field survey encompassed some 798 kilometres (or some 3,998 hectares) of linear pedestrian transects across the construction area and included 1,228 individual points of observation and documentation. These values are in excess of the ~260 km construction area, but account for the need to undertake multiple transects across wider portions of the footprint, and for earlier variations of the project design that are no longer being considered. Overall ~79% of the construction area was subject to archaeological field survey. The remaining 21% was not surveyed due to a combination of landowner access and weather constraints. Visibility and coverage across the construction area was relatively poor (~4.5%) due to the presence of dense vegetation. Despite this, some 183 Aboriginal objects, sites and/or places were documented. These were dominated by stone artefact scatters (n=78) and isolated stone objects (n=65), with lesser occurrences of grinding grooves (n=15) and culturally modified trees (n=14). Spatially, these were found across the construction area, but there were clear clusters primarily located within 250 m of several 2nd to 4th order creeks, including (from west to east) Laheys Creek, Sandy Creek, Tallawang Creek, Browns Creek, Copes Creek and Deadmans Creek. While Wilpinjong Creek appears to have been a foci based on previous investigations, few cultural materials were observed during this field survey. Following project refinement, only 82 of these sites now remain in the construction area.
- Test excavations consisted of 128 0.25 m<sup>2</sup> manually dug test pits at a small number of proposed transmission tower locations extending across the construction area to supplement and confirm the field survey findings. Overall, some 84 artefacts were recovered from test pits, primarily between 10–20 cm below surface, with no test pits exceeding 80 cm in depth. Overall, artefact densities of 2.1/m<sup>2</sup> were recovered. When extrapolating values from the test excavation, four test pits (and two groups of test pits) returned values of >17/m<sup>2</sup>, which was considered to reflect above background levels of activity. These were on average ~104 m from 2nd – 4th order creek lines, with high densities recorded along Copes Creek and Sportsman Hollow Creek. The assemblage indicates a focus on extraction of raw materials potentially from these (and other) creeks, notably a milky quartz, and likely dating to the last few thousand years.
- The findings of the field investigation align closely with the previous investigations outlined in Section 7.3. These all demonstrate that the most significant cultural deposits appear to primarily be found along major watercourses and/or strongly influenced by other environmental factors such as the presence of sandstone outcrops and overhangs.

## 8.2 Archaeological survey

### 8.2.1 Approach and methods

The construction area has been subject to an extensive field survey campaign, extending over 12 weeks ,primarily between 8 July and 24 November 2022, but extending up until 23 April 2023 (Figure 8.1). These works were undertaken by EMM archaeologists (including Alan Williams, Joel Mason, Cameron Neal, Megan Sheppard Brennand, Luke Kirkwood, Amber Morgan), as well as assistance from Artefact Heritage Services Pty Limited (Michael Lever, Brye Marshall) and OzArk Environment and Heritage Pty Limited (Brendan Fisher, Harrison Rochford), with the participation of 15 locally based RAPs consisting of Wiradjuri and Gomeroi traditional owners (Appendix A.1).

The primary aims of the field survey were to:

- identify Aboriginal archaeological sites and/or places with the assistance of Aboriginal participants
- characterise the landscape to aid predictions of archaeological potential and sensitivity
- identify sites or areas that would require further investigation if planned for development as part of the project
- identify sites or areas to be avoided by development, where possible
- identify areas with minor or negligible Aboriginal cultural heritage values that hold no constraint for development as part of the project.

Following direction from Heritage NSW, the archaeological survey attempted to achieve near entire (100%) coverage of the construction area. For the majority of the project, archaeological surveys consisted of a pedestrian inspection of the construction area between ~200 and 400 m in width. A team of eight personnel (generally two archaeologists and six Aboriginal participants) spread between 10–20 m apart in a line and walked along the construction area either in a single direction or completed adjoining transects to ensure complete coverage. The length of each transect was typically dictated by logistical factors, such as land access, impassable obstacles (such as major waterways) or distance from vehicles. While several hundred transects were undertaken, these have been divided into larger survey units for the purpose of discussion below. In the case of the larger Elong Elong and Merotherie Energy Hubs, and the New Wollar switching station, the same methods as above were adopted, but multiple transects were applied across the area to ensure suitable coverage. During the field investigations, the construction area was continually refined, and as such there are portions of the field survey that now extend outside of the current footprint, which are presented but not discussed further below.

The survey team targeted ground exposures along transects, where cultural material was possible to be identified throughout the landscape. It must, however, be noted that archaeological surveys are inherently limited by ground surface visibility conditions and therefore any survey, despite the intensity of survey effort and spacing of survey transects, is considered to only *sample* the archaeological landscape.

The effectiveness of the survey is determined through recording and analysing survey coverage data. It is evaluated for its effectiveness in identifying the distribution of Aboriginal objects across the landscape, taking into account the potential for archaeological deposits. The percentage of the ground surface exposed in each landform and the visible ground surface within exposures (as ground exposures are often obscured by vegetation, gravels, etc) influences the survey results. For example, an archaeologically sensitive landform surface that is highly exposed by erosion is likely to reveal Aboriginal objects, whereas a similar landform that is thickly grassed will obscure surface artefacts if they are present. Overall, calculation of visibility and effective survey coverage is used to estimate not only how much area was physically surveyed, but also how favourable the survey conditions were for the identification of Aboriginal sites.

The archaeological survey and data collection methods followed Section 2.2 of the *Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010). Site recording was completed in accordance with the *Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010). Site locations and their details were recorded with digital tablets using site recording forms created by EMM on the Survey123 application for ArcGIS (Esri® software). The digital tablets had a location accuracy of up to ±3 m which is similar to hand-held non-differential GPS units (~5 m). The Survey123 forms allowed for a site's location, details and representative photographs to be linked together, which avoided potential post-fieldwork issues around data integrity.

## 8.2.2 Results

Overall, the archaeological field survey included the completion of about 798 km of survey units (SU) across the construction area (Figure 8.1). This value is substantively longer than construction area itself (~260 km), but accounts for multiple transects used to encompass the wider portions of the footprint of the construction area. This also includes some portions of investigation that are now no longer in the construction area following project refinement. Overall, these distances encompass some 3,998 ha of the construction area, and is equivalent to ~79% of the overall footprint (Table 8.1, Plate 8.1-8.30, Figure 8.2, Appendix E.1 and E.2). Some 1,228 discrete observations were made across the construction area, where a participant entered notes, photographs, descriptions, etc, about the landscape, and/or identified cultural materials (Figure 6.1; Appendix F.1). The ~21% of the construction area that was not surveyed as part of this ACHA was primarily a result of landowner access restrictions at the time of the field work being undertaken.

To enable an overview to be provided here, the construction area was divided into 15 main SUs, which have been developed based on the transect data and observations that demonstrate consistency in the landforms and environmental context (Table 8.1, Figure 8.3). These SUs are on average ~53 km in length and had an overall effective coverage<sup>5</sup> of ~4.5%. Despite this limited visibility primarily as a result of dense ground cover, 184 Aboriginal objects and places were documented through the archaeological field survey, and which were primarily found in survey units 3, 4, 11 and 12 – west of Moolarben, Merotherie Energy Hub, Tallawang and east of Elong Elong Energy Hub (Table 8.1). These are further discussed in Section 8.2.3.

The results of the field investigations aligned closely with the desktop information outlined in Chapter 7. In the south-east, SU 1 extended from the proposed New Wollar switching station to the edge of the existing Wilpinjong coal mine (Plate 8.1 and Plate 8.2). The environment consisted of gentle undulating hills interspersed by deeply incised creek-lines. Soil profiles generally exhibited shallow topsoil often either eroding or absent and was perhaps 30 cm in depth in the exposed sections along Wollar Creek. The SU was heavily vegetated by low-lying grass with occasional stand of more established trees, although few appeared to be of significant age. Visibility was limited throughout by this vegetation, with exposures typically constrained to tracks and creek edges. As with most of the construction area, the SU was subjected to various pastoral activities, and included localised disturbance such as dams, tracks, fencing, et cetera.

<sup>5</sup> Effective coverage incorporates visibility and exposure as part of calculating coverage, so will be lower than actual transect coverage.

SU 2 ran along the northern edge of the existing Wilpinjong coal mine. The SU generally followed a wide flat valley within which Wilpinjong Creek flows (Plate 8.3 and Plate 8.4). To the north of the construction area is heavily vegetated moderate to steep hills that form the edge of Goulburn River National Park. Some attempts were made to relocate a previously documented rockshelter in these hills (AHIMS site #36-3-0570) but could not be validated – the general location did however align with the general description of the environment. As with most of the construction area, visibility was limited by low-lying dense grass cover, although numerous tracks and other disturbances were evident from nearby mining activities increasing useful exposures. Despite being next to the established Wilpinjong coal mine, disturbances were relatively limited, the most noticeable being a significant transmission line easement (Transgrid Line 79). The western end of this SU extends through the Moolarben coal mine, which was inaccessible at the time of survey.

SU 3 transitions from steep sandstone relief to the east (Plate 8.5 and Plate 8.6), within which two new potential rockshelters were encountered (SNI-RS01 and SNI-RS02), into moderate and eventually gentle undulating hills to the west. Also of note was minor elevations with thinly vegetated woodland in the vicinity of Copes Creek, and where subsurface potential was considered probable (see Section 8.3). The westernmost end of the survey transect nearest Merotherie Road was flood-prone and swampy, especially in the vicinity of numerous tributaries feeding into Cockabutta Creek. Vegetation was typically low-lying grasses with infrequent trees – several of fairly significant age. Previous disturbance was limited, and dominated by pastoral activity, although many of the smaller creek-lines had been subject to some form of modification, especially damming and/or dam construction.

SU 4 encompassed the Merotherie Energy Hub site, which was subject to multiple transects due to its size. The southern portions of the energy hub were generally flat or consisting of very gentle undulating hills (Plate 8.7 and Plate 8.8). Activities here included various cultivation and pastoral activities and resulted in improved localised visibility especially in recently ploughed fields. These all suggested a fairly shallow soil profile, with underlying heavy clay subsoils evident in deep rills and/or plough marks. Of note was a series of discrete hills found in the north-west of the energy hub, which had numerous sandstone exposures, and within them an abundance of grinding grooves was identified (SNI-GG2-15 inclusive). These grinding grooves did not generally appear in close proximity to any established creek-lines.

The majority of SU 5 was not accessible at the time of survey, due to landowner access agreements and flooding, but includes the floodplains and open depression of the Talbragar River and Cockabutta Creek (Plate 8.9 and 8.10). Where accessed, this survey unit exhibited wide valley floors, with minimal elevation in the construction area. Activities were typically pastoral and dominated by low-lying grasses. Numerous farming related activities were evident in the form of access tracks, dam construction and fence-lines et cetera, which provided some visibility, but few cultural materials were observed.

SU 6 and 7 were in similar environmental contexts and extended to the north and north-east from Merotherie (Plate 8.11–Plate 8.14) towards the (proposed) Valley of the Winds and (approved) Liverpool Range wind farms. These SUs were in gentle to progressively moderate hills northwards, interspersed with narrow heavily incised minor creek-lines. Geology where observed was typically of a coarse or pebbly sandstone, and which may limit the potential for grinding groove in many parts of this portion of the construction area. Commonly these areas were being used for pastoral activity and dominated by low-lying grasses. There were, however, frequent isolated remnant trees, and occasional thin woodland, often on discrete hill tops. Such vegetation did not appear to be well established and may reflect regrowth in areas left fallow in the recent past.

SU 8 was only partially accessible during the field survey due to landowner access restrictions at the time of field investigations (Plates 8.15 and 8.16); however, the surveyed area was comparable with SU 9 (Plate 8.17 and Plate 8.18). These SUs were found in moderate to steep undulating hills, more extensive than SU7, and indicative of a transition to the steeper terrain of Goulburn River National Park to the east and south of this area. The steep nature of many of these slopes limited soil profiles, and geological outcropping was frequently encountered. Vegetation was typically low-lying grassland, with cattle often observed. This was interspersed with discrete established trees, as well as denser low-lying shrubs along narrow minor creek tributaries. Elevation increased northwards, with SU 9 probably reflecting some of the highest points reached across the construction area, and good views to the east and south were documented.

SU 10, west of Merotherie Energy Hub, was dominated by numerous minor tributaries that ran from elevation to the south into Brown's and White Creek to the north (Plate 8.19 and Plate 8.20). The SU was typically flat and gently undulating, and often water-logged and/or swampy. Vegetation was low-lying and included reeds and other hydrophilic species. Of interest was the interface between these low-lying areas, and the footslopes of gentle to moderate heavily vegetated elevation at Barneys Reef to the south. Cultural materials were consistently found along this interface and suggest past populations may have been occupying the footslopes while utilising the surrounding swampy environments and creek-lines. The construction area only minimally intersects these footslopes.

SU 11 runs down to the west of the elevated areas encompassed by Barneys Reef, but in contrast to SU 10, reflects gentle undulating hills (Plate 8.21 and Plate 8.22). Geological outcropping and exposures were consistently evident across the SU, and especially in proximity to the moderate hills at Barneys Reef. To the south, terrain became flatter and was associated with the wide valley or floodplains associated with Tallawang Creek. Similarly, soil profiles here appeared shallow, with heavy clay subsoils, especially on numerous farm tracks, frequently encountered on the surface. As with SU 10, numerous stone artefacts were encountered on exposures around Tallawang Creek and the Barneys Creek elevations and suggest the interface of this resource zone was a focus in the past. Activities here were primarily pastoral and dominated by dense low-lying grasses interspersed with occasional disparate trees.

The eastern end of SU 12 is comparable with SU 10, but elevation increases slightly to the west, and could be characterised as gentle to moderate undulating hills (Plate 8.23 and Plate 8.24). The western portion of this survey unit within Tuckland State Forest became increasingly rugged and two rockshelter sites were encountered (SNI-RS03 and SNI-RS04) within the areas of steep relief. Outside of this area, the SU was characterised by pastoralism with dense low-lying grasses. However, numerous areas included thin to increasingly dense shrubs, especially along minor creek corridors and on hill tops. This typically appeared to be regrowth, rather than remnant vegetation. Where observed, soil profiles appeared shallow, with a 20–30 cm topsoil over-lying heavy clay subsoils.

SU 13 encompassed the Elong Elong Hub and was characterised by gentle undulating hills (Plate 8.25 and Plate 8.26). Of note was the presence of Laheys Creek, running parallel but outside the eastern boundary of the energy hub. Here, the SU was typically flat for 200–300 m around the creek, and within which dense cultural materials (SNI-AS01) were encountered. A previously documented grinding groove site within the creek – and just outside the construction area – was also validated. However, the majority of the SU was dominated by hill slopes subject to both pastoral activities and cultivation. The latter ensured good visibility in numerous parts of the SU and indicated a topsoil some 20–30 cm in depth based on plough marks and rills. Vegetation was typically low-lying, with thin woodland on small elevations not subject to existing activity. There was significant evidence of rock removal and relocation from the cultivation activities across this SU, and numerous piles of stones were observed – none were considered of Aboriginal origin.

SU 14 extended west of SU 13 and continued to be undulating hills usually subject to pastoralism and cultivation (Plate 8.27 and Plate 8.28). This SU was however interrupted by Sandy Creek, which was a deeply incised major water course in this locale. Here, the creek was situated some 2 m below the surrounding landscape and revealed a shallow duplex soil along its banks. Sandstone exposures were also evident along this and other nearby creek-lines, and the densest concentration of grinding grooves (SNI-GG3) was encountered near tributaries of Prospect Creek. There were numerous exposures found in the vicinity of these various creek-lines, and a number of sites were documented. As predicted in Chapter 7, both Laheys and Sandy Creek appear to have been a focus of past activities.

SU 15 was a small transect that encompassed a proposed construction camp at Neeley's Lane, near the southern end of SU 9 (Plate 8.29 and Plate 8.30). However, the majority of this SU was situated on low-lying flats or floodplains associated with Ironbark Creek. The creek was incising to ~1 m below the surrounding landscape. This demonstrated both a shallow duplex soil profile, as well as sandstone exposures in the creek channel. Vegetation was typically low-lying grass, with occasional trees and shrubs. To the north, the landscape changes to moderate hills consistent with SU 9.

Overall, the archaeological field survey supported the findings of the desktop information and demonstrated that the vast majority of the construction area consisted of gentle to moderate undulating hills typically subject to various pastoral and/or cultivation activities. In the north-east and south-east of the construction area, the terrain becomes increasingly steep, with only the south-east exhibiting steep relief conducive to rockshelter formation. The construction area typically follows wide and relatively floodplain landforms through this locale and generally avoids such areas of steep relief.

Soil profiles, where encountered, were universally shallow, and in many locations the under-lying geology was observed. Across the construction area, incised creeks or ploughed fields typically revealed a 20–30 cm topsoil – usually a clay loam – was present above under-lying heavy clay subsoils or immediately onto geological substrate. Sandstone exposures and outcroppings were frequently observed and especially within many of the creek-lines, and its prevalence may explain in part the abundance of grinding grooves documented in the region.

With the exception of the south-east where the construction area intersects with active coal mining, past disturbance appears to have been limited and generally constrained to de-vegetation. Few remnant trees or vegetation was observed across the construction area. There are localised impacts usually in the form of access tracks and dams, but overall substantive landscape change was not evident. In the case of dams, it was considered that a significant portion of the smaller (1st order) and ephemeral creek-lines were formed or heavily modified as a result of such water management. In most cases, where creeks are not named, it is considered that they are more probably a post-Contact creation either directly from water management or indirectly as a result of de-vegetation and increased erosion.

**Table 8.1** Summary of survey effort

Unit #	Length (m)	Area (m <sup>2</sup> )	Landform	Exposure (%)	Visibility (%)	Effective coverage		Aboriginal sites identified	
						Area (m <sup>2</sup> )	% of construction area	Number of sites	Site IDs
SU1	31,303	2,593,563	Moderate undulating hills and small open depressions	10	30	77,807	3	6	SNI-AS63, SNI-AS64, SNI-AS66, SNI-CMT03, SNI-CMT11, SNI-RA01
SU2	72,120	5,284,320	Modified landforms set within floodplains	20	40	145,817	8	7	SNI-AS08, SNI-AS09, SNI-AS10, SNI-AS11, SNI-IF13, SNI-IF14, SNI-PAD01
SU3	105,240	6,144,299	Open depressions with intermittent gently undulating hills	10	30	84,855	3	22	SNI-AS12, SNI-AS13, SNI-AS14, SNI-AS27, SNI-AS31, SNI-AS32, SNI-AS33, SNI-AS34, SNI-AS61, SNI-CMT01, SNI-GG13, SNI-IF02, SNI-IF16, SNI-IF17, SNI-IF20, SNI-IF34, SNI-IF35, SNI-IF36, SNI-IF37, SNI-IF38, SNI-RS01, SNI-RS02
SU4	139,344	7,686,953	Open depressions with intermittent gently undulating hills	10	80	380,665	8	26	SNI-AS05, SNI-AS06, SNI-AS07, SNI-AS29, SNI-AS62, SNI-AS75, SNI-CMT02, SNI-CMT13 SNI-GG02, SNI-GG03, SNI-GG04, SNI-GG05, SNI-GG06, SNI-GG07, SNI-GG08, SNI-GG09, SNI-GG10, SNI-GG15, SNI-IF09, SNI-IF10, SNI-IF11, SNI-IF12, SNI-IF15, SNI-IF32, SNI-IF33, SNI-Q01
SU5	3,788	1,678,510	Open depressions with intermittent gently undulating hills	20	40	509,985	8	2	SNI-AS45, SNI-IF49
SU6	32,372	698,946	Moderate undulating hills and small open depressions	10	10	4,452	1	7	SNI-AS39, SNI-GG14, SNI-IF43, SNI-IF44, SNI-IF45, SNI-IF57, SNI-SA01
SU7	47,670	1,211,029	Moderate undulating hills and small open depressions	10	40	26,408	4	1	SNI-IF28
SU8	16,503	1,642,852	Open depressions with intermittent gently undulating hills	10	20	22,644	2	3	SNI-AS74, SNI-CMT07, SNI-CMT08
SU9	37,608	1,114,367	Moderate undulating hills and small open depressions	10	10	9,747	1	4	SNI-AS23, SNI-CMT06, SNI-GG12, SNI-IF29

**Table 8.1** Summary of survey effort

Unit #	Length (m)	Area (m <sup>2</sup> )	Landform	Exposure (%)	Visibility (%)	Effective coverage		Aboriginal sites identified	
						Area (m <sup>2</sup> )	% of construction area	Number of sites	Site IDs
SU10	18,657	2,616,628	Open depressions with intermittent gently undulating hills	10	40	44,575	4	12	SNI-AS04, SNI-AS41, SNI-AS42, SNI-AS43, SNI-AS57, SNI-AS58, SNI-GG01, SNI-IF01, SNI-IF07, SNI-IF08, SNI-IF46, SNI-IF56
SU11	48,395	1,126,087	Open depressions with intermittent gently undulating hills	20	30	48,538	6	24	SNI-AS15, SNI-AS16, SNI-AS17, SNI-AS18, SNI-AS19, SNI-AS24, SNI-AS25, SNI-AS26, SNI-AS46, SNI-AS52, SNI-AS60, SNI-IF18, SNI-IF19, SNI-IF21, SNI-IF22, SNI-IF23, SNI-IF24, SNI-IF30, SNI-IF31, SNI-IF52, SNI-IF54, SNI-IF55, SNI-IF58, SNI-NR01
SU12	51,249	3,935,500	Open depressions divided by moderate undulating hills	10	20	52,487	2	26	SNI-AS35, SNI-AS36, SNI-AS37, SNI-AS38, SNI-AS40, SNI-AS44, SNI-AS49, SNI-AS50, SNI-AS51, SNI-AS54, SNI-AS55, SNI-AS56, SNI-AS59, SNI-CMT09, SNI-CMT14, SNI-IF39, SNI-IF40, SNI-IF41, SNI-IF42, SNI-IF47, SNI-IF48, SNI-IF50, SNI-IF51, SNI-PAD02, SNI-RS03, SNI-RS04
SU13	115,829	2,961,848	Gently undulating hills and small open depressions	10	30	88,855	3	16	SNI-AS01, SNI-AS02, SNI-AS03, SNI-AS28, SNI-AS30, SNI-AS47, SNI-AS48, SNI-AS67, SNI-AS68, SNI-AS72, SNI-AS73, SNI-IF03, SNI-IF04, SNI-IF05, SNI-IF06, SNI-IF62
SU14	73,937	806,982	Gently undulating hills and small open depressions	20	40	50,341	8	25	SNI-AS20, SNI-AS21, SNI-AS22, SNI-AS53, SNI-CMT04, SNI-CMT05, SNI-CMT12, SNI-GG11, SNI-IF25, SNI-IF26, SNI-IF27, SNI-IF53, SNI-IF59, SNI-IF61, SNI-NR02
SU15	4,368	475,083	Floodplain	20	30	28,505	6	2	SNI-AS65, SNI-IF60
<b>Total</b>	<b>798,382</b>	<b>39,976,968</b>				<b>1,966,409</b>	<b>4</b>	<b>183</b>	
Average	53,225	2,665,131		13	33	131,094	4.5		



**Plate 8.1** Gently rolling hills and undulating flats typical of SU 1, view north



**Plate 8.2** An isolated stand of trees in SU 1, mature but likely not of advanced age, view east



**Plate 8.3** A bend of Wilpinjong Creek (located right of frame), showing the deeply incised nature of the waterway in SU 2, view west



**Plate 8.4** Example of disturbance associated with mining activities in SU 2, view north



**Plate 8.5** Gently undulating hills and plains to the east within SU 3, view north



**Plate 8.6** Hilly terrain typical of the eastern portion of SU 3, near where rockshelters were identified, view north



**Plate 8.7** Gently rolling hills and undulating flats typical of SU 4, view north



**Plate 8.8** Instance of gully erosion in SU 4, likely a result of vegetation clearing, demonstrating the shallow silty clay topsoil of the locale



**Plate 8.9** The gently undulating hills of SU5, view west



**Plate 8.10** Gentle hills onto extensive floodplains pictured in the background, typical of SU 5, view east



**Plate 8.11** Steeply incised drainage lines typical of SU 6, view west. Exposures were more common in these locales, due to rill and sheetwash erosion



**Plate 8.12** Moderately undulating hills typical of SU 6, view north



**Plate 8.13** Moderately undulating hills typical of SU 7, view east. Visibility was very poor in parts of this survey unit due to long grasses



**Plate 8.14** The extensive floodplains associated with the Talbragar River in the southern portion of SU 7, view south



**Plate 8.15** Undulating flats typical of the western portion of SU 8, view north east



**Plate 8.16** Moderately undulating hills typical of SU 8, particularly to the east, view east



**Plate 8.17** The more moderately inclined terrain of SU9, view east towards the deeply incised Four Mile Creek



**Plate 8.18** The more hilly and elevated terrain typical of the northern portion of SU 9, view north



**Plate 8.19** The floodplains typical of SU 10, view east. The conditions at the time of survey in this locale were marshy and boggy, preventing access to some areas



**Plate 8.20** The extensive floodplains associated with SU 10, view west



**Plate 8.21** Gentle slopes and undulating plains of SU 11, view east. The elevated areas of Barneys Reef are shown in the background



**Plate 8.22** The flat floodplains of Tallawang Creek (SU 11), shown here by the tree lined vegetation corridor in the background, view north



**Plate 8.23** The gentle to moderately undulating landscape of SU 12, view east. Tucklan Creek is shown here by the tree lined vegetation corridor in the background



**Plate 8.24** Example of flooding in SU 12, reflecting the extremely wet conditions at the time of survey; this was compounded by the relatively flat nature of many parts of the construction area



**Plate 8.25** The rocky stream bed of Laheys Creek (SU 13), view east.



**Plate 8.26** Ploughed fields typical of SU 13, view west, with a gently inclined knoll developing to the left of frame



**Plate 8.27** The deeply incised creek-line of Sandy Creek within SU 14, flooded at the time of survey. View north



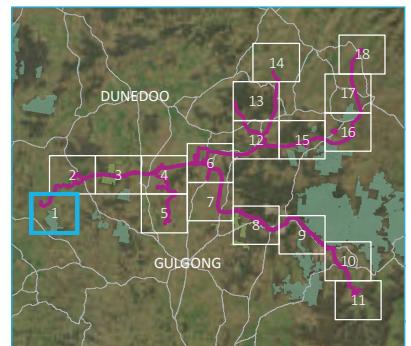
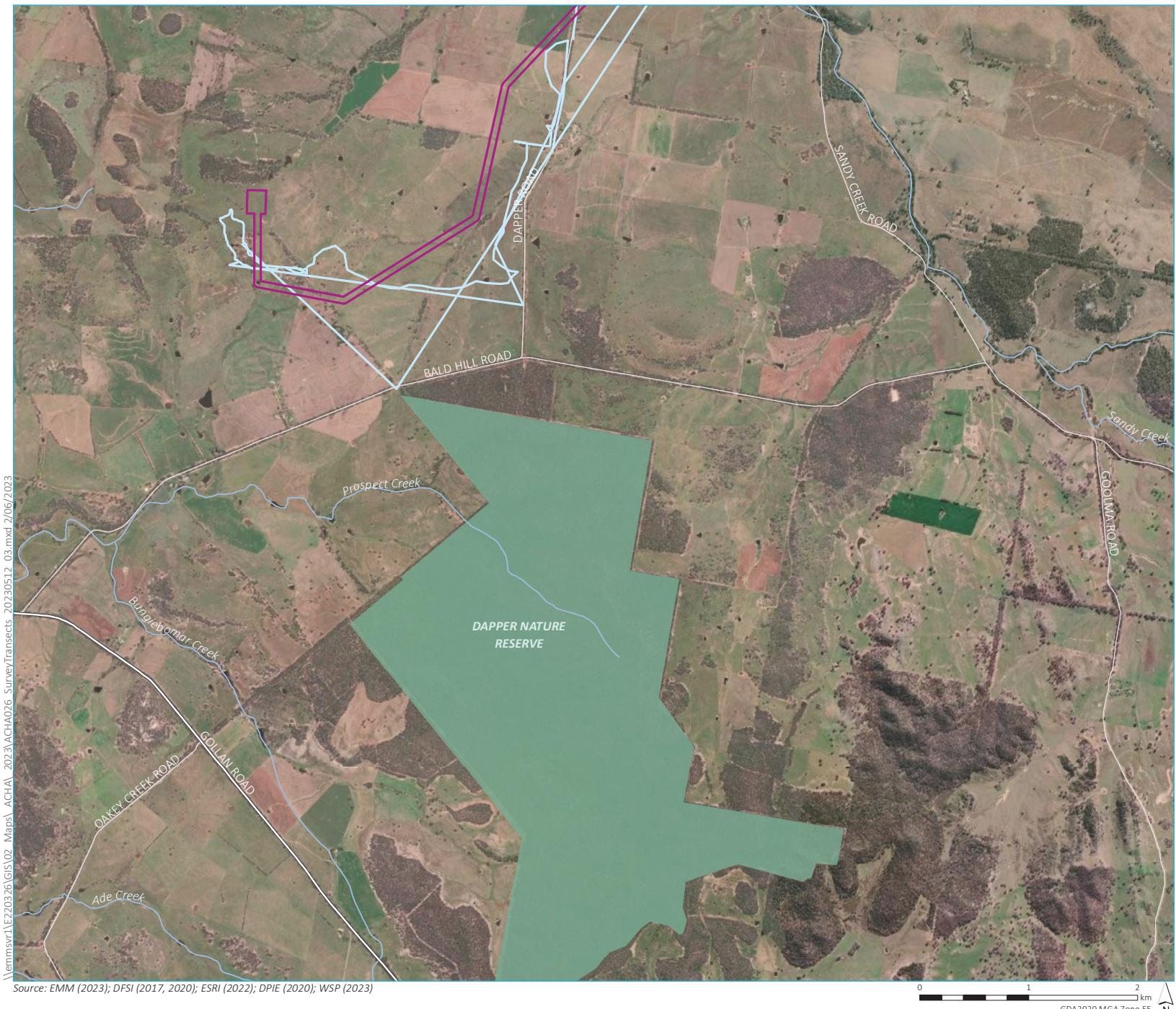
**Plate 8.28** Undulating hills to the far west of the construction area within SU 14, view east



**Plate 8.29** The deeply incised creek-line of Ironbark Creek (pictured right of frame), showing the good exposures where the soils have been subject to sheetwash, view north west

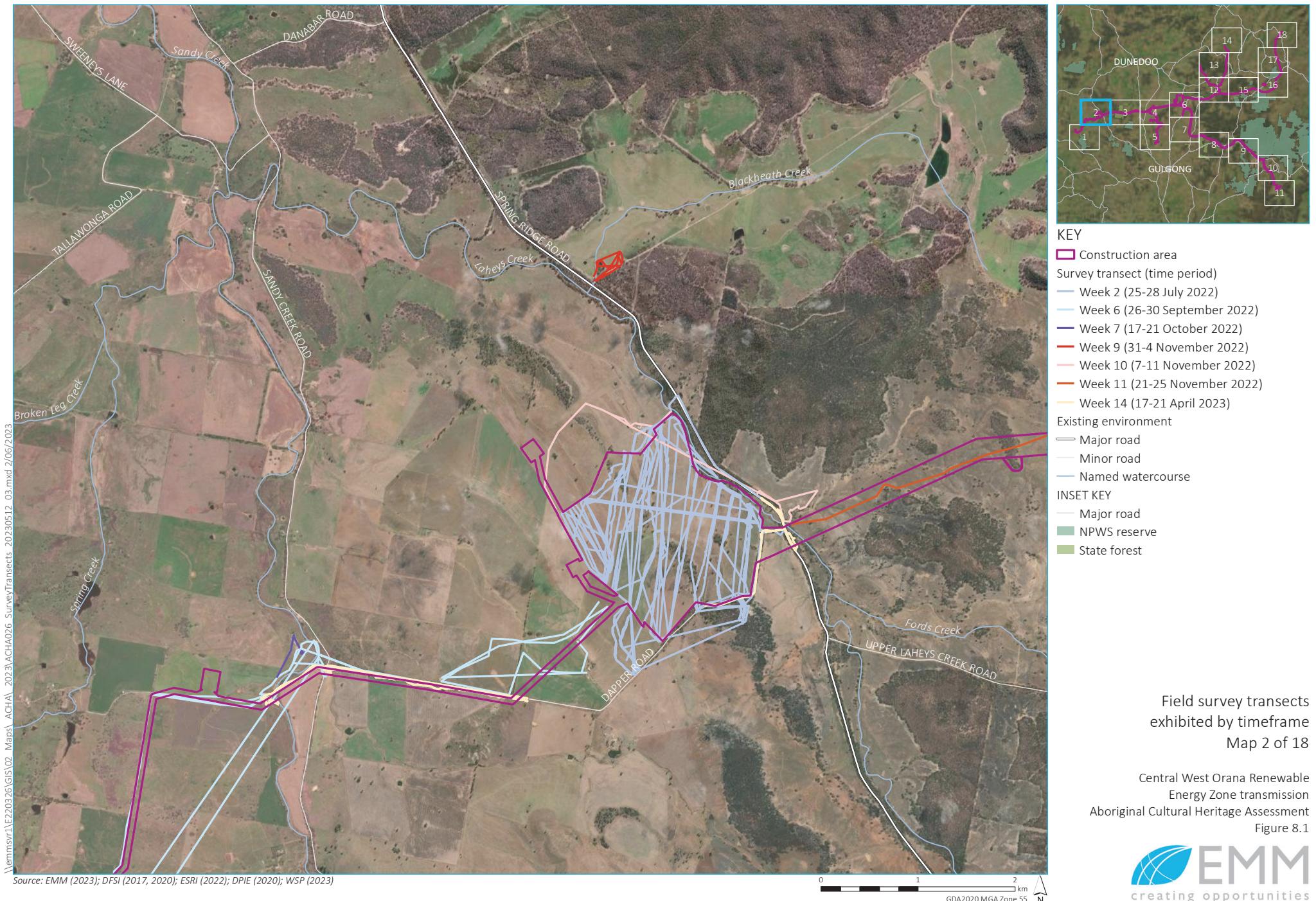


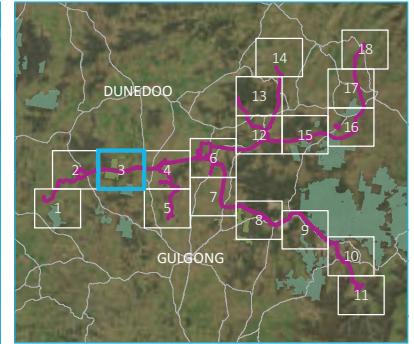
**Plate 8.30** The low lying flats typical of the majority of SU 15, view north



Field survey transects  
exhibited by timeframe  
Map 1 of 18

Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 8.1





#### KEY

- Construction area
- Survey transect (time period)
  - Week 7 (17-21 October 2022)
  - Week 9 (31-4 November 2022)
  - Week 11 (21-25 November 2022)
  - Week 14 (17-21 April 2023)

#### Existing environment

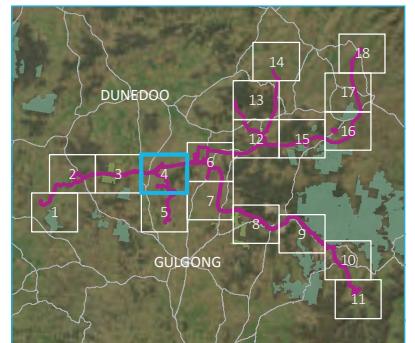
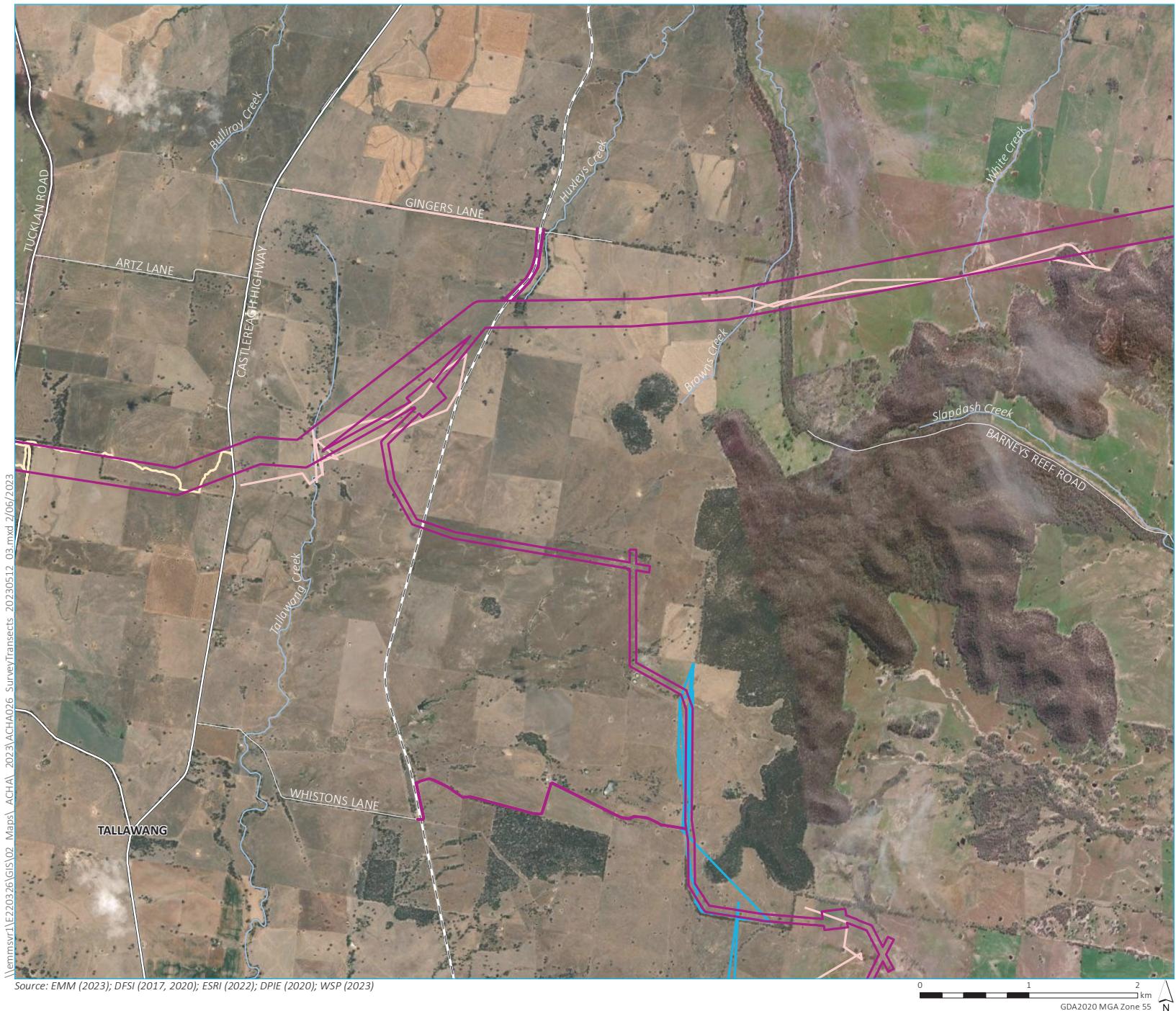
- Major road
- Minor road
- Named watercourse
- NPWS reserve
- State forest

#### INSET KEY

- Major road
- NPWS reserve
- State forest

Field survey transects  
exhibited by timeframe  
Map 3 of 18

Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 8.1



#### KEY

■ Construction area  
■ Survey transect (time period)

— Week 5 (19-24 September 2022)  
■ Week 10 (7-11 November 2022)  
■ Week 14 (17-21 April 2023)

#### Existing environment

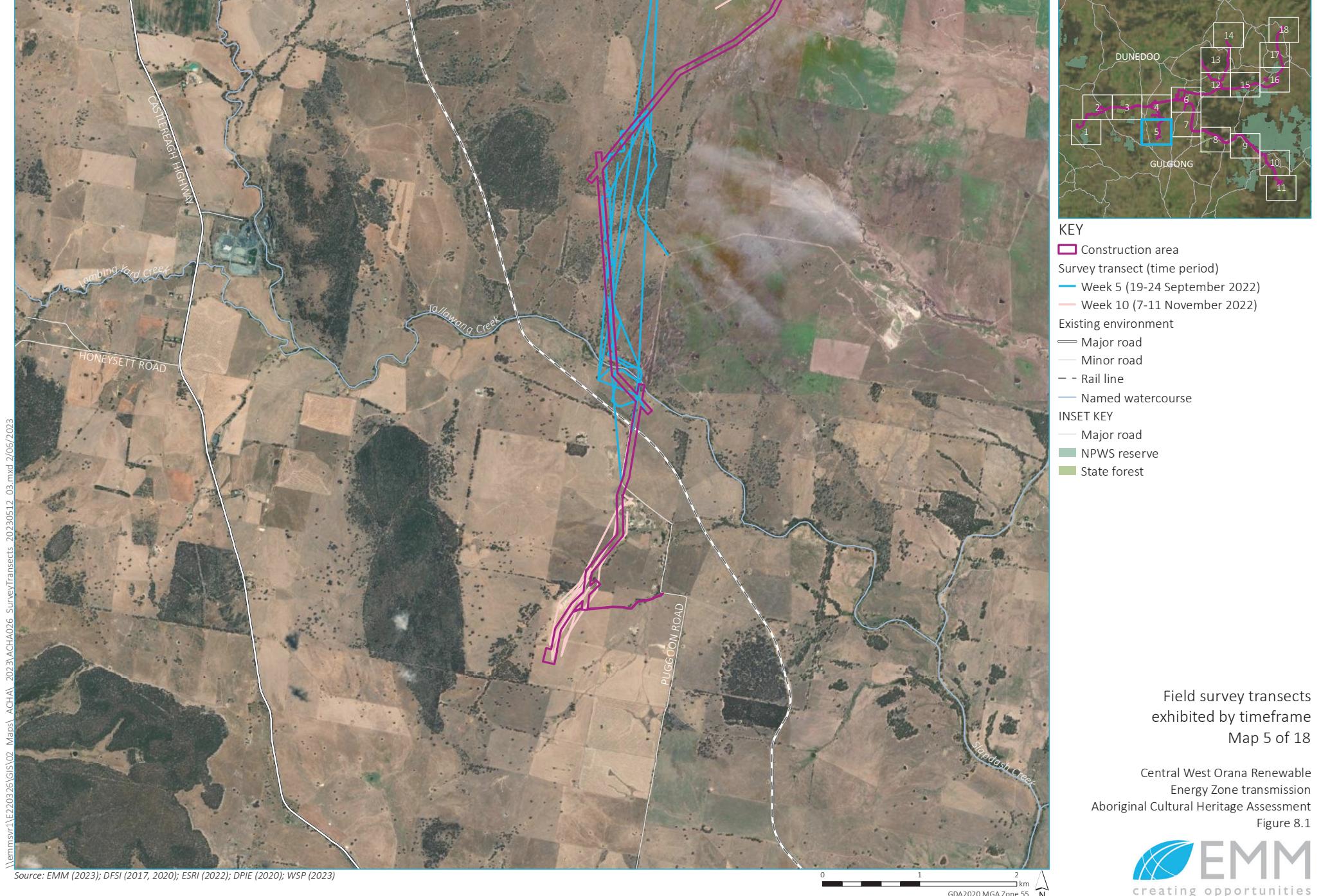
— Major road  
— Minor road  
- - Rail line  
— Named watercourse

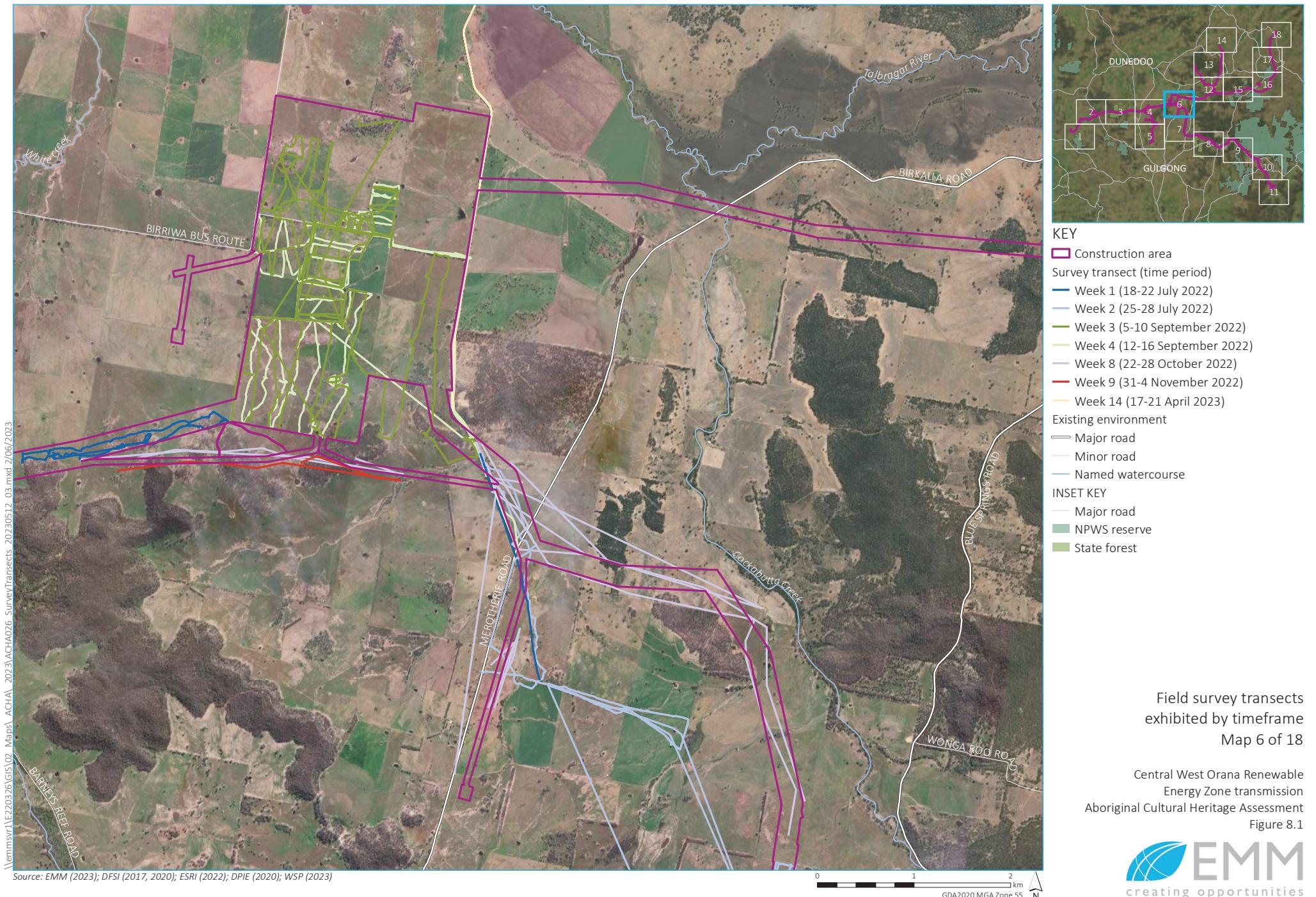
#### INSET KEY

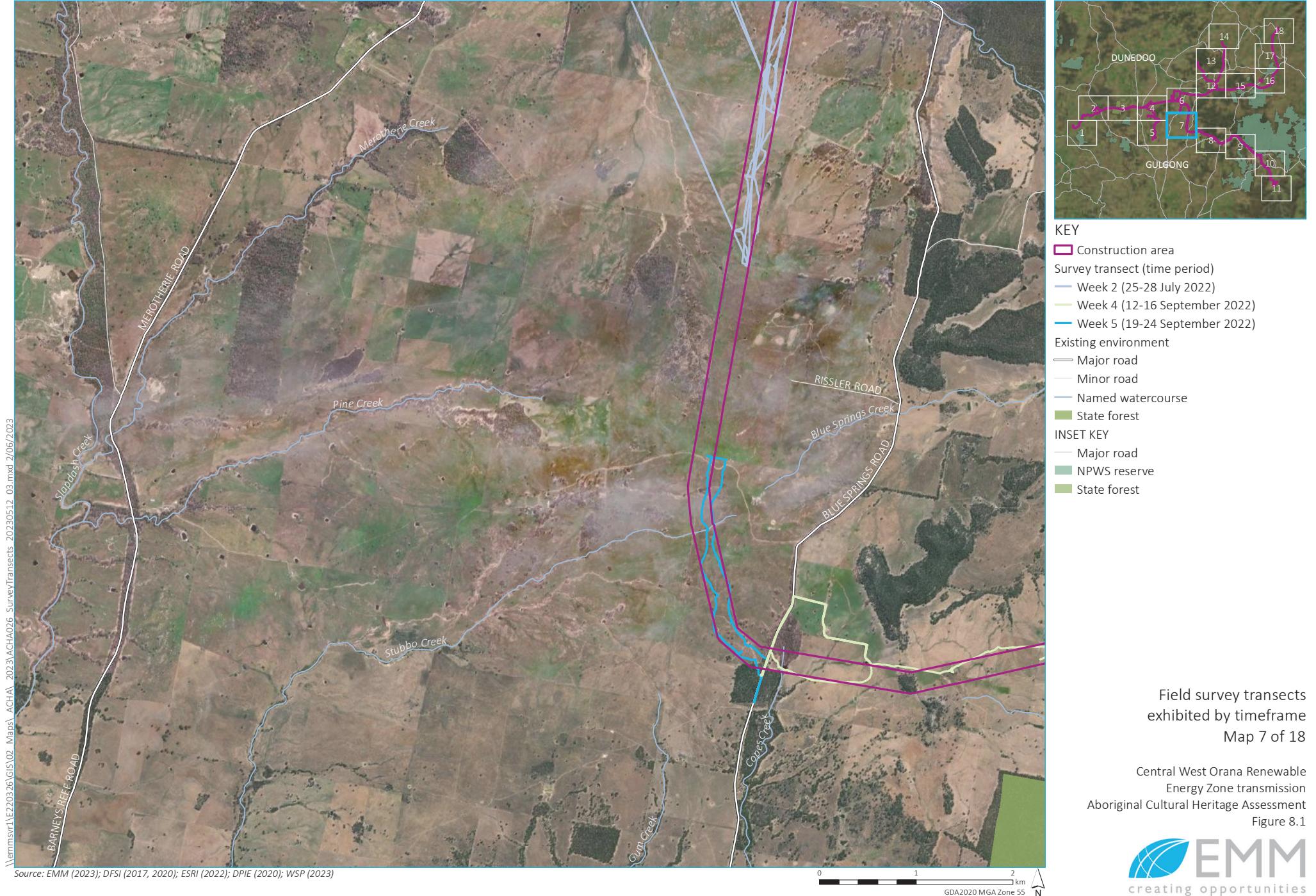
— Major road  
■ NPWS reserve  
■ State forest

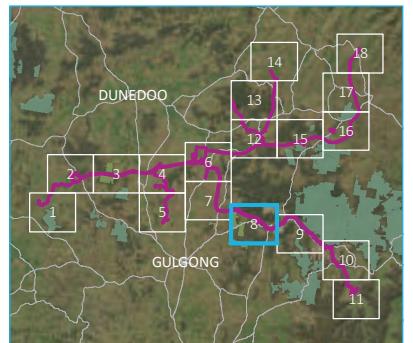
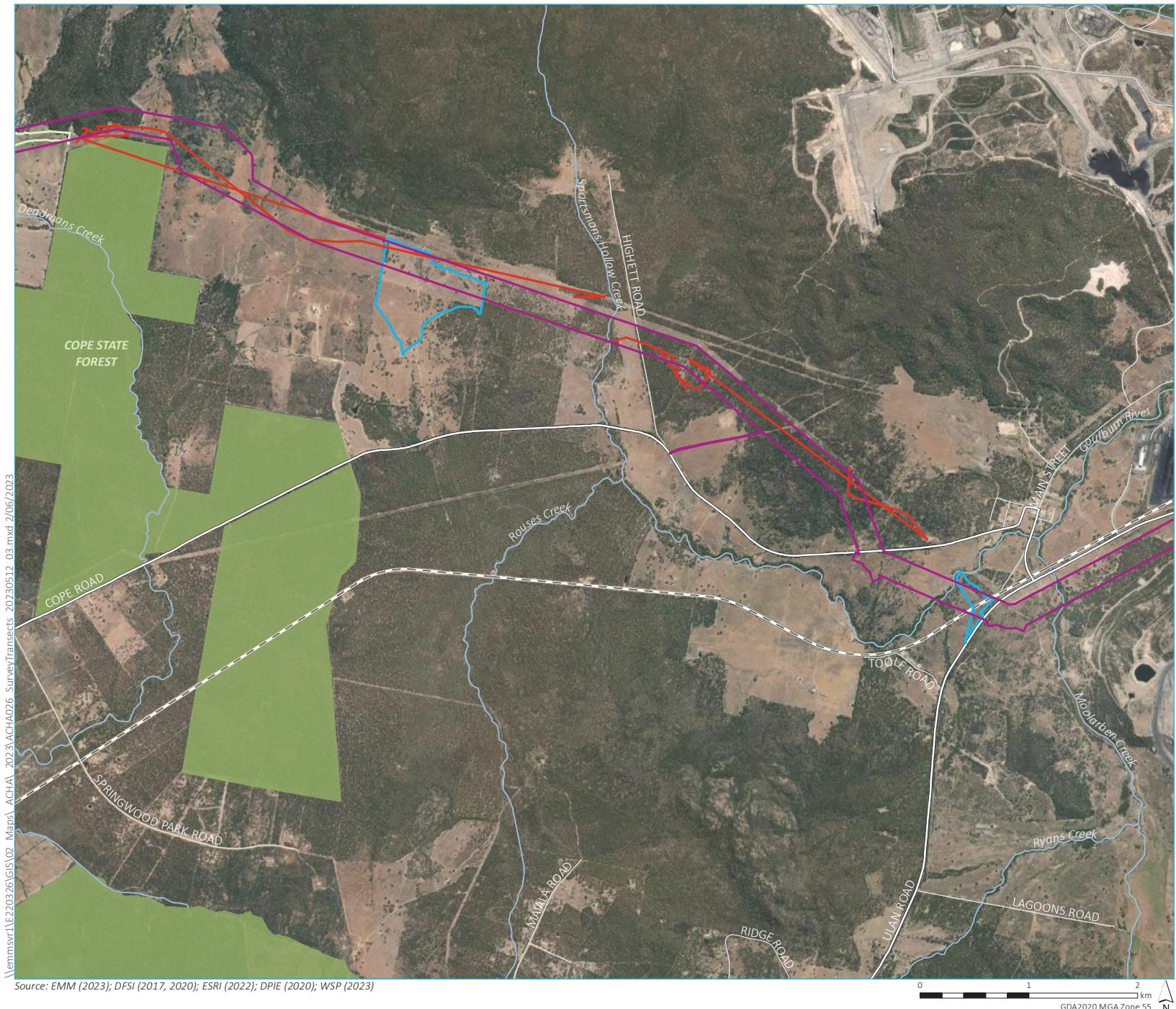
Field survey transects  
exhibited by timeframe  
Map 4 of 18

Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 8.1









#### KEY

■ Construction area  
Survey transect (time period)

- Week 4 (12-16 September 2022)
- Week 5 (19-24 September 2022)
- Week 9 (31-4 November 2022)

#### Existing environment

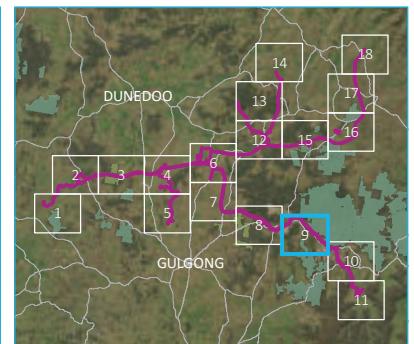
- Major road
- Minor road
- - Rail line
- Named watercourse
- State forest

#### INSET KEY

- Major road
- NPWS reserve
- State forest

Field survey transects  
exhibited by timeframe  
Map 8 of 18

Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 8.1

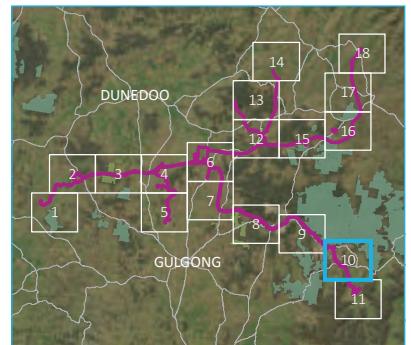
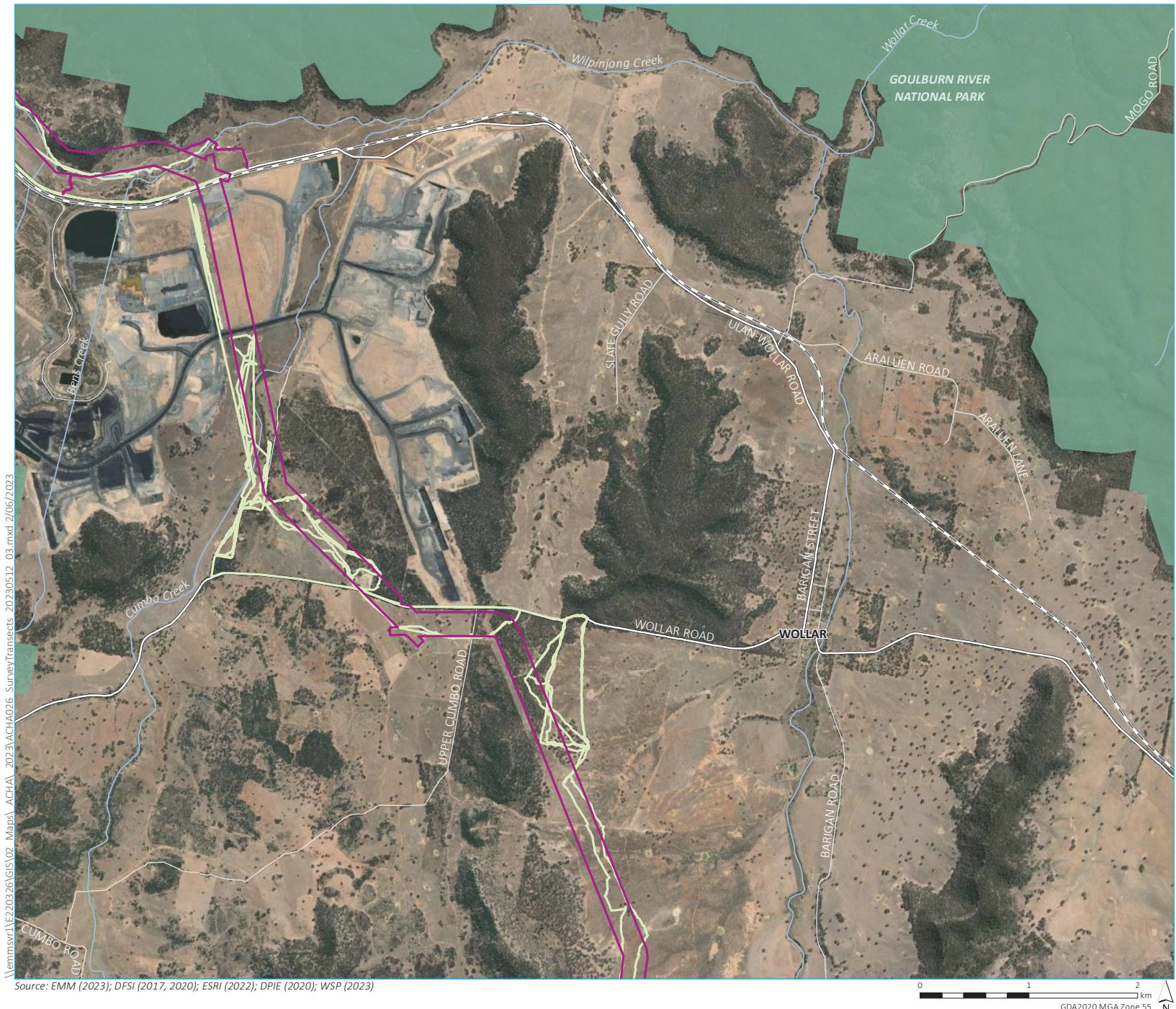


#### KEY

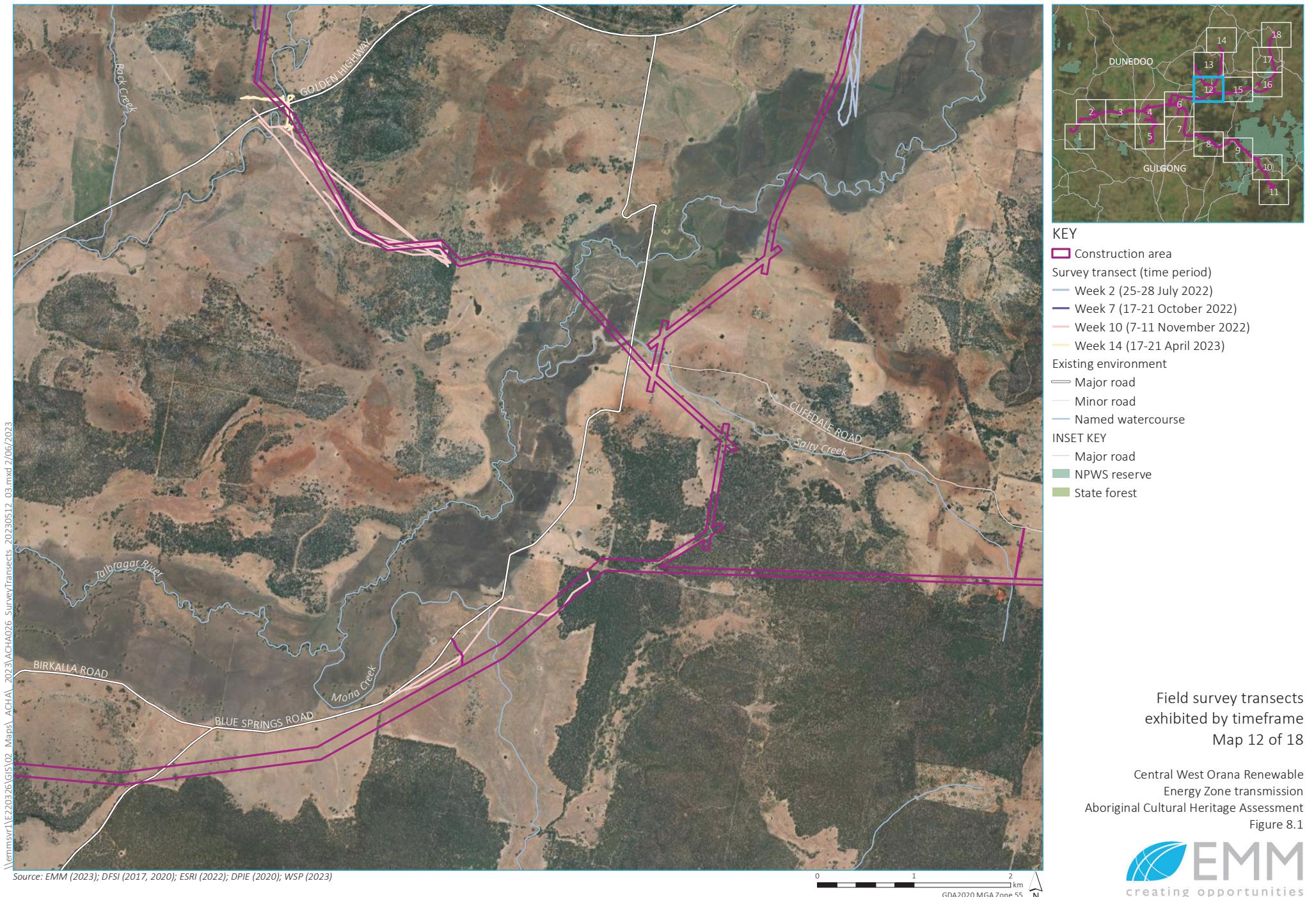
- Construction area
- Survey transect (time period)
  - Week 4 (12-16 September 2022)
- Existing environment
- Major road
- Minor road
- - Rail line
- Named watercourse
- NPWS reserve
- INSET KEY
- Major road
- NPWS reserve
- State forest

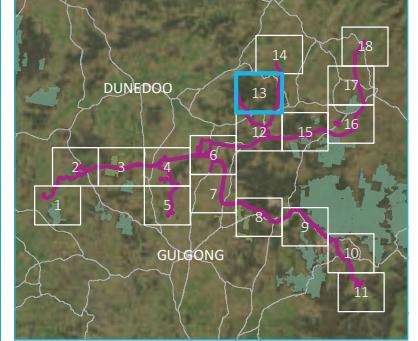
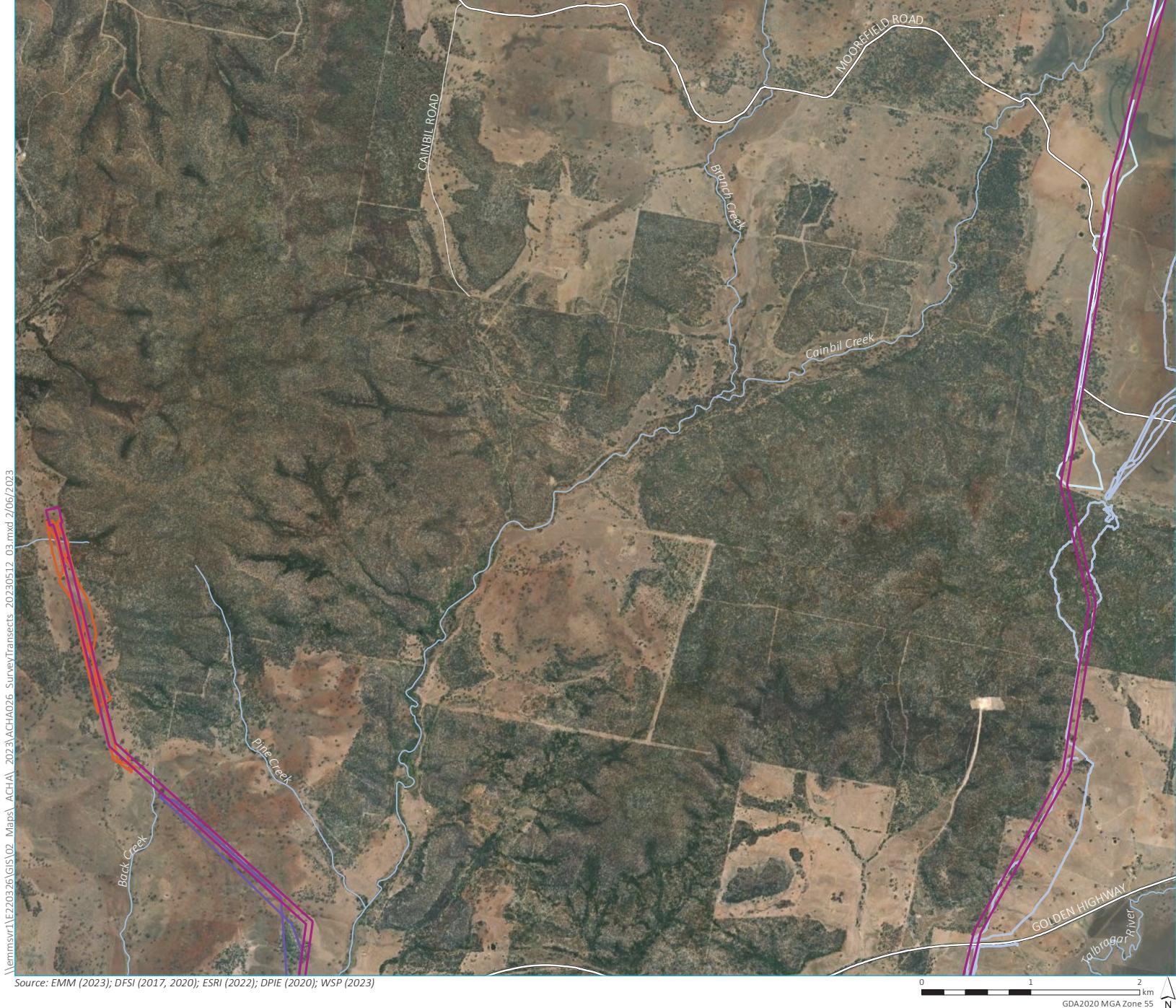
Field survey transects  
exhibited by timeframe  
Map 9 of 18

Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 8.1



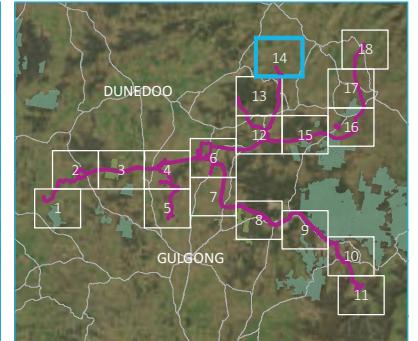






Field survey transects  
exhibited by timeframe  
Map 13 of 18

Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 8.1



#### KEY

■ Construction area  
Survey transect (time period)

— Week 6 (26-30 September 2022)

Existing environment

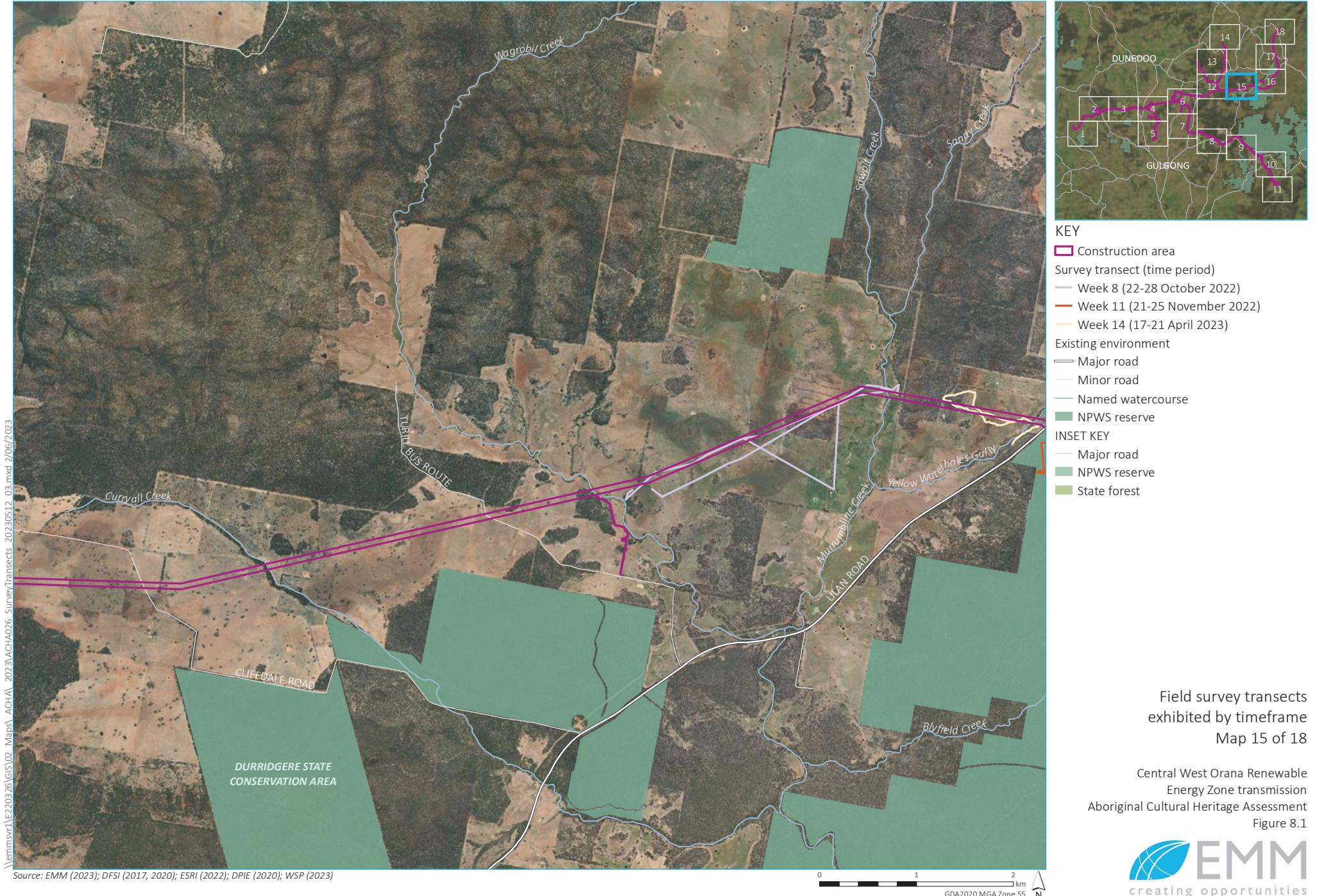
- Major road
- Minor road
- - Rail line
- Named watercourse

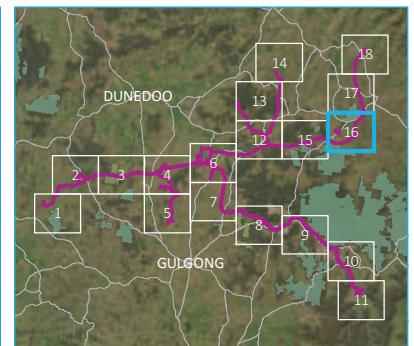
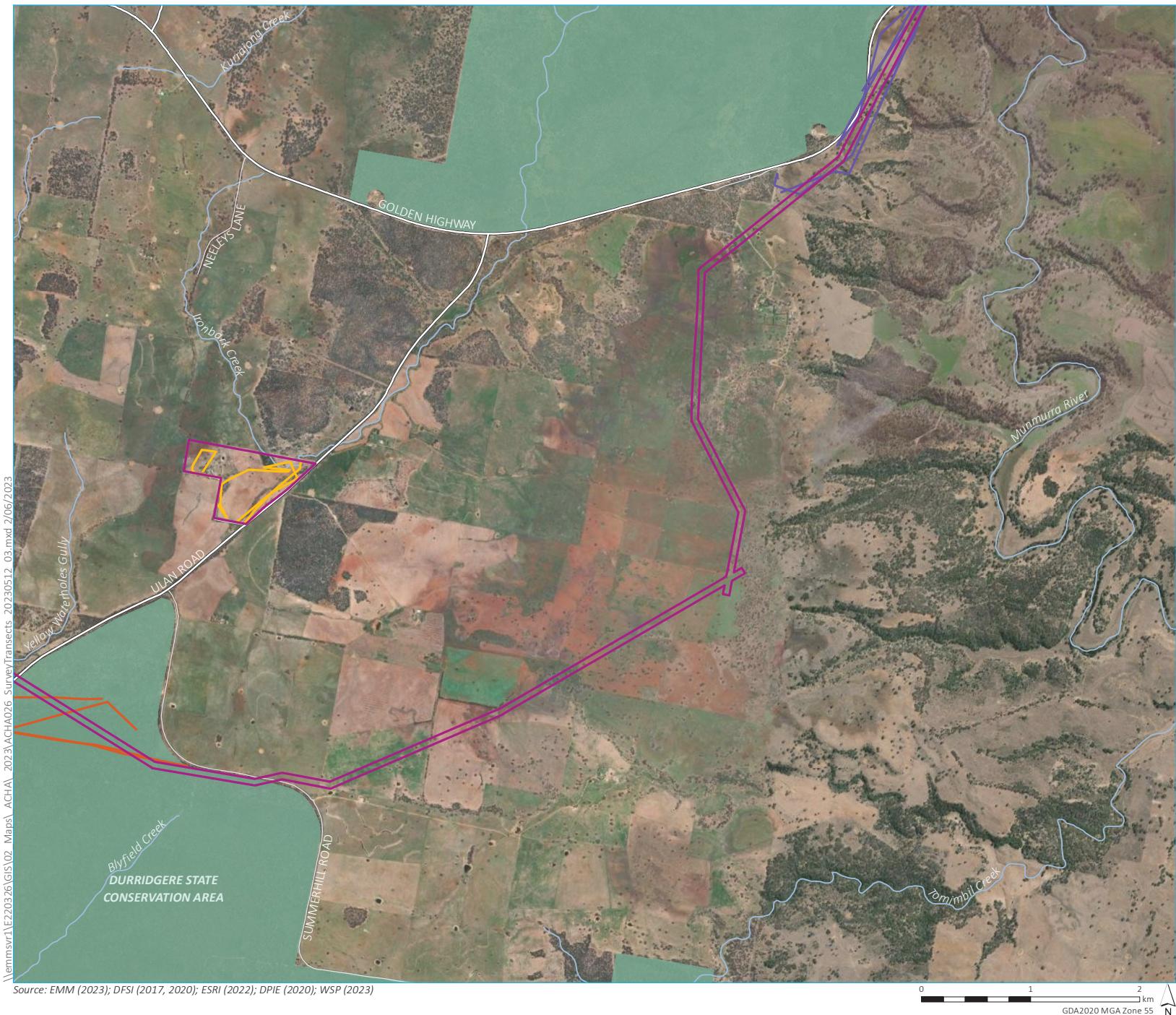
#### INSET KEY

- Major road
- NPWS reserve
- State forest

Field survey transects  
exhibited by timeframe  
Map 14 of 18

Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 8.1





#### KEY

- Construction area
- Survey transect (time period)
  - Week 7 (17-21 October 2022)
  - Week 11 (21-25 November 2022)
  - Week 13 (20-24 March)

#### Existing environment

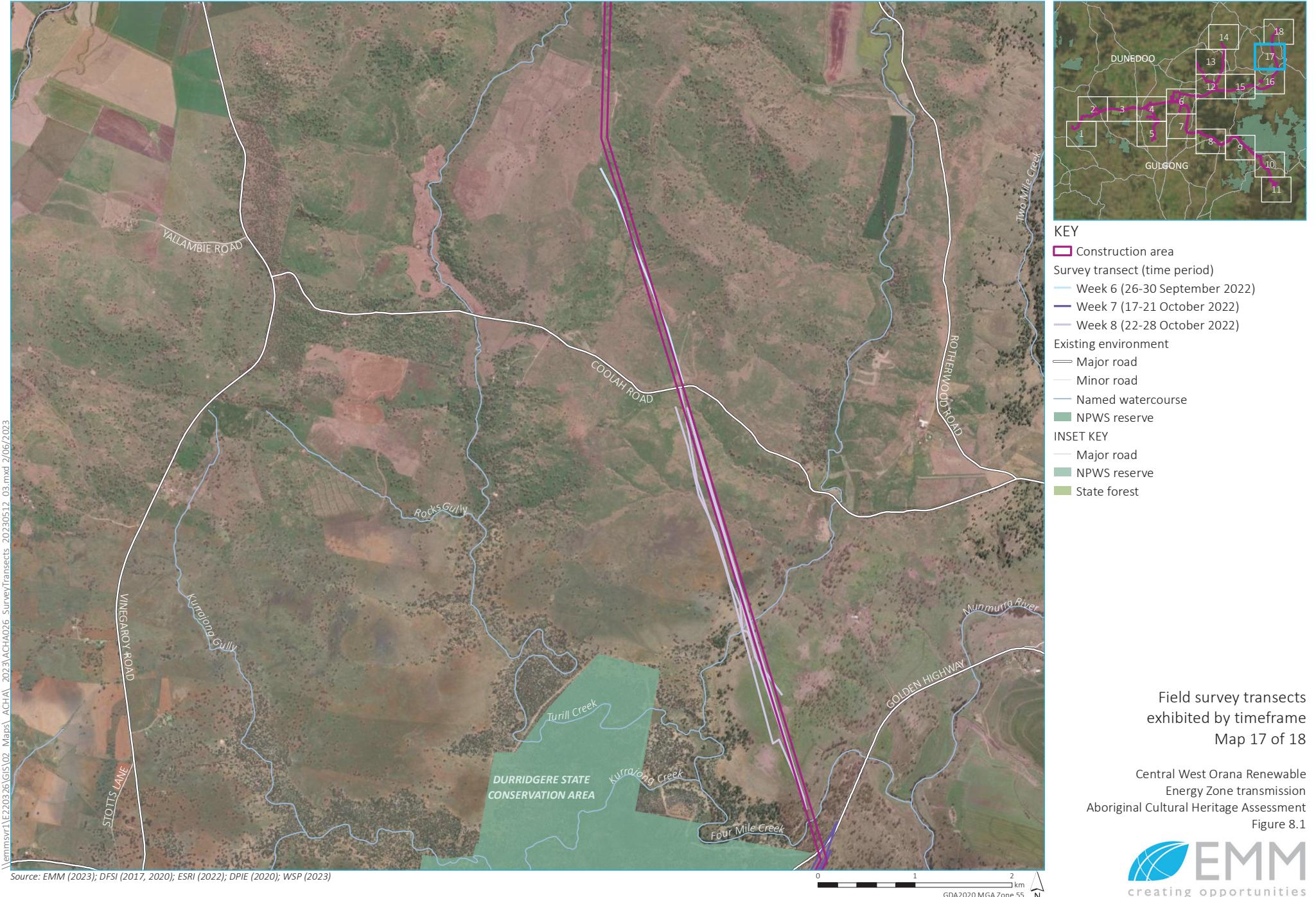
- Major road
- Minor road
- Named watercourse
- NPWS reserve

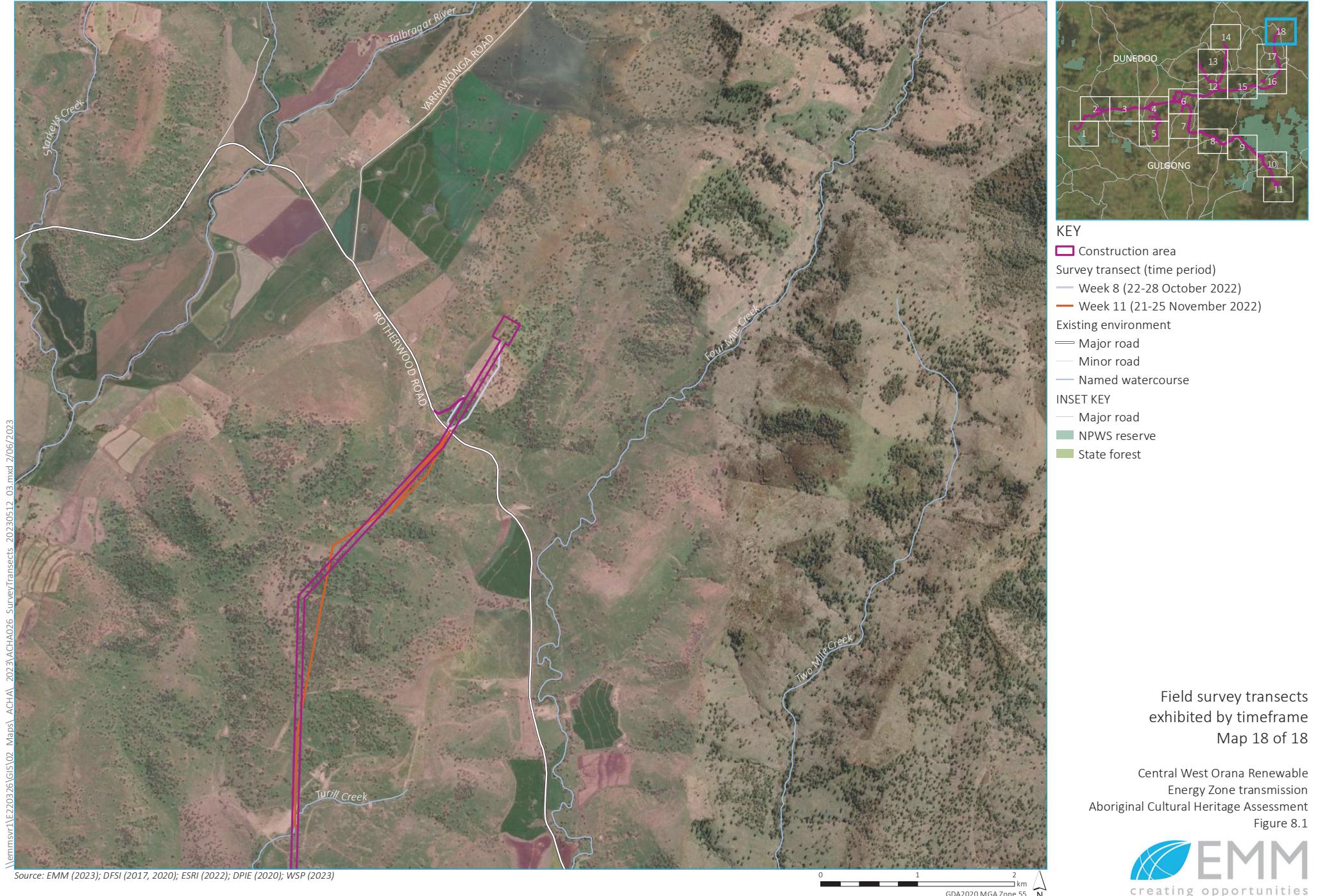
#### INSET KEY

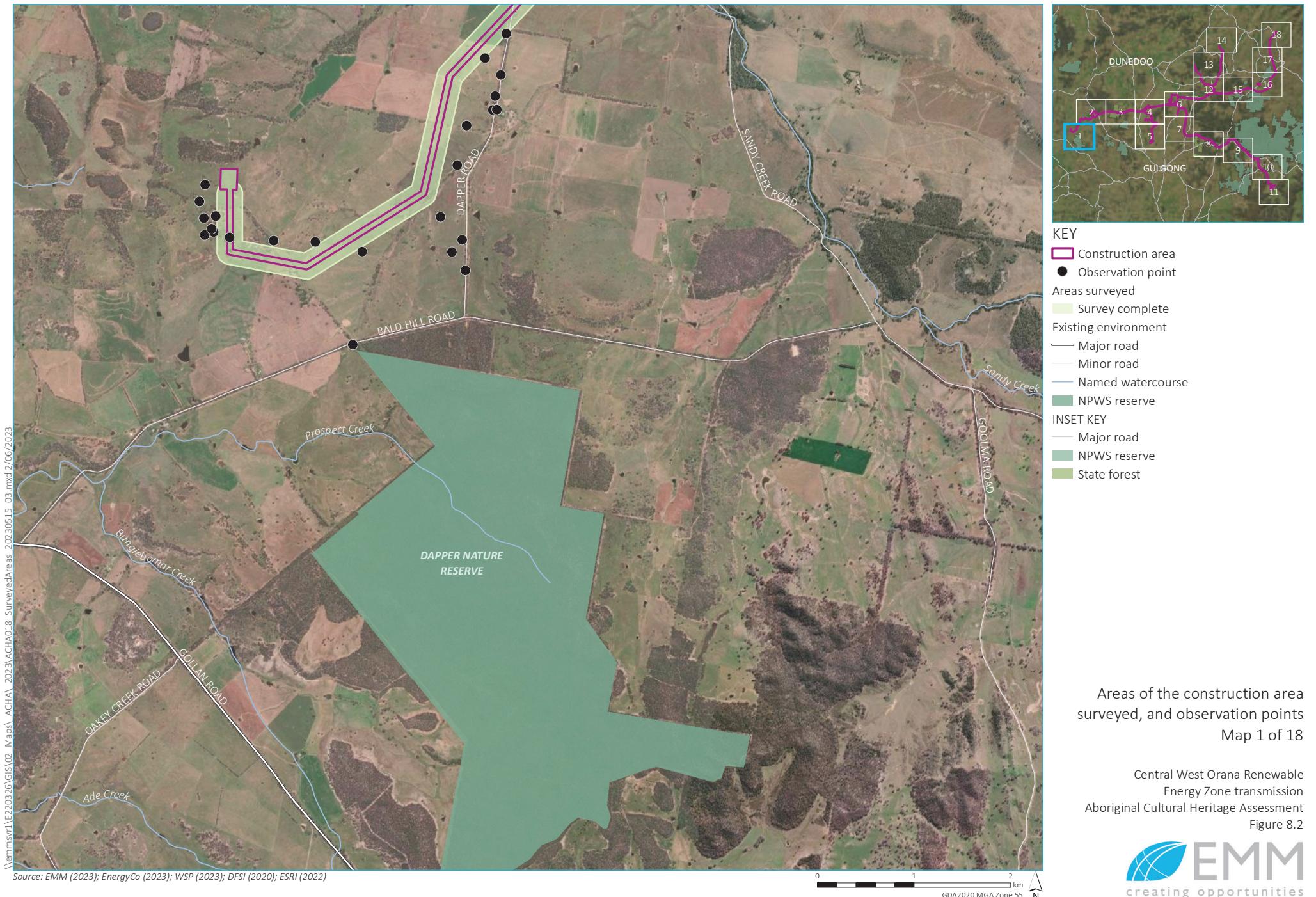
- Major road
- NPWS reserve
- State forest

