



APPENDIX K

ABORIGINAL CULTURAL HERITAGE
ASSESSMENT



**STOCKTON SAND QUARRY DREDGING PROJECT (SSD 9490)
FULLERTON COVE, NSW**

Aboriginal Cultural Heritage Assessment Report

Prepared for Element Environment Pty Ltd
on behalf of Boral Resources (NSW) Pty Ltd

Port Stephens Local Government Area

November 2019

Ref. 1829

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Executive Summary

Boral Resources (NSW) Pty Ltd ('Boral') owns and operates the Stockton Sand Quarry, a long standing operation that extracts and transports up to 500,000 tonnes of sand product per year for use in the building, landscaping and construction markets. The Stockton Sand Quarry is located behind Stockton Beach at Fullerton Cove, in the Port Stephens Local Government Area (LGA). Due to current and future demand for sand in the Hunter and Sydney regions, Boral is seeking approval for continued and expanded operations at the site through a State Significant Development (SSD) application (SSD 9490) to the NSW Department of Planning, Industry and Environment (DPIE). The proposed development (hereafter referred to as the 'Project') involves the staged extraction of sand from the inland vegetated dunes. Stage 1 will comprise dry extraction by front-end loader/excavator to a depth of 4 metres (m) Australian Height Datum (AHD) and subsequent Stages 2-6 will comprise wet extraction (dredging) from 4 m AHD to 15 m below sea level (-15 m AHD). The Project would seek to permit a site wide increase on the dispatch limit to 750,000 tonnes per annum (tpa) (i.e. the windblown sand extraction area and the Project operations combined) up until 2028 after which the site wide limit would reduce to no more than 500,000 tpa. The Project would be for a period of up to 25 years.

The Project is subject to approval under Part 4 of the *Environmental Planning & Assessment Act 1979* (EP&A Act). Boral is currently undertaking detailed planning and assessment for the Project, including the preparation of an Environmental Impact Statement (EIS). Boral engaged Element Environment Pty Ltd ('Element') to assist with the preparation of the EIS for the Project. An Aboriginal heritage assessment is required as part of the EIS. Element engaged Kelleher Nightingale Consulting Pty Ltd (KNC) to prepare an Aboriginal cultural heritage assessment report (CHAR) to inform the EIS.

The preparation of the EIS is being undertaken in accordance with the Secretary's environmental assessment requirements (SEARs) issued by the Secretary of the DPIE. (Amended) SEARs for the Project were issued on 16 November 2018. This CHAR addresses the SEARs relating to Aboriginal heritage. The CHAR has been prepared in accordance with the EIS requirements for the Project and DPIE conservation division [formerly Office of Environment and Heritage (OEH)] requirements and guidelines for Aboriginal community consultation and archaeological assessment, including the *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* and the *Aboriginal cultural heritage consultation requirements for proponents 2010*.

The review of background information revealed there were no known Aboriginal archaeological sites within the study area and proposed extraction area. While sites do occur within the wider Boral property, the study area is generally highly disturbed due to the previous extraction operations and removal of the bulk of the dune mass. Site inspection with the Aboriginal community confirmed the site condition and no Aboriginal objects, archaeological sites or areas of archaeological potential were identified. Subsurface archaeological deposits are considered unlikely to occur given the study area's geomorphological context and the nature and extent of prior extraction disturbance.

Consultation with registered Aboriginal stakeholders was undertaken to identify Aboriginal cultural/social heritage values in the study area, assess impacts of the proposed expansion activities and develop appropriate management recommendations. Consultation with the 19 registered Aboriginal stakeholders identified that the local area has cultural heritage value to the local Aboriginal community. In particular, Aboriginal stakeholders expressed the cultural importance and significance of the vegetated hind dune landscape around the study area. No specific Aboriginal cultural values have been identified within the study area. Boral values Aboriginal community consultation and is committed to ongoing consultation with Aboriginal stakeholders for the Stockton Sand Quarry Dredging Project.

The configuration of the proposed extraction pits has been developed having regard to the constraints of the land, the desire to mitigate and avoid impacts where possible, whilst balancing the commercial viability of the Project and the extent of the known resource. The Project seeks to capitalise on sand availability within the area of existing and previous operations, maximising output from existing production facilities. This results in a smaller disturbance footprint and minimises environmental impacts compared to expansion into un-quarried adjacent areas within the wider property. Impact to intrinsic Aboriginal cultural values of the surrounding landscape is also minimal.

No Aboriginal heritage constraints have been identified for the Project. No avoidance or mitigation measures are required for the Project on Aboriginal heritage grounds.

Management measures should be implemented for adjacent areas (outside of proposed impact area and study area). Aboriginal objects are known to occur in adjacent landforms and these must be avoided by all proposed extraction activities. Management measures to be implemented should include clear delineation of the boundary of the approved impact area and the inclusion of Aboriginal heritage in the existing Environmental Management Strategy (EMS). Documented toolbox talks should also be held to ensure all on-site staff and contractors are aware of obligations and requirements regarding the protection of Aboriginal heritage.

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1 Introduction

1.1 Development Context

Boral Resources (NSW) Pty Ltd ('Boral') owns and operates the Stockton Sand Quarry, a long standing operation that extracts and transports up to 500,000 tonnes of sand product per year for use in the building, landscaping and construction markets. The Stockton Sand Quarry is located behind Stockton Beach at Fullerton Cove, in the Port Stephens Local Government Area (LGA).

Due to current and future demand for sand in the local Hunter and Sydney regions, Boral is seeking approval for continued and expanded operations at the site through a State Significant Development (SSD) application (SSD 9490) to the NSW DPIE. The Project involves the staged extraction of sand from the inland vegetated dunes. Stage 1 will comprise dry extraction by front-end loader/excavator to a depth of 4 metres (m) Australian Height Datum (AHD) and subsequent Stages 2-6 will comprise wet extraction (dredging) from 4 m AHD to 15 m below sea level (-15 m AHD). The Project would seek to permit a site wide increase on the dispatch limit to 750,000 tpa (i.e. the windblown sand extraction area and the Project operations combined) up until 2028 after which the site wide limit would reduce to no more than 500,000 tpa. The Project would be for a period of up to 25 years.

The Project will provide:

- supply of essential natural sand to major infrastructure and associated development projects;
- employment of six full time employees and truck/transportation drivers, with further jobs created through flow-on effects;
- optimal use of a regionally-significant resource; and
- economic benefits to the local community through the purchase of goods and services and local expenditure both directly and indirectly through employee wages.

The Project is subject to approval under Part 4 of the *Environmental Planning & Assessment Act 1979* (EP&A Act). Boral is currently undertaking detailed planning and assessment for the Project, including the preparation of an Environmental Impact Statement (EIS). Boral engaged Element Environment Pty Ltd ('Element') to assist with the preparation of the EIS for the Project. An Aboriginal heritage assessment is required as part of the EIS. Element engaged Kelleher Nightingale Consulting Pty Ltd (KNC) to prepare an Aboriginal cultural heritage assessment report (CHAR) to inform the EIS.

The preparation of the EIS is being undertaken in accordance with the Secretary's environmental assessment requirements (SEARs) issued by the Secretary of the DPIE. (Amended) SEARs for the Project were issued on 16 November 2018. This CHAR addresses the SEARs relating to Aboriginal heritage. The CHAR has been prepared in accordance with the EIS requirements and DPIE conservation division [formerly Office of Environment and Heritage (OEH)] requirements and guidelines for Aboriginal community consultation and archaeological assessment.

1.2 Project location and description

The Stockton Sand Quarry is located at Stockton Beach, in the suburb of Fullerton Cove, approximately 10.5 kilometres north east of the Newcastle CBD (Figure 1). The site is owned and operated by Boral and covers an approximate area of 246 hectares. Boral's land holding is identified as Lots 1 and 2 DP 1006399 and Lot 3 DP 664552. The site is accessed via a road over an adjacent Crown reserve (Lot 7300 DP1130730) under licence agreement with DPIE Crown Lands.

Under Boral's ownership there have been two primary development consents granted, these include:

- DA 2010/94: The 'inland extraction area' (also known as pits 1 – 6) granted by Port Stephens Council in May 1996; and
- DA 140-6-2005: The 'windblown sand extraction area' (also known as the "windblown project" or pit 7) located on the transgressive dunes adjoining Stockton Beach granted by the Department of Planning in 2006.

The inland extraction operation (DA2010/94) on the vegetated dunes occurred above 5 metres AHD and ceased in 2008 and rehabilitation has been ongoing. This former extraction area is generally consistent with the Project site and is the focus of this Development Application.

The windblown sand extraction area started operations in 2008 and in accordance with condition 5 of the development consent has a 20 year life, due to cease in 2028.

The location of the Project is generally consistent with the same disturbance footprint associated with the former inland extraction area approved under the 1996 development consent, with the exception of areas to east and south east of Lot 3 and along the southern edge to allow for the construction of new haul roads. This area was previously subject to assessment in the *Environmental Impact Statement, For a Sand Extraction Operation on Boral Resources Freehold Property at Fern Bay, Near Newcastle NSW* (ERM Resource Planning Pty Ltd ('ERM') 1994).

The 'study area' for this CHAR comprises the proposed extraction area and impact area for the current Project. The study area is shown in Figures 1 and 2. The study area is substantially the same footprint as the inland extraction area approved under the 1996 development consent and extends over Lot 1 DP 1006399 and partially into Lot 3 DP664552. The study area covers an area of approximately 37 hectares and encompasses all areas to be disturbed by Project operations. The nature of disturbance associated with the Project will occur progressively over six stages and include tree clearing, installation of site infrastructure, access roads, excavation and dredging operations.

As the site is an existing sand quarry, there are minimal site establishment works required, as the Project will predominantly utilise existing infrastructure and services. Where new or augmented infrastructure is required this will be delivered as part of Stage 1 of the Project and will generally include:

- Construction of new entry, exit and associated haul roads to connect with established haul road network;
- Establishment of a pad for the washplant and diesel generator;
- The existing site depot will also be reconfigured to support the Project and will include the following:
 - installation of a new prefabricated office building;
 - relocation of light vehicle parking;
 - relocation of entry gates (inside Boral's boundary); and
 - relocation of onsite of material storage.

