Appendix 12 First Nations Tangible Underwater Cultural Heritage Due Diligence Assessment

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BEEHIVE Project
Western Australia
First Nations Tangible Underwater Cultural Heritage
Due Diligence Assessment

FINAL

This Due Diligence Assessment (DDA) provides advice on the potential impacts to tangible underwater cultural heritage (UCH) arising from the activities related to an exploration well, BEEHIVE-1, in Bonaparte Gulf, Western Australia.

The purpose of this DDA is to assess tangible heritage risk and advise if a full data review and assessment is required.

This DDA only address tangible Aboriginal underwater cultural heritage expressed as …*traces of human existence* … as defined in the Commonwealth *Underwater Cultural Heritage Act 2018*.[1] In the context of this assessment tangible UCH refers to archaeological sites that have become inundated during sea level rise in the late Pleistocene.

Intangible First Nations UCH is not addressed in this due diligence assessment. Intangible refers to oral histories, songlines, dreaming narratives, and other forms of cultural memories associated with landforms that are now submerged.

Maritime Heritage in the form of shipwrecks has also not been assessed in this DDA.

This DDA has been prepared from the following documentation provided by the client:

- EOG Resources and EGS Group, February 2023; *Beehive-1 Wellsite Clearance Letter for Drilling Hazards Assessment*. Report Number: RT-PRO-108-2021035 Revision 2.0
- Fugro, December 2022; *Geophysical Site Investigation – Beehive Pre-Drill Survey. Bonaparte Basin: Volume 2 – Interpretation (Survey Results) Report*. 206084-1-052-REP-006 1. Includes Appendices C and D as well as Charts and Drawings.
- EOG Resources and EGS Group, November 2021; *Beehive Regional Shallow Hazards Assessment*.

[1] Underwater Cultural Heritage Act 2018 Part 1, Division 2, Section 15

Location of proposed seabed works

EOG Resources is proposing to undertake drill exploration of BEEHIVE-1 in 2024. The proposed wellsite location is at:

WELL BEEHIVE-1	GDA2020		WGS84 UTM 52 South	
	Longitude	***Latitude***	***Easting***	***Northing***
	128°34'18.51"E	14°03'23.74"S	453770.24	8445972.64

It is understood that this location is located 250 m southeast of that shown in Figure 3.

It is understood that 2 other locations, WHP -1 and WHP-2, within the BEEHIVE-1 site boundary are nominal locations for future work.

Proposed seabed disturbance

The planned operation is to spud an exploration well from the three-legged jack up rig Valaris–107. The spuds can penetrate up to 10 m into a sandy/silty seabed. The planned drill hole has a diameter of 36".

BEEHIVE-1 surrounding area

The BEEHIVE-1 well is located within Joseph Bonaparte Gulf in water depths of 45.6 m below sea level, and ~80 km from the present coastline. The Joseph Bonaparte Gulf (including the Cambridge Gulf) is a large embayment, approximately 300 km east-west and 120 km north-south with regional Northwest Shelf located to the northeast. Several large rivers including the Durack, Pentecost, and Ord rivers drain into Cambridge Gulf, while the Victoria and Fitzmaurice rivers drain into the Joseph Bonaparte Gulf. Sediments within the Gulf are terrigenous inshore and grading to carbonates offshore.

Local sea level curve

A locally derived sea level curve spanning the last 80,000 years shows the relative and changing position of BEEHIVE -1 wellsite to the ancient shorelines. Around the time of first Human arrival around 65,000 years ago sea level was approximately 80 m lower than present and BEEHIVE -1 wellsite located around 85 km inland of the ancient coastline. BEEHIVE -1 wellsite became a coastal environment for a period between 60,000 and 50,000 yeas BP and gradually becoming situated further inland as sea level continued to fall until the peak of the last glacial maximum (LGM) around 18,000 years BP. At this time the BEEHIVE -1 wellsite was situated 450 km from open marine coastal environments, however it was proximal to (approx. 100 km) a large lacustrine system that likely formed within the Bonaparte basin fed by river systems that drained the hinterland catchments. The termination of the LGM saw rapid sea level rise with the BEEHIVE-1 site becoming inundated at around 13,500 years BP.