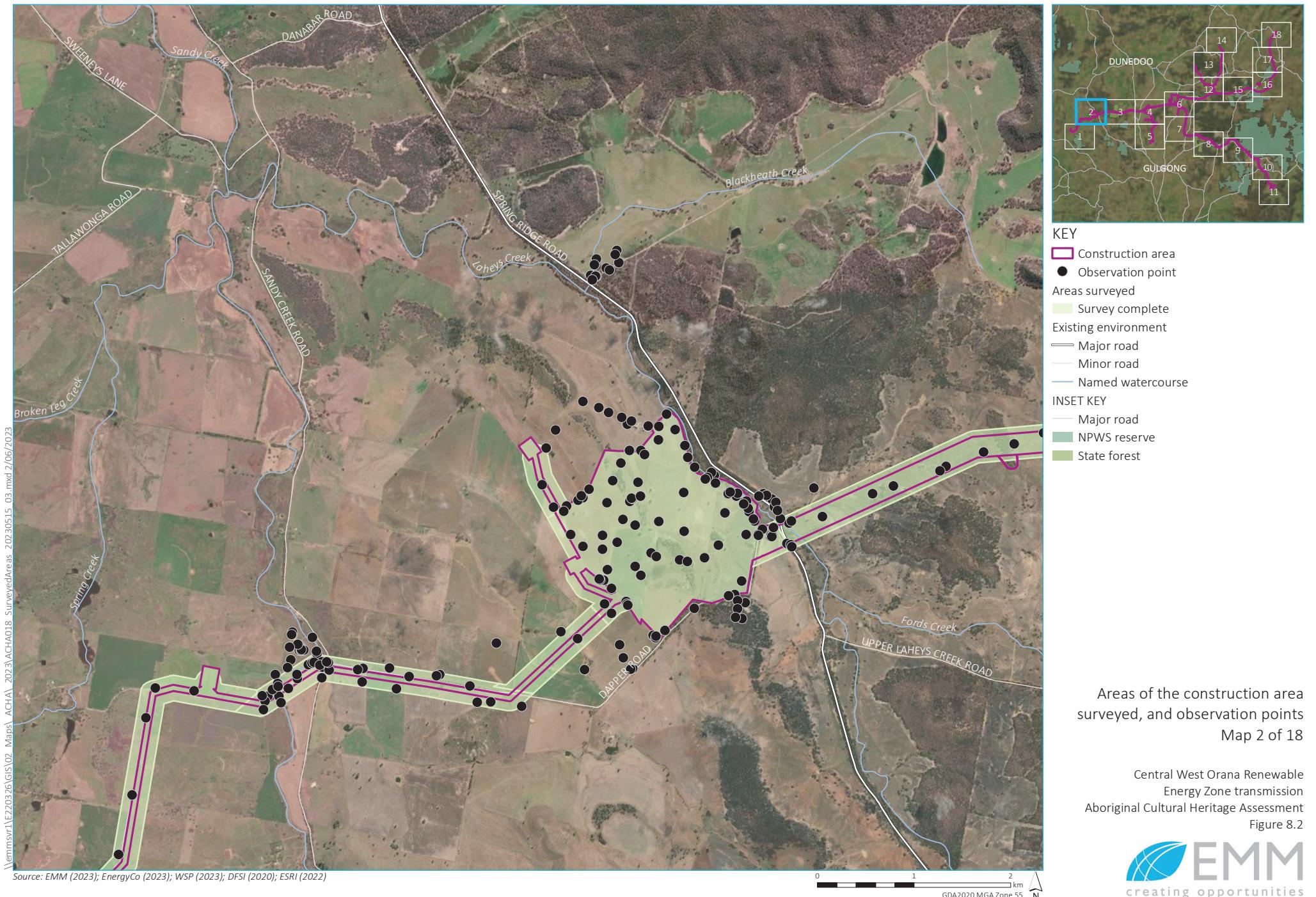
Field survey transects  
exhibited by timeframe  
Map 16 of 18

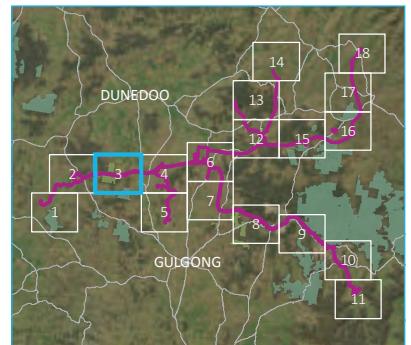
Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 8.1









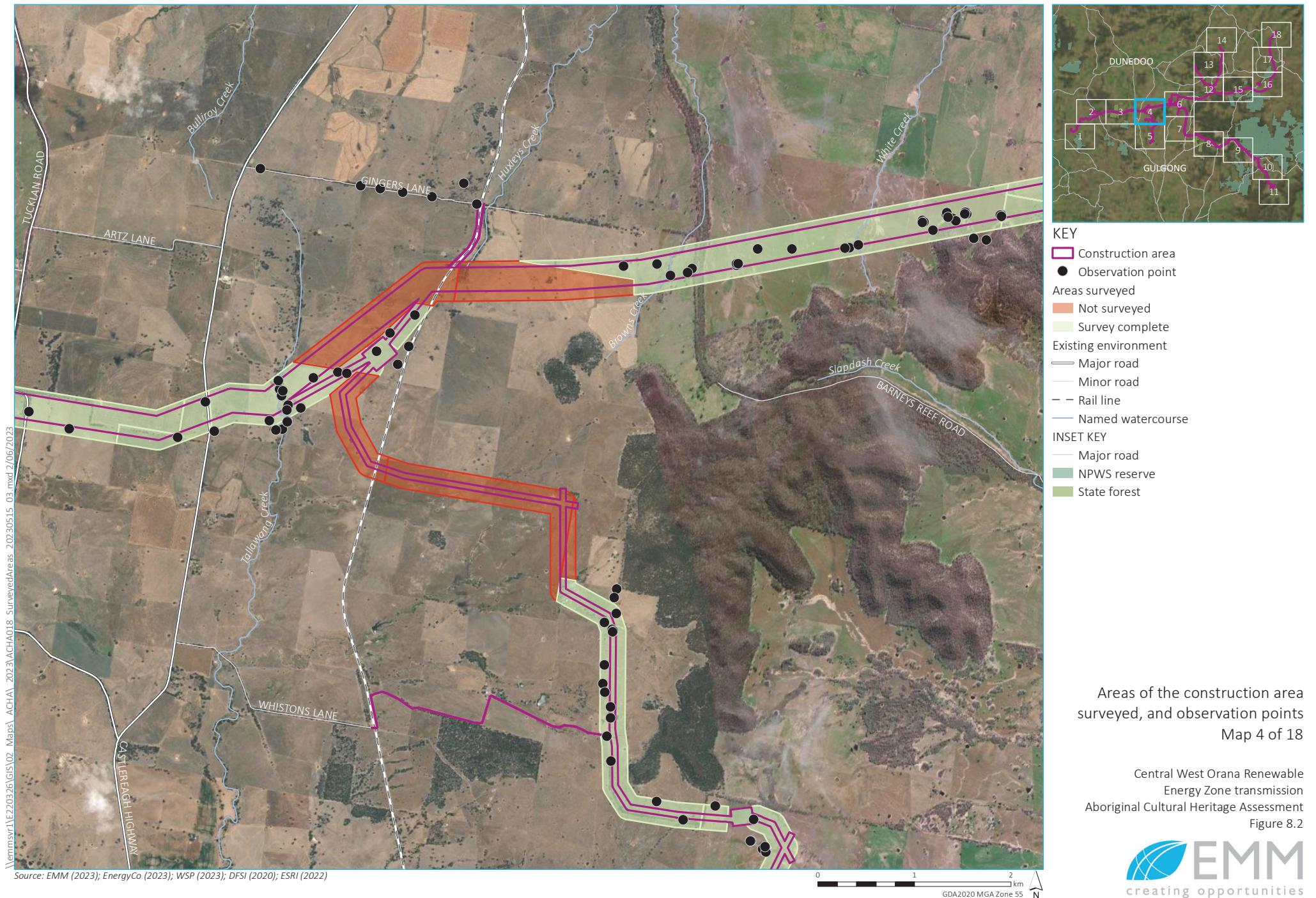


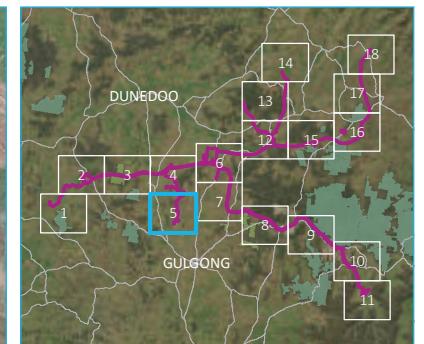
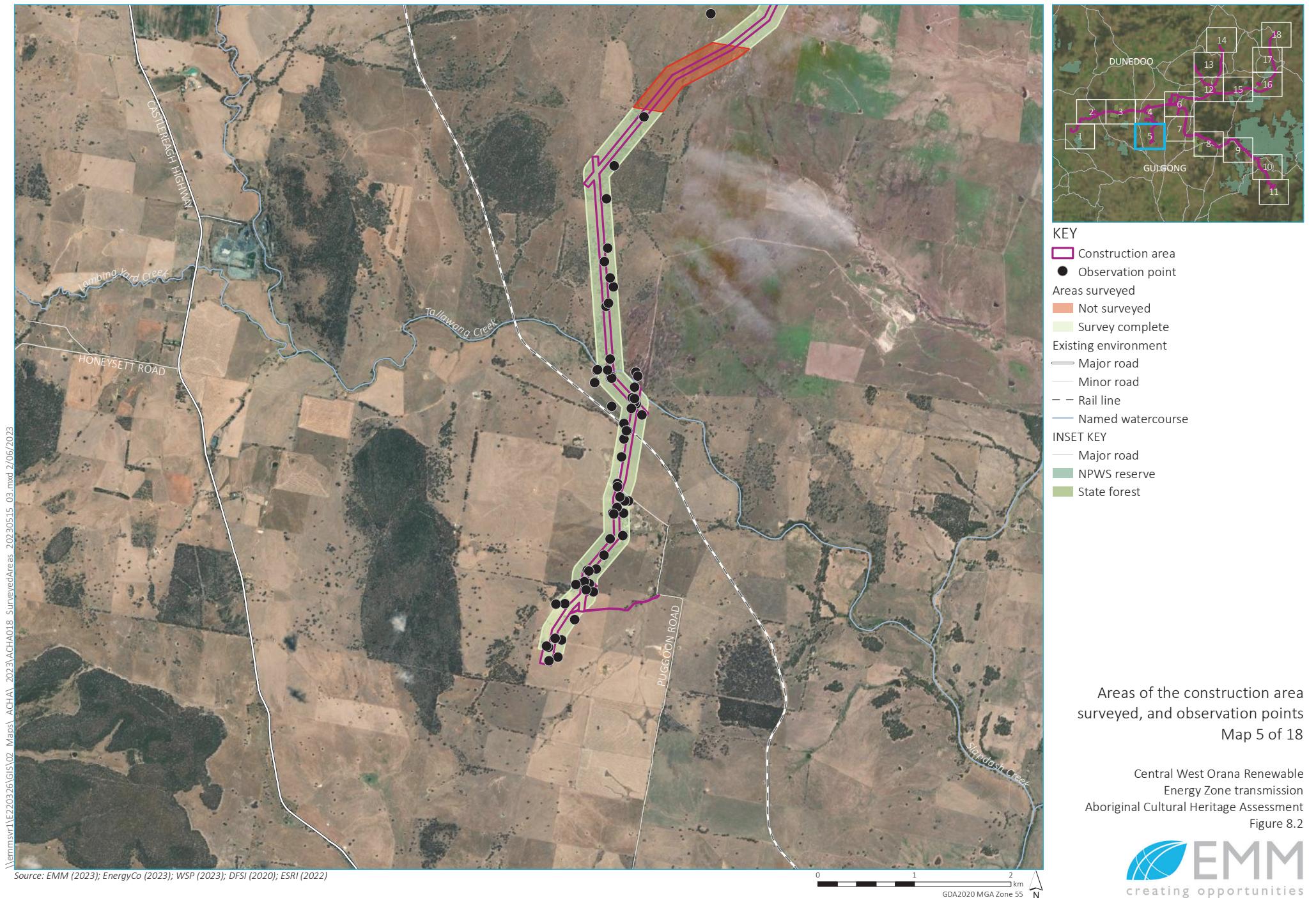
#### KEY

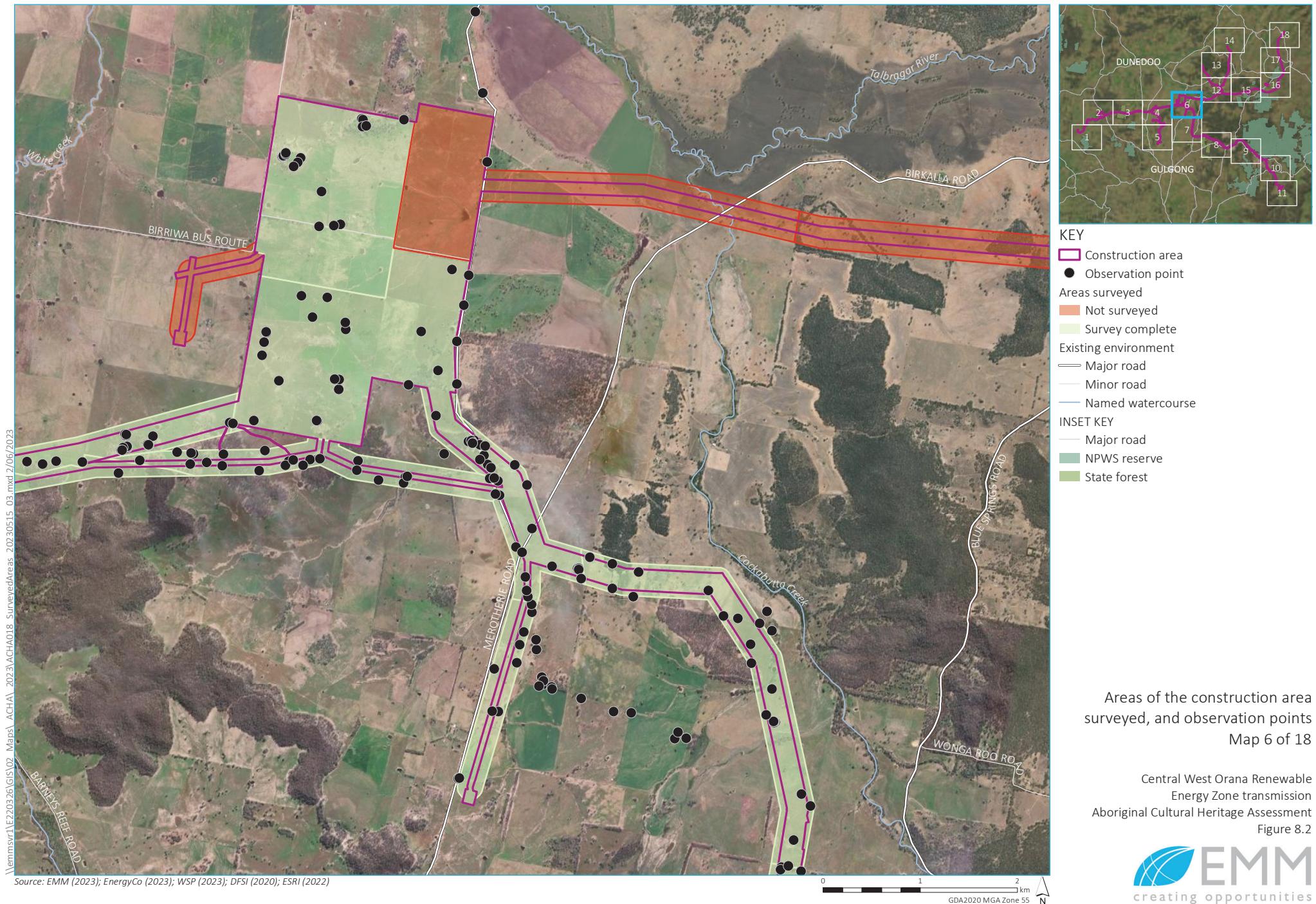
- Construction area
- Observation point
- Areas surveyed
- Survey complete
- Existing environment
- Major road
- Minor road
- Named watercourse
- NPWS reserve
- State forest
- INSET KEY
- Major road
- NPWS reserve
- State forest

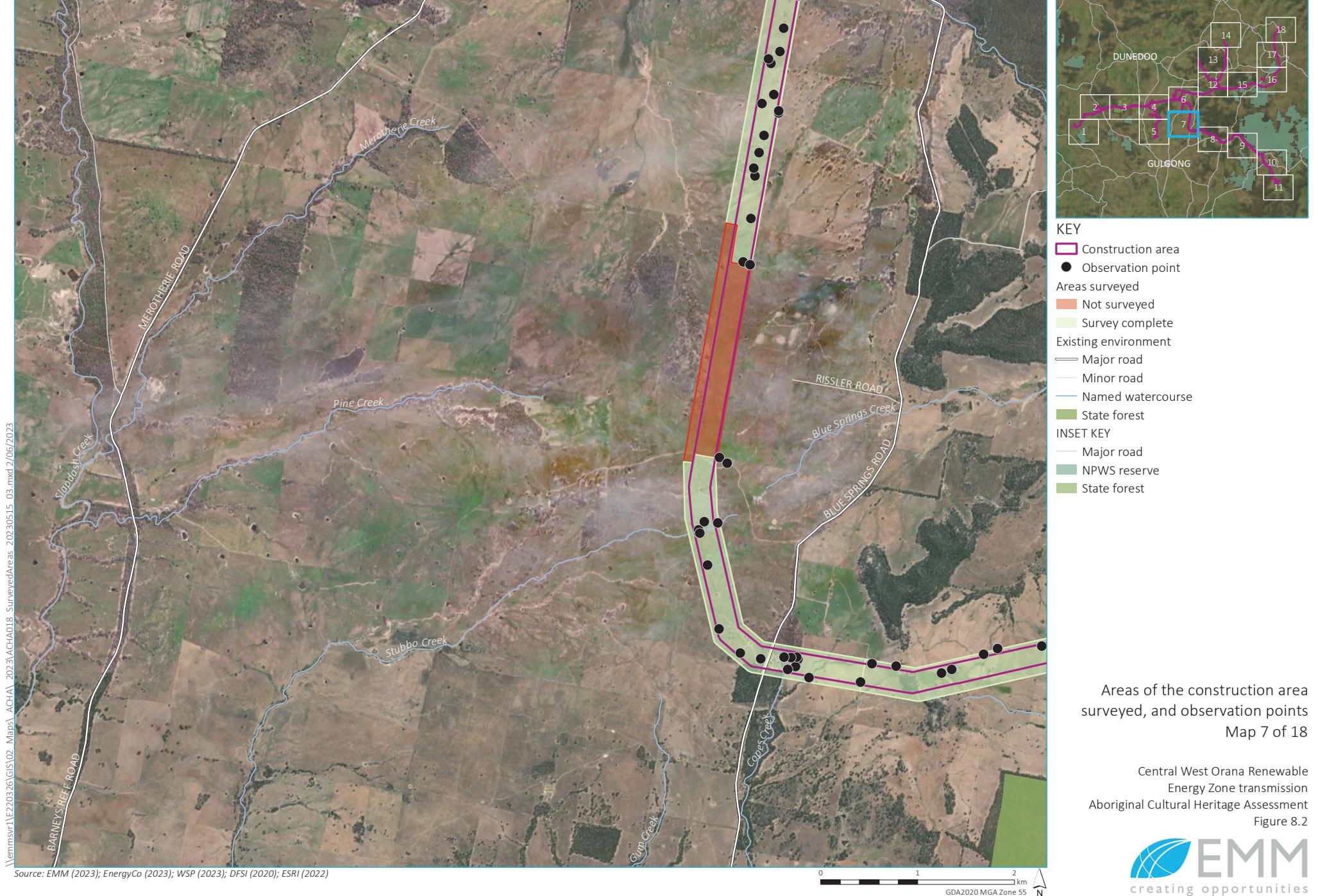
Areas of the construction area  
surveyed, and observation points  
Map 3 of 18

Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 8.2

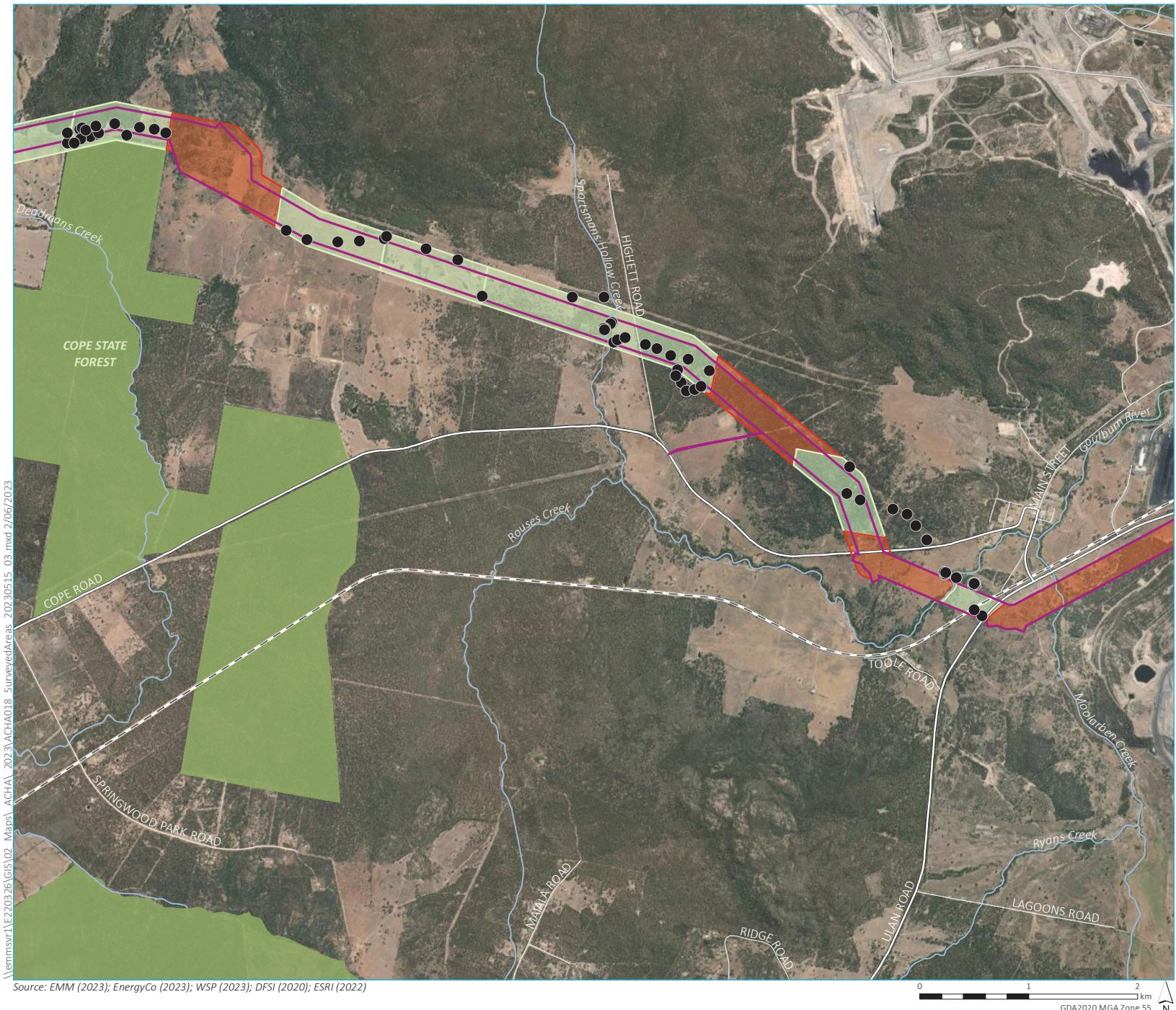








Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 8.2

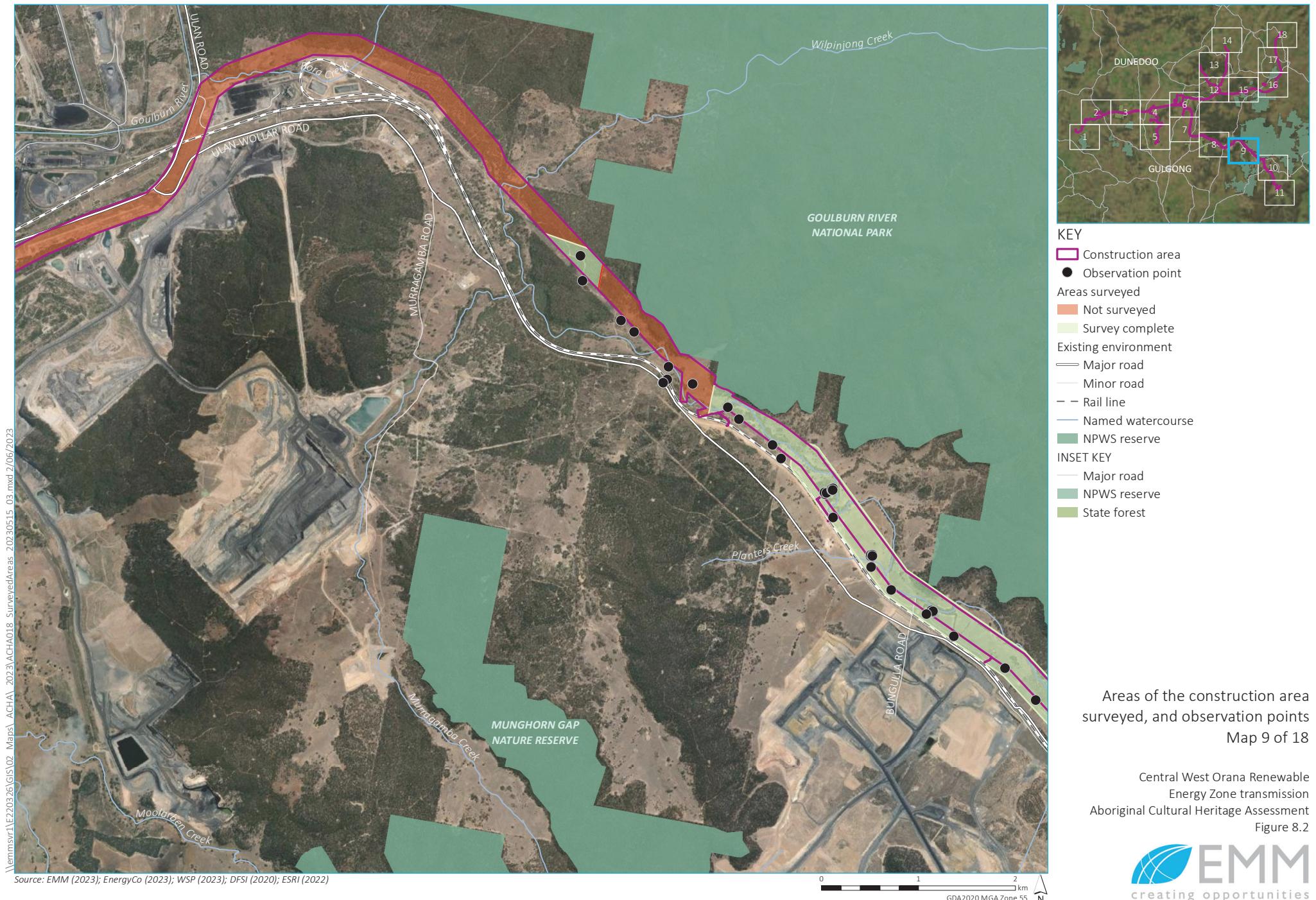


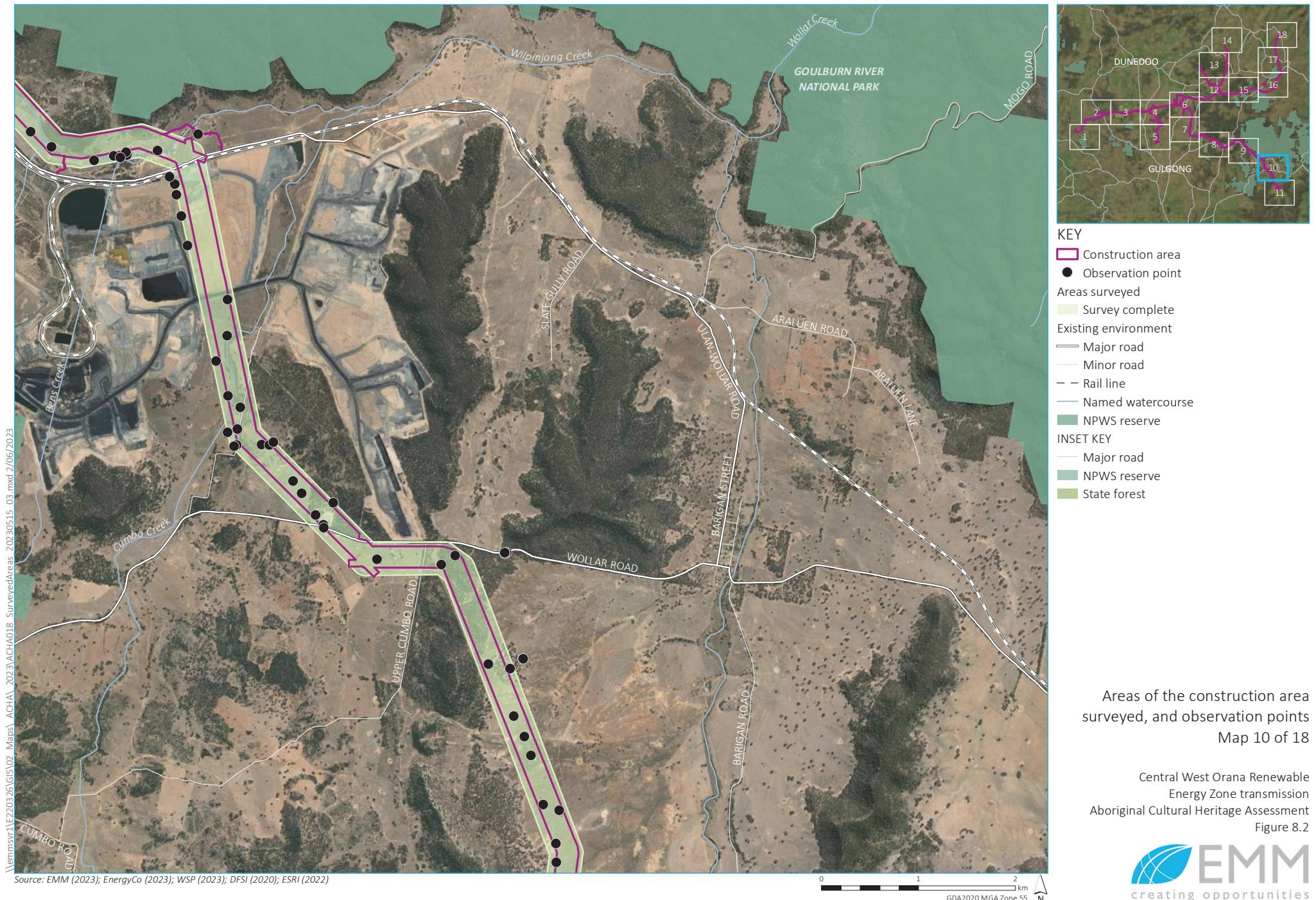
#### KEY

- Construction area**
- Observation point**
- Areas surveyed**
  - Not surveyed**
  - Survey complete**
- Existing environment**
  - Major road**
  - Minor road**
  - Rail line**
  - Named watercourse**
  - State forest**
- INSET KEY**
  - Major road**
  - NPWS reserve**
  - State forest**

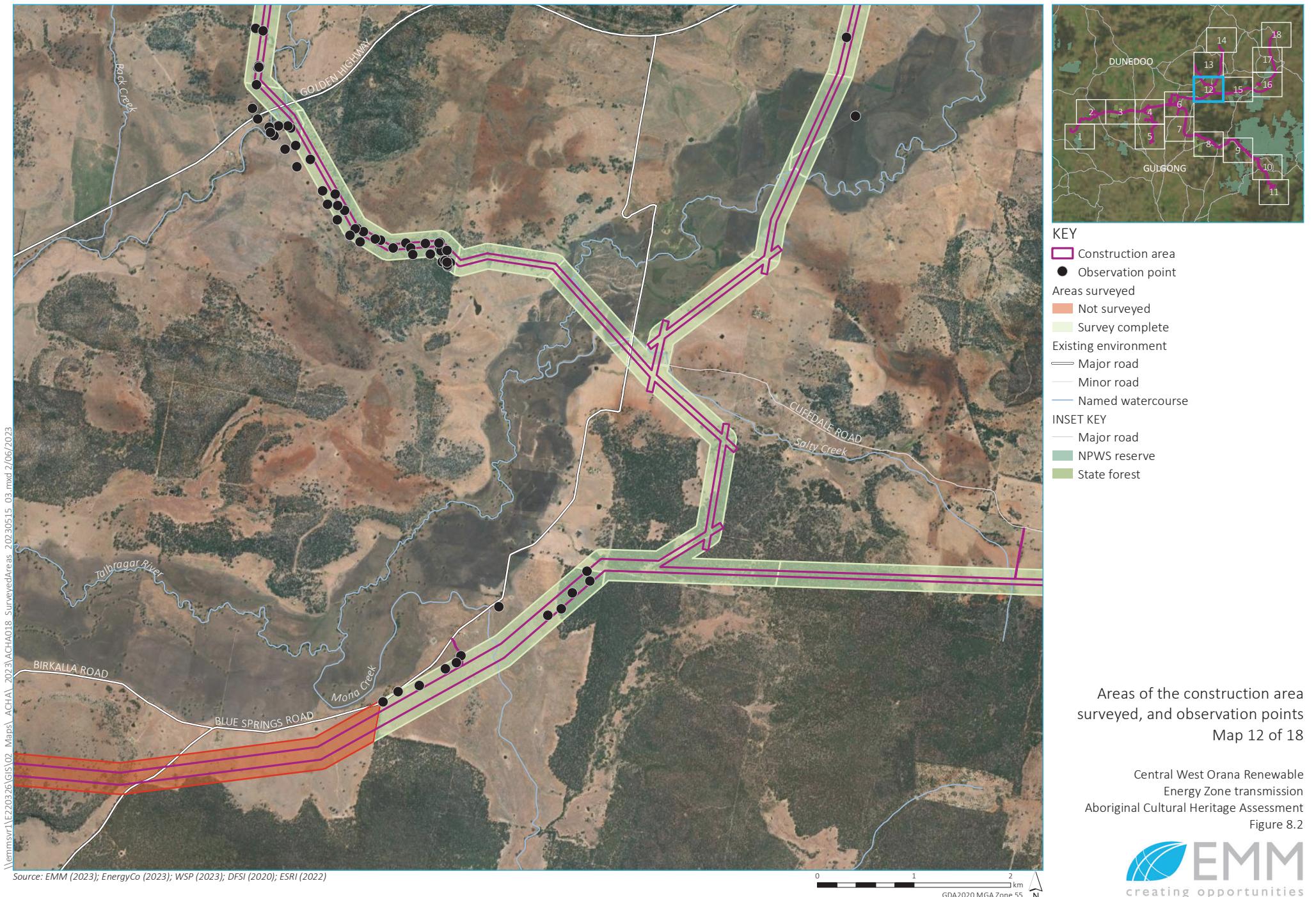
Areas of the construction area surveyed, and observation points  
Map 8 of 18

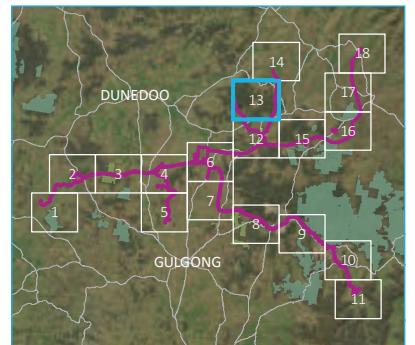
Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 8.2









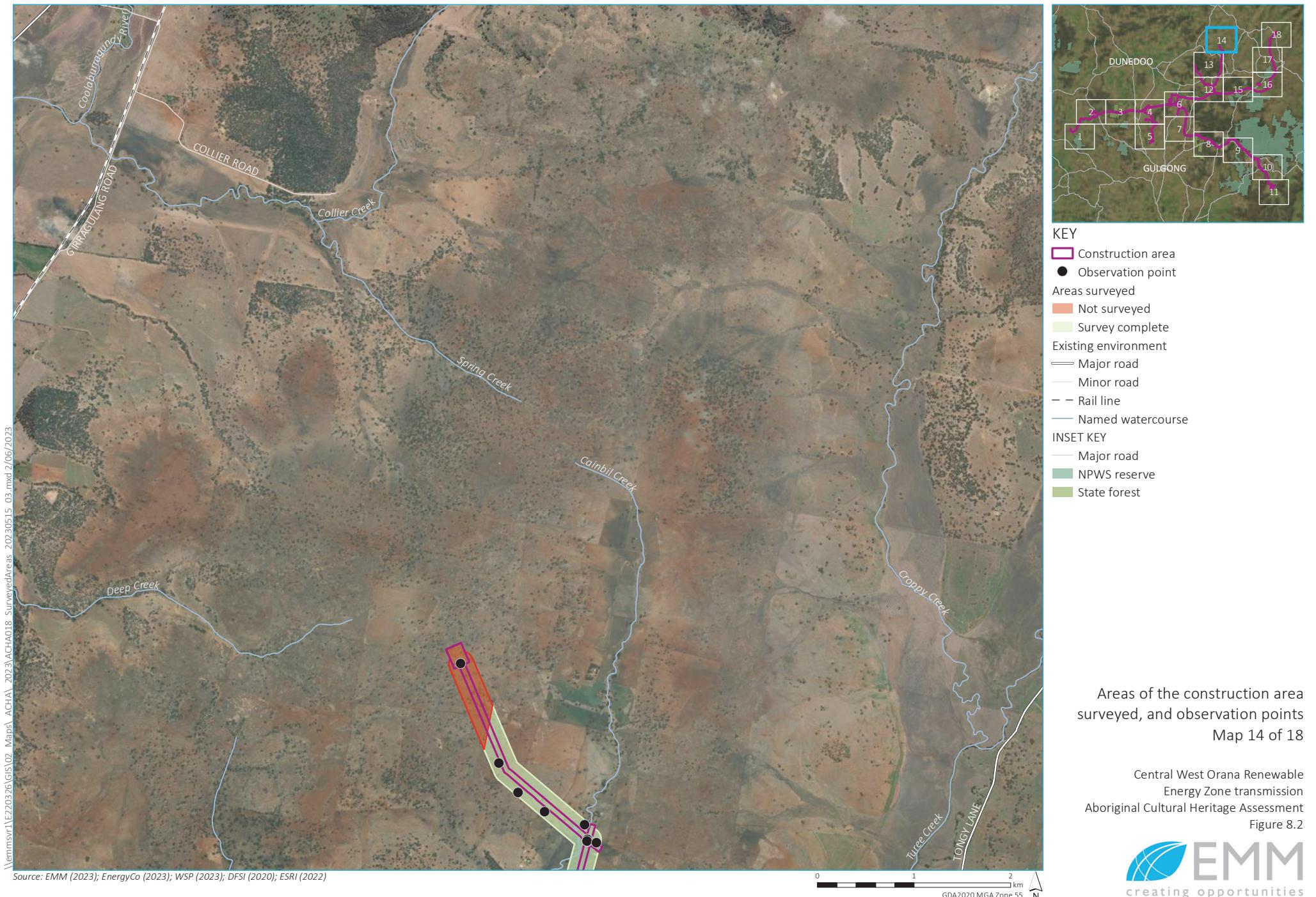


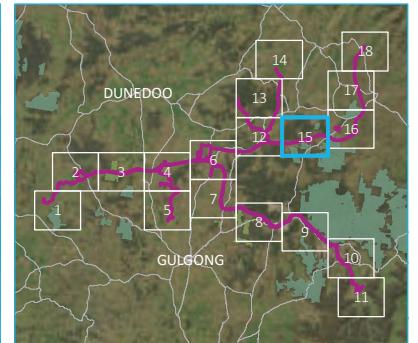
#### KEY

- Construction area
- Observation point
- Areas surveyed
- Survey complete
- Existing environment
- Major road
- Minor road
- Named watercourse
- INSET KEY**
- Major road
- NPWS reserve
- State forest

Areas of the construction area  
surveyed, and observation points  
Map 13 of 18

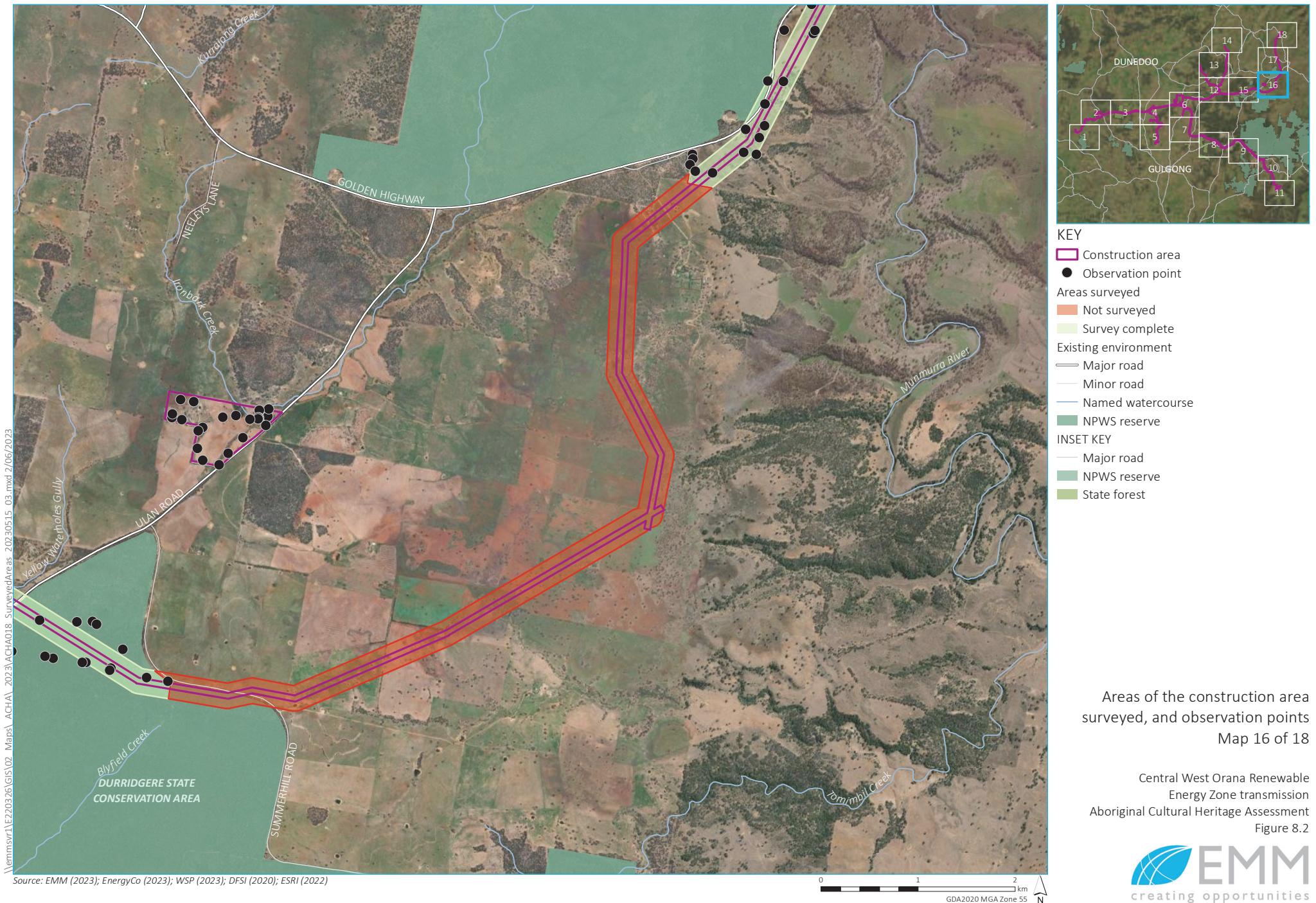
Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 8.2

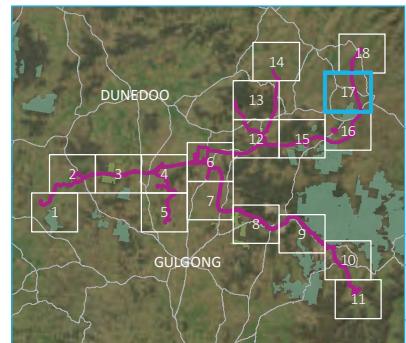
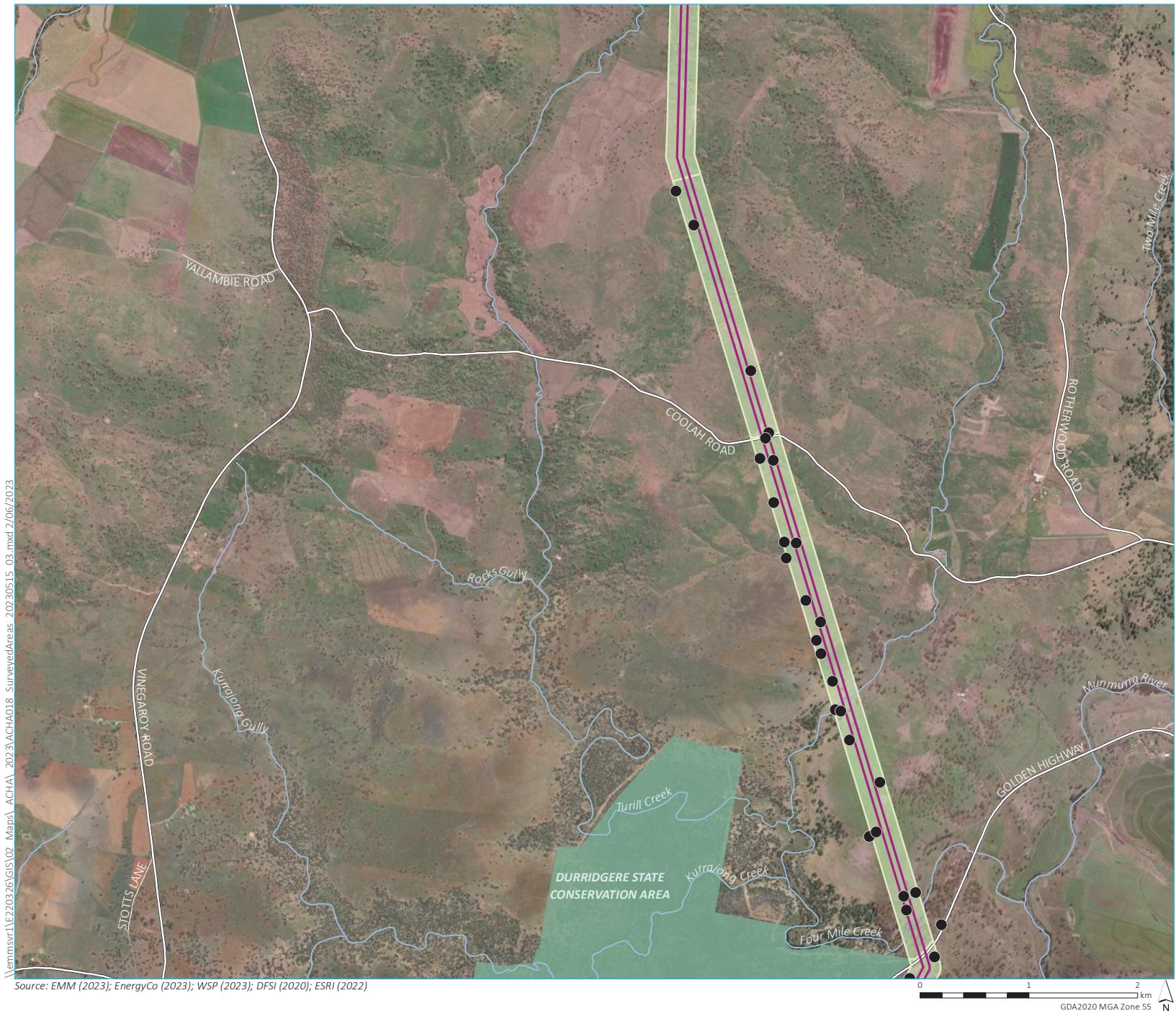




Areas of the construction area surveyed, and observation points  
Map 15 of 18

Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 8.2





#### KEY

- Construction area
- Observation point
- Areas surveyed
- Survey complete
- Existing environment
- Major road
- Minor road
- Named watercourse
- NPWS reserve
- INSET KEY
- Major road
- NPWS reserve
- State forest

Areas of the construction area  
surveyed, and observation points  
Map 17 of 18

Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 8.2



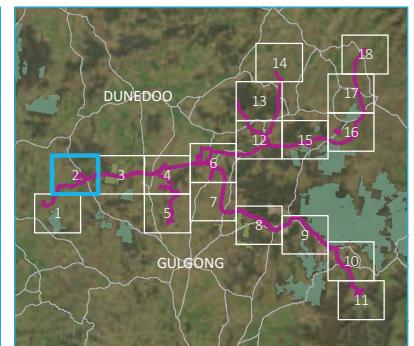
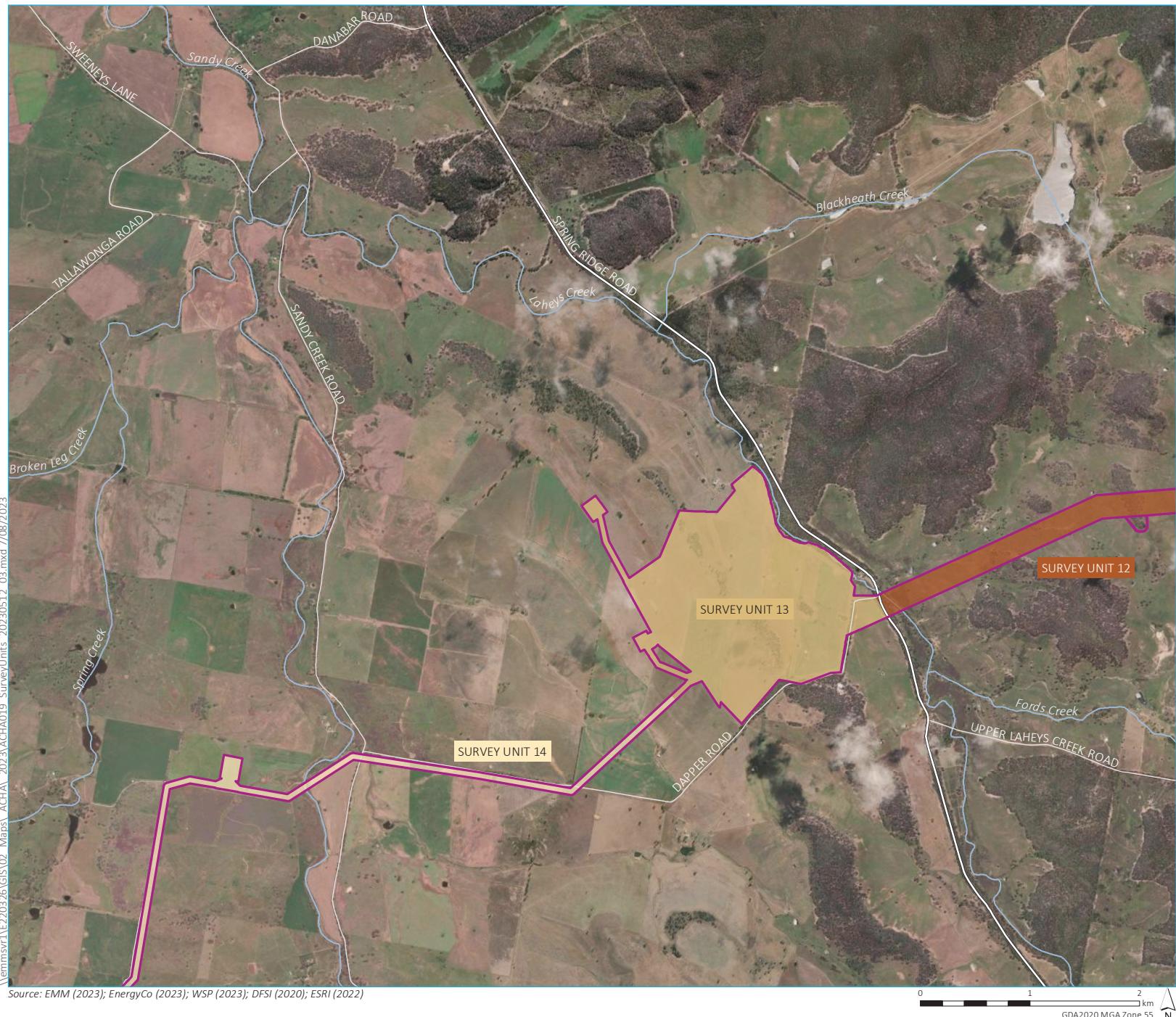


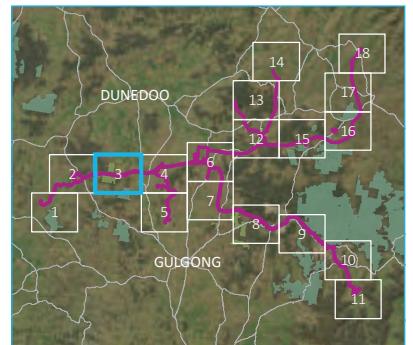
#### KEY

- Construction area
- Survey unit (number of new sites)
  - SU14 (16)
- Existing environment
- Major road
- Minor road
- Named watercourse
- NPWS reserve
- INSET KEY
- Major road
- NPWS reserve

Survey units applied to the  
construction area  
Map 1 of 18

Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 8.3



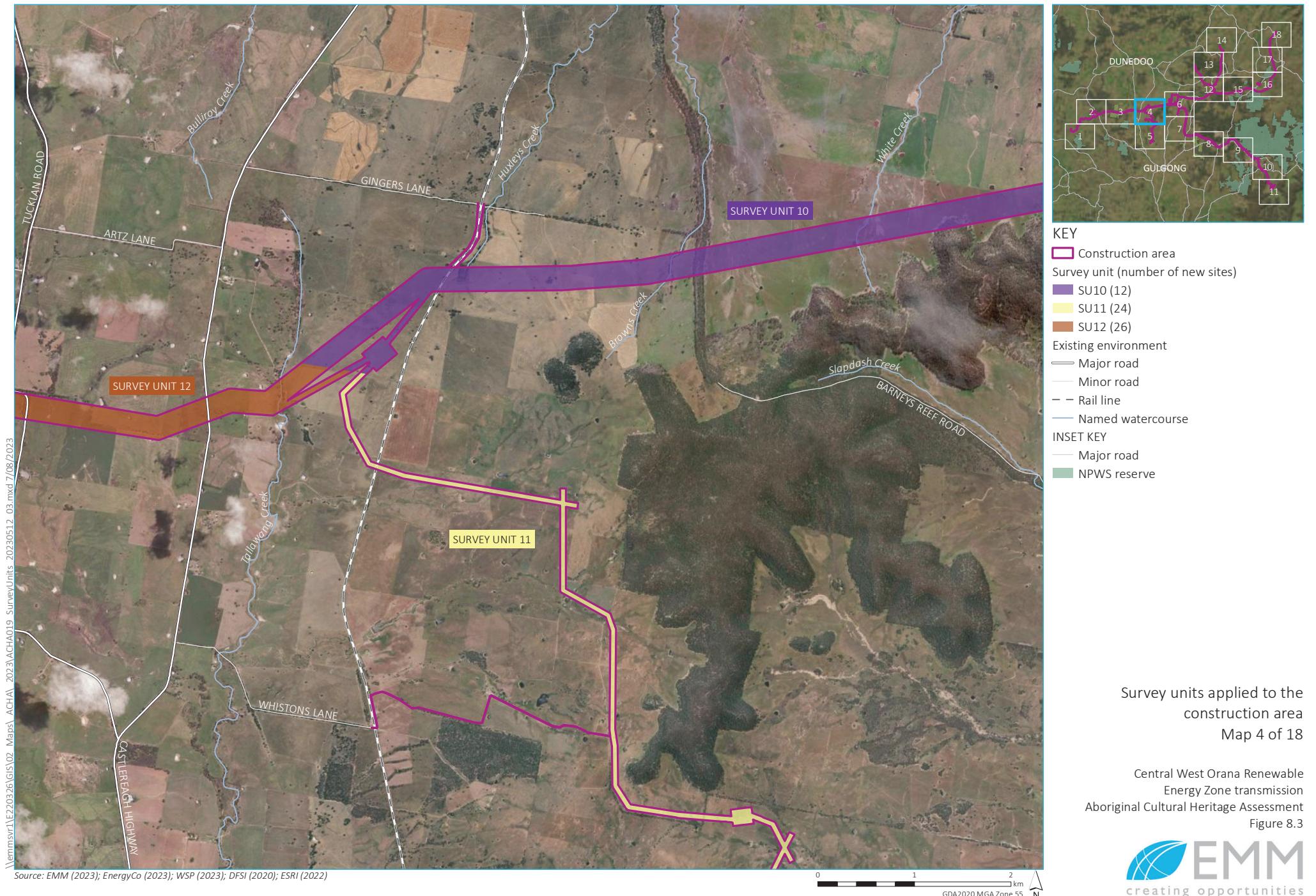


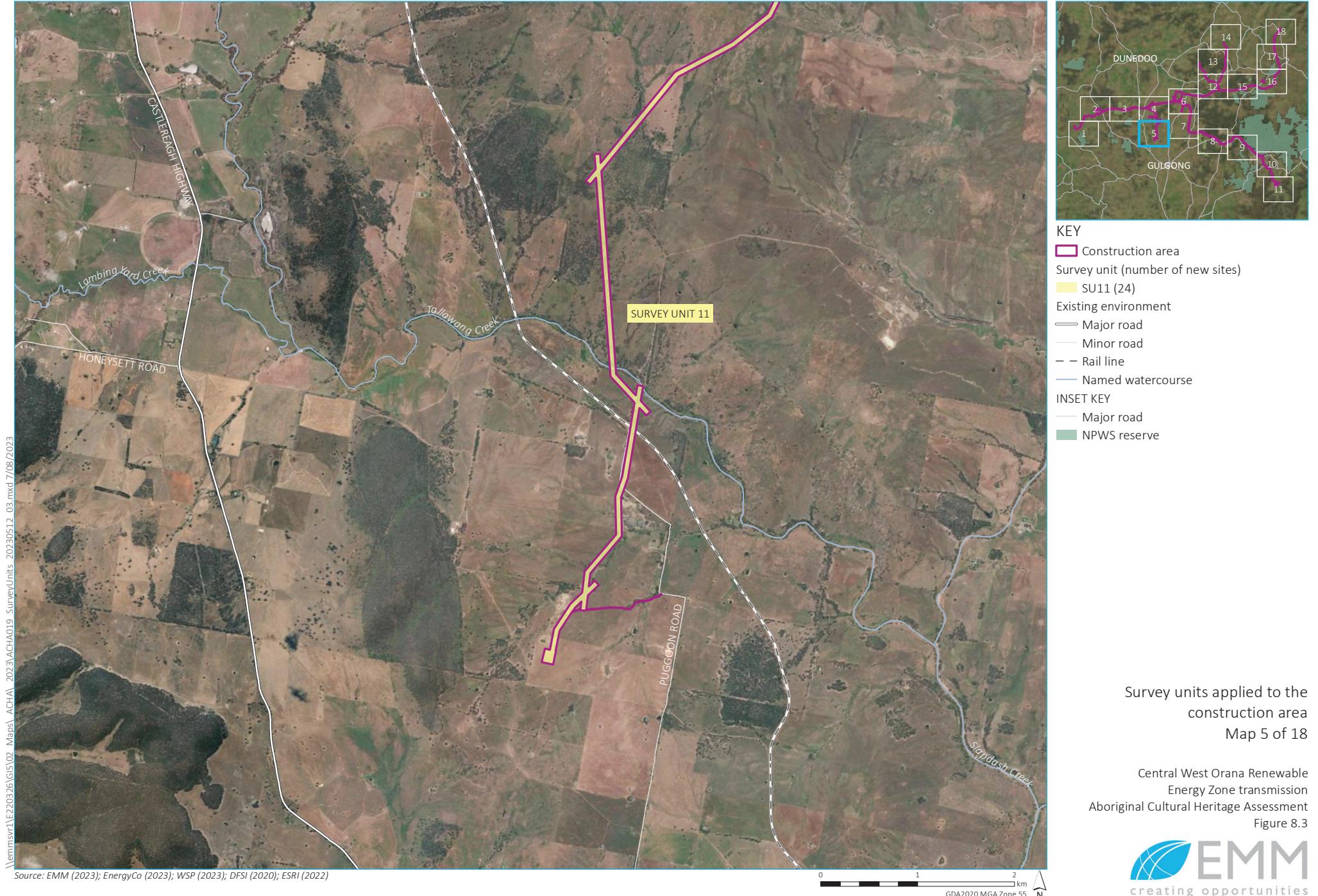
#### KEY

- Construction area
- Survey unit (number of new sites)
  - SU12 (26)
- Existing environment
- Major road
- Minor road
- Named watercourse
- NPWS reserve
- State forest

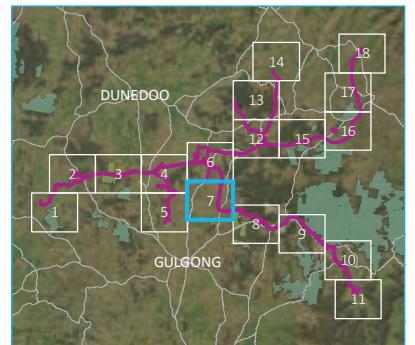
Survey units applied to the construction area  
Map 3 of 18

Central West Orana Renewable Energy Zone transmission Aboriginal Cultural Heritage Assessment Figure 8.3



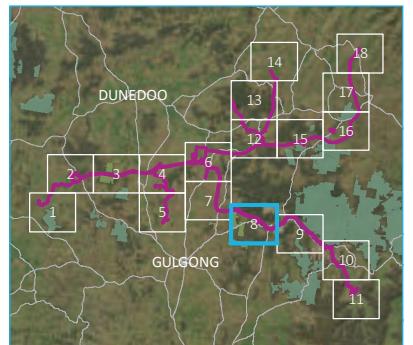
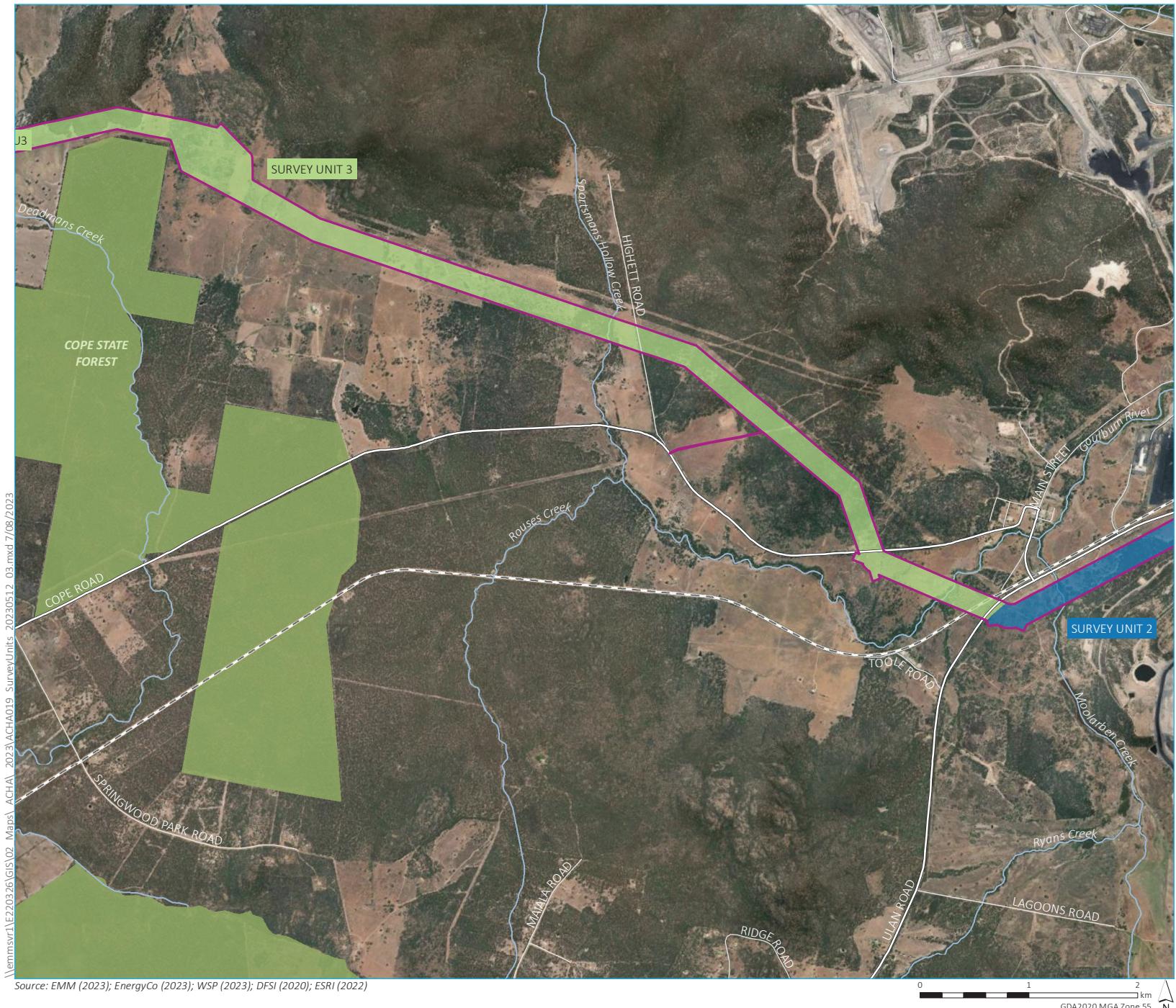






Survey units applied to the construction area  
Map 7 of 18

Central West Orana Renewable Energy Zone transmission Aboriginal Cultural Heritage Assessment  
Figure 8.3

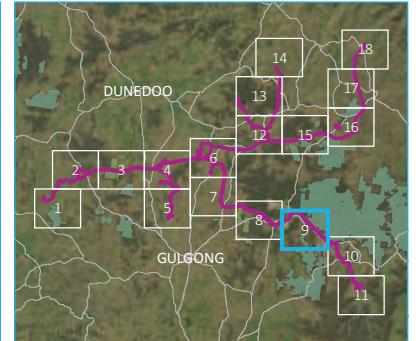


#### KEY

- Construction area
- Survey unit (number of new sites)
  - SU2 (8)
  - SU3 (22)
- Existing environment
  - Major road
  - Minor road
  - Rail line
  - Named watercourse
  - State forest
- INSET KEY
  - Major road
  - NPWS reserve

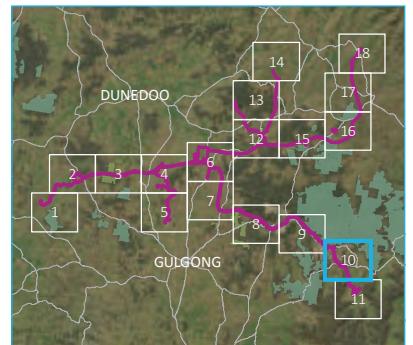
Survey units applied to the construction area  
Map 8 of 18

Central West Orana Renewable Energy Zone transmission Aboriginal Cultural Heritage Assessment  
Figure 8.3



Survey units applied to the construction area  
Map 9 of 18

Central West Orana Renewable Energy Zone transmission Aboriginal Cultural Heritage Assessment  
Figure 8.3

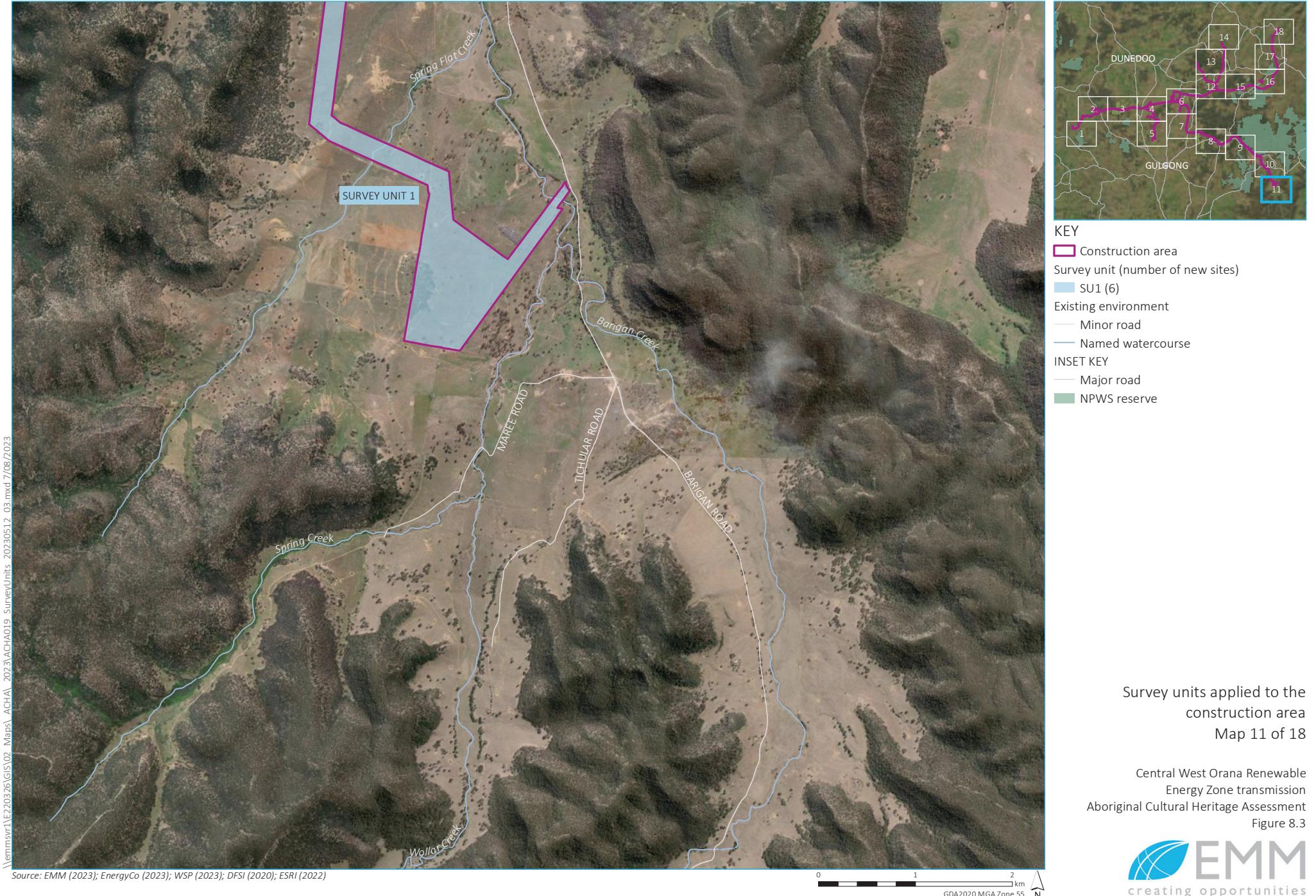


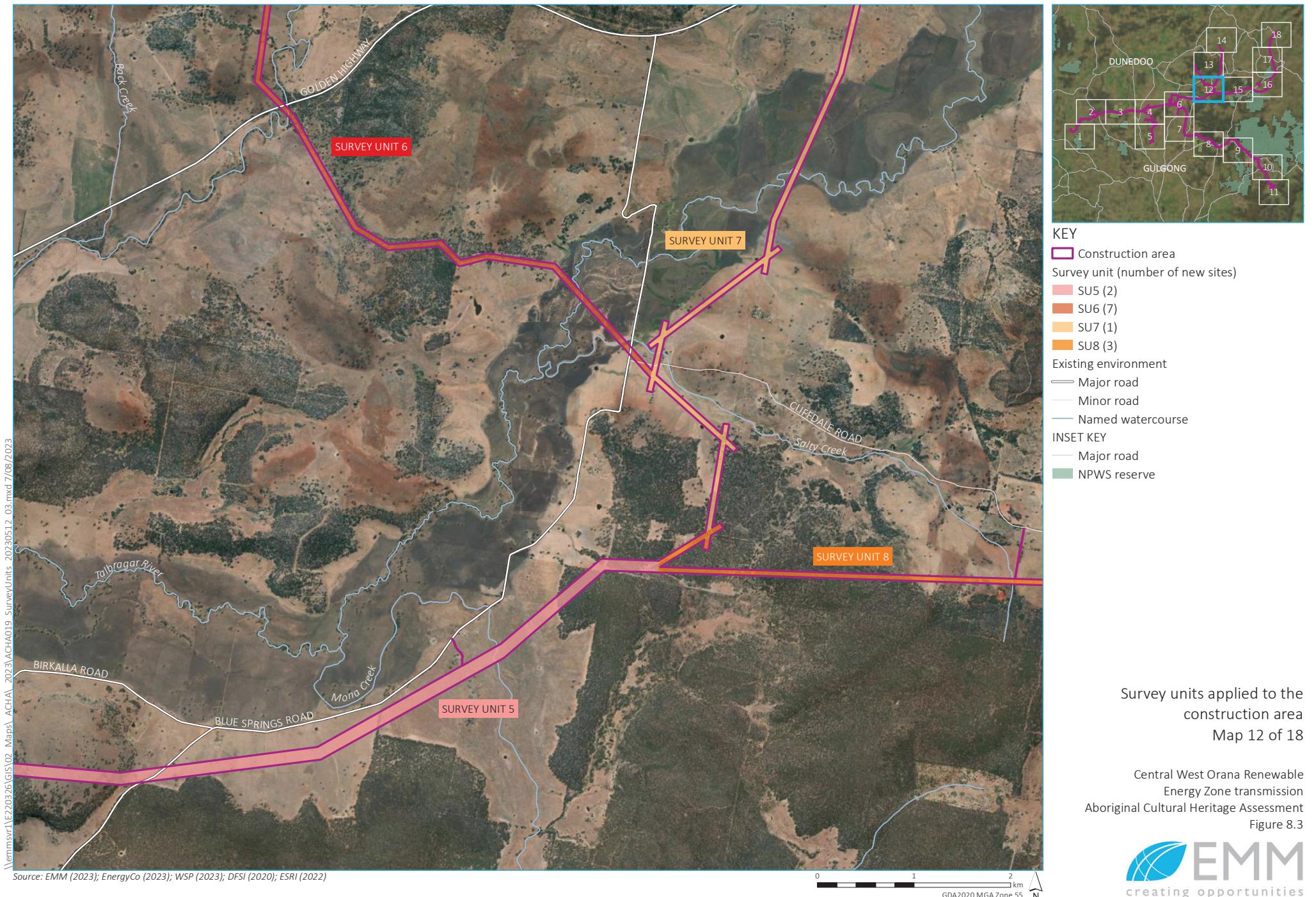
**KEY**

- Construction area
- Survey unit (number of new sites)
  - SU1 (6)
  - SU2 (8)
- Existing environment
- Major road
- Minor road
- Rail line
- Named watercourse
- NPWS reserve
- INSET KEY**
- Major road
- NPWS reserve

Survey units applied to the construction area  
Map 10 of 18

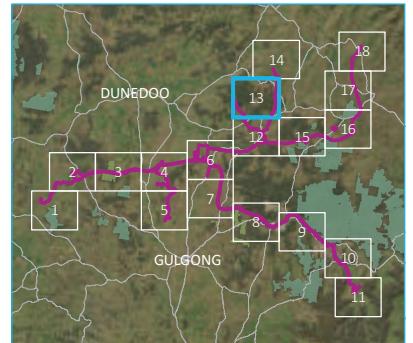
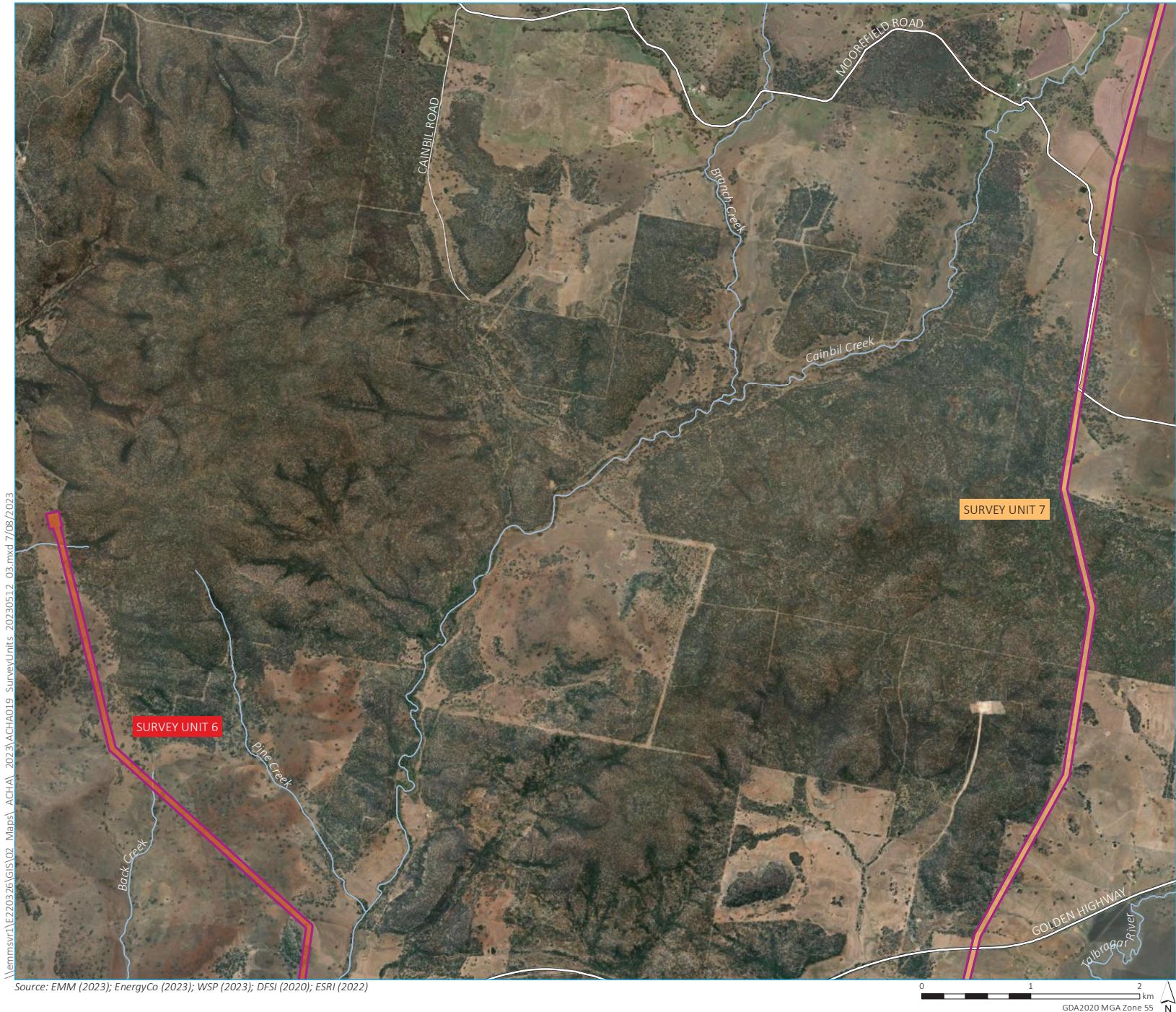
Central West Orana Renewable Energy Zone transmission Aboriginal Cultural Heritage Assessment  
Figure 8.3





Survey units applied to the construction area  
Map 12 of 18

Central West Orana Renewable Energy Zone transmission Aboriginal Cultural Heritage Assessment  
Figure 8.3



#### KEY

**Construction area**

**Survey unit (number of new sites)**

**SU6 (7)**

**SU7 (1)**

**Existing environment**

**Major road**

**Minor road**

**Named watercourse**

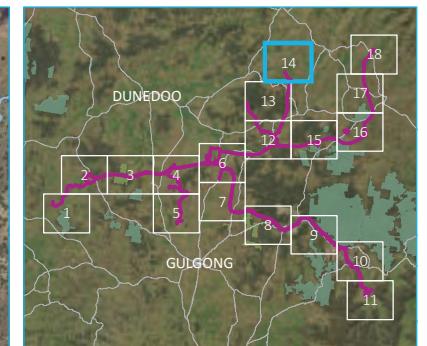
**INSET KEY**

**Major road**

**NPWS reserve**

Survey units applied to the  
construction area  
Map 13 of 18

Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 8.3

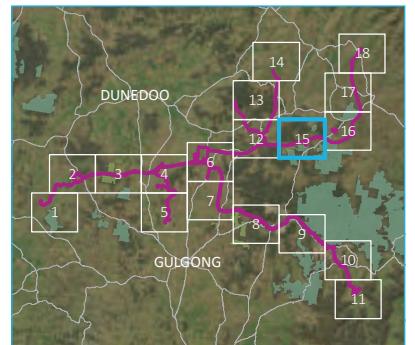


#### KEY

- Construction area
- Survey unit (number of new sites)
  - SU7 (1)
- Existing environment
  - Major road
  - Minor road
  - Rail line
  - Named watercourse
- INSET KEY
  - Major road
  - NPWS reserve

Survey units applied to the construction area  
Map 14 of 18

Central West Orana Renewable Energy Zone transmission Aboriginal Cultural Heritage Assessment Figure 8.3

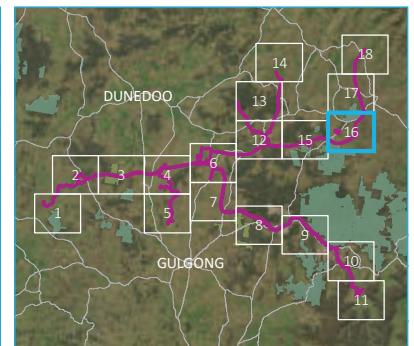
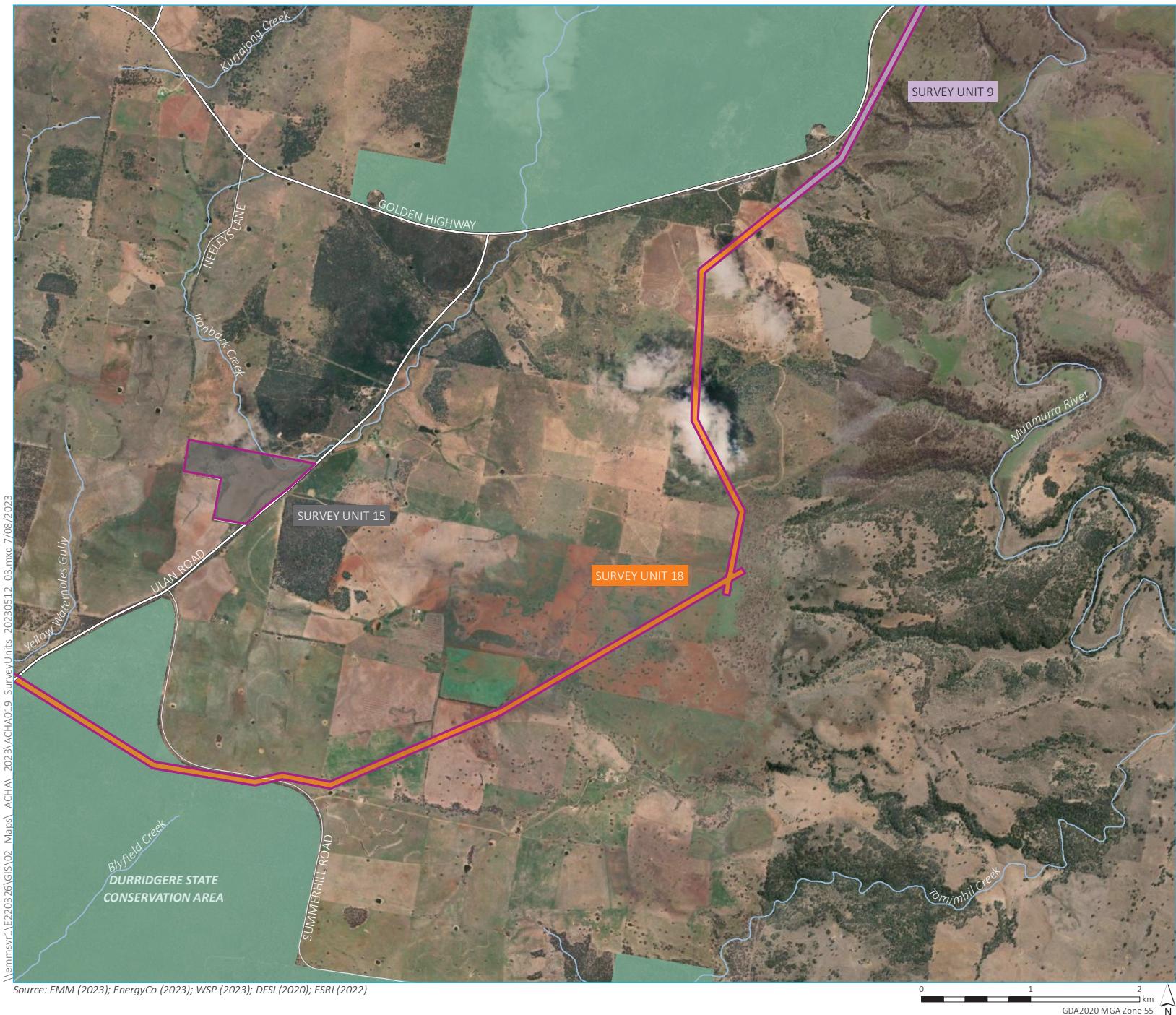


#### KEY

- Construction area
- Survey unit (number of new sites)
- SU8 (3)
- Existing environment
- Major road
- Minor road
- Named watercourse
- NPWS reserve
- INSET KEY**
- Major road
- NPWS reserve

Survey units applied to the construction area  
Map 15 of 18

Central West Orana Renewable Energy Zone transmission Aboriginal Cultural Heritage Assessment  
Figure 8.3



#### KEY

Pink box: Construction area

Survey unit (number of new sites)

Orange (SU8 3)

Purple (SU9 4)

Grey (SU15 2)

Existing environment

Major road

Minor road

Named watercourse

NPWS reserve

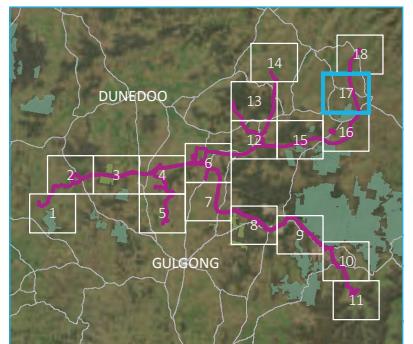
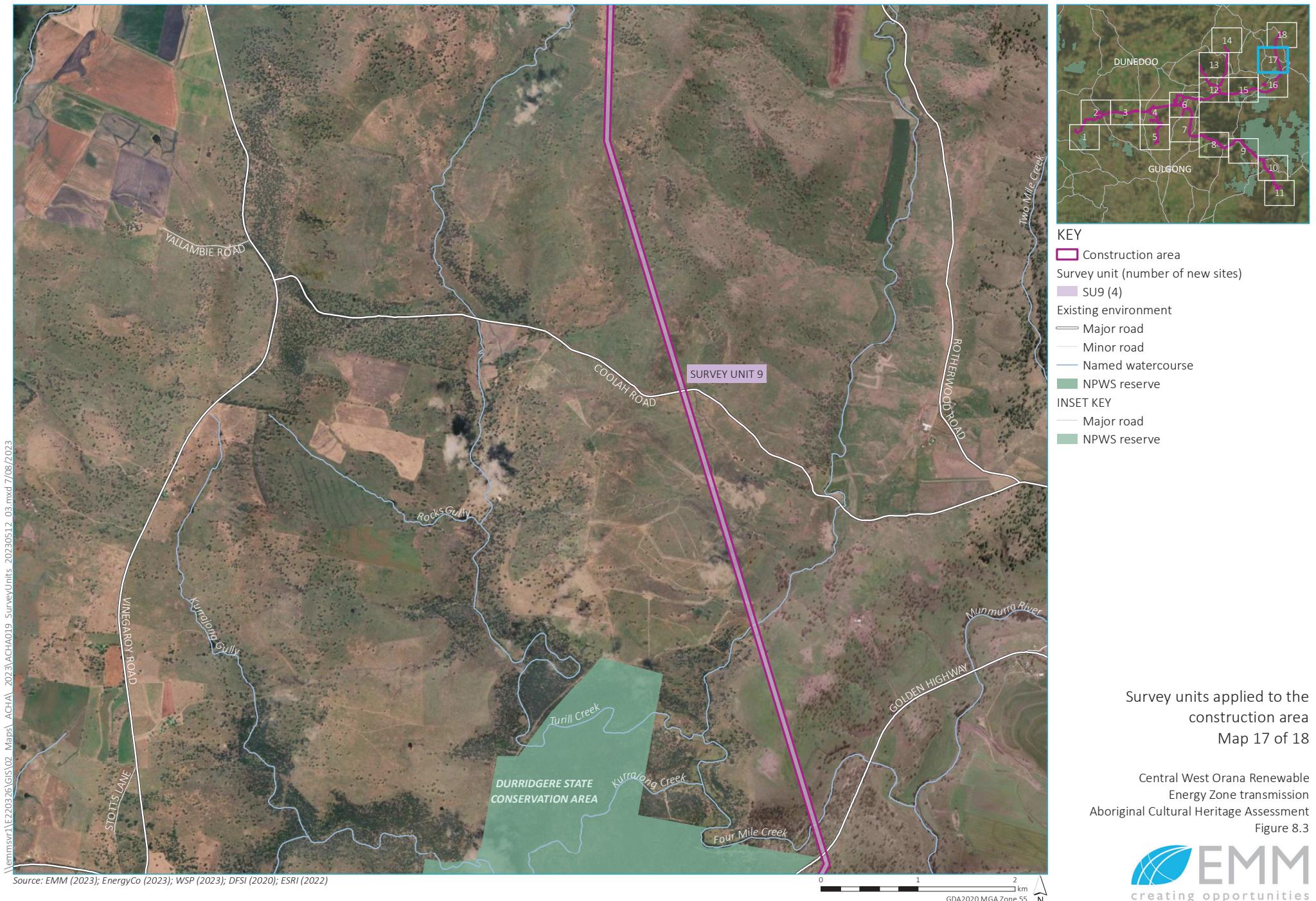
Inset Key

Major road

NPWS reserve

Survey units applied to the construction area  
Map 16 of 18

Central West Orana Renewable Energy Zone transmission Aboriginal Cultural Heritage Assessment  
Figure 8.3





### 8.2.3 Aboriginal sites identified

The field survey identified 183 Aboriginal objects, sites and/or places (Plate 8.31–Plate 8.40, Figure 8.4). These are each described in detail in Appendix E.1 and Figure 8.4. These were dominated by stone artefact scatters (n=78) and isolated stone objects (n=65), with lesser occurrences of grinding grooves (n=15) and culturally modified trees (n=14), as well as a range of other site types (Table 8.2). Several of these reflect previously documented sites (n=6), and these are ratified in Chapter 9.