Similar to previous operations of the inland extraction area, sand extraction will involve clearing and grubbing of established vegetation from previous rehabilitation and possible sieving of accumulated leaf litter and organic matter. Cleared vegetation will either be mulched or stockpiled on-site for later reuse in rehabilitation. Similarly, any stripped topsoil would be retained for use in rehabilitation efforts across the site.

Stage 1 will involve dry extraction, removing sand via a front-end loader which pushes into the exposed sand face. As the sand is relatively free-flowing, material falls towards the front-end loader at the natural angle of repose. The front-end loader or excavator then loads road trucks in-pit with screened raw sand for transport off-site via the weighbridge.

Following initial dry extraction of sand in Stage 1 above the water table to a depth of 4 m AHD, a pond will be created in the area of Stage 2. The pond will be made large enough to float a dredge and accommodate fresh water pumping for the proposed wash plant. The dredge will move progressively through the extraction area generally following the nominated stages. In most cases, the sand in each extraction stage is fully extracted unless constraints are encountered.

The dredge will move backwards and forwards across the active dredge pond, suctioning away against the underwater sand face. The sand / water mix will be pumped directly from the dredge via a pontoon-mounted pipeline to the wash plant in the processing area. The dredge manoeuvres around the pond and its position is stabilised by tie ropes connected to the banks around the active pond.

The dredge will then progressively extract sand in a south westerly direction in a staged process. Extraction will then move to the east and culminate with relocation of the proposed processing and stockpile area to a confined area in Stage 1 and subsequent dredging of the majority of the Stage 1 extraction area (to be known as Stage 6). Sand will be extracted to a maximum depth of approximately 15 m below the sea level (0 m AHD).

Project features are shown in Figure 3.

1.3 Purpose of this report

The Project is subject to assessment by the DPIE and approval under the EP&A Act which requires preparation of an EIS. This CHAR is one of a number of technical papers that forms part of the EIS. The purpose of this technical paper is to identify and assess the Aboriginal heritage impacts of the Project. In doing so it responds directly to the SEARs as outlined in section 1.4. This report has also been prepared in accordance with the DPIE requirements and guidelines relating to the assessment of Aboriginal heritage in NSW. These include:

- *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (OEH 2010a);
- *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* (OEH 2011);
- *Aboriginal cultural heritage consultation requirements for proponents 2010* (OEH 2010b); and
- *NSW Skeletal Remains: Guidelines for Management of Human Remains* (Heritage Office 1998).

1.4 Secretary's environmental assessment requirements

This CHAR has been prepared to address the SEARs for the Project for the purpose of seeking project approval under the EP&A Act. The CHAR addresses the Standard Environmental Assessment Requirements provided for the Project. Table 1 outlines the requirements relevant to this assessment and where they are addressed in the report.

Table 1. SEARs: Aboriginal Heritage

General requirements	Where addressed in this document
An assessment of the potential impacts on Aboriginal heritage (cultural and archaeological), including evidence of appropriate consultation with relevant Aboriginal communities/parties and documentation of the views of these stakeholders regarding the likely impact of the development on their cultural heritage	Section 2 Section 5 Appendices A-C
Specific requirements	Where addressed in this document
5. The Environmental Impact Assessment (EIS) must identify and describe the Aboriginal cultural heritage values that exist across the whole area that will be affected by the development and document these in the Aboriginal Cultural Heritage Assessment Report (ACHAR). This may include the need for surface survey and test excavation. The identification of cultural heritage values should be guided by the <i>Guide to investigating, assessing and reporting on Aboriginal Cultural Heritage in NSW</i> (DECCW, 2011) and consultation with OEH regional branch officers.	Section 2 Section 5 Section 6 Section 7
6. Consultation with Aboriginal people must be undertaken and documented in accordance with the <i>Aboriginal cultural heritage consultation requirements for proponents 2010</i> (DECCW). The significance of cultural heritage values for Aboriginal people who have a cultural association with the land must be documented in the ACHAR.	Section 2 Section 7 Appendices A-C
7. Impacts on Aboriginal cultural heritage values are to be assessed and documented in the ACHAR. The ACHAR must demonstrate attempts to avoid impact upon cultural heritage values and identify any conservation outcomes. Where impacts are unavoidable, the ACHAR must outline measures proposed to mitigate impacts. Any objects recorded as part of the assessment must be documented and notified to OEH.	Section 8

1.5 CHAR objectives

The objectives of the CHAR are to:

- Undertake background research and primary investigations, including ethnohistorical, landscape/environmental, archaeological and cultural, to identify Aboriginal cultural heritage places and values within the study area – addressed in Chapters 2-6;
- Involve Aboriginal stakeholders in all stages of Aboriginal heritage assessment and development of management recommendations – addressed in Chapter 2;
- Identify and assess Aboriginal archaeological and cultural heritage places and values within the study area including an assessment of significance – addressed in Chapters 2-6, Chapter 7;
- Identify and assess the actual or likely harm to Aboriginal objects or Aboriginal places from the proposed activities of the project – addressed in Chapter 8; and
- Identify any practical measures that may be taken to protect and conserve Aboriginal objects or Aboriginal places and any practical measures that may be taken to avoid or mitigate any actual or likely harm to Aboriginal objects or Aboriginal places – addressed in Chapters 8-9 (no harm identified).

The DPIE *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* provides further guidance on the preparation of a CHAR. This report has been prepared in accordance with the requirements of the Regulation and the DPIE guide.