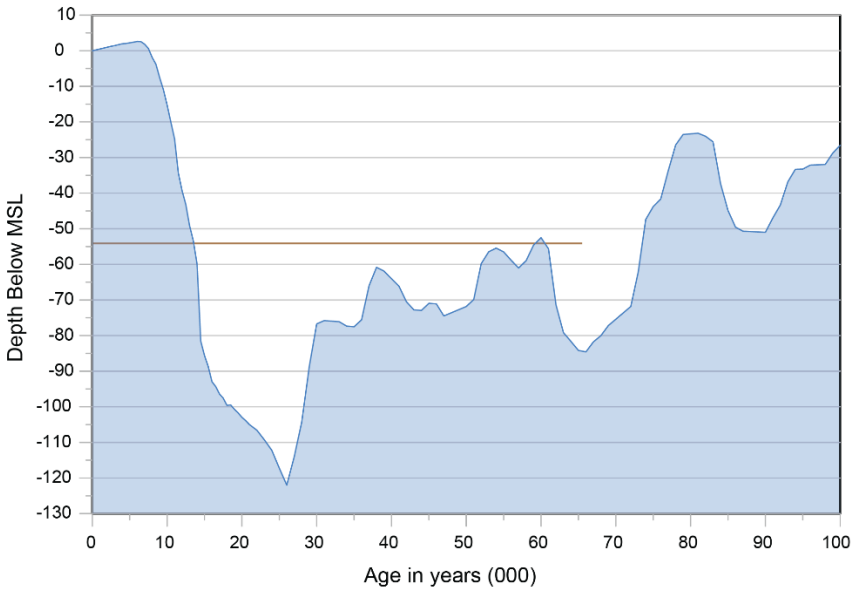


Figure 1: Sea level curve with the brown line showing the elevation of the antecedent Pleistocene land surface at BEEHIVE-1 well site compared to the palaeosea level record, the length of the line representing the duration of occupation.

Regional landscape reconstructions

Despite terrigenous sedimentation along the inner gulf during the mid to late Holocene, regional scale bathymetry still provides some evidence of the preinundaiton landscapes and associated palaeoenvironments. The inner margin of the Joseph Bonaparte Gulf is characterised by a relatively flat and seaward sloping terrain. Remnant palaeochannels can be seen incising the shelf, the most prominent being the palaeoVictoria river system which passes about 30 km to the east of BEEHIVE-1. Smaller palaeochannels are intermittently exposed at the seabed likely representing the palaeoKeep/Sandy river systems which appear to flow in the direction of the BEEHIVE-1 well site. Palaeodrainage channels appear to become less prominent at sea floor depths > 40 m, the likely result of channels becoming less entrenched and/or becoming buried by marine sediments.