Spatially, Aboriginal objects, sites and/or places were found across the majority of the surveyed portions of the construction area, but there are clear clusters primarily within 250 m of several 2nd to 4th order creeks (Figure 8.4). These notably included (from west to east) Laheys Creek, Sandy Creek, Tallawang Creek, Browns Creek, Copes Creek and Deadmans Creek. While Wilpinjung Creek appears to have been a foci based on previous investigations (Section 7.3), few cultural materials were observed along this watercourse during this field survey. In several of these locales, additional local environments were also considered to contribute to the presence of past activity, including the interface of higher elevation surrounded by low-lying swampy environments such as at Barney's Reef and near Deadman's Creek, or where creeks run through narrow gaps in elevation, such as Copes Creek. In addition to this common pattern, considerable cultural materials were encountered in the western portions of the Merotherie Energy Hub. This distribution cannot be readily explained, since major water courses are not present; however, the steep sandstone rich hills to the north-west that were used for sharpening tools may be one factor.

When considering landforms, the majority of cultural materials were encountered within hillslopes and/or modified terrain (e.g. dams, access tracks, fence lines) (Table 8.2). This is perhaps expected, given the construction area is primarily situated in undulating hills that are subject to cultivation and pastoralism. However, in addition to this, a significant portion of the assemblage was found in alluvial terraces and footslopes, and this aligns with the broader models of past behaviour as outlined above, namely that creek lines and/or low-lying elevation near resources were a focus of occupation and use.

The identified sites and objects primarily consisted of isolated or low density activity, with most artefact scatters containing 10 artefacts or less, which is below the typical threshold indicative of a background scatter. In the case of grinding grooves most were a single groove or <3, and again indicative of transient or ephemeral use. Of note, however, were several sites that indicated more intense use and activity. These included SNI-GG11, which consisted of over 100 grinding grooves in close proximity to Prospect and Sandy Creeks (Plate 8.33 and Plate 8.34); SNI-GG14, a similar grinding groove site near the Talbragar River (and previously documented) and containing some 85 individual grooves; SNI-AS01-03 and SNI-AS67, which included a 250 m stretch of Laheys Creek terrace that contained more than 100 artefacts on the eastern edge of the Elong Elong Energy Hub, and may reflect the extension of a dense artefact scatter on the east of Spring Ridge Road (Plate 8.35 and Plate 8.36); SNI-AS41, SNI-AS43 and SNI-AS57 that cumulatively reflect over 300 artefacts on the banks of Browns and Whites Creeks; SNI-GG02-09 that documents a suite of grinding grooves in close proximity on two sharp elevations in the north-west of the Merotherie Energy Hub; SNI-RS01 and SNI-RS02 that consist of two rockshelters situated on the footslopes of steep elevation immediately north of Deadman's Creek (Plate 8.39 and Plate 8.40); and SNI-RS03 and SNI-RS04, which comprises two rockshelters identified on the ridgelines near the Tuckland State Forest.

Following refinement of the construction area through continued development of the project, and re-design – in many cases to avoid impacts to identified cultural materials – only 82 of the 183 Aboriginal objects and sites identified in the field survey are currently within the construction area (Table 8.3; Figure 8.4; Appendix E.1). The remaining 101 objects and sites are now situated outside of the proposed construction area for the project. This encompasses several culturally modified trees (n=6) and grinding grooves (n=5), including SNI-GG11 and SNI-GG14, which have been actively avoided (Section 11.2).

**Table 8.2** Identified Aboriginal objects and sites (*n*) by landform context

Site Type	Landform							Total
	Alluvial terrace	Foot slope	Hillcrest	Hillslope	Modified landform	Plain	Ridge	
Artifact scatter	21	4	3	13	18	7		66
Artifact scatter, grinding groove, PAD		1						1
Artifact scatter, PAD	3	3		1	3	1		11
Culturally modified tree	1	2		6	1	4		14
Grinding groove		1	5	8			1	15
Isolated artefact	5	7	1	20	20	7	2	63
Isolated artefact, PAD		1			1			2
Natural resource		1					1	2
PAD		1				1		2
Quarry, artefact scatter					1			1
Rock art					1			1
Rock shelter, PAD			1		3			4
Stone arrangement		1						1
<b>Total</b>	<b>35</b>	<b>18</b>	<b>9</b>	<b>54</b>	<b>42</b>	<b>20</b>	<b>2</b>	<b>3</b> <b>183</b>

**Table 8.3** Identified Aboriginal objects and sites (*n*) within/outside the construction area following project refinement

Site Type	Within the construction area	Outside of the construction area	Total
Artefact scatter	29	37	66
Artefact scatter, grinding groove, PAD	1		1
Artefact scatter, PAD	3	8	11
Culturally modified tree	5	9	14
Grinding groove	11	4	15
Isolated artefact	26	37	63
Isolated artefact, PAD	1	1	2
Natural resource	1	1	2
PAD	1	1	2
Quarry, artefact scatter	1		1
Rock art	1		1
Rock shelter, PAD	3	1	4
Stone arrangement	1		1
<b>Total</b>	<b>84</b>	<b>99</b>	<b>183</b>



Plate 8.31 Example of good exposures at 36-3-3835, view west



Plate 8.32 Possible post contact glass artefact identified at 36-3-3835



Plate 8.33 SNI-GG11, showing sandstone outcropping in this locale, view east



Plate 8.34 Detail of grinding grooves identified on sandstone outcropping at SNI-GG11



Plate 8.35 SNI-AS67, view south east. Soils here appear to be deeper than most observed within the construction area, and are possibly associated with alluvial deposition from Laheys Creek



Plate 8.36 Sample of flakes identified at SNI-AS67. Artefacts observed here were primarily chert



Plate 8.37 SNI-CMT01, view north



Plate 8.38 SNI-CMT09, view north



Plate 8.39 SNI-RS01, view north-west

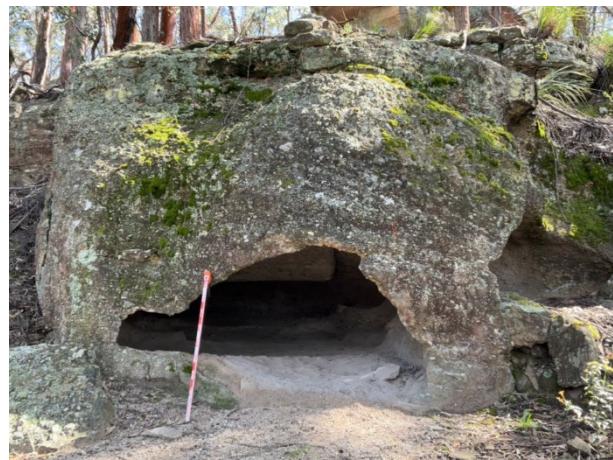


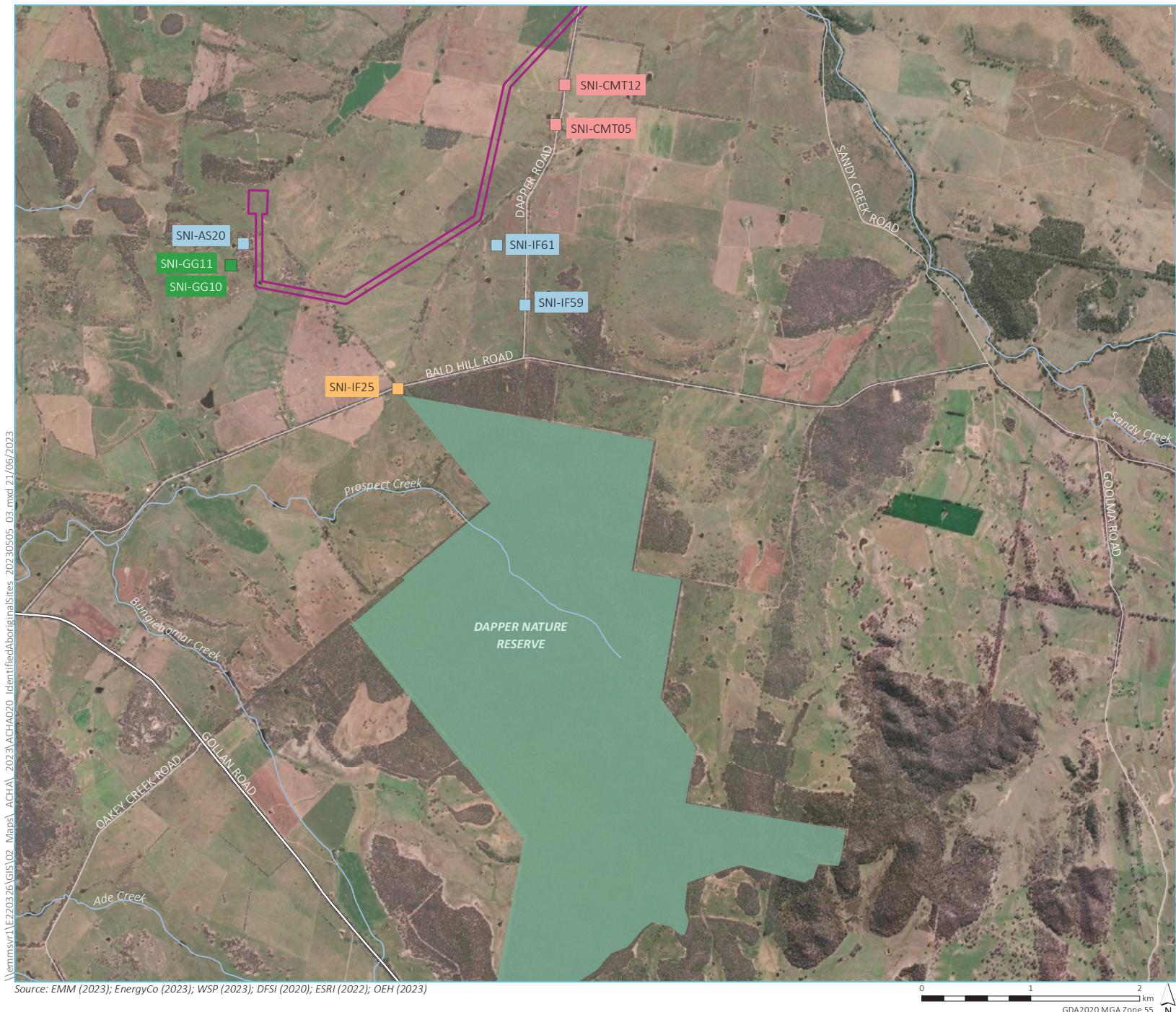
Plate 8.40 SNI-RS02, view north



Plate 8.41 SNI-RS03, view north



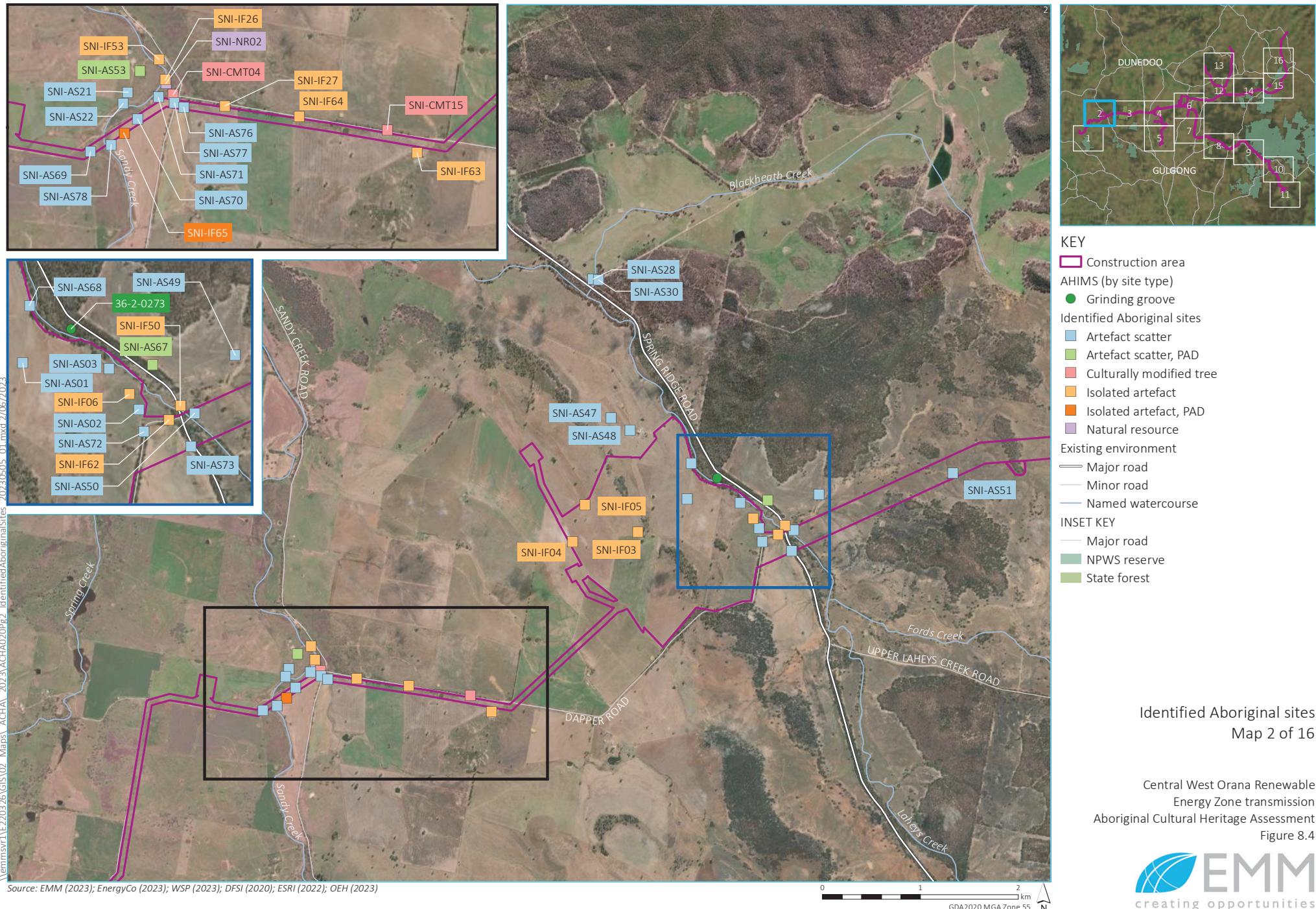
Plate 8.42 SNI-RS04, view north

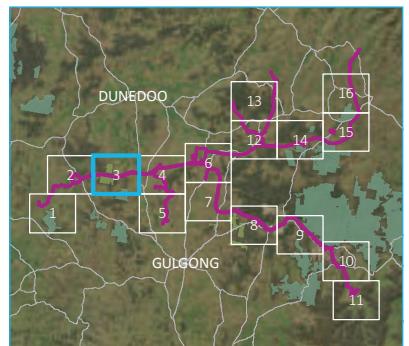
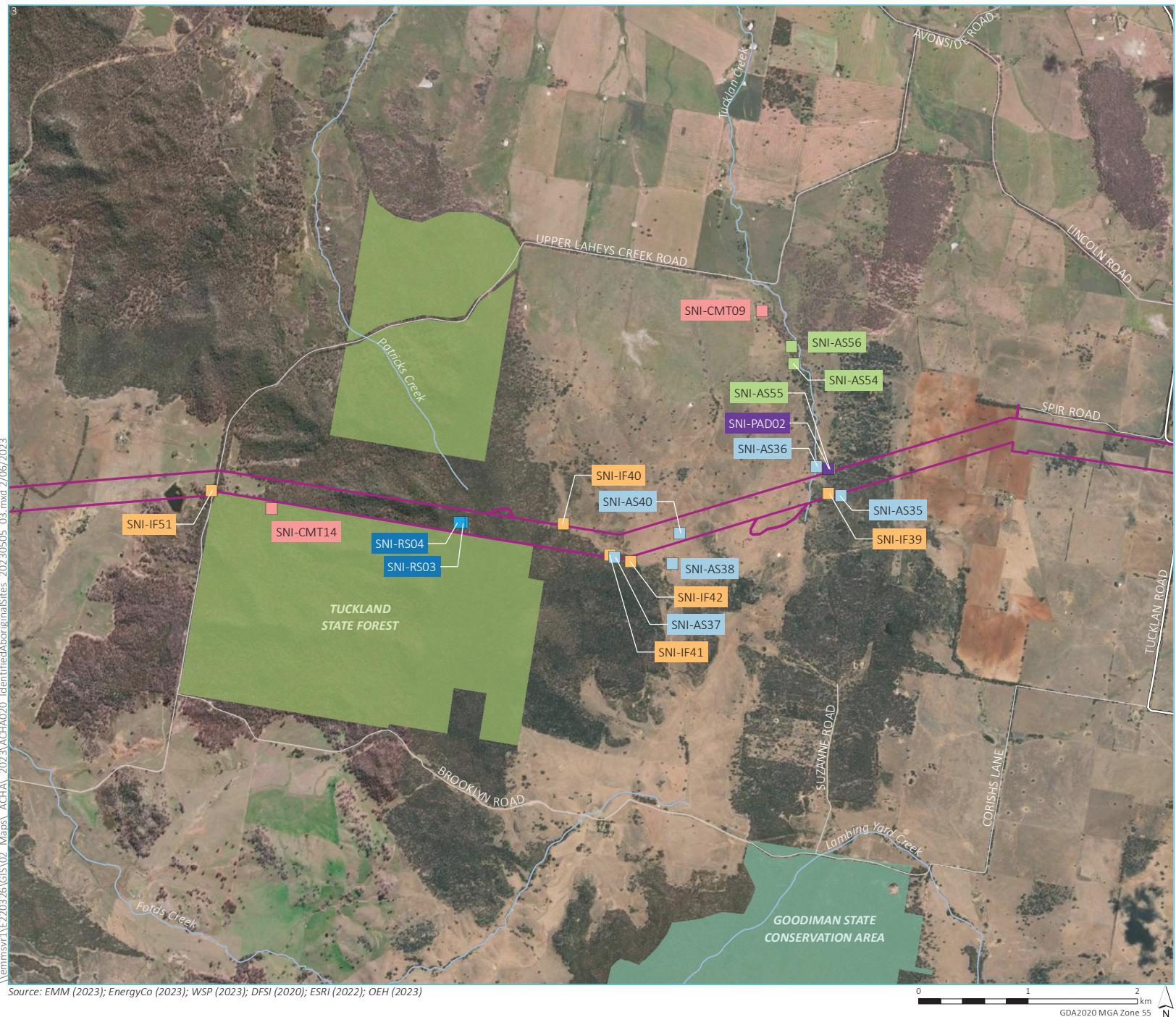


- KEY**
- [Magenta square] Construction area
  - [Blue square] Identified Aboriginal sites
  - [Blue square] Artefact scatter
  - [Red square] Culturally modified tree
  - [Green square] Grinding groove
  - [Orange square] Isolated artefact
  - Existing environment**
  - [Black line] Major road
  - [Grey line] Minor road
  - [Blue line] Named watercourse
  - [Green area] NPWS reserve
  - INSET KEY**
  - [Black line] Major road
  - [Green area] NPWS reserve
  - [Light green area] State forest

Identified Aboriginal sites  
Map 1 of 16

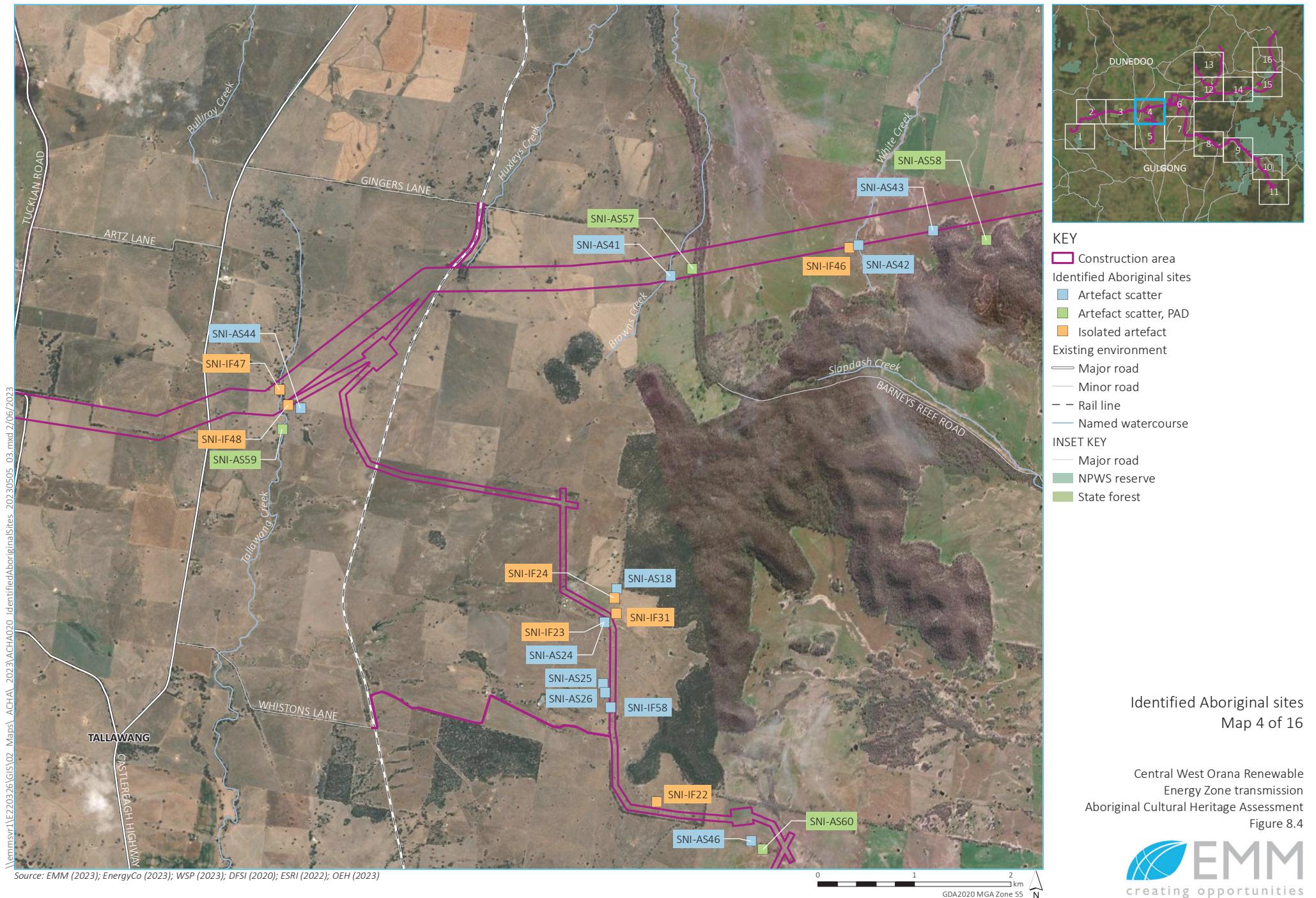
Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 8.4

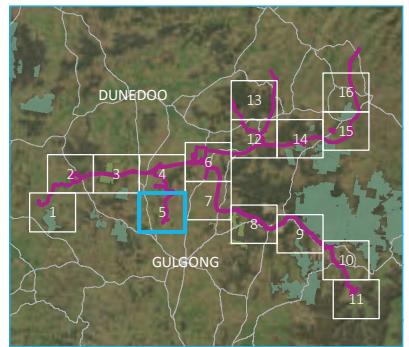
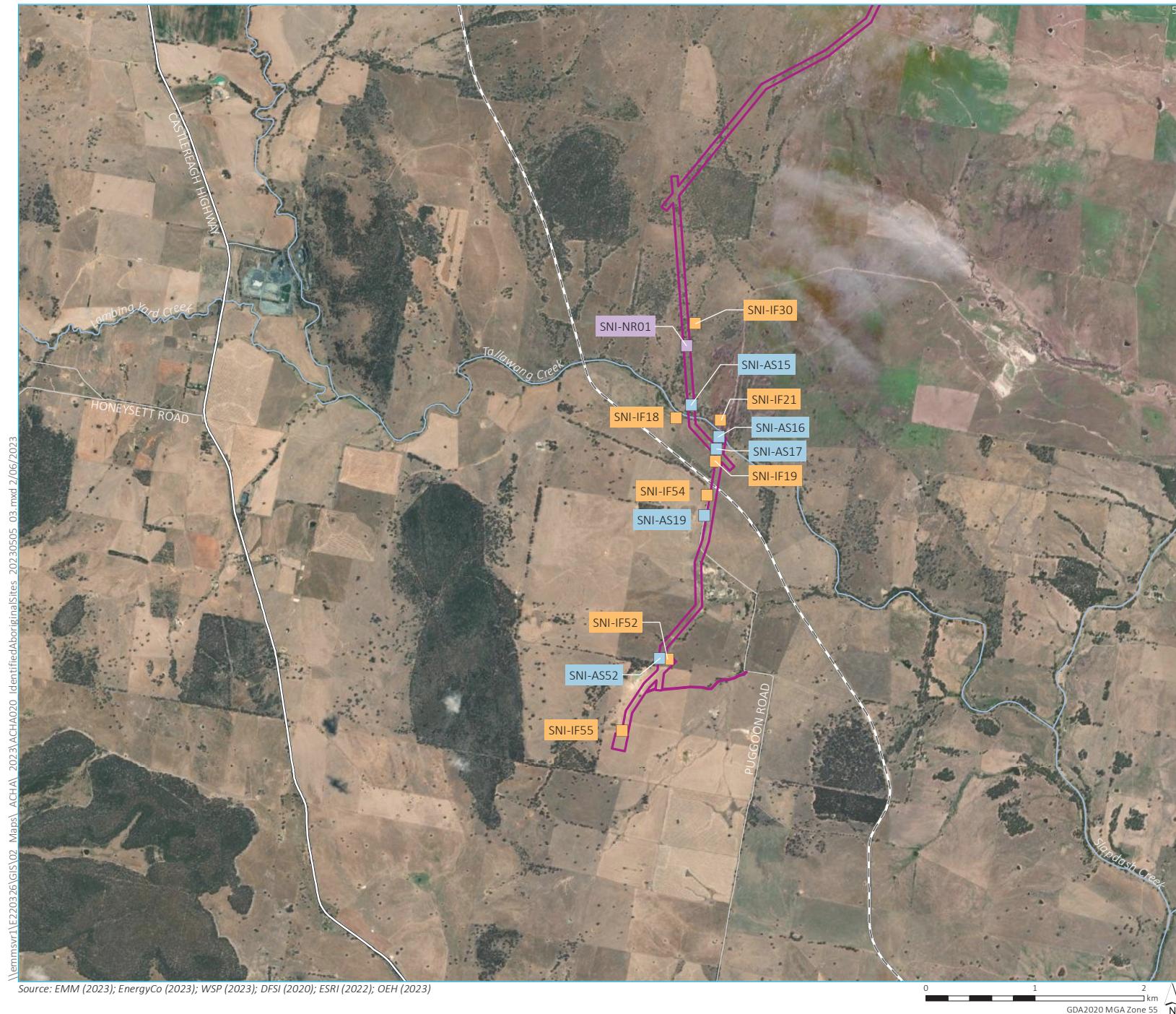


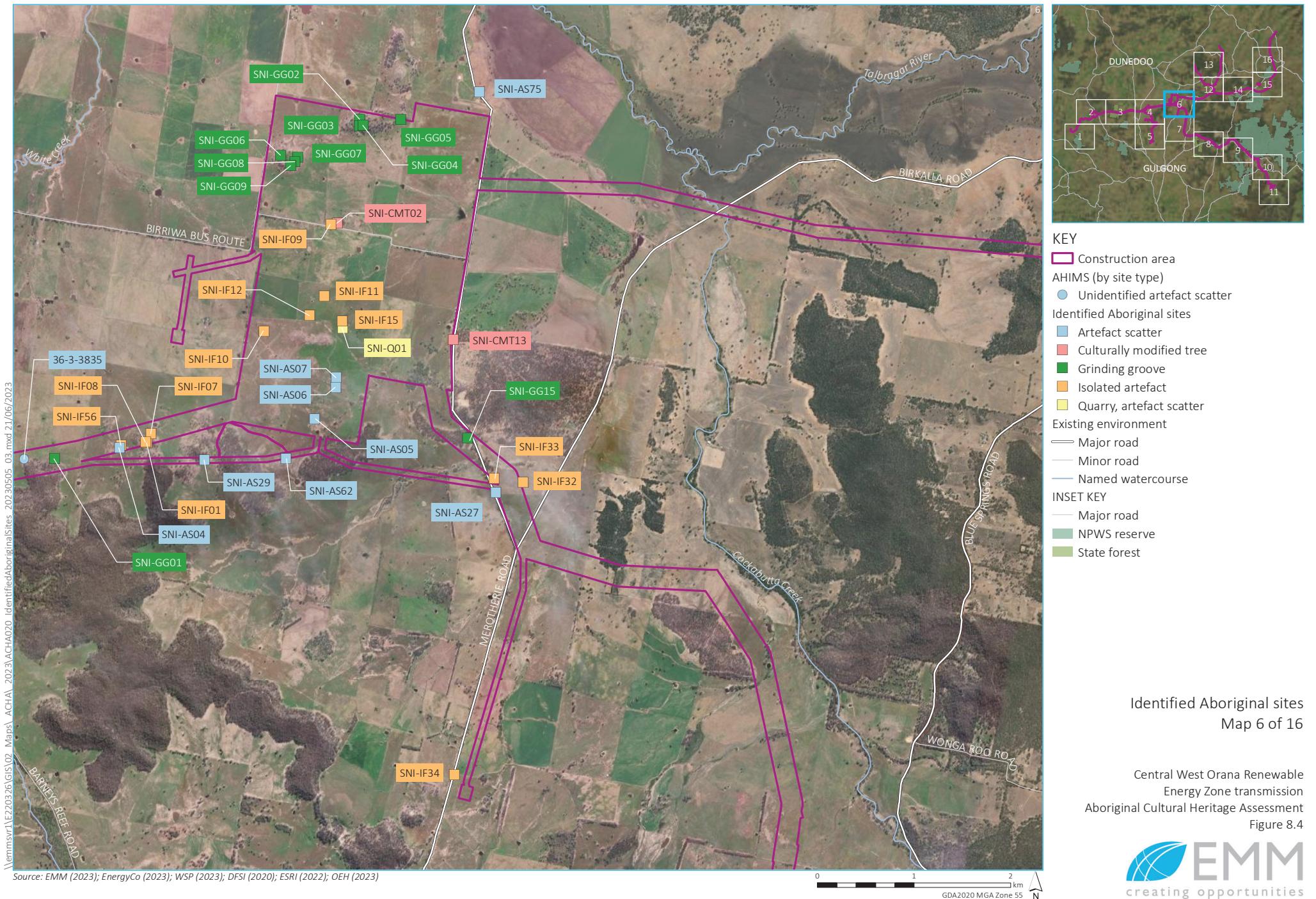


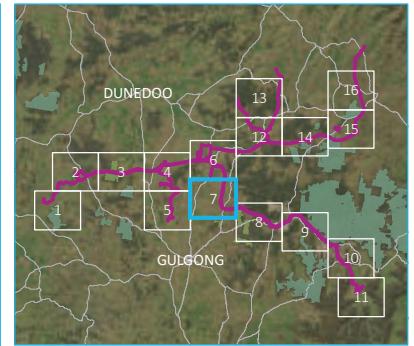
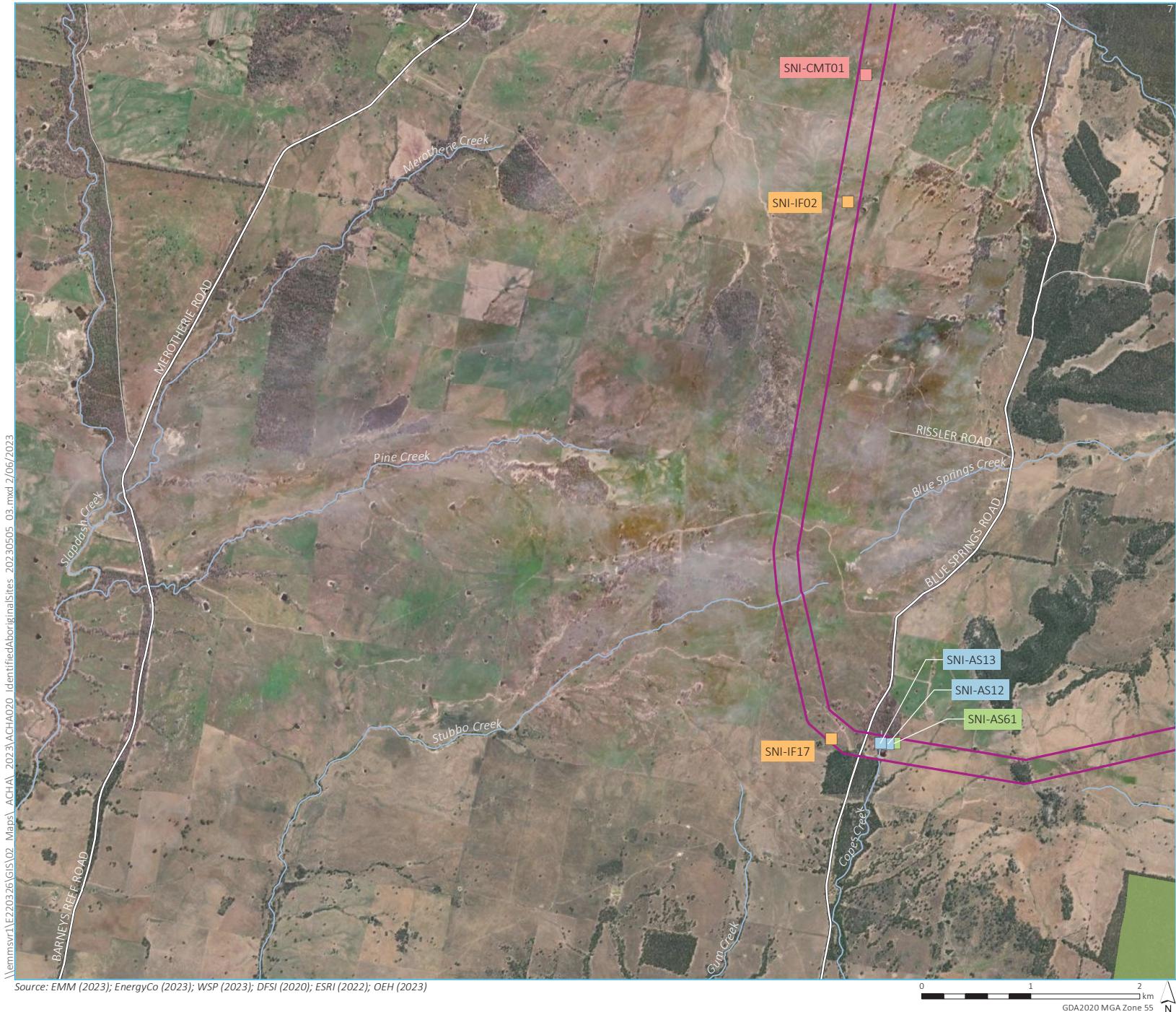
Identified Aboriginal sites  
Map 3 of 16

Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 8.4





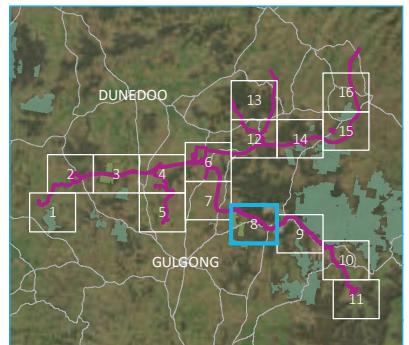
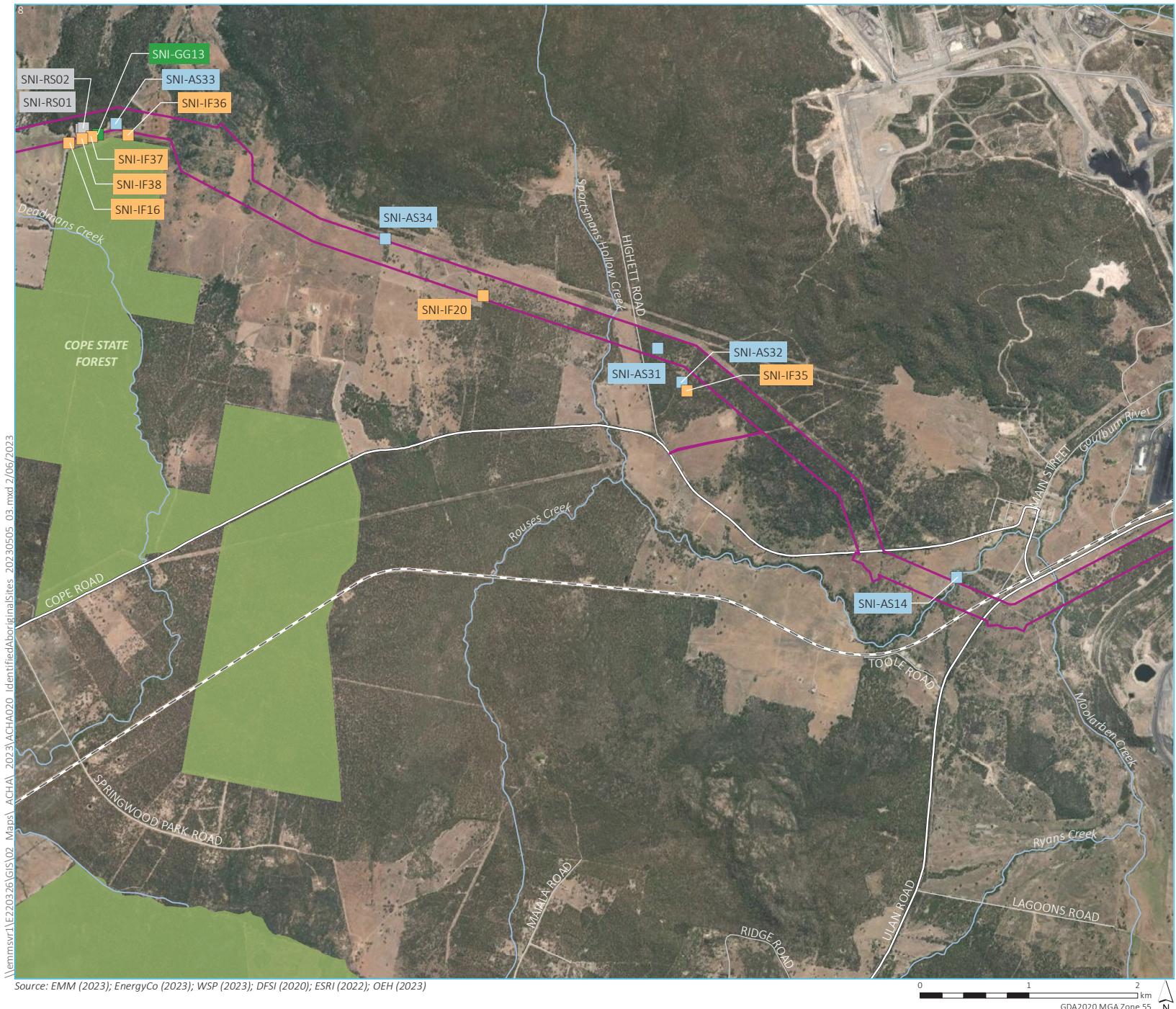




- KEY**
- Construction area
  - Identified Aboriginal sites
  - Artefact scatter
  - Artefact scatter, PAD
  - Culturally modified tree
  - Isolated artefact
  - Existing environment
  - Major road
  - Minor road
  - Named watercourse
  - State forest
  - INSET KEY
  - Major road
  - NPWS reserve
  - State forest

Identified Aboriginal sites  
Map 7 of 16

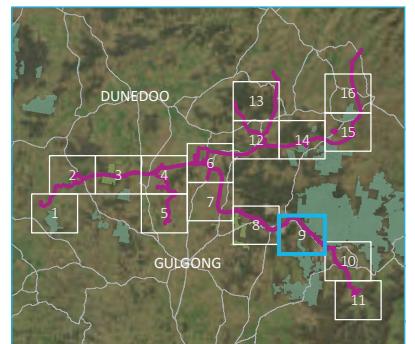
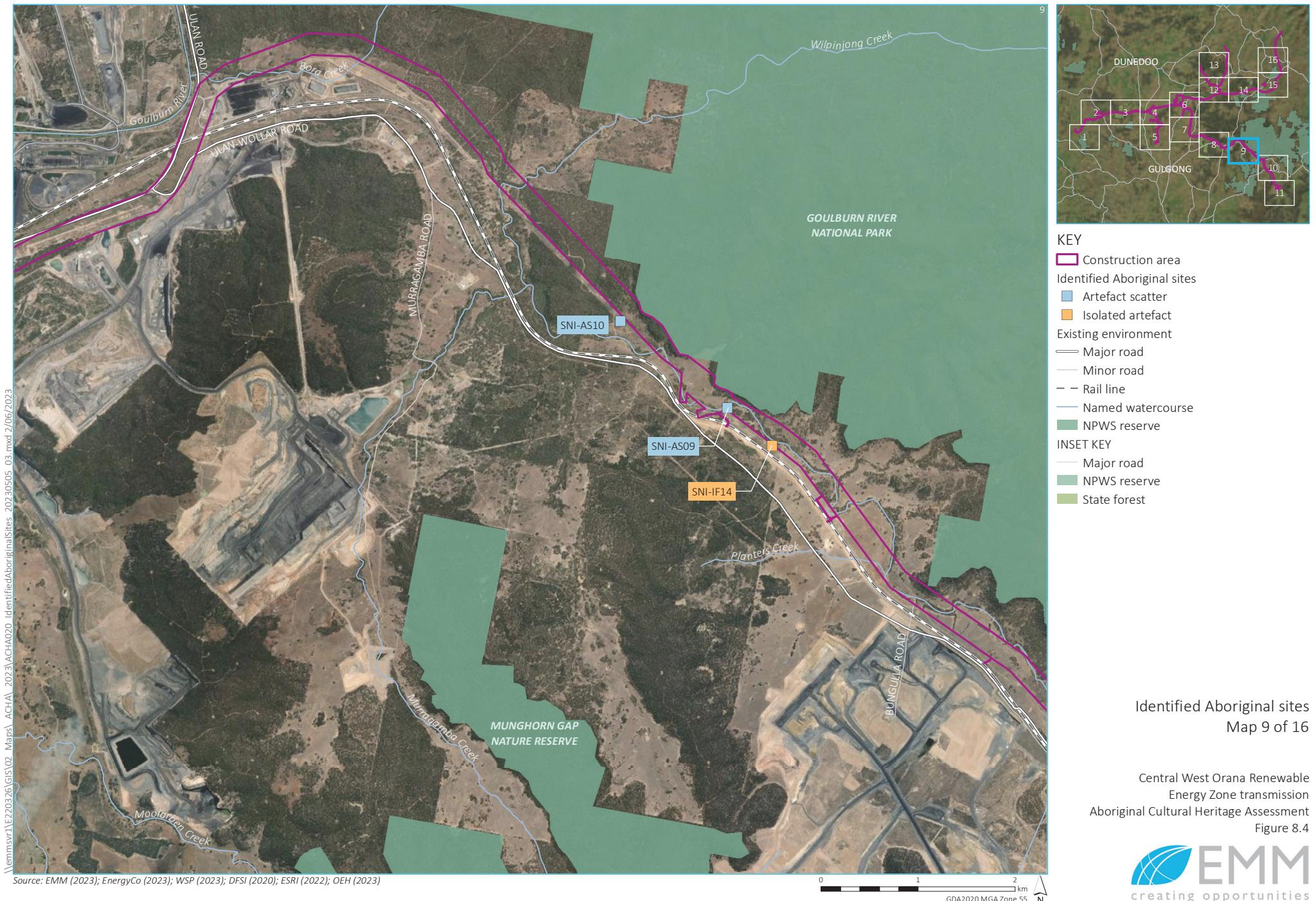
Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 8.4

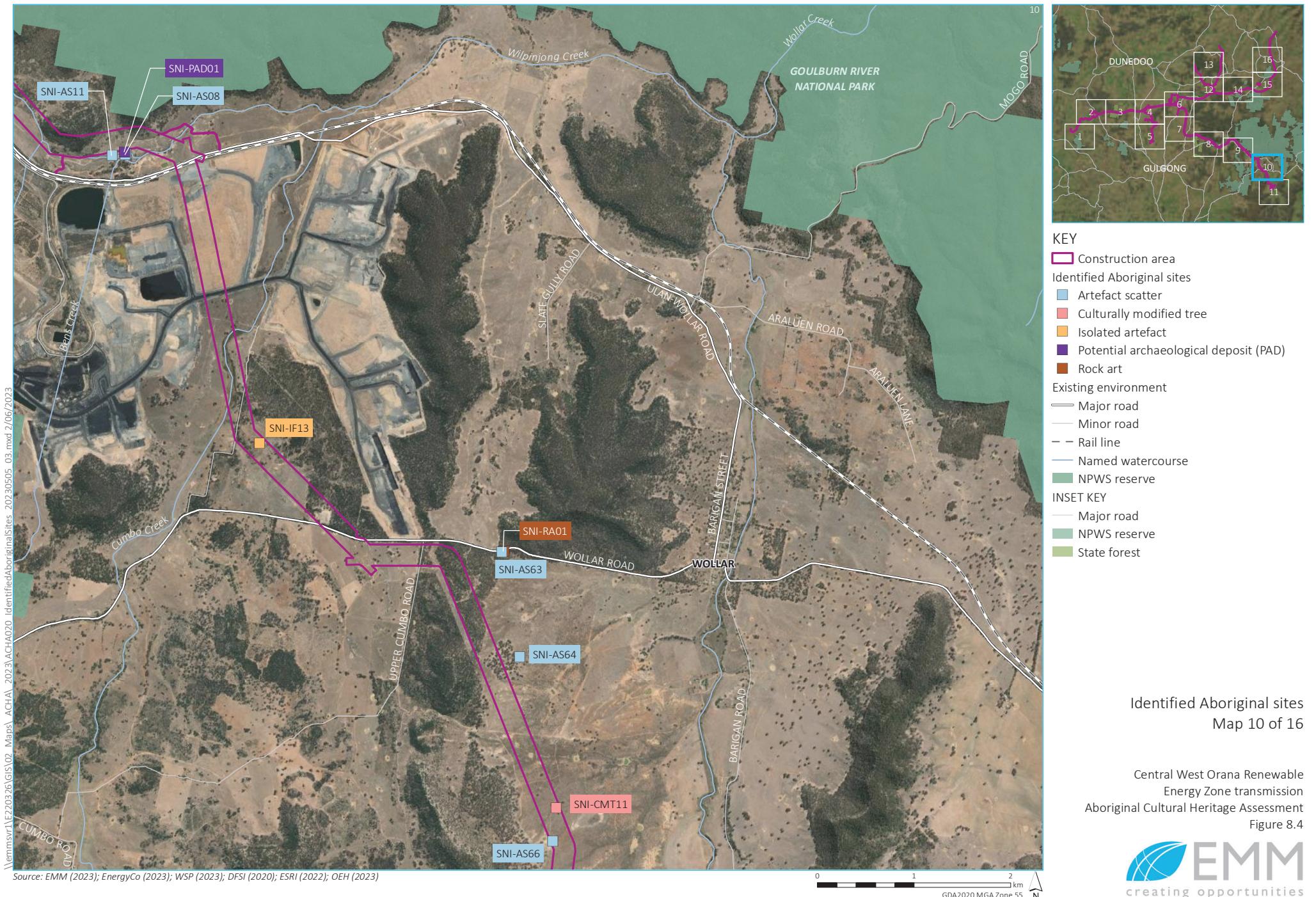


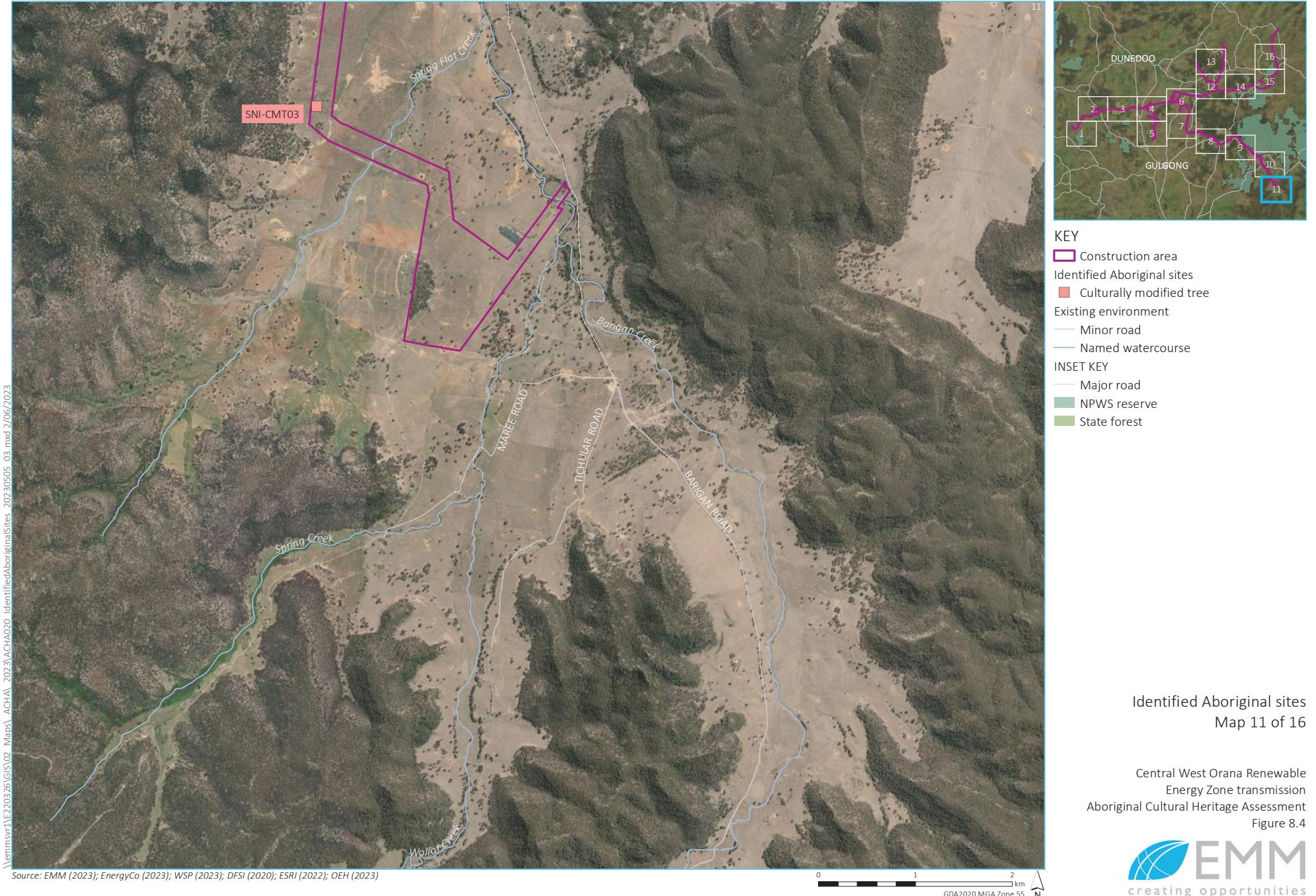
- KEY**
- Construction area
  - Identified Aboriginal sites
  - Artefact scatter
  - Grinding groove
  - Isolated artefact
  - Rock shelter, PAD
  - Existing environment
  - Major road
  - Minor road
  - - Rail line
  - Named watercourse
  - State forest
  - INSET KEY
  - Major road
  - NPWS reserve
  - State forest

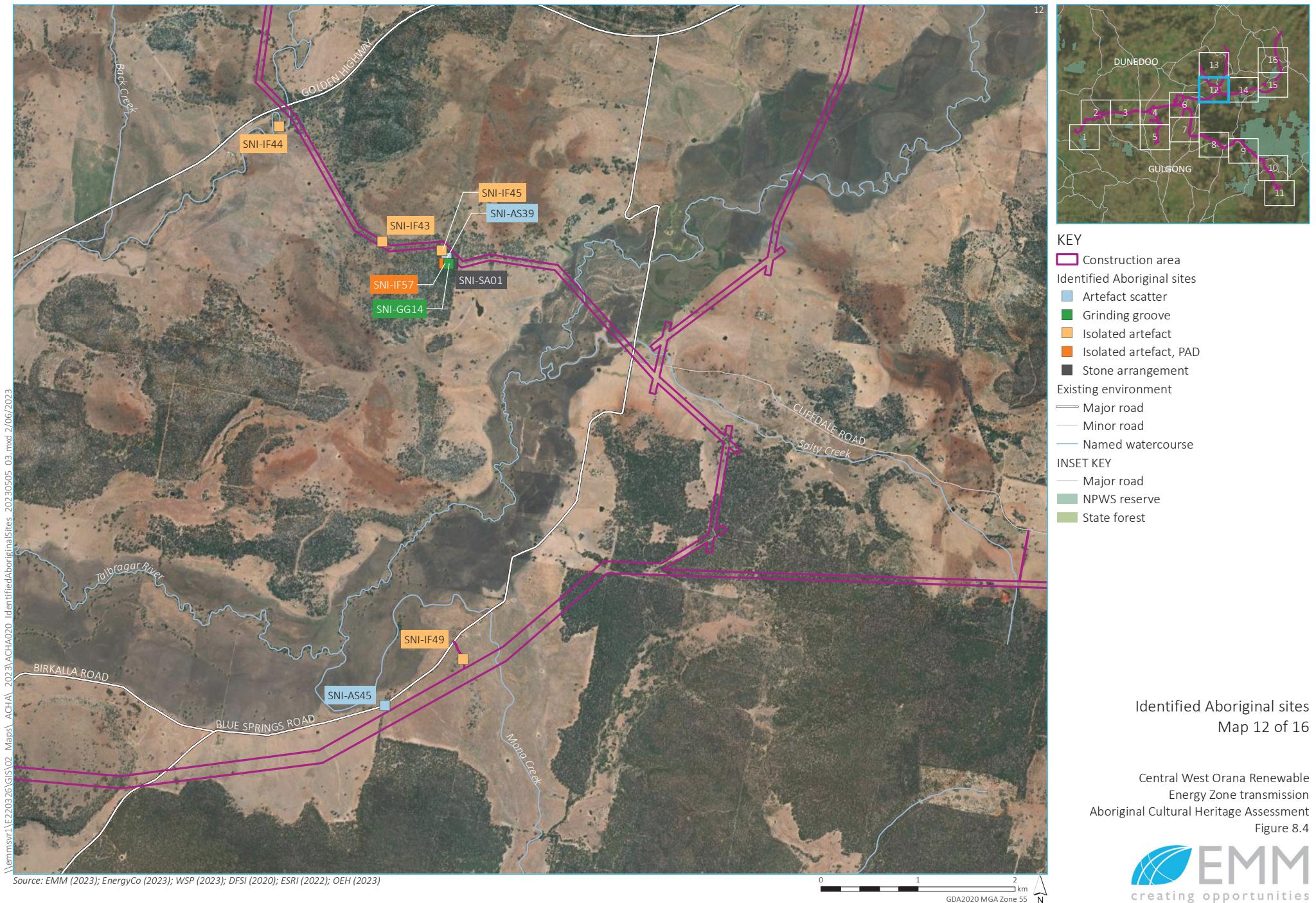
Identified Aboriginal sites  
Map 8 of 16

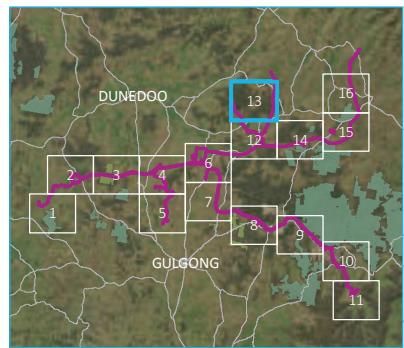
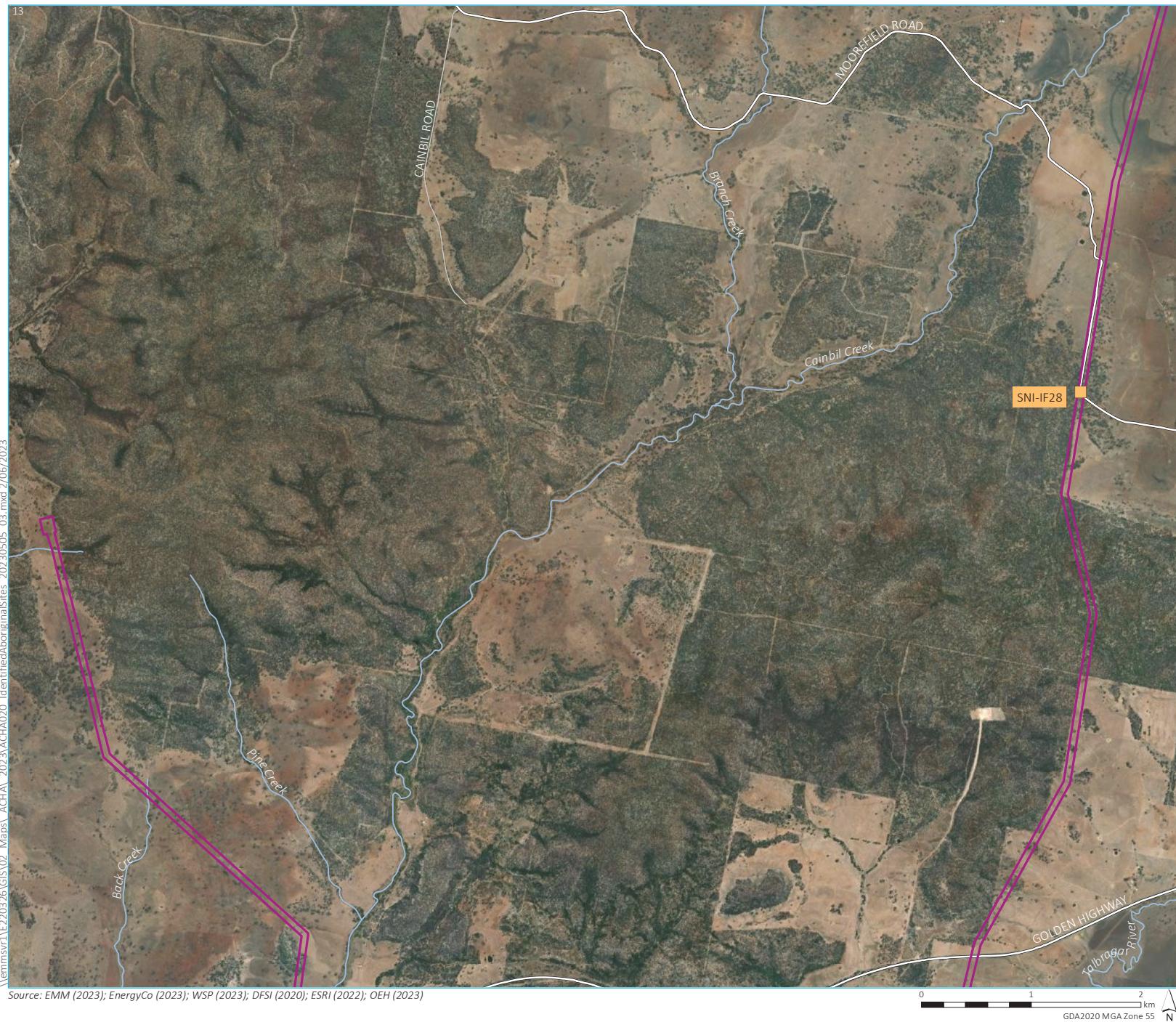
Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 8.4









**KEY**

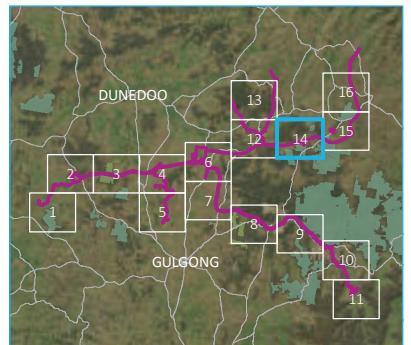
- [Purple Box] Construction area
- [Yellow Box] Identified Aboriginal sites
- [Orange Box] Isolated artefact
- [Grey Line] Existing environment
- [Black Line] Major road
- [Light Grey Line] Minor road
- [Blue Line] Named watercourse

**INSET KEY**

- [Grey Line] Major road
- [Green Box] NPWS reserve
- [Light Green Box] State forest

Identified Aboriginal sites  
Map 13 of 16

Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 8.4

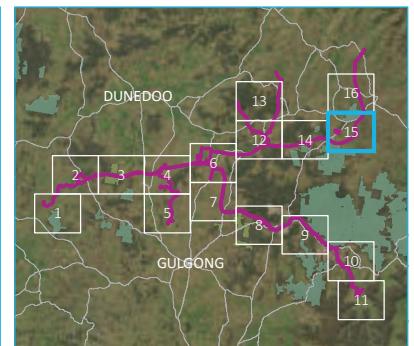
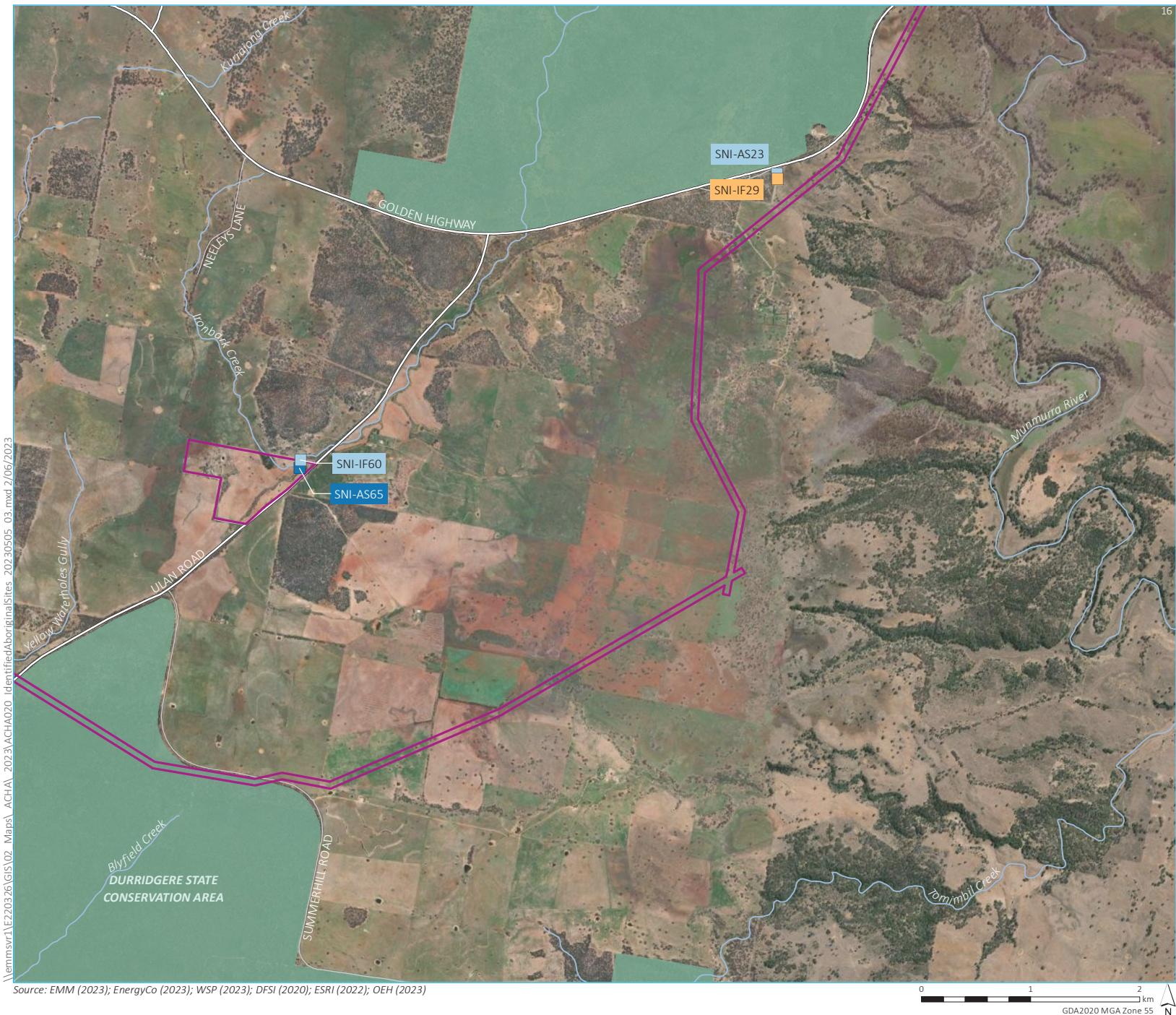


#### KEY

- Construction area
- Identified Aboriginal sites
- Artefact scatter
- Culturally modified tree
- Existing environment
- Major road
- Minor road
- Named watercourse
- NPWS reserve
- INSET KEY
- Major road
- NPWS reserve
- State forest

Identified Aboriginal sites  
Map 14 of 16

Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 8.4

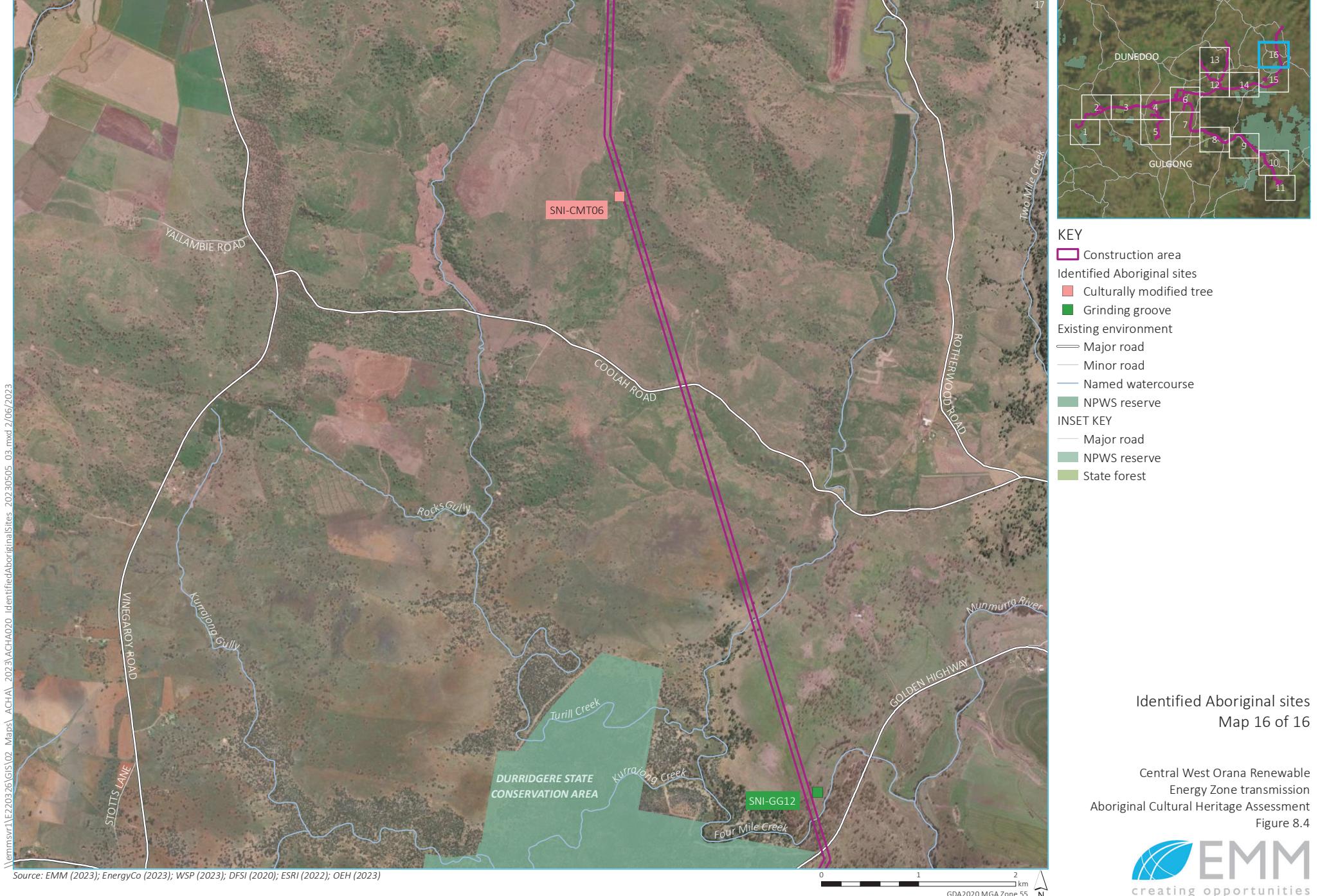


#### KEY

- Construction area
- Identified Aboriginal sites
- Artefact scatter
- Artefact scatter, grinding groove, PAD
- Isolated artefact
- Existing environment
- Major road
- Minor road
- Named watercourse
- NPWS reserve
- INSET KEY
- Major road
- NPWS reserve
- State forest

Identified Aboriginal sites  
Map 15 of 16

Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 8.4



## 8.3 Test excavations

### 8.3.1 Approach and methods

A small, targeted program of test excavation was undertaken over a six-week period between 7 November and 15 December 2022. These works were undertaken by EMM archaeologists (including Cameron Neal, Megan Sheppard Brennand, Miles Robson, Luke Kirkwood), as well as assistance from OzArk (Brendan Fisher, Harrison Rochford), with the participation of 15 locally based Wiradjuri and Gomeroi traditional owners (Appendix B).

Given the ~260 km length of the construction area and the conceptual nature of the development impacts during the ACHA process, the test excavations were undertaken to supplement and support the findings of the field survey, rather than implement a broader exploratory approach that may be employed on smaller sites. Specifically, the test excavations were undertaken at locations where:

1. proposed transmission line tower locations were considered probable and planned based on initial concept designs
2. the field survey had identified a discrete area of archaeological interest, either through observed cultural materials or a belief they would be present
3. the predictive models developed from the desktop information (Section 7.5) needed to be validated. The approach to the test excavation program was developed in discussions with Heritage NSW, who requested increased field survey compared with test excavation – which as shown in previous sections accurately reflects the cultural record in this region – and in response to logistical constraints, notably extremely wet weather (>400 mm occurring during the field campaign) and land owner access restrictions.

Within the above parameters, the primary aims of the excavations were as follows:

- Identify, map and characterise the nature, age, extent, integrity and significance of the cultural materials within the construction area.
- Collect data to answer the following research questions:
  - What are the environmental characteristics associated with the distribution of cultural materials within the construction area?
  - Can the formative processes of the stratigraphic profile provide information on the nature and/or survivability of the archaeological resources?
  - What are the cultural, social and public values associated with the Aboriginal archaeological resource within the construction area?
  - How should the Aboriginal sites in the region be conserved and managed in future?
- Better assess the significance and historical meaning of the cultural materials that exist within the construction area so that future archaeological investigation can advance our understanding of past Aboriginal cultural behaviour and environmental adaptation.
- Direct future heritage activities and mitigation measures (if required) for the project.

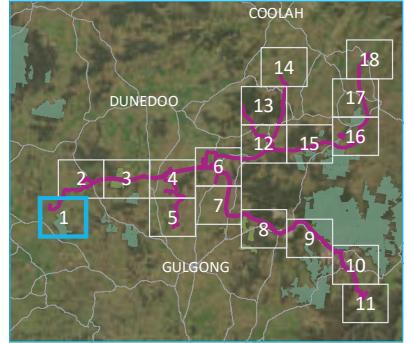
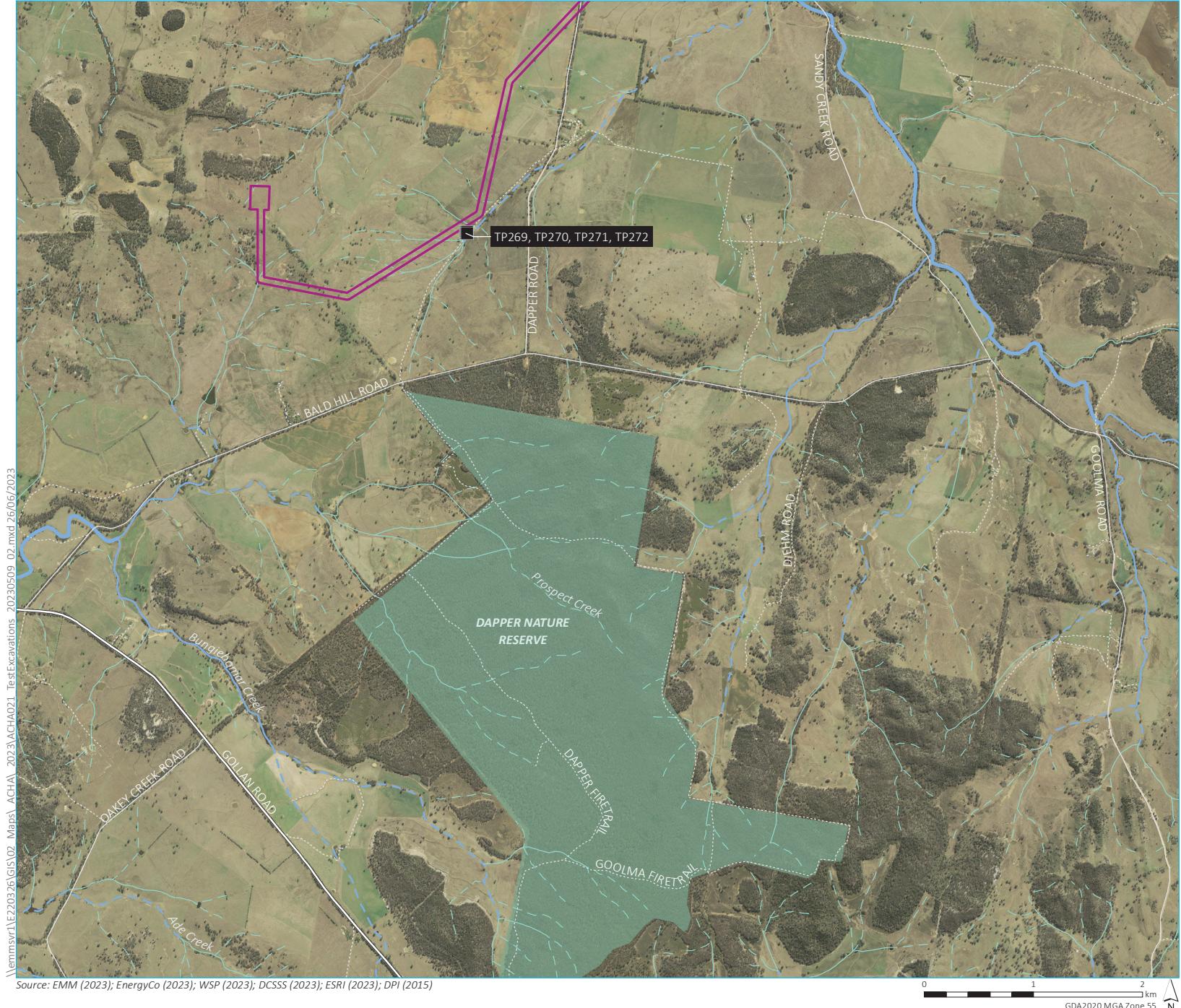
To achieve these aims, the archaeological program targeted 30 indicative transmission tower locations (based on a reference design for the project) that were either within or close to areas that were identified as PADs or in close proximity to 2nd order or above creek lines (Figure 8.5). The rationale was that while the designs were conceptual and the transmission locations may change, the program would enable:

1. an overall predictive model of the cultural material distribution, with tower locations being found in a range of landforms and distances from water courses
2. provide a general indication of the cultural materials at a given locale even where transmission towers may be subject to some change.

Each site was further assessed prior to completing the test excavations, and several of the original targeted areas were not completed following observations of localised impacts, either from active farming activities or due to submergence from extreme rain events in late 2022. A series of secondary targets were also developed to replace those not undertaken, and which were based on meeting at least two of the location criteria above. At each of the proposed test excavation locations, four test pits were established in a 20 m spaced grid, each nominally located where the support of the tower would be established. Archaeological test excavations were undertaken in accordance with Requirements 16 and 17 of the *Code of Practice for the Investigation of Aboriginal Objects in NSW* (DECCW 2010).

In summary, the following methods were adopted for the excavation:

- all test excavation pits were spatially located using a non-differential GPS device
- manual excavation of 0.25 m<sup>2</sup> test pits
- all excavation used hand tools, such as shovels, mattocks and trowels
- excavation of the first unit was in 5 cm spits, with subsequent excavation in 10 cm spits
- manual excavation continued to either: i) the base of the cultural deposits; ii) to the depth of the underlying geology; or iii) to the maximum depth possible via hand excavation (~1–1.5 m)
- wet sieving of all manually excavated material through a 5 mm sieve
- soil profiles were recorded in accordance with the Code of Practice, including scaled drawings, photographs, and written descriptions
- soil samples were collected for description, sedimentological and chronological analysis where such analysis was considered likely to contribute significant information.