Figure 1. Location of the Stockton Sand Quarry and study area

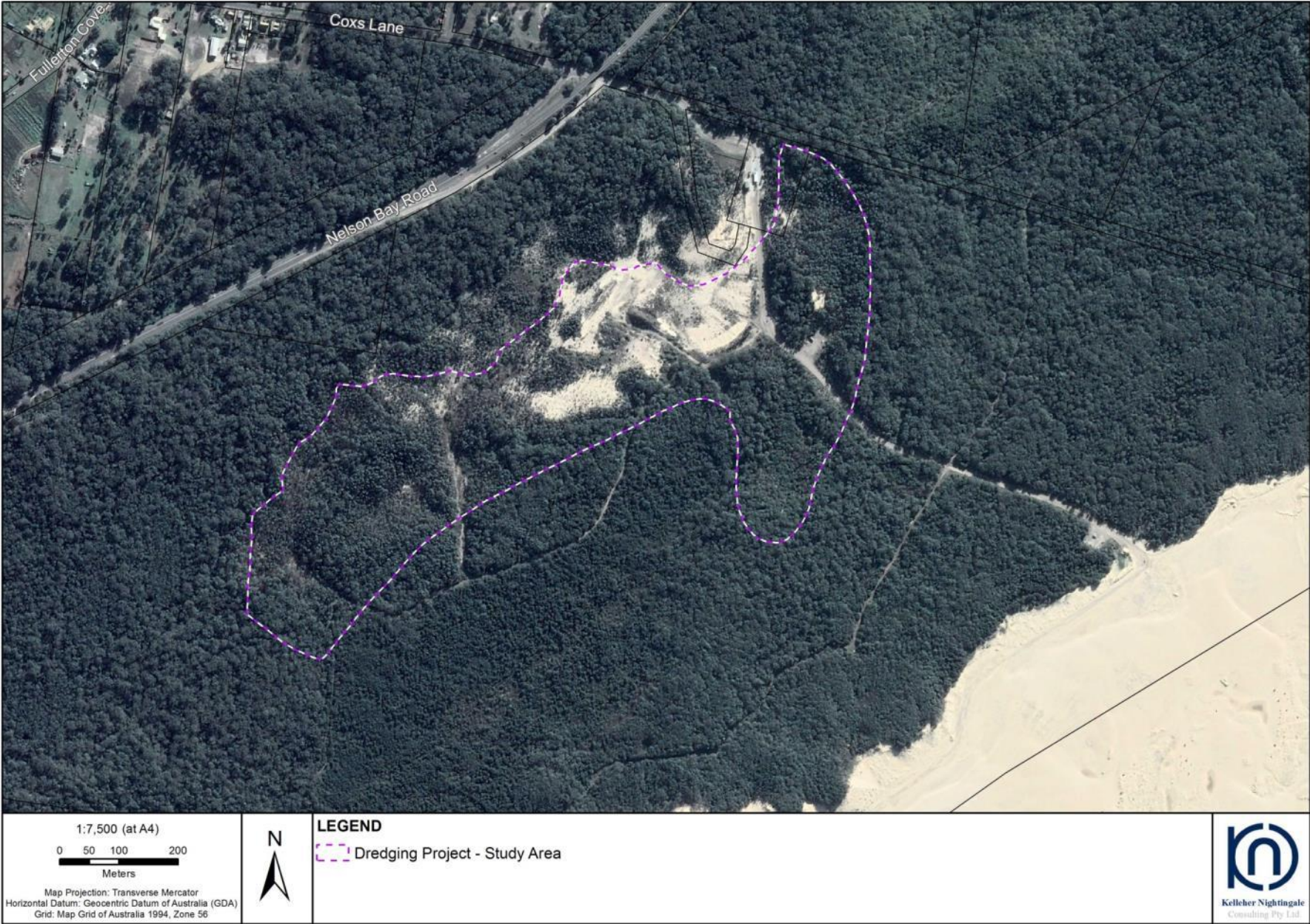


Figure 2. Detail of the study area

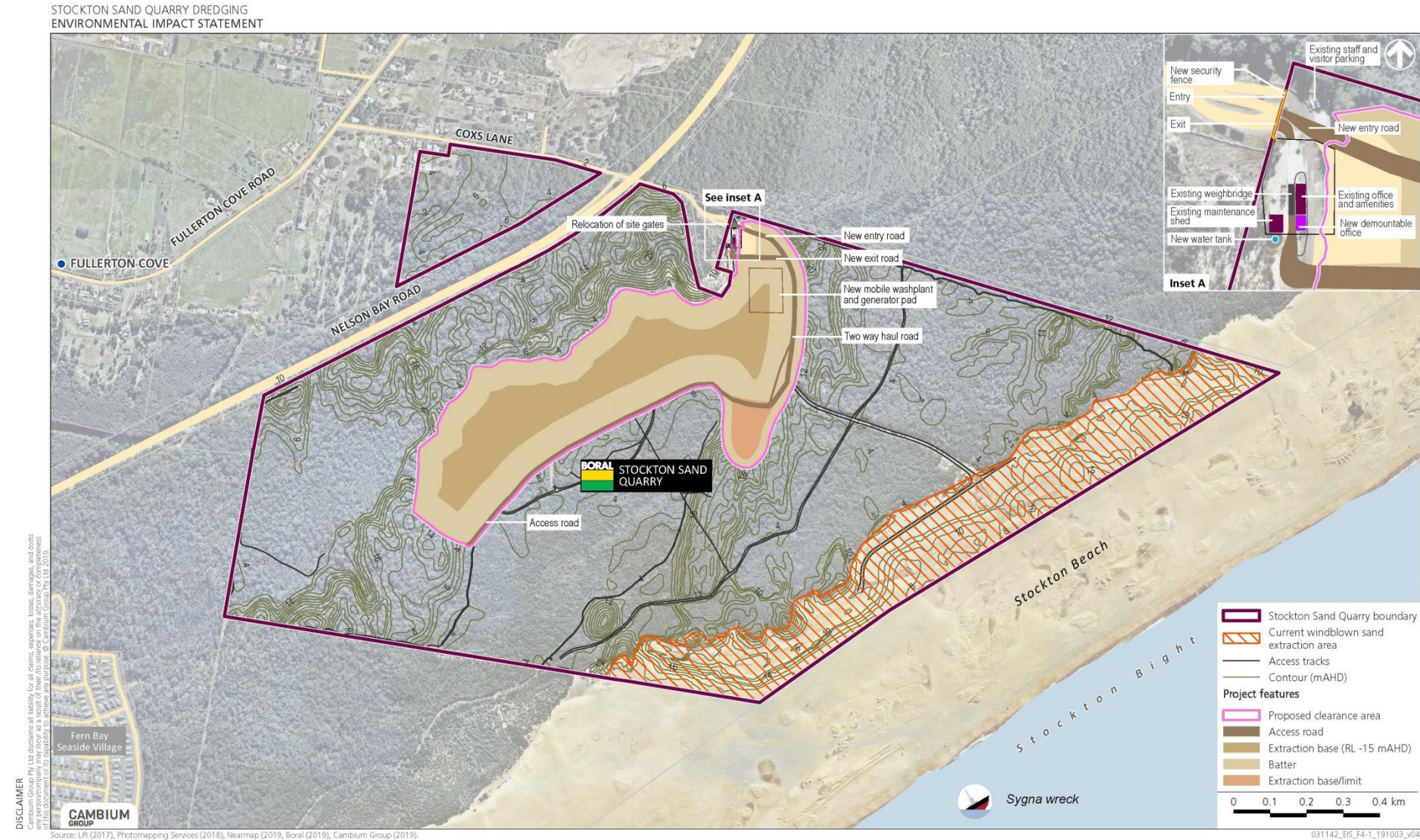


Figure 3. Key features of the Project (Element 2019:Figure 4.1)

2 Aboriginal Community Consultation

The aim of Aboriginal community consultation is to integrate cultural and archaeological knowledge and ensure registered stakeholders have information to make decisions on Aboriginal cultural heritage. For the preparation of this CHAR, consultation with Aboriginal people has been undertaken in accordance with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (OEH 2010b) and the requirements of Clause 80C of the *National Parks and Wildlife Regulation 2009*. The formal consultation process has included:

- government agency notification letters (letters dated 15 February 2019);
- advertising for registered stakeholders in local media (*Port Stephens Examiner* 7 March 2018: refer Appendix A);
- notification of closing date for registration (21 March 2019);
- ongoing compilation of registrants list, through continuing to register individuals and groups for consultation on the project;
- provision of project information and proposed cultural heritage assessment methodology (letters dated 3 April 2019) allowing for a 28 day review period;
- provision of draft CHAR (letters dated 9 September 2019) allowing for a 28 day review period; and
- ongoing consultation with the local Aboriginal community.

Aboriginal stakeholders were consulted throughout all stages of the assessment process. A full log of consultation is attached as Appendix B. Boral is committed to ongoing consultation with the Aboriginal community.

2.1 Registration of interest

Aboriginal people who hold knowledge relevant to determining the cultural heritage significance of Aboriginal objects and Aboriginal places in the area were invited to register an interest in a process of community consultation. Sixteen groups or individuals registered an interest in the Project. Investigations included consultation with Aboriginal community individuals and groups as listed in Table 2.

Table 2. Registered Aboriginal stakeholders

Registered Aboriginal Stakeholder	Representative and/or Contact Person
Worimi Local Aboriginal Land Council (LALC)	Jamie Merrick
Murra Bidgee Mullangari Aboriginal Corporation	Ryan Johnson
Didge Ngunawal Clan	Paul Boyd and Lilly Carroll
Merrigarn Indigenous Corporation	Shaun Carroll
Muragadi Heritage Indigenous Corporation	Anthony Johnson
Nur-Run-Gee Pty Ltd	Leonard Anderson OAM
Lower Hunter Wonnarua Cultural Services	Tom Miller
Worimi Traditional Owners Indigenous Corporation	Candy Towers
A1 Indigenous Services	Carolyn Hickey
Murrooma Incorporated	Anthony Anderson
Karuah Indigenous Corporation	David Feeney
Widescope Indigenous Group	Steven Hickey
Worimi Conservation Lands (WCL Board of Management c/o Graeme Russell)	Graeme Russell
Amanda Hickey Cultural Services	Amanda Hickey
Aboriginal stakeholder (details withheld)	Aboriginal stakeholder (details withheld)
Aboriginal stakeholder (details withheld)	Aboriginal stakeholder (details withheld)

*Two stakeholders specified they did not want their details released in accordance with item 4.1.5 of the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*

2.2 Consultation regarding the land and proposed activity

Following on from Stage 1 of the consultation process undertaken by KNC (stakeholder identification and registration), project-specific consultation was undertaken. Information regarding the proposed extraction project was provided to registered Aboriginal stakeholder groups in a letter dated 3 April 2019. Information included an outline of the Project, location of the study area, development approval context and an invitation to consult during the assessment.

Stakeholders were also provided with the proposed assessment methodology for the Cultural Heritage Assessment Report, and invited to review and provide feedback (review period of 28 days, closing on 1 May 2019). An invitation was extended for Aboriginal cultural knowledge holders and stakeholders to provide comments on the proposed cultural heritage assessment methodology, including any protocols regarding the gathering of information and any matters such as issues/areas of cultural significance that might affect, inform or refine the assessment methodology.

Stakeholders were invited to attend a site inspection of the study area with the proponent and project archaeologist. All stakeholders were invited to attend (invitations sent 18 June 2019) or provide a representative. The site inspection took place on 27 June 2019.

2.3 Stakeholder responses to the proposed assessment methodology for the Cultural Heritage Assessment Report

Responses to the proposed assessment methodology were received from A1 Indigenous Services (A1), Murra Bidgee Mullangari Aboriginal Corporation (MBMAC), Muragadi Heritage Indigenous Corporation (MHIC), Murrooma Incorporated (Murrooma), Merrigarn Indigenous Corporation (Merrigarn), Widescope Indigenous Group (WIG), and Worimi Traditional Owners Indigenous Corporation (WTOIC).

A1 stated that they supported the proposed CHAR methodology and expressed interest in being involved in any potential fieldwork associated with the project (email dated 13 April 2019).

MBMAC stated they had read the project information and proposed assessment methodology and endorsed the proposed approach (email dated 3 April 2019).

MHIC stated that they endorsed KNC's assessment recommendations and had reviewed the project information and methodology (email dated 3 April 2019).

Murrooma responded via email (9 April 2019) and requested some additional information prior to making comment, including a map of the proposed dredging area. KNC responded on 9 April 2019 and provided a map. Further comment was then provided by Murrooma on 23 April 2019. Murrooma stated that they agreed with the proposed assessment methodology and consultation process for the Project, and noted their involvement with previous assessments in the area. In particular, Murrooma identified the dune ridges as traditional transit routes along the coast, and noted the presence of culturally significant Worimi sites in the surrounding area. Murrooma also stressed the importance of having local knowledge holders involved in the consultation process.

Merrigarn stated that they had read the project information and proposed assessment methodology and supported the recommendations made by KNC (email dated 3 April 2019).

WIG expressed support for the proposed methodology (email dated 19 April 2019).

WTOIC expressed that the Project area held cultural significance for the Worimi people (email dated 6 May 2019) and recommended further assessment of the area due to the potential to find artefacts. WTOIC affirmed that it was "extremely important to our Worimi people to gain the best outcome for protection and preservation of our local sites/objects".

2.4 Site inspection

A site inspection was undertaken with Aboriginal stakeholder representatives on 27 June 2019. Stakeholders attended across two sessions in the morning and afternoon. Representatives from Worimi LALC, Didge Ngunawal Clan, Nur-Run-Gee Pty Ltd, Murrooma, Worimi Conservation Lands, Karuah Indigenous Corporation, Widescope Indigenous Group and Amanda Hickey Cultural Services attended the inspection and Worimi LALC, Didge Ngunawal Clan, Nur-Run-Gee Pty Ltd, Murrooma, Worimi Conservation Lands and Karuah Indigenous Corporation representatives took part in the site walkover. Representatives were accompanied by project archaeologist Dr Matthew Kelleher (KNC) and Neil Gascoyne (Quarry Manager, Boral).

The site inspection included a discussion of the site history and existing quarrying disturbance, further discussion of the Project, proposed extraction staging, remediation and archaeological context of the local area including location of nearby previously recorded sites. A site walkover was undertaken of the study area.

No Aboriginal objects were identified and representatives concurred with the assessment of existing severe disturbance within the study area and proposed extraction area.

2.5 Review of draft CHAR

The draft CHAR was provided to stakeholders with an invitation to review and provide comment (draft CHAR review package sent 9 September 2019). Stakeholders were invited to provide further comment on the Aboriginal cultural significance of the study area and the management recommendations presented in the report. A 28 day review and comment period was provided.

Two responses were received from stakeholders. Comments are attached in full in Appendix C and summarised below.