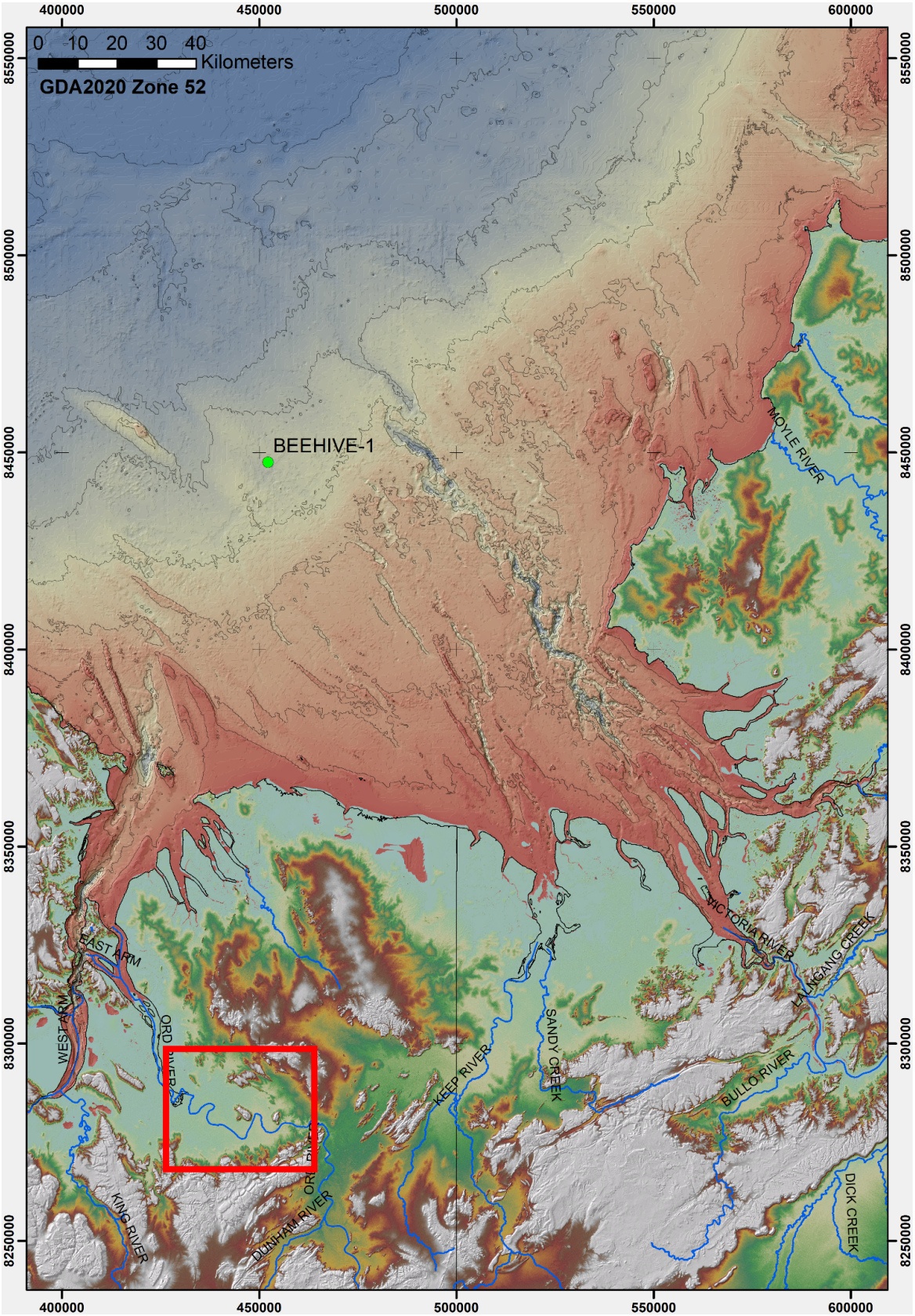


Figure 2: Terrestrial and submerged landscapes of the Joseph Bonaparte Gulf. Depth contours representing 10 m intervals. Red box shows location of figure 5.

Local Geomorphology

The antecedent Pleistocene landscapes around the BEEHIVE-1 well site have been buried by Recent marine sedimentation. A large low relief sand body is situated to the immediate north and east of BEEHIVE-1 at a depth of -44 to -45 m below mean sea level (bmsl) with what appears to be sand wave forming to the west. An interpretation of the subbottom survey data suggest the swales between sand waves may represent outcropping preinundation land surface at the seabed (at depths of -48 to -49 m bms) though no distinctive landforms are evident.