#### KEY

Construction area

Test pit status

Proposed

Strahler stream order

1st order

2nd order

3rd order

4th order

5th order

Existing environment

Major road

Minor road

Vehicular track

NPWS reserve

INSET KEY

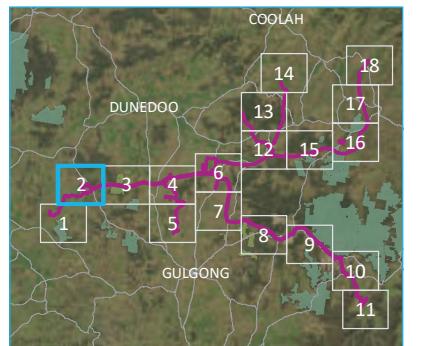
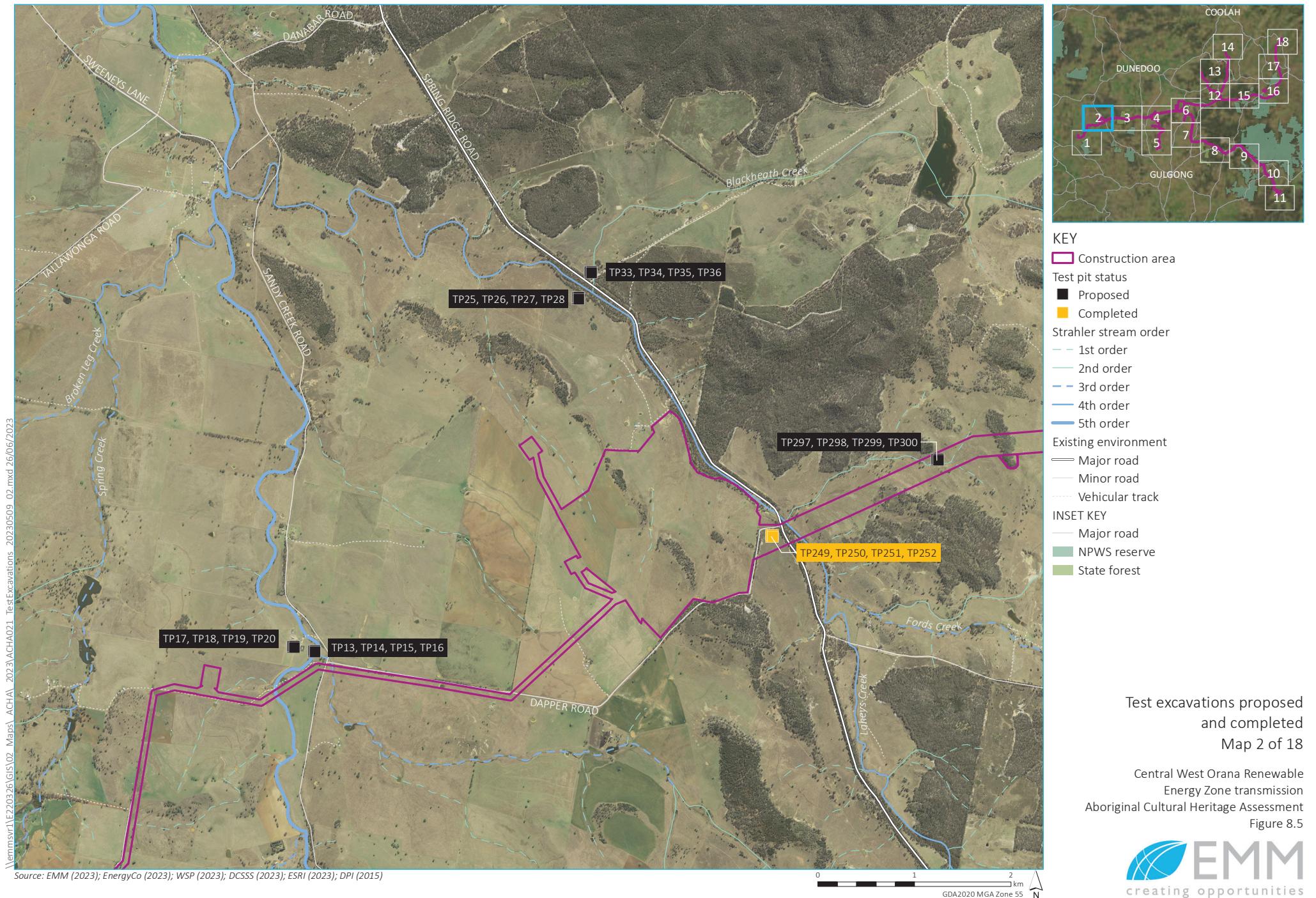
Major road

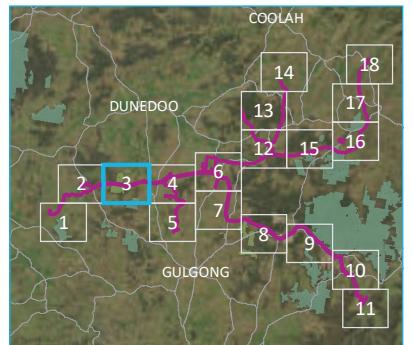
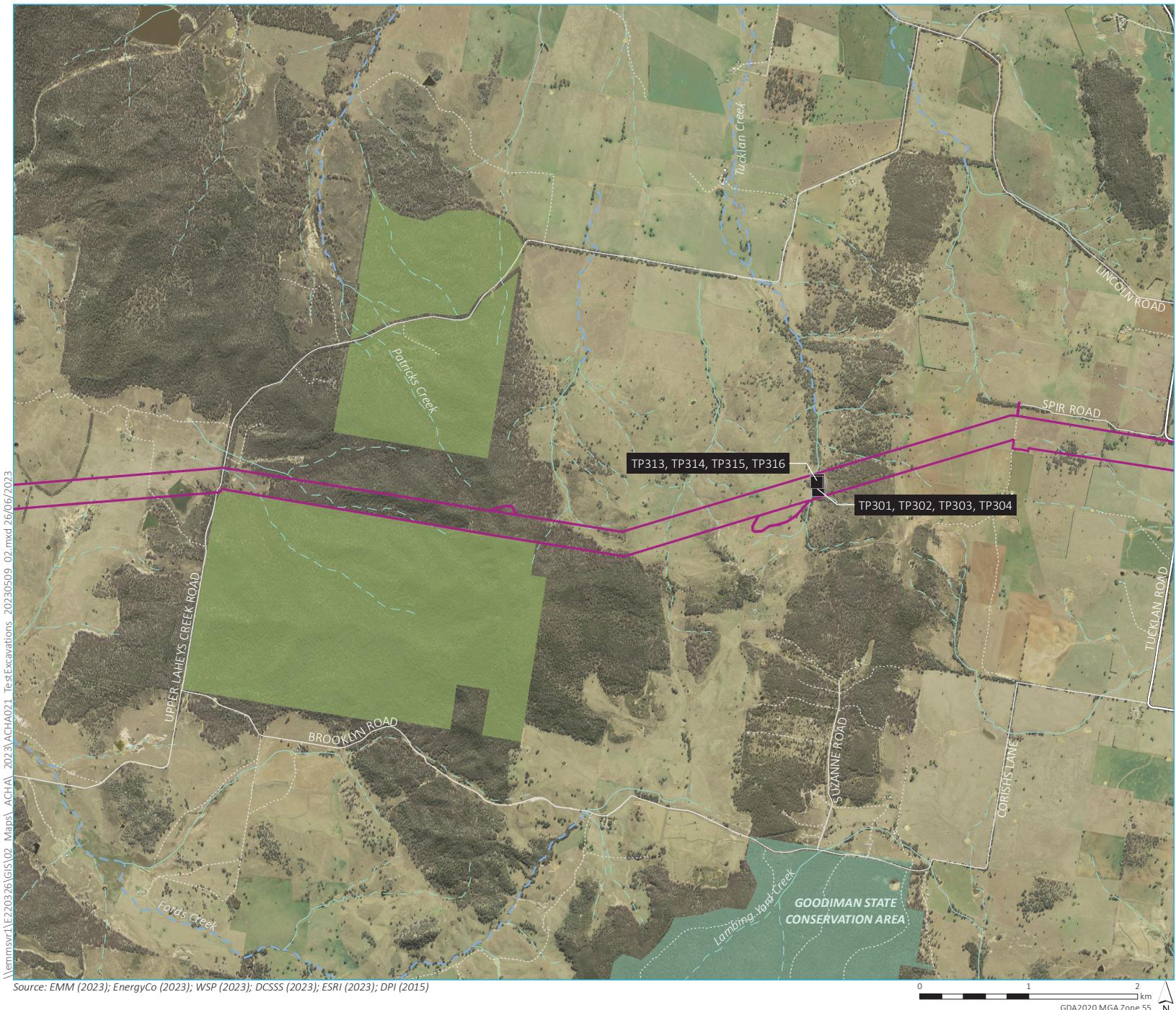
NPWS reserve

State forest

Test excavations proposed  
and completed  
Map 1 of 18

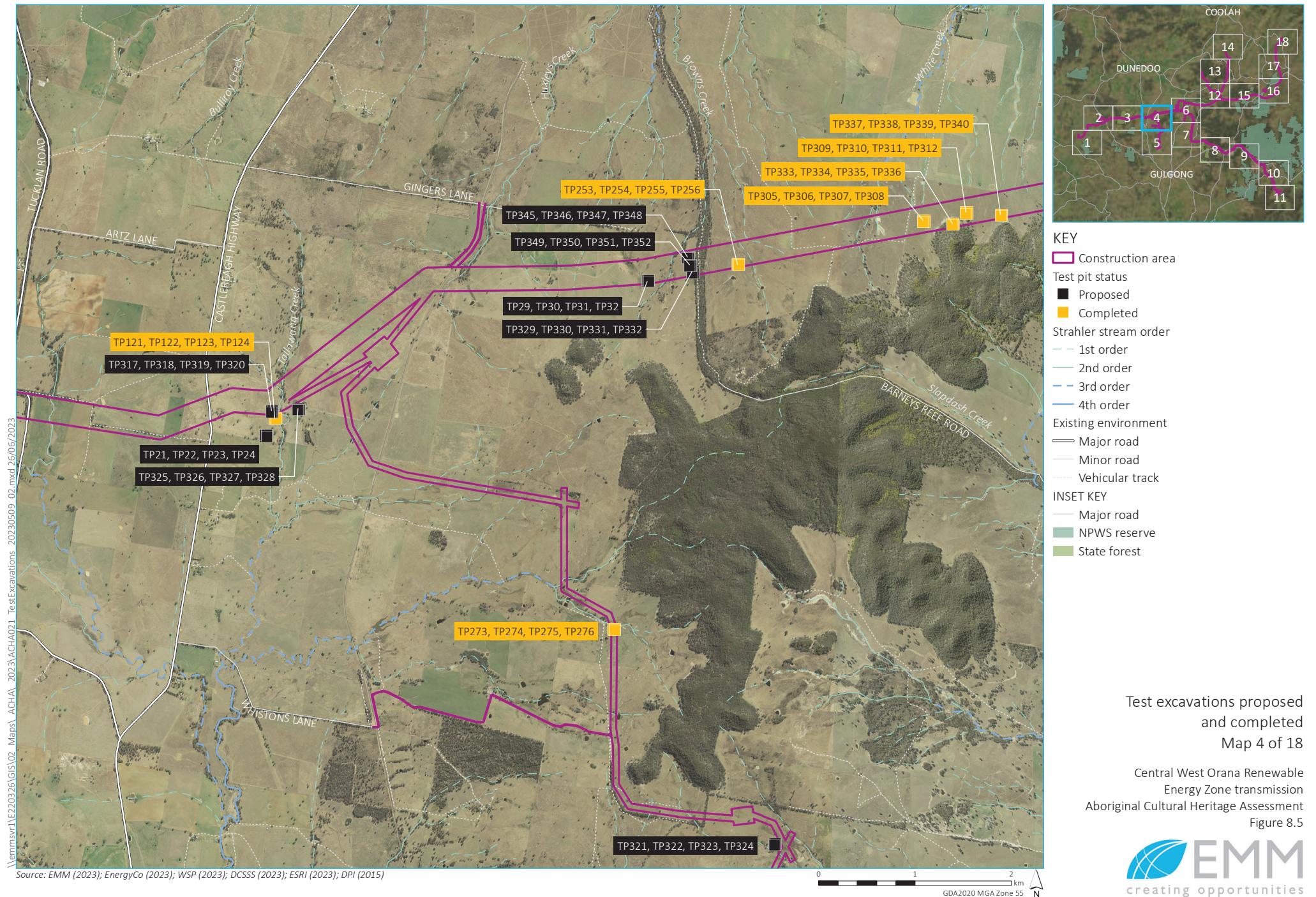
Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 8.5





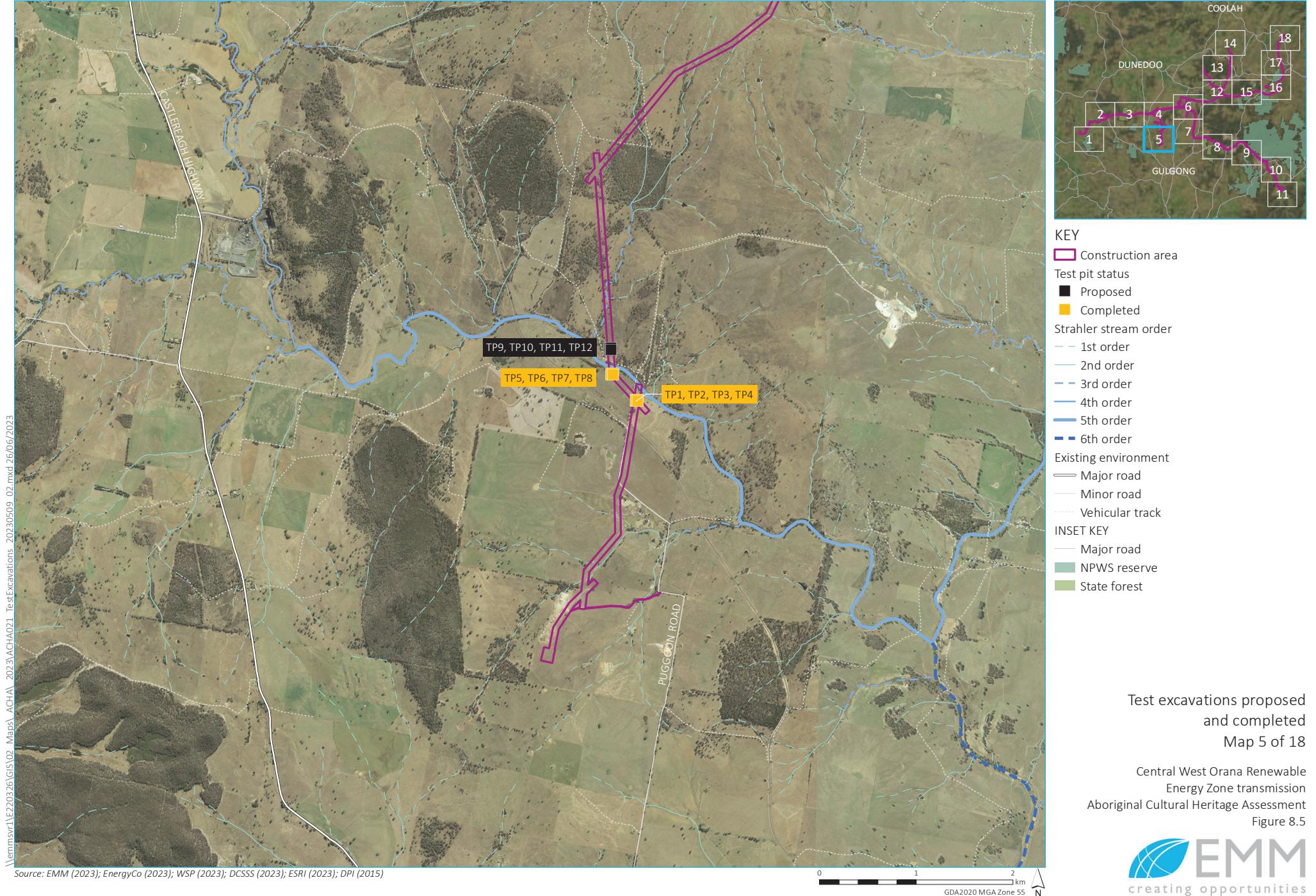
Test excavations proposed  
and completed  
Map 3 of 18

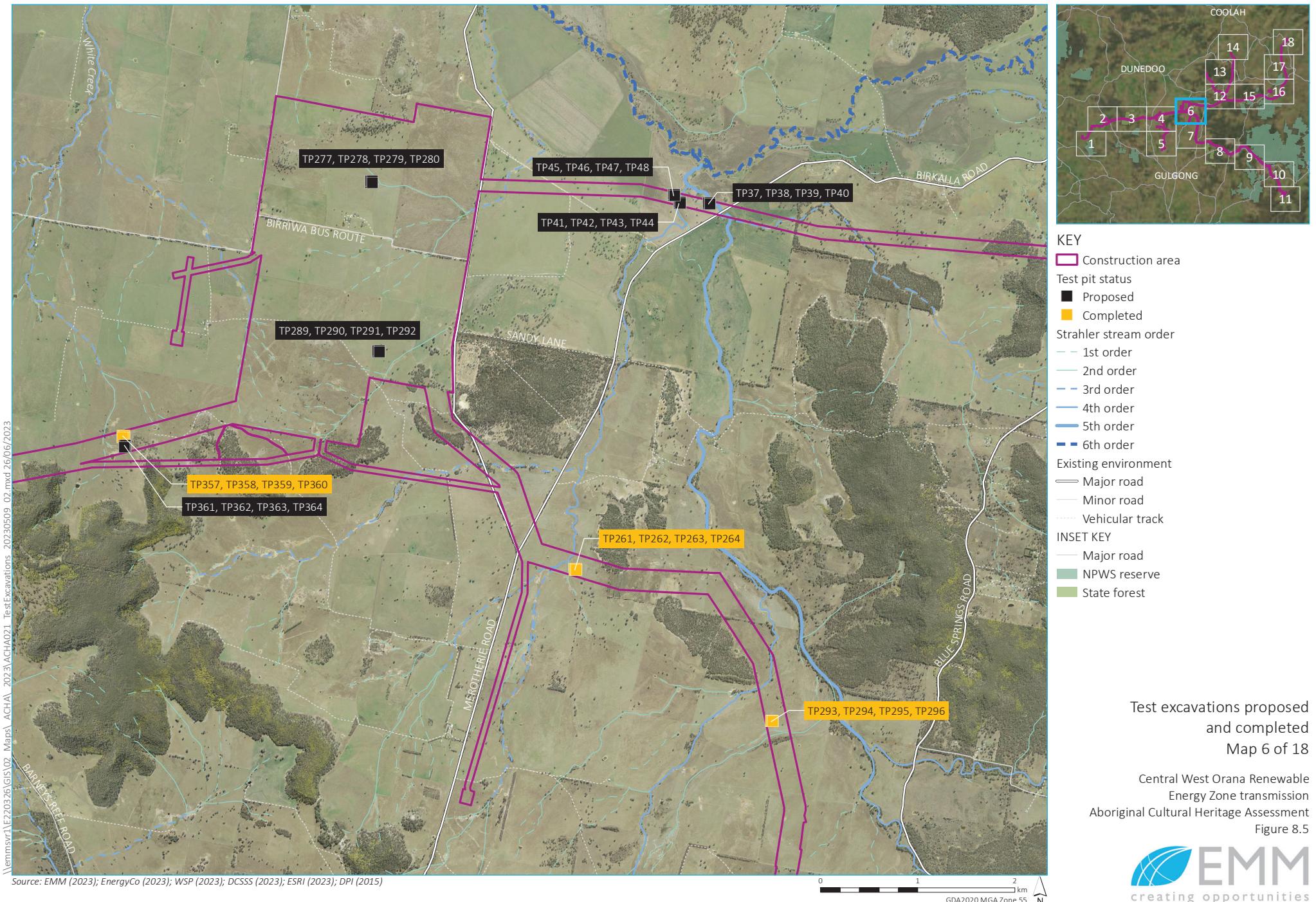
Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 8.5

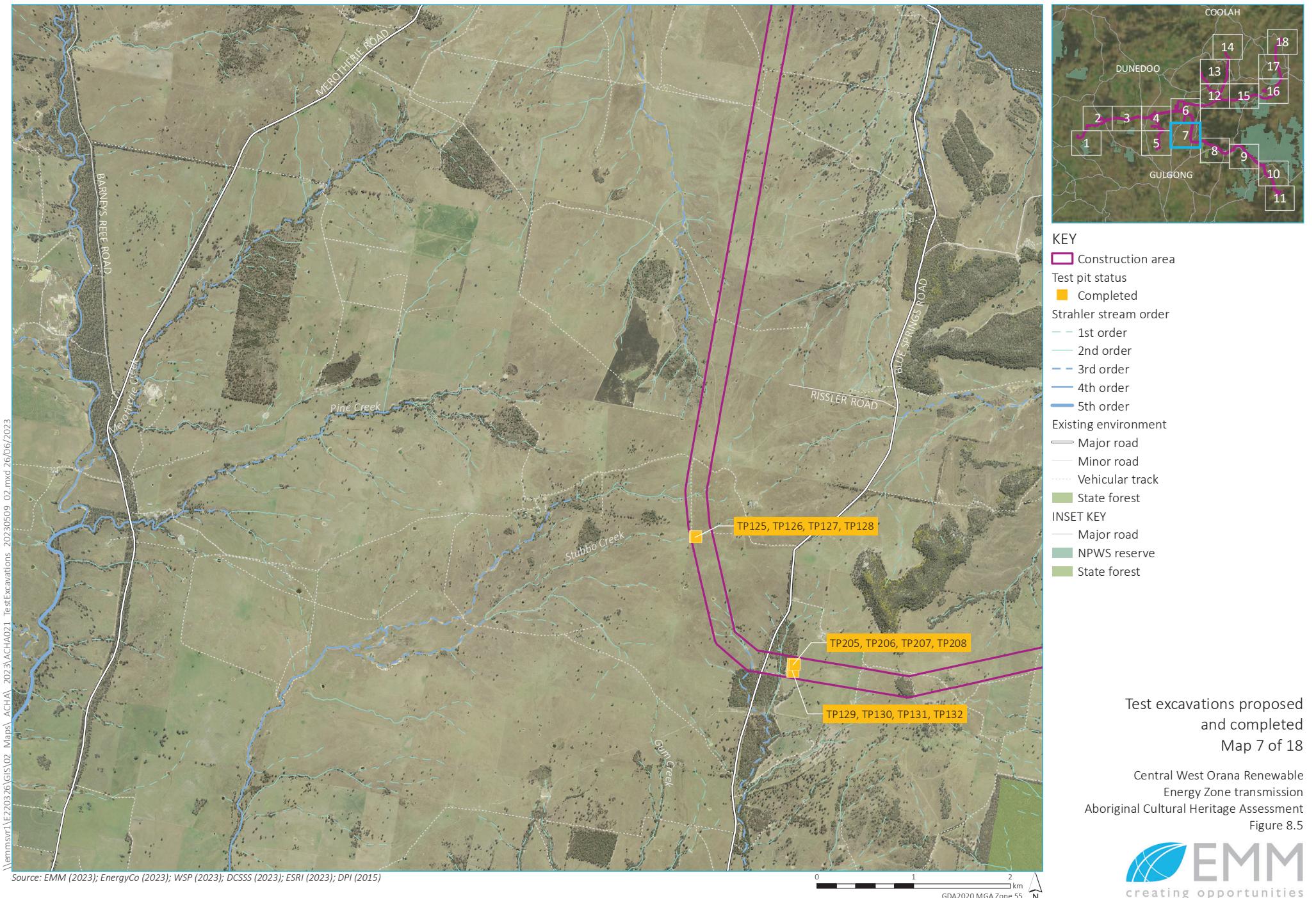


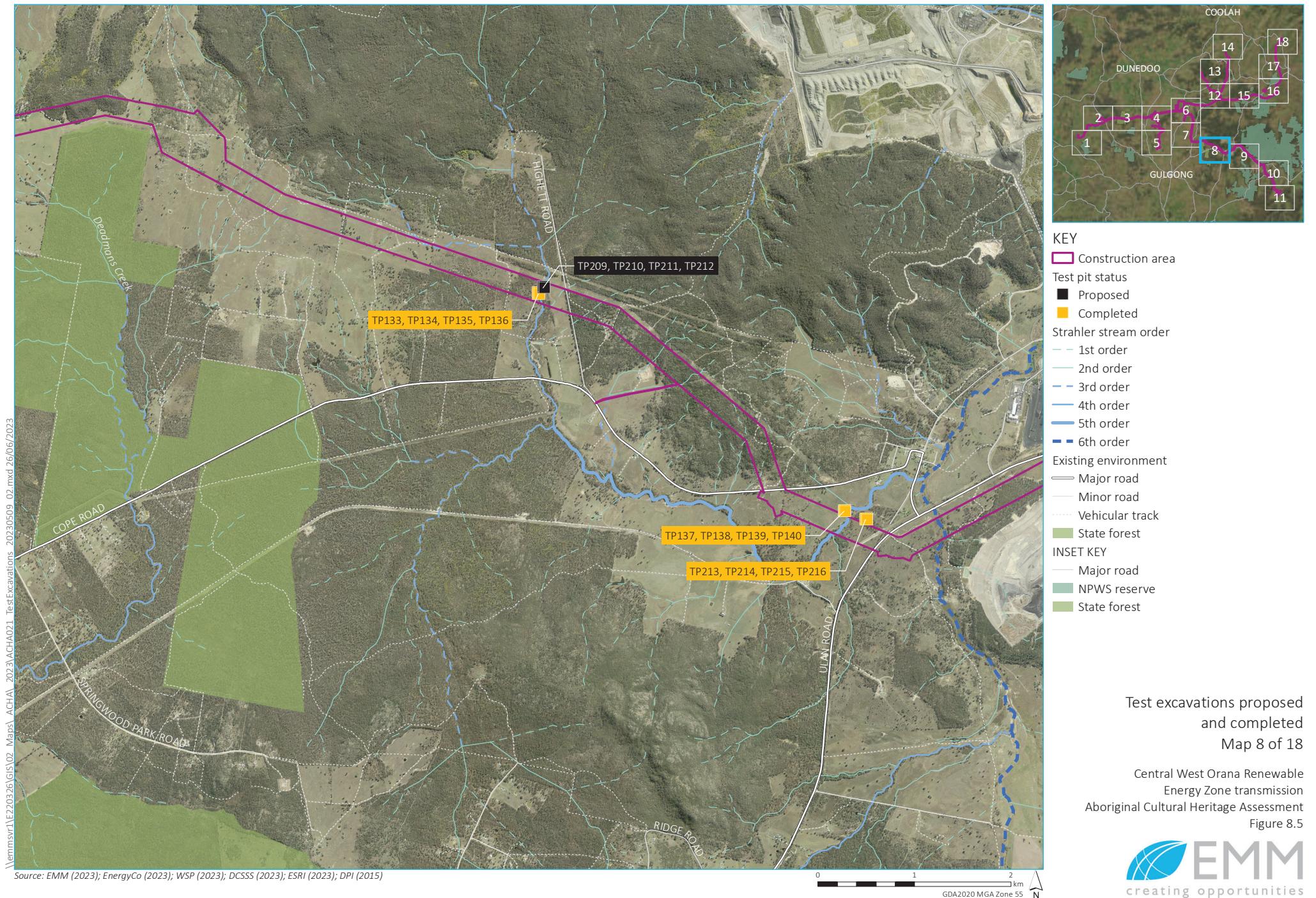
Test excavations proposed  
and completed  
Map 4 of 18

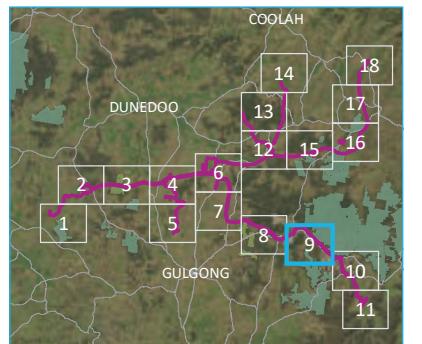
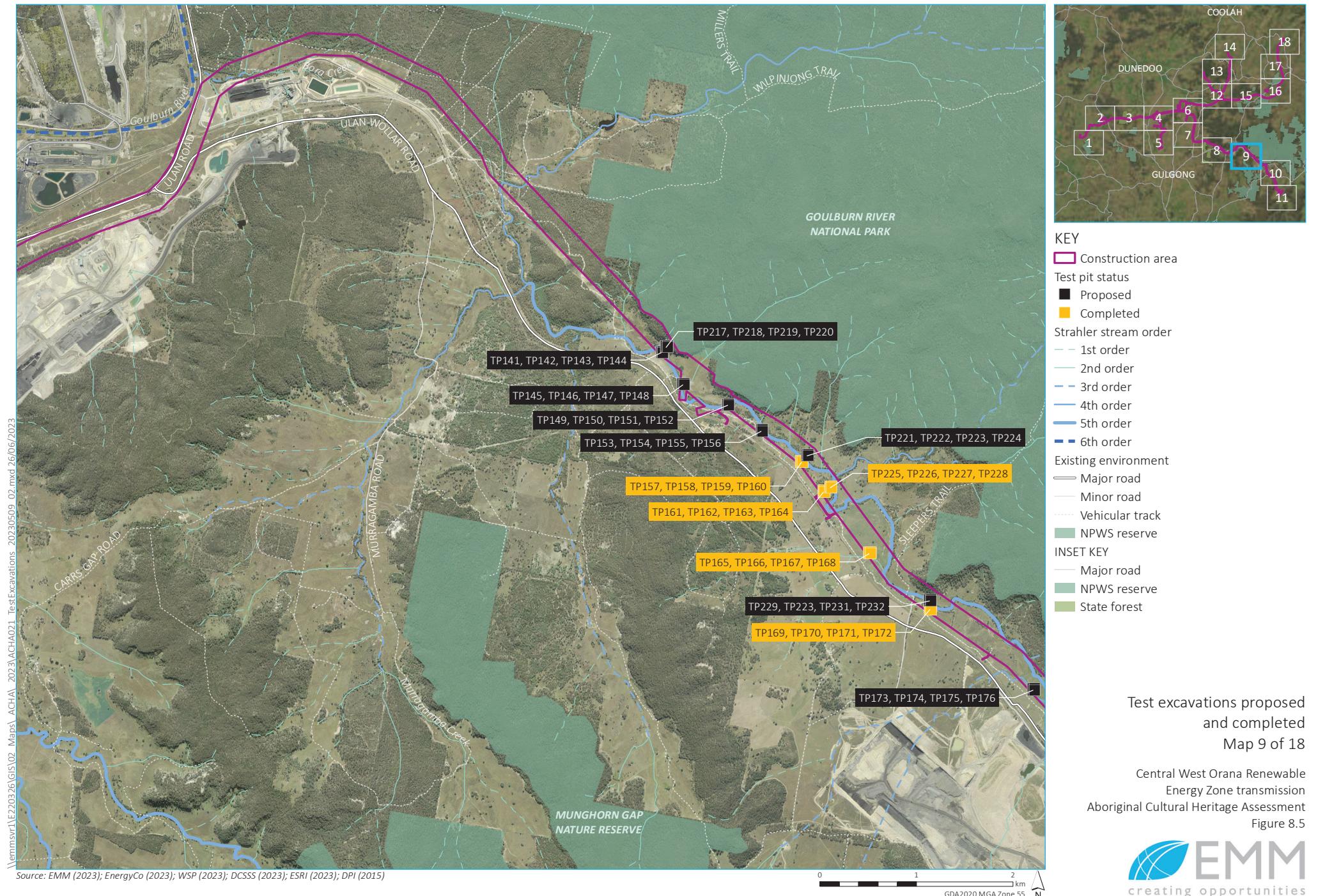
Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 8.5

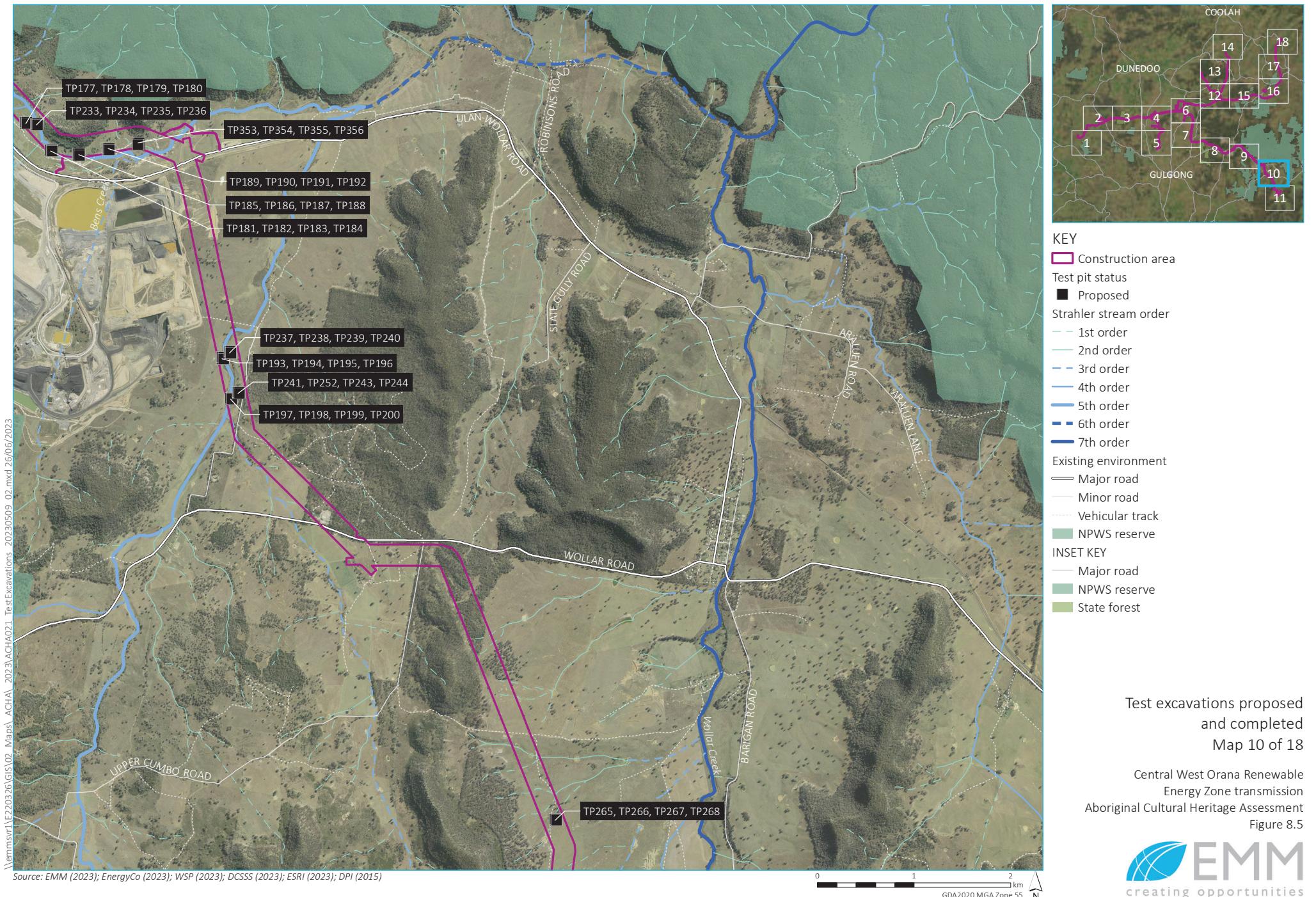


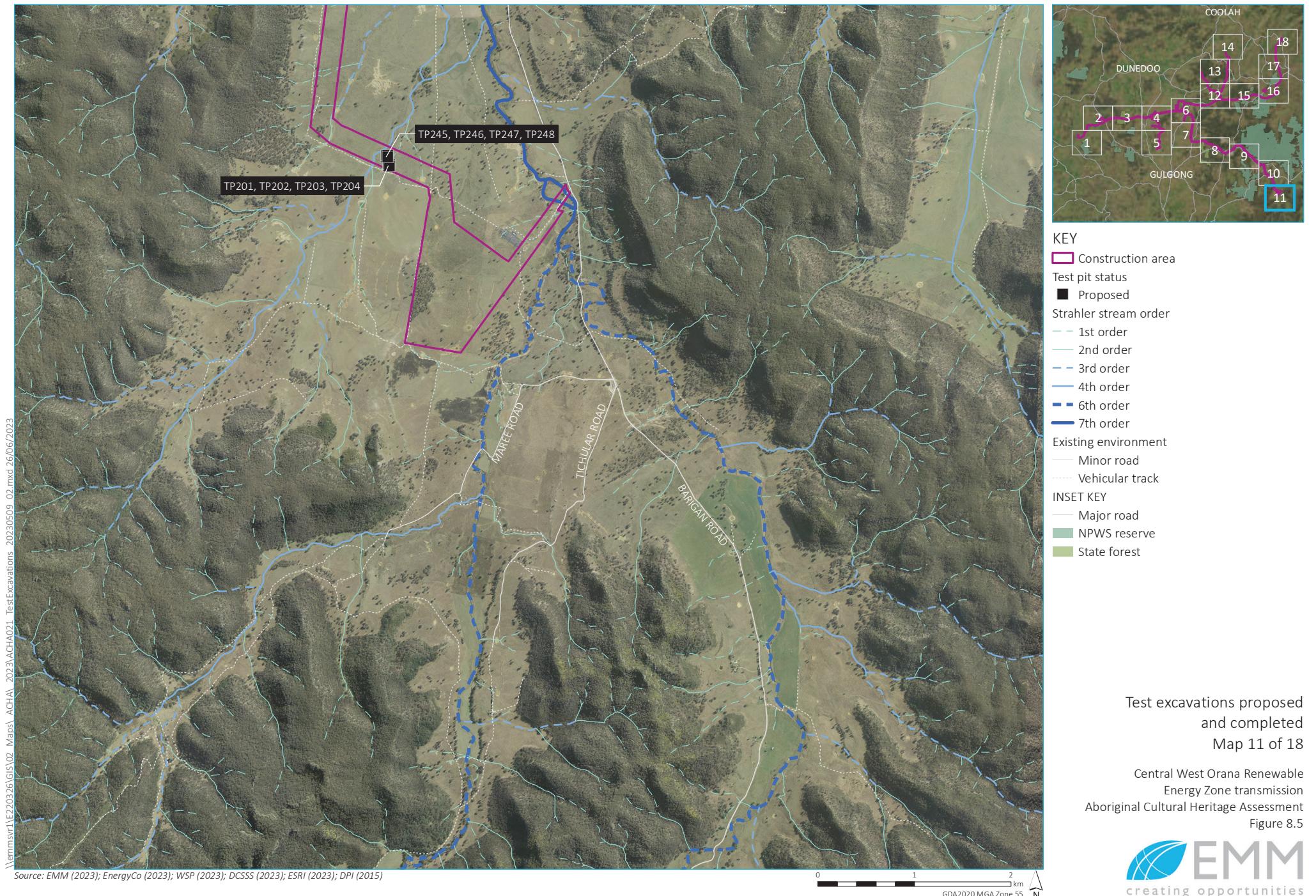






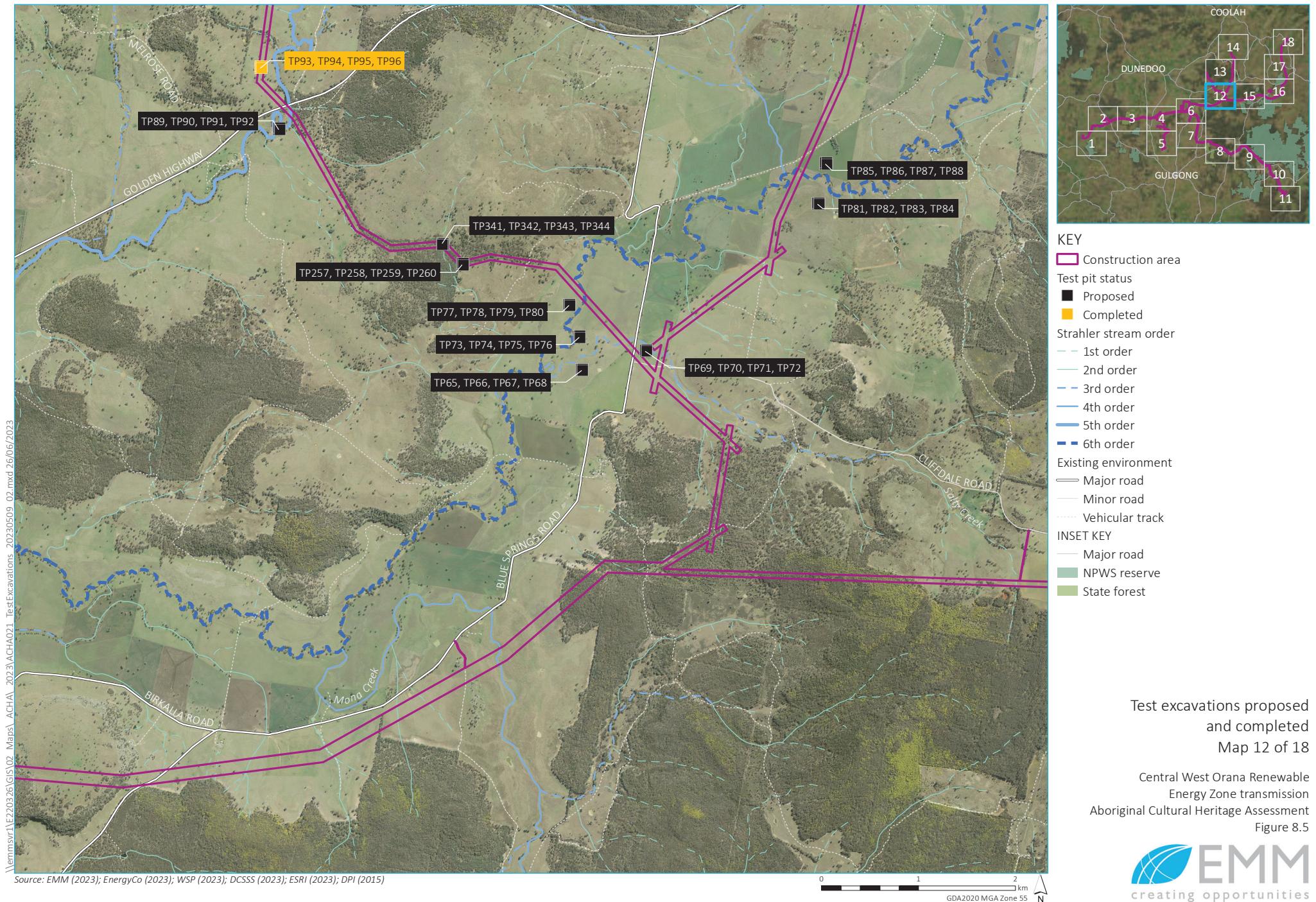


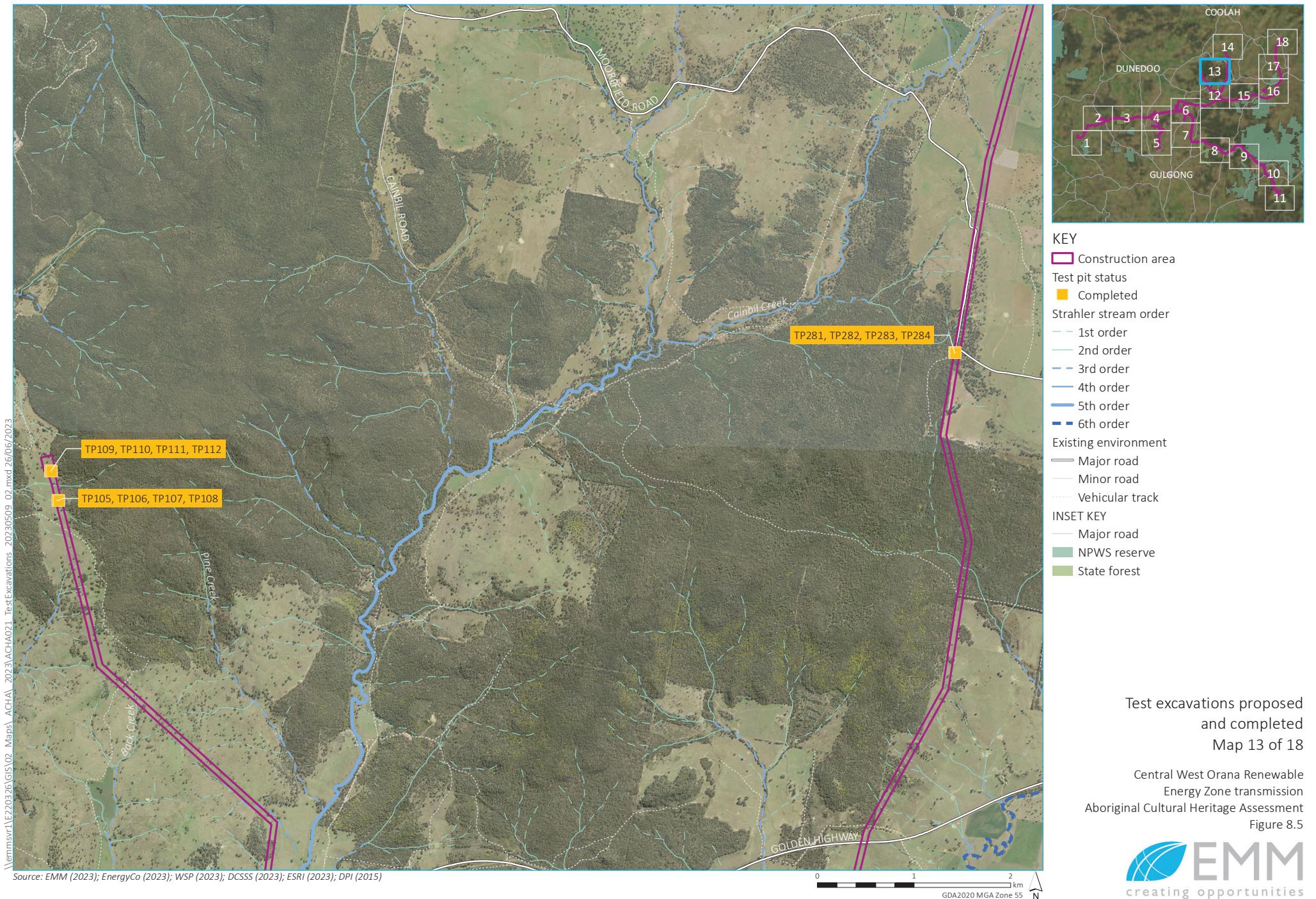


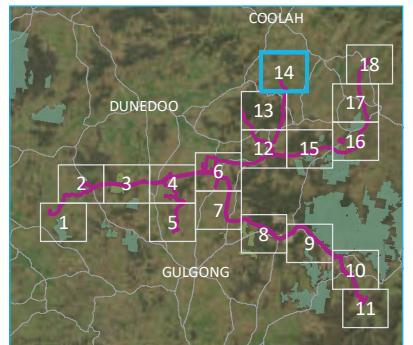


Test excavations proposed  
and completed  
Map 11 of 18

Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 8.5

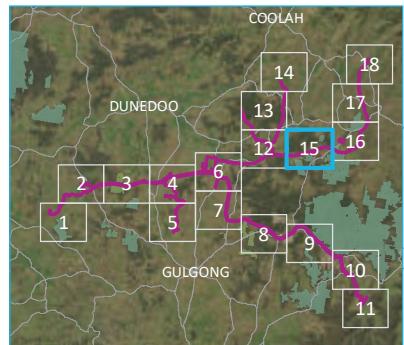
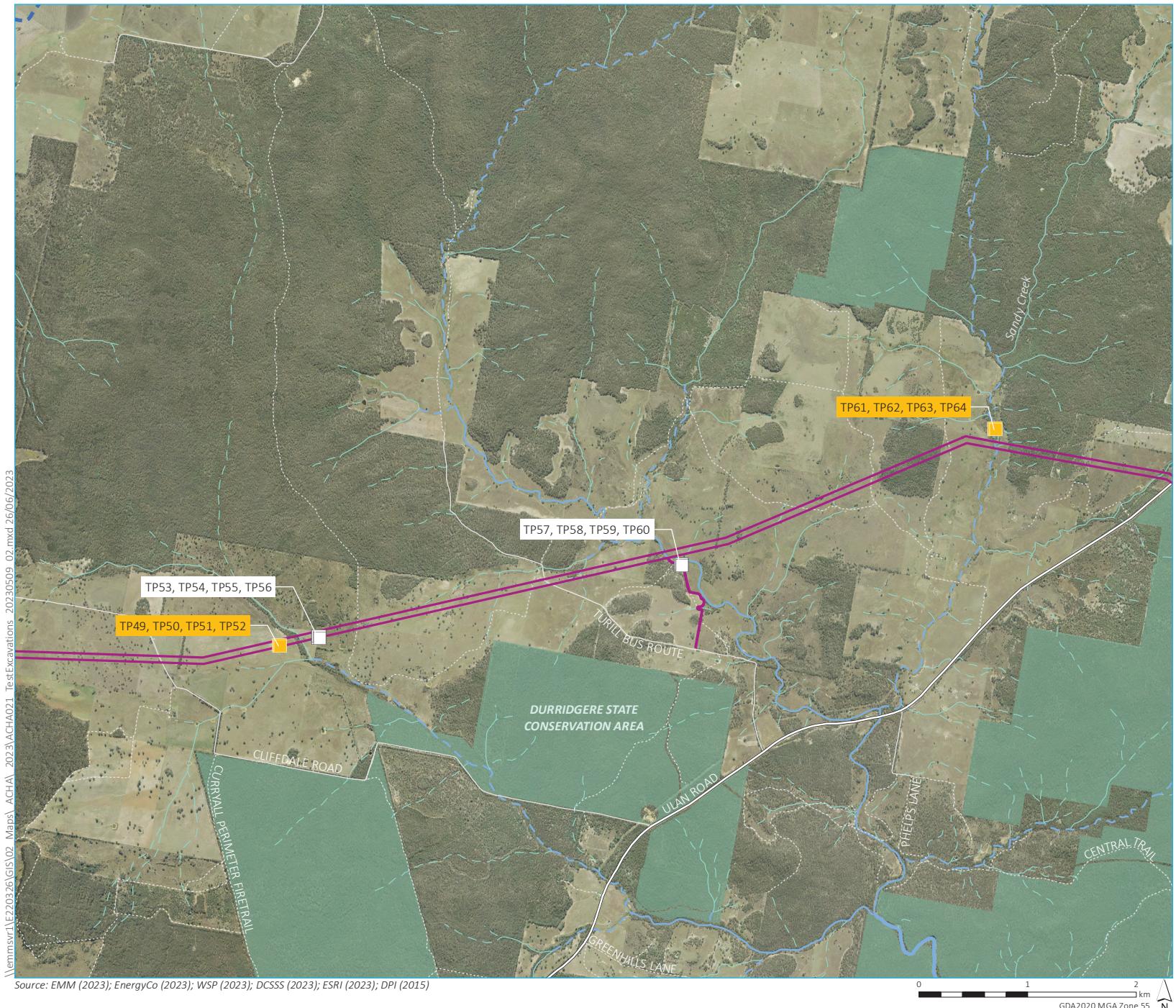






Test excavations proposed  
and completed  
Map 14 of 18

Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 8.5



#### KEY

■ Construction area

Test pit status

■ Completed

□ Removed from program

Strahler stream order

— 1st order

— 2nd order

— 3rd order

— 4th order

— 5th order

— 6th order

Existing environment

— Major road

— Minor road

.... Vehicular track

■ NPWS reserve

INSET KEY

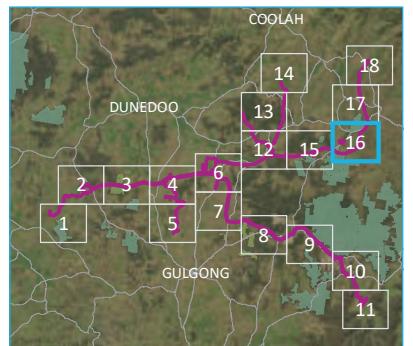
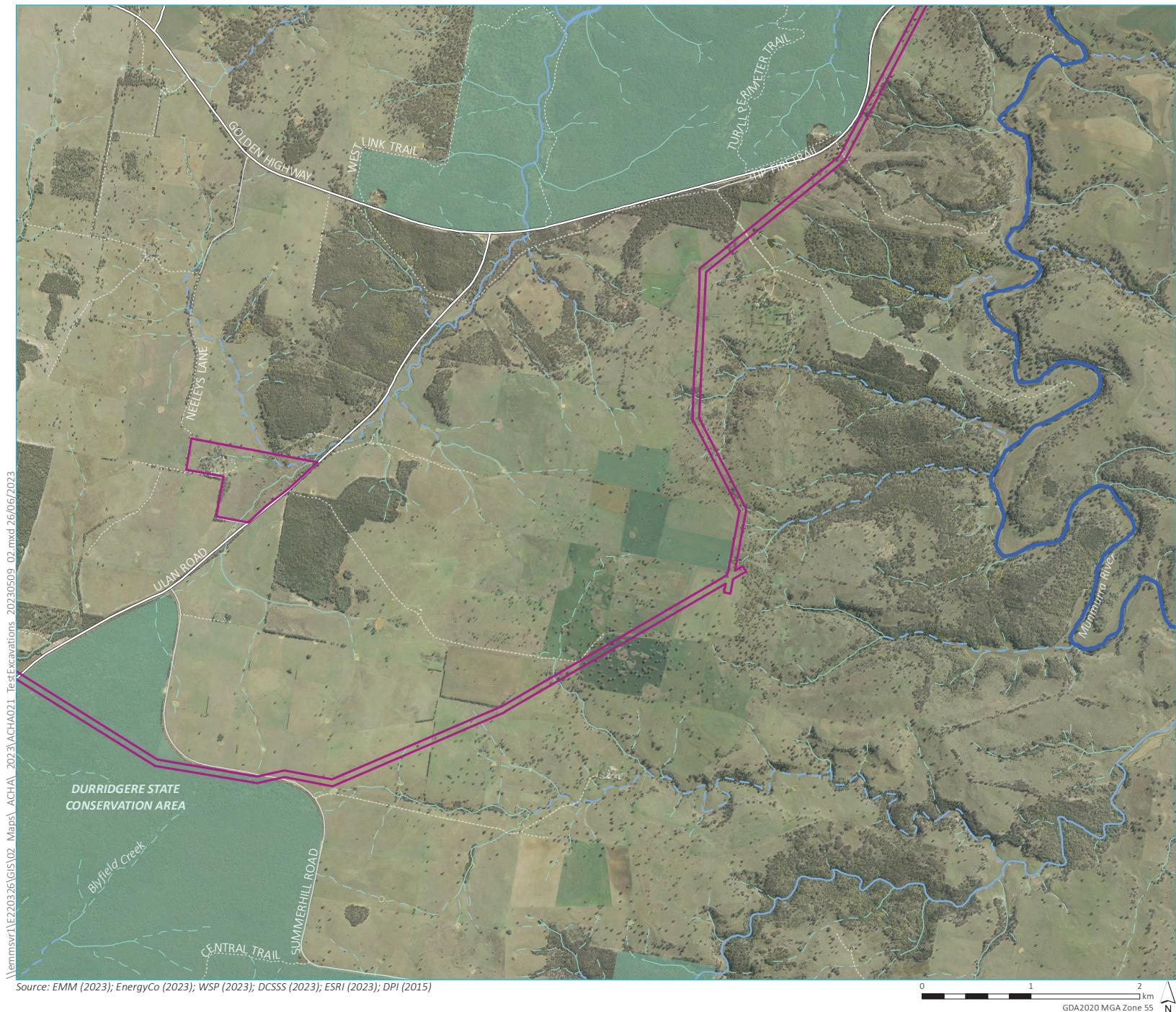
— Major road

■ NPWS reserve

■ State forest

Test excavations proposed  
and completed  
Map 15 of 18

Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 8.5



#### KEY

Construction area

Strahler stream order

1st order

2nd order

3rd order

4th order

5th order

7th order

Existing environment

Major road

Minor road

Vehicular track

NPWS reserve

INSET KEY

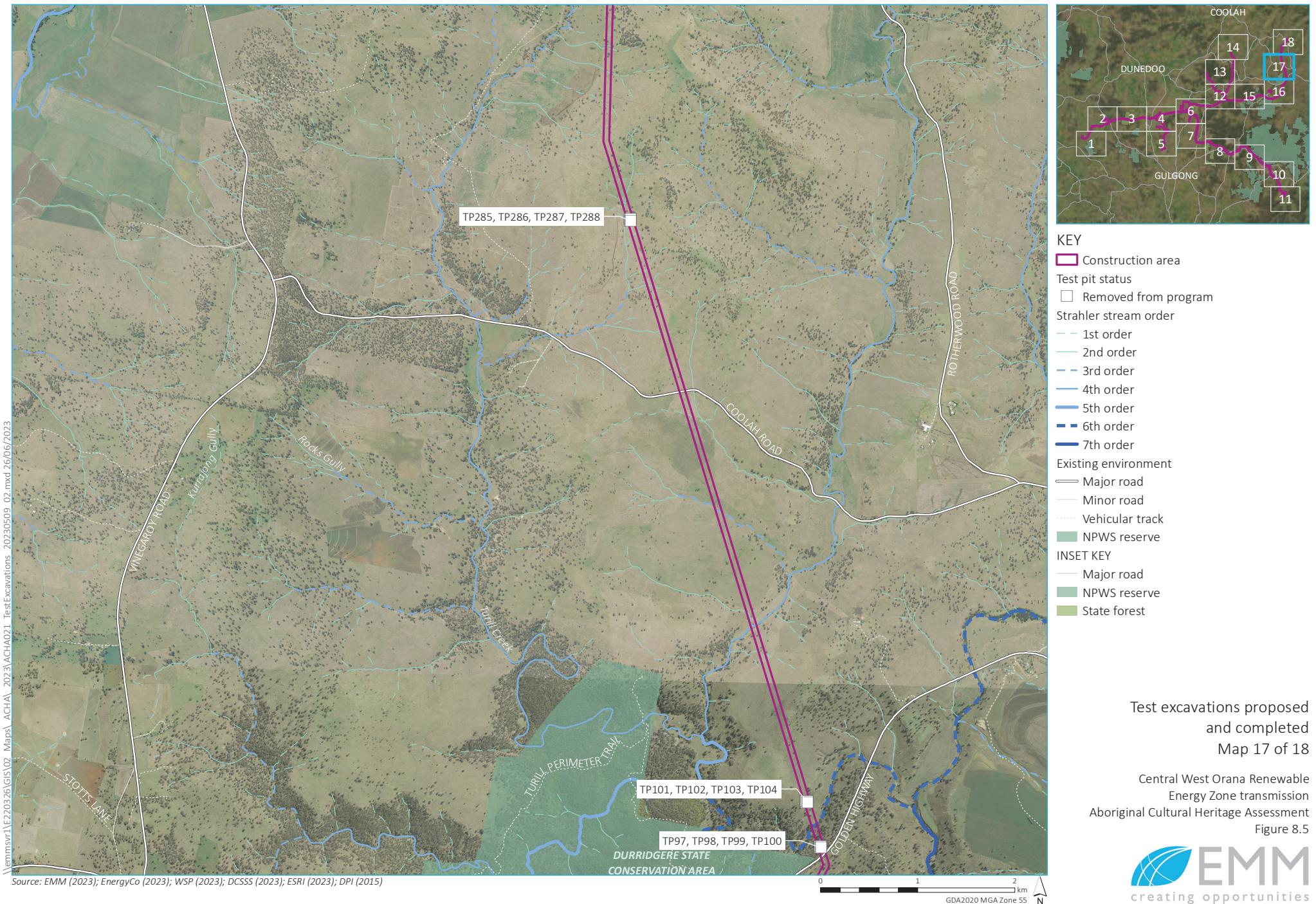
Major road

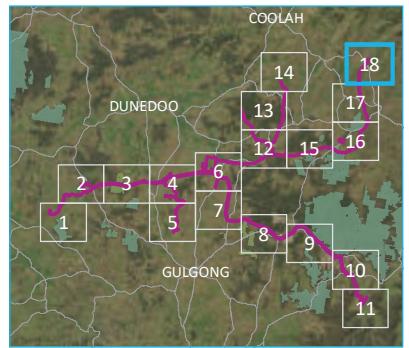
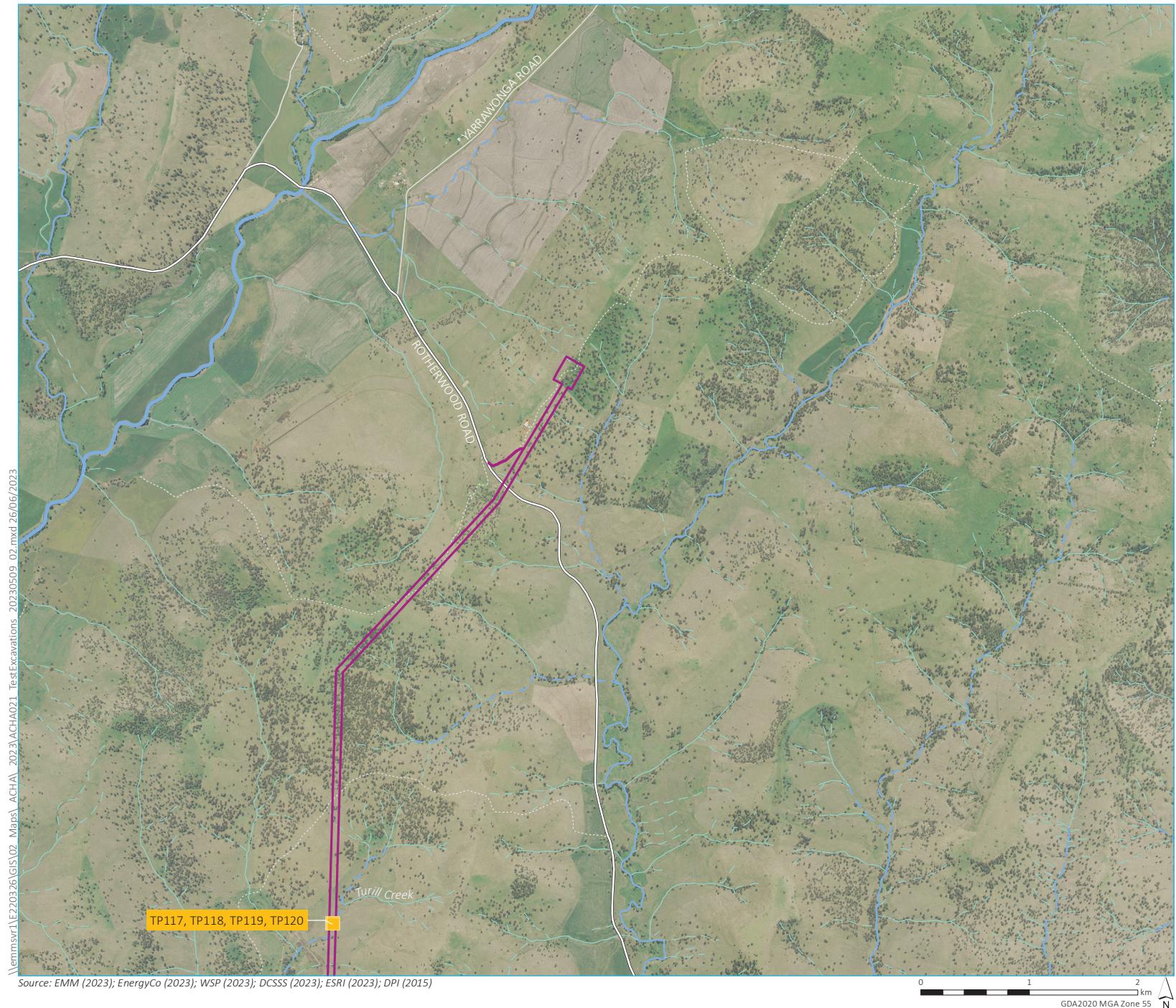
NPWS reserve

State forest

Test excavations proposed  
and completed  
Map 16 of 18

Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 8.5





#### KEY

Construction area

Test pit status

Completed

Strahler stream order

1st order

2nd order

3rd order

4th order

5th order

Existing environment

Major road

Minor road

Vehicular track

#### INSET KEY

Major road

NPWS reserve

State forest

Test excavations proposed  
and completed  
Map 18 of 18

Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 8.5

### 8.3.2 Results

This section provides a summary of the excavations and subsequent analysis (Plate 8.41–Plate 8.50; Figure 8.5 and Figure 8.6), with further detail provided in Appendices E.4–E.6. This includes a full catalogue of the excavated test pits (Appendix E.3) photographic catalogue of the excavated test pits (Appendix E.4) and detailed lithic analysis (Appendix E.5 and E.6). A summary of the post excavation analysis, including stratigraphy, chronology and lithics analysis, from the excavations is provided below.

Overall, some 128 0.25 m<sup>2</sup> test pits were excavated across the construction area and encompassing some 32 proposed tower locations (Figure 8.5 and Figure 8.6). The excavation program excavated some 32 m<sup>2</sup> or 11.2 m<sup>3</sup>. Spatially, these were distributed across the construction area, but with specific focus on the Laheys Creek, Tallawang Creek, Browns and White Creeks, Copes Creek and Wilpinjong Creek (in the vicinity of a previously recorded rockshelter) areas, based on the findings of the archaeological field survey. As outlined in Section 8.2, the majority of cultural materials were encountered within, or in close proximity to, these creek corridors and further understanding of the nature of the under-lying soil profile and any cultural materials within them was a focus of these investigations. A number of other, more disparate tower locations encompassing the remainder of the construction area were also implemented to provide a representative coverage of the project. Six locations were removed from the archaeological program following observations of localised impacts, either from active farming activities or due to submergence from extreme rain events in late 2022 (Figure 8.5). Test pits were on average ~35 cm deep, with deepest excavations of 60–80 cm along Wilpinjong and Stubbo Creeks.

There was some variation in soil profiles extending across a 260 km transect (e.g. Plate 8.42, Plate 8.44, Plate 8.46, Plate 8.48 and Plate 8.50). However, the test pits were all typically shallow and expressed some variant of a duplex or fabric contrast soil profile. Specifically, they all encompassed a shallow A1 horizon (topsoil), which was generally <20 cm in depth, highly organic, dark in colour (black, dark grey brown, brown), and either a clay or sandy loam composition. In most cases, this immediately overlaid a compact to indurated heavy clay subsoil (B2 horizon) that was brown or orange brown in colour. The interface between these two units was either sharp in the case of duplex soils (e.g. Plate 8.48), or gradual in the case of fabric contrast soils (e.g. Plate 8.44). Depending on location, there are various other units between the A1 and B2 units, including:

1. an A2 unit – an eluviation zone – in deeper more established and well-drained soil profiles and often a friable pale grey/brown clayey sandy (e.g. Plate 8.42)
2. colluvial deposits from movement of sediments upslope of the test pit, and typically friable coarse sand and small gravels (e.g. Plate 8.46)
3. alluvial deposits generally within <50 m of creeks (e.g. Plate 8.50) and, where observed, of friable brown/light brown clayey sand composition.

In many cases, the subsoil showed greyed colouring and/or frequent manganese and iron panning (usually in the form of small pebble and gravel precipitates), which repeated inundation and/or waterlogging (e.g. Plate 8.48). In all cases, the excavations demonstrated that the soil profiles were typically shallow, even where potential alluvial and colluvial units were encountered. Based on this, cultural materials would be expected to occur only in the upper 80 cm across the construction area, and typically <40 cm.

Only 33 of the 128 test pits (25.8%) contained artefacts (Appendix E.3; Figure 8.6), with a total of 84 Aboriginal objects recovered (Appendix E.5). When extrapolating each 0.25 m<sup>2</sup> test pit to 1 m<sup>2</sup>, which is more commonly how artefact densities are discussed in the archaeological literature, an extrapolated average density of 2.1/m<sup>2</sup> was found across the construction area (Figure 8.7). Of these 33, only 2 exhibited values greater than five artefacts, TP#135 and TP#208, located in the vicinity of Sportsmans Hollow Creek and Copes Creek, respectively (Plate 8.47-Plate 8.49). When extrapolating these test pits, they return artefact density values of 24 and 36/m<sup>2</sup>, respectively. A further two locales, TP#165 and TP#273, and the combined values of TPs #1-4, #5-8 and #249-252, return values of >17/m<sup>2</sup> and above, which are consistent with values that are considered to be representative of background activity (Figure 8.7). These test pits were variously located along the banks of Laheys Creek, Planter Creek and Tallawang Creek. Test pits containing higher densities – and identified as areas of past foci – were on average ~104 m away from their closest water course ( $\sigma = 48 - 184$  m). The broader excavations had a similar average (~113 m) and range (0 – 384 m).

All cultural materials were recovered from the upper 40 cm of the soil profile within test pits, and the majority of the assemblage recovered from the upper two spits (i.e. 0–20 cm). Most of the artefacts were made white, milky quartz (a macrocrystalline variety) (n=44), with lesser occurrences of tuff (n=26), chalcedony (n=2) and chert (n=2). The quality of the milky quartz artefacts was extremely high and results in a more predictable flake manufacture (Plate 8.51). It is likely that semi-translucent milky quartz was preferred for artefact manufacture over other raw materials. The presence of atypical burin-blade cores, backed artefacts, and blades (Plate 8.52) in the assemblage indicates that it can be dated to the mid-late Holocene (<7,000 years ago), while an increased use of quartz is typically of late Holocene age (<3,000 years ago). Of note was the presence of numerous cores (n=16) in the assemblage along with hammerstones and grinding implements, all of which indicate that these sites reflected either initial or early extraction from nearby raw material sources and/or areas of extended occupation where artefact production was carried out (in contrast to a short-term hunting camp or re-tooling site for example). Indeed, a potential quarry site was encountered within the Merotherie Energy Hub (SNI-Q01). It is probable that several of the creek-lines, such as Laheys Creek and Tallawang Creek, may have formed important sources of raw materials in the use of artefact production, and account for the cultural materials recovered. Further lithics analysis is provided in Appendix E.5.

While the test excavation was relatively limited in its extent, the findings reinforce the results of the extensive field survey outlined in Section 8.2. Specifically, they demonstrate that the majority of the cultural materials is encountered near the surface of the soil profile, which can be regularly observed in exposures from cultivation, creek erosion et cetera, and that these deposits are typically shallow. The deepest soil profiles encountered at the base of a slope being <80 cm in depth. Spatially, the findings also continue to demonstrate the importance of several 2nd–4th order creek lines extending across the construction area. These may have been used for raw material extraction based on the assemblage composition. Of importance from the excavations was the identification of the distance cultural materials were encountered away from these watercourses, with the majority of substantive cultural materials found within 150 m, and on average ~104 m. These distances are used in subsequent sections of the report for future management.



Plate 8.43 TP#250, view north-east towards Laheys Creek



Plate 8.44 TP#251 view north. This soil profile suggests a duplex soil profile with both an A1, A2 (potentially alluvial) and B2 horizons



Plate 8.45 TP#6, view north-west towards Tallawang Creek



Plate 8.46 TP#6, view north. This test pits contained a fabric contrast soil of an A1 horizon gradually grading into a B2 unit



Plate 8.47 TP#127, view north. This test pit is in the vicinity of Stubbo Creek



Plate 8.48 TP#127, view north. This soil profile was one of the deepest in the excavations, but can be characterised as a colluvial deposit near the base of a hill



**Plate 8.49** Landscape context of TP#208, located ~150 m from Copes Creek, view north. This test pit recovered the highest density ( $36/m^2$ ) of artefactual material within the construction area

**Plate 8.50** Stratigraphy of TP#208, north section. Note, the gravel inclusions and wet base, suggesting frequent inundation or waterlogging



**Plate 8.51** Landscape context of TP#135 (24 artefacts/ $m^2$ ), located ~20 m from Sportsmans Hollow Creek, view north. As indicated in this picture, the soils in this locale were shallow, with a thin layer of silty sediment over compacted clay

**Plate 8.52** Stratigraphy of TP#165 (20 artefacts/ $m^2$ ), located ~50 m from Planters Creek, view north. Soils here are similar to TP208

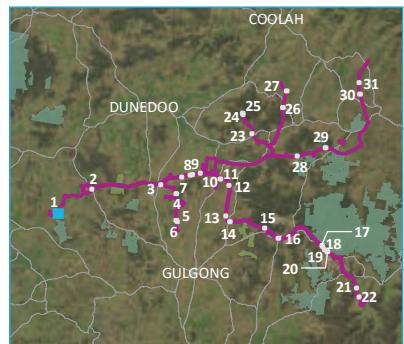


**Plate 8.53** Examples of quartz cores recovered from the excavations



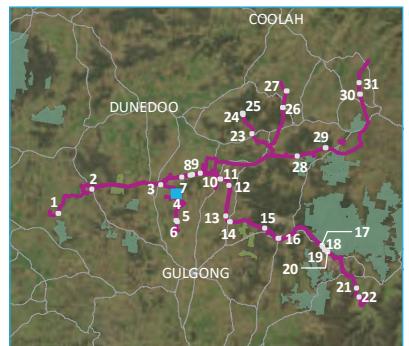
**Plate 8.54**

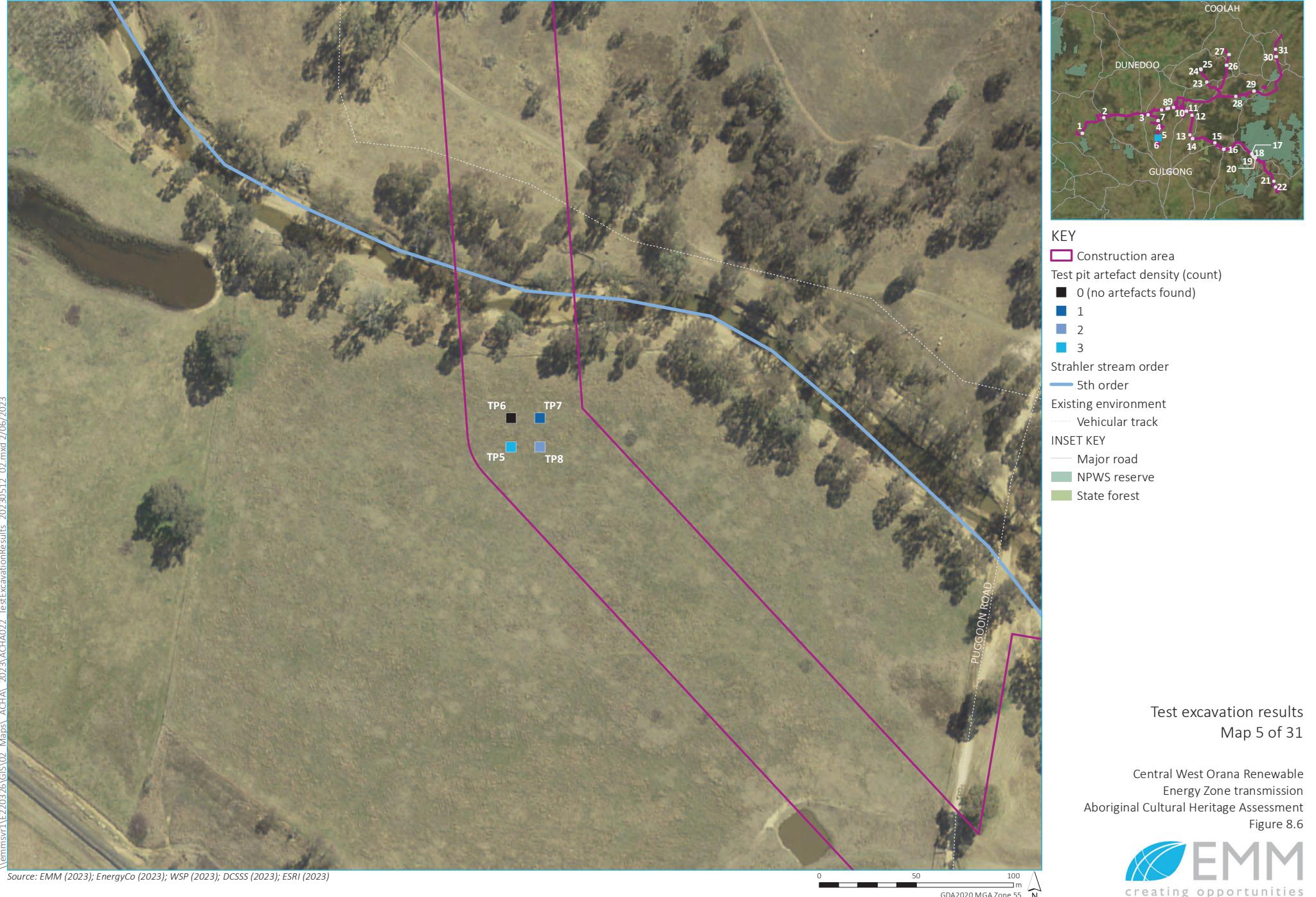
**Plate 8.54** Examples of Bondi points, a late Holocene technology, from the assemblage



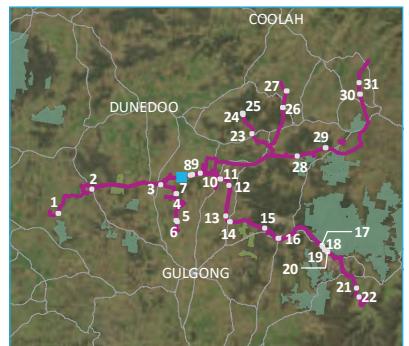




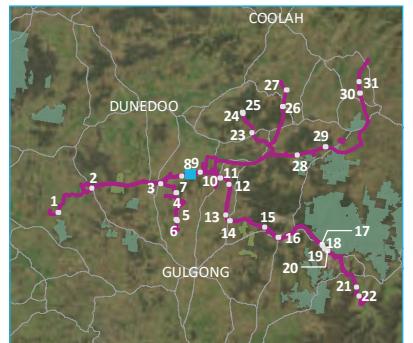






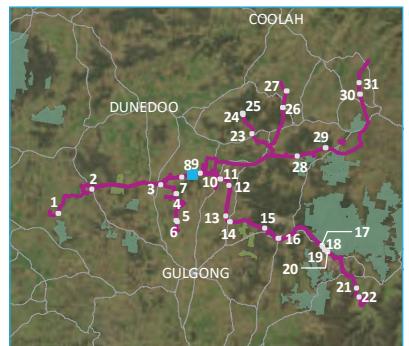


Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 8.6



KEY

- Construction area
- Test pit artefact density (count)
  - 0 (no artefacts found)
- Strahler stream order
- 1st order
- Existing environment
- Vehicular track
- INSET KEY
- Major road
- NPWS reserve
- State forest



#### KEY

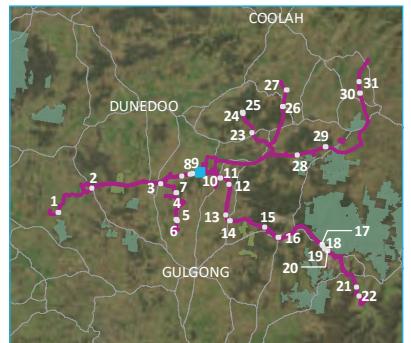
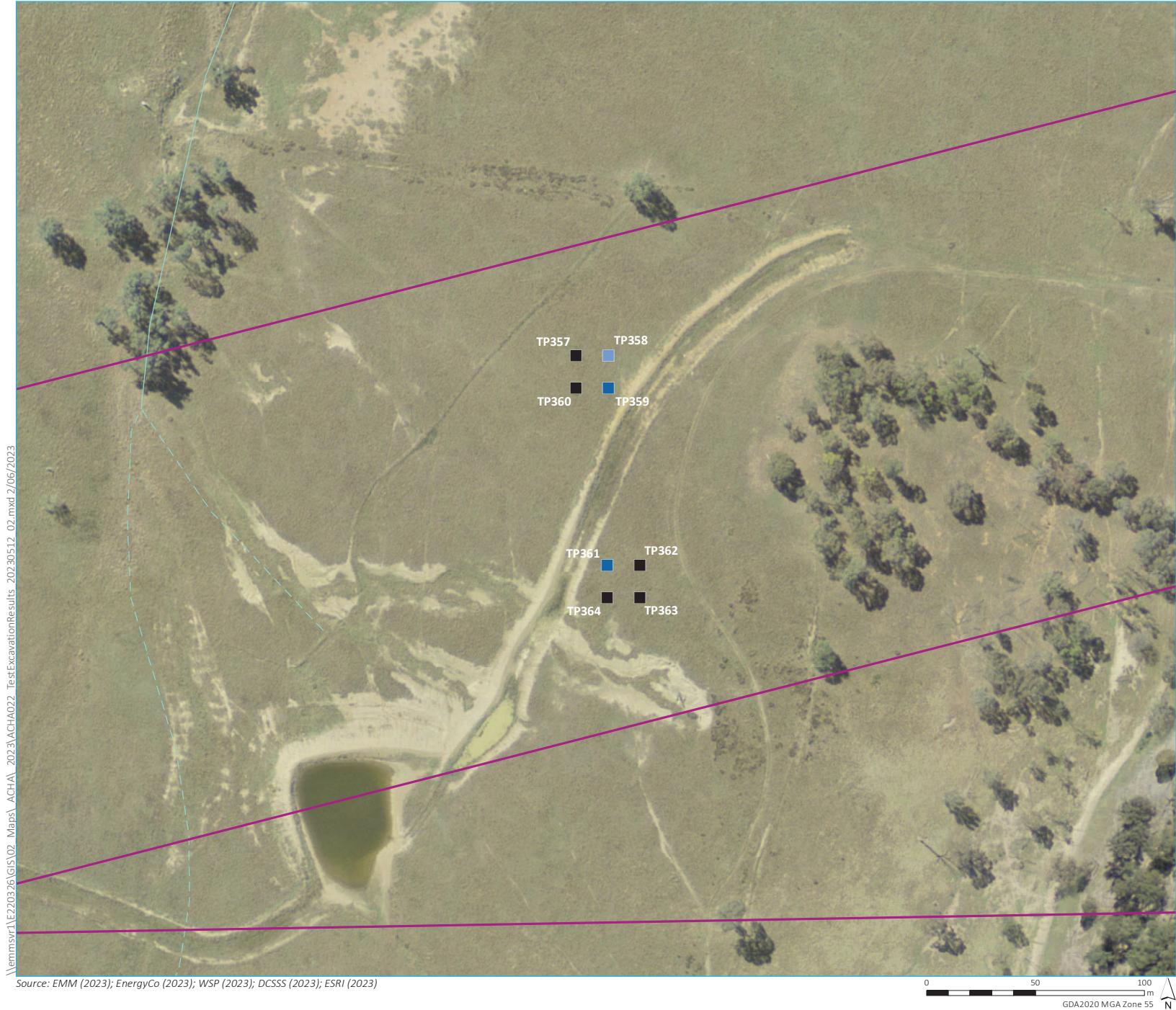
■ Construction area  
■ Test pit artefact density (count)  
■ 0 (no artefacts found)

#### INSET KEY

— Major road  
■ NPWS reserve  
■ State forest

Test excavation results  
Map 9 of 31

Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 8.6



#### KEY

Construction area

Test pit artefact density (count)

■ 0 (no artefacts found)

■ 1

■ 2

Strahler stream order

— 1st order

— 2nd order

INSET KEY

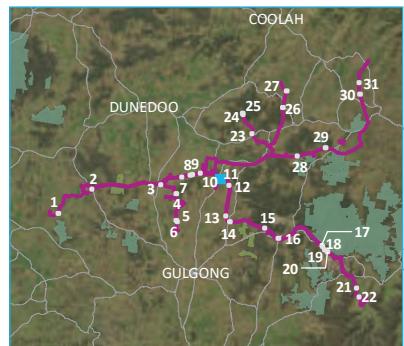
— Major road

■ NPWS reserve

■ State forest

Test excavation results  
Map 10 of 31

Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 8.6



#### KEY

■ Construction area

■ Test pit artefact density (count)

■ 0 (no artefacts found)

■ 2

Strahler stream order

— 1st order

- - - 3rd order

— 4th order

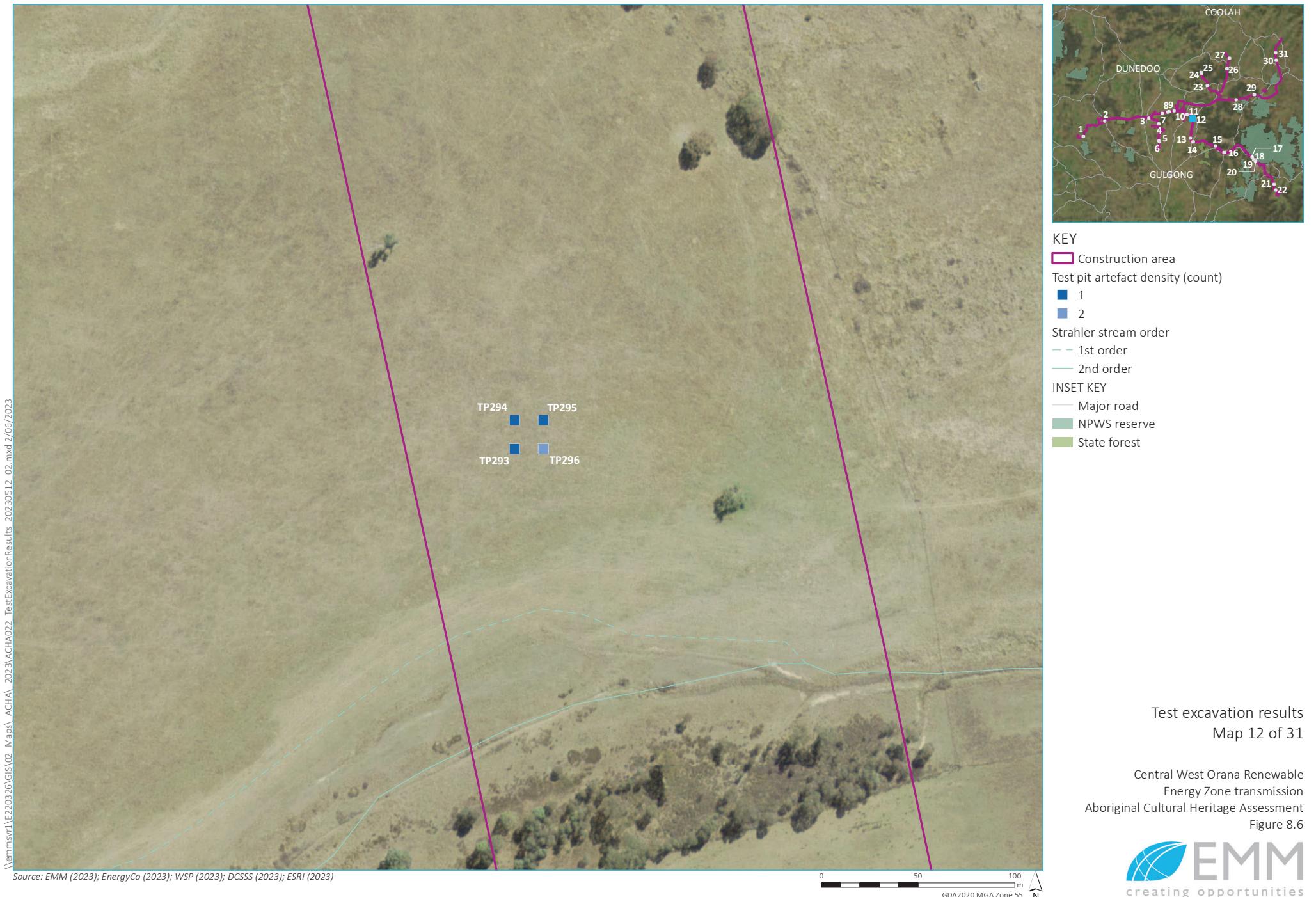
INSET KEY

— Major road

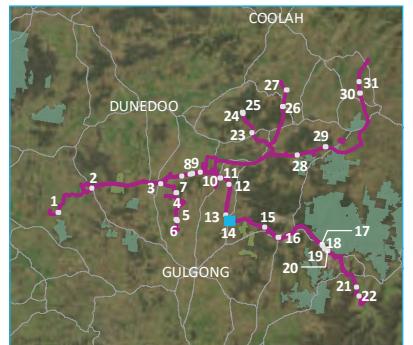
■ NPWS reserve

■ State forest

Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 8.6







#### KEY

Construction area

Test pit artefact density (count)

■ 0 (no artefacts found)

■ 1

■ 2

■ 4

■ 9

Strahler stream order

— 1st order

— 2nd order

Existing environment

— Major road

INSET KEY

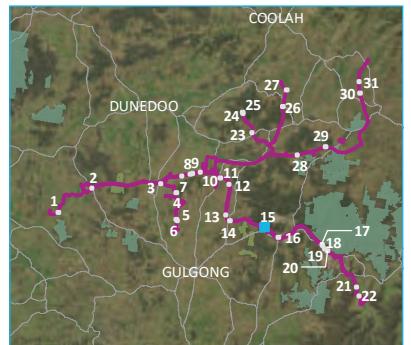
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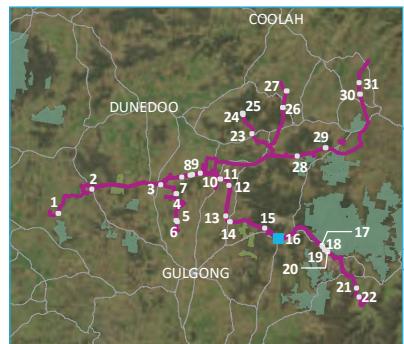
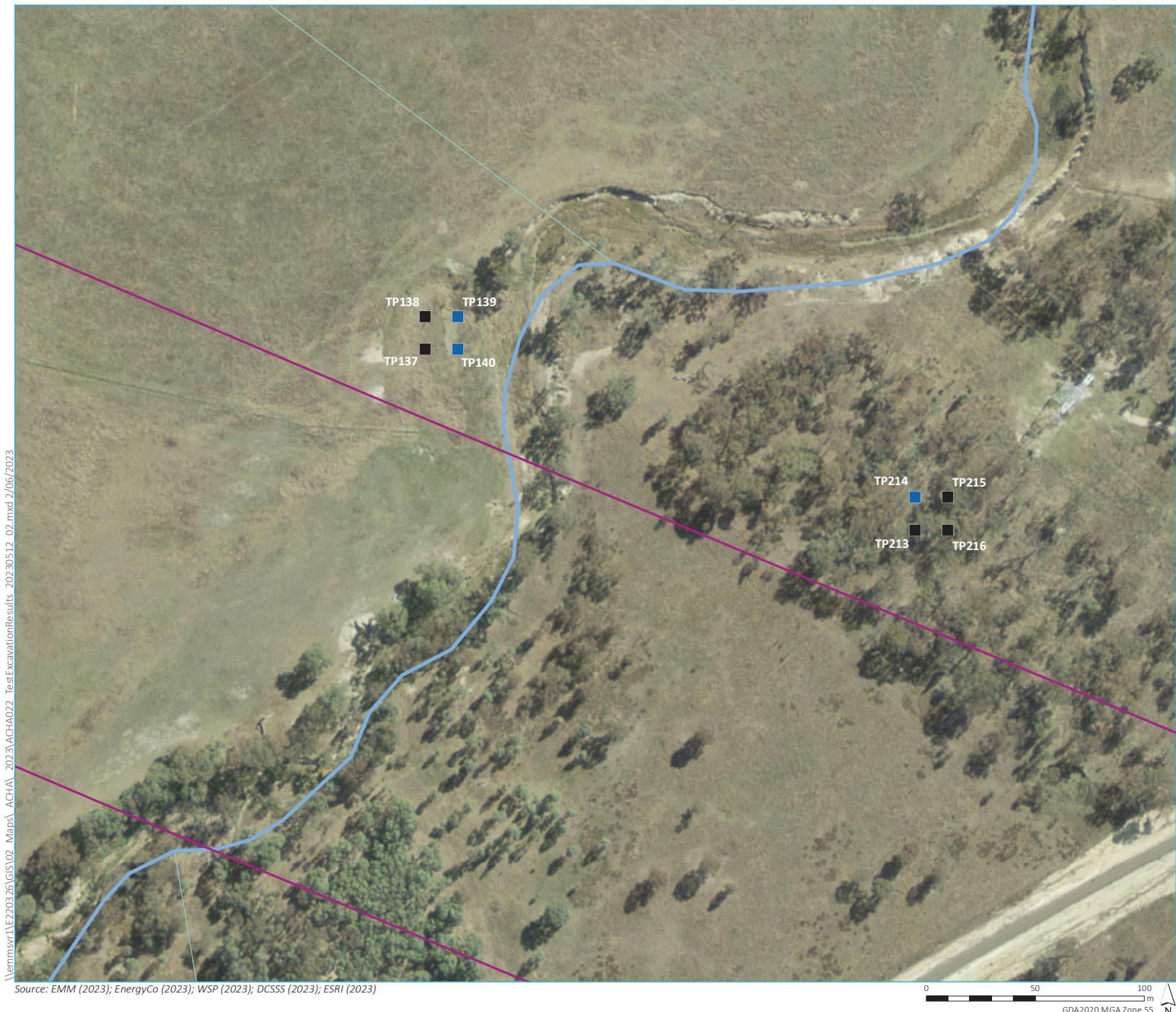
■ NPWS reserve