2.6 Stakeholder responses to draft CHAR

MBMAC stated that they had received and reviewed the draft CHAR, and endorsed the recommendations made in the document (email dated 12 September 2019).

Muragadi stated that they agreed with the recommendations made in the report (email dated 13 September 2019).

2.7 Ongoing consultation

Boral values Aboriginal community consultation and is committed to ongoing consultation with Registered Aboriginal Stakeholders for the Stockton Sand Quarry Dredging Project.

2.8 Aboriginal cultural values

It has been identified during the consultation process to date that the wider study area has cultural heritage value to the local Aboriginal community. Some of the Aboriginal cultural heritage values expressed by stakeholders include:

- strong association with the land;
- responsibility to look after the land, including the heritage sites, plants and animals, waterways, beaches, ocean and the land itself;
- scarred trees;
- artefact sites and middens;
- water sources, wetlands, creek lines and rivers, especially major landscape features such as the Hunter River and Fullerton Cove;
- indigenous plants and animals; and
- general concern for burials, as their locations are not always known and they can be found anywhere.

Numerous stakeholders have expressed close familial and traditional connections with the area, and stakeholders retain oral histories and cultural knowledge of the area. Stakeholders expressed the importance of education and protection of Aboriginal cultural heritage, and consideration of the landscape as a whole when assessing archaeological sites and their connections across Country. Aboriginal cultural values and knowledge of the area have been provided by registered stakeholders throughout the consultation process to date and are summarised below.

Murrooma highlighted the importance of the general area, stating that “there are many places within this area that have significant cultural value to Worimi people and are in close proximity to the proposed project. These places of social, spiritual and cultural value are traditional areas with direct linkage to our ancestors and storylines” (letter dated 23 April 2019). Murrooma noted that traditional uses of the area included transit routes across the dune fingers and stressed that local knowledge holders and Traditional Owners from the area should be the source of specific cultural information for the study area.

WTOIC noted that the area was culturally significant to Worimi people (email dated 6 May 2019).

3 Environmental Context

3.1 Geology and geomorphology

The Stockton Sand Quarry is located within the Hunter subregion of the Sydney Basin, bordering the Pacific Ocean. The Sydney Basin is a large geological feature stretching from Batemans Bay in the south to Newcastle in the north and Lithgow in the west. The formation of the basin began between 250 to 300 million years ago when river deltas gradually replaced the ocean that had extended as far west as Lithgow (Pickett and Alder 1997). Fluctuating marine advances and regressions deposited sediment onto older basement rocks of the Lachlan Fold Belt and Late Carboniferous volcanoclastic sediments.

The Hunter subregion comprises a complex of Permian shales, sandstones, conglomerates, volcanics and coal measures, and is bounded on the north by the Hunter Thrust fault and on the south by cliffs of Narrabeen Sandstone. A Quaternary coastal barrier system is present in the Newcastle/Stockton Bight (National Parks and Wildlife Service (NPWS) 2003:191). The quarry is located within this coastal barrier system in the Stockton Bight. Stockton Bight (also known as Newcastle Bight) is a wide south facing coastal embayment bordered by Nobbys Head at Newcastle in the south and Birubi Point at Anna Bay in the north. The bedrock of Nobbys Head and the higher relief of Newcastle border the southern side of Stockton Bight, comprising the various Permian age subgroups of the Newcastle Coal Measures (coal, tuff, conglomerate, sandstone and shale) (Gorbert and Chesnut 1975).

The Hunter River has been deflected to the south by the Stockton Bight barrier system and enters the sea against Nobbys Head. The Bight sediments abut the sedimentary Permian rocks of the Tomago coal measures (shale, mudstone, sandstone, coal, tuff and clay) and Mulbring siltstone (siltstone, claystone, sandstone, conglomerate and limestone) between Raymond Terrace and Big Swan Bay, and at the northern end of the Bight abut the older Carboniferous Nerong Volcanics at Birubi Point (toscanite, dacite, andesite, ignimbrite, agglomerate, conglomerate, sandstone and siltstone). Between the Stockton training wall of the Hunter River and Birubi Point is the Stockton sand barrier system. The coastal barrier system consists of a gently curving Quaternary sand dune barrier system that comprises four major components (ERM 2005a:42):

- an inner (Pleistocene) barrier extending from the Hunter River to Lemon Tree Passage which was deposited as a series of parallel beach ridges and transgressive dunes approximately 120,000 years ago;
- a back-barrier depression backs the inner barrier and is occupied by the Hunter River - Raymond Terrace - Grahamstown Reservoir and Port Stephens;
- an interbarrier depression occupied by Fullerton Cove - Salt Ash – Tilligerry Creek; and
- an outer (Holocene) barrier that was deposited after the last post-glacial sea level rise, approximately 6,000-6,500 years ago.

Aeolian erosion and redeposition have reworked the surfaces of both barriers and in addition the morphology of the beach ridges has been modified by fluvial denudation. The Stockton Sand Quarry is located in the Holocene outer barrier system. The outer barrier includes the present beach and dune system and was initiated by waves and wind once post-glacial sea levels stabilised. The outer barrier has been through four periods of development (Short 2017:6):

1. 6,500-5,000 BP: Development of the Holocene foredune ridge plain. Waves delivered sand that progressively built the shoreline seaward by 3km, leaving a series of undulating foredune ridges. These extended the length of the bight and were fully vegetated. The only ridges visible today are located at the northeastern end of the bight, the majority having been exhumed, reworked and buried by subsequent dune movement;
2. 5,200-4,000 BP: Phase 1 dune transgression. The initial development and subsequent inland migration of the Phase 1 transgressive dune system buried the old land surface. Phase 1 dunes were then vegetated and stabilised up to 3km inland;
3. 2,000 BP: Phase 2 dune transgression. Second dune transgression moved up to 2km inland, reworking and burying earlier Phase 1 dunes. Phase 2 dunes were then vegetated and stabilised; and
4. 500 BP-ongoing: Phase 3 dune transgression. Phase 3 dunes have started moving inland as bare sand, excavating the outer foredune ridges and burying Phase 2 dunes. The Phase 3 dunes have moved several hundred metres inland since the commencement of transgression, and currently form an active, unstable and unvegetated transverse dune system along the bight.

The study area for the current Project is located atop a series of stable, vegetated dune ridges associated with the Phase 1 and 2 dune transgressions. ERM (1994) examined the age of the dune system within the previous extraction area. The study identified that the majority of the extraction area was positioned within the dune system estimated to be between 1200 and 2300 years old (Phase 2 transgression), with a small portion of the extraction area along the northern boundary of the site adjacent to Nelson Bay Road identified to be around 4500 years old (Phase 1 transgression) (Element 2019:64).

This accords with more recent coastal geomorphology assessment undertaken for the current Project (Short 2019), which confirmed that the Project area was located within the Phase 1 and 2 dunes. These are located atop the former Holocene foredune ridge plain (6,500-5,000 BP). During the initial development of the outer barrier, the prograding shoreline was capped by this series of well vegetated undulating foredune ridges and swales with an elevation between 5 and 10 metres (Short 2019:2). The foredune ridges would have provided a suitable sheltered area close to the ocean shore for Aboriginal occupation sites, albeit within a changing geomorphological system. Archaeological material located on the surface of these 5-10 metre high landforms would likely have been retained at or near the surface given the stabilising effect of vegetation but would have been vulnerable to erosion and displacement in areas of disturbance.

Old land surfaces associated with this phase of barrier development area known to contain midden sites where exposed by the ongoing Phase 3 dune transgression closer to the current shoreline (see Section 5). Further inland, successive periods of exhumation, reworking and reburial of the foredune ridges have taken place associated with the Phase 1-2 dune transgressions. Excavation to 5 metres AHD during previous extraction work associated with the inland extraction area is expected to have removed material to below the depth at which Aboriginal occupation evidence associated with either the Holocene foredune ridge plain or Phase 1-2 dunes would be expected to occur. It is therefore unlikely that the study area retains Aboriginal occupation evidence.

The remaining Phase 1-2 relict series of vegetated beach parallel dunes and intervening low profile sand sheets forms a distinct geomorphological unit within the outer barrier system, and contrasts with the active, mobile Phase 3 dune transgression currently taking place to the east along the margin of the sand quarry property boundary.

Recent Quaternary coastal geology mapping (Figure 4; Hashimoto and Troedson 2008) shows the geological units which underlie the Boral property at Stockton. The eastern extent of the Boral property is located atop Holocene age mobile dunes comprised of marine sand (Qhbdm), corresponding to the geomorphological unit of existing beach and unstable high dunes. The majority of the property (including the entirety of the study area) is located atop Holocene dunes of marine sand (Qhbd), corresponding to the older stable, vegetated beach parallel dunes and intervening sand sheets. Small areas to the west and north are mapped as Holocene beach ridge swales and dune deflation hollows (Qhbw) comprising marine sand, organic mud and peat. Some small areas of Holocene freshwater swamp (Qhs) have developed in these low-lying areas, comprising organic mud, peat, clay and silt with a marine sand component. Almost the entirety of the current study area has been modified by previous sand mining activity.

3.2 Topography and hydrology

The majority of Boral's property comprises relatively stable and vegetated hind dune and inter dune environments, while the south eastern property boundary encompasses the un-vegetated and mobile foredune environment. An existing and ongoing windblown sand extraction program is located along the sheltered side of this un-vegetated mobile dune. Elevations of the dunes in the vicinity of the quarry typically range from 8 to 16 metres AHD with some in excess of 20 metres AHD, while the lowest interdunal areas are approximately 4 metres AHD (RPS 2016 in Element 2019:8).

Originally, two parallel dune ridges were present on the property but large portions of these (the current study area) have been subject to previous sand quarrying and rehabilitation and do not retain a natural topography. The rehabilitated surface is undulating with steep cut slopes. Prior to previous sand extraction, the 1994 EIS described the original natural topography of the ridges. The westernmost ridge had a northeast-southwest orientation and a maximum height of 36 metres AHD along the northern Boral property boundary. The ridge comprised a series of steep-sided conical sand knolls connected by more gentle undulating areas. Slopes were variable but localised gradients were as high as 40%. The lower ridge to the east was described as diverging in a north-south direction and ranging from 20-34 metres AHD. The intervening low sand sheet separating the two ridges had an elevation of approximately 5 metres AHD. The removal of substantial sand mass is evident when comparing this to the current site topography.