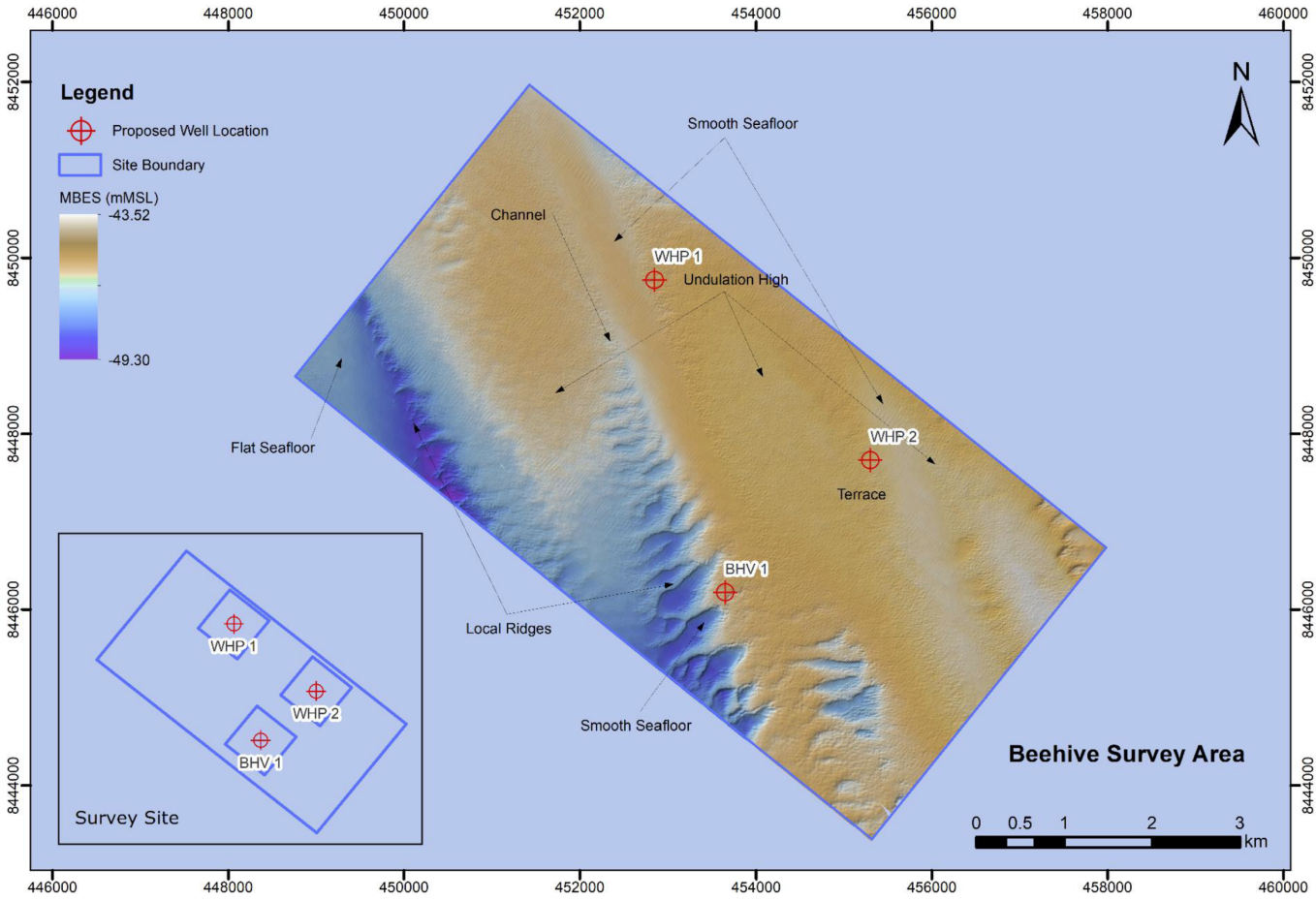


Figure 3 Bathymetric Image of the Beehive General Survey Area [Image from 206084-1-052-REP-006 1 | Volume 2 – Interpretation (Survey Results) Report Page 34 of 99]. Note the proposed location of the exploration well is 250 m SE of that depicted in the figure.