■ State forest

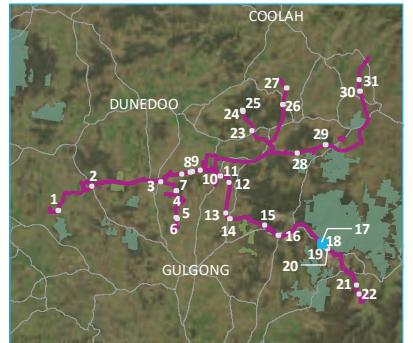
Test excavation results  
Map 14 of 31

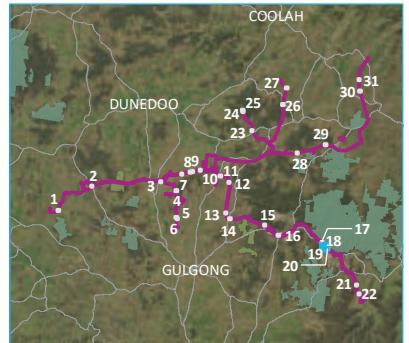
Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 8.6

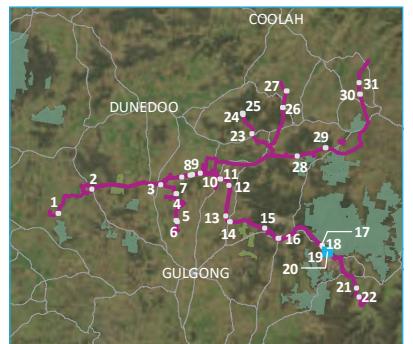
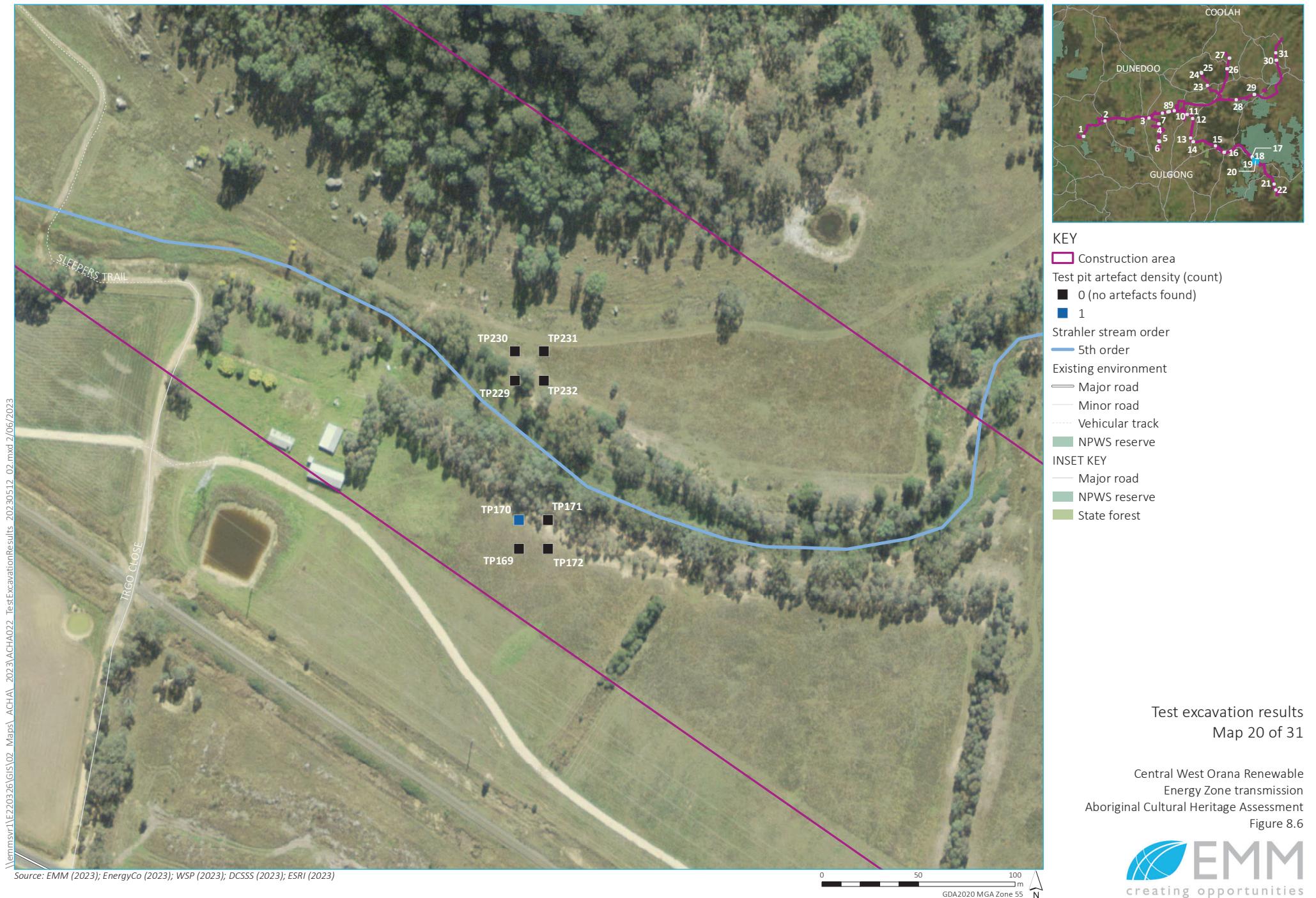




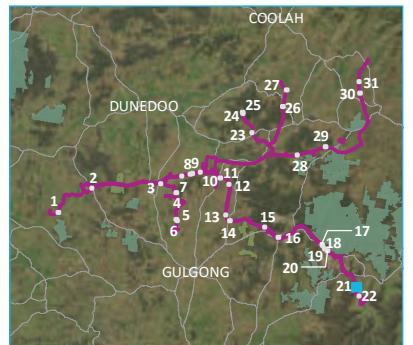




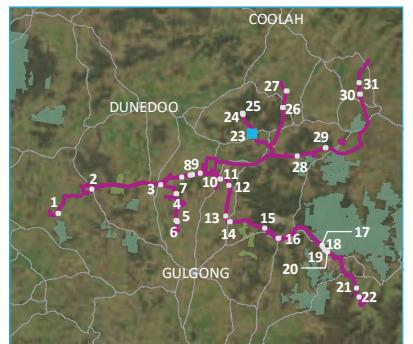


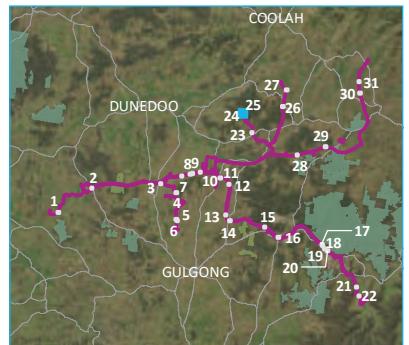


Central West Orana Renewable  
 Energy Zone transmission  
 Aboriginal Cultural Heritage Assessment  
 Figure 8.6





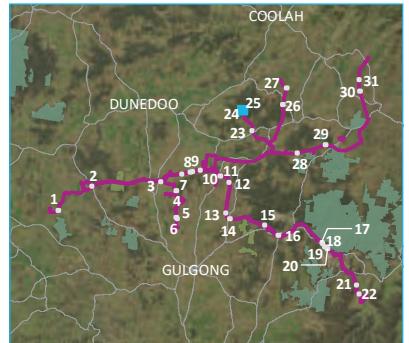




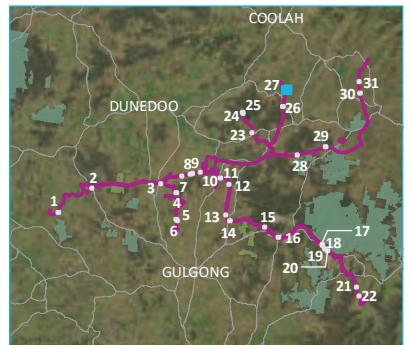
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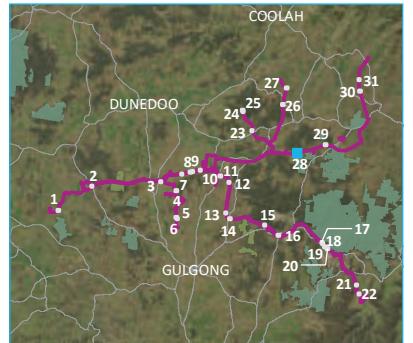
- Construction area
- Test pit artefact density (count)
  - 0 (no artefacts found)
- Strahler stream order
  - 1st order
  - 2nd order
- Existing environment
  - Vehicular track
- INSET KEY
  - Major road
  - NPWS reserve
  - State forest

Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 8.6









#### KEY

■ Construction area

Test pit artefact density (count)

■ 0 (no artefacts found)

Strahler stream order

— 1st order

— 2nd order

INSET KEY

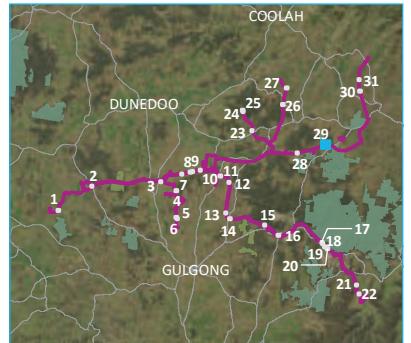
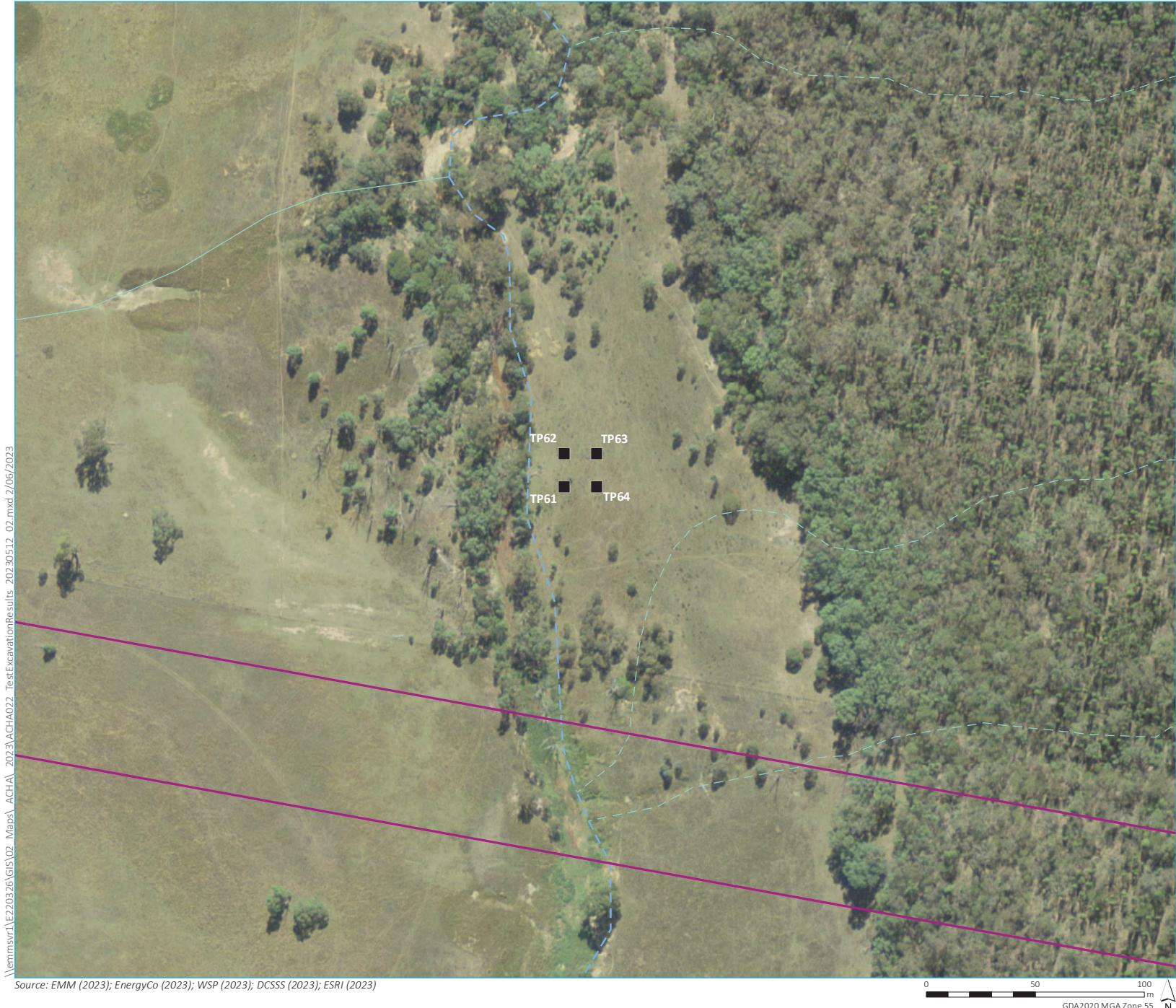
— Major road

■ NPWS reserve

■ State forest

Test excavation results  
Map 28 of 31

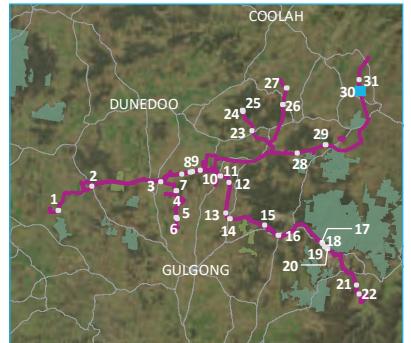
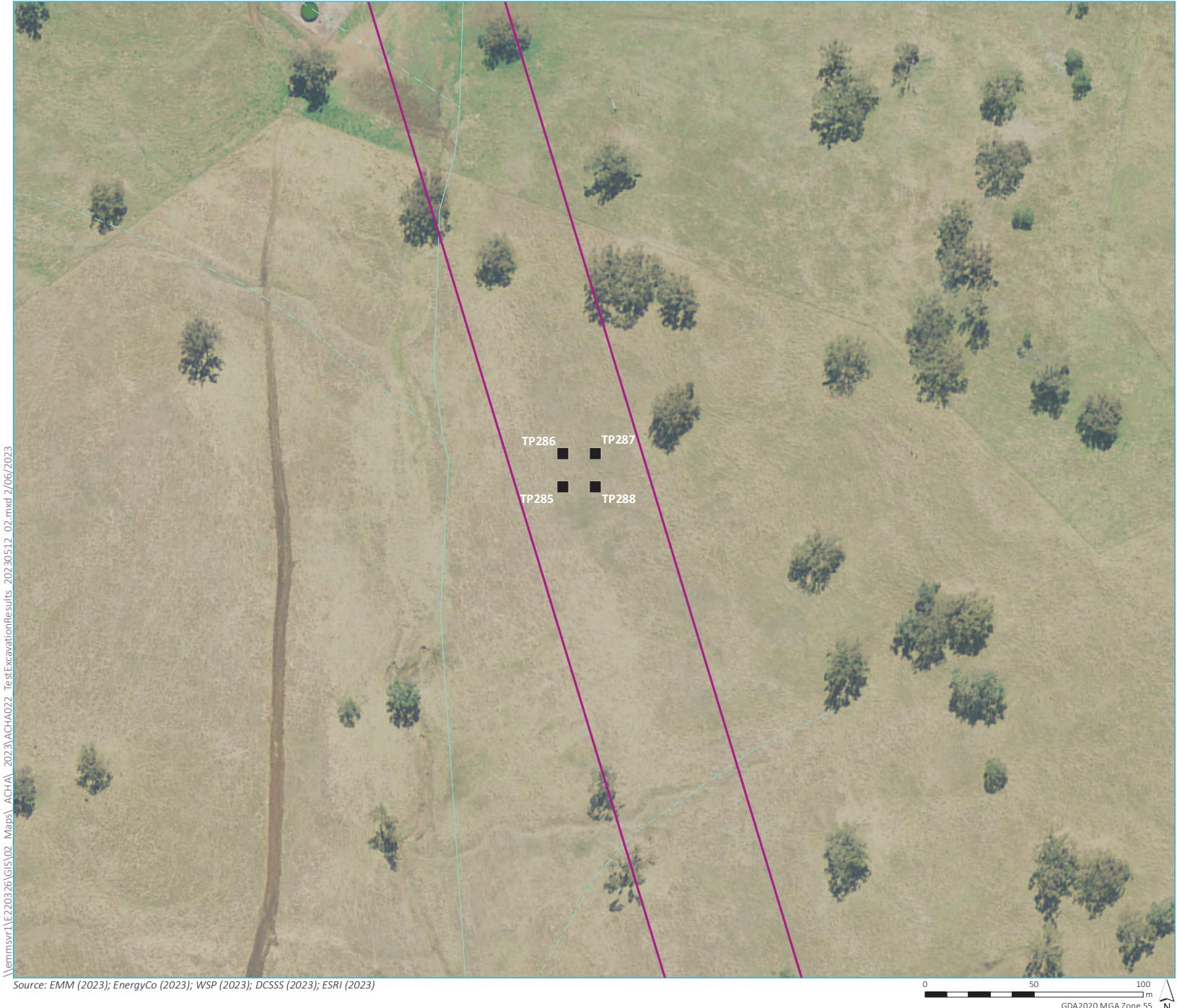
Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 8.6



#### KEY

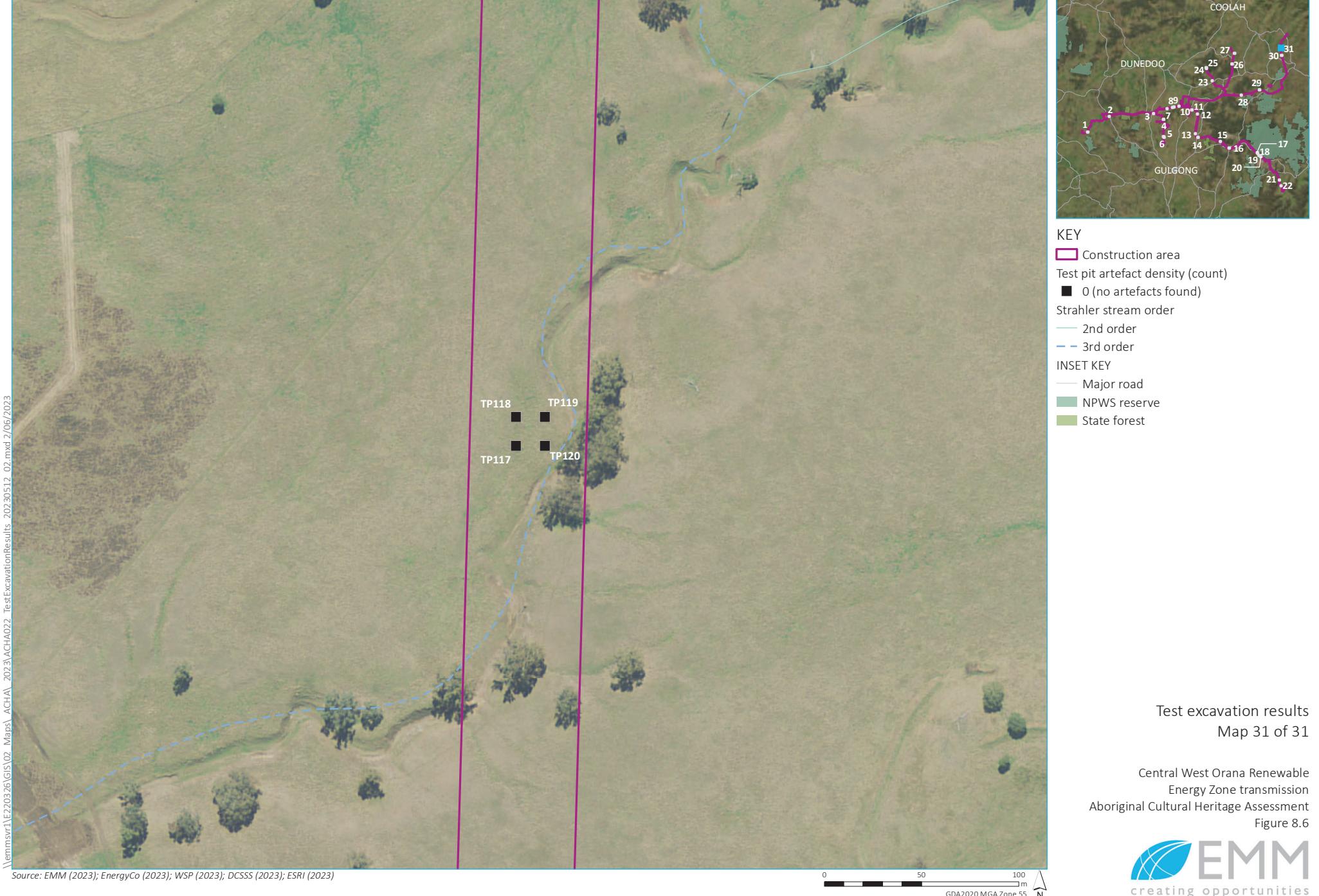
- Construction area
- Test pit artefact density (count)
  - 0 (no artefacts found)
- Strahler stream order
  - 1st order
  - 2nd order
  - 3rd order
- INSET KEY
  - Major road
  - NPWS reserve
  - State forest

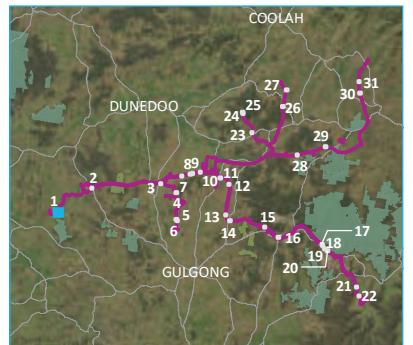
Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 8.6



Test excavation results  
Map 30 of 31

Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 8.6

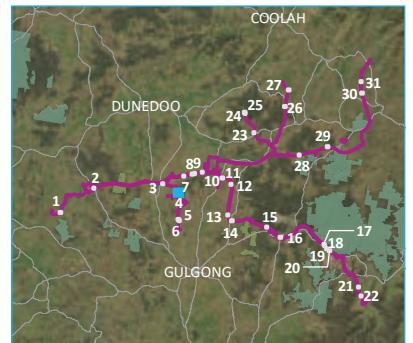


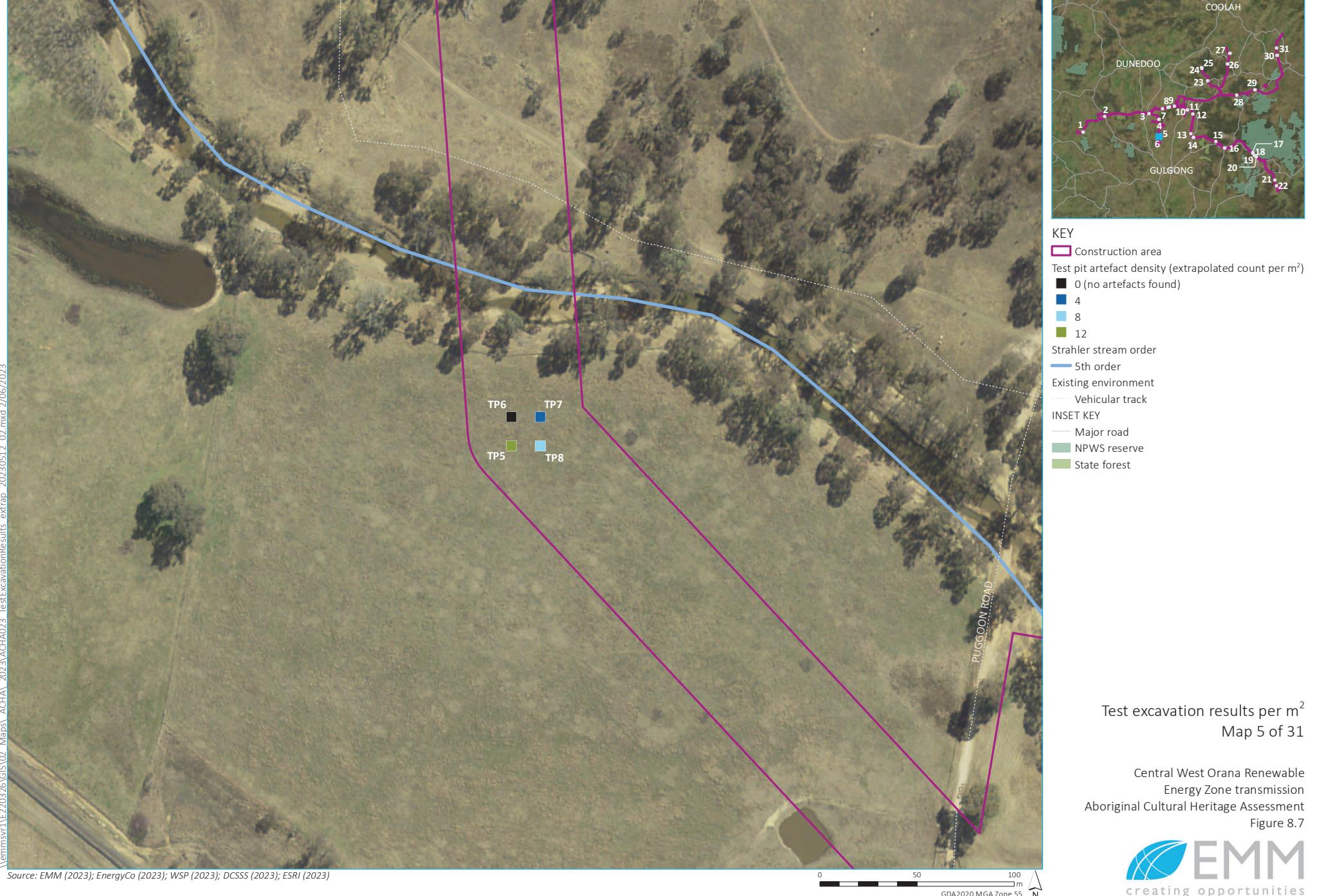


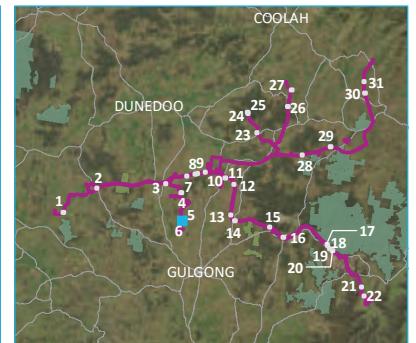
- KEY**
- Construction area
  - Test pit artefact density (extrapolated count per  $m^2$ )
  - 0 (no artefacts found)
  - Strahler stream order
    - 1st order
    - 2nd order
    - 3rd order
  - Existing environment
    - Vehicular track
  - INSET KEY**
  - Major road
  - NPWS reserve
  - State forest



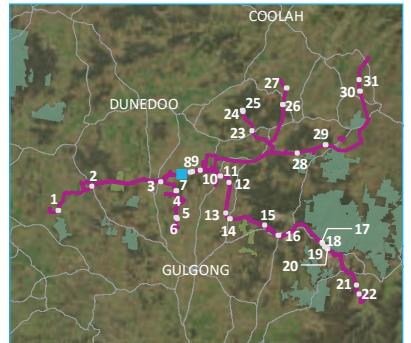


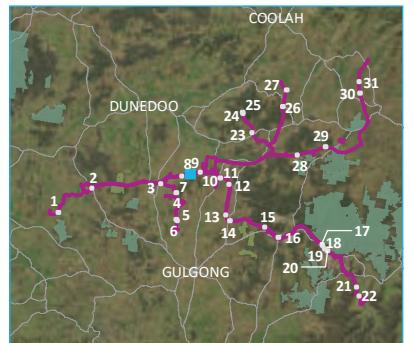






- KEY**
- Construction area
  - Test pit artefact density (extrapolated count per m<sup>2</sup>)
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    - 12
    - 16
  - Strahler stream order
    - 2nd order
    - 5th order
  - Existing environment
    - Vehicular track
  - INSET KEY**
  - Major road
  - NPWS reserve
  - State forest







Source: EMM (2023); EnergyCo (2023); WSP (2023); DCSSS (2023); ESRI (2023)



#### KEY

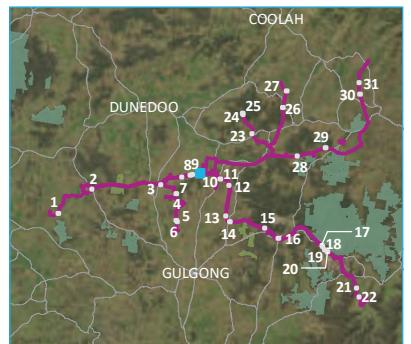
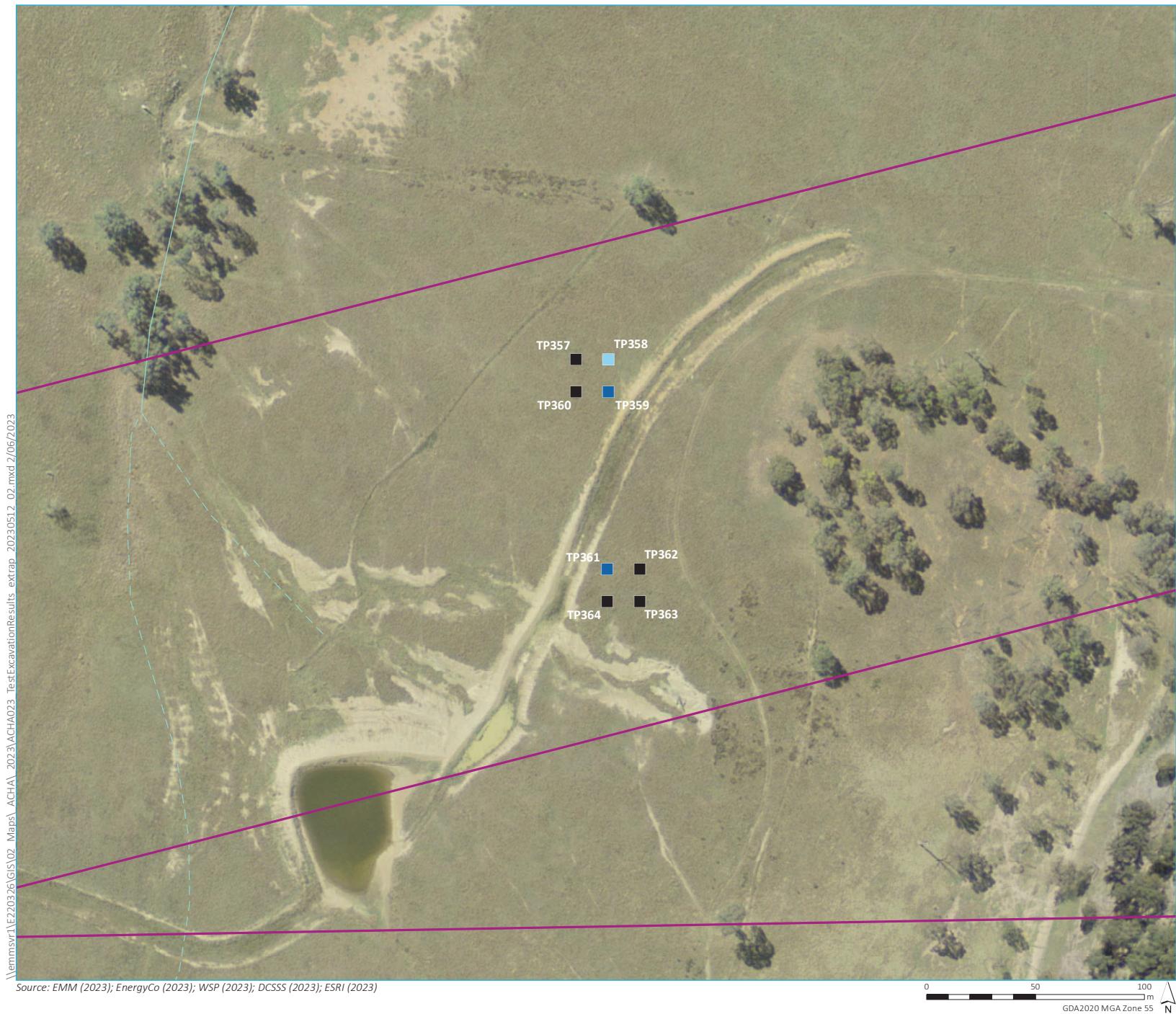
- Construction area (represented by magenta line)
- Test pit artefact density (extrapolated count per m<sup>2</sup>)
  - 0 (no artefacts found)

#### INSET KEY

- Major road
- NPWS reserve
- State forest

Test excavation results per m<sup>2</sup>  
Map 9 of 31

Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 8.7



#### KEY

- Construction area
- Test pit artefact density (extrapolated count per m<sup>2</sup>)
  - 0 (no artefacts found)
  - 4
  - 8
- Strahler stream order
  - 1st order
  - 2nd order
- INSET KEY**
- Major road
- NPWS reserve
- State forest

Test excavation results per m<sup>2</sup>  
Map 10 of 31

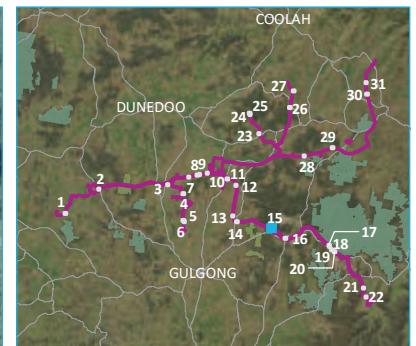
Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 8.7



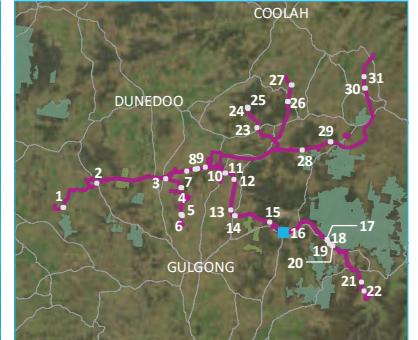
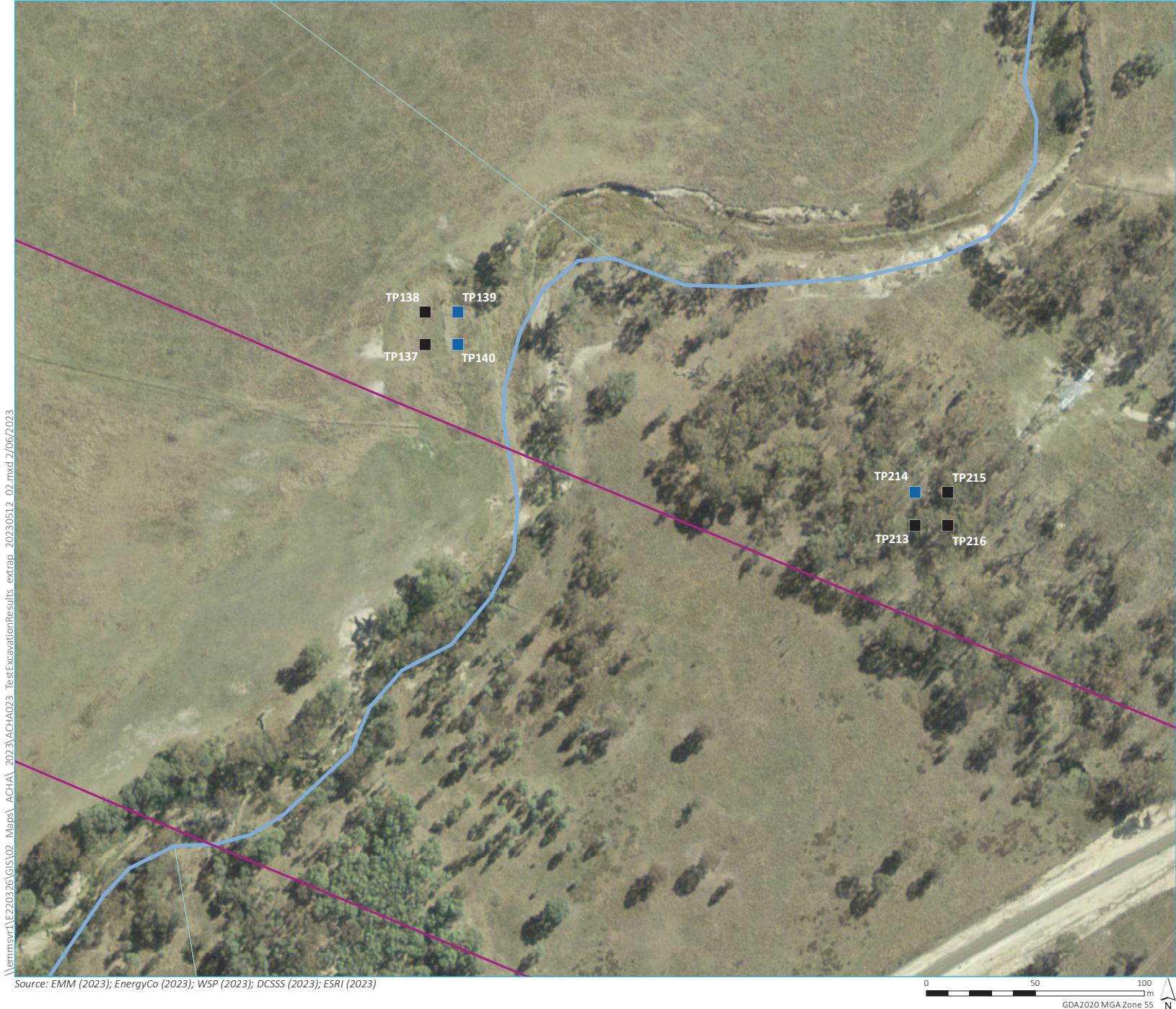








Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 8.7



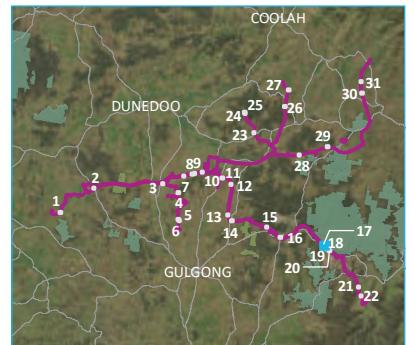
**KEY**

- Construction area
- Test pit artefact density (extrapolated count per  $m^2$ )
  - 0 (no artefacts found)
  - 4
- Strahler stream order
  - 2nd order
  - 5th order
- INSET KEY**
- Major road
- NPWS reserve
- State forest

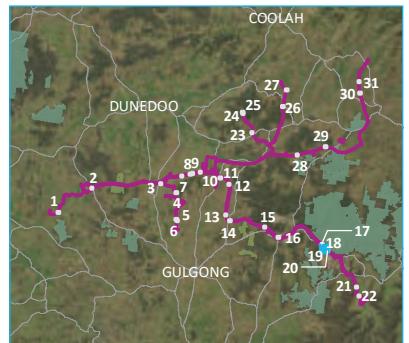
Test excavation results per  $m^2$   
Map 16 of 31

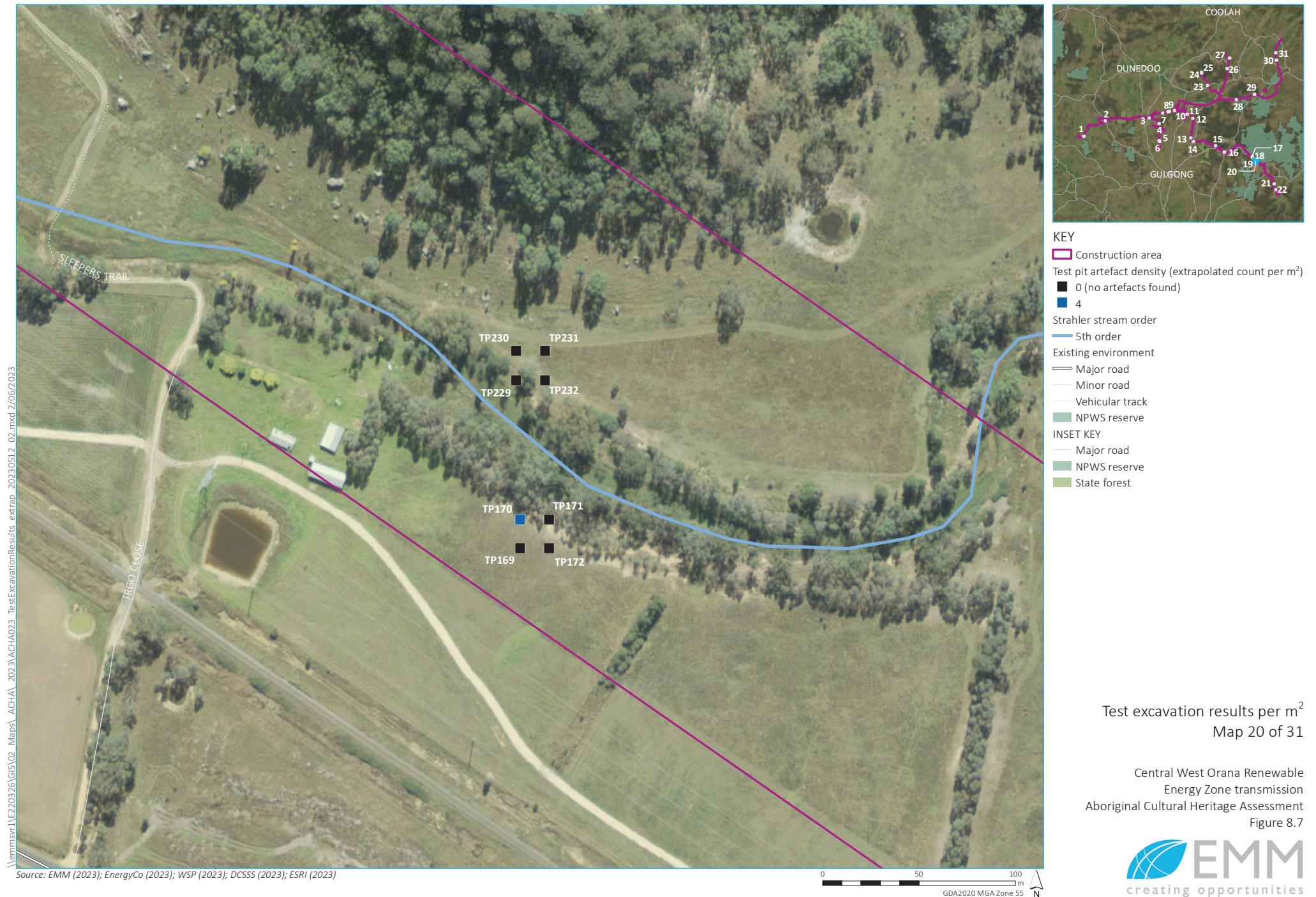
Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 8.7



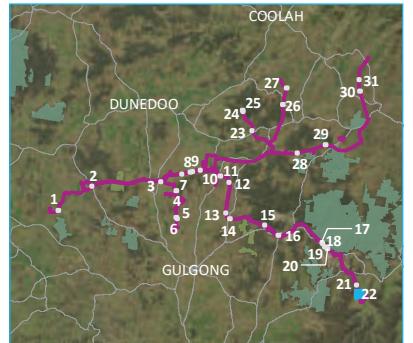


Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 8.7



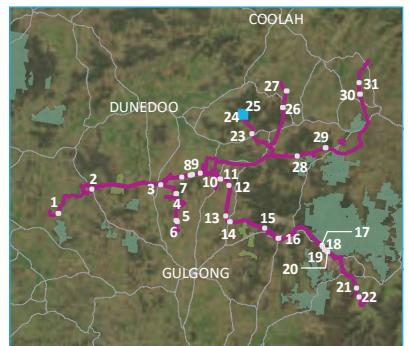






Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 8.7





- KEY**
- Construction area
  - Test pit artefact density (extrapolated count per m<sup>2</sup>)
  - 0 (no artefacts found)
  - Strahler stream order
  - 1st order
  - 2nd order
  - Existing environment
  - Vehicular track
  - INSET KEY**
  - Major road
  - NPWS reserve
  - State forest

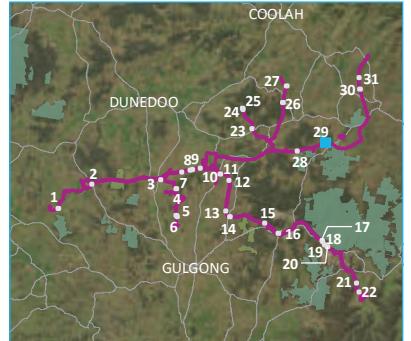
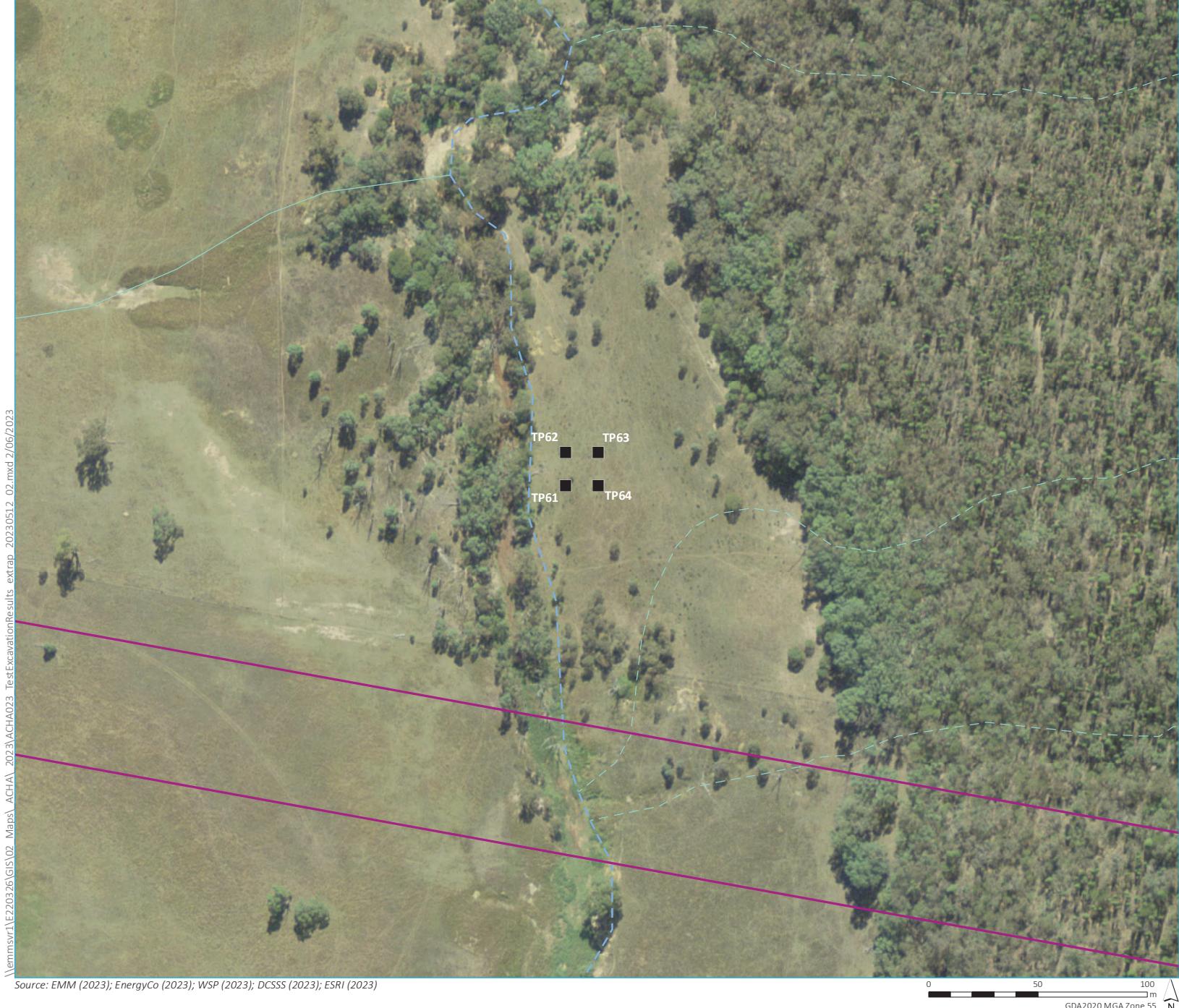


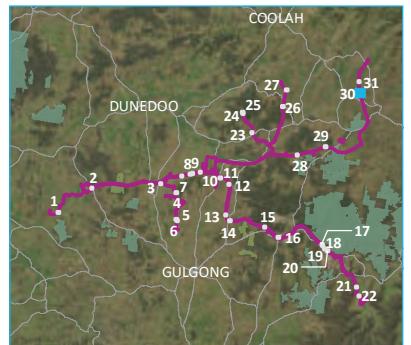
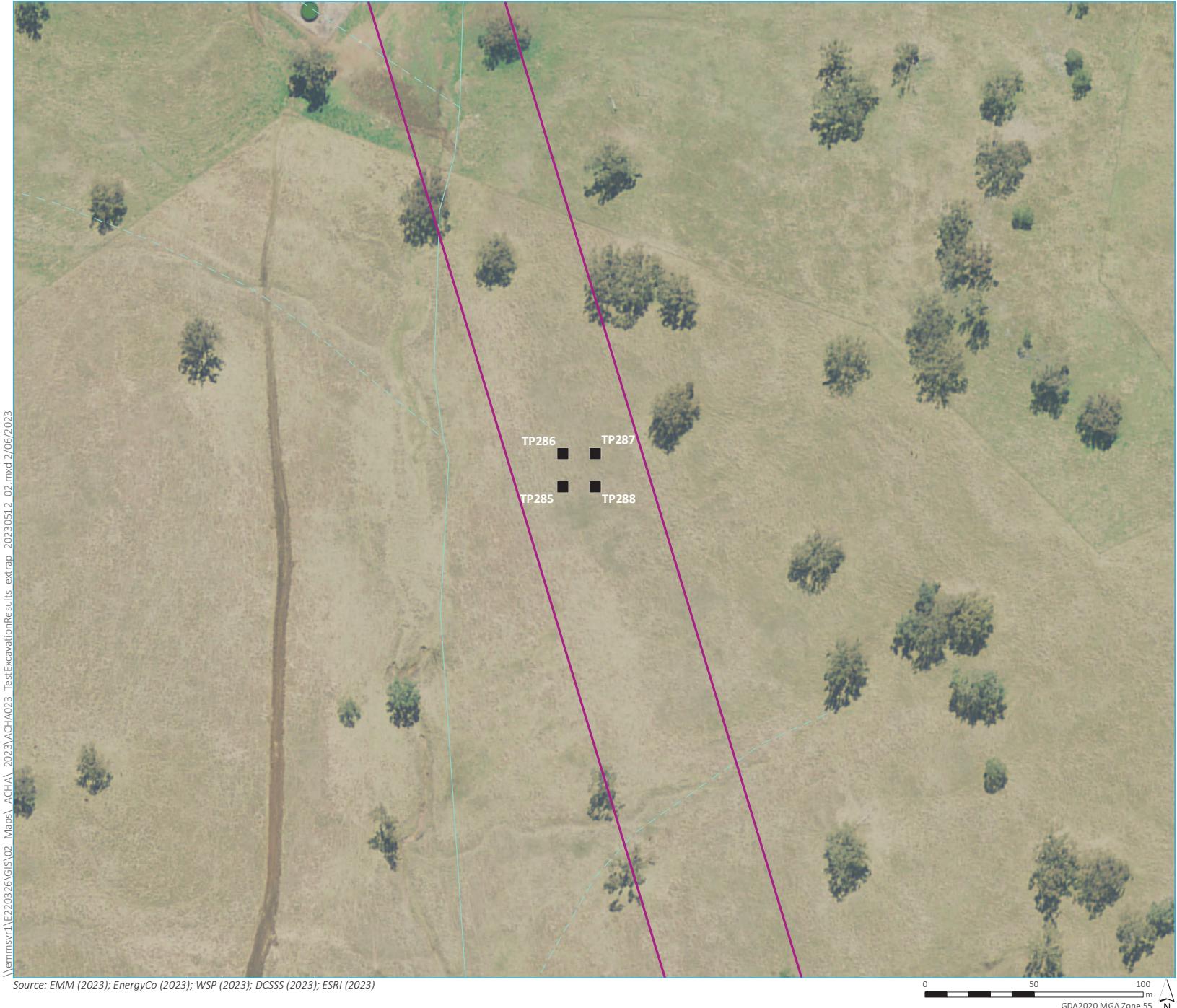




Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 8.7

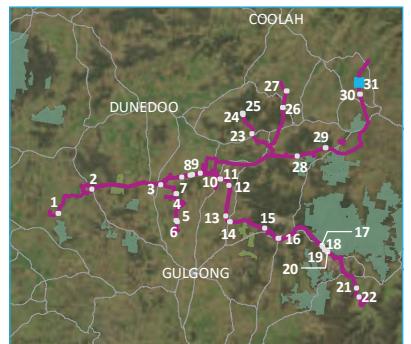
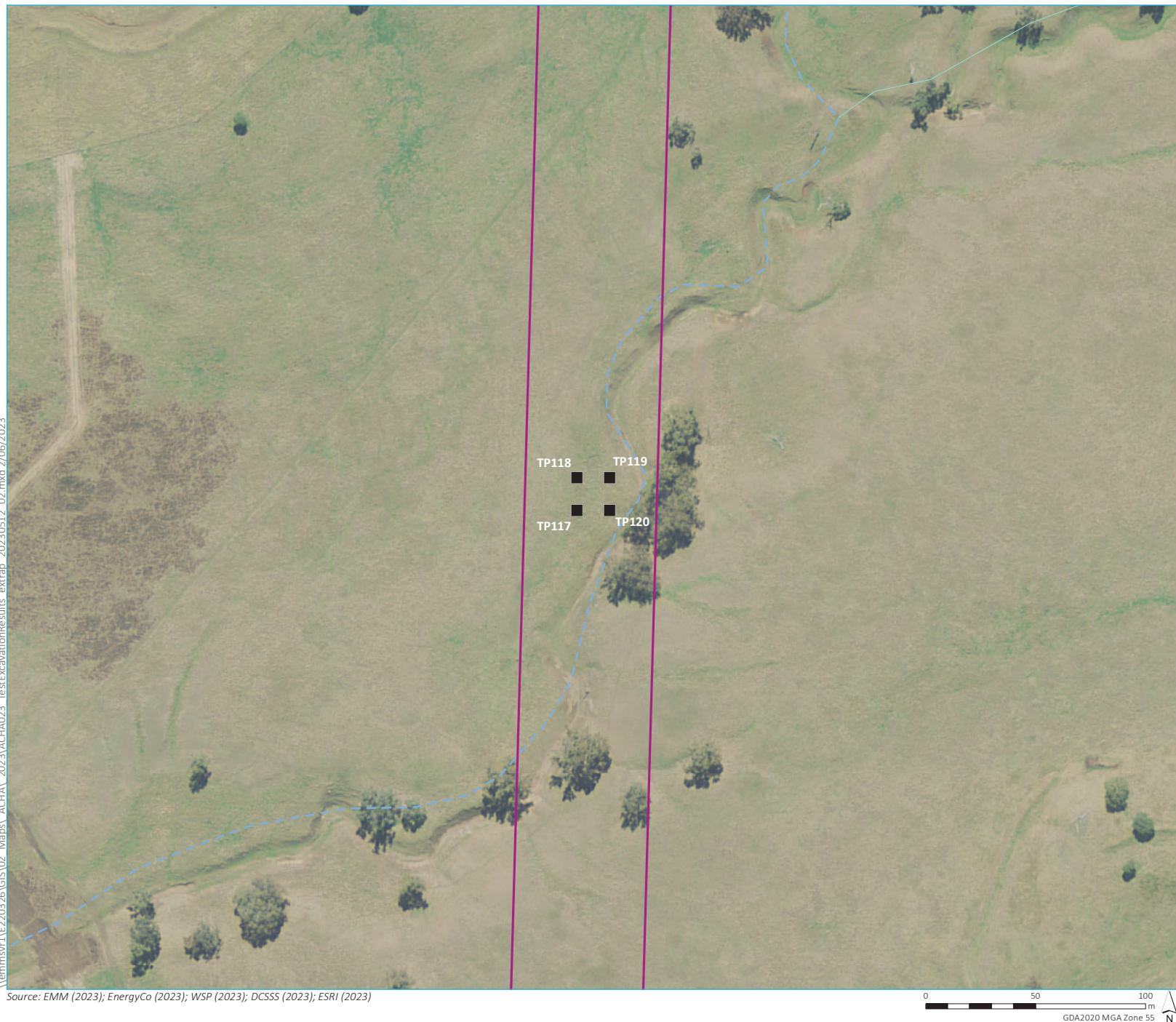






- KEY**
- Construction area
  - Test pit artefact density (extrapolated count per m<sup>2</sup>)
  - 0 (no artefacts found)
  - Strahler stream order
  - 1st order
  - 2nd order
  - INSET KEY**
  - Major road
  - NPWS reserve
  - State forest

Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 8.7



- KEY**
- Construction area
  - Test pit artefact density (extrapolated count per  $m^2$ )
    - 0 (no artefacts found)
  - Strahler stream order
    - 2nd order
    - - - 3rd order
  - INSET KEY**
    - Major road
    - NPWS reserve
    - State forest

Test excavation results per  $m^2$   
Map 31 of 31

Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 8.7

## 9 The archaeological resource

### 9.1 Key findings

The following provides a summary of key activities and/or findings of this Chapter:

- The assessment undertook cultural mapping, archaeological field survey and test excavations to explore and document the Aboriginal objects, site and places within the construction area, and to align them within the regional context. Overall, the findings were found to largely conform with the regional models, which are dominated by low density stone artefact material indicative of utilitarian and transient use in the west and increasing rockshelters and associated features in the east. Additional refinement of the regional model was also undertaken for the construction area, which allowed the data-driven identification of key locales and river corridors within the construction area, and a reduction of buffers around identified creek-lines within which cultural material may occur down to ~150 m.
- Without ratification or data hygiene, these activities identified 84 previously documented Aboriginal sites, places and/or deposits (Section 7.4.2), 82 newly identified sites through field survey (Section 8.2.3) and 6 cultural deposits from test excavations (Section 8.3.2) within the construction area. However, there is duplication across these different activities and several sites have either been destroyed or re-assessed through previous investigations and/or this report. Ultimately, when combining and ratifying these findings, there are some 46 discrete identified sites and places along with a continuous and complex distribution of surface and shallowly buried stone artefacts distributed across the construction area (SNI-BS1) – the latter encompassing the majority of the discrete site recordings in the desktop information and field survey data. These can be broken down as:
  - Eight rockshelters, including #36-3-3794 (habitation structure), #36-3-0449, #36-3-0570, #36-3-3790, SNI-RS01, SNI-RS02, SNI-RS03, and SNI-RS04. All previously documented sites presented here are located along the footslopes and hills north of Wilpinjong Creek within the Moolarben and Wilpinjong coal mining leases. SNI-RS01 and SNI-RS02 are two newly identified sites situated in vicinity of Deadmans Creek, west of Moolarben; SNI-RS03 and SNI-RS04 are situated near the Tuckland State Forest.
  - Nine culturally modified trees, including #36-3-0565, #36-6-0626, #36-3-0638, #36-3-0103, #36-3-0643, SNI CMT-01, SNI-CMT02, SNI-CMT03, and SNI-CMT11. Of these, #36-3-0643 and #36-3-0626 may be destroyed, given they are located within the active mine lease. All of these sites were assigned a tentative classification; and all are recommended for further specialist investigation.
  - Eleven grinding grooves sites, including SNI-GG01-09 inclusive, SNI-GG15 and SNI-AS65. The majority of these are found in two discrete elevations to the north-west of the Merotherie Energy Hub. SNI-GG15 was found in the south-east corner of the energy hub. SNI-AS65 included a small number of grooves (n=3) in the bed of Ironbark Creek at the proposed Neelys Lane construction camp.
  - Five high density artefact scatters (>100/m<sup>2</sup>) that are indicative of above background activity levels and reflect intense past occupation and/or repeated visitation. These include #36-3-1140, #36-3-1141, SNI-AS41, SNI-AS43 and SNI-AS57, and which are found near Bora Creek, Browns Creek, and Whites Creek.
  - Seven moderate density artefact scatters (>20-50+/m<sup>2</sup>) that are above background activity levels, but which likely reflect less intense or repeat occupation in the past. These include #36-3-0496, #36-3-0503, #36-3-0658, #36-3-0685/SNI-FA03, #36-3-0720, #36-3-0793, and SNI-AS02, and located along Cumbo Creek, Wilpinjong Creek, and Planters Creek.

- Six areas of past foci and activity characterised by high densities of sub-surface artefacts (>20/m<sup>2</sup>), including SNI-FA01, SNI-FA02, SNI-FA04, SNI-FA05, SNI-FA06 and SNI-FA07. These are found in close proximity to Laheys Creek, Tallawang Creek, Sportsmans Hollow Creek and Copes Creek.
- A stone artefact background scatter that is predicted to occur across the construction area and extending beyond its limits within which low artefact densities of ~2.1–16/m<sup>2</sup> may be expected (SNI-BS1). This includes a large number of the previously recorded isolated and low density stone artefact sites currently documented across the construction area. These sites are typically of low significance and reflect the long-term, transient use of the entire landscape by Aboriginal people in the past.
- A zone of ~150 m encompassing the banks on either side of Prospect Creek, Sandys Creek, Laheys Creek, Browns Creek, Whites Creek, Sportsmans Hollow Creek, Deadmans Creek, Bora Creek, Cumbo Creek, Planters Creek, Wilpinjong Creek, Tallawang Creek and Copes Creek within which higher densities of stone artefacts and/or other areas of past foci may be expected to be present.
- Cultural values mapping identified six places of cultural value and two key travelling routes, which do not overlap with the Aboriginal sites and deposits outlined above, despite many reflecting archaeological features such as rockshelters. Of these, three (SNI-CS4, SNI-CS5, SNI-CS6) are in close proximity and within visual range of the project.

## 9.2 Results and synthesis

### 9.2.1 General overview

Past studies and previously documented Aboriginal cultural heritage within the study area has been extensive, but localised. To the east, established coal mines at Ulan, Wilpinjong and Moolarben have undertaken several decades of investigation, and a considerable number of Aboriginal objects and sites have been documented in this region. A proposed, but never implemented, coal mine at Cobbora has also encompassed the Elong Elong Energy hub in the west of the construction area, and associated investigations have similarly identified numerous sites. Elsewhere across the construction area, investigations are less prevalent and relate to increasing development of, and planning for, renewable energy projects within the study area. These often intersect the construction area, but many are under current investigation and the results remain unavailable.

These past studies suggest that the study area was dominated by utilitarian and resource utilisation activities in the past, with cultural materials dominated by various stone artefact discard from raw material extraction, hunting, et cetera. These resources appeared to be focussed on various major water courses, including Wilpinjong Creek, Laheys Creek, and several others generally >2nd order in size. In discussions with the RAPs, there is also reference to the importance of the Talbragar River, although formal studies are limited to date, and our understanding of the cultural materials is poor. There is some evidence of a more complex use of the landscape in some parts, with the presence of a known bora ground (ceremonial) to the west of Wilpinjong Creek, as well as several natural landscape features identified as of value to the Aboriginal community.

## 9.2.2 Summary and analysis of previously documented sites

Overall, 2,809 previously documented sites are noted as occurring in the study area (Section 7.4) by these previous studies, and these provide a substantial database to inform the project. These previous investigations show that cultural materials within the study area is generally dominated by artefactual sites, most frequently isolated stone artefacts or low density (<15) artefact scatters. There are a handful of references to artefact scatters exceeding 1,000 objects, but these are rare (some six of the 2,809 [0.21%] documented sites) and appear to be primarily situated to the north-west of the study area. One of these six sites is located to the south-east of the Elong Elong Energy Hub on Laheys Creek and highlights the importance of this river corridor for past Aboriginal activities. In addition, to the east of the study area where steep sandstone relief is prevalent, there is extensive documentation of rockshelters and their various site features. While only ~140 rockshelter sites are presented in Section 7.3, which was based on spatially constrained searches either side of the construction area in this locale, a broader review of the literature suggests well over 500 sites are known to be present in the vicinity of Goulburn River National Park. The presence of grinding grooves and culturally modified trees are also well documented in this region where environmental conditions are suitable.

A review of the AHIMS database identified 84 previously documented sites within the construction area (Section 7.4; Figure 7.1, Appendix D.5), and which conform with the regional findings above. Specifically, they are dominated by stone artefactual material (n=73), with isolated or disparate recordings of other site types, including rockshelters (n=4), art sites (n=1), culturally modified trees (n=5), and a habitation structure (n=1). However, on detailed review of this data, seven of these, all artefactual sites, have been previously destroyed by existing coal mining activities; the art site (#36-3-0720) is actually a moderate density artefact scatter poorly documented in the AHIMS database; the habitation structure (#36-3-3794) was a natural cleft in a hilltop with no evidence of cultural activity; and one of the rockshelters (#36-3-3018) is actually an isolated Aboriginal object on review of the detailed site information. Based on this, it can be considered that some 77 previously documented sites intersect the construction area, consisting of three rockshelters, five culturally modified trees, a probable natural feature identified as a habitation structure, and 68 stone artefactual sites (Appendix E.5). Of the latter, six can be considered of moderate or high density (#36-3-0496, #36-3-0503, #36-3-0658, #36-3-0793, #36-3-1140, #36-3-1141), with the remainder containing few cultural materials.

## 9.2.3 Summary and analysis of newly identified sites

The field investigations continued to validate the regional models outlined above, as well as provide further refinement. Specifically, a substantive archaeological field survey that encompassed some 79% of the construction area, and identified 183 Aboriginal objects, site and/or places (Figure 9.1, Appendix E.1). Spatially, these sites were primarily found in two different environmental contexts, either:

- within close proximity (<200 m) of major water courses, including Laheys Creek, Sandy Creek, Tallawang Creek, Browns Creek, Copes Creek and Deadmans Creek. While Wilpinjong Creek, and/or
- at interfaces of changing resource environments, typically on the edges of elevation/relief and surrounding swampy or riverine corridors, such as along the edges of Barney's Reef and between hills and ranges near Molarben and Ulan.

Of the 183 identified sites, 82 are within the construction area, consisting of artefact scatters (n=34; three with deposit, and one in association with grinding grooves), isolated Aboriginal objects (n=28; two including deposit), culturally modified trees (n=4), grinding grooves (n=11), natural resource sites (n=1), and four rockshelters (n=4) (Table 8.3, Figure 9.1, Appendix E.1).

Of those identified (including not within the construction area), several require further consideration:

1. The rock art site, SNI-RA01, consists of two hand stencils highly visible to the main road, and yet has yet to be previously recorded. Discussions with the Aboriginal participants indicate the site is a recent creation likely by a non-Aboriginal person and is therefore considered 'not a site' for the purposes of this report.
2. The natural resource reflects exposed sandstone geology, which is prevalent across the study area, and this particular locale contained no other cultural materials that may suggest a reason for the identification over other geological outcrops.
3. Several of the sites reflect a re-identification of previously documented sites and are, therefore, duplicates to the existing record. These include SNI-AS11 (#36-3-0664), SNI-AS33 (#36-3-1424), and SNI-AS50 (#36-3-0222). A number of the identified sites no longer in the construction area are also re-identifications of previously documented sites, including SNI-AS67 [#36-3-0365], SNI-GG11, SNI-SA01, SNI-AS39, SNI-IF57 and SNI-IF45 [#36-3-0111], SNI-IF16 [#36-3-0659].

When considering these discrepancies, it can be considered that some 77 newly identified sites remain within the construction area.

Each of the newly identified sites were assessed for robustness, and either considered 'valid' or 'tentative' dependent on the archaeological features that were observed in the field (Appendix F.1). Ultimately, the majority of the culturally modified trees in which natural and/or post-European pastoral activities may have played a role in their creation, potential archaeological deposits, and several grinding grooves have been proposed as tentative at this stage. These site types are recommended for further investigation to clarify their status prior to the construction of the project.

#### 9.2.4 Summary and analysis of test excavations

The archaeological test excavations were undertaken to supplement the field survey results and provide further information on specific questions stemming from the field survey. These included the potential depth of soil profiles where cultural materials may be expected, as well as targeting a number of specific locales where cultural deposits were considered probable. The excavations provided two important pieces of information on the cultural landscape:

1. cultural materials were predominantly found in the upper 20 cm of test pits, and the overall soil profile was typically less than 80 cm in depth
2. despite test pits ranging up to 384 m from major water courses, most cultural material was encountered within 150 m of a creek's edge (with an average of ~104 m).

Overall, limited cultural materials were recovered from 32 discrete locations across the construction area.

Specifically, average artefact densities were  $\sim 2/m^2$  whereas regional models show that  $>17/m^2$  would be expected to dictate above background level activities.

However, on extrapolation of the data, seven areas were identified as having been potential focus areas of past activity, with densities that exceeded 20/m<sup>2</sup> either in one location or several closely spaced test pits. These consist of:

- TP#1-4 and #5-8, now identified as SNI-Focus Area (FA)01 and FA02, situated on the southern bank of Tallawang Creek
- TP#165, identified as SNI-FA03, situated near Planters Creek and potentially a duplicate of nearby #36-3-0685
- TP#208, identified as SNI-FA04 near Copes Creek and several newly identified sites (SNI-AS12, 14 and 61)
- TPs#249-252, now identified as SNI-FA05, situated on the western bank of Laheys Creek in the south-east corner of the Elong Elong Energy Hub
- TP#273, identified as SNI-FA06, located at the interface of Tallawang Creek and Barneys Reef
- TP#135, identified as SNI-FA07, located on the banks of Sportsmans Hollow Creek.

Using the spacing between test pits to provide a maximum limit of these cultural materials, focus areas were determined to range in size from 1.6–3.6 ha in size, depending on whether a single test pit or group of test pits were encompassed.

The recovered assemblage was considered to date to the last few thousand years based on artefact typology. The assemblage further indicated the sites were used to extract raw materials from nearby sources, potentially various water courses, and/or reflected increased and/or repeated occupation of these locales compared with many of the other sites encountered during the field investigations.

### 9.2.5 Summary and ratification of all archaeological data

Overall, when removing those sites that have been destroyed by development activities, and combining and ratifying the information above, the construction area can be considered to encompass the following Aboriginal sites, places and/or objects (Figure 9.2):

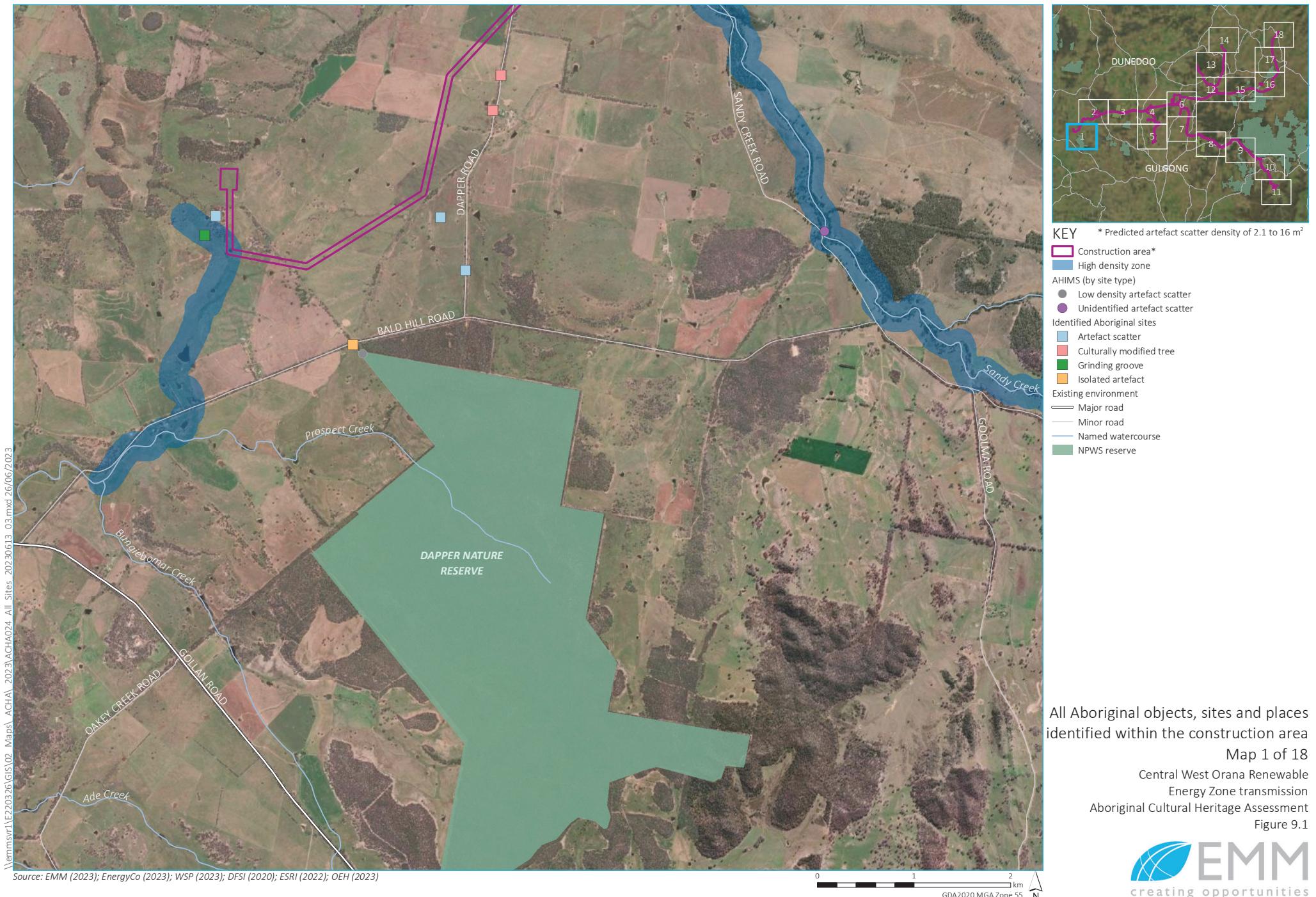
- Eight rockshelters, including #36-3-3794 (habitation structure), #36-3-0449, #36-3-0570, #36-3-3790, SNI-RS01, SNI-RS02, SNI-RS03, and SNI-RS04. All previously documented sites presented here are located along the footslopes and hills north of Wilpinjung Creek within the Moolarben and Wilpinjung coal mining leases. Two newly identified sites (SNI-RS01 and SNI-RS02) are situated in vicinity of Deadmans Creek, west of Moolarben; and SNI-RS03 and SNI-RS04 are situated near the Tuckland State Forest.
- Nine culturally modified trees, including #36-3-0565, #36-6-0626, #36-3-0638, #36-3-0103, #36-3-0643, SNI-CMT-01, SNI-CMT02, SNI-CMT03, and SNI-CMT11. Of these, #36-3-0643 may be destroyed being within the active mine lease. All of these sites were assigned a tentative classification; and all are recommended for further specialist investigation.
- Eleven grinding grooves sites, including SNI-GG01-09 inclusive, SNI-GG15 and SNI-AS65. The majority of these are found in two discrete elevations to the north-west of the Merotherie Energy Hub. SNI-GG15 was found in the south-east corner of the energy hub. SNI-AS65 included a small number of grooves (n=3) in the bed of Ironbark Creek at the proposed Neelys Lane construction camp.
- Five high density artefact scatters (>100/m<sup>2</sup>) that are indicative of above background activity levels and reflect intense past occupation and/or repeated visitation. These include #36-3-1140, #36-3-1141, SNI-AS41, SNI-AS43 and SNI-AS57, and which are found near Bora Creek, Browns Creek, and Whites Creek.

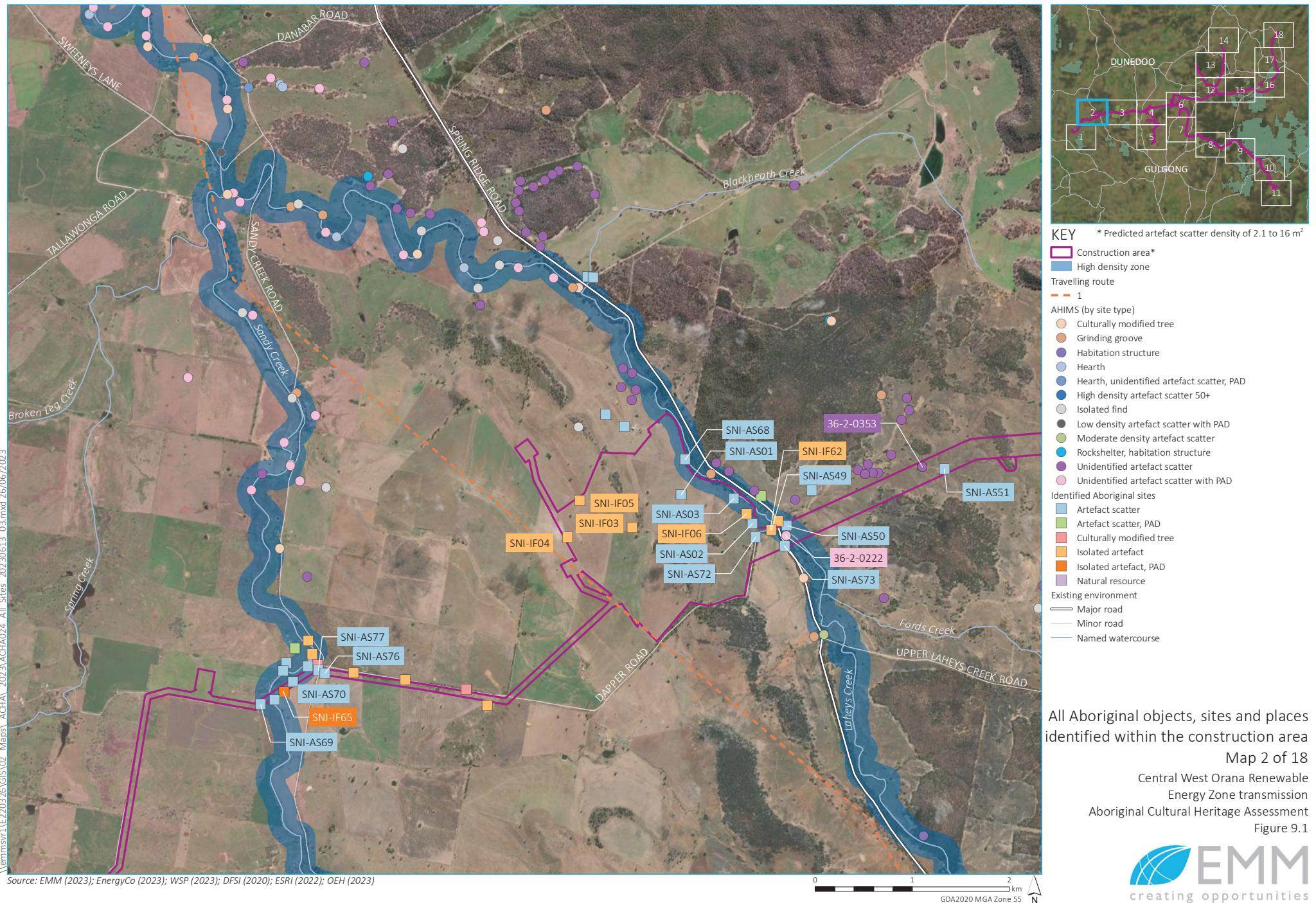
- Seven moderate density artefact scatters ( $>20-50+/m^2$ ) that are above background activity levels, but which likely reflect less intense or repeat occupation in the past. These include #36-3-0496, #36-3-0503, #36-3-0658, #36-3-0685/SNI-FA03, #36-3-0720, #36-3-0793, and SNI-AS02, and located along Cumbo Creek, Wilpinjong Creek, and Planters Creek.
- Six areas of past foci and activity characterised by high densities of sub-surface artefacts ( $>20/m^2$ ), including SNI-FA01, SNI-FA02, SNI-FA04, SNI-FA05, SNI-FA06 and SNI-FA07. These are found in close proximity to Laheys Creek, Tallawang Creek, Sportsmans Hollow Creek and Copes Creek.
- A stone artefact background scatter that is predicted to occur across the construction area and extending beyond its limits within which low artefact densities of  $\sim 2.1-16/m^2$  may be expected (SNI-BS1). This includes 113 of the previously recorded isolated and low density stone artefact sites currently documented across the construction area, including #36-3-0336, #36-3-0353, #36-3-0470, #36-3-0497, #36-3-0498, #36-3-0569, #36-3-0634, #36-3-0660, #36-3-0691, #36-3-0815, #36-3-0816, #36-3-0817, #36-3-0818, #36-3-0819, #36-3-0820, #36-3-0821, #36-3-1047, #36-3-1048, #36-3-1049, #36-3-1050, #36-3-1051, #36-3-1053, #36-3-1054, #36-3-1055, #36-3-1058, #36-3-1062, #36-3-1063, #36-3-1064, #36-3-1065, #36-3-1066, #36-3-1067, #36-3-1068, #36-3-1090, #36-3-1395, #36-3-1402, #36-3-1404, #36-3-1428, #36-3-1403, #36-3-3406, #36-3-1052, #36-3-1056, #36-3-1057, #36-3-1594, #36-3-1401, #26-3-2514, #36-3-2833, #36-3-3182, #36-3-3227, #36-3-3233, #36-3-3291, #36-3-3432, #36-3-3523, #36-3-3805, #36-3-3828, #36-3-3832, #36-3-3833, #36-3-3835, SNI-IF01-15 inclusive, SNI-IF17, SNI-IF20, SNI-IF28, SNI-IF33, SNI-IF39, SNI-IF41, SNI-IF43, SNI-IF47, SNI-IF48, SNI-IF51, SNI-56, SNI-IF58, SNI-IF62, SNI-IF65, SNI-AS01, SNI-AS03-07 inclusive, SNI-AS09, SNI-AS012, SNI-AS13, SNI-AS15, SNI-AS17, SNI-AS29, SNI-AS31, SNI-AS37, SNI-AS40, SNI-AS51, SNI-AS52, SNI-AS61, SNI-AS66, SNI-AS68, SNI-AS69, SNI-AS70, SNI-AS72, SNI-AS73, SNI-AS76, SNI-AS77 and SNI-Q01. These sites are typically of low significance and reflect the long-term, transient use of the entire landscape by Aboriginal people in the past.
- A zone of  $\sim 150$  m encompassing the banks on either side of Prospect Creek, Sandys Creek, Laheys Creek, Browns Creek, Whites Creek, Sportsmans Hollow Creek, Dedmans Creek, Bora Creek, Cumbo Creek, Planters Creek, Wilpinjong Creek, Tallawang Creek and Copes Creek within which higher densities of stone artefacts and/or other areas of past foci may be expected to be present.