No springs or permanent streams are present within the study area or the larger Boral property. Several small semi-permanent waterholes are present around the stable, vegetated dunes and shallow water pools form in the interdunal swales of the active transgressive dunes to the east after periods of rain, persisting when deflation reaches the water table. Shallow ponding across the sand sheets separating the older dunes also occurs as a result of naturally low lying interdunal swales where there is interaction with shallow groundwater. It is also possible that some surface runoff which does not infiltrate through the sand may accumulate in these swale areas contributing to the ponding (Element 2019:8). Previous assessments indicate the water table within the current study area fluctuates between 1.5-4 metres AHD (ERM 1994:5.10-5.11).

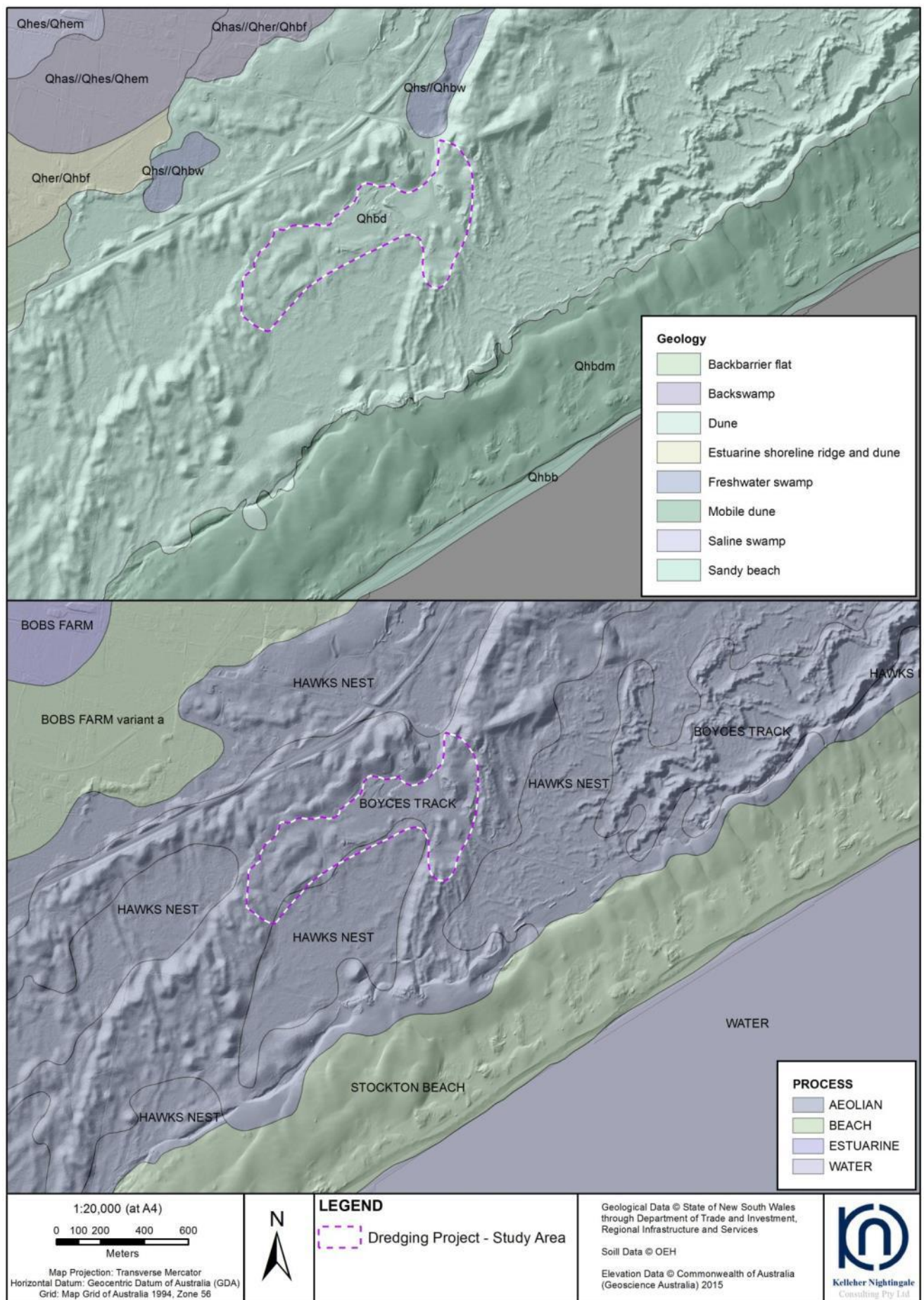


Figure 4. Geology and soils of the study area

3.3 Soil landscapes

The study area intersects two soil landscapes. The majority of the area is located atop the aeolian Boyces Track soil landscape. Boyces Track soils occur on the steep, stable Holocene transgressive aeolian dunes of the Tomago Coastal Plain, primarily arranged as two long walled ridges parallel to the shoreline between Stockton and Bobs Farm. Local relief is between 10-30 metres with slope gradient <30%. Windward dune slopes are generally longer and gentler than leeward slopes. Soils comprise deep (>300 cm), well-drained weakly developed Podzols under native vegetation with loose, loamy sand topsoils. Occurrence and relationship of soil material is generally up to 40 cm of speckled loose loamy sand (A1 horizon) overlying up to 100 cm of bleached loose light grey sand (A2 horizon), which overlies up to a 50 cm of faintly mottled sand (weak Bhs horizon) and >500 cm of loose dull yellow orange sand (C horizon (parent material)).

The long ridges occupied by the Boyces Track soils are separated by a low relief sand sheet where the Hawks Nest soil landscape occurs and intersects the eastern margins of the current study area. Hawks Nest soils occur on the low Holocene sandsheets, swales and low transgressive dunes, comprising deep (>300 cm), well-drained Podzols and Siliceous Sands/Podzols on dunes and deep (>200 cm), poorly drained Humus Podzols on sandsheets (Matthei 1995:215). Local relief is <3 metres with slope gradients <10%. Low sandy dunes and swales are the dominant landform elements. Soil type is dependent on the age of the sand body (Matthei 1995). Along the coastal fringe, soil development is very poor on the younger dunes apart from some organic matter build-up on the surface and minor development of a Bhs horizon. Typical occurrences and relationship of soil materials is as follows: up to 40 cm of loose speckled grey-brown loamy sand (A1) overlies 10–150 cm of bleached loose sand (A2). This overlies 30–100 cm of coloured mottled sand (B horizon) and over 300 cm of greyish yellow brown sand (C horizon). There are well-drained Siliceous Sand/Podzol intergrades on the seaward fringe, while Podzols occur landward.

Both soil landscapes are highly susceptible to wind erosion and mass movement if disturbed, being non-cohesive, and locally steep slopes also occur. The Boyces Track and Hawks Nest soil landscapes (which occur on the stable Phase 1 and 2 dune systems and intervening sand sheets) are gradually being engulfed by the Stockton Beach soil landscape associated with the active transgressive Phase 3 dune to the east. The stabilised dunes within the study area have previously been assessed by various mining companies for their heavy mineral content. The drilling and logging data from these assessments was considered by Boral in the 1994 EIS (ERM 1994:5.4-5.7). This included 74 holes drilled by Mineral Deposits Ltd (MDL) in 1989 and a further 175 holes by RZM Pty Ltd in 1990. In both explorations, holes were arranged along parallel lines across the Boral property. Two cross sections were prepared for the EIS based on the results. Both cross sections cover the current study area. The cross sections demonstrated fine to medium-grained, light brown to buff coloured sand to approximately 3-6 metres below sea level. Below this was a substrate of fine to coarse-grained grey sand with shell and lithic fragments. Within the paler sand (Phase 1/2 dunes) were lenses of fine to coarse-grained grey sand with a higher organic content and lithic fragments but no shell material. Areas of darker grey or brown staining were evident in association with these, and below the organic rich horizon in the low-lying sand sheet between ridgelines. These areas may be reworked remnants of the vegetated Holocene foredune ridge plain (6,000-5,000 BP). The higher dunes also displayed an organic-rich upper horizon. Quality and grading analysis determined that the sand was fine to medium-grained, generally well sorted and free of shells, shell fragments, pebbles and clay lumps.

3.4 Site history and land use

The study area and wider Boral property has a history of sand quarrying and landscape disturbance over at least the last 60 years. G. Hawkins and Sons acquired the site in the 1950s although, prior to that time, sand had already been removed from the site. Further extraction activities took place across the site from the late 1970s under a consent granted by Port Stephens Council in 1976, with sand transported along internal haul roads. Previous areas of disturbance identified in the 1994 EIS included a large portion of the eastern Phase 1-2 dune, the Crown Land at Lot 7300 DP1130730, areas around the site office, the southern part of the western Phase 1-2 dune, a large part of the sand sheet between the Phase 1-2 dunes and the active Phase 3 dune, and former haul roads and tracks (ERM 1994: Figure 5.12). In addition, the eastern section of Boral's landholding along the active Phase 3 transverse dunes was previously dredged for mineral sands by MDL between late 2000 and 2003.

Boral acquired the site in 1992 and extraction of sand on the vegetated dunes in the inland extraction area commenced in 1996 under a development consent issued by Port Stephens Council. The consent was for sand extraction above 5 metres AHD and road transport of up to 500,000 tpa for a period of 13 years. The development involved clearance of native vegetation and sand extraction by front end loader. Excavated material was then dry-screened in order to remove roots and minor naturally occurring coal fragments. Recycled road base from Boral's Kooragang Island recycling facility was imported to provide an inert stable base for haul roads and the floor of the operating extraction area. A front-end loader or excavator loaded road trucks in-pit with screened raw sand for transport off-site via the weighbridge, or was moved to the stockpile area. As each area of extraction was exhausted, topsoil and previously felled vegetation was re-spread over finished areas. The extraction areas were thus progressively rehabilitated until the approved resource was exhausted in 2008. The approved extraction area predominantly occupies the same footprint as the current study area and comprises large areas of evident disturbance despite rehabilitation (cf. Figures 2 and 5).