Local palaeolandscapes and environments

An isopach map showing the thickness of overlying Recent marine sediments (up to 5 m around the BEEHIVE -1 well site) to seismic reflector R1 (understood to represent the antecedent Pleistocene land surface), explains the lack of expression of submerged terrestrial landforms at the sea floor. Furthermore, the fact that there are no prominent positive relief features present within the study area suggests that the palaeolandscape was subdued and likely dominated by negative relief features. This interpretation is supported by analysis of shallow seismic datasets which has revealed an extensive network of palaeochannels which have incised the Pleistocene land surface.

This evidence of palaeochannels along with (1) a very low topographic relief and shallow seaward slope of the underlying Pleistocene land surface, (2) the vast inland catchments and large palaeodrainage system evident along the inner shelf, suggest this region was situated within a large regional scale floodplain characterised by a fluvial meander belt (the zone within which a meandering stream periodically shifts its channel and typically ranges from 15 to 18 times the width of the channel) complex, with channels, scroll bars, cut banks, oxbow lakes, and terraces at the local level. These types of sedimentary environments are highly dynamic on geomorphic timescales with meanders typically migrating downstream.

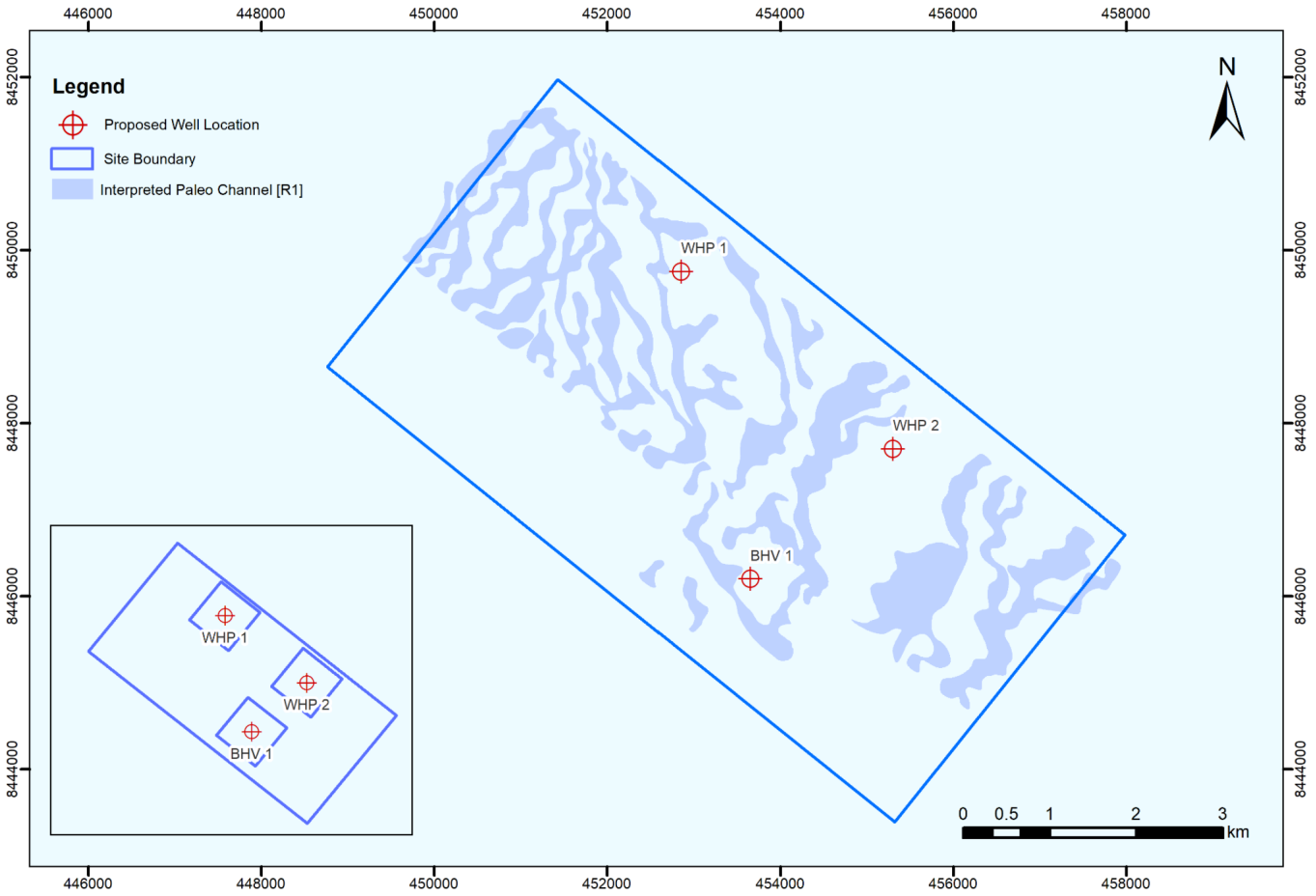


Figure 4: Interpreted Paleo Channel margins representing the reflector 1 boundary [From 206084-1-052-REP-006 1 | Volume 2 – Interpretation (Survey Results) Report Page 63 of 99.

Terrestrial Analogue of the BEEHIVE-1 Meander System

A terrestrial landform analogue to the interpreted BEEHIVE -1 meander belt complex can be found in the lower reaches of the Ord River system, which is located approximately 170 km south of the BEEHIVE-1 well site. A 5 m Lidar product shows the location of the main river channel which drains through the lower Ord River catchment and onto the flat coastal plain. As the land surface slope decreases the river begins to meander with evidence of an active meander bends with advancing scroll bars and eroding cut banks. There is also evidence of older abandoned channels forming oxbow lakes. The down channel migration of fluvial meanders means that most of the river terraces/flood plains within the meaner belt will eventually erode at the cut bank and become redeposited along the downstream scroll bar, resulting in a relatively young land surface. As a result of this particular geomorphic system,

archaeological material situated within a meaner belt should equally be relatively young. The Department of Planning, Land and Heritage (DPLH) archaeological site database identified a total of 8 archaeological sites along a 20 km section of the Ord River meander belt. All sites are registered as artifact scatters and would be considered to have a very low site density.