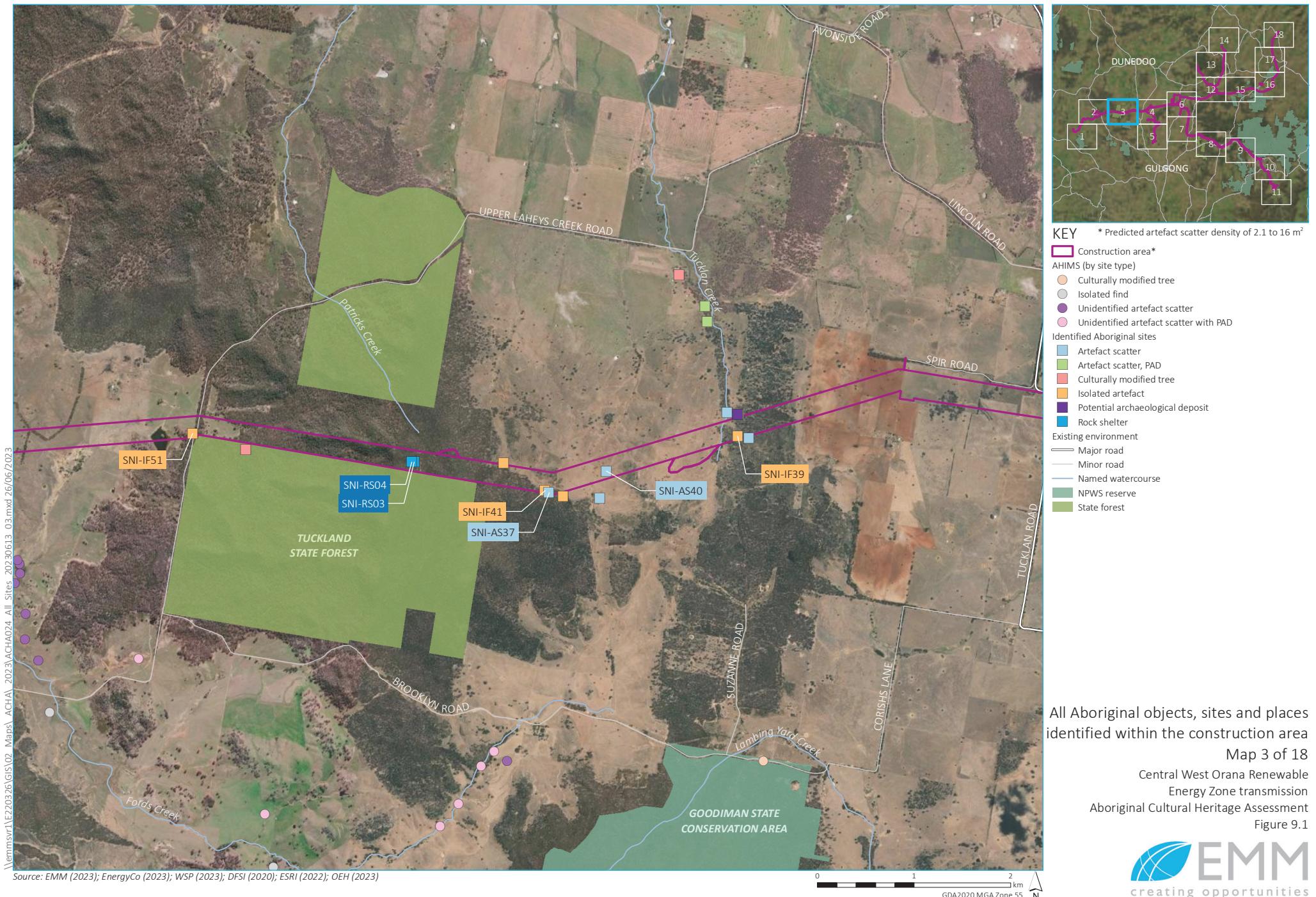
### 9.2.6 Summary and analysis of ethnographic and cultural values mapping information

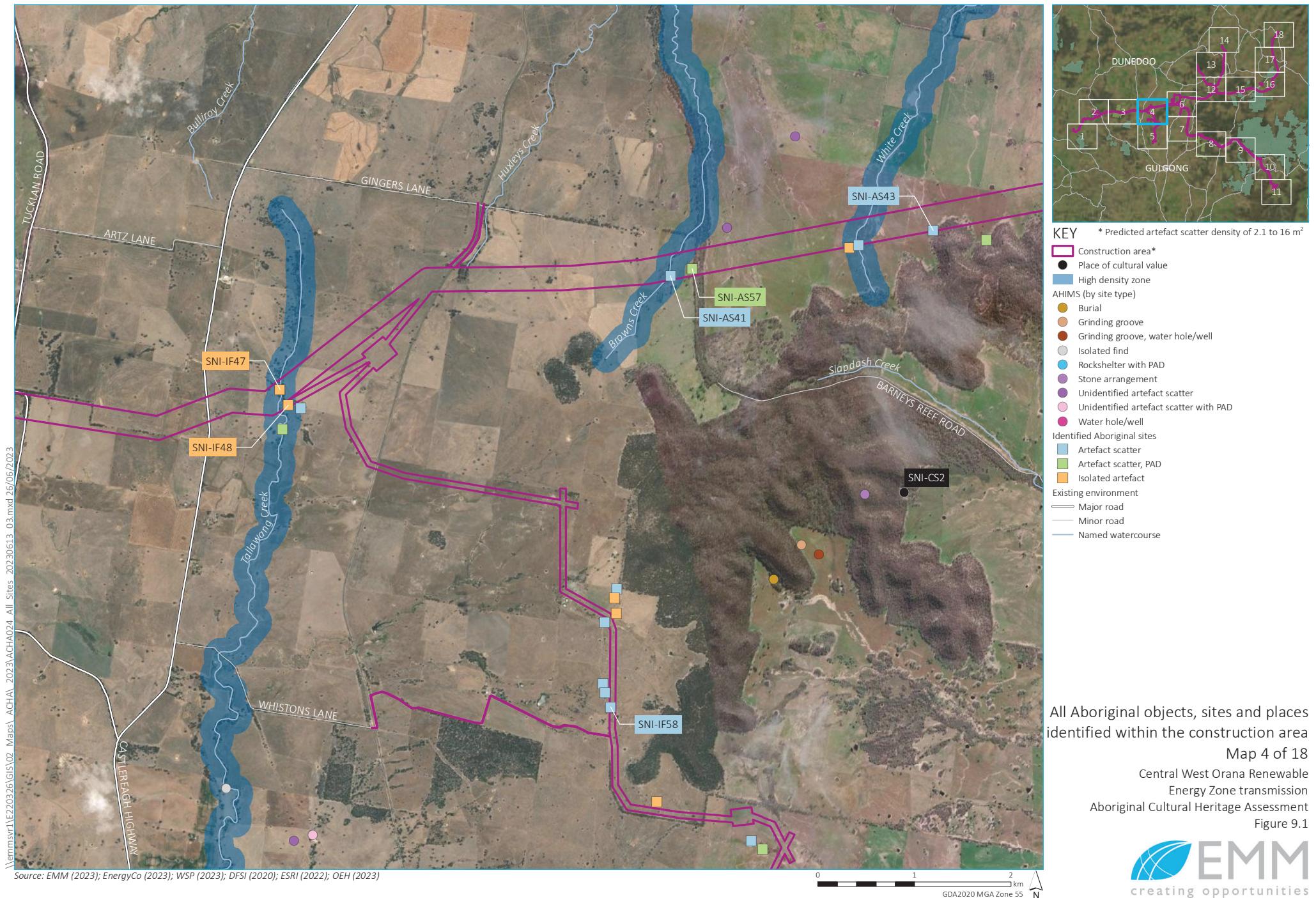
No ethnographic or cultural places have been identified within the construction area. There is documentary evidence of the region having been used by Jimmy and Joe Governor, bushrangers, in 1900 – a significant regional event — which included visiting Tallawang and Sportsmans Hollow Creek in the vicinity of the construction area (Section 6.2.3). However, while they almost certainly traversed the construction area, no definitive places or events can be identified within its curtilage.

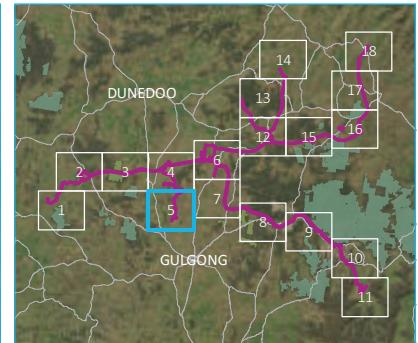
Cultural values mapping of the construction area was also undertaken (Section 6.3) as part of the ACHA. This identified six places of cultural value within the study area. These include a number of significant archaeological sites, including bora grounds, rockshelters and burials, as well as two travelling routes or song-lines. Despite many being archaeological in nature, none overlap with the previously documented findings or newly identified sites discussed above – although two have probably been documented more broadly by previous investigations of the Wollar Solar Farm and Wilpinjong coal mine (Section 7.3; Appendix C). Of the six sites, three are in close proximity to the construction area, including parts of a substantial rockshelter site (SNI-CS4), a bora ground (SNI-CS5), and evidence of past occupation at Wollar Creek (SNI-CS6).









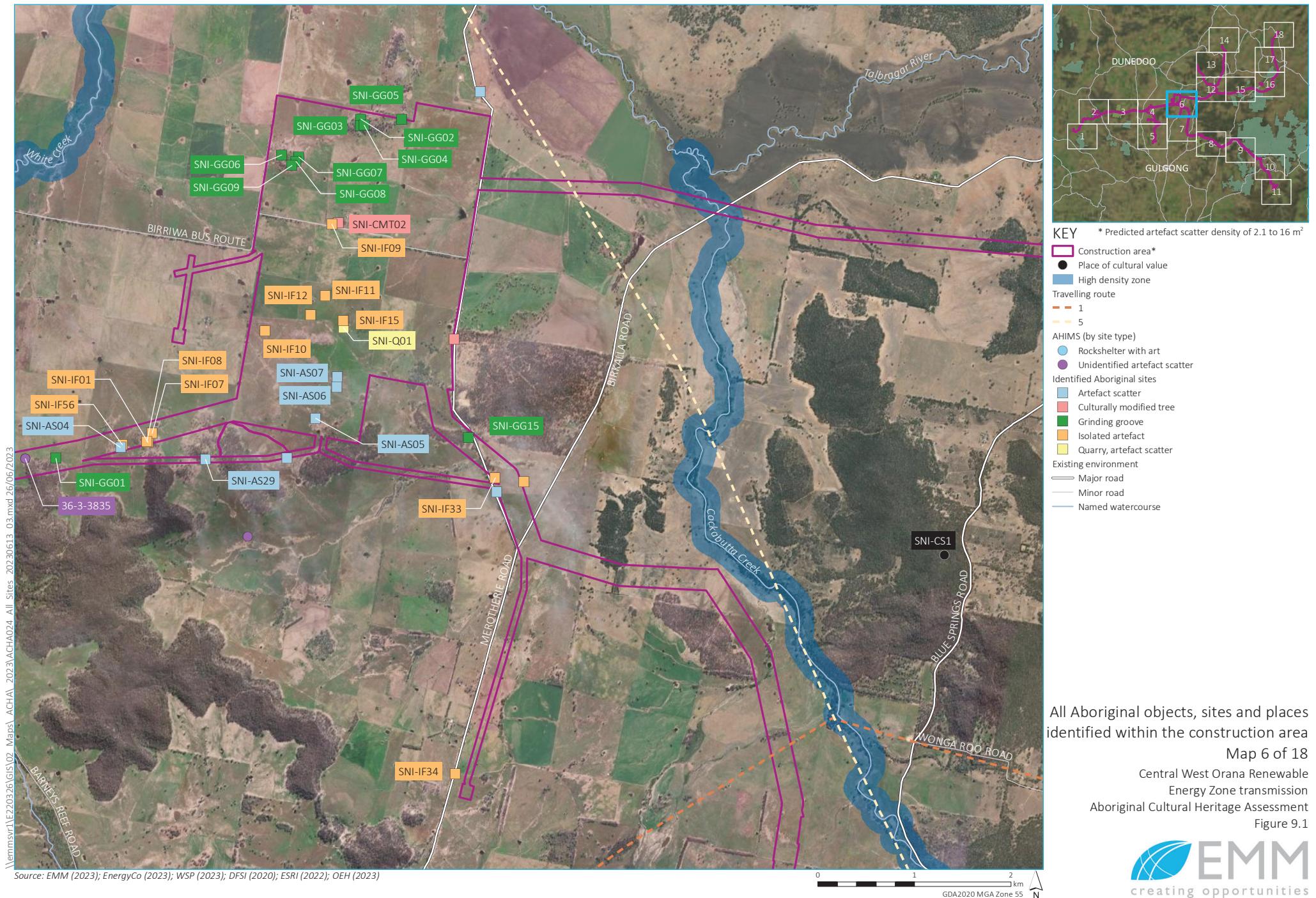


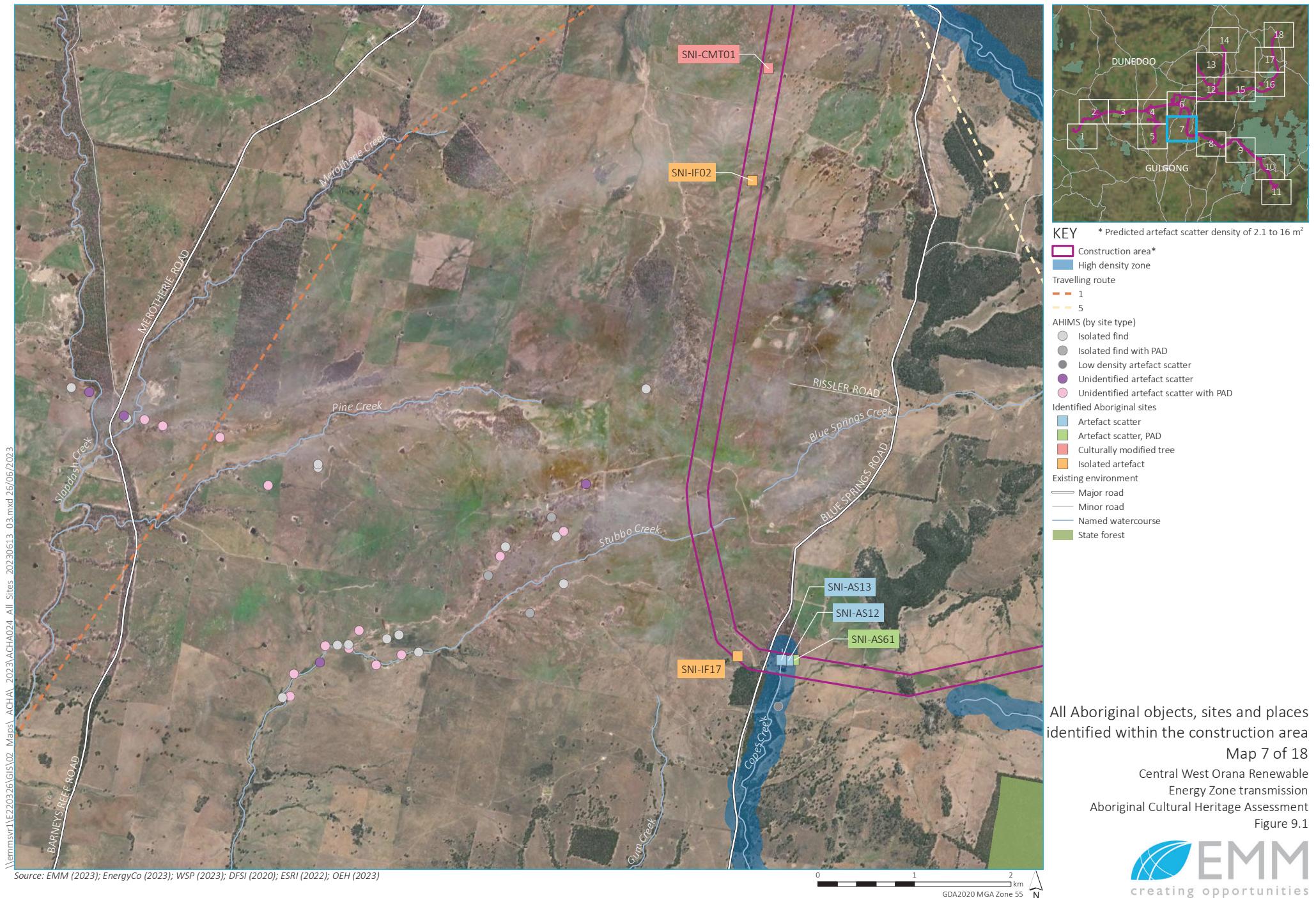
All Aboriginal objects, sites and places identified within the construction area

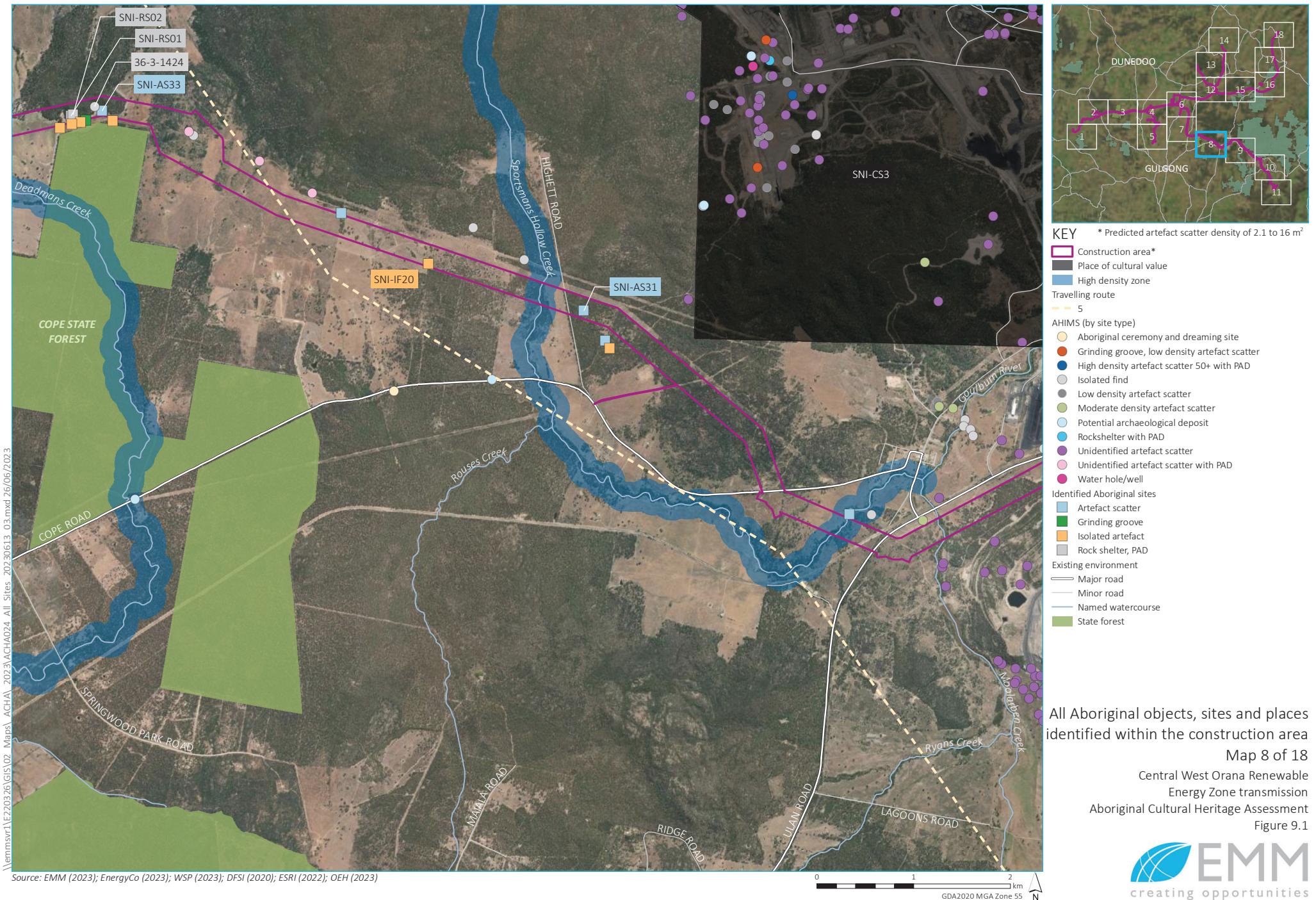
Map 5 of 18

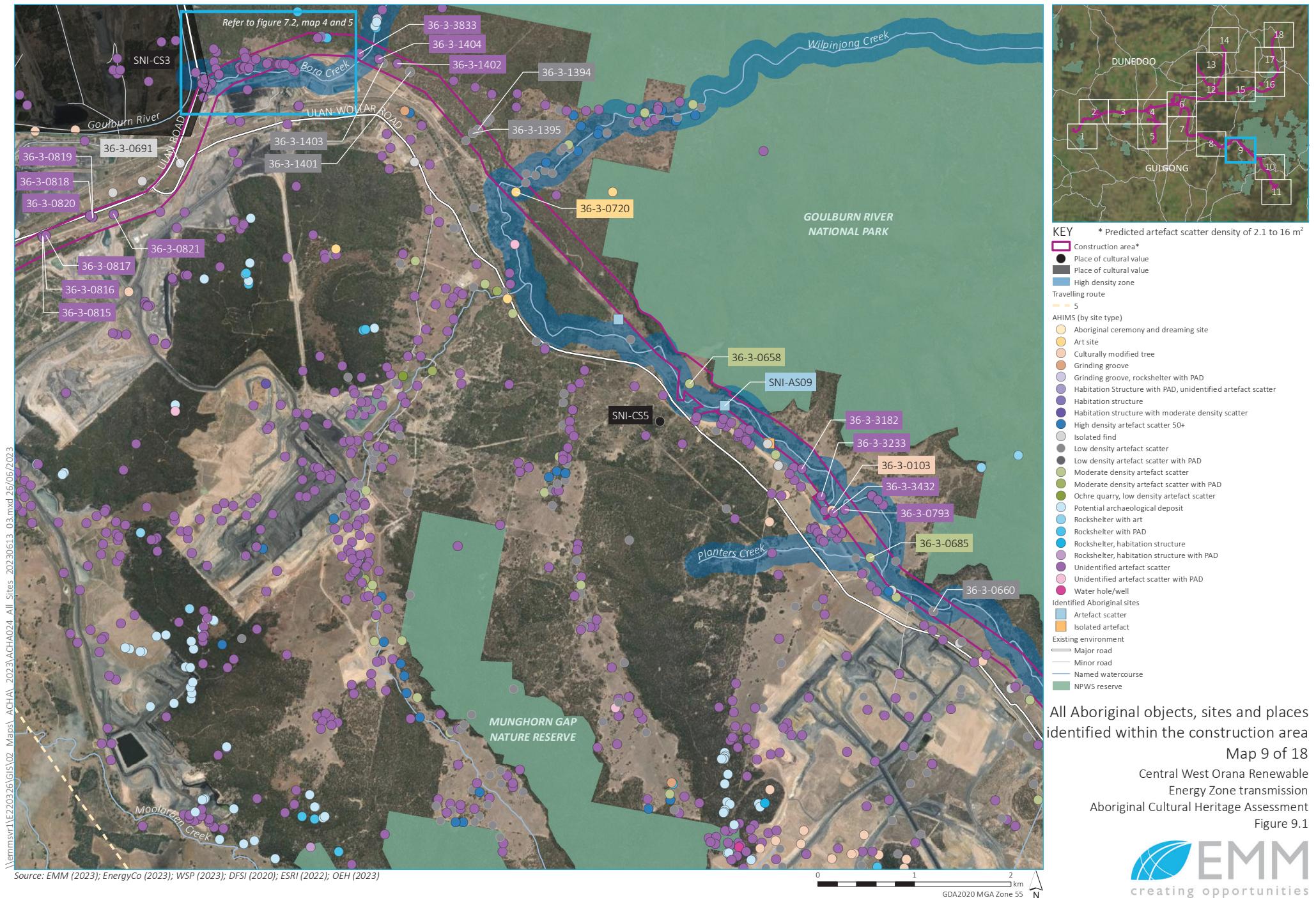
Central West Orana Renewable  
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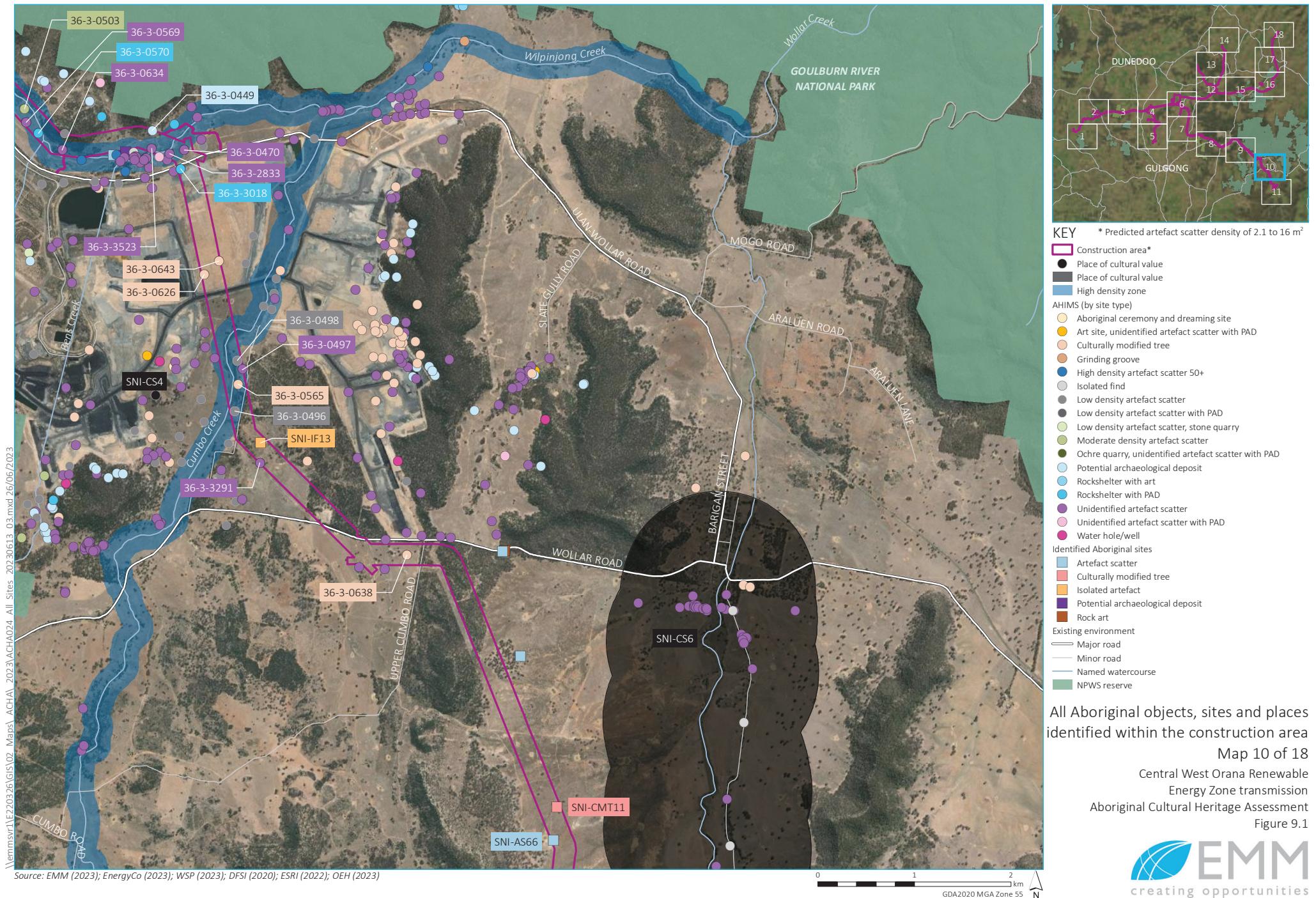
Figure 9.1

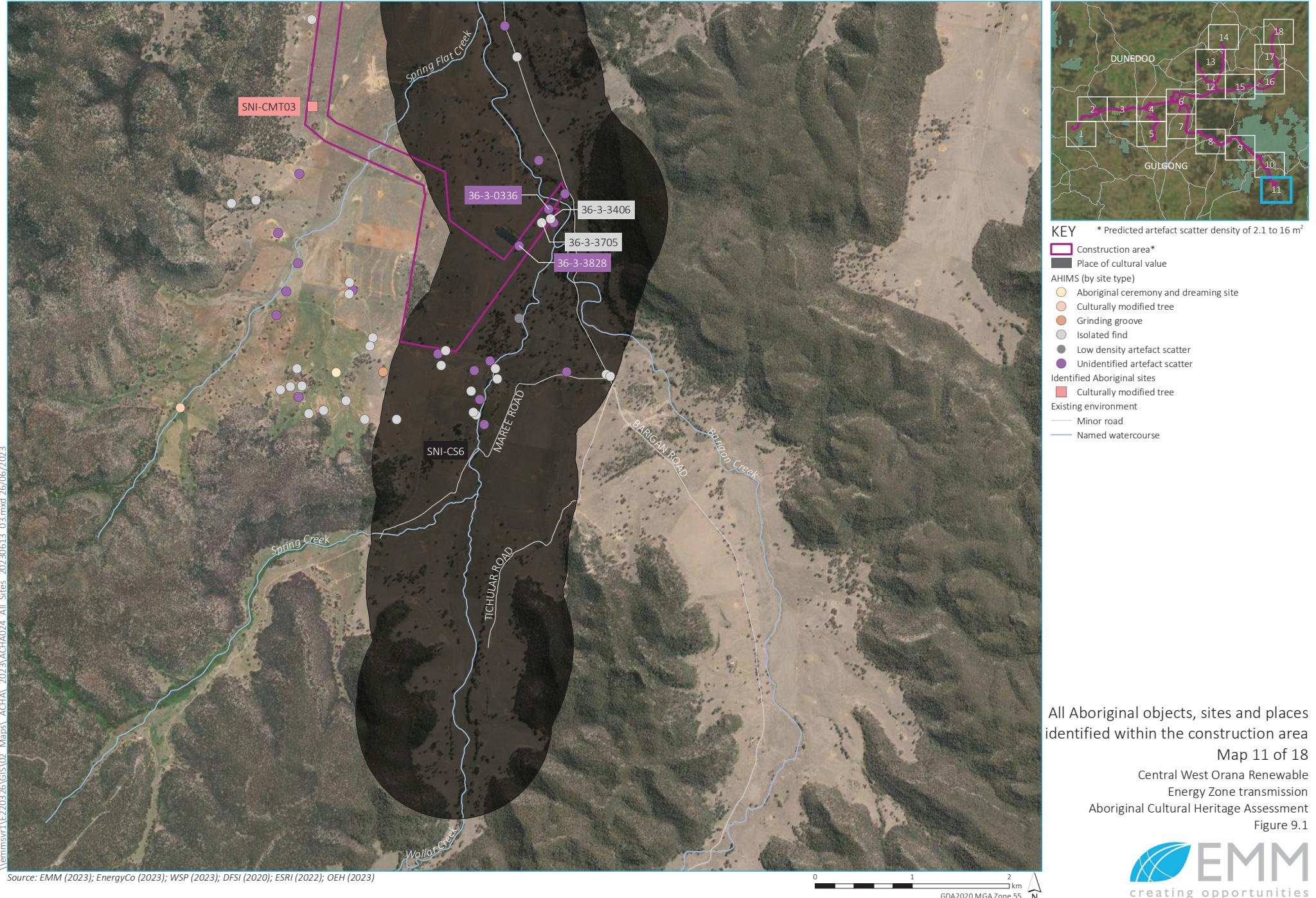


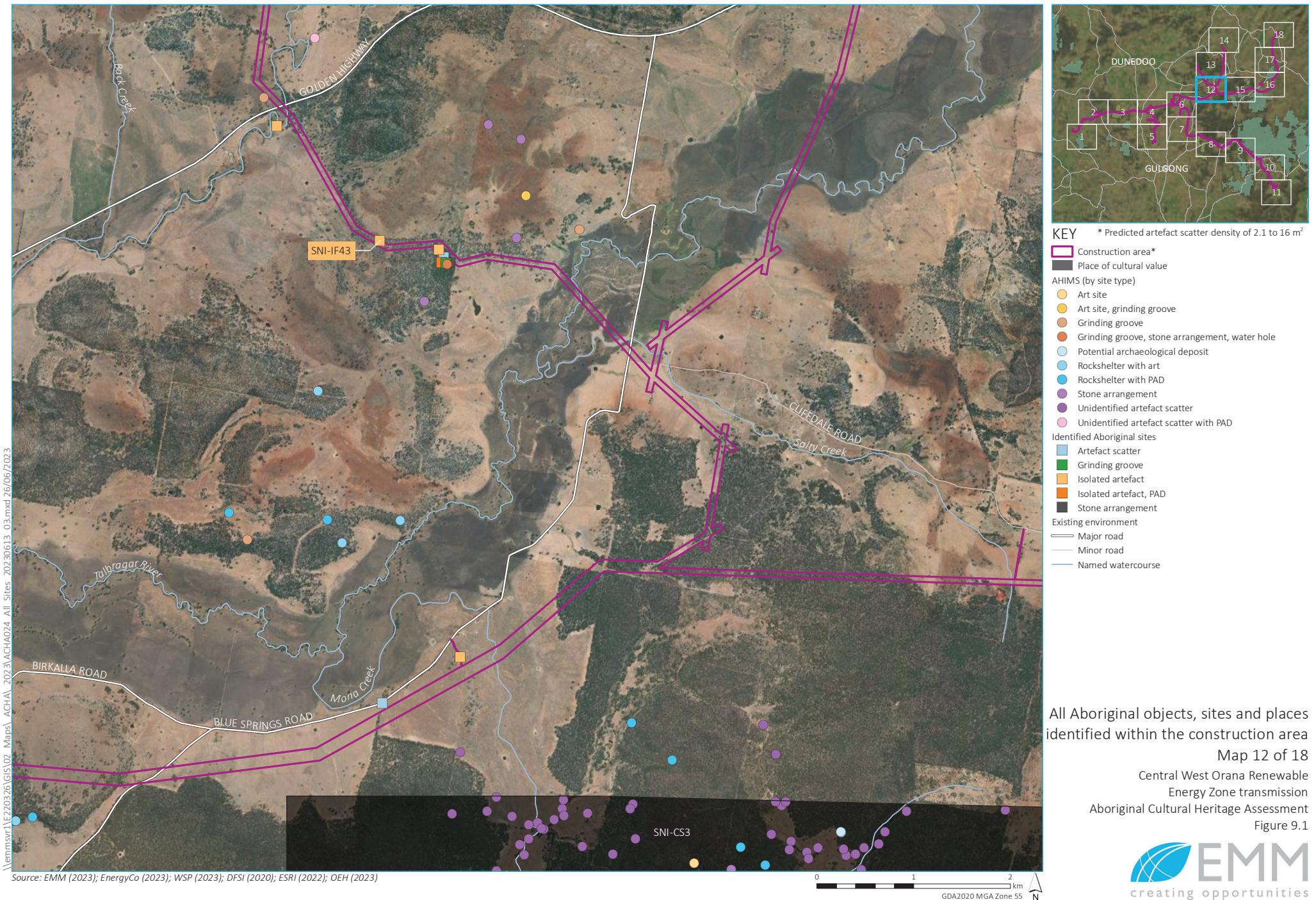


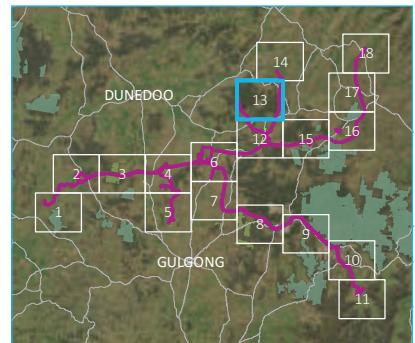
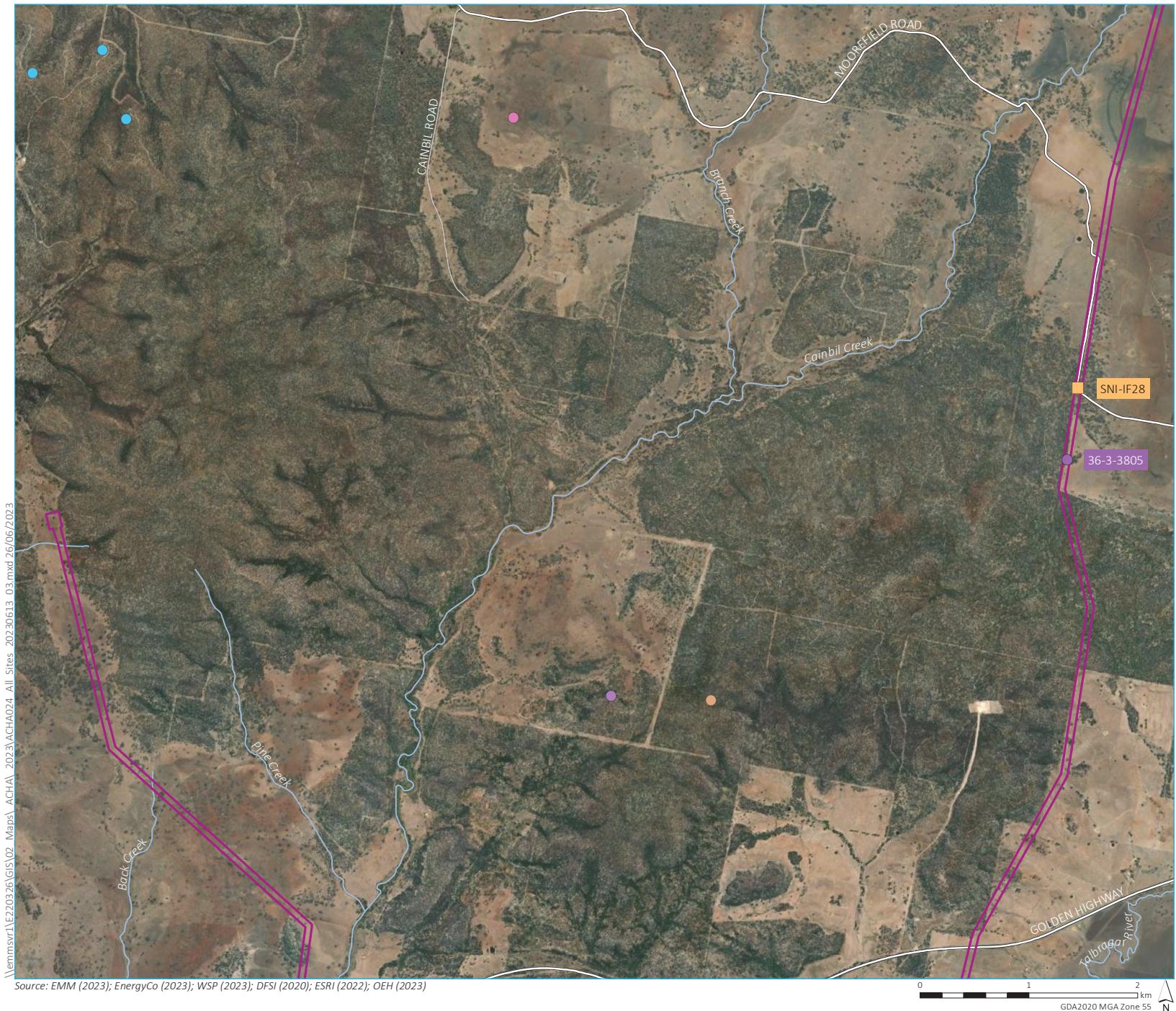












KEY \* Predicted artefact scatter density of 2.1 to 16 m<sup>2</sup>

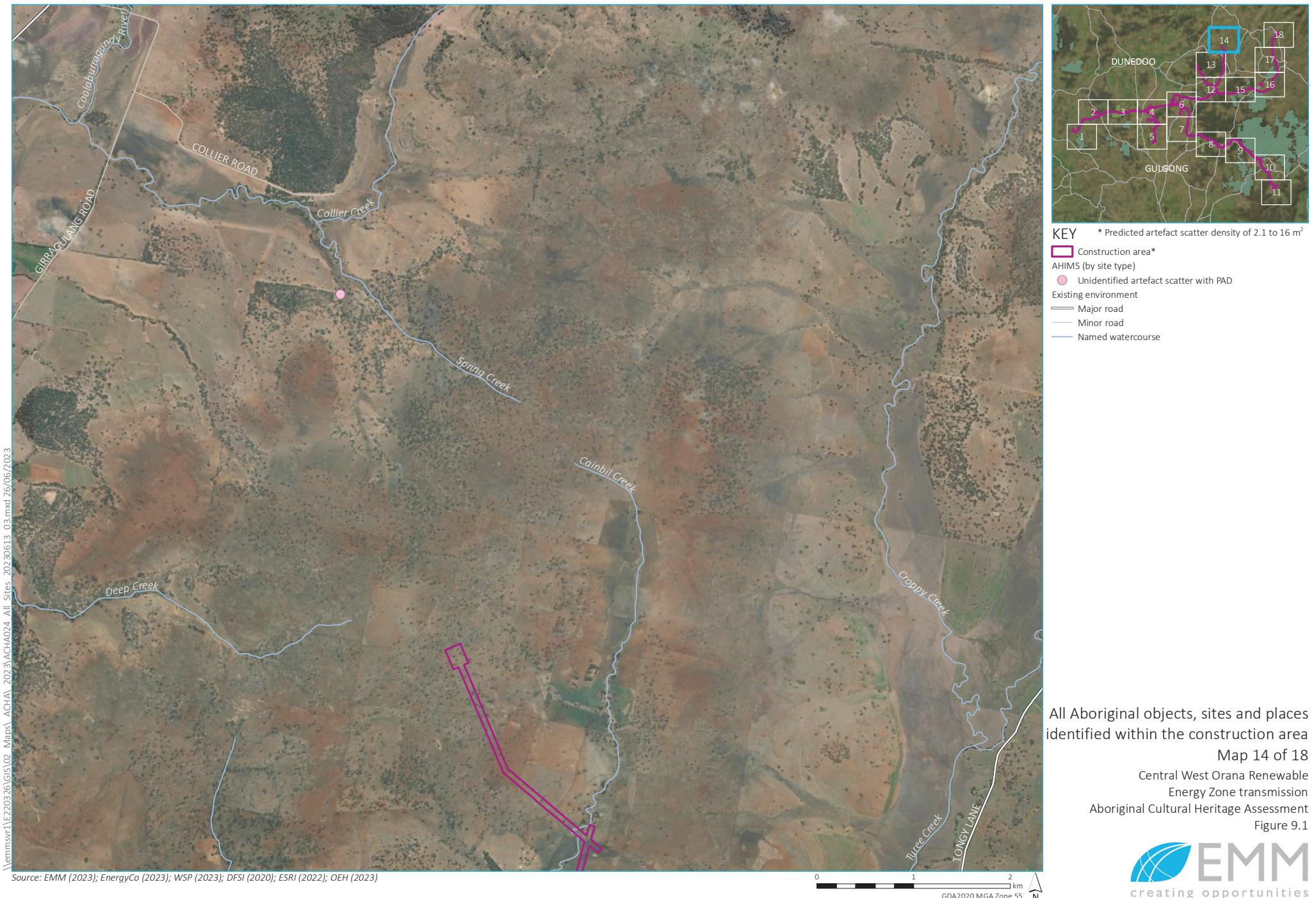
- Construction area\***
- AHIMS (by site type)**
  - Grinding groove
  - Rockshelter with PAD
  - Stone arrangement
  - Unidentified artefact scatter
  - Unidentified artefact scatter, stone quarry
  - Water hole/well
- Identified Aboriginal sites**
  - Isolated artefact
- Existing environment**
  - Major road
  - Minor road
  - Named watercourse

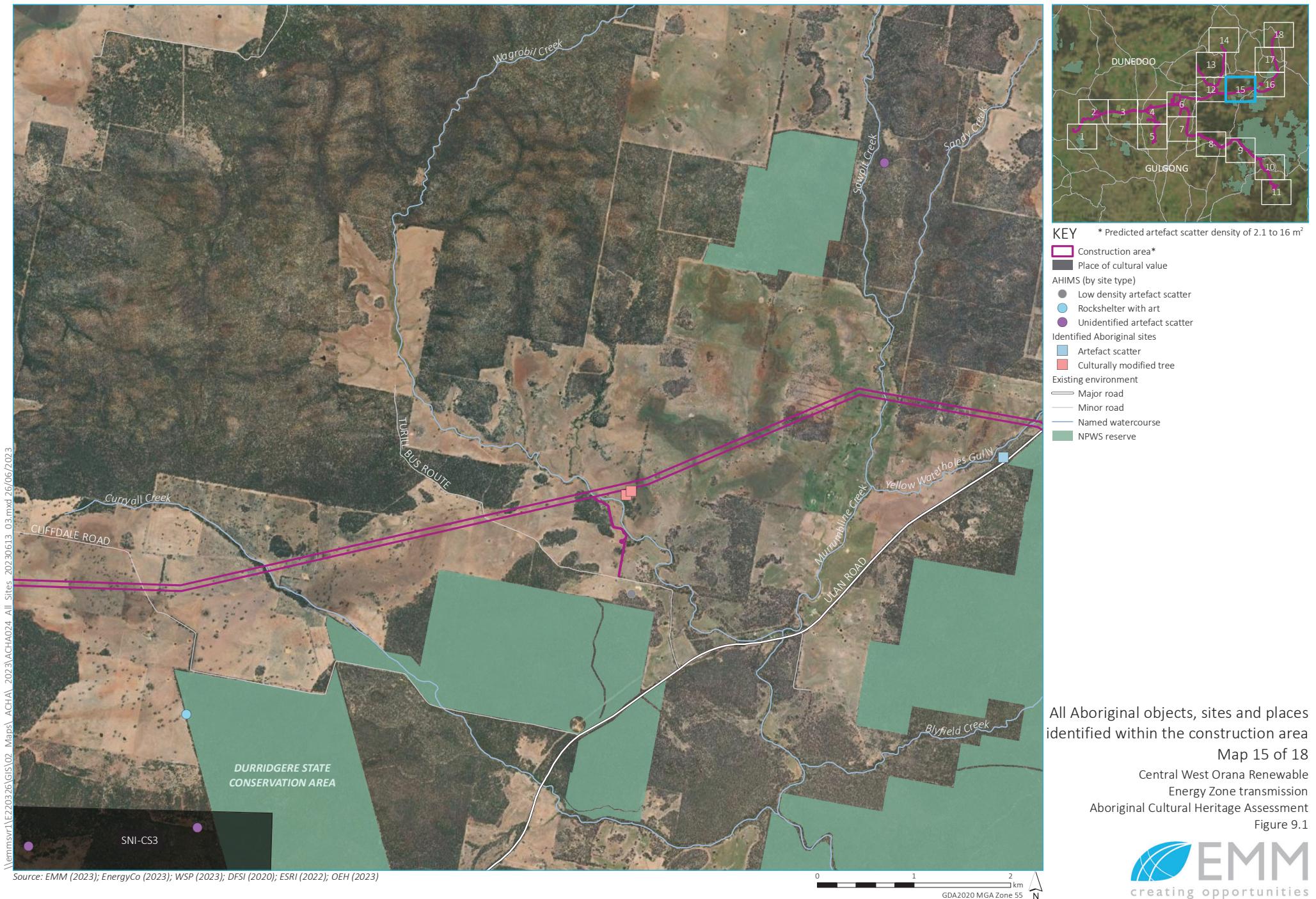
All Aboriginal objects, sites and places identified within the construction area

Map 13 of 18

Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment

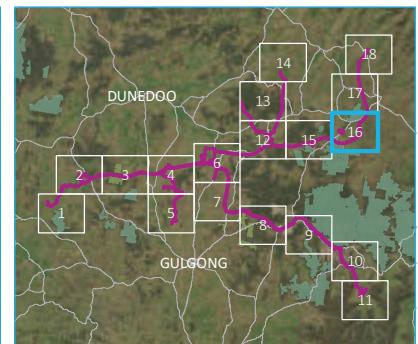
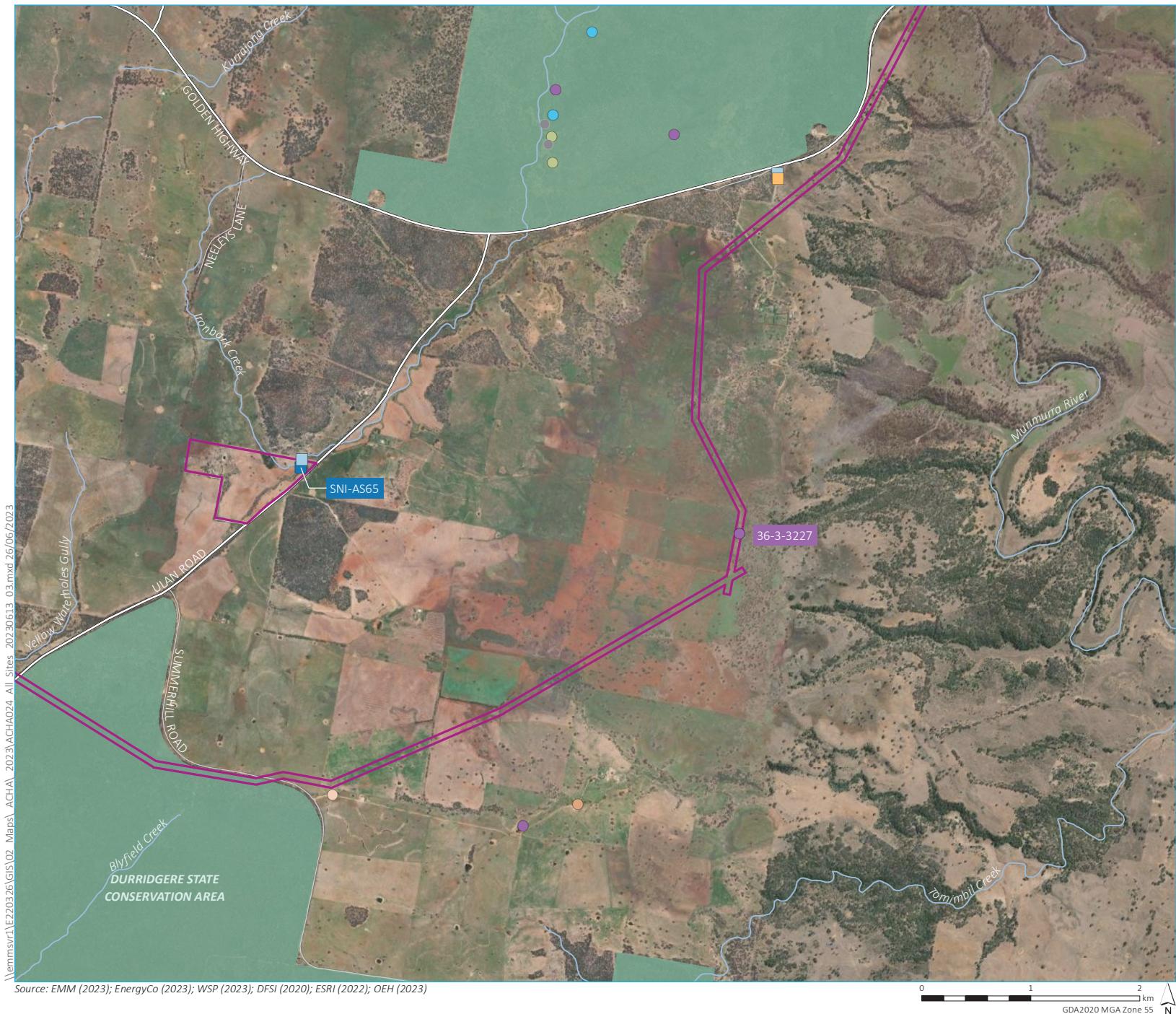
Figure 9.1





All Aboriginal objects, sites and places identified within the construction area

Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 9.1



KEY \* Predicted artefact scatter density of 2.1 to 16 m<sup>2</sup>

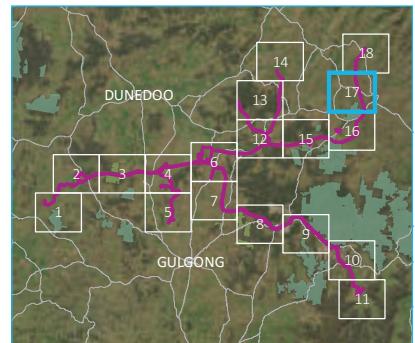
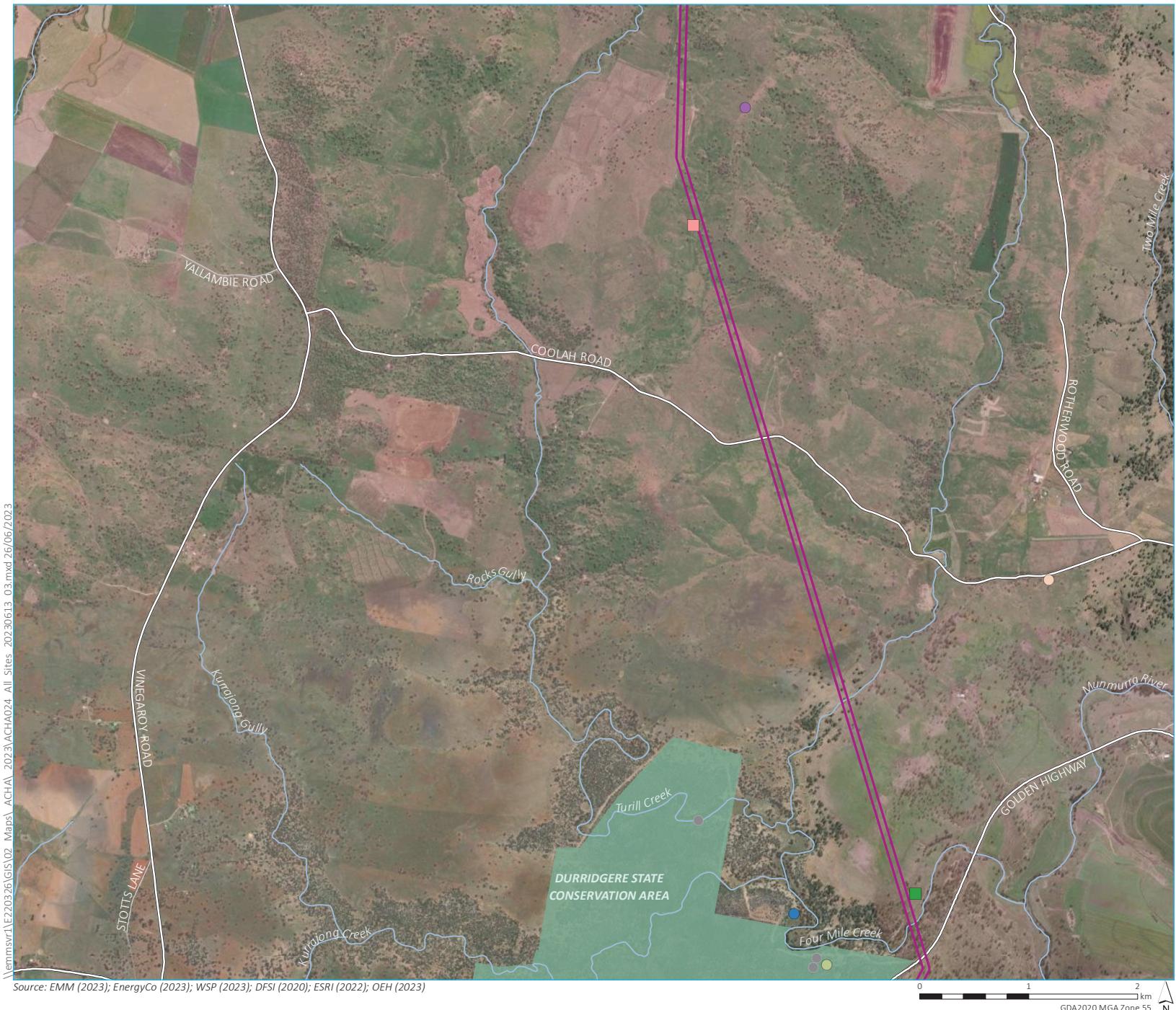
- |  |                     |
|--|---------------------|
| <b>Construction area*</b>              | (Magenta outline)   |
| <b>AHIMS (by site type)</b>            |                     |
| Culturally modified tree               | (Orange circle)     |
| Grinding groove                        | (Orange circle)     |
| Low density artefact scatter           | (Grey dot)          |
| Moderate density artefact scatter      | (Green dot)         |
| Rockshelter with PAD                   | (Blue square)       |
| Unidentified artefact scatter          | (Purple dot)        |
| <b>Identified Aboriginal sites</b>     |                     |
| Artefact scatter                       | (Light blue square) |
| Artefact scatter, grinding groove, PAD | (Dark blue square)  |
| Isolated artefact                      | (Orange square)     |
| <b>Existing environment</b>            |                     |
| Major road                             | (White line)        |
| Minor road                             | (Thin grey line)    |
| Named watercourse                      | (Blue line)         |
| NPWS reserve                           | (Green shaded area) |

All Aboriginal objects, sites and places identified within the construction area

Map 16 of 18

Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment

Figure 9.1

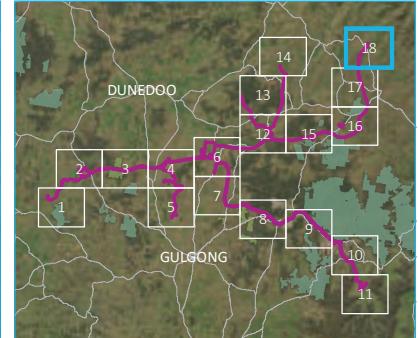


All Aboriginal objects, sites and places identified within the construction area

Map 17 of 18

Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment

Figure 9.1

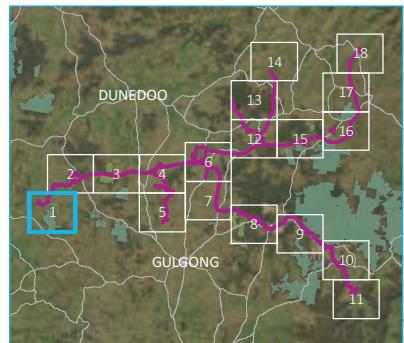
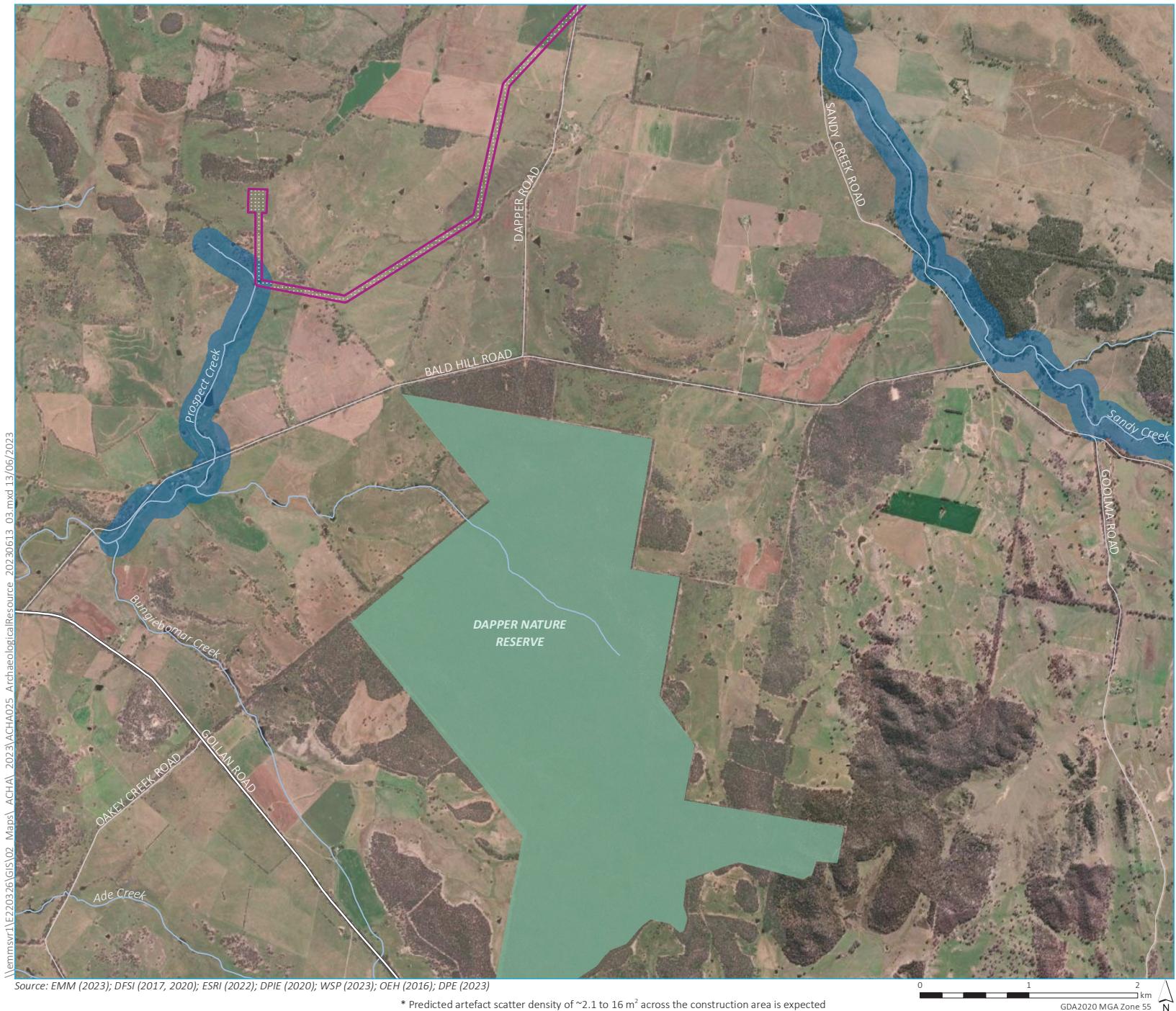


All Aboriginal objects, sites and places identified within the construction area

Map 18 of 18

Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment

Figure 9.1

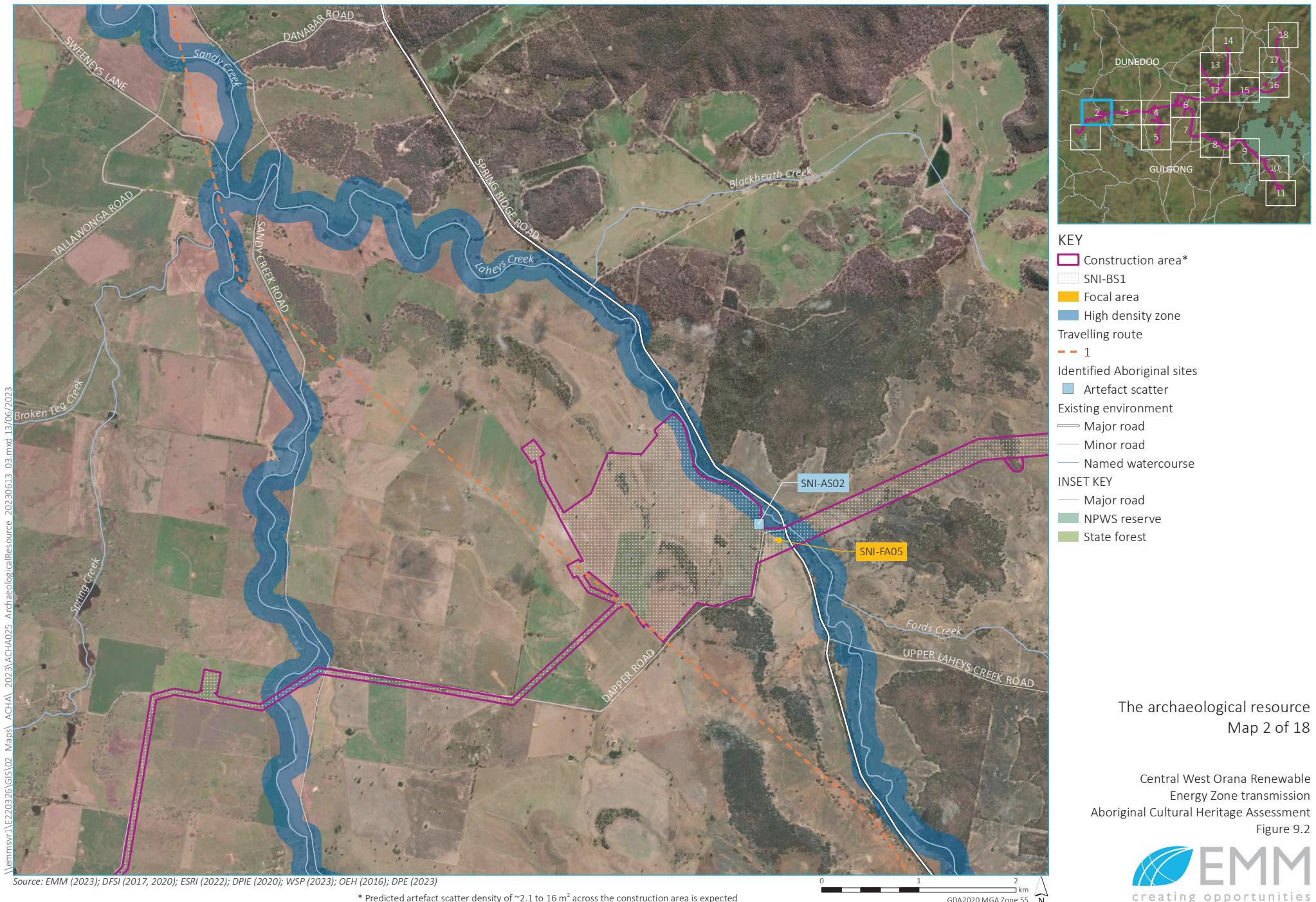


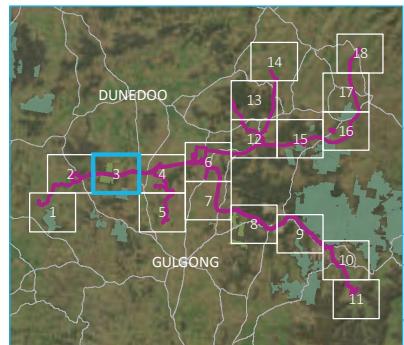
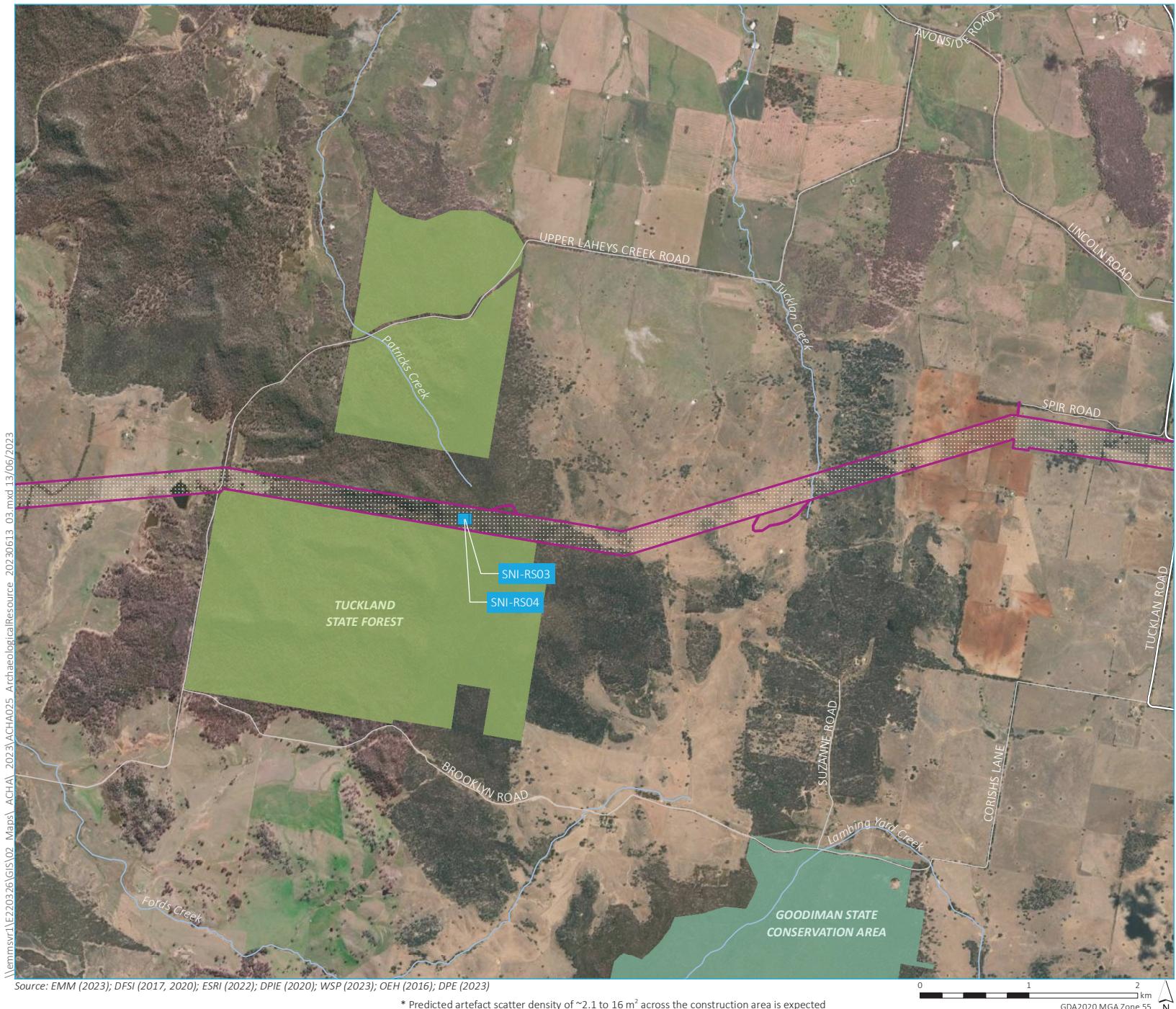
#### KEY

- Construction area\*
- SNI-BS1
- High density zone
- Existing environment
- Major road
- Minor road
- Named watercourse
- NPWS reserve
- INSET KEY
- Major road
- NPWS reserve
- State forest

The archaeological resource  
Map 1 of 18

Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 9.2





#### KEY

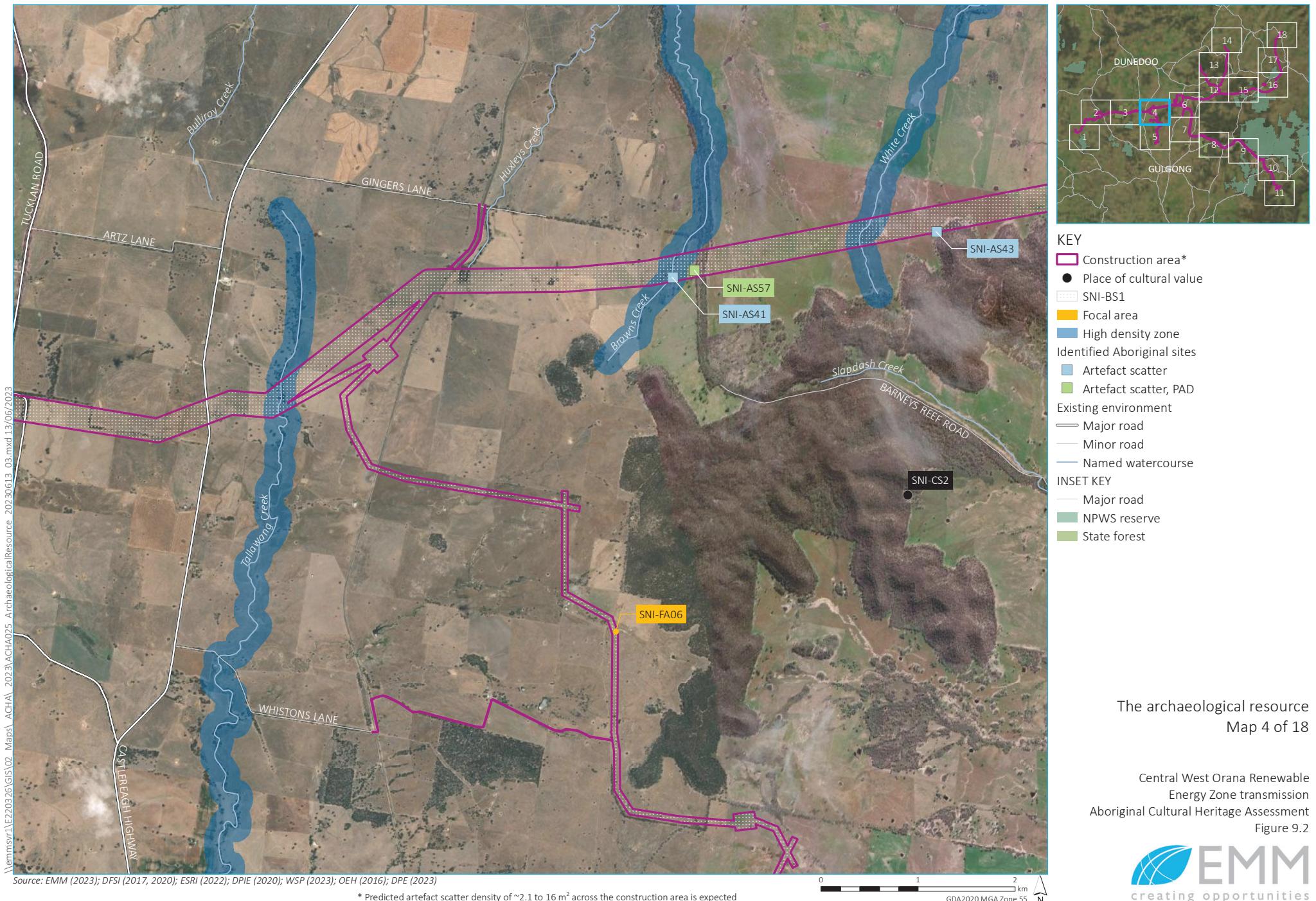
- Construction area\*
- SNI-BS1
- Identified Aboriginal sites
- Rock shelter
- Existing environment
- Major road
- Minor road
- Named watercourse
- NPWS reserve
- State forest

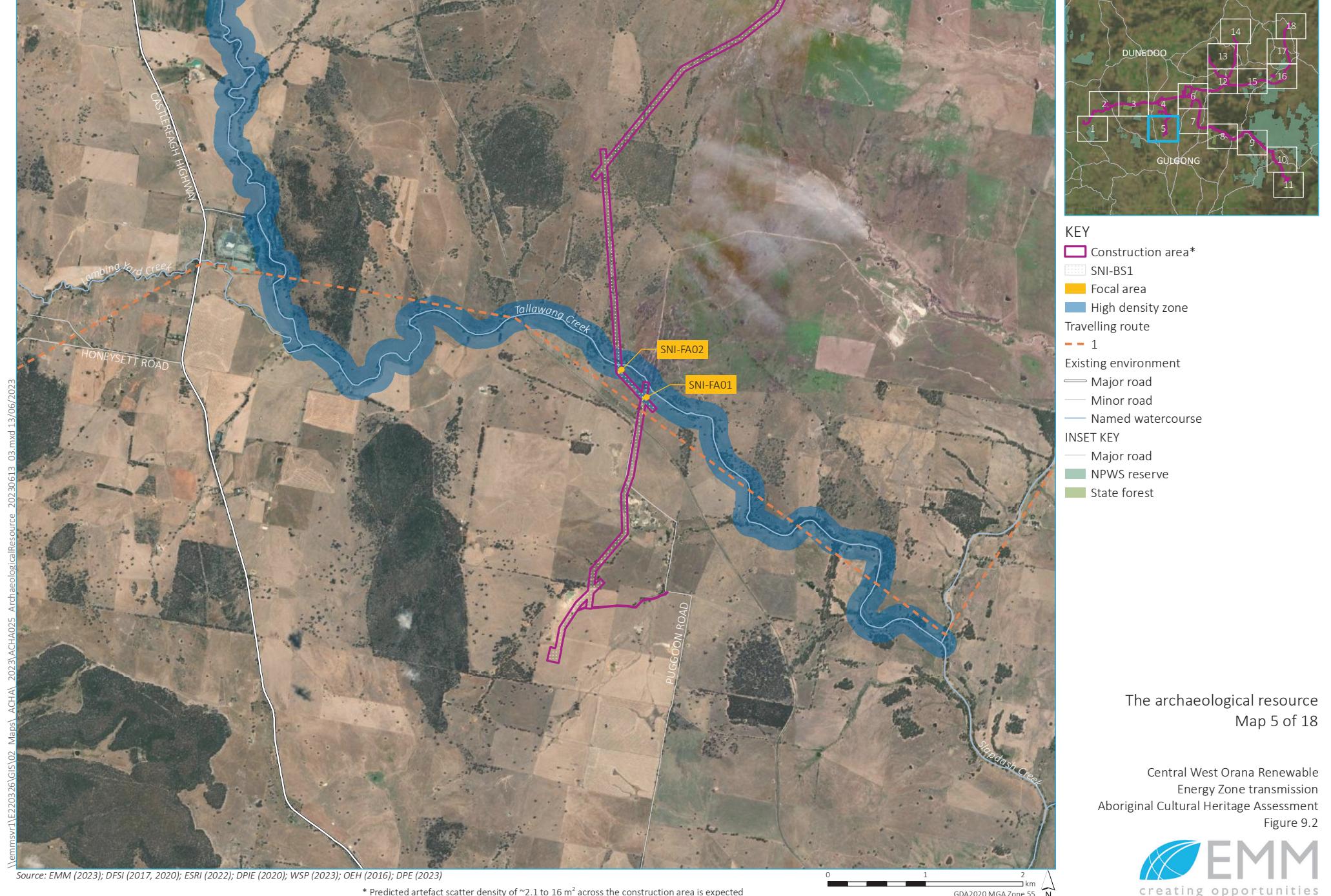
#### INSET KEY

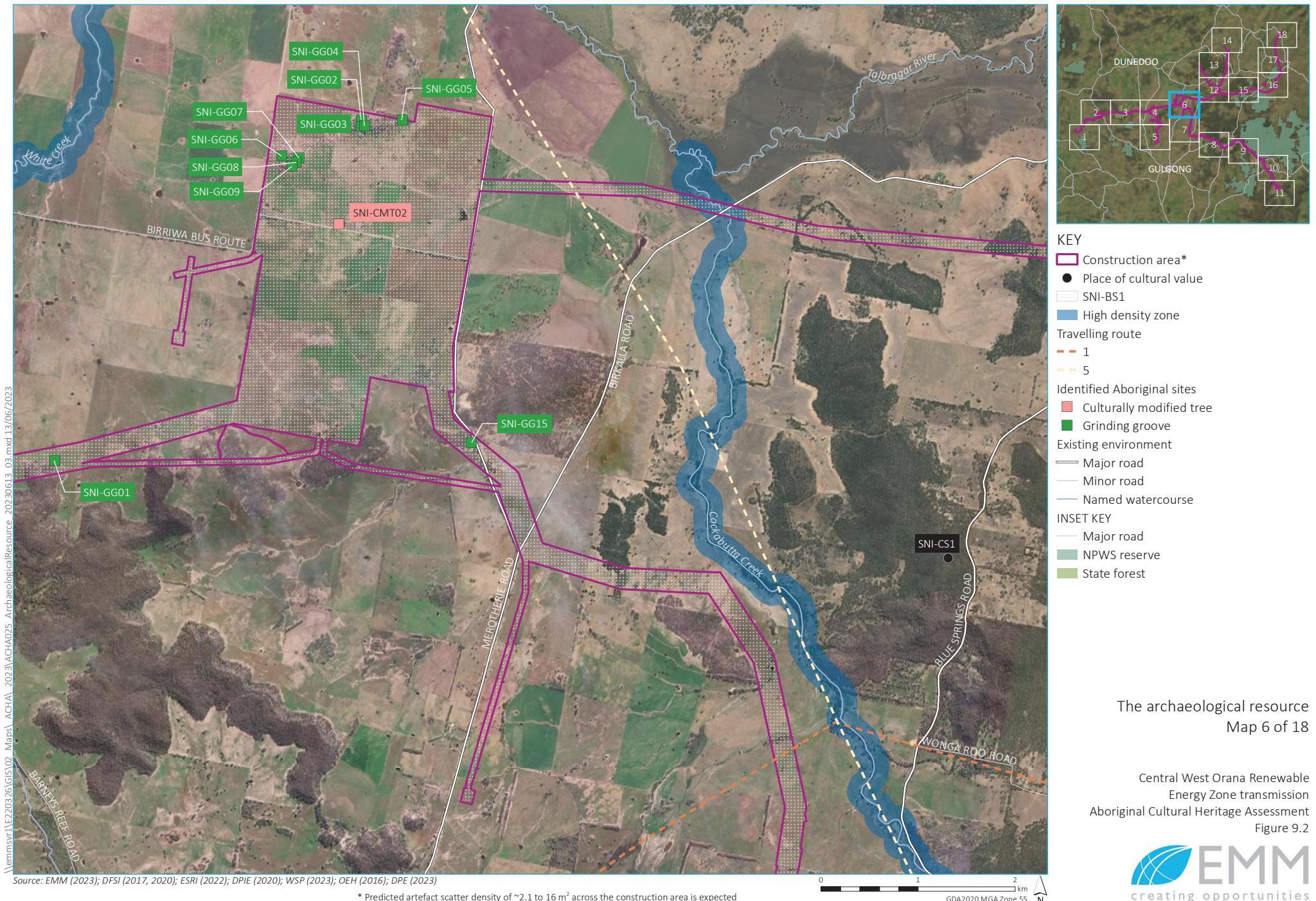
- Major road
- NPWS reserve
- State forest

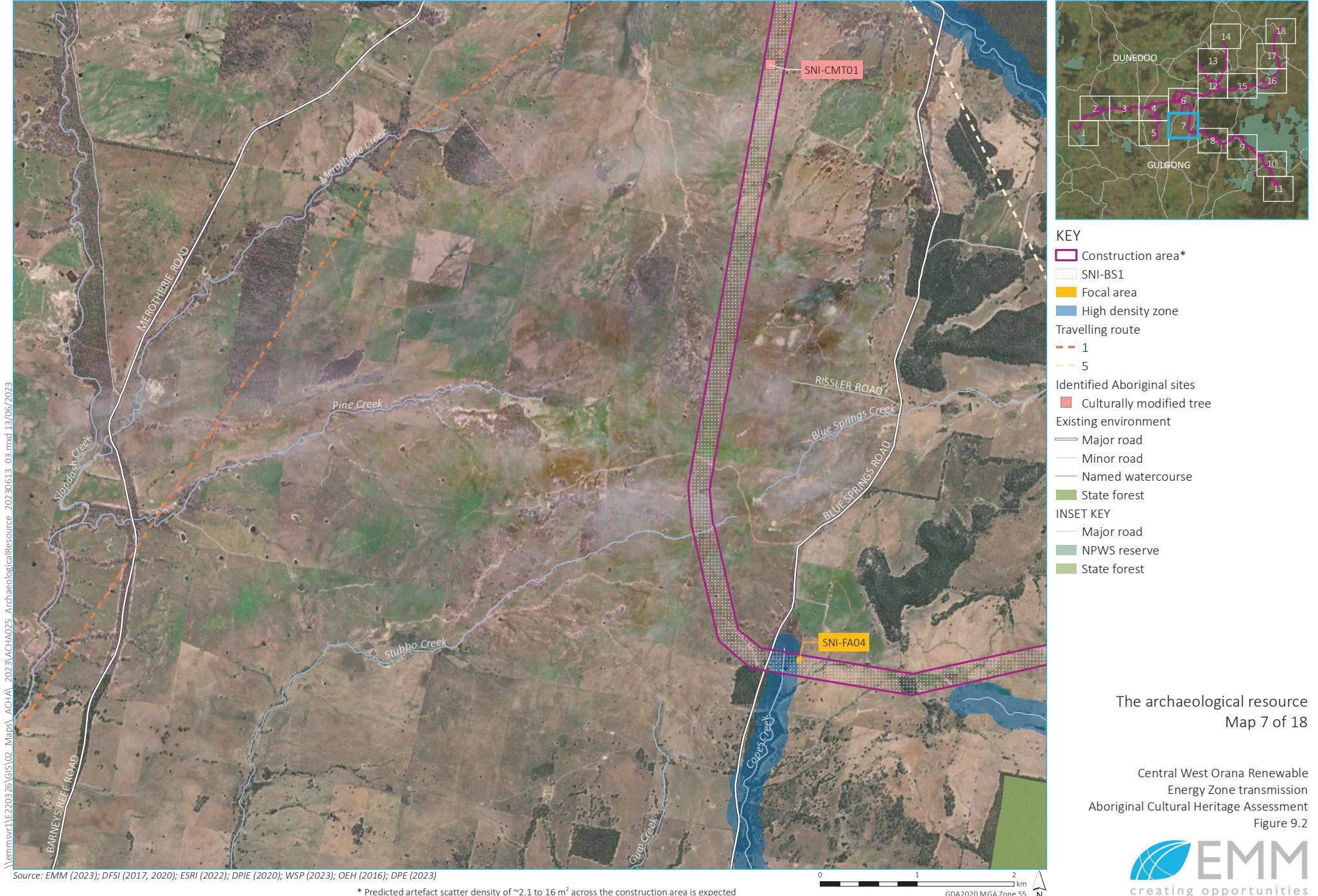
The archaeological resource  
Map 3 of 18

Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 9.2



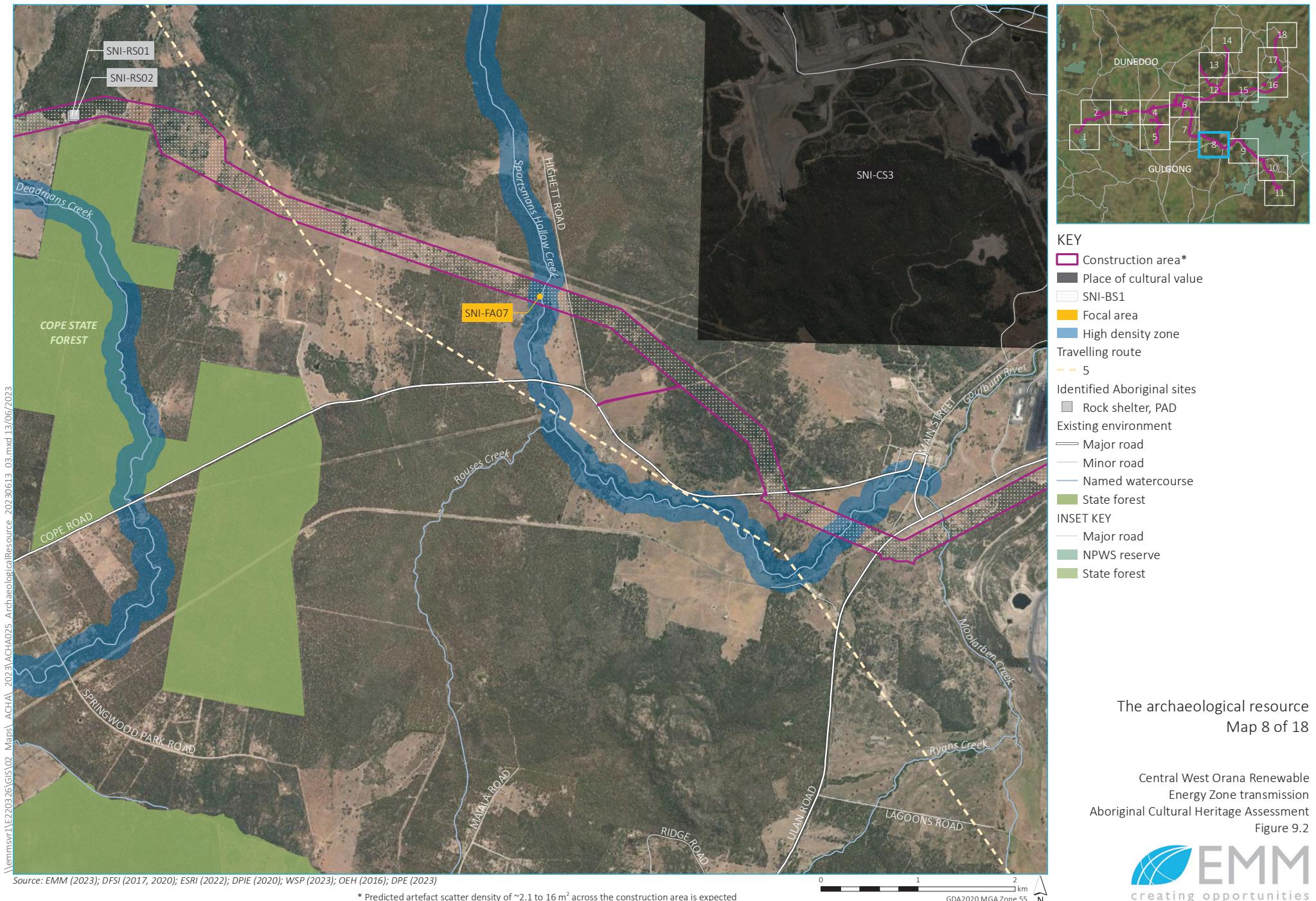


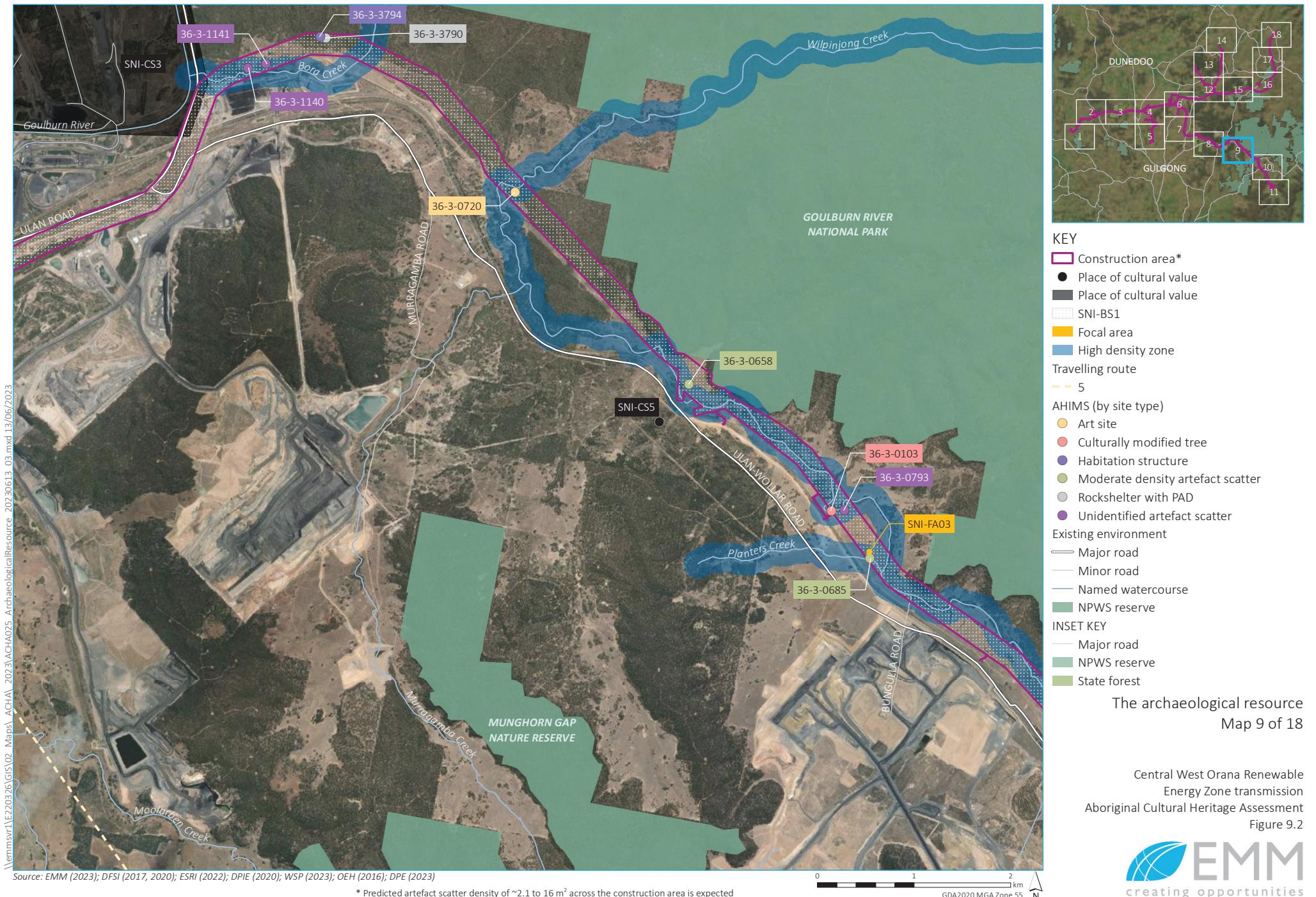




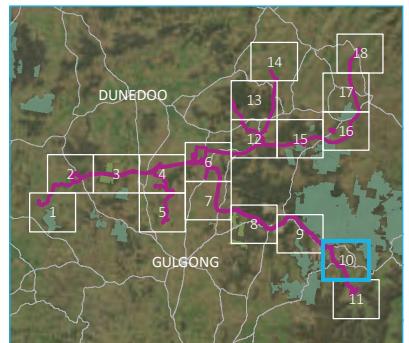
The archaeological resource  
Map 7 of 18

Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 9.2





Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 9.2

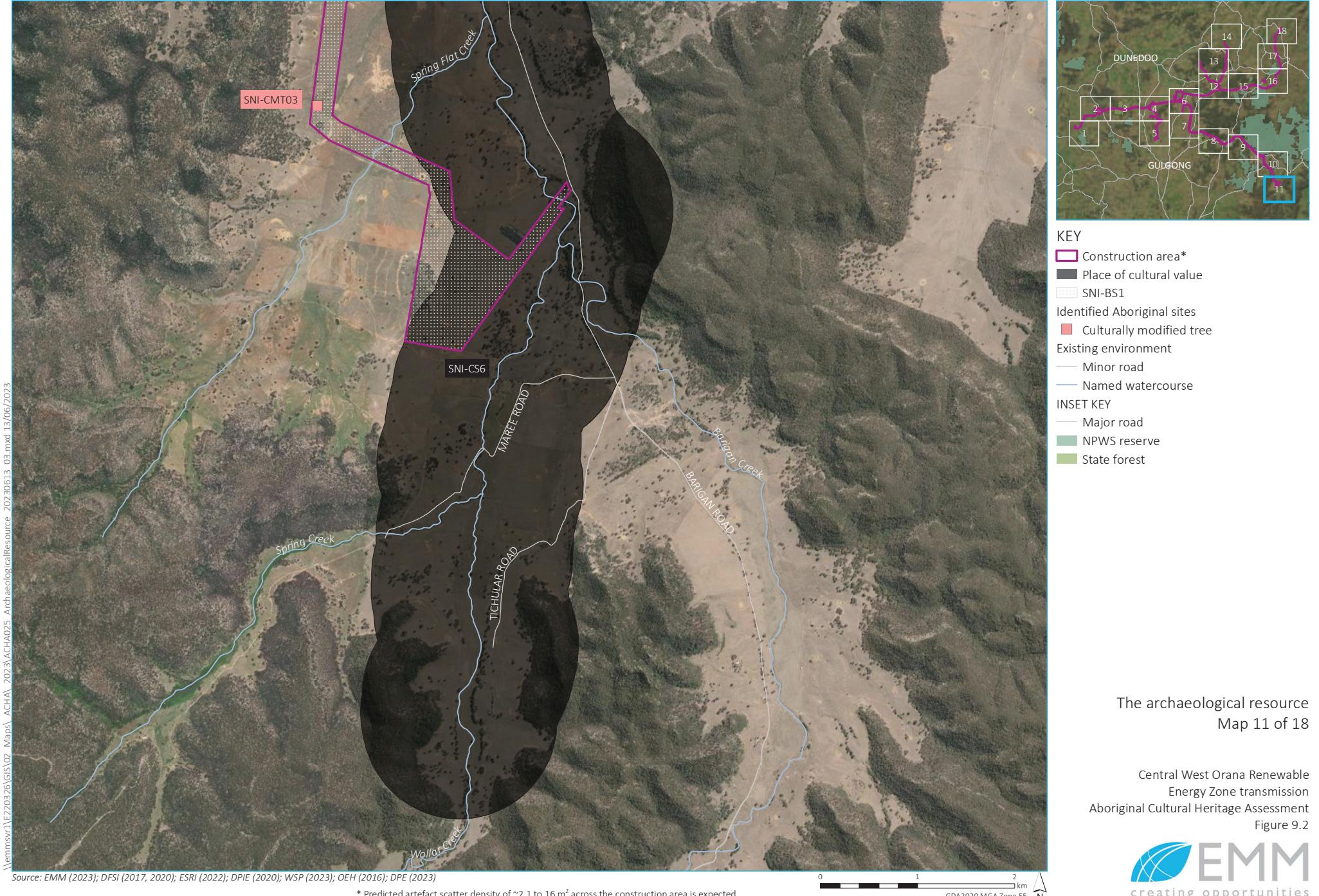


#### KEY

- [Pink box] Construction area\*
- [Black dot] Place of cultural value
- [Dark grey area] Place of cultural value
- [Dotted pattern] SNI-BS1
- [Blue box] High density zone
- AHIMS (by site type)
  - Culturally modified tree
  - Low density artefact scatter
  - Moderate density artefact scatter
  - Blue dot Potential Archaeological Deposit (PAD)
  - Grey dot Rockshelter with PAD
- Identified Aboriginal sites
  - Culturally modified tree
- Existing environment
  - Major road
  - Minor road
  - Named watercourse
  - NPWS reserve
- INSET KEY
  - Major road
  - NPWS reserve
  - State forest

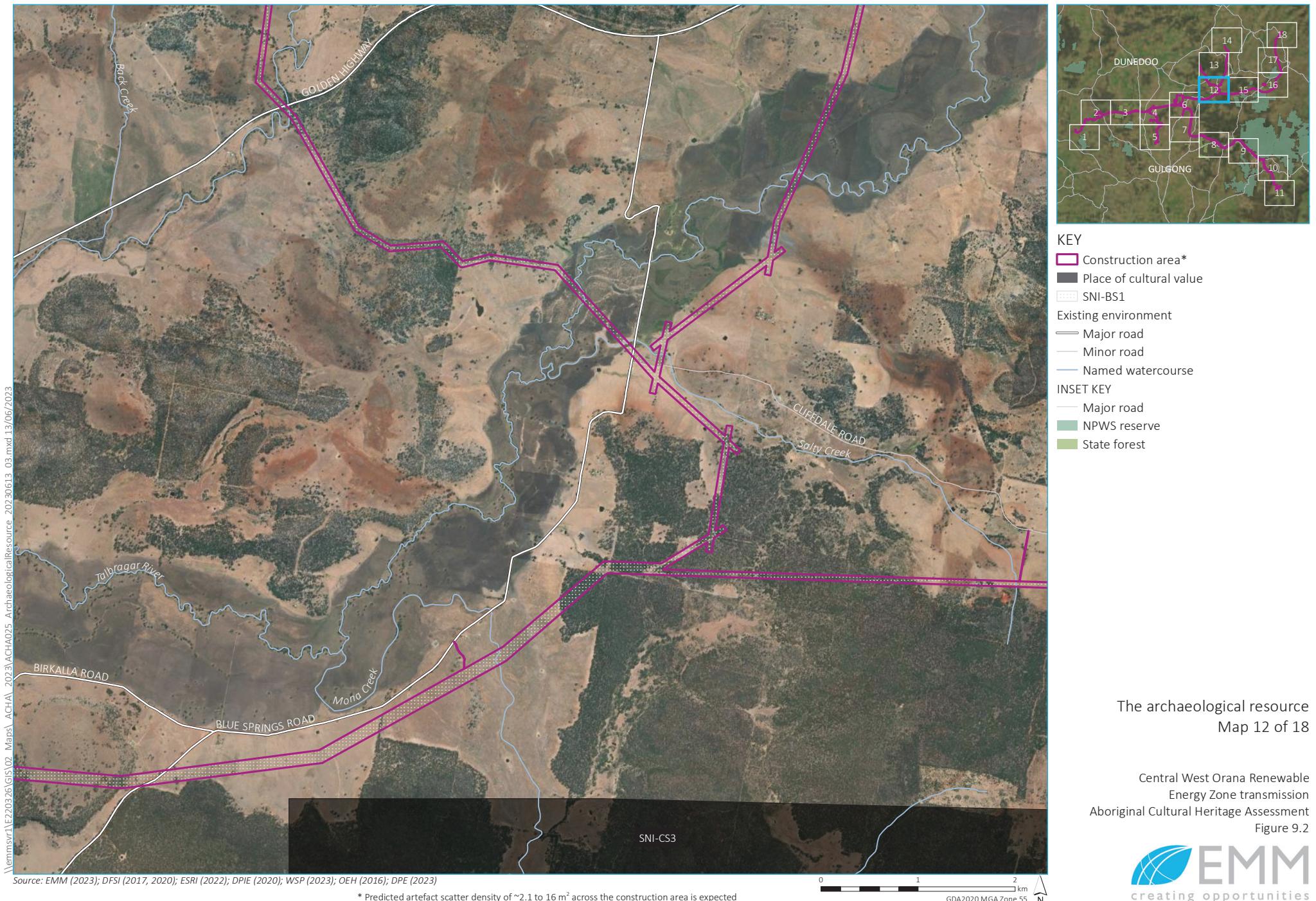
The archaeological resource  
Map 10 of 18

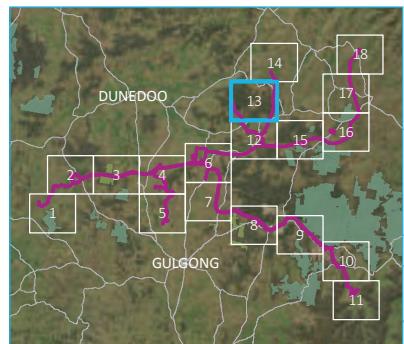
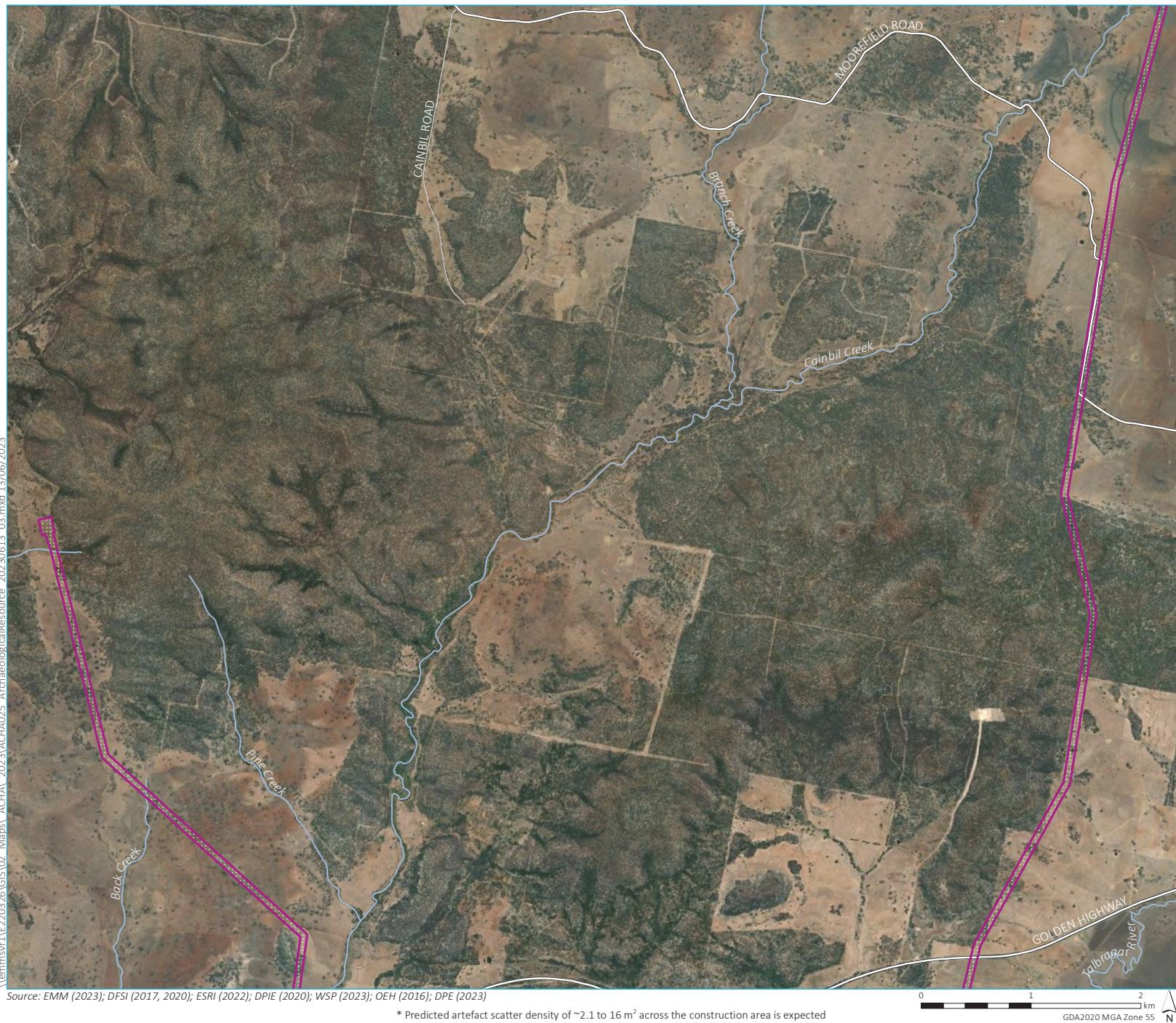
Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 9.2



The archaeological resource  
Map 11 of 18

Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 9.2





#### KEY

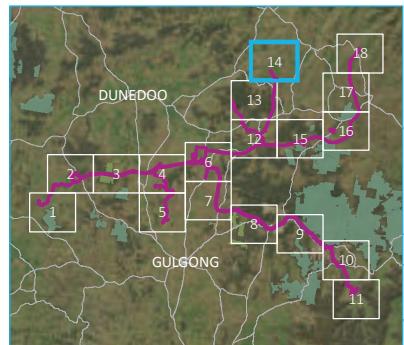
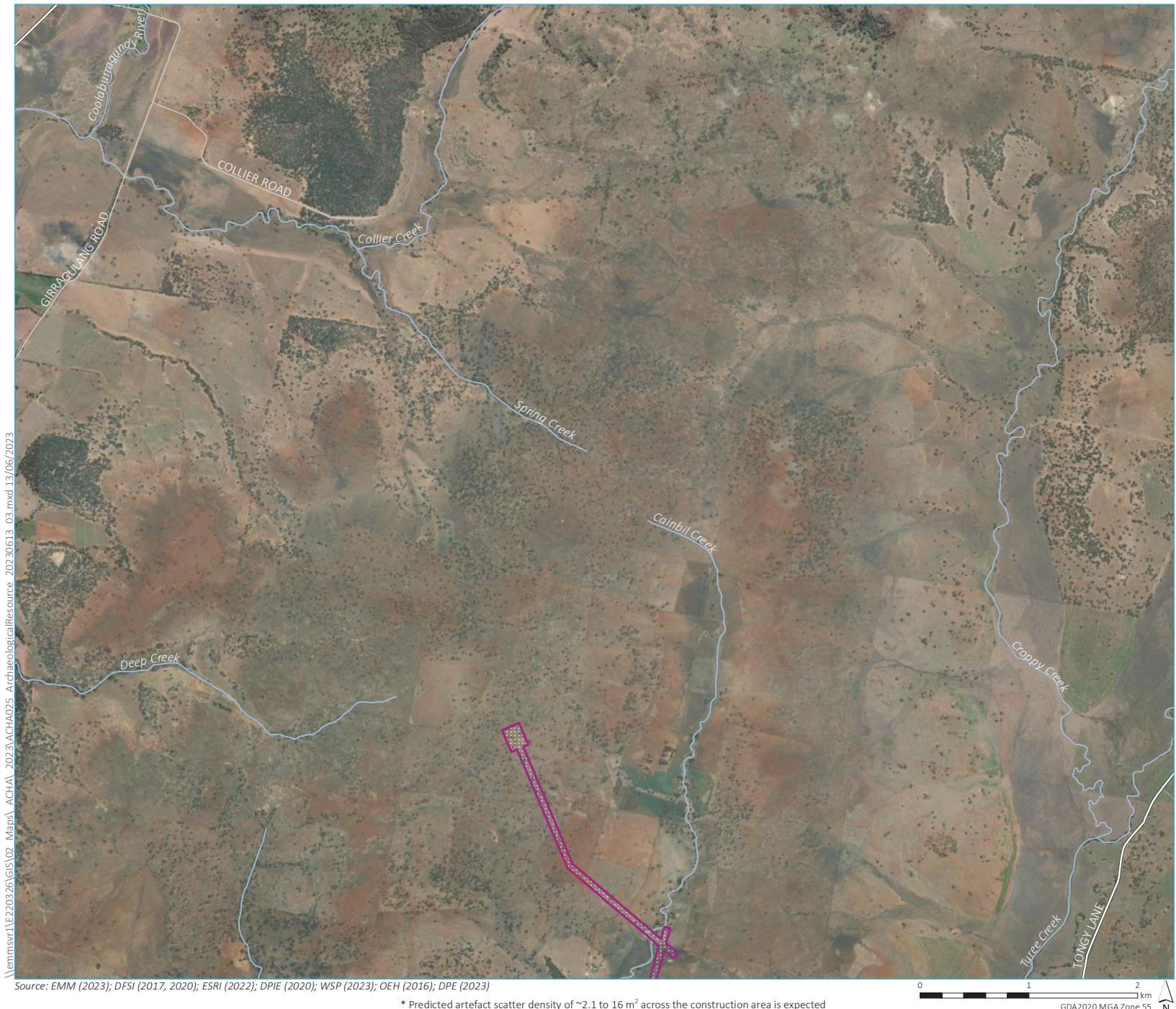
- Construction area\*
- SNI-BS1
- Existing environment
- Major road
- Minor road
- Named watercourse

#### INSET KEY

- Major road
- NPWS reserve
- State forest

The archaeological resource  
Map 13 of 18

Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 9.2



#### KEY

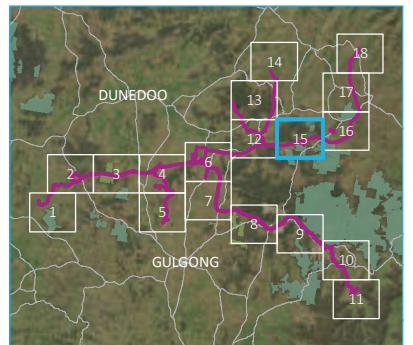
- Construction area\*
- SNI-BS1
- Existing environment
- Major road
- Minor road
- Named watercourse

#### INSET KEY

- Major road
- NPWS reserve
- State forest

The archaeological resource  
Map 14 of 18

Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 9.2



#### KEY

■ Construction area\*

■ Place of cultural value

■ SNI-BS1

#### Existing environment

— Major road

— Minor road

— Named watercourse

■ NPWS reserve

#### INSET KEY

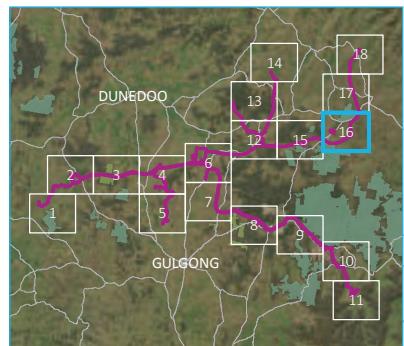
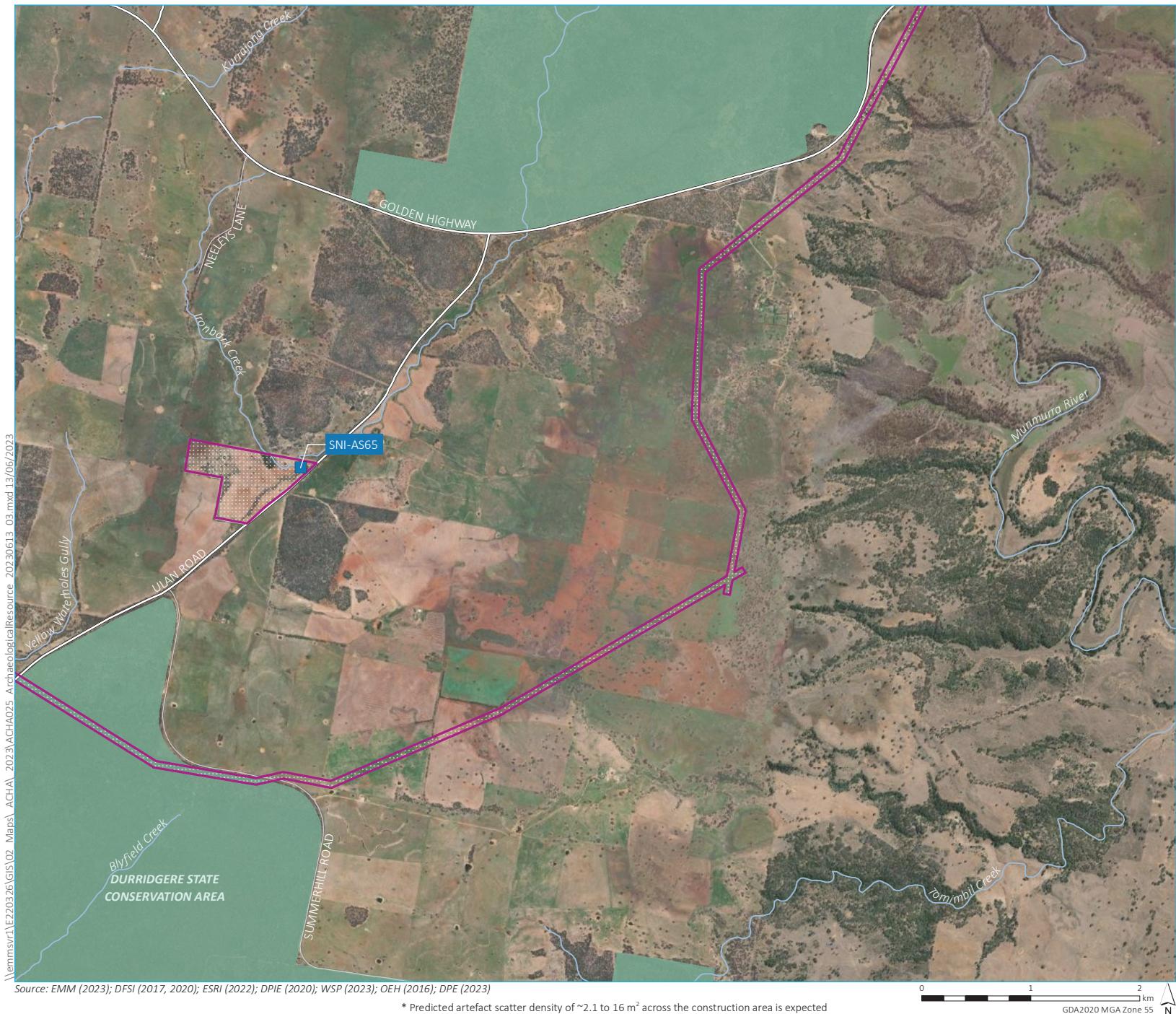
— Major road

■ NPWS reserve

■ State forest

The archaeological resource  
Map 15 of 18

Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 9.2

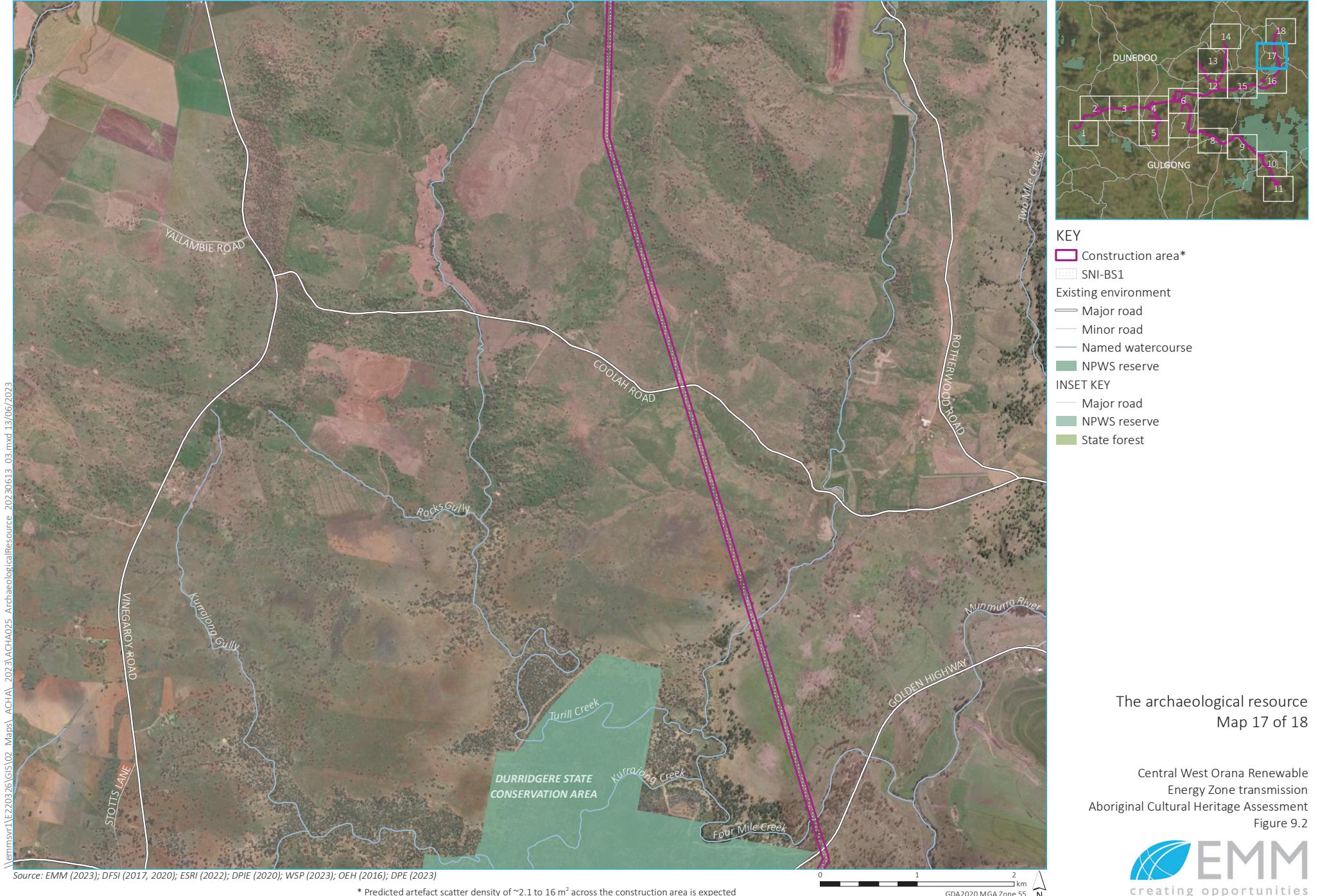


#### KEY

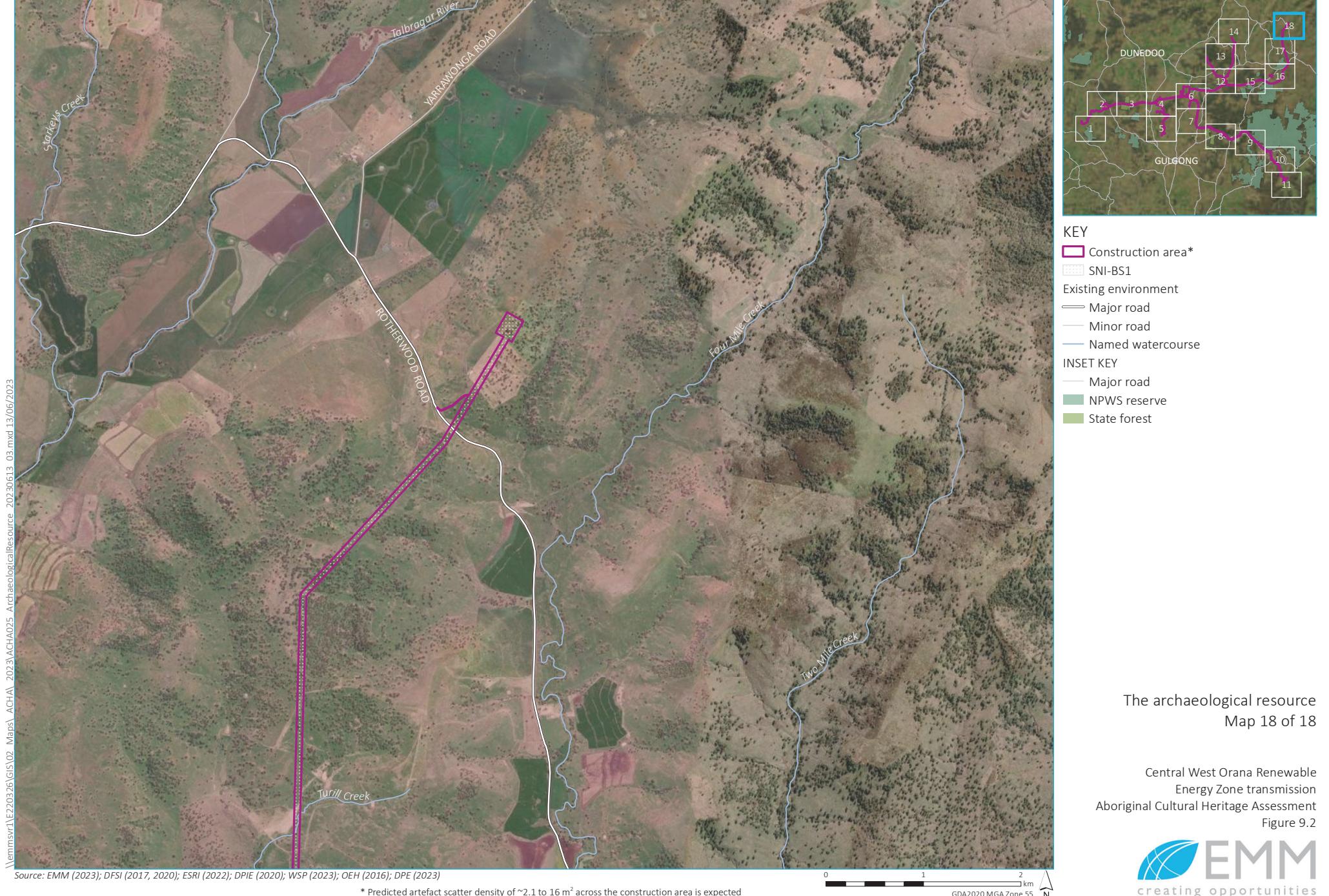
- [Magenta Box] Construction area\*
- [Light Gray Box] SNI-BS1
- Identified Aboriginal sites
- [Blue Square] Artefact scatter, grinding groove, PAD
- Existing environment
- Major road
- Minor road
- Named watercourse
- NPWS reserve
- INSET KEY
- Major road
- NPWS reserve
- State forest

The archaeological resource  
Map 16 of 18

Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 9.2



Central West Orana Renewable  
 Energy Zone transmission  
 Aboriginal Cultural Heritage Assessment  
 Figure 9.2



# 10 Significance assessment

## 10.1 General

All Aboriginal objects in NSW are protected under the *National Parks and Wildlife Act 1974*. It is recognised that the destruction of sites may be necessary to allow other activities or developments to occur if they cannot be avoided. For the consent authority to make informed decisions on such matters, an important element of cultural heritage management is determining the significance of cultural heritage places to understand what may be lost and how best it can be mitigated.

Cultural significance is outlined in Article 1.2 of the *Burra Charter* – the best practise document for managing cultural heritage – as ‘aesthetic, historic, scientific, social or spiritual value for past, present or future generations’ (Australia ICOMOS 2013). These values are reiterated in the NSW guidelines, which determines that cultural significance of a place can be assessed by identifying the values that are present across the subject area and assessing what is important and why (OEH 2011). In assessing the scientific significance of sites, aspects such as rarity and representativeness and the integrity must be considered. Generally speaking, a site or object that is rare will have a heightened significance, although a site that is suitable of conservation as ‘representative’ of its type will also be significant. Conversely an extremely rare site may no longer be significant if its integrity has been sufficiently compromised.

The criteria adopted for this report are defined in Table 10.1. The management implications of these sites’ significance are discussed in subsequent sections.

**Table 10.1 A summary of criteria used to assess the cultural significance (OEH 2011, 8–10)**

Criterion	Definition
<b>Social value</b> – Does the place have a strong or special association with a particular community or cultural group for social, cultural or spiritual reasons?	Social (or, more accurately for this assessment, cultural) value refers to the spiritual, traditional, historical or contemporary associations and attachments the place or area has for Aboriginal people. Social or cultural value is how people express their connection with a place and the meaning that place has for them.  Social or cultural value can only be identified through consultation with Aboriginal people.
<b>Historic value</b> – Is the place important to the cultural or natural history of the local area and/or region and/or state?	Historic value refers to the association of a place with a historically important person, event, phase or activity. Historic places do not always have physical evidence of their historical importance (such as structures, planted vegetation or landscape modifications). They may have ‘shared’ historic values with other (non-Aboriginal) communities.
<b>Scientific (archaeological) value</b> – Does the place have potential to yield information that will contribute to an understanding of the cultural or natural history of the local area and/or region and/or state?	Scientific (archaeological) value refers to the importance of a landscape, area, place or object because of its rarity, representativeness and the extent to which it may contribute to further understanding and information.  Information about scientific values is gathered through archaeological investigation undertaken in this report.
<b>Aesthetic value</b> – Is the place important in demonstrating aesthetic characteristics in the local, regional, and/or State environment?	Aesthetic value refers to the sensory, scenic, architectural and creative aspects of the place. It is often linked with social value, and can consider form, scale, colour, texture and material of the fabric or landscape, and the smell and sounds associated with the place and its use. This value is only relevant to archaeological sites on only rare occasions, such as rock shelters that contain art, or culturally modified trees in prominent positions, etc.

## 10.2 Statement of significance

This assessment identified 46 discrete Aboriginal sites and places located within the construction area (Table 10.2; Figure 9.2). In addition, the entire construction area was characterised by a low-density background artefact scatter (SNI-BS1) interspersed with occasional areas of denser material associated with past foci and/or repeat occupation (SNI-FA01-07 inclusive) (Chapter 9; Figure 9.2). These continuous buried deposits were documented throughout the field investigations as part of the field survey and test excavations and encompass 113 low density stone artefact sites or isolated objects. (These locales and sites have now all been integrated into the broader background scatter identification for management purposes – see Table 10.2). The results align with the broader regional archaeological picture, which is dominated by stone artefact sites to the west and rockshelters to the east, or their potential to occur, and highlights the importance of major water courses to Aboriginal visitation and occupation in the past.

For the purposes of significance assessment, all sites and places have been assigned a classification, even where they are only identified as being of tentative identification to allow the ACHA to be completed. These sites have been conservatively identified as an archaeological and/or cultural site; however, further assessment by a specialist is required for validation prior to construction. Following further investigation of these sites – some of which are ranked as being of moderate or high (i.e. regional) importance – may require their significance to be re-classified in the future. A range of recommendations to further clarify the classification of these sites is proposed in Chapter 12 to resolve this uncertainty where required, including technical specialists to further visit, investigate and analyse the sites in more detail. Where sites have been previously recorded and significance documented, we have extended these values to the significance assessment presented below. Where values were not provided, these have been developed based on the documentary evidence provided.

When considering the scientific significance, a number of the sites and zones can be considered to have moderate (local) or high (regional) significance with the ability to provide information on the past activities of the area (research potential). These sites can primarily be divided into three main categories:

1. Rockshelters that would have been used for habitation in the past. These sites form the foundational information across Australia for past Aboriginal populations, behaviour and activity, and are therefore of high scientific significance. Commonly, they include art and other cultural deposits that make them extremely important to the local Aboriginal community as well. However, in the case of the eight rockshelter sites within the construction area, few exhibit any evidence of cultural activity, and cannot be robustly demonstrated as having been used in the past. AHIMS site #36-3-0570 was a substantive site with observed cultural materials and has accordingly been considered of high value. Conversely, #36-3-3794, consisted of a shallow overhang with no cultural activity nor deposits, and as such can provide little further understanding of its, or the broader region's use, by people in the past, though it was identified as of moderately cultural value to Aboriginal stakeholders. The remaining sites, including SNI-RS01, SNI-RS02, SNI-RS03 and SNI-RS04 are considered of moderate significance, each requiring additional investigation (that is not readily achievable under the guidelines imposed on the ACHA) to validate their use in the past and the level of information that they may provide.<sup>6</sup>

<sup>6</sup> The current SEARs require the adoption of Heritage NSW's *Code of Practise for the Archaeological Investigation of Aboriginal Objects in NSW* guidelines. These guidelines allow archaeological test excavations in most circumstances but exempt a number of site types. Rockshelters, among others, are not permitted for excavation under the guidelines, and an AHIP would be required to enable such works. Since AHIPs are not required for an SSI project, this results in legislative uncertainty around any works within these sites.

2. Grinding grooves that indicate the re-sharpening of tools and equipment was undertaken in the past. These sites are generally significant both in the information they can provide on past dietary habits through residue techniques that can extract plant and animal materials from the groove – embedded by the tool being sharpened – and the relative rarity of these site types in the study area. Within this site type, two sites are considered to have regional rarity – and therefore of high significance – previously recorded AHIMS site #36-3-0111 and SNI-GG11, which both contained more than 80 individual grooves. Such sites have significant research potential, and only a small number of examples elsewhere with this number of grooves are known (including the Gostwyck grinding grooves in New England, and Stone Quarry Creek grinding grooves at Tahmoor). Both sites are outside of the construction area. In the case of those within the construction area, these typically have 1–3 individual grooves and, as such, have more limited research value and are increasingly common amongst this site type. As such, these sites have all generally been assigned a moderate significance. These sites have also been assigned an aesthetic value, since their existence is based at least in part with their proximity to running water that is required to facilitate sharpening.
3. High and moderate density artefact scatters that indicate the occupation and/or repeat visitation of a locale by people in the past. The largest portion of the assemblage consisted of surface high density artefact scatters (>50 artefacts), moderate density artefacts (20–50 artefacts) and subsurface stone artefactual material (>20/m<sup>2</sup>), which encompassed 18 (41%) of the 46 discrete sites within the construction area documented. These sites are assigned either a moderate or high significance based on their potential research potential to inform our understanding of past use and behaviour. Of note are AHIMS sites #36-3-1140 and #36-3-1141, which are both on the banks of Bora Creek and contain both substantive observed cultural material that can be explored to inform procurement and technological behaviours, and potential subsurface deposits that may inform temporal change through time. Similarly, SNI-AS41, SNI-AS43 and SNI-AS57 are a comparable size and are all in close proximity, suggesting extensive past use of Brown and Whites Creek. They also have some potential for subsurface deposits to inform temporal change. All of these sites are relatively rare even when considering the broader 2,809 sites documented in Section 7.3 (which suggests the average number of artefacts in a site is <17). All of these sites are within the construction area.

From a sub-surface perspective, the findings at Copes Creek (SNI-FA04) and Sportsmans Hollow Creek (SNI-FA07) also demonstrate high artefact densities, and which may, therefore, be able to provide local and regional questions of raw material extraction behaviour, techniques and timing. The limited investigations undertaken as part of this ACHA have demonstrated the exploitation of raw quartz materials of a number of creeks over the last few thousand years. Such information is more substantive than many of the studies reviewed for the region (Section 7.3), which have been subjected to limited research driven investigation. It is considered that further investigation of these high-density zones, as proposed in Chapter 12, has high potential to yield more information on the past economic and social behaviour of people in this region.

The moderate sites are more marginal in what types of information can be obtained, several contain densities only just above background activity levels, while a number are in disturbed environments. As such, the level of research potential is considered limited, and low and moderate values have been assigned.

In relation to culturally modified trees, these have limited research potential but are increasingly rare in the region due to land clearance. They are also typically important to the local Aboriginal community. For these reasons, these sites have been assigned a moderate significance.

The remaining identified sites, including the broader background artefact scatter, are considered to have limited, if any, research potential (Table 10.2). While important in demonstrating the longevity and continued use of the region by Aboriginal people in the past, it is considered that little further information can be obtained from additional investigation of these sites, places and objects.

While there is an important post-Contact history across the study area, most evident in the Jimmy and Joe Governor bushranging events, no specific sites or places have been identified within the construction area that meet the criterion of historical significance. One site, AHIMS site #36-3-3583, encompassed within the SNI-BS1, recovered a single glass artefact that may suggest post-Contact activity, but this would not be uncommon in the general region and further post-Contact sites would be expected in the study area.

All the sites have some level of aesthetic significance, but only few can consider it an intrinsic part of their significance. These include the grinding groove sites that require some form of running water usually (although various isolated pools following rain can also be used), and several of the high-density artefact scatter zones and areas adjacent creeks that were likely selected by people in the past, at least in part, due to their aesthetic appeal.

Site specific cultural values have not been provided by the Aboriginal participants to date, and the values presented in Table 10.2 are based on discussions in the field during recording, as well as subsequent meetings (Chapter 4). To date, discussions have focussed on specific river corridors (discussed further in Chapter 12) and Aboriginal sites and places not within the construction area, such as #36-3-0111 and SNI-GG10. As part of the cultural values mapping, six places of value were identified, as well as two travelling routes. Recommendations for further interrogation are made in Chapter 12 and Appendix F. In addition, none of these are within the construction corridor, but three are in close proximity, SNI-CS4, SNI-CS5, and SNI-CS6. These are all considered to have moderate cultural significance, clearly being of importance to the local Aboriginal community. In addition, SNI-CS5 is a bora ground, and as such has high research potential in the investigation and evolution of such ritual practise in the past.

Table 10.2 provides a summary of the significance values for each Aboriginal object and/or site identified.

**Table 10.2 Significance of Aboriginal objects and/or sites identified within the construction area**

Site	AHIMS #	Site type	General location	Site status	Significance				
					Scientific	Aesthetic	Historical	Social	Overall
S1MC487	#36-3-3794	Rockshelter	North of Wilpinjung Creek	Valid	Low	-	-	Moderate	Moderate
UWF SU51/L3	#36-3-0449	Rockshelter	North of Wilpinjung Creek	Valid	Moderate	-	-	Moderate	Moderate
WCP137	#36-3-0570	Rockshelter	North of Wilpinjung Creek	Valid	High	-	-	High	High
S1MC488	#36-3-3790	Rockshelter	North of Wilpinjung Creek	Valid	Moderate	-	-	Moderate	Moderate
SNI-RS01	-	Rockshelter	Near Deadmans Creek	Valid	Moderate	-	-	Moderate	Moderate
SNI-RS02	-	Rockshelter	Near Deadmans Creek	Valid	Moderate	-	-	Moderate	Moderate
SNI-RS03	-	Rockshelter	Within Tuckland State Forest	Valid	Moderate	-	-	Moderate	Moderate
SNI-RS04	-	Rockshelter	Within Tuckland State Forest	Valid	Moderate	-	-	Moderate	Moderate
WCP129	#36-3-0565	Culturally modified tree	Near Cumbo Creek	Tentative	Moderate	-	-	Moderate	Moderate
WCP52	#36-6-0626	Culturally modified tree	Near Cumbo Creek	Tentative	Moderate	-	-	Moderate	Moderate
WCP64	#36-3-0638	Culturally modified tree	East of Cumbo Creek	Tentative	Moderate	-	-	Moderate	Moderate
Stoney Creek 2	#36-6-0103	Culturally modified tree	Near Planters Creek	Tentative	Moderate	-	-	Moderate	Moderate
WCP69	#36-3-0643	Culturally modified tree	Near Cumbo Creek	Tentative	Moderate	-	-	Moderate	Moderate
SNI-CMT01	-	Culturally modified tree	North of Blue Springs Creek	Tentative	Moderate	-	-	Moderate	Moderate
SNI-CMT02	-	Culturally modified tree	Within Merotherie energy Hub	Tentative	Moderate	-	-	Moderate	Moderate
SNI-CMT03	-	Culturally modified tree	West of Wollar Creek	Tentative	Moderate	-	-	Moderate	Moderate
SNI-CMT06	-	Culturally modified tree	North of Coolah Road, near Turill Creek	Tentative	Moderate	-	-	Moderate	Moderate
SNI-CMT08	-	Culturally modified tree	North of Ulan Road, near Wagrobil Creek	Tentative	Moderate	-	-	Moderate	Moderate

**Table 10.2 Significance of Aboriginal objects and/or sites identified within the construction area**

Site	AHIMS #	Site type	General location	Site status	Significance				
					Scientific	Aesthetic	Historical	Social	Overall
SNI-CMT11	-	Culturally modified tree	West of Spring Flat Creek	Tentative	Moderate	-	-	Moderate	Moderate
SNI-CMT13	-	Culturally modified tree	Eastern edge of Merotherie Energy hub	Tentative	Moderate	-	-	Moderate	Moderate
SNI-CMT15	-	Culturally modified tree	North of Dapper Road, west of Elong Elong energy hub	Tentative	Moderate	-	-	Moderate	Moderate
SNI-GG01	-	Grinding groove	Northwest of Merotherie Energy Hub	Valid	Moderate	Low	-	Moderate	Moderate
SNI-GG02	-	Grinding groove	Northwest of Merotherie Energy Hub	Valid	Moderate	Low	-	Moderate	Moderate
SNI-GG03	-	Grinding groove	Northwest of Merotherie Energy Hub	Valid	Moderate	Low	-	Moderate	Moderate
SNI-GG04	-	Grinding groove	Northwest of Merotherie Energy Hub	Valid	Moderate	Low	-	Moderate	Moderate
SNI-GG05	-	Grinding groove	Northwest of Merotherie Energy Hub	Valid	Moderate	Low	-	Moderate	Moderate
SNI-GG06	-	Grinding groove	Northwest of Merotherie Energy Hub	Valid	Moderate	Low	-	Moderate	Moderate
SNI-GG07	-	Grinding groove	Northwest of Merotherie Energy Hub	Valid	Moderate	Low	-	Moderate	Moderate
SNI-GG08	-	Grinding groove	Northwest of Merotherie Energy Hub	Valid	Moderate	Low	-	Moderate	Moderate
SNI-GG09	-	Grinding groove	Northwest of Merotherie Energy Hub	Valid	Moderate	Low	-	Moderate	Moderate
SNI-GG15	-	Grinding groove	West of Cockabutta Creek	Valid	Moderate	Low	-	Moderate	Moderate
SNI-AS65	-	Grinding groove, low density artefact scatter and PAD	Within Ironbark Creek	Valid	Moderate	Low	-	Moderate	Moderate
S1MC303	#36-3-1140	High density artefact scatter	Near Bora Creek	Valid	High	-	-	High	High
S1MC304	#36-3-1141	High density artefact scatter	Near Bora Creek	Valid	High	-	-	High	High
SNI-AS41	-	High density artefact scatter	East of Browns Creek	Valid	High	Low	-	Moderate	High

**Table 10.2 Significance of Aboriginal objects and/or sites identified within the construction area**

Site	AHIMS #	Site type	General location	Site status	Significance				
					Scientific	Aesthetic	Historical	Social	Overall
SNI-AS43	-	High density artefact scatter	East of Whites Creek	Valid	High	Low	-	Moderate	High
SNI-AS57	-	High density artefact scatter	East of Browns Creek	Valid	High	Low	-	Moderate	High
WCP220	#36-3-0496	Moderate density artefact scatter	East of Cumbo Creek	Valid	Low	-	-	Low	Low
WCP227	#36-3-0503	Moderate density artefact scatter	South of Wilpinjong Creek	Valid	Low	-	-	Low	Low
WC OS 17 with PAD	#36-3-0658	Moderate density artefact scatter	South of Wilpinjong Creek	Valid	Moderate	-	-	Moderate	Moderate
CE-09-OS and SNI-FA03	#36-3-0685	Moderate density artefact scatter, and deposit	Near Planters Creek	Valid	Moderate	-	-	Moderate	Moderate
WC1— WILPINJONG CREEK 1	#36-3-0720	Moderate density artefact scatter	East of Wilpinjong Creek	Valid	Moderate	-	-	Moderate	Moderate
WCP260	#36-3-0793	Moderate density artefact scatter	Near Planters Creek	Valid	Moderate	-	-	Moderate	Moderate
SNI-AS02	-	Moderate density artefact scatter	West of Laheys Creek	Valid	Moderate	-	-	Moderate	Moderate
SNI-FA01	-	Moderate density artefact scatter, and deposit	South of Tallawang Creek	Valid	Moderate	-	-	Moderate	Moderate
SNI-FA02	-	Moderate density artefact scatter, and deposit	South of Tallawang Creek	Valid	Moderate	-	-	Moderate	Moderate
SNI-FA04	-	Moderate density artefact scatter, and deposit	East of Copes Creek	Valid	High	Low	-	High	High
SNI-FA05	-	High density artefact scatter, and deposit	West of Laheys Creek	Valid	Moderate	-	-	Moderate	Moderate
SNI-FA06	-	Moderate density artefact scatter, and deposit	West of Tallawang Creek	Valid	Moderate	-	-	Moderate	Moderate

**Table 10.2 Significance of Aboriginal objects and/or sites identified within the construction area**

Site	AHIMS #	Site type	General location	Site status	Significance				
					Scientific	Aesthetic	Historical	Social	Overall
SNI-FA07	-	High density artefact scatter, and deposit	Near Sportsmans Hollow Creek	Valid	High	Low	-	High	High
SNI-BS1	-	Low density artefact scatter	Entire construction area	Valid	Low	-	-	Low	Low

Notes:

1. Values are only assigned where the site fulfils that specific criterion.
2. In the case of the cultural criterion, it is ranked in relation to whether the site is important to one individual (low), a mixed view from the Aboriginal participants (moderate) or broad-scale support from all stakeholders (high). Further details are presented in Section 6.3 and Appendix C.
3. Cultural sites rankings are based on the cultural mapping report presented in Attachment D. While all sites identified were of value to the Aboriginal participants, some were clearly of more significance than others. Greater significance was also given to those that had broader regional analogues. Sites requiring further investigation and/or validation, are ranked based on the assumption the site proves valid. However, their significance should be revisited when further analysis and classification of them occurs. These values are presented in red to demonstrate their tentative status.
5. The overall significance is comparable with the highest ranking achieved in any of the four main criteria.
6. SNI-BS1 incorporates #36-3-0336, #36-3-0353, #36-3-0470, #36-3-0497, #36-3-0498, #36-3-0569, #36-3-0634, #36-3-0660, #36-3-0691, #36-3-0815, #36-3-0816, #36-3-0817, #36-3-0818, #36-3-0819, #36-3-0820, #36-3-0821, #36-3-1047, #36-3-1048, #36-3-1049, #36-3-1050, #36-3-1051, #36-3-1053, #36-3-1054, #36-3-1055, #36-3-1058, #36-3-1062, #36-3-1063, #36-3-1064, #36-3-1065, #36-3-1066, #36-3-1067, #36-3-1068, #36-3-1090, #36-3-1395, #36-3-1402, #36-3-1404, #36-3-1428, #36-3-1403, #36-3-3406, #36-3-1052, #36-3-1056, #36-3-1057, #36-3-1594, #36-3-1401, #26-3-2514, #36-3-2833, #36-3-3182, #36-3-3227, #36-3-3233, #36-3-3291, #36-3-3432, #36-3-3523, #36-3-3805, #36-3-3828, #36-3-3832, #36-3-3833, #36-3-3835, SNI-IF01-15 inclusive, SNI-IF17, SNI-IF20, SNI-IF28, SNI-IF33, SNI-IF39, SNI-IF41, SNI-IF43, SNI-IF47, SNI-IF48, SNI-IF51, SNI-56, SNI-IF58, SNI-IF62, SNI-IF65, SNI-AS01, SNI-AS03-07 inclusive, SNI-AS09, SNI-AS12, SNI-AS13, SNI-AS15, SNI-AS17, SNI-AS29, SNI-AS31, SNI-AS37, SNI-AS40, SNI-AS51, SNI-AS52, SNI-AS61, SNI-AS66, SNI-AS68, SNI-AS69, SNI-AS70, SNI-AS72, SNI-AS73, SNI-AS76, SNI-AS77, and SNI-Q01.

# 11 Impact assessment

## 11.1 Key findings

The following provides a summary of key activities and/or findings of this Chapter:

- Through the iterative approach to design development, the project has avoided about 55% of the Aboriginal sites identified through the ACHA process across the field survey area. This includes two of the most significant sites, grinding groove complexes at Prospect Creek and Talbragar River, and several areas of cultural importance as provided by the Aboriginal participants (e.g. SNI-CS4).
- Of the 46 discrete Aboriginal sites and places remaining within the construction area, 37 would be potentially subject to direct impacts resulting in their complete loss. These are dominated by rockshelters, grinding grooves, culturally modified trees – many only tentatively classified – and sub-surface moderate and high density artefact sites in close proximity to identified creek corridors. In addition, the project would directly impact some 99.47 ha of creek banks identified as having sub-surface potential. A low-density stone artefact background scatter is considered present across the entire construction area and would also be adversely affected where ground disturbance occurs.
- Following stakeholder feedback, EnergyCo have identified nine sites that can be avoided, including several high value grinding groove sites at the proposed Merotherie energy hub (SNI-GG02-09), and a significant artefact site with associated grinding groves at the proposed Neelys Lane accommodation camp (SNI-AS65). These sites may be indirectly impacted by visual impacts, potentially resulting in partial loss of value, simply due to proximity to the proposed project infrastructure.
- In addition, EnergyCo is continuing to explore the potential avoidance of other sites of high and moderate significance within the construction area, especially within the energy hubs and switching station sites, construction compounds and workforce accommodation camps. It is expected that the eight rockshelters (#36-3-3794, #36-3-0449, #36-3-0570, #36-3-3790, SNI-RS01 – RS04 inclusive), two additional grinding groove sites (SNI-GG01, SNI-GG15), and two high density artefact scatters (#36-3-1140, #36-3-1141) would be avoided or minimally adversely affected by the project. Where achieved, this would significantly reduce the potential impacts of the project. Additional works to further validate and explore the culturally modified trees and cultural deposits during continued development of the project design would also further modify these values.
- Vegetation clearance associated with the project can potentially impact on culturally modified trees and other cultural heritage values. Vegetation clearance associated with construction of the project would be variable across the construction area, as detailed in Technical Paper 4 – biodiversity development assessment report. During operation of the project, the project easement would be subject to ongoing removal of vegetation greater than 2 metres in height, and the removal of certain trees (associated with bushfire hazard) for 10 metres beyond the easement boundary. These ongoing activities could potentially further impact cultural heritage values where not removed during construction.

- The project would result in some intergenerational/cumulative impacts to cultural materials, with the loss of between 5–16% of the main site types based on desktop data presented in Chapter 7. Where EnergyCo, can avoid sites of moderate and high significance as is proposed, especially in the case of the grinding groove sites, these values would be significantly reduced. Further, it is considered that there would be numerous cultural heritage benefits. These include the conservation of numerous sites within the eventual transmission easement, and where other development activities would be limited, a greater understanding of the past and contemporary values in the region, and opportunities for heritage interpretation and both Aboriginal and public outreach. Further mitigations to maximise site retention as the project is further refined is also proposed in Chapter 12.

## 11.2 Avoidance and minimisation of impacts through design refinement

The development and refinement of the project's alignment has been iterative since 2021 and has been informed by the findings of the ACHA and other field assessments as they have become available. This has included:

- Through the iterative approach the project has undertaken since its inception, some 55%, or 101 of the 183 of the Aboriginal sites identified during the fieldwork (as detailed in Chapter 9), have been avoided through project refinement. This includes two of the most significant sites, grinding groove complexes at Prospect Creek and Talbragar River, and several areas of cultural importance as provided by the Aboriginal participants. The relocation of the project away from SNI-GG11 and GG10 and AHIMS site #36-3-0111, some of the most significant griding groove sites found during field investigations.
- Shifting the alignment in the vicinity of Cockabutta Creek, south-east of the Merotherie Energy Hub following identification of important cultural places in this locale (Section 6.4).
- Refinements east of Wilpinjung mine where cultural sites and places are documented (Section 6.3). Specifically, the project now avoids Rocky Hill, a cultural place encompassing a number of rockshelters and an identified bora ground (#36-3-0044) situated in a narrow riverine corridor, east of the mine site.
- At Elong Elong Energy hub, based on scale of the infrastructure and space requirements for construction activities most of the Aboriginal sites (isolated finds and artefact scatters) would be impacted. However, to avoid impacts to cultural material within 150 m of Laheys Creek, an exclusion zone would be established along the eastern edge of the energy hub, to the north of the proposed transmission lines. Construction activities with the potential to cause subsurface disturbance would not be permitted in the exclusion zone. Where such activities cannot be avoided, a physical barrier/layer would be installed to minimise potential impacts.
- The inclusion of mitigation measures in Chapter 12 to maximise the avoidance and retention of sites of moderate and high significance, notably rockshelters (#36-3-3794, #36-3-0449, #36-3-0570, #36-3-3790, SNI-RS01 – RS04 inclusive), grinding grooves (SNI-GG01, SNI-GG15), a culturally modified tree (SNI-CMT02) and high density artefact scatters (#36-3-1140, #36-3-1141).
- While Section 11.3 and 11.4 consider that the entire construction area would be subject to adverse impacts, this is considered unlikely. It is considered probable that a number of sites would be unaffected following construction and, where retained in the construction area, would be subject to a form of conservation, since these areas within the easement would not be permissible for major development activities into the future.

## 11.3 Project impacts

As outlined in Section 1.2, the project would consist of construction and operation of the new high voltage electricity transmission infrastructure within the construction area. This would consist of 2 new energy hubs, 14 switching stations, 90 km of twin double circuit 500 kV transmission lines, 150 kilometres of single circuit, double circuit and twin double circuit 330 kV transmission lines, underground fibre optic cabling along the transmission lines, and various access tracks, workforce accommodation camps and other ancillary construction facilities.

Extensive ground earthworks and vegetation clearance would be required to construct the project. This would be undertaken using heavy machinery and, where necessary, blasting of shallow bedrock and/or hard geological conditions. The latter is potentially required at Merotherie energy hub, as well as switching stations and occasional locations along the transmission line. Following completion of the project, there are operational impacts that would continue, primarily in the form of vegetation management and ongoing clearing within the transmission line easement, and for removal of hazard trees for up to 10 m beyond the construction area.

At the time of the ACHA, the project design was not final, and would be subject to continued development and, as such, for the purposes of potential impacts, it is considered that the entire construction area would be adversely affected. EnergyCo is continuing to refine the project design, and several Aboriginal sites within the energy hubs and construction camps may ultimately be avoided, this is further discussed in Section 11.4. Activities that have the potential to impact on Aboriginal heritage items within the construction area would largely be associated with earthworks through the installation of construction camps, towers and access tracks, and various vegetation clearance along the alignment.

Based on these activities, it is considered that these impacts would differentially affect the cultural materials encountered within the construction area. As outlined in Section 9.1, cultural materials included discrete Aboriginal sites and places, including rockshelters, grinding grooves, culturally modified trees, and various densities of stone artefactual material on the surface and/or shallowly buried. Ground disturbance from activities such as construction of transmission line towers, energy hubs, switching stations and some access tracks would result in the modification and/or loss of the upper soil profile and land surface where site types including stone artefacts, grinding grooves and rockshelters are documented, while vegetation clearance would primarily affect culturally modified trees where exceeding height thresholds outlined above.

The proposed 330 kV and 500 kV transmission tower locations detailed in the EIS are based upon a reference design. As such, the final location of towers, including associated construction works, within the construction area would be confirmed during detailed design considering detailed engineering requirements and site constraints. Accordingly, the assessment of impacts to Aboriginal sites within the construction area for transmission lines has taken a conservative approach to facilitate the detailed design. In this regard, 37 of 46 Aboriginal sites would be potentially subject to direct impact, resulting in their complete loss. This includes nine culturally modified trees (many only tentatively classified), eight rockshelters, two grinding groove sites, surface and sub-surface artefact sites of moderate and high-density, as well as a low-density stone artefact background scatter which is present across the construction area.

## 11.4 Aboriginal heritage impact

Generally, two types of potential impact are considered in relation to cultural materials, direct and indirect. Direct impacts relate to the project removing, truncating and/or disturbing the ground surface. This would include the removal of vegetation, removal or modification of geological outcropping and the removal or disturbance of the upper soil profile, within which cultural material are normally encountered. Indirect impacts are the result of both construction and operational activities that may result in environmental changes that would affect cultural material within, or near the project. General examples of indirect impact may include the changing view-lines to a site where visibility to/from it is part of its values, or an increase in dust being blown into a rock shelter and negatively affecting art motifs should they be present.

Assuming the entire construction area would be adversely affected, this results in direct impacts to, and loss of, all 37 identified Aboriginal objects, sites and places identified in Chapter 9 (Table 11.1; Figure 11.1). These encompass 8 highly significant and 28 moderately significant sites, including rockshelters (n=8), culturally modified trees (n=9), grinding grooves (n=11), and moderate and/or high density stone artefact scatters (n=18). This includes all seven areas of past foci identified through the test excavations, and totalling ~0.47 ha across the construction area. Nine (n=8) moderately significant grinding groove sites would be indirectly affected by the project, though visual impacts, and this would potentially result in partial loss of value. While the project requires removal of ‘hazard trees’ that may intersect with the construction area +10 m, none of the remaining culturally modified trees are within this zone. It must be noted that many of the culturally modified trees are subject to only tentative classification at this stage, and further analysis of these sites to determine their cultural origin is proposed in Chapter 12 and Appendix F.

EnergyCo is continuing to explore the potential avoidance of sites of high and moderate significance within the construction area, especially within the energy hubs, construction compounds and workforce accommodation camps. It is considered that a number of the sites would be avoided through this process, including SNI-GG01, SNI-GG15, #36-3-3794, #36-3-0449, #36-3-0570, #36-3-3790, SNI-RS01-04 inclusive, #36-3-1140, and #36-3-1141 (Table 11.1; Figure 11.1). Mitigation measures are included in Chapter 12 to explore avoidance and retention of these sites. Where achieved, this would result in a reduction of the potential impact outlined in the preceding paragraph, specifically only 9 culturally modified trees and 16 high density artefact scatters being adversely affected – a total of 25 (or 54%) of the identified sites within the construction area.

In relation to the 150 m zone encompassing the banks of Laheys Creek, Browns Creek, Whites Creek, Sportsmans Hollow Creek, Bora Creek, Cumbo Creek, Planters Creek, Wilpinjung Creek, Tallawang Creek and Copes Creek, within which higher densities of stone artefacts and/or other areas of past foci may be expected to be present, some 99 ha would be directly affected within the construction area. This equates to ~1.93% of the extent of these zones along these river systems. Zones around Prospect Creek, Sandy Creek and Deadmans Creek would be unaffected by the project.

As demonstrated in Chapter 9, the entire construction area is considered to encompass a low-density stone artefact background scatter ranging from 0 - ≤16 artefacts/m<sup>2</sup>. Stone artefacts were either found as isolated objects and/or low-density artefact scatters as part of the field survey and/or as part of the test excavations. These findings reflect the long use of the region over several millennia but are considered to have limited archaeological significance. It would be expected that this background scatter would be encountered across much of the ~4,000 ha construction area and would be directly impacted.

In relation to indirect impacts, three sites identified during the cultural mapping (SNI-CS4, SNI-CS5, SNI-CS6) and two travelling lines (#1 and #5) would be subject to visual impact from the project, and further interrogation of adverse (indirect) impacts on these sites will be needed during detailed design. Similarly, SNI-GG02-GG09 and SNI-AS65, though committed to be avoided by the final project design, may have their aesthetic value impacted by the proposed development through visual impacts, simply due to proximity. Other indirect impacts would need to be considered in the event that sites within the construction area are retained following detailed design and may therefore be affected by the construction and/or operation of the project. This may include the increased visibility of sites, such as rockshelters and/or grinding grooves where vegetation clearance is required. Notably, this may also need to consider indirect impacts of blasting that may extend a considerable distance from detonation and may affect sites such as rockshelters and/or grinding grooves. Mitigation measures outlined in Chapter 12 are proposed to address this.

## 11.5 Intergenerational loss/cumulative impacts

Ecologically sustainable development, or intergeneration equity, is the principle whereby the current generation should maintain the health, diversity and longevity of the environment for the benefit of future society. For Aboriginal heritage management, intergenerational equity can be considered primarily in terms of the cumulative impacts to Aboriginal objects, sites and/or places in a region. If few Aboriginal objects and places remain in a region (e.g. due to development impacts), there are fewer opportunities for future generations of Aboriginal people and the broader community to enjoy the cultural benefits. Information about the integrity, rarity and representativeness of the Aboriginal objects, sites and places that may be impacted, and how they inform the past visitation and occupation of land by Aboriginal people, are relevant to the consideration of intergenerational equity and the understanding of the cumulative impacts of a project. While not directly related to the ACHA process, such (future) impacts are also a critical issue for consideration under the *Native Title Act 1993* (see Appendix A for brief discussion).

Overall, the project would potentially result in adverse impacts to 37 identified Aboriginal sites, objects and/or places, as well as various amounts of buried stone or artefactual material (Chapter 9). These consist of 8 rockshelters, 9 culturally modified trees, 2 grinding groove sites, and 18 discrete stone artefact scatters and/or deposits. Several of these sites have been assigned a tentative identified status, and further investigation is required to validate them. In the case of the broader stone artefactual material expected to occur along the banks of moderate to large creek systems, some ~99 ha would be lost.

Through ongoing project refinement, some 55%, or 101 of the 183 of the Aboriginal sites identified during the fieldwork have been avoided by the project, including several highly significant sites. However, the 46 sites potentially impacted (complete and partial) represent a notable portion of the documented cultural assemblage (Section 7.4). Eleven grinding groove sites reflect ~16% of this documented site type based on the data in Section 5.4, ~5% of rockshelters, ~6% of the cultural modified trees, and ~14% of the high and moderate density artefacts scatters. Further, SNI-RS03 and SNI-RS04, represent some of the few rockshelters found outside of the Wilpinjung, Ulan and Moolarben locale. As such, it must be concluded that the project would have some cumulative impact to the cultural assemblage of the region. However, EnergyCo is exploring the avoidance and/or retention of the rockshelters (n=8), grinding grooves (n=11) and several high density artefact scatters (n=2), and this forms mitigation measures in Chapter 12. Where successful, this would substantively reduce the cumulative impact of the project, especially in relation to the grinding grooves sites, which are currently the most significantly affected based on the values above.

More broadly, the study area is being subject to intense development from existing coal mining projects, combined with the development of multiple renewable energy generation projects in the form of solar and wind farms. While many of the renewable energy generation projects are still under investigation and assessment, the cumulative impact to Aboriginal heritage in the region is likely to be significant. This is due to the number and size of the renewable energy projects under assessment within the same region, considered in conjunction with the existing coal projects, and the amount of sites being identified via archaeological investigations which may potentially be impacted.

However, many of the larger renewable energy generation projects, especially in close proximity to the construction area are proposed wind farms. Such developments have highly localised impacts and are often able to avoid sites of high cultural significance. While solar farms result in a larger impact due to the type and extent of infrastructure, they too are able to remove or modify blocks of panels to avoid cultural materials in some circumstances. In both cases, these renewable energy generation projects will typically avoid construction activities and operation close to major creek-lines by establishing riparian corridors, upon which the majority of Aboriginal cultural materials have been encountered during the field investigations for this project.

A review of completed archaeological assessments in the study area (Appendix E.1) has shown that project design can largely be altered, as described above, to avoid impact to as many recorded sites as possible and especially to those sites assessed as having high significance (i.e. higher density stone artefact scatters, rock shelters, grinding grooves and modified trees). This means that often the renewable energy generation projects are only impacting on a smaller portion of the overall sites identified, and the sites that are subject to impact generally comprise isolated finds and low density stone artefact scatters of low significance. In contrast, past and current activities in the south-east of the construction area associated with the Moolarben, Ulan and Wilpinjung coal mines have resulted in substantial loss of Aboriginal sites and cultural materials at this location. As outlined in Section 7.3, of the 800 or so sites identified at Moolarben, ~40% have been lost through ongoing activities.

While the project may ultimately result in protection of some of the identified cultural assemblage, currently assessment is based on the assumption of complete impacts within the construction area. In addition, the information obtained through this ACHA will be provided to proponents of other renewable energy generation projects and thereby assist in identifying key sites of local and regional value for a more holistic approach to the conservation of cultural materials across the REZ.

While the project would result in some loss of cultural materials, it is acknowledged that, increasingly, engagement on this topic is seeking to move beyond the material culture to a more holistic consideration of heritage. Holtorf (2015:412) states:

The acts of changing, destroying or replacing a heritage object in the landscape can all be seen as forms of interpreting, using and transforming this heritage....The core values of heritage are increasingly deemed to reside in the meanings and values humans invest in heritage objects, not in their physical substance.

And (Holtorf 2015:408):

...maintenance of the status quo of cultural heritage is widely perceived as being superior to any loss or possible substitution of that cultural heritage. But is it really justified in the interest of present or future generations to prioritise the conservation of existing cultural heritage over the prospect of gaining new cultural heritage [or knowledge of, and engagement with, that cultural heritage]?

Holtorf is not alone in his views, with DeSilvey and Harrison (2020:3-5) similarly stating:

These kinds of statements about the future appear to normalise and lend moral weight to the mission of conservation practice, whilst detracting from a consideration of how the salvage paradigm in heritage is fundamentally premised on a system which is equally implicated in the sacrifice and loss of certain less valued cultural and natural formations alongside the preservation or conservation of more valued ones...

Increasingly, heritage scholars are adopting integrated approaches to examine the politics of loss in both cultural and natural heritage contexts. A recent study of the effects of sea level rise on Kiribati, a low-lying island nation in the Pacific Ocean, for example, engages with questions about the extent to which an indigenous, largely oral culture can be 'preserved' outside its 'natural' and dynamic setting.

...point to both the inevitability and the creative potential of loss and change. Such observations seem inescapable for heritage in light of the current recognition of the Anthropocene... it is clear that the more sophisticated ways of understanding, anticipating and engaging forms of heritage loss outlined here point not only to challenging new ways of 'doing' and practising natural and cultural heritage preservation, conservation and management but also map out important new lines of enquiry for heritage studies in the future.

When considering the potential impacts to Aboriginal cultural heritage from this perspective, the current and proposed impacts of the project and associated material culture loss, can be considered to have significant benefits. In the first instance, the investigations of the construction area have significantly improved our archaeological and scientific understanding of a previously poorly understood locales. Information on the past peopling and their activities within the construction area have now come to light, as well as an improved understanding of contemporary sites and values. Such information will only be added to and further refined through future stages of the development of the project (see Chapter 12). This project also provides the Aboriginal community with opportunities to undertake heritage interpretation, development of narratives and visual representation of Aboriginal values, stories and places for the construction area— something that is currently lacking from the region. This would improve understanding and public outreach of cultural heritage to the broader community into the future.

The Aboriginal participants have also expressed a desire to remain involved in the project and continue to access the project area and visit/maintain the identified Aboriginal sites and places into the future. As such, the project can enable and support an ongoing connection to Country for the local Aboriginal community, which has previously not been readily available to date. Assuming these opportunities are realised, the project provides an important continuation and re-imagining of cultural heritage of the region for future generations.

**Table 11.1 Summary of potential impact to Aboriginal objects and/or sites located within the construction area**

Site ID	AHIMS ID	Site type	Site status	Significance	Type of Harm	Location and/or activity of harm	Degree of harm	Consequence of harm	Notes
S1MC487	#36-3-3794	Rockshelter	Valid	Low	Direct	Within construction area	Complete	Complete loss of value	EnergyCo continues to refine project design to avoid or reduce impacts to this site. Mitigation measures committing to this are provided in Chapter 12.
UWF SU51/L3	#36-3-0449	Rockshelter	Valid	Moderate	Direct	Within construction area	Complete	Complete loss of value	EnergyCo continues to refine project design to avoid or reduce impacts to this site. Mitigation measures committing to this are provided in Chapter 12.
WCP137	#36-3-0570	Rockshelter	Valid	High	Direct	Within construction area	Complete	Complete loss of value	EnergyCo continues to refine project design to avoid or reduce impacts to this site. Mitigation measures committing to this are provided in Chapter 12.
S1MC488	#36-3-3790	Rockshelter	Valid	Moderate	Direct	Within construction area	Complete	Complete loss of value	EnergyCo continues to refine project design to avoid or reduce impacts to this site. Mitigation measures committing to this are provided in Chapter 12.
SNI-RS01	-	Rockshelter	Valid	Moderate	Direct	Within construction area	Complete	Complete loss of value	EnergyCo continues to refine project design to avoid or reduce impacts to this site. Mitigation measures committing to this are provided in Chapter 12.
SNI-RS02	-	Rockshelter	Valid	Moderate	Direct	Within construction area	Complete	Complete loss of value	EnergyCo continues to refine project design to avoid or reduce impacts to this site. Mitigation measures committing to this are provided in Chapter 12.
SNI-RS03	-	Rockshelter	Valid	Moderate	Direct	Within construction area	Complete	Complete loss of value	EnergyCo continues to refine project design to avoid or reduce impacts to this site. Mitigation measures committing to this are provided in Chapter 12.
SNI-RS04	-	Rockshelter	Valid	Moderate	Direct	Within construction area	Complete	Complete loss of value	EnergyCo continues to refine project design to avoid or reduce impacts to this site. Mitigation measures committing to this are provided in Chapter 12.
WCP129	#36-3-0565	Culturally modified tree	Tentative	Moderate	Direct	Within construction area	Complete	Complete loss of value	
WCP52	#36-6-0626	Culturally modified tree	Tentative	Moderate	Direct	Within construction area	Complete	Complete loss of value	

**Table 11.1 Summary of potential impact to Aboriginal objects and/or sites located within the construction area**

Site ID	AHIMS ID	Site type	Site status	Significance	Type of Harm	Location and/or activity of harm	Degree of harm	Consequence of harm	Notes
WCP64	#36-3-0638	Culturally modified tree	Tentative	Moderate	Direct	Within construction area	Complete	Complete loss of value	
Stoney Creek 2	#36-3-0103	Culturally modified tree	Tentative	Moderate	Direct	Within construction area	Complete	Complete loss of value	
WCP69	#36-3-0643	Culturally modified tree	Tentative	Moderate	Direct	Within construction area	Complete	Complete loss of value	
SNI CMT01	-	Culturally modified tree	Tentative	Moderate	Direct	Within construction area	Complete	Complete loss of value	
SNI-CMT02	-	Culturally modified tree	Tentative	Moderate	Direct	Within construction area	Complete	Complete loss of value	
SNI-CMT03	-	Culturally modified tree	Tentative	Moderate	Direct	Within construction area	Complete	Complete loss of value	
SNI-CMT11	-	Culturally modified tree	Tentative	Moderate	Direct	Within construction area	Complete	Complete loss of value	This tree is on the periphery of the construction area and may potentially be avoided.
SNI-GG01	-	Grinding groove	Valid	Moderate	Direct	Within construction area	Complete	Complete loss of value	EnergyCo continues to refine project design to avoid or reduce impacts to this site. Mitigation measures committing to this are provided in Chapter 12.
SNI-GG02	-	Grinding groove	Valid	Moderate	Indirect	Within construction area	None	Partial loss of value	EnergyCo has committed to avoiding this site through future design refinements. This site however may be visually impacted by the construction of the Merotherie energy hub, which may result in a partial loss of value.
SNI-GG03	-	Grinding groove	Valid	Moderate	Indirect	Within construction area	None	Partial loss of value	EnergyCo has committed to avoiding this site through future design refinements. This site however may be visually impacted by the construction of the Merotherie energy hub, which may result in a partial loss of value.

**Table 11.1 Summary of potential impact to Aboriginal objects and/or sites located within the construction area**

Site ID	AHIMS ID	Site type	Site status	Significance	Type of Harm	Location and/or activity of harm	Degree of harm	Consequence of harm	Notes
SNI-GG04	-	Grinding groove	Valid	Moderate	Indirect	Within construction area	None	Partial loss of value	EnergyCo has committed to avoiding this site through future design refinements. This site however may be visually impacted by the construction of the Merotherie energy hub, which may result in a partial loss of value.
SNI-GG05	-	Grinding groove	Valid	Moderate	Indirect	Within construction area	None	Partial loss of value	EnergyCo has committed to avoiding this site through future design refinements. This site however may be visually impacted by the construction of the Merotherie energy hub, which may result in a partial loss of value.
SNI-GG06	-	Grinding groove	Valid	Moderate	Indirect	Within construction area	None	Partial loss of value	EnergyCo has committed to avoiding this site through future design refinements. This site however may be visually impacted by the construction of the Merotherie energy hub, which may result in a partial loss of value.
SNI-GG07	-	Grinding groove	Valid	Moderate	Indirect	Within construction area	None	Partial loss of value	EnergyCo has committed to avoiding this site through future design refinements. This site however may be visually impacted by the construction of the Merotherie energy hub, which may result in a partial loss of value.
SNI-GG08	-	Grinding groove	Valid	Moderate	Indirect	Within construction area	None	Partial loss of value	EnergyCo has committed to avoiding this site through future design refinements. This site however may be visually impacted by the construction of the Merotherie energy hub, which may result in a partial loss of value.
SNI-GG09	-	Grinding groove	Valid	Moderate	Indirect	Within construction area	None	Partial loss of value	EnergyCo has committed to avoiding this site through future design refinements. This site however may be visually impacted by the construction of the Merotherie energy hub, which may result in a partial loss of value.
SNI-GG15	-	Grinding groove	Valid	Moderate	Direct	Within construction area	Complete	Complete loss of value	EnergyCo continues to refine project design to avoid or reduce impacts to this site. Mitigation measures committing to this are provided in Chapter 12.

**Table 11.1 Summary of potential impact to Aboriginal objects and/or sites located within the construction area**

Site ID	AHIMS ID	Site type	Site status	Significance	Type of Harm	Location and/or activity of harm	Degree of harm	Consequence of harm	Notes
SNI-AS65	-	Grinding groove, low density artefact scatter and PAD	Valid	Moderate	Indirect	Within construction area	None	Partial loss of value	EnergyCo has committed to avoiding this site through future design refinements. This site however may be visually impacted by the construction of the Neelys Lane accommodation camp, which may result in a partial loss of value. Site extends beyond boundary of the proposed camp.
S1MC303	#36-3-1140	High density artefact scatter	Valid	High	Direct	Within construction area	Complete	Complete loss of value	EnergyCo continues to refine project design to avoid or reduce impacts to this site. Mitigation measures committing to this are provided in Chapter 12.
S1MC304	#36-3-1141	High density artefact scatter	Valid	High	Direct	Within construction area	Complete	Complete loss of value	EnergyCo continues to refine project design to avoid or reduce impacts to this site. Mitigation measures committing to this are provided in Chapter 12.
SNI-AS41	-	High density artefact scatter	Valid	High	Direct	Within construction area	Complete	Complete loss of value	-
SNI-AS43	-	High density artefact scatter	Valid	High	Direct	Within construction area	Complete	Complete loss of value	-
SNI-AS57	-	High density artefact scatter	Valid	High	Direct	Within construction area	Complete	Complete loss of value	-
WCP220	#36-3-0496	Moderate density artefact scatter	Valid	Low	Direct	Within construction area	Complete	Complete loss of value	-
WCP227	#36-3-0503	Moderate density artefact scatter	Valid	Moderate	Direct	Within construction area	Complete	Complete loss of value	-
WC OS 17 with PAD	#36-3-0658	Moderate density artefact scatter	Valid	Moderate	Direct	Within construction area	Complete	Complete loss of value	-

**Table 11.1 Summary of potential impact to Aboriginal objects and/or sites located within the construction area**

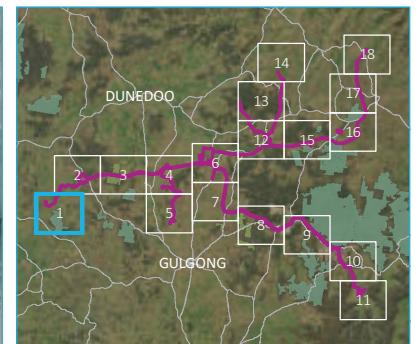
Site ID	AHIMS ID	Site type	Site status	Significance	Type of Harm	Location and/or activity of harm	Degree of harm	Consequence of harm	Notes
CE-09-OS and SNI-FA03	#36-3-0685	Moderate density artefact scatter and deposit	Valid	Moderate	Direct	Within construction area	Complete	Complete loss of value	This site forms part of the broader Wilpinjung Creek corridor of archaeological potential
WC1 - WIL PINJONG CREEK 1	#36-3-0720	Moderate density artefact scatter	Valid	Moderate	Direct	Within construction area	Complete	Complete loss of value	-
WCP260	#36-3-0793	Moderate density artefact scatter	Valid	Moderate	Direct	Within construction area	Complete	Complete loss of value	-
SNI-AS02	-	Moderate density artefact scatter	Valid	Moderate	Direct	Within construction area	Complete	Complete loss of value	-
SNI-FA01	-	Moderate density artefact scatter, and deposit	Valid	Moderate	Direct	Within construction area	Complete	Complete loss of value	This site forms part of the broader Tallawang Creek corridor of archaeological potential
SNI-FA02	-	Moderate density artefact scatter, and deposit	Valid	Moderate	Direct	Within construction area	Complete	Complete loss of value	
SNI-FA04	-	Moderate density artefact scatter, and deposit	Valid	High	Direct	Within construction area	Complete	Complete loss of value	This site forms part of the broader Copes Creek corridor of archaeological potential
SNI-FA05	-	High density artefact scatter, and deposit	Valid	Moderate	Direct	Within construction area	Complete	Complete loss of value	This site forms part of the broader Laheys Creek corridor of archaeological potential

**Table 11.1 Summary of potential impact to Aboriginal objects and/or sites located within the construction area**

Site ID	AHIMS ID	Site type	Site status	Significance	Type of Harm	Location and/or activity of harm	Degree of harm	Consequence of harm	Notes
SNI-FA06	-	Moderate density artefact scatter, and deposit	Valid	Moderate	Direct	Within construction area	Complete	Complete loss of value	
SNI-FA07	-	High density artefact scatter, and deposit	Valid	High	Direct	Within construction area	Complete	Complete loss of value	This site forms part of the broader Sportsmans Hollow Creek corridor of archaeological potential
SNI-BS1	-	Low density artefact scatter	Valid	Low	Direct	Within construction area	Complete	Complete loss of value	

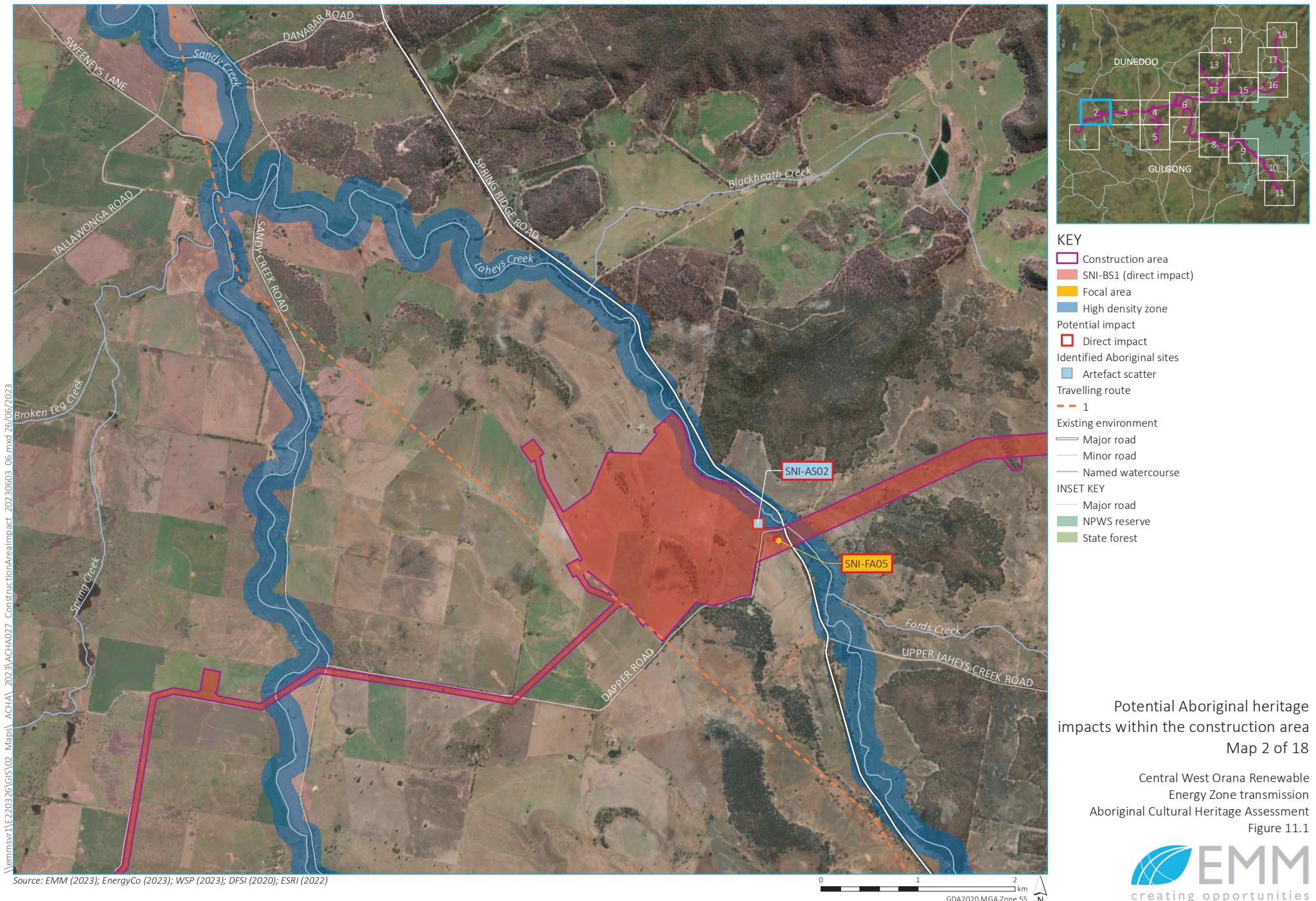
Notes: The type, degree and consequence of harm definitions are based on DECCW's Code of Practise for the Archaeological Investigation of Aboriginal objects in NSW.

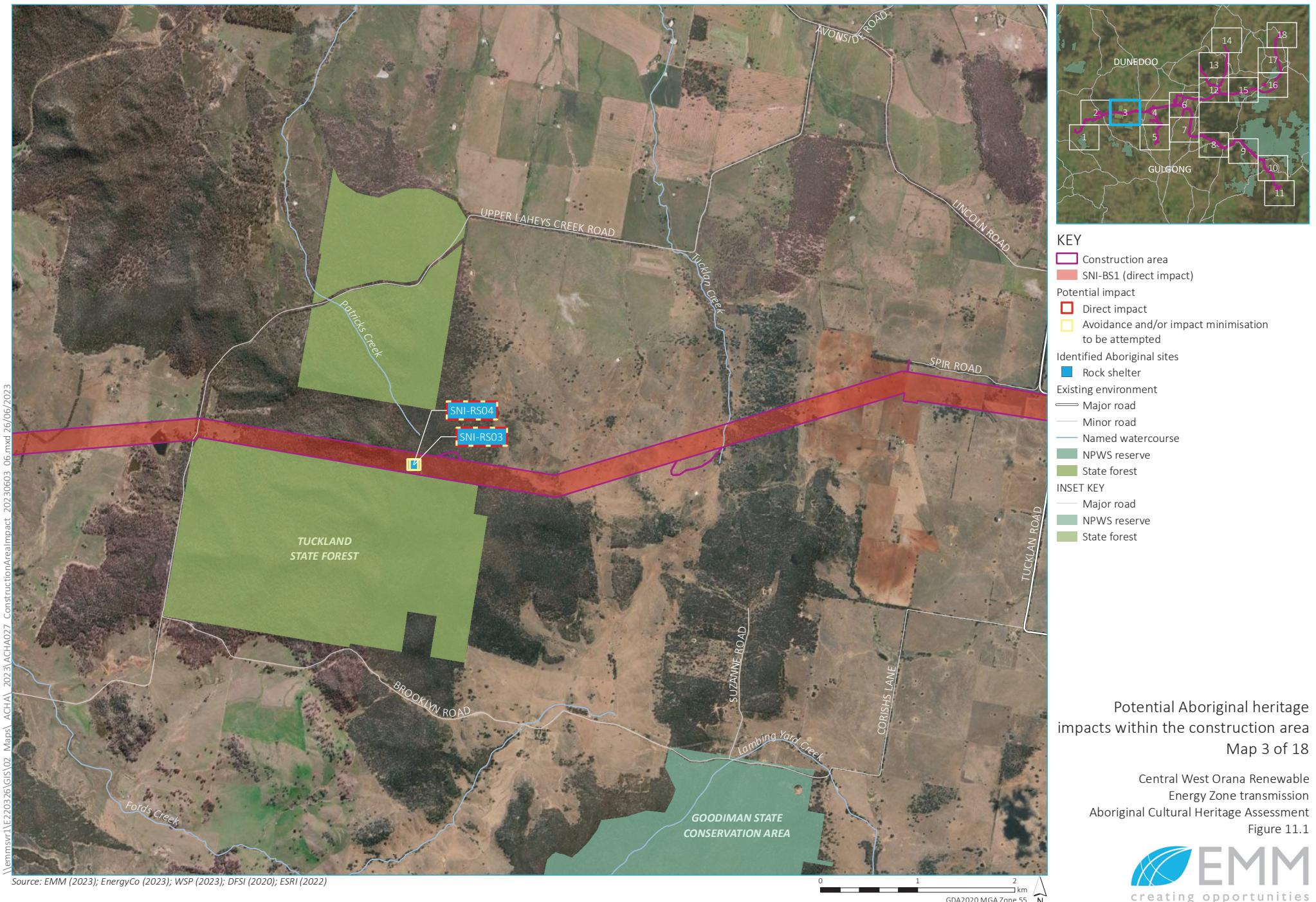
The type, degree and consequence of harm to Aboriginal objects and/or sites is based on the project's design at the time of preparation of this ACHA.

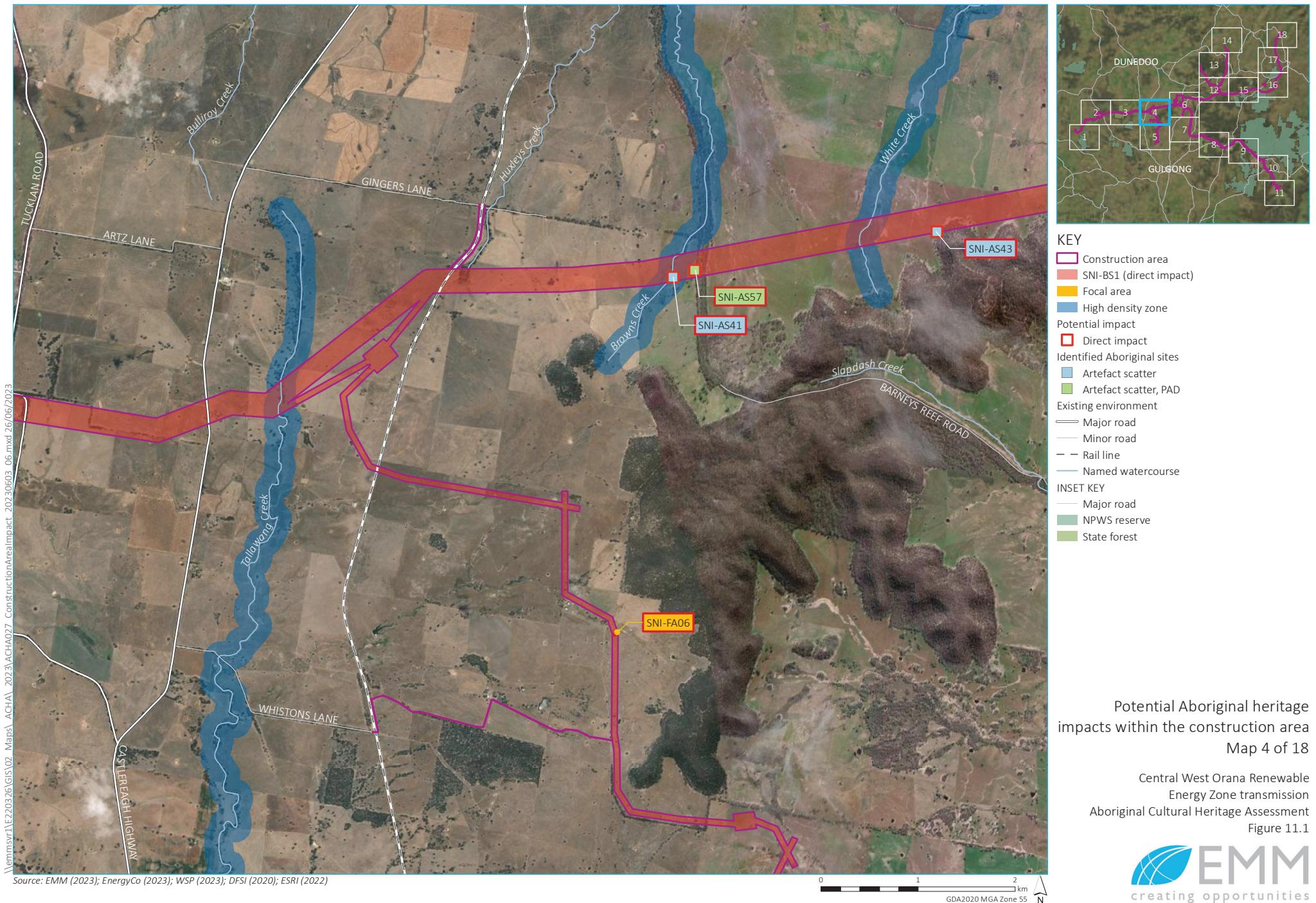


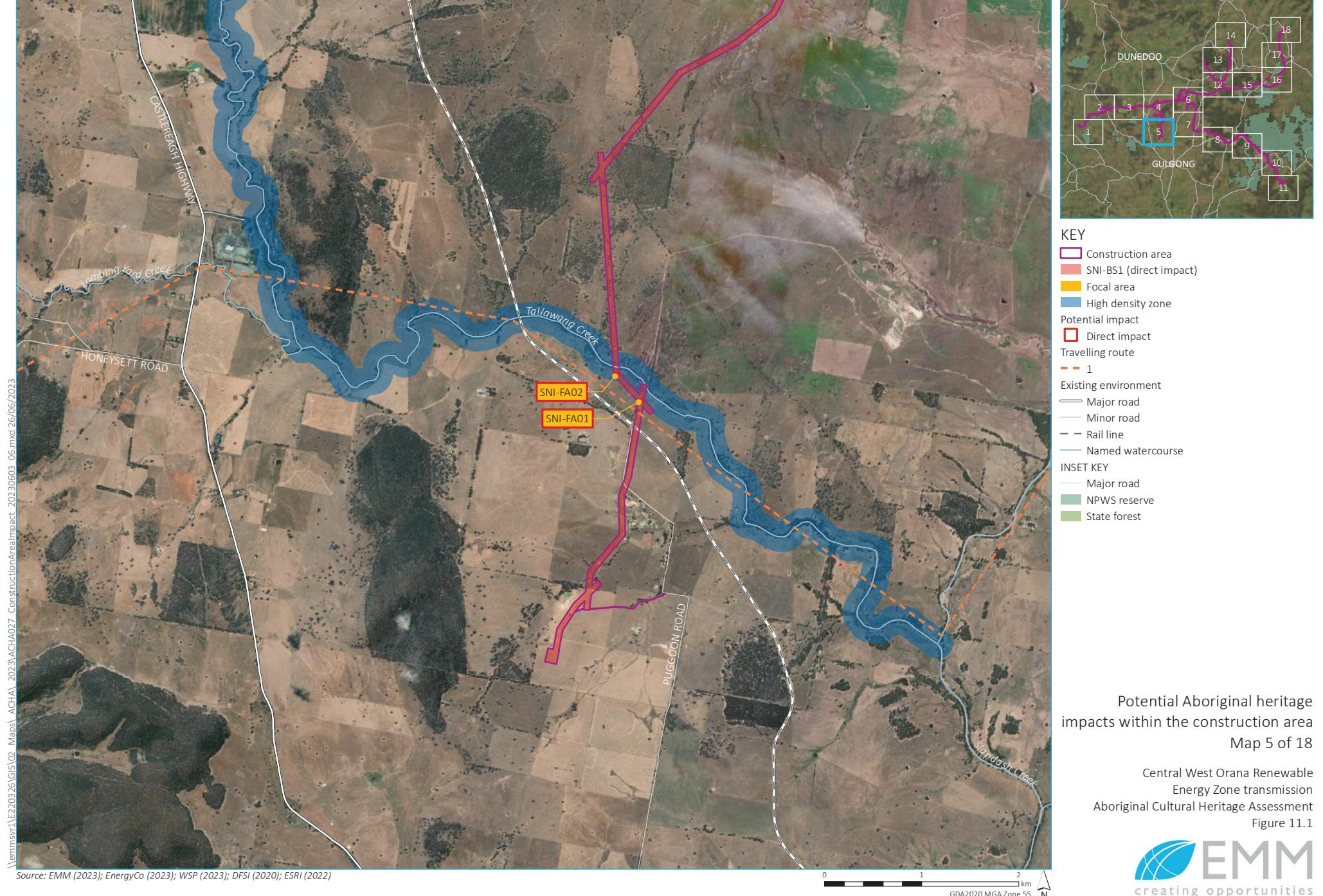
Potential Aboriginal heritage impacts within the construction area  
Map 1 of 18

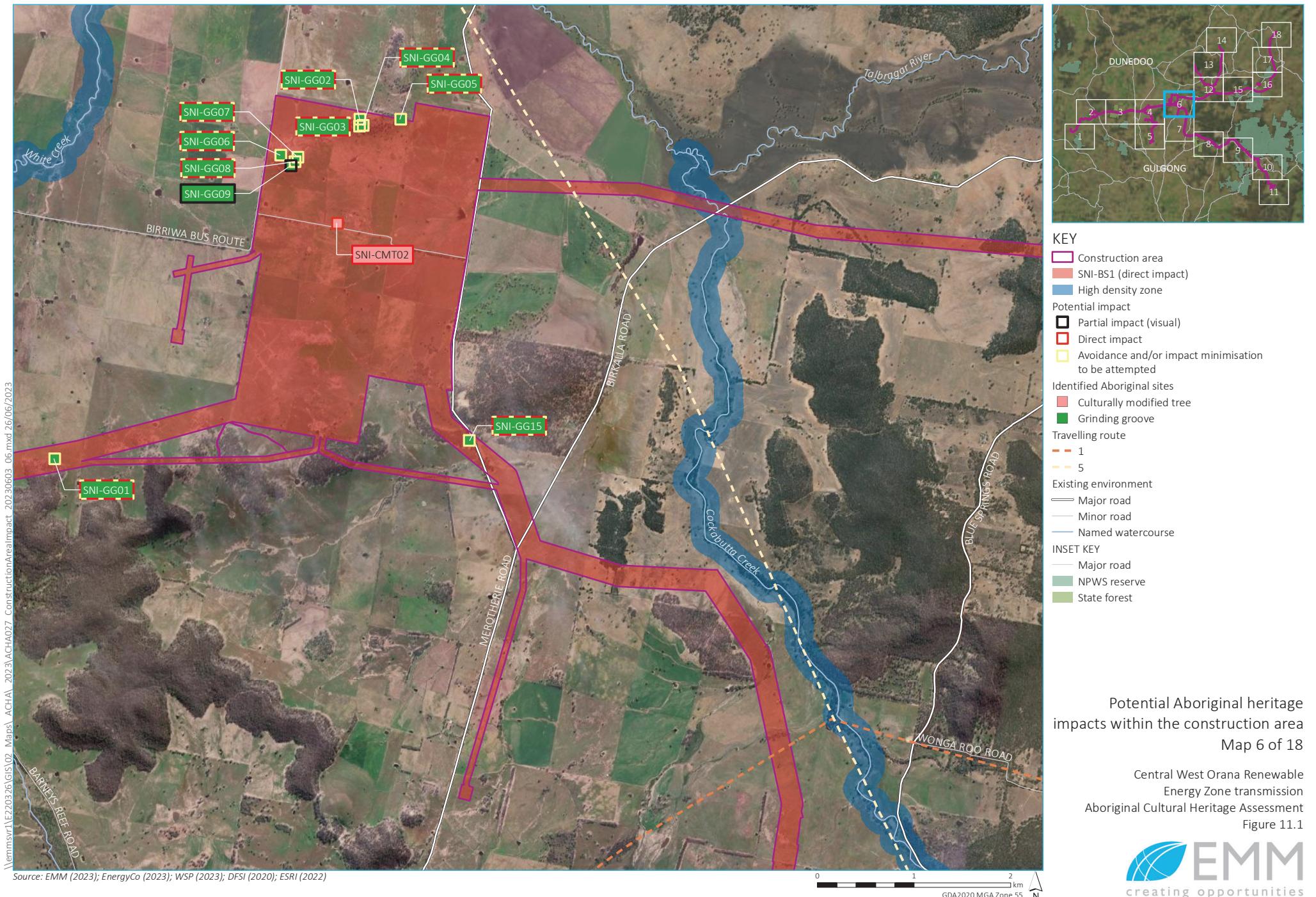
Central West Orana Renewable Energy Zone transmission Aboriginal Cultural Heritage Assessment  
Figure 11.1





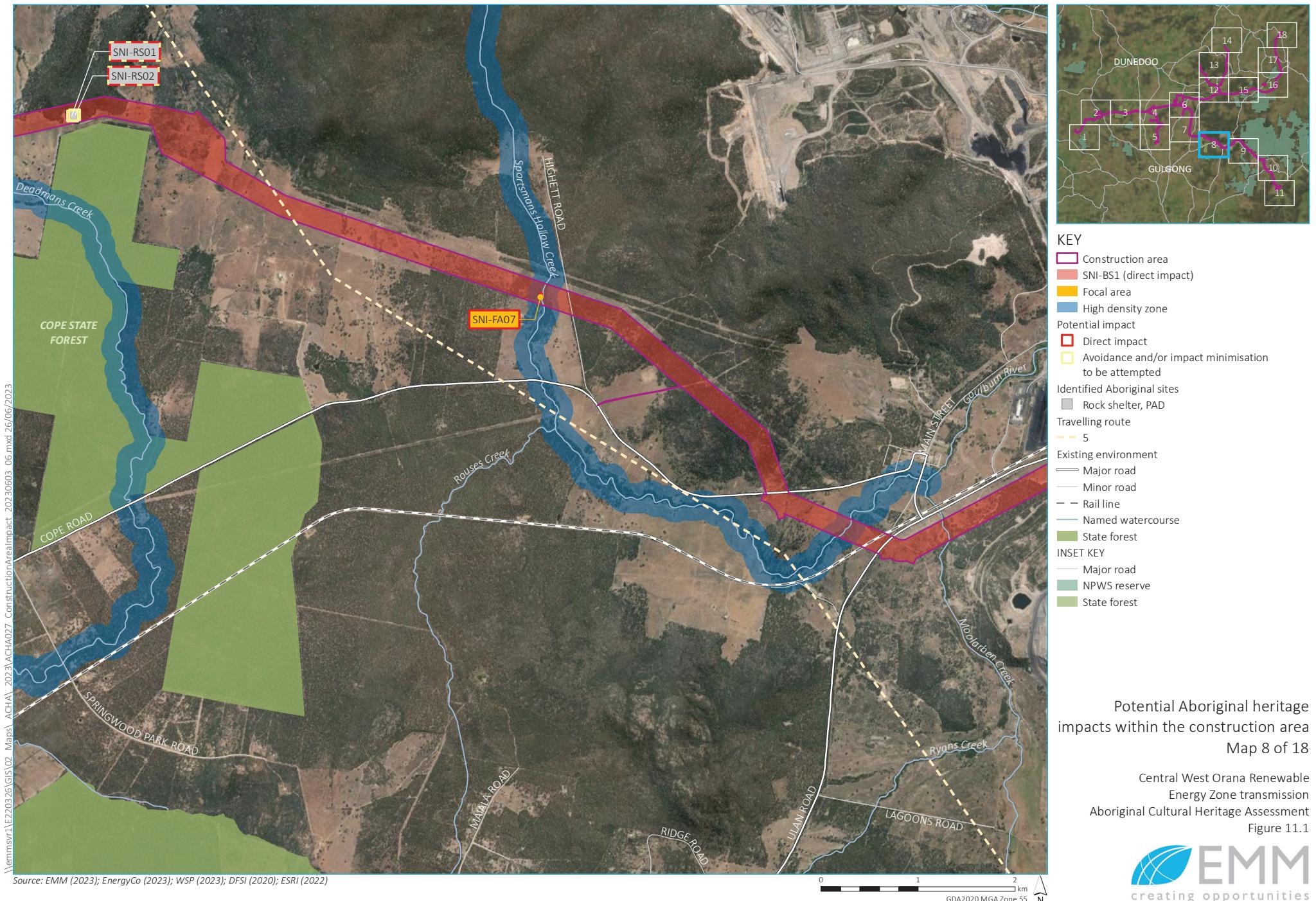


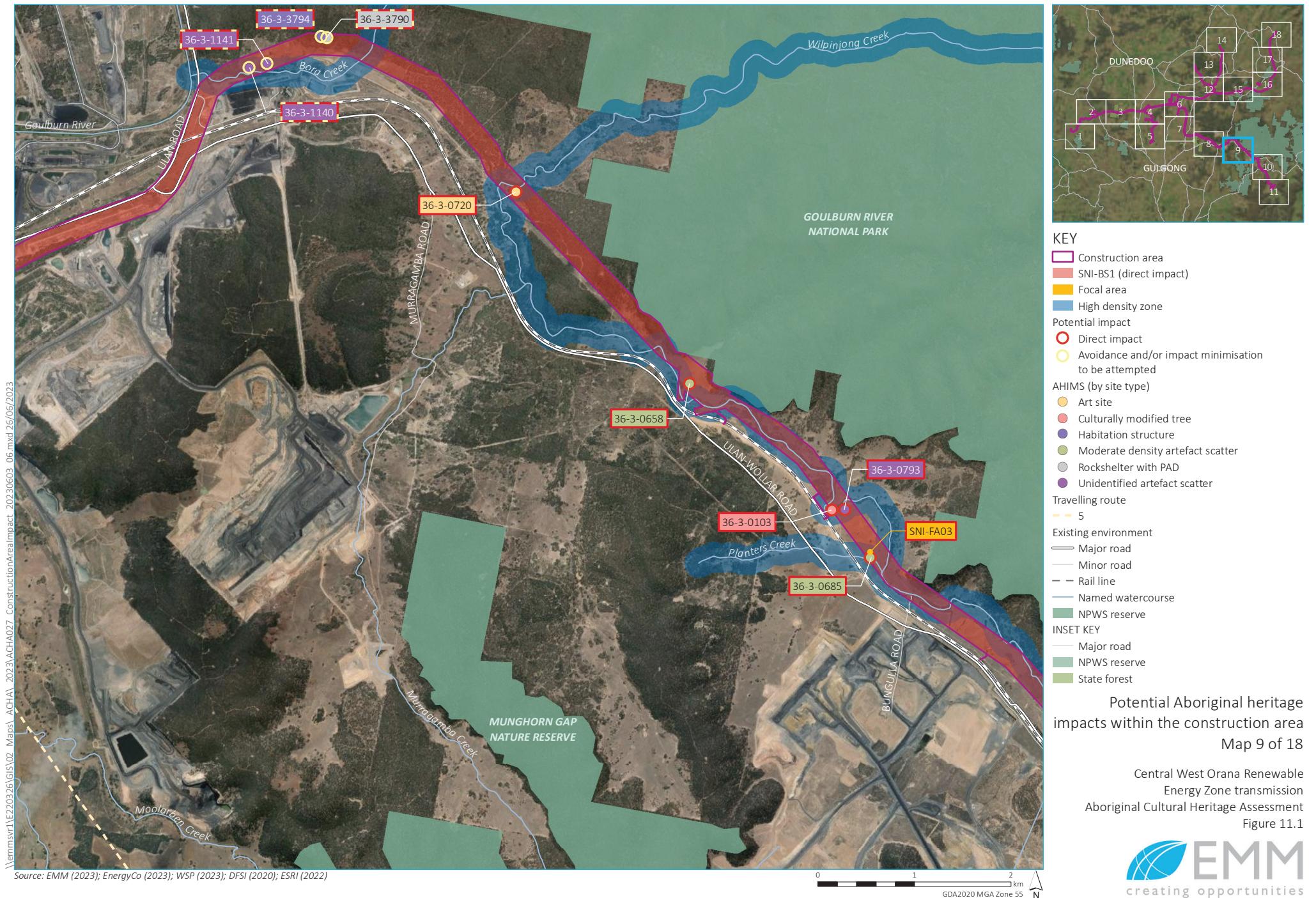


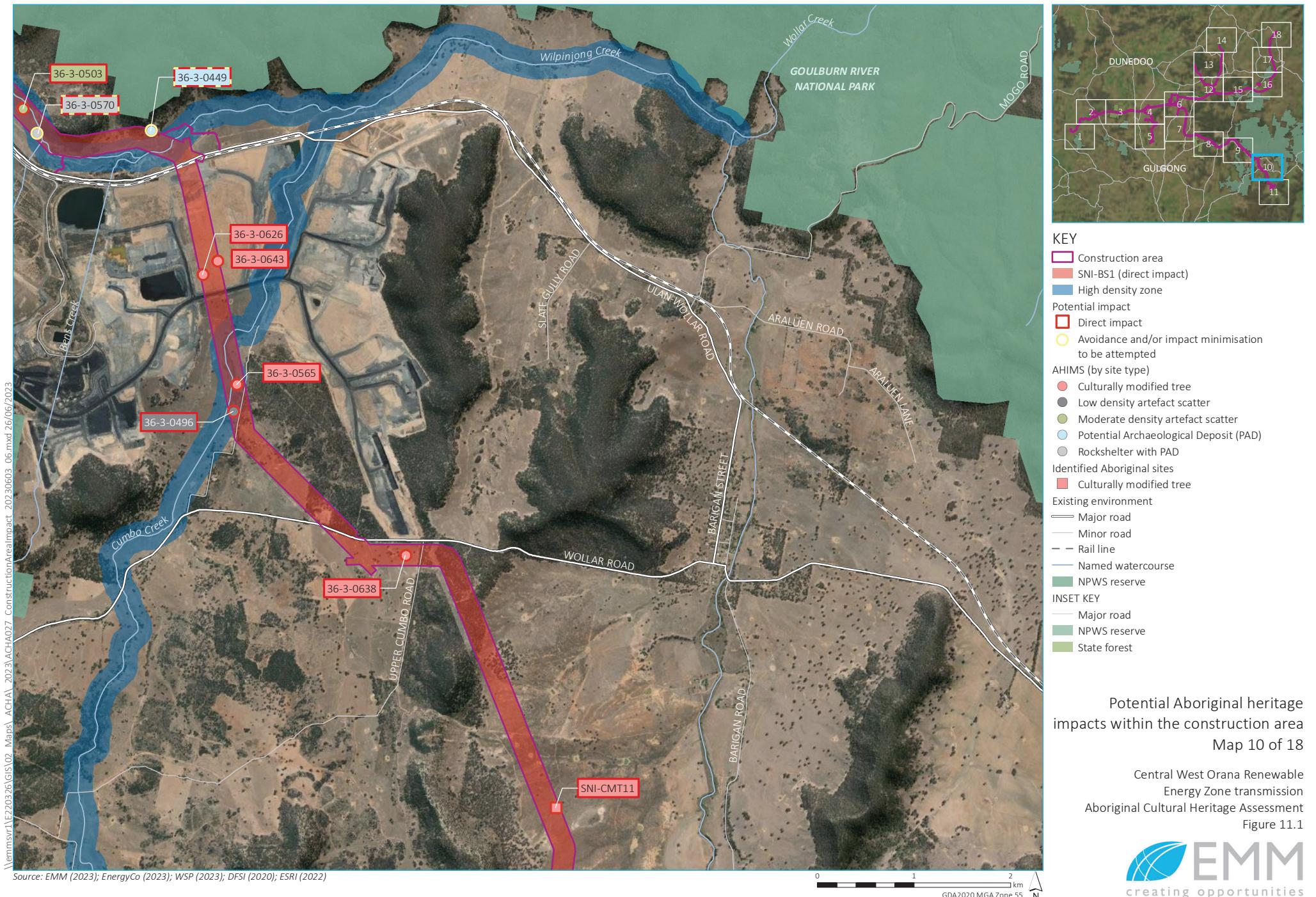


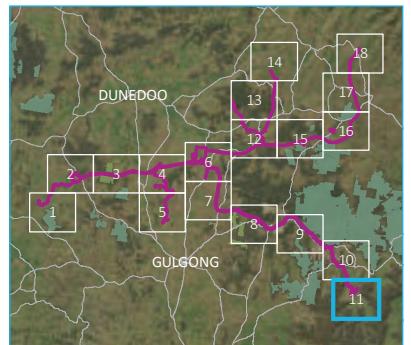
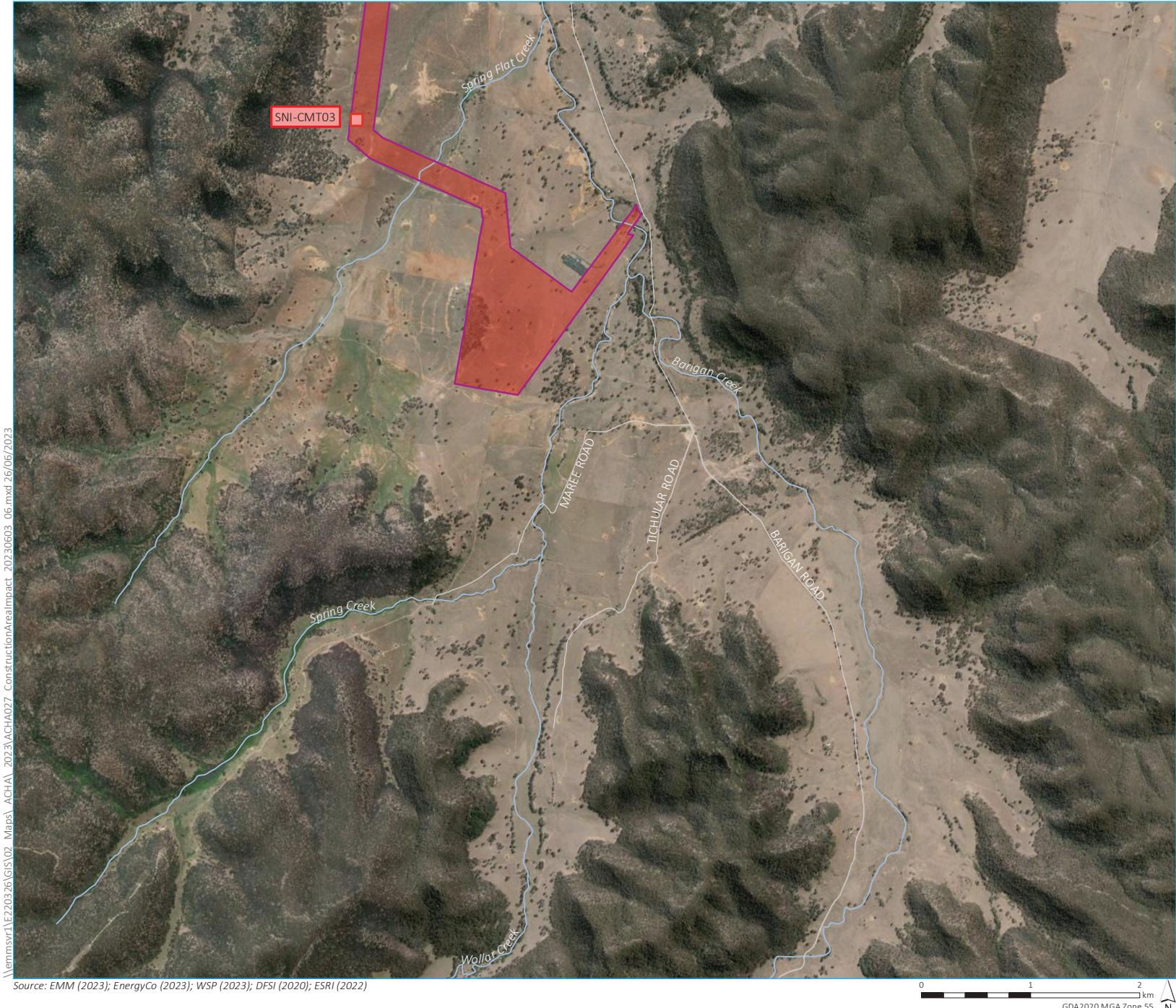


Central West Orana Renewable  
 Energy Zone transmission  
 Aboriginal Cultural Heritage Assessment  
 Figure 11.1



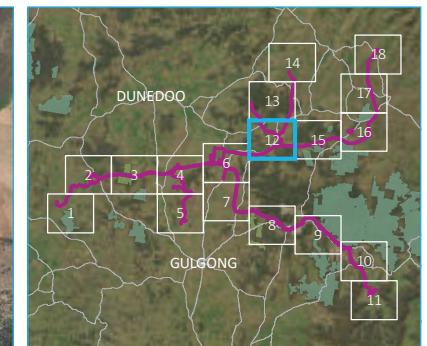
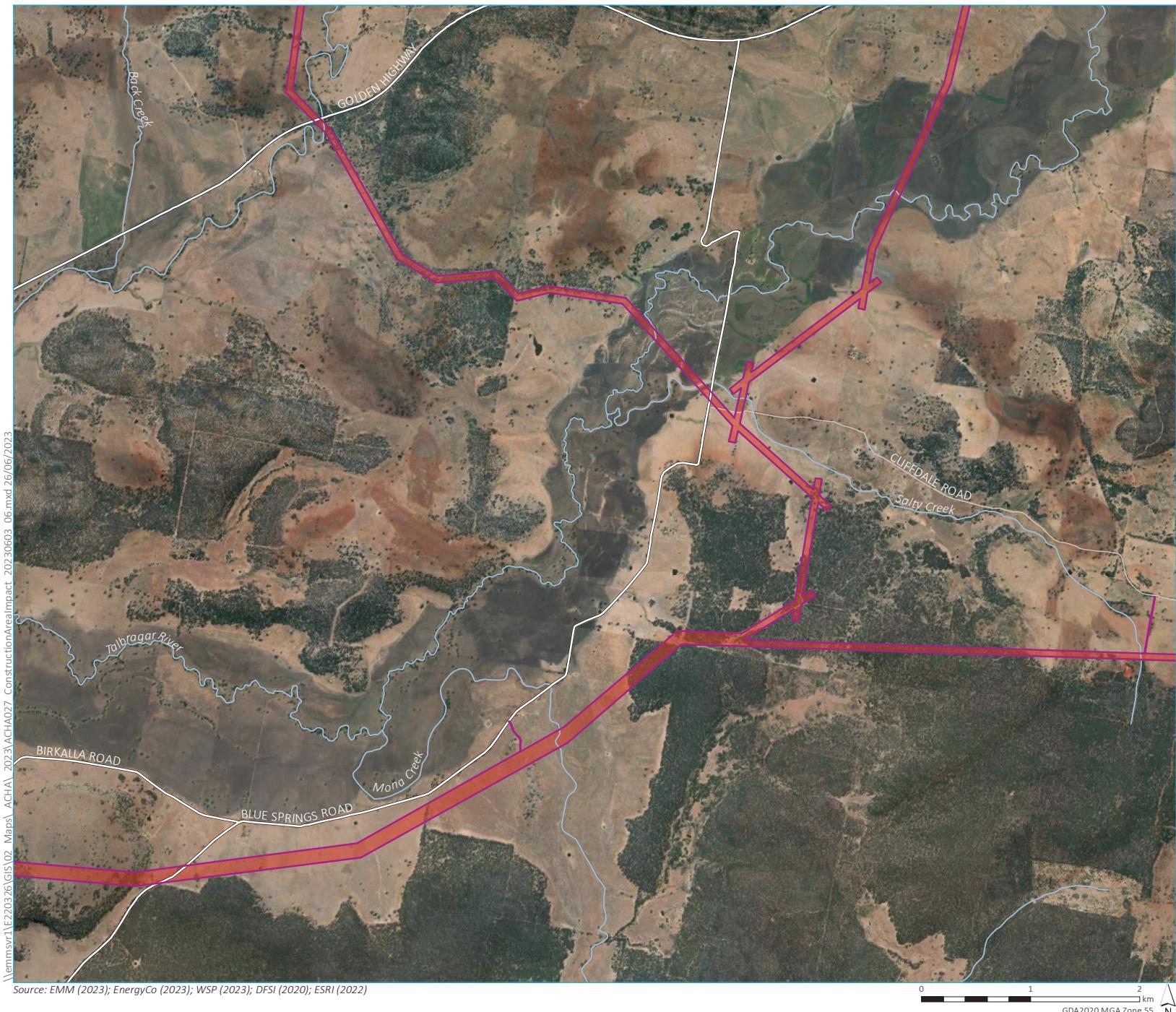






Potential Aboriginal heritage  
impacts within the construction area  
Map 11 of 18

Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 11.1



**KEY**

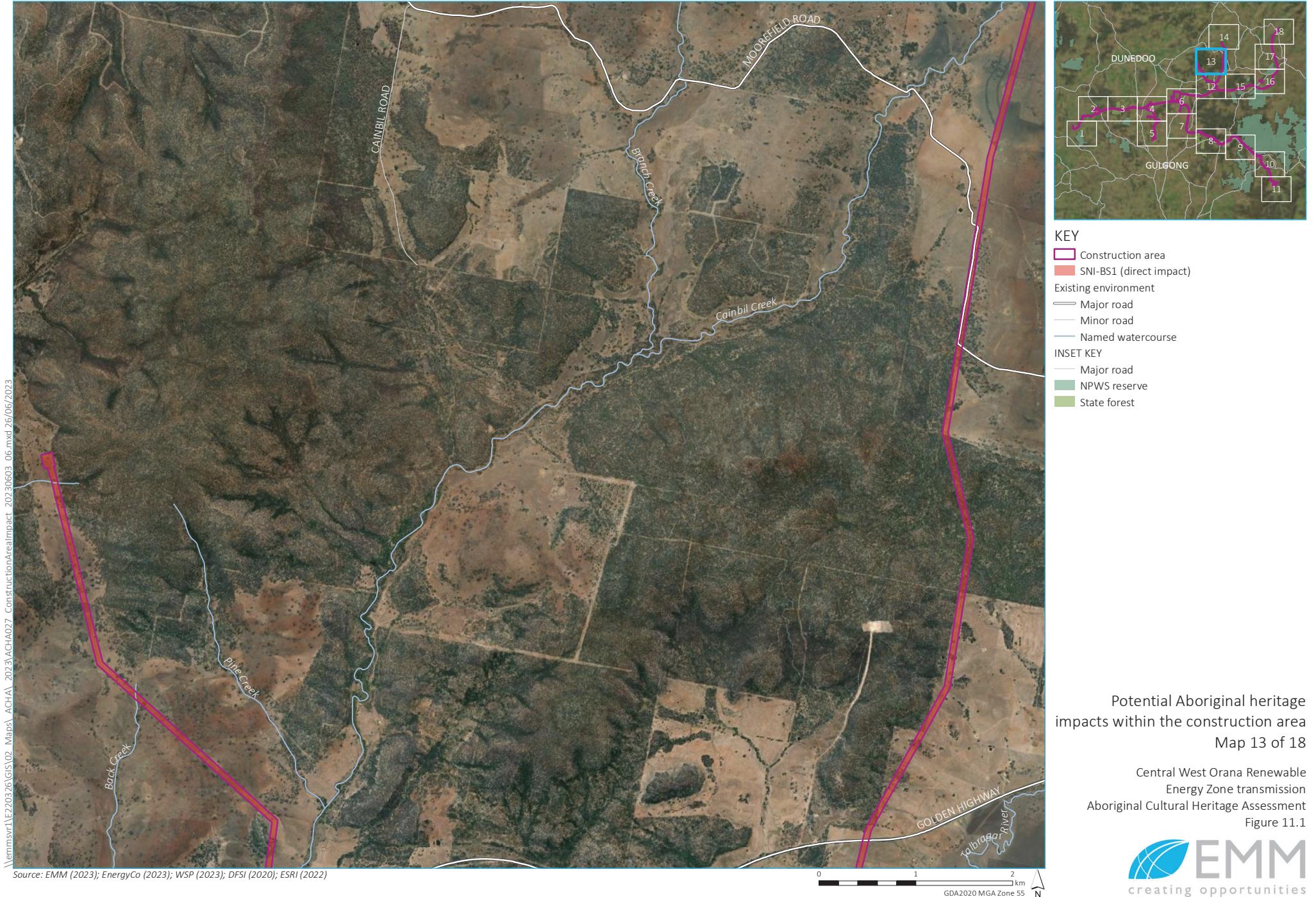
- Pink area: Construction area
- Red area: SNI-BS1 (direct impact)
- Existing environment
- Major road
- Minor road
- Named watercourse

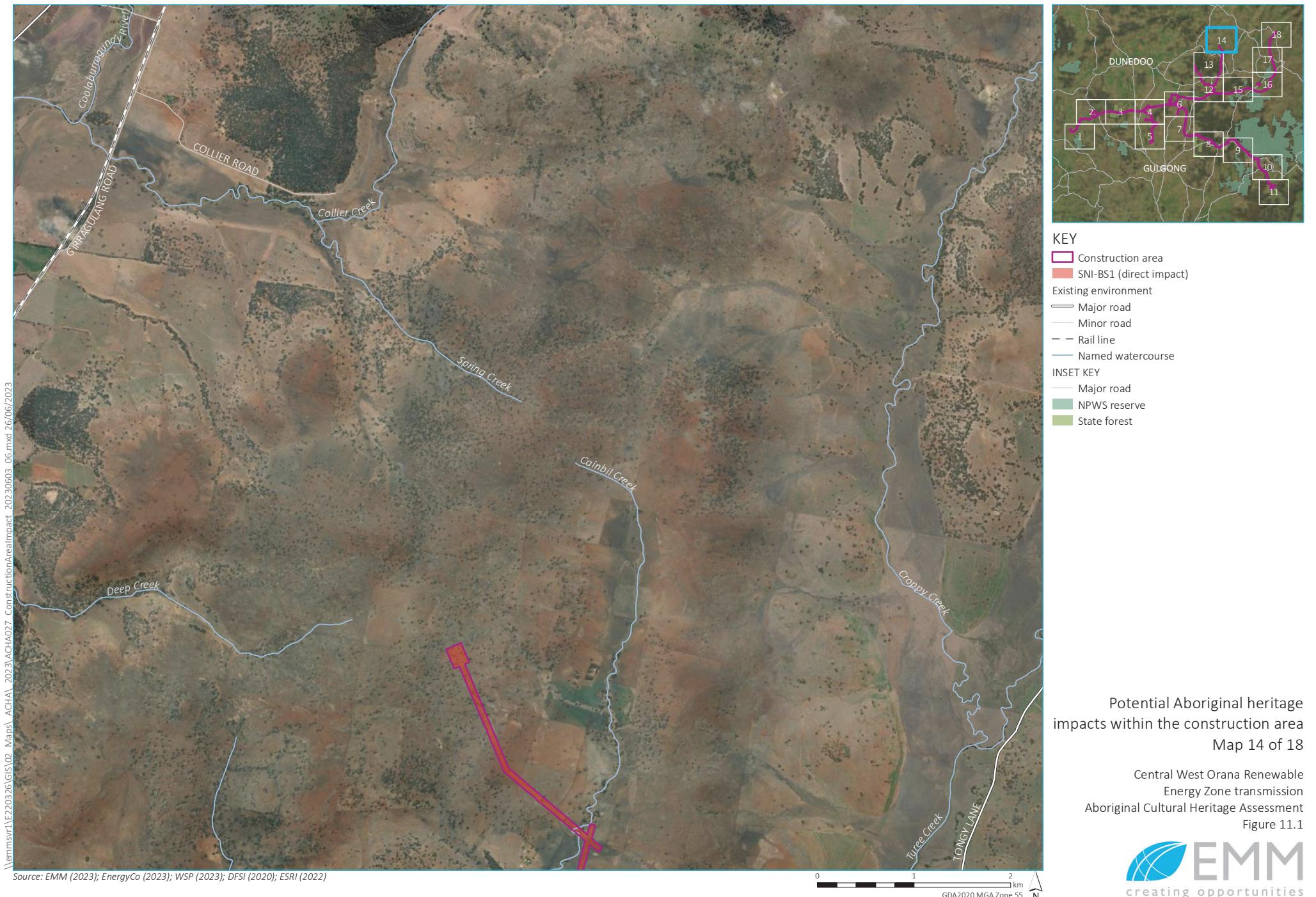
**INSET KEY**

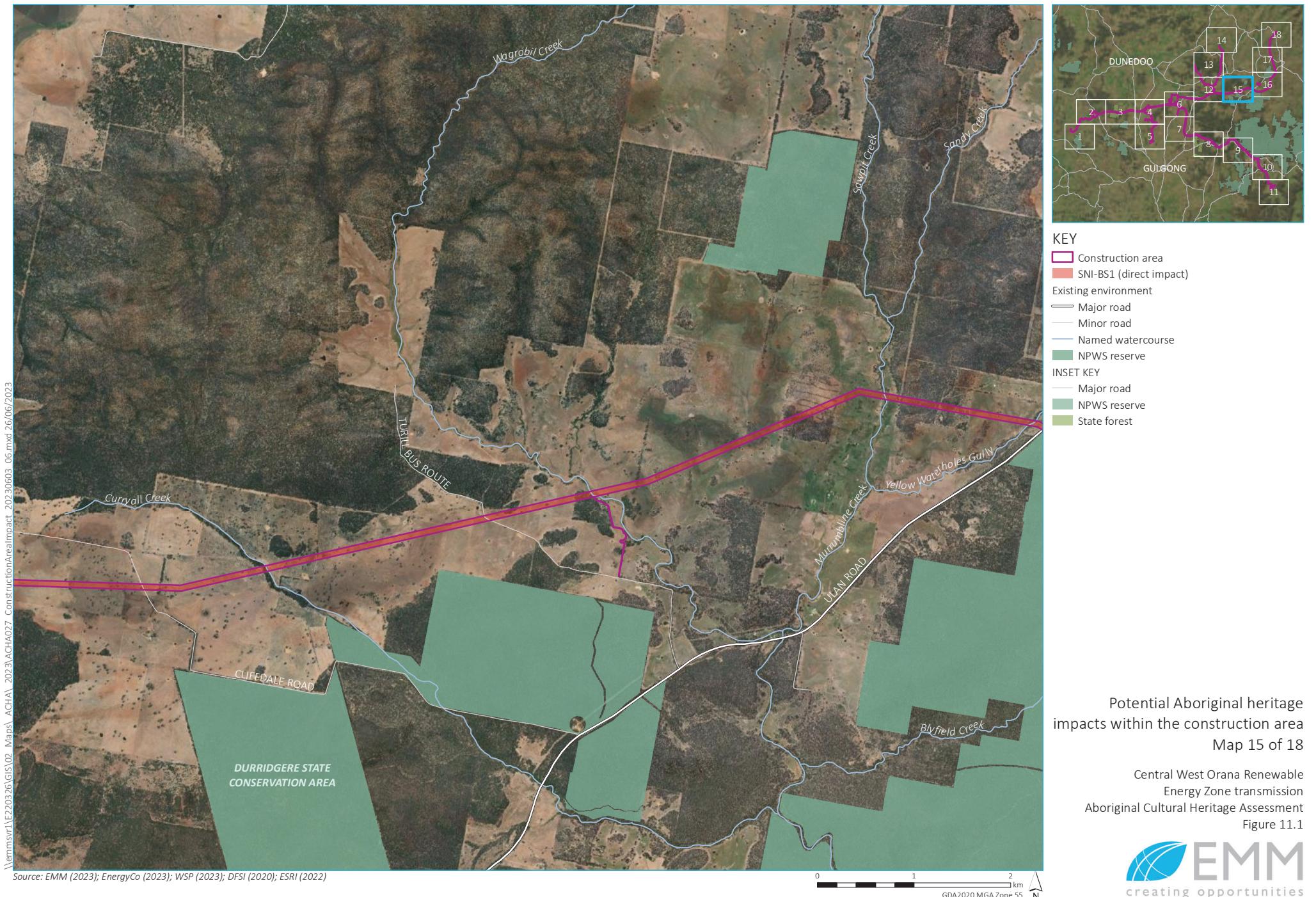
- Major road
- NPWS reserve
- State forest

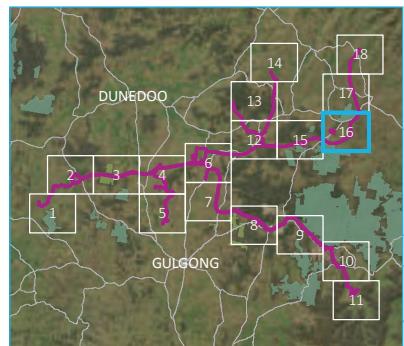
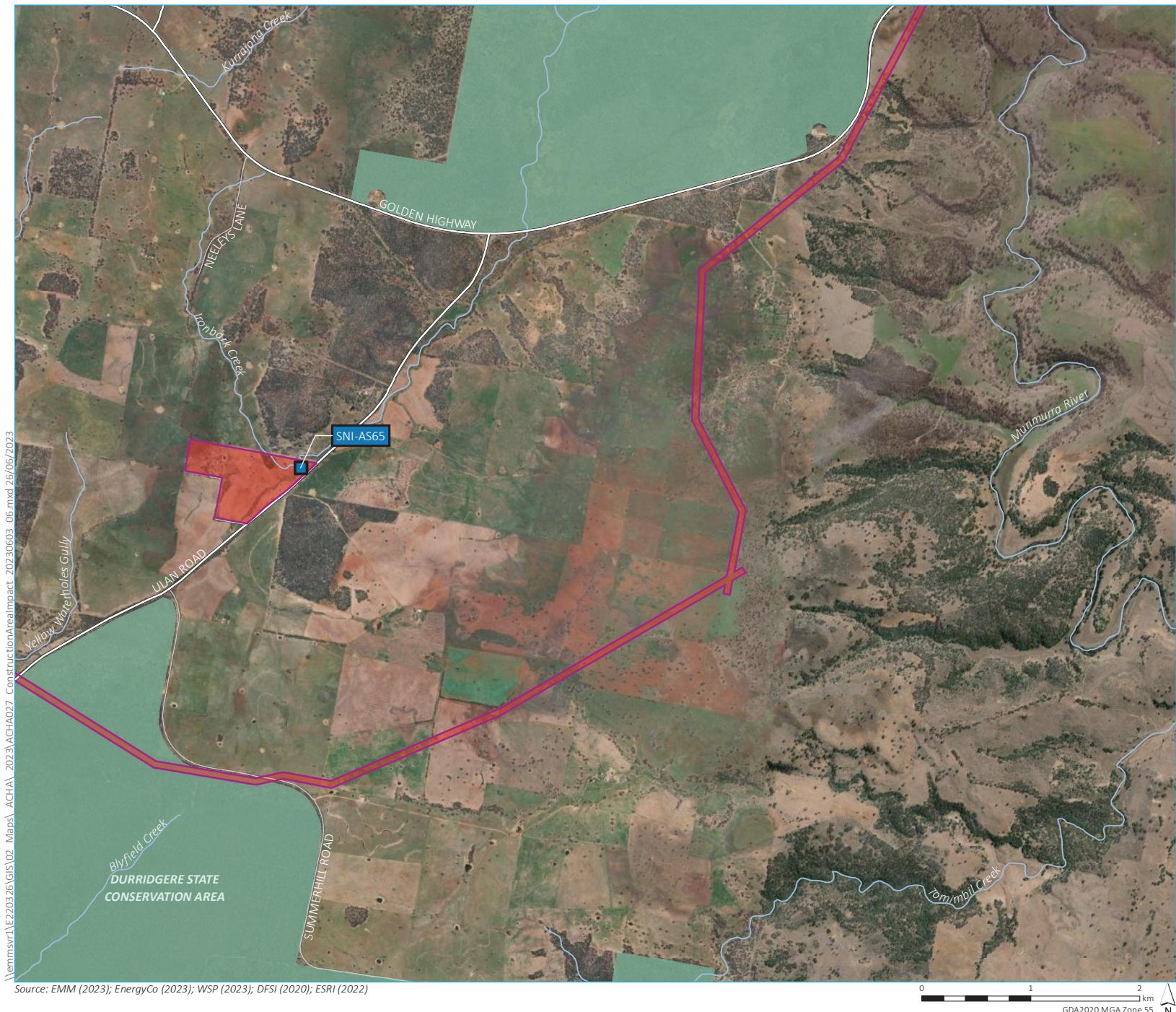
Potential Aboriginal heritage impacts within the construction area  
Map 12 of 18

Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 11.1







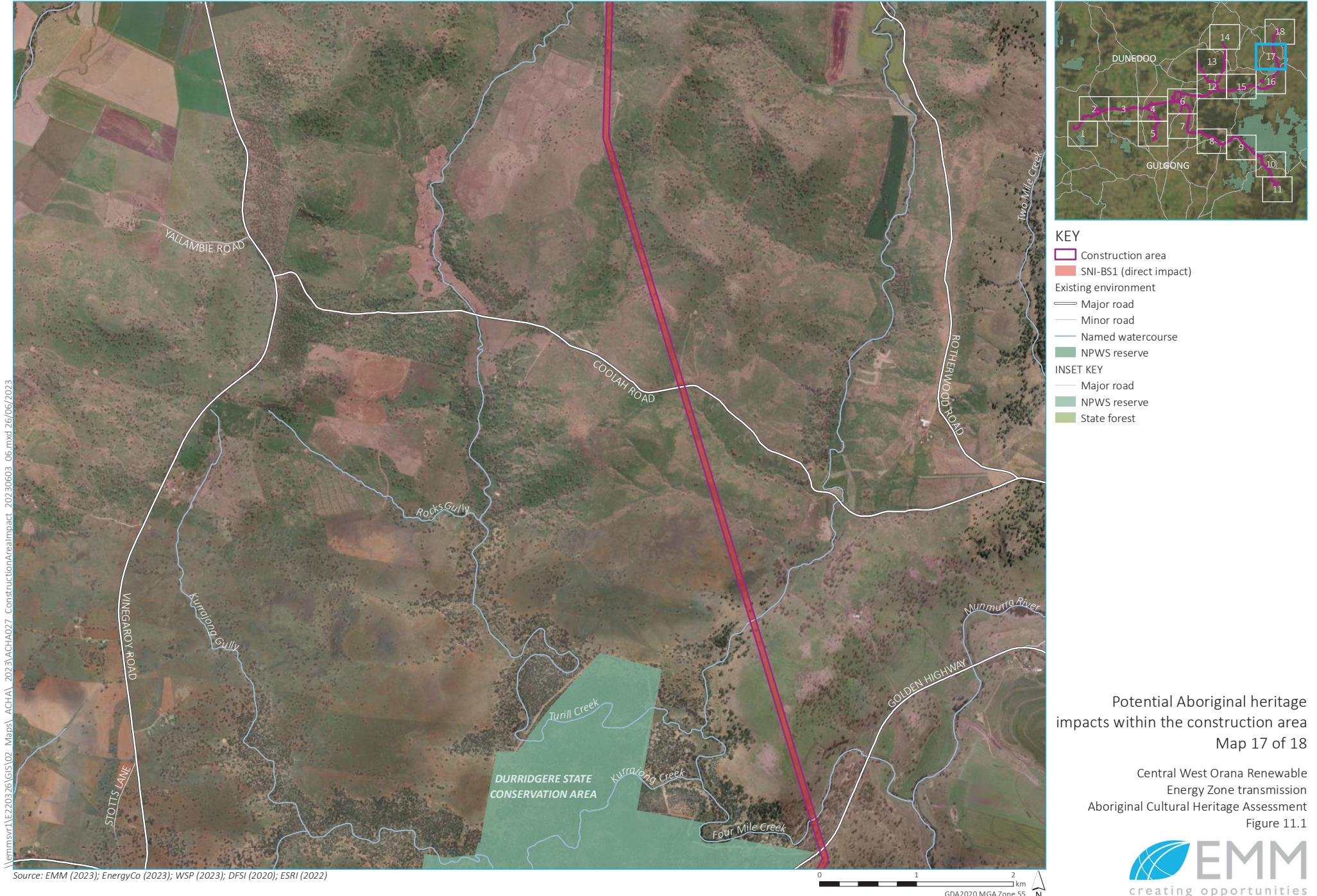


#### KEY

- Construction area
- SNI-BS1 (direct impact)
- Potential impact
  - Partial impact (visual)
- Identified Aboriginal sites
  - Artefact scatter, grinding groove, PAD
- Existing environment
  - Major road
  - Minor road
  - Named watercourse
  - NPWS reserve
- INSET KEY
  - Major road
  - NPWS reserve
  - State forest

Potential Aboriginal heritage impacts within the construction area  
Map 16 of 18

Central West Orana Renewable  
Energy Zone transmission  
Aboriginal Cultural Heritage Assessment  
Figure 11.1





# 12 Management strategy and recommendations

## 12.1 Key findings

The following provides a summary of key activities and/or findings of this Chapter:

- The ACHA concludes that 46 Aboriginal objects and/or sites are within the construction area, along with a complex landscape of buried stone artefactual material (Chapter 9). Thirty-seven of these would be directly affected by the project, based on the assumption of complete ground disturbance and vegetation clearance within the construction area. Some 99.47 ha of zoned probable moderate and high artefact densities would also be directly affected in the vicinity of major creek-lines. EnergyCo is continuing to explore avoidance options for these sites and deposits, and 21 of the moderate and high significant sites (including rockshelters and grinding grooves) are recommended for avoidance and/or impact minimisation.
- Following stakeholder feedback, EnergyCo have identified nine sites that can be avoided, and includes several high value grinding groove sites at the proposed Merotherie energy hub (SNI-GG02-09), and a significant artefact site with associated grinding grooves at the proposed Neelys Lane accommodation camp (SNI-AS65).
- A series of investigative actions are proposed to validate the identification of several of the sites (n=12) and places (multiple creek corridors) that cannot be robustly identified as cultural heritage without additional specialist input and/or further archaeological research (Section 12.3). General discussion on the methods and approaches to some of the mitigation measures is also summarised and presented further in Appendix F.
- Mitigation measures are proposed for inclusion in the project approval to guide post-approval requirements for the protection and management of Aboriginal heritage (Section 12.4; Appendix F). These include the development of an Aboriginal Cultural Heritage Management Plan (ACHMP) to provide a framework for such activities, as well as direction on its content; and the development of an Interpretation Strategy and Plan to provide acknowledgement and other visual/educational opportunities for the Aboriginal and broader local community.
- Timing for the implementation of these recommendations against the project activities is also provided.

## 12.2 Summary of findings and impacts

The assessment outlined in the preceding sections, and including Aboriginal consultation with 39 organisations, included cultural mapping, field survey and test excavations. Each of these activities identified various areas and locales of archaeological and/or cultural value.

Ultimately, on ratifying this data, some 46 Aboriginal objects and/or potential sites were identified within the construction area, as well as a complex pattern of surface and buried stone artefactual material generally focussed on 2nd–4th order water courses. The identified sites include several rockshelters, culturally modified trees, grinding grooves, high and moderate density surface and sub-surface artefact scatters. The remaining cultural material, which included a substantive number of discrete observations were captured by a background scatter encompassing the construction area. There are several notable areas of cultural materials including the banks of Laheys Creek, the interface between Barneys Reef and the surrounding lowlands near Tallawang, a suite of grinding grooves on discrete sandstone dominated hills on the north-west of Merotherie Energy Hub, and an abundance of diverse sites along Wilpinjong Creek.

As well as these identified sites, a substantial number of stone artefacts both on the surface and buried within the upper 0.4 m of the soil profile were documented. These were divided into three main zones:

- Areas within 150 m either side of several identified creek-lines where observed cultural material is prevalent, and more extensive sites should be expected. These include Prospect Creek, Sandys Creek, Laheys Creek, Browns Creek, Whites Creek, Sportsmans Hollow Creek, Deadmans Creek, Bora Creek, Cumbo Creek, Planters Creek, Wilpinjong Creek, Tallawang Creek and Copes Creek.
- The remainder of the construction area where a background scatter of artefacts  $\sim 2\text{-}16/\text{m}^2$  would be expected and considered to reflect the ephemeral use of the region in the past. Previous investigations and field survey identified a number of isolated objects and/or low density artefact scatters that were documented separately (Chapter 9), but were ultimately integrated into this classification.

Several key or highly significant sites were encountered during the survey but, following project refinement, most are now outside of the construction area, including extensive grinding groove sites (SNI-GG11; #36-3-0111), numerous rockshelters and culturally modified trees. Indeed, some 101 Aboriginal objects, sites and places initially found as part of the project are now outside of the construction area; and of the 2,809 previously documented sites within the study area, only 77 (2.74%) would be potentially adversely affected.

To maintain flexibility to facilitate the detailed design, the report has assessed potential impacts based on the entire construction area being subject to disturbance. As such, 37 of 46 identified sites and places would be adversely affected, as well as some 99.47 ha of zones adjacent major creek-lines where high artefact densities may be expected would be directly affected. This would include several high and moderate significant sites, including rockshelters, grinding grooves and culturally modified trees. EnergyCo continues to refine the project design, and it is expected that many of up to 21 (45%) of the cultural assemblage, including the rockshelters and grinding grooves, would be avoided or subject to impact minimisation. Following stakeholder feedback, EnergyCo have identified nine sites that can be avoided, and includes several high value grinding groove sites at the proposed Merotherie energy hub (SNI-GG02-09), and a significant artefact site with associated grinding groves at the proposed Neelys Lane accommodation camp (SNI-AS65).

The project identified six places of cultural value, which included archaeological sites and features, as well as numerous travelling route or song-line across the region; two of these have been specifically identified by the Aboriginal participants and encompass portions of Barney's Reef and Cockabutta Creek. Of these, three are within visual range of the project and may be subject to indirect impacts, including SNI-CS4, SNI-CS5 and SNI-CS6.

Despite these potential impacts, numerous cultural heritage benefits have resulted from the project. These include a significantly improved understanding of the archaeological and scientific understanding of a previously poorly understood locale. Information on the past peopling and their activities within the construction area have now come to light, as well as an improved understanding of contemporary sites and values. Such information will be added to and further refined through future stages of the development of the project.

## 12.3 Further investigations to be undertaken prior to project approval

Several of the Aboriginal sites identified in the field investigations have been provided a tentative status, lacking detailed analysis or agreement amongst the field team as to their anthropogenic origins and/or values. These sites require additional specialist investigation and analysis to either validate them as being of cultural origin or result in their removal as an Aboriginal object. It is proposed that subject to land access constraints, these investigations would be undertaken prior to project approval, and could be integrated into the proposed Aboriginal cultural heritage management plan (ACHMP) (Section 12.4) prior to construction activities commencing if required.

### **12.3.1 Culturally modified trees**

Scarring similar to that which is present on culturally modified trees can also occur via natural processes, such as lightning strike or limb tear.

Given the uncertainty in relation to identified culturally modified trees, it is recommended that additional specialist investigations are undertaken prior to determination of the project, and/or before the commencement of construction via an ACHMP to clarify their status, and ultimately the management of these sites. Such analysis should include, but not be limited to, inspection by an arboriculturist to provide further advice. Typically, an arboriculturist would provide advice on the age of the tree – having to be at least 130 years old to intersect with known traditional tree scarring practises – and identify whether natural mechanisms may explain the scar in question. Where a natural explanation can be identified, the site can be discounted as an Aboriginal site and would no longer form a potential constraint to the Project. Where the arboriculturist cannot provide a natural explanation, it provides increasing evidence that the site is of cultural origin and should be treated as an Aboriginal site with suitable management and mitigation measures.

### **12.3.2 Test excavation of areas within 150 metres of 2nd to 4th order streams**

As outlined in Chapter 9, areas within 150 m of numerous 2nd to 4th order creek-lines have been identified through field investigations as having a higher likelihood of containing significant cultural materials (Figure 9.1). While test excavations have been adequate to identify this zone of potential, it was not robustly characterised by the current investigations. Additional test excavations prior to direct impacts in this zone should be undertaken prior to construction to further refine the areas of archaeological potential, and to continue to inform the project.

Any project elements proposed within 150 m of Prospect Creek, Sandys Creek, Laheys Creek, Browns Creek, Whites Creek, Sportsmans Hollow Creek, Deadmans Creek, Bora Creek, Cumbo Creek, Cockabutta Creek, Planters Creek, Wilpinjung Creek, Tallawang Creek and Copes Creek should be subject to further test excavations to further characterise deposits that may be directly impacted.

The methods for the archaeological excavations are presented in detail in Appendix F but would include a high-resolution systematic grid of test pits spaced 20–25 m across targeted sections of the construction area and/or proposed project elements. Excavations would be undertaken manually in discrete test pits (1 m<sup>2</sup>), use 10 cm spits for recovery, sieve all sediment through a 5 mm mesh, recover suitable palaeo environmental and chronological sampling, and undertake appropriate recording.

## **12.4 Post-approval requirements**

For the purposes of this project, recommendations below include development of an Aboriginal cultural heritage management plan (ACHMP) to provide the post-approval management framework for all future Aboriginal heritage requirements for the project. Specific components to be included in the ACHMP are outlined in the recommendation, with guiding principles for management of identified archaeological site types to be incorporated into the ACHMP presented in Appendix F. To maintain flexibility to facilitate the detailed design, a key component of the ACHMP is to maximise the conservation and retention of identified Aboriginal sites and places prior to construction. Each of these requirements should be developed in consultation with the Aboriginal participants in the project and Heritage NSW.

In addition to the tangible cultural materials within the construction area, a wide range of intangible and cultural values were identified which the Aboriginal participants frequently had more interest and concern about. Given this focus during the consultation process, and the potential impact to cultural sites and places, it is recommended that an interpretation strategy, interpretation plan, and their implementation to explore, develop and present Aboriginal heritage values of the site, be undertaken. As with the ACHMP, guiding principles to be integrated into these documents are presented in Appendix F.

## 12.5 Mitigation measures

Based on the findings of the ACHA (Section 12.2), Table 12.1 provides a series of recommendations to be implemented for the project. These should be read in conjunction with guiding principles in Appendix F.

**Table 12.1 Management and mitigation measures for Aboriginal cultural heritage.**

Reference	Impact	Mitigation measure	To be implemented prior to or on completion	Applicable location
AH1	Impact avoidance and minimisation	<p>The project will avoid impacts to the following identified Aboriginal objects and/or sites within the construction area:</p> <ul style="list-style-type: none"> <li>• the proposed workforce accommodation camps and construction activities at the Merotherie Energy Hub will establish a heritage protection zone to avoid SNI-GG02-GG09 inclusive</li> <li>• the proposed workforce accommodation camps and construction activities at Neeley's Lane will establish a heritage protection zone to avoid SNI-AS65</li> <li>• a protection zone will also be implemented at the Elong Elong energy hub to protect cultural material within 150 m of the eastern bank of Laheys Creek (excluding the unavoidable impacts associated with the crossing of Laheys Creek by the transmission corridor, which will be minimised).</li> </ul> <p>Some guiding principles for consideration of avoidance are presented in Appendix F of Technical paper 5 (Aboriginal cultural heritage assessment report)</p>	Pre-construction Construction	SNI-GG02 – GG09 inclusive, SNI-AS65; and 150 m of Laheys Creek
AH2	Impact avoidance and minimisation	<p>The project will investigate the micro-siting of project infrastructure and construction activities in consultation with an Aboriginal heritage specialist to avoid or minimise impacts to:</p> <ul style="list-style-type: none"> <li>• rockshelters (#36-3-3794, #36-3-0449, #36-3-0570, #36-3-3790, SNI-RS01 – RS04 inclusive)</li> <li>• grinding groove sites (SNI-GG01 and SNI-GG15)</li> <li>• a culturally modified tree (SNI-CMT02)</li> <li>• high-density stone artefact sites (#36-3-1140, #36-3-1141), and</li> <li>• 150 m of Prospect Creek, Sandys Creek, Browns Creek, Whites Creek, Sportsmans Hollow Creek, Deadmans Creek, Bora Creek, Cumbo Creek, Cockabutta Creek, Planters Creek, Wilpinjung Creek, Tallawang Creek and Copes Creek.</li> </ul> <p>Some guiding principles for consideration of avoidance and/or impact minimisation are presented in Appendix F of Technical paper 5 (Aboriginal cultural heritage assessment report).</p>	Pre-construction Construction	#36-3-3794, #36-3-0449, #36-3-0570, #36-3-3790, SNI-RS01 – RS04 inclusive, SNI-GG01, SNI-GG15, SNI-CMT02, #36-3-1140, #36-3-1141, areas within 150 m of Prospect Creek, Sandys Creek, Browns Creek, Whites Creek, Sportsmans Hollow Creek, Deadmans Creek, Bora Creek, Cumbo Creek, Cockabutta Creek, Planters Creek, Wilpinjung Creek, Tallawang Creek and Copes Creek

**Table 12.1 Management and mitigation measures for Aboriginal cultural heritage.**

Reference	Impact	Mitigation measure	To be implemented prior to or on completion	Applicable location
AH3	Impact avoidance and minimisation	On-Country meetings will be undertaken with participating Elders and key knowledge-holders of the project to discuss any potential view-line impacts of the project and places of cultural value, and their subsequent management.	Pre-construction Construction	SNI-CS4 – CS6 inclusive, and travelling routes #1 and #5 where they intersect the construction area.
AH4	Cultural heritage management	An Aboriginal Cultural Heritage Management Plan (ACHMP) will be developed by an Aboriginal heritage specialist in consultation with the Registered Aboriginal Parties (RAPs) and Heritage NSW.  The contents and guiding principles for the management of identified site types for the ACHMP are presented in Appendix F of Technical paper 5 (Aboriginal cultural heritage assessment report), and include: <ul style="list-style-type: none"><li>• processes, timing, communication methods and project involvement for maintaining Aboriginal community consultation and participation through the remainder of the project</li><li>• inputs and content of a cultural heritage induction package for all construction personnel and subcontractors</li><li>• descriptions and methods for archaeological test/salvage excavations of rockshelters, stone artefact scatters, potential archaeological deposits, and cultural deposits that will be adversely affected by the project</li><li>• descriptions and methods for surface collection of identified isolated objects and stone artefact scatters that will be adversely affected by the project</li><li>• descriptions and method for mitigation and/or recovery of grinding grooves and culturally modified trees that will be adversely affected by the project</li><li>• delineating and protecting Aboriginal and cultural sites within or in close proximity to the construction area, including clear marking, appropriate screen for any gender-specific areas, surface protection, etc</li><li>• procedures for managing the unexpected discovery of Aboriginal objects, sites and/or human remains during the project</li><li>• procedures for the curation and long-term management of recovered cultural materials</li><li>• methods of post-excavation analysis and reporting of the archaeological investigations, including suitable collection and processing of stone artefacts, palaeo-environmental, chronological and other soils from archaeological activities; and</li><li>• a monitoring regime for implementing the above measures.</li></ul>	Pre-construction Construction	Construction area, and all identified Aboriginal objects, sites and deposits in the Chapter 9 of Technical paper 5 that will be adversely impacted by the project.

**Table 12.1 Management and mitigation measures for Aboriginal cultural heritage.**

Reference	Impact	Mitigation measure	To be implemented prior to or on completion	Applicable location
AH5	Cultural heritage management	Additional archaeological field survey will be undertaken of the portions of the construction area inaccessible during the Aboriginal cultural heritage assessment. Any identified Aboriginal objects, sites, places and/or deposits during these works will be integrated into the ACHMP (AH04).	Pre-construction	Previously unsurveyed portions of the construction area
AH6	Cultural heritage management	Where construction is unable to avoid areas within 150 m of Prospect Creek, Sandys Creek, Browns Creek, Whites Creek, Sportsmans Hollow Creek, Deadmans Creek, Bora Creek, Cumbo Creek, Cockabutta Creek, Planters Creek, Wilpinjung Creek, Tallawang Creek and Copes Creek, archaeological test excavations will be undertaken.  Test excavations will adopt the methods outlined in Appendix F and/or developed in the ACHMP (AH04). The findings of the test excavations will be integrated into the ACHMP (AH04).	Pre-construction	The construction area, where it is located within 150 m of Prospect Creek, Sandys Creek, Laheys Creek, Browns Creek, Whites Creek, Sportsmans Hollow Creek, Deadmans Creek, Bora Creek, Cumbo Creek, Cockabutta Creek, Planters Creek, Wilpinjung Creek, Tallawang Creek, and Copes Creek
AH7	Cultural heritage management	An inspection will be undertaken by a qualified arboriculturist of all tentatively identified culturally modified trees to confirm whether they have formed through anthropogenic or natural processes. Where identified as of cultural formation, they will be integrated into the ACHMP (AH04).  The findings of this investigation and subsequent management of the trees confirmed as being culturally modified will be integrated into the ACHMP (AH04) as required.	Pre-construction	#36-3-0565, #36-6-0626, #36-3-0638, #36-3-0103, #36-3-0643, SNI-CMT01, SNI-CMT02, SNI-CMT03, SNI-CMT06, SNI-CMT08, SNI-CMT11, SNI-CMT13, SNI-CMT15
AH8	Cultural heritage management	Archival recording will be undertaken of all rockshelters, grinding grooves, and culturally modified trees that may be adversely impacted by the project.  Archival recording will be undertaken in accordance with relevant Heritage NSW guidelines.	Pre-construction	#36-3-3794, #36-3-0449, #36-3-0570, #36-3-3790, SNI-RS01 – RS04 inclusive, SNI-GG01, SNI-GG15, #36-3-1140, #36-3-114; and as required following AH03: #36-3-0565, #36-6-0626, #36-3-0638, #36-3-0103, #36-3-0643, SNI-CMT01, SNI-CMT02, SNI-CMT03, SNI-CMT06, SNI-CMT08, SNI-CMT11, SNI-CMT13, SNI-CMT15

**Table 12.1 Management and mitigation measures for Aboriginal cultural heritage.**

Reference	Impact	Mitigation measure	To be implemented prior to or on completion	Applicable location
AH9	Heritage interpretation	<p>An Aboriginal heritage-interpretation strategy and plan will be developed by an Aboriginal heritage specialist, in consultation with Registered Aboriginal Parties, which will identify the interpretive values of the construction area (and specifically Aboriginal heritage values) and provide direction for interpretive installations and devices.</p> <p>The contents and guiding principles for the management of the strategy and plan are presented in Appendix F of Technical paper 5 and include the need to incorporate Registered Aboriginal Parties' views on traditional and contemporary values, local ethnographic and post-Contact information, and archaeological data developed for the project.</p>	Construction Post-construction	Construction area
AH10	Aboriginal engagement	Consultation will be maintained with the Registered Aboriginal Parties during the finalisation of the assessment process and subsequent stages of the project where cultural heritage requires management.	Pre-construction Construction	-
AH11	Administrative	A copy of the Aboriginal cultural heritage assessment report and all relevant AHIMS site recording forms and information for the project will be lodged with Heritage NSW and provided to each of the RAPs.	Pre-construction Construction	All Aboriginal objects, sites and places described in Chapter 9 of Technical paper 5.

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# Abbreviations

AHD	Australian Height Datum
ACHA/ACHAR	Aboriginal cultural heritage assessment report
AHIMS	Aboriginal Heritage Information Management System
ACHMP	Aboriginal Cultural Heritage Management Plan
BP	Years before present
c.	circa
cm	centimetres
CWO REZ	Central-West Orana REZ - a geographic area of approximately 20,000 square kilometres centred by Dubbo and Dunedoo and extending west to Narromine and east beyond Mudgee and to Wellington in the south and Gilgandra in the north, that will combine renewable energy generation, storage and HV transmission infrastructure to deliver energy to electricity consumers
DEC	Department of Environment and Conservation, now Heritage NSW
DECCW	Department of Environment Climate Change and Water, now Heritage NSW
DPC	Department of Premier and Cabinet
DPE	Department of Planning and Environment
DPIE	Department of Planning, Industry and Environment, now DPE
EIS	Environmental Impact Statement
EMM	EMM Consulting Pty Ltd
EnergyCo	The Energy Corporation of New South Wales constituted by section 7 of the <i>Energy and Utilities Administration Act 1987</i> as the NSW Government-controlled statutory authority responsible for the delivery of NSW's REZs.
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
ESD	Ecologically sustainable development
FGS	Fine grained siliceous
g	grams
GIS	geographical information system
GPS	global positioning system
ha	hectare
ICOMOS	International Council on Monuments and Sites
IMTC	Indurated mudstone/tuff/chert
km	kilometres
LALC	Local Aboriginal Land Council
LEP	Local Environmental Plan
LGA	Local Government Area

## Abbreviations

m	metres
$m^2$	square metres
mm	millimetres
n	Number
NSW	New South Wales
OEH	Office of Environment and Heritage, now Heritage NSW
PAD	Potential archaeological deposit
RAP	Registered Aboriginal Party
REZ	Renewable Energy Zone - a geographic area with high-quality variable renewable energy resources (such as wind and solar), suitable topography and land use designations for development, and demonstrated interest from project developers.
SEARs	Secretary's Environmental Assessment Requirements
t	Tonne
TP	Test pit

# Glossary

Many of these definitions have been taken from the *Code of Practice for archaeological investigation of Aboriginal objects in NSW* (DECCW 2010).

**Aboriginal object:** A physical manifestation of past Aboriginal activity. The legal term is defined in the *National Parks and Wildlife Act 1974* Section 5 as: any deposit, object or material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of the area that comprises New South Wales, being habitation before or concurrent with (or both) the occupation of that area by persons of non-Aboriginal extraction, and includes Aboriginal remains.

Typical examples include stone artefacts, grinding grooves, Aboriginal rock shelters which by definition include physical evidence of occupation, midden shell, hearths, stone arrangements and other landscape features which derive from past Aboriginal activity.

**Archaeological survey:** A method of data collection for Aboriginal heritage assessment. It involved a survey team walking over the land in a systematic way, recording information. Activities are not invasive or destructive.

**Aboriginal culturally modified tree:** A tree of sufficient age to have been mature at the time of traditional Aboriginal hunter-gatherer life and therefore generally of more than 220 years ago with evidence of bark or cambium wood removal for the purpose of implement manufacture, footholds, bark sheet removal for shelter, or extraction of animals or other food. Care must be taken to distinguish Aboriginal scars from the much more common natural causes of branch tear, insect attack, animal impact, lightning strike and dieback. Culturally modified tree recognition guidelines exist to distinguish these features. Naturally scarred trees are often misidentified as Aboriginal culturally modified trees.

**Aboriginal site:** The location where a person in the present day can observe one or more Aboriginal objects. The boundaries of a site are limited to the extent of the observed evidence. In the context of this report a ‘site’ does not include the assumed extent of unobserved Aboriginal objects (such as archaeological deposit). Different archaeologists can have varying definitions of a ‘site’ and may use the term to reflect the assumed extent of past Aboriginal activity beyond visible Aboriginal objects. Such use of the term risks defining all of Australia as a single ‘site’.

**Aboriginal stone artefact:** A stone object with morphological features derived from past Aboriginal activity such as intentional fracture, abrasion or impact. Artefacts are distinguished by morphology and context. Typically flaked stone artefacts are distinguished from naturally broken stone by recognition of clear marginal fracture initiation (typically hertzian/conchoidal or wedging initiation) on highly siliceous stone types which can often be exotic to the area. Care must be taken to distinguish modern broken stone in machine impacted contexts and therefore context must be carefully considered as well as morphology.

**Aggradation:** a term used in geology for the increase in land elevation, typically in a river system, due to the deposition of sediment.

**AHIMS:** Aboriginal Heritage Information Management System — a computer software system employed by the Office of Environment and Heritage to manage many aspects of Aboriginal site recording and permitting. AHIMS includes an Aboriginal sites database which can be accessed via an internet portal.

**Archaeological deposit:** Aboriginal objects occurring in one or more soil strata. The most common form of archaeological deposit relates to the presence of a single conflated layer of Aboriginal stone artefacts worked into the topsoil through **bioturbation**.

**Backed artefact:** A thin flake or blade-flake that has been shaped by secondary flaking (**retouch**) along one lateral margin. The retouched margin is typically steep and bipolar to form a blunt ‘back’ in the manner of a modern scalpel blade. Distinctive symmetrical and asymmetrical forms are typically found called geometric **microliths** and Bondi points respectively. A thick symmetrical form, called an Elouera, is typically the size of a mandarin segment.

**Bioturbation:** is the reworking of soils and sediments by animals or plants. Its effects include changing texture of sediments (diagenetic), bio irrigation and displacement of microorganisms and non-living particles.

**Bipolar flaking:** Where the stone to be worked is rested on an anvil or other stone before being hit by the hammerstone. This results in the presence of negative flake scars on both ends of the core.

**Bondi point:** See backed artefact definition.

**Brown podosols:** Topsoils have loamy textures. A2 horizons are common, there is a clear boundary onto the B horizon. They have a sandy clay to heavy clay texture (typically occur on upper and mid-slopes).

**Chocolate Soils:** Soils that are typically formed in a basaltic parent material where slope or bedrock strata influence drainage. Surface horizons comprise loam, clay loam or silty clay loam. There is a gradual boundary to a brown or brownish black B horizon. There is no A2 horizons.

**Conchoidal:** A term used in relation to fracture surfaces on Aboriginal stone artefacts - bulb-like in the manner of a bulbous protrusion on a bivalve shell.

**Elouera:** See backed artefact definition.

**Eraillure scar:** The small flake scar on the dorsal side of a flake next to the platform. It is the result of rebounding force during percussion flaking.

**Exposure:** estimates the area with a likelihood of revealing buried artefacts or deposits, not just an observation of the amount of bare ground.

**Geometric microlith:** See backed artefact definition.

**Grinding grooves:** Grinding grooves typically derive from the sharpening of stone hatchet heads on sandstone rock. Grooves appear as elliptical depressions of around 25 cm length with smooth bases. Although mostly occurring in association with water to wash the abraded stone dust away from the groove, such sites have been recorded away from water. Narrow grooves or broad abraded areas may occur less commonly and may be derived from spear sharpening or other grinding activities.

**Haematite:** a pigment featured in ochre used for tinting with a permanent colour.

**Holocene:** A period of time generally 10,000 years, which marks the end of the last ice age, to the present.

**Igneous:** relating to or involving volcanic or plutonic processes.

**Indurated mudstone/tuff (IMT):** the fine textured, very hard, yellowish, orange, reddish-brown or grey rocks from which stone artefacts are made.

**Isotropic:** Having a physical property that has the same value when measured in different directions. In relation to stone used for stone tools a fracture path is not hindered by layer boundaries or other favoured plane of cleavage.

**Keeping place:** A room or facility with the express and exclusive purpose of storing Aboriginal cultural heritage materials with accompanying documentation in a secure and accessible manner which protects their cultural heritage values.

**Knapping:** This term is used in reference to stone tool production. Specifically, it relates to the production and shaping of a block of stone (e.g. a cobble) into a stone tool. The process is called knapping, while the individual undertaking the task is often called a knapper. A knapping floor or event often referenced in the literature relates to an archaeological deposit, usually of high densities of stone artefacts, where researcher's believe this process has occurred in a given locale.

**Krasnozems:** Mainly loams, clay loams and silty clay loams with a clear or gradual boundary to a dark reddish brown B horizon. Clays are typically light to medium and occasionally heavy.

**Lithosols:** Soils that have little or no profile development. They occur on steep slopes and are usually shallow and are left mainly as uncleared native bushland.

**Microlith:** Very small fragments of flakes retouched into geometric shapes and usually present on tools like barbed spears, arrows and sickles.

**Midden:** A collection of shells and associated economic remains resulting from Aboriginal food gathering and processing activity. Middens comprise shellfish remains of consistent size in a rich dark earth matrix commonly associated with stone artefacts, fish bone and animal bone although shells are commonly the most obtrusive element.

**Open stone artefact site/stone artefact site:** An unenclosed area where Aboriginal stone artefacts occur – typically exposed from a topsoil archaeological deposit by erosion. Typically the term is used to refer to two or more artefacts although this is an arbitrary distinction. A general ‘rule of thumb’ boundary definition employed by archaeologists is that artefacts or features more than 50 m apart are regarded as separate sites, however there is no theoretical imperative dictating such a rule. (The 50 m separation rule is used for the most part in EMM’s work).

**Pirri point:** A leaf-shaped stone implement with unifacial retouch extending from the lateral margins to a central keel running the length of the dorsal surface.

**Pleistocene:** A period of time 2.6 million years ago to 10,000 years ago. Reference to ‘Pleistocene sites’ generally means reference to sites older than 10,000 years.

**Podosols:** Soils with accumulations of organic matter, iron and aluminium. They are usually sand textured to depth. Yellow and red podosols are generally acid neutral. Yellow podosols have coarse to medium textured A horizons.

**Point cluster:** A group of GPS points used to identify the locations of individual artefacts in the field.

**Potential Archaeological Deposit (PAD):** An area where there is an inferred presence of Aboriginal objects in the soil based on the environmental context which is typically associated with discovery of Aboriginal objects in analogous areas. This is not strictly a ‘site’ type, although AHIMS records it as such for the purpose of associating Aboriginal heritage Impact Permits with geographical areas.

**Red podosols:** Podosols with a pronounced texture contrast and clear to abrupt boundaries between A and B horizons. A2 is often massive and gravelly.

**Retouch:** The modification of the edges of a flake or tool by the removal of a series of small flakes.

**Siliceous Sands:** Sands that are usually found on coarse-grained sandstones and in sandstone colluvium. They are often sandstone outcrops present in the landscape. The topsoil has a loamy sand to light sandy clay.

**Scarp:** a steep slope characterised by outcropping bedrock. In this report, scarp refers to a combination of landform elements including scarp foot slopes, scarps, and cliff lines where outcropping sandstone is present in the landscape 10% and above.

**Spit/s:** This term reflects an arbitrary unit of depth that archaeologists excavate when lacking evidence of a stratigraphy within the soil profile. Commonly, archaeologists remove vertical intervals of 5, 10 or 20 cm, each representing a spit, down the soil profile. Through this process, archaeologists can determine the depth at which archaeological materials are found, even in soil profiles with no clear divisions or boundaries.

**Spur:** the lateral crests of land that descend from the summit of hills or ridges. Spurs typically extend, with decreasing elevation, closer to streams and valley floors than the main crest of a hill.

**Taphonomic:** the events and processes, such as burial in sediment, leading to the degradation, decomposition or preservation of objects.

**Thumbnail scraper:** A thumbnail sized thin flake with steep unidirectional retouch or use-wear around a convex working edge.

**Transect:** A sample unit which is walking line or corridor across the study area.

**Upsidence:** phenomena of uplift in the ground surface that can occur when underground mining approaches and undermines river valleys. It can result in cracking and buckling of river beds and rock bars and localised loss of water flow.

**Visibility:** The amount of bare ground on exposures which might reveal artefacts or other archaeological materials.

**Yellow earths:** predominantly sandy-textured soils with earthy porous fabric, weak profile differentiation and gradual or diffuse boundaries except for the darker A1 horizon.

**Yellow podzols:** Podosols which typically occur on the upper slopes of steep landscapes and on the mid to lower slopes of others. The A2 soil horizon is present in most profiles and the boundary change to the B horizon is generally clear. The B horizon is typically sandy clay to heavy clay.