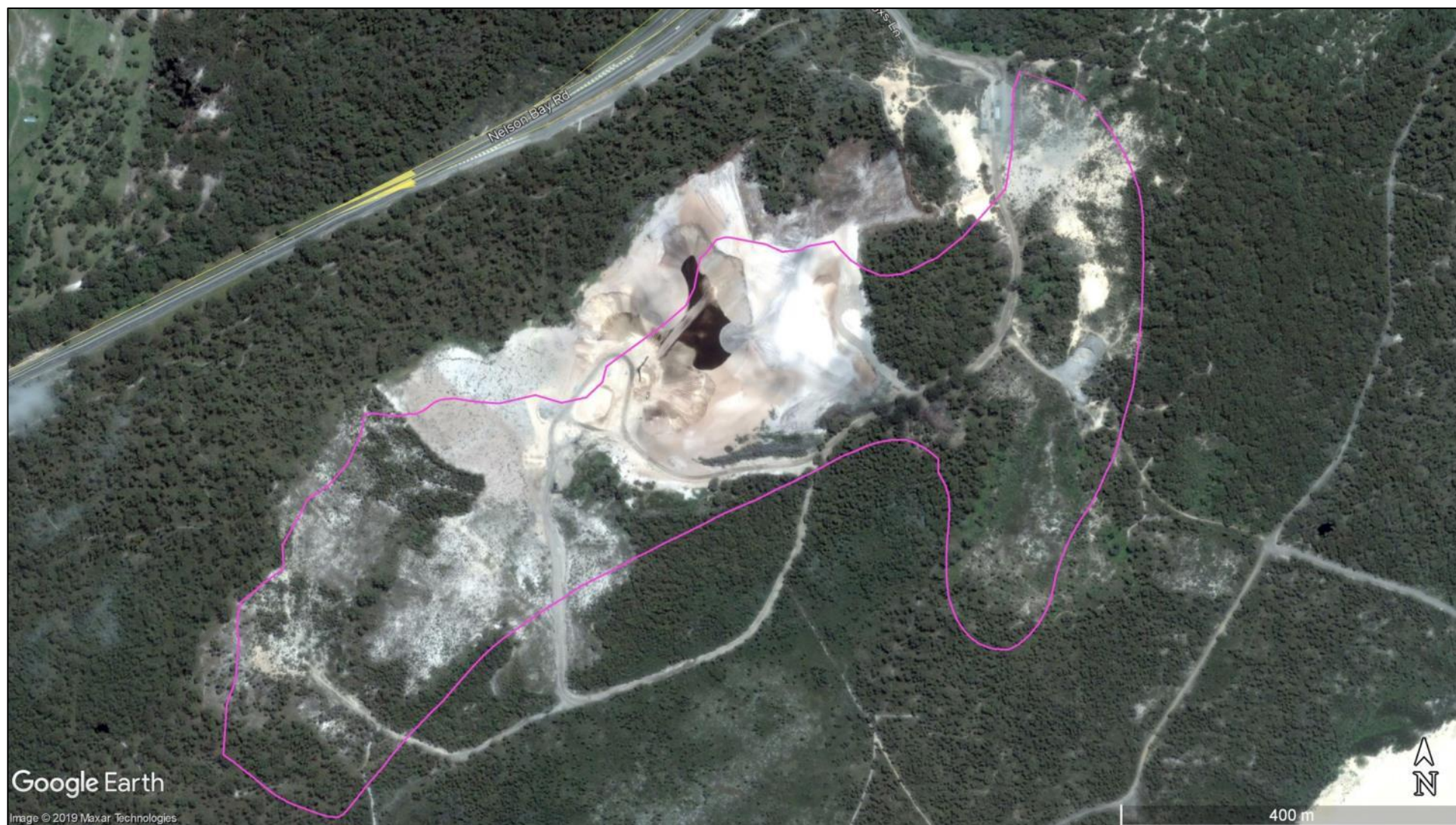


Figure 5. Aerial imagery from 2004 showing extent of disturbance from previous extraction (Google Earth)

4 Ethnohistoric context

Although the specific Project area is not recorded directly in ethnographical accounts, historical accounts were made of the Aboriginal people living in the region at the time of initial European exploration and settlement in the late eighteenth and early nineteenth centuries. (cf. Brayshaw 1987; Maynard 2015). These historical accounts describe a landscape which was important to and intensively used by Aboriginal people. Contact with Europeans introduced diseases that drastically altered the size and structure of the Aboriginal population, whilst the establishment of a penal colony and later settlement at Newcastle subsumed the traditional areas used to meet subsistence needs and displaced the Aboriginal people inhabiting these areas.

Early historical observations described several Aboriginal groups within the wider Hunter region associated with particular areas of land. The study area and the wider Port Stephens area is located within the traditional lands of the Worimi. The area inhabited by the Worimi is traditionally described as bounded by the Hunter River to the south, Manning River to the north, and the Allyn and Patterson Rivers to the west (WCL 2019). Language group boundaries described by Tindale (1974) give the Worimi area as from the “Hunter River to Forster near Cape Hawke along coast; at Port Stephens; inland to near Gresford; about Glendon Brook, Dungog, head of Myall Creek and south to Maitland”. Aboriginal people appear to have been organised into small groups of families or ‘bands’ who participated in communal subsistence gathering activities and formed part of a larger clan or descendant group that held ties to that area of Country. The Worimi around the immediate Port Stephens area were traditionally divided into four groups or *ngurras*: the Maiangal, Gamaipingal, Garuagal/Garuegal and Buraigal/Baraigal. The study area is located within the Maiangal area south of Port Stephens along the Stockton Bight to the Hunter River. To the south of the Hunter River were the Awabakal and inland, the Wonarua and Gringai.

Early European accounts indicate that the Worimi lived a mobile lifestyle, primarily in small territorial clans and local clans of extended family groups, forming larger bands through social and cultural links including marriage and communal participation in subsistence activities. Interactions with neighbouring language groups such as the Awabakal were also common. The Port Stephens area offered many lakes, estuaries, sandy beaches and intertidal zones with a diversity and abundance of resources for the local people to use. In the Port Stephens region, local Aboriginal people were identified as inland or salt water people due to their occupation of particular marine or estuarine landscapes and their use of the natural resources found in these environments. The salt water Maiangal occupied the vicinity of the study area. They would have had access to a wide range of avian, terrestrial and marine fauna along the shore while repeated firing of vegetation would have opened up foliage allowing ease of access through and between different eco zones as they moved through Country.

The shelters used by Aboriginal people at camp locations around Port Stephens were depicted in a 1826 painting by Augustus Earle (Plate 1). In the painting, the shelters can be seen as being constructed of bark sheeting while Aboriginal people are depicted gathered around fires which are situated at the entrances to the shelters. The construction was supported by three forked sticks brought together at the top to form a triangle. Dawson (1830:171 in Brayshaw 1987) recorded that “the two sides towards the wind are covered by long sheets of bark, the third is left open...When the wind shifts the gunyer is shifted also”.

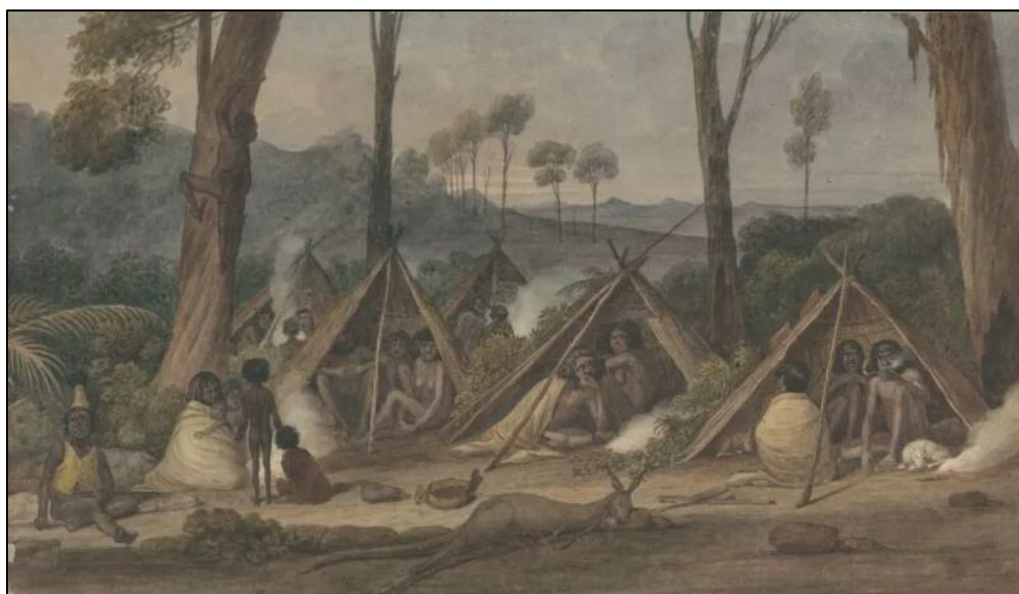


Plate 1. “A native camp of Australian savages near Port Stevens, [i.e. Stephens] New South Wales”, by Augustus Earle. 1826. National Library of Australia; Rex Nan Kivell Collection NK12/28. <http://nla.gov.au/nla.obj-134497417/view>

Thomas Skottowe, while Commandant of the Newcastle penal settlement from 1811 to 1814, collected several Aboriginal items from the region which were drawn by T.R. Browne (Plate 2). The items include spears, a shield, a spear-thrower, clubs, an axe with a European iron blade, a boomerang, a basket, a water-carrier, a twined dilly bag, and a fishing line with shell hook. The depicted items illustrate the use of various perishable materials including bark, wood and grasses that are rarely preserved in the archaeological record and would have constituted a large portion of the items used by past Aboriginal people.

Historical sources also recorded some of the uses that artefacts which are found within archaeological contexts would have had. Hatchets were constructed from hard stone which was chipped and then ground to an edge before being hafted while stone knives were documented as being used for cutting up meat and stone chips or shells used for skinning animals (Miller 1886: 353). Brayshaw (1987) provides a list of recorded material culture from the area, including forked poles for climbing trees, eucalypt bark canoes, bark string and netted bags, shell fish hooks, spears made with *Xanthorrhoea* shafts, spear-throwers, shield, clubs, and shaped sticks for digging yams and tubers.



Plate 2. Native Arms from Select Specimens From Nature of the / Birds Animals &c &c of New South Wales, Collected and Arranged by Thomas Skottowe Esqr. The Drawings By T.R. Browne. Image from the State Library of New South Wales: <http://www.sl.nsw.gov.au/collection-items/native-arms-select-specimens-nature-birds-animals-c-c-new-south-wales-collected-and>

Early historical sources also note that an abundant supply of fresh water and marine resources were available in the region from the Hunter River, the estuary towards the mouth of the Hunter River and the coast of the South Pacific Ocean (cf. Grant 1803). Aboriginal people were observed exploiting marine resources of the coast and Hunter River by fishing and gathering shell fish while terrestrial resources such as kangaroos, bandicoots, snakes and lizards were hunted in the hinterland areas (Grant 1803: 55; Fawcett 1898: 152; Threlkeld in Gunson 1974:54-55). Consumption of shellfish was particularly important along the coast, and historical sources also record lobster-diving around the Port Stephens area with William Scott noting that “lobsters were caught by the women who, in the sea dived amongst the rocks for them”. Various fishing techniques were used and canoes were used for both line and spear fishing. At Port Stephens in the mid 1800s, Scott recorded that women used the hook and line and men used spears. However, one method of fishing he observed included both men and women: “the women would be on the lookout for the shining, shimmering mass of fish to come round some wooded headland, and when their shrill outcries told of the approach of the finny prey, the men would rush to the shore. Hissing into the water would hurtle the heavy spears....” (Newcastle Morning Herald Supplement 1993 in AMBS 2005). Another technique included the use of a hand net, “forming a circle in shallow waters and enclosing the fish” (Threlkeld in Gunson 1974:190). Threlkeld also noted fish traps made from twigs and poles in streams (Threlkeld in Gunson 1974:190).

The Port Stephens region remains important to local Aboriginal people, who have maintained their traditional ties to the area through the sharing of knowledge and lore down generations. The consultation process to date has identified a number of people who have indicated their interest in the area, demonstrating the tangible link that members of the contemporary Aboriginal community retain to the land.

5 Archaeological Context

5.1 AHIMS web services

The Aboriginal Heritage Information Management System (AHIMS) is a heritage database and regulated under section 90Q of the *National Parks and Wildlife Act 1974*. AHIMS contains information and records pertaining to registered Aboriginal archaeological sites (Aboriginal objects, as defined under the Act) and declared Aboriginal places in NSW.

A search of AHIMS was conducted on 25 July 2019 to identify registered (known) Aboriginal sites or declared Aboriginal places within or adjacent to the study area (Appendix D).

The AHIMS Web Service database search was conducted within the following coordinates (GDA, Zone 56):

Eastings:	388850 - 393800
Northings:	6363000 - 6366500
Buffer:	0 metres (search coordinates included a buffer around the study area)

The AHIMS search results showed 75 Aboriginal sites recorded in or near the above location. No Aboriginal places had been declared in or near the above location. The locations of registered Aboriginal sites in the search area are shown on Figure 6. The frequencies of site types ('site features') are listed in Table 3.

Table 3. Frequency of site features from AHIMS database search

Site Context	Site Features	Frequency	(%)
Open Site	Aboriginal Resource and Gathering; Artefact	2	2.7
	Artefact	18	24.0
	Artefact; Shell	24	32.0
	Shell	24	32.0
	Restricted*	7	9.6
<i>Total</i>		75	100

*Seven restricted sites were present within the AHIMS search area, meaning no further information is available regarding site type, location or condition. Consultation with the AHIMS registrar confirmed that none of these were located within the study area and would not be impacted by any works within the Project area.

As well as determining if there are any registered (known) sites within a given area, an AHIMS search also helps to characterise local archaeology by illustrating the distribution of known sites within the local landscape. Search results for the current project indicated the predominance of open context occurrences of artefacts and shell (middens) around the study area. According to the data retrieved from AHIMS, these are the most common manifestations of archaeological material in the local area. Sites displaying solely shell (n=24) or solely artefacts (n=18) have also been recorded. Artefacts may be identified in isolation ('isolated finds') or in association with others in an artefact scatter (open camp site). Two artefact sites have also been recorded in association with areas of Aboriginal Resource and Gathering.

The presence of numerous recorded sites in the vicinity of the study area demonstrates physically that the local landscape was used by Aboriginal people in the past and that material traces of this landscape use have survived in the form of Aboriginal objects and archaeological deposit. No previously registered AHIMS sites are located within the study area although several are present on the wider Boral property. The wider property also contains one unregistered site (BFB 1) identified during a previous survey. These recordings are discussed further in section 5.3.

5.2 Other heritage registers and databases

A search was also undertaken of the following statutory and non-statutory heritage registers for Aboriginal heritage items within or adjacent to the study area:

- Port Stephens Local Environmental Plan (LEP) 2013;
- State Heritage Register and State Heritage Inventory;
- Section 170 Heritage and Conservation Registers;
- Commonwealth Heritage List;
- National Heritage List;
- Australian Heritage Database;
- Australian Heritage Places Inventory; and
- Register of the National Estate (N.B. the Register was closed in 2007 and is no longer a statutory list. It is maintained on a non-statutory basis as a publicly available archive and educational resource).



Figure 6. Registered Aboriginal sites near the study area (AHIMS results)

Three heritage items were identified on these registers. The Port Stephens LEP 2013 lists the 'Stockton Beach Dune System' within Lots 224–227 and 230 DP 1097995, Lots 216 and 218 DP 1044608, Lot 592 DP 1097992 and Lot 7033 DP 1053720. The item borders the wider Boral property to the east and north. The item is listed as a natural landscape. The listing includes 'Aboriginal site and shell middens, ship wrecks, WWII ramparts, tank traps, proofing range, rifle range and tin huts' within the Stockton Beach Dune System. The item is listed as 'I34' on Schedule 5 of the Port Stephens LEP 2013 as displaying local heritage significance. The item is located outside of the current study area.

The Register of the National Estate, a non-statutory archive which closed in 2007, lists two further recordings in the Fern Bay area. 'Newcastle Bight Coastal Area' is listed as an Indicative Place (i.e. was not accessioned onto the register prior to its closing) and was nominated for its Natural value. The statement of significance includes Aboriginal heritage values in its description, particularly "some of the largest Midden sites in NSW as well as burial and educational sites". The recording is not a listed heritage item and has no legal status as a statutory heritage item.

A second Indicative Place described only as 'Indigenous Place' is listed for the suburb of Fern Bay, with no further information available. This recording is also not a listed heritage item and has no legal status as a statutory heritage item.

No other Aboriginal heritage items or items of Aboriginal heritage significance were listed on these databases within or in the vicinity of the study area.

5.3 Previous investigations around the study area

The study area and adjacent areas have been subject to a number of detailed archaeological investigations conducted as part of the planning and approval process for previous sand extraction activities, as well as larger scale regional studies of the Newcastle Bight.

Newcastle Bight Aboriginal Sites Study

The Newcastle Bight Aboriginal Sites Study was a comprehensive and large scale assessment undertaken in the late 1980s to inform the region's future development planning (Dean-Jones 1990). The assessment area encompassed the whole of the Bight and a range of environmental and geomorphological contexts. A detailed analysis of environmental change and landscape processes through the Late Pleistocene and Holocene was formulated in order to better understand the Aboriginal archaeological record. The study also included a review of previously recorded sites and relevant ethnographical data. Prior to this study, approximately 70 Aboriginal archaeological sites had been formally recorded within the Bight's dual barrier system, primarily midden sites. While some of these were spatially extensive, including dense concentrations of stone artefacts and packed, stratified shell, the majority of middens were smaller deposits exhibiting high levels of disturbance from a combination of natural (aeolian, fluvial) factors and modern landscape use. The dynamic geomorphic context of the Bight was highlighted as a particular factor in site taphonomy, detection and distribution patterning.

A field survey was undertaken as part of the assessment and recorded over 100 archaeological sites, with a further 40-50 additional middens noted in the modern foredune/swale but not recorded in detail. Midden sites predominated, with three quarters (74%) of the newly recorded sites including at least a sparse scatter of estuarine or marine shell material. Most of these were thin and disturbed deposits, with only 12% displaying dense concentrations or lenses of packed shell. Stone artefacts were relatively rare, with fewer than five recorded at most sites where these were present. Denser concentrations of stone artefacts were associated with two particular types of site: midden complexes associated with late Holocene stable dune surfaces overlooking the deflation basin at the rear of the beach, and open campsites on Pleistocene dunes associated with Pleistocene freshwater wetlands or Holocene estuarine wetlands. It was noted that despite the presence of sites on Pleistocene dune surfaces of the inner barrier, there was no evidence that these were of an age with the substrate, and were generally similar in stone tool technology to more recent sites from the Holocene barrier. Site differences appeared to relate to differing environmental contexts and exploitation of the attendant resource zones rather than differences in site age.

An analysis of site distribution patterning was undertaken based on the results of the background research and the field survey. For the most part, newly identified sites recorded during the survey were located on the deflation basin and outer margin of active transgressive dunes. Almost all were middens. This was considered to represent intensive occupation of the deflation basin/dune area over the last 1000 years but with several caveats; namely, very active geomorphological processes. In particular, dune cycling and the movement of transgressive dunes leads to constant exposure, deflation and reburial of archaeological material. Freshwater pools in the swales and deflation basin also deflate and rework middens around their margins. Large and complex middens may only be exposed as discontinuous, disturbed scatters or recorded as several smaller sites and archaeological context was hard to ascertain where no direct association with a recognisable land surface existed.

A total of 18 sites were recorded on the stable, vegetated Phase 1 and 2 hind dunes. Most were in locations associated with modern freshwater and estuarine environments along the interbarrier depression, although eight were located in

the body of the transgressive dune field. Sites were situated on weakly to moderately podzolised sands with a light grey A1 horizon incorporating organic material and charcoal and a slightly bleached A2 horizon. Shell content of the sand was low. Sites were found on both the Phase 1 and Phase 2 dunes and it was noted that although sites were not located on the highest points or on every longitudinal dune ridge, “they conspicuously avoid the swales” (Dean-Jones 1990:97). Sites comprised thin scatters of fragmented shell, with no stone artefacts observed. Species were predominantly pipi, with a smaller component of cockle and mud whelk.

Sites located further to the west, on Phase 1 dunes bordering the interbarrier depression, tended to have a higher representation of estuarine species, especially oyster, and had larger and denser middens with stone artefacts much more frequently recorded. Archaeological sites on the seaward side of the outer barrier were located either at the interface between the deflation basin and the seaward base of the transgressive dune, or in close association with linear exposures of the older Holocene land surface (wherever this occurred). The Fern Bay sites recorded during this assessment near the current study area are located within these contexts, further to the east of the study area in the active transgressive Phase 3 dune field. Disturbed shell scatters around the margins of the freshwater soaks were considered to be lag deposits in the deflating floor of the swales and blowouts. Given the high number of sites recorded within these areas, the active transgressive dune/deflation basin margin was ascribed with high archaeological sensitivity, although it was noted that apart from the current beach/foredune, this was also the area with the greatest geomorphic instability. It was also noted that 4WD activity was impacting on numerous sites. It was recommended that this activity be better managed to minimise archaeological impact, and that the NPWS explore the possibility of increasing their landholdings in the Bight in order to capture a sample of the aeolian surfaces which dominate its complex geomorphology.

Stockton Rifle Range

An Aboriginal cultural heritage and archaeological assessment was undertaken for a proposed residential development at the Stockton Rifle Range approximately 3.4 kilometres to the south west of the current study area (Umwelt 2017). The assessment comprised a review of background information including landscape factors and archaeological context, an Aboriginal community consultation process and a field survey. The assessment focused on the proposed development lands within the vegetated stable dune system east of Fern Bay. The part of the property containing the active transgressive (unvegetated) dune field and beach front was to be rezoned as E2 Environmental Conservation land and not developed.

A review of landscape factors identified the complex geomorphology of the Stockton Bight dual barrier system and dune transgression sequence as a key factor in understanding archaeological site occurrence, visibility and preservation. In particular, it was noted that the Holocene beach ridge, strand plain and dune sequence present along the outer barrier had a maximum age of approximately 6000 BP. Within this sequence, the three phases of dune transgression have been dated to 4500 - 4000BP for Phase 1, 2300 - 1200BP for Phase 2, and the currently active Phase 3 approximately 300BP.

The environmental context of the local area was identified as having provided a wide range of resources to Aboriginal people. Flora and fauna from terrestrial, saltmarsh, estuarine and marine environments would have provided raw materials for food, medicine, and material culture. Stone resources suitable for tool-making do not occur in the immediate area but were available from outcrops at Nobbys Head to the south and various coal measures at Shortland and Tomago to the west and northwest. Coastal woodland would have been present across the earlier Phase 1 and Phase 2 stable transgressive dunes, supporting a range of mammal, reptile and bird species that provided food and other resources for Aboriginal people.

Review of archaeological context confirmed that shell middens were the most commonly recorded site type in the area. A previous analysis of archaeological patterning by Umwelt (2003) identified that sites recorded within the vegetated dune field (stable Phase 1 and 2 transgressive dunes) were primarily small scatters of stone artefacts or small (likely single event) pipi middens. Sites within the vegetated dunes tended to be buried and only visible in disturbed areas, resulting from a combination of bioturbation, occupation processes (e.g. trampling) and natural slope movement processes. This exposure of material that previously would have been in a subsurface context suggested that deposits were not deep within the dune profile (<1 metre). However, it was also noted that stabilised dunes are still subject to erosion moving sands downslope (degrading) or the addition of new wind-blown sand or ongoing podsol formation (aggrading). The stable Phase 1/2 dunes may therefore have both aggrading and degrading surfaces through time, which may affect the location and integrity of any archaeological deposits they contain.

Sites within the deflation basin between the foredune and the active, un-vegetated Phase 3 dunes included both small scatters and middens along with more complex sites, with identification and exposure of archaeological material “at least partially dictated by the history of deposition and deflation in the location and the destructive forces of aeolian abrasion” (Umwelt 2003). It was also noted that most sites in the Outer Barrier had not been subject to dating, and that while sites were known to occur on the buried soil surfaces of the Holocene foredune ridge plain, the archaeological material was not necessarily of the same age.

Field survey was undertaken of the proposed residential development area located within the western vegetated area. Eleven previously unrecorded sites were identified and the locations of two previously recorded sites within the area were revisited. Sites comprised disturbed, low density artefact scatters with shell midden material. Artefact raw material was primarily Nobbys tuff with occasional silcrete. Shell material was generally in poor condition, weathered and highly fragmented. The archaeological sensitivity and potential of the remainder of the vegetated dunes was linked to disturbance factors.

Sites were identified in areas of exposure and disturbance associated with the decommissioning and remediation of the former rifle range and Defence lands, or along recreational vehicle tracks. The location of four further registered sites (presumed but unconfirmed burials registered as a result of anomalous results on a Ground Penetrating Radar survey) were confirmed to be outside the proposed development area, along the Popplewell Road reserve to the west. In general, the recorded middens displayed low integrity and low research potential due to previous disturbance. The cultural values assessment conducted by the Aboriginal community identified that the more intact, vegetated stable dunes north of the access road, known site locations and the potential burials displayed high significance.

Stockton Sandpit Sand Extraction – Archaeological Assessment (1994)

In 1994, Resource Planning Pty Ltd undertook an archaeological assessment and survey to inform the EIS being prepared for the proposed sand extraction area in the centre of the Boral property. The study area for this assessment is the same as the previous sand extraction area and the current study area. The assessment included a review of background archaeological and environmental context, review of previous investigations both in and around the study area, development of site predictions, archaeological field survey and an impact assessment/recommendations for the sand extraction proposal. The assessment was undertaken with the Worimi LALC.

The study area was confirmed to be located on the Phase 1/2 stable hind dunes, across an area of low, stabilised sandy swamp and an area of higher stable dunes. Several vegetation species in the area were identified as having been used by Aboriginal people as food and medicinal resources, as well as for material culture such as string, baskets and containers. Stone resources were found to be scarce on the outer barrier, only known to be present at Nobbys Head (fine cherty tuffs) and Tomago (silicified crystalline tuffs). It was suggested that Aboriginal people living around the study area would have accessed these via water craft. A review of previous investigations and recorded sites identified that the majority of known archaeological sites in the local area sites were middens and were mostly located within the active Phase 3 dune system, deflation basin and foredune along the current beach. Middens were also known to occur on the landward side of the stabilised Phase 1 dunes facing the interbarrier depression. Based on background information review, these two landscape contexts appeared to be the most archaeologically sensitive, with fewer recordings known from the Phase 2 dune field. Stone artefacts were found to be generally rare in small midden sites but were common at the larger, stratified sites.

Previous assessments undertaken in the Phase 1/2 dune field immediately to the south of Boral's holdings indicated that midden material was primarily identified in areas of disturbance. In particular, Koettig (1987) stated that midden material was present 10-20cm below the present ground surface and thus would only be identified in areas where ground disturbance extended to at least this depth. A shovel testing program was also undertaken by Dean-Jones in the area, which concluded that midden material was consistently identified on ridges between 30-50cm below the present ground surface (ERM 1994:5.30).

It was established that two previously recorded AHIMS sites were present on the wider Boral property. Both were recorded during a previous survey assessment of the Boral property in 1992 (Resource Planning 1992). 38-4-0321 comprised an open artefact scatter recorded on the edge of the Phase 1 stabilised dune along the Boral property boundary along Nelson Bay Road. Eight tuff flakes were identified along the southern side of the road, with a further 40 located along the northern side of the road. The second site (38-4-0322) was identified within the former deflation basin landward of the active transgressive dune field. The site comprised a small, disturbed shell midden of crushed pipi fragments in the vicinity of three waterholes. Neither site was located in the proposed extraction area (current study area) and neither was to be affected by the proposed quarrying. Two further locations of potential were identified during the 1992 survey. The first of these was a sparse scatter of fragmented rock oyster and whelk located on the dune face of the Phase 2 dune, and the second was scattered fragments of oyster shell on the dune slope near Nelson Bay Road. Neither of these locations were recorded as archaeological sites.

Archaeological field survey was undertaken of the proposed extraction area with the Worimi LALC, with a particular focus on areas of exposure and ground disturbance that could be expected to reveal archaeological material (e.g. vehicle and animal tracks, areas of natural exposure). No archaeological material was identified within the study area and it was confirmed that previously recorded sites would not be affected by the proposal. The potential for subsurface midden sites was assessed as low and it was noted that previous drilling programs across the property did not detect any subsurface shell deposits or archaeological material. Given the indications from previous studies that midden material occurred within the top ~50cm of the profile in the Phase 1/2 dune field, the study area was considered unlikely to contain any buried deposits. It was concluded that there was low site potential in the Phase 2 dunes where the extraction was proposed.

The fragmented material previously identified on the Phase 2 dune in 1992 was considered to display low to no archaeological value and was not considered to be a constraint. The report provided by the Worimi LALC confirmed that no archaeological material was found within the study area despite an intensive field survey. Overall, it was recommended that the sand extraction could proceed with no objection on Aboriginal archaeological grounds. Port Stephens Council subsequently gave development consent for the project in 1996 and extraction was undertaken until the approved resource was exhausted in 2008. Extraction activities completed under this development consent have impacted the majority of the current study area (cf. Figures 2 and 5).

Stockton Sandpit Windblown Sand Extraction - Archaeological Assessment (2005)

Aboriginal heritage assessment also formed part of the EIS prepared for the subsequent Windblown Project to the east of the current study area (ERM 2005b). This assessment included the overall Boral property but focussed on the proposed Windblown extraction area, primarily the active transgressive dune previously dredged for mineral sands by MDL. The assessment included background research to provide an assessment of the potential for the study area to contain cultural material, a site inspection to assess Aboriginal cultural heritage and areas of potential cultural heritage, and consultation with the Aboriginal community (Worimi LALC and Maaiangal Aboriginal Heritage Incorporation).

Environmental assessment confirmed