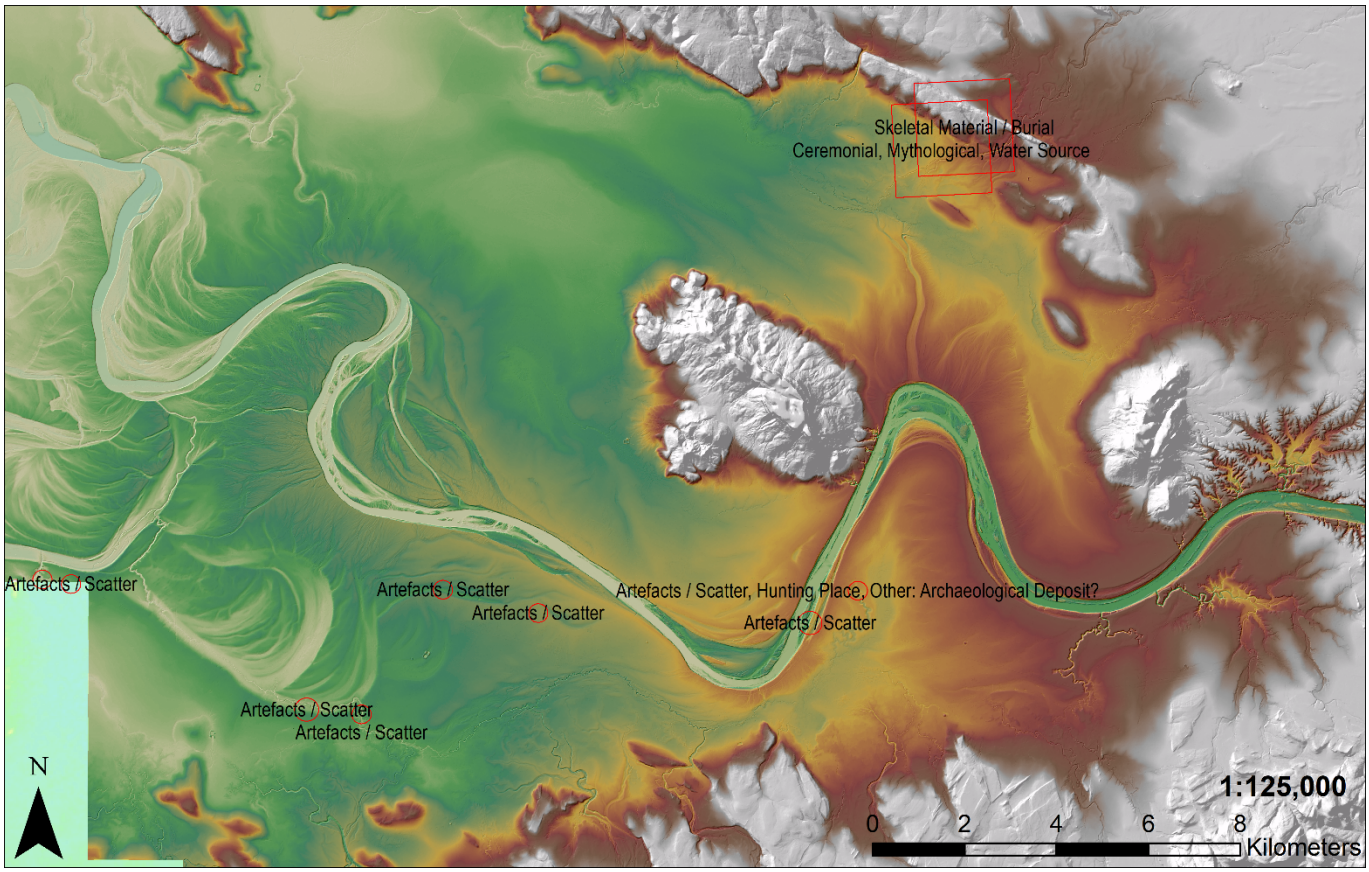


Figure 5: DEM showing the lower reaches of the Ord River system before draining into East Arm of the Cambridge Gulf.

Potential of archaeological sites at the Beehive -1 well site

Given that the BEEHIVE-1 well site is located within an interpreted meander belt, which has likely been an active fluvial system across the period of occupation, would suggest that the natural down-stream migration of these meanders would have resulted in multiple phases of erosion and deposition (recycling) of the fluvial flood plain. This would mean that archaeological material periodically deposited within a meander belt system would eventually erode and transported downstream, or on the case of larger lithics simply deposited at the foot of the cut bank and buried by the advancing scroll bar. This type of fluvial process might explain the very low density of archaeological sites within the lower reaches of the Ord River and if used as an analogue for the BEEHIVE-1 meander belt, it would equally suggest a very low density of archaeological sites having formed around the BEEHIVE-1 development area.

Due to the exposed nature of the BEEHIVE-1 wellsite, during the process of inundation wave and tidal energy may have further mobilised the lithic artefacts that comprised the more ‘recent’ sites either dispersing or concentrating them depending on their exposure, rate of burial and micro-geomorphological context. As such it is possible that some sites may have undergone relatively low levels of disturbance as has been demonstrated at the Dampier

Archipelago (Murujuga) thereby retaining a relatively high level of archaeological integrity.[2] However, for the majority of exposed sites composed of artefact scatters it can be expected that they have been dispersed or dissipated and for the most part from have moved from an archaeological context towards a geomorphological/sedimentological context. This would reduce but not eliminate the archaeological/scientific values associated with these artefacts. Note that the inherent cultural heritage values of the artefacts themselves as may be identified and expressed by the relevant First Nations stakeholder would not be diminished.

Potential impact

The three spuds and the drill hole will penetrate the recent Holocene sediments and impact the former Late Pleistocene surfaces. Each point of contact will impact an area of between 0.5 to 1 m^2. There is a remote likelihood that the spuds or drill will intersect a lithic artefact. Only the drill would destroy such an artefact while the spuds will dislocate it or modify it. Even with the remote likelihood that an artefact may be impacted such an impact will not appreciably alter the existing archaeological integrity of any site present and as such will not affect its archaeological/scientific cultural heritage values.

Potential mitigation

The relocation of the drilling site within the site boundary as shown in Figures 3 and 4 will not alter the risk of impact.

Any form of retrieval of seabed material from the potential impact areas for the purposes of recovering artefacts will likely cause the same or greater disturbance than the proposed works.

It is believed that any further remote sensing or geotechnical investigation will not alter the assessment of the identified landform and archaeological potential presented in this report.

Compliance with the *Underwater Cultural Heritage Act 2018*.

Ship and aircraft wrecks over 75 years old are automatically protected in Commonwealth waters. All other forms of underwater cultural heritage including First Nations submerged terrestrial sites can be protected by the Minister however they have to have been found before they can be declared protected.

Though it has been assessed that there is a remote likelihood that the undertaking of the proposed works would lead to the discovery of any form of underwater cultural heritage it is noted that under Section 40 of the Act a person who finds … *an article of underwater cultural heritage*… which … *appears to be of an archaeological character*… is legally obligated to report the find to the Minister.

Compliance with Relevant Guidelines

On 31st March the Department of Climate Change, Energy the Environment and Water issued draft *Guidelines for working in the near and offshore environment to protect Underwater Cultural Heritage*. This document is currently exposed for public comment.[3]

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[2] **Benjamin, J., O'Leary, M., McDonald, J., Wiseman, C., McCarthy, J., Beckett, E., Morrison, P., Stankiewicz, F., Leach, J., Hacker, J. and Baggaley, P., 2020**. Aboriginal artefacts on the continental shelf reveal ancient drowned cultural landscapes in northwest Australia. *PloS one*, *15*(7), p.e0233912.
[3] **DCCEEW, March 2023,** Draft guidelines to protect underwater cultural heritage https://consult.dcceew.gov.au/draft-guidelines-to-protect-uc-heritage

The purpose of the document is to provide guidance to proponents proposing to undertake activities in Australian waters.

The Guidelines propose a range of cultural heritage assessment and mitigation actions in response to seabed development. The commencement of this process is the undertaking of a UCH desktop assessment.[4] The draft Guidelines state the UCH desktop assessment :

> ***…*** *outlines the initial assessment of known protected UCH and potential unlocated UCH within the project area and proposes a forward work program for the detailed assessment of UCH in the project area and potential impacts as a result of the proposed work. A forward work program may not be necessary if a negligible risk of impact to UCH is assessed. A UCH desktop assessment should always be prepared by a qualified maritime archaeologist should appropriate experience.*

Elsewhere in the draft Guidelines this is referred to as a 'due diligence desktop assessment'.[5]

This document complies with the above described desktop assessment process and furthermore includes the review of remote sensing data and has assessed the risk of impact to be remote which is comparable to 'negligible'.

Note that the draft Guidelines are more focused on maritime heritage, such as shipwrecks, than First Nations UCH. The Commonwealth is currently preparing Technical guidance notes specific to the investigation and assessment of First Nations UCH.

Conclusion

The proposed works as presented in this short letter report will have a remote likelihood of impacting First Nations tangible UCH. The level of analysis undertaken in this short letter report is sufficient to make the aforementioned statement with confidence. A more detailed UCH impact assessment is not required.

It is advised that an Unexpected Finds Protocol be prepared and implemented in the event that that seabed material is bought aboard the jack up barge during the works.

This report has been prepared by:

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[4] **DCCEEW, March 2023**: Section 3.2
[5] **DCCEEW, March 2023**: Table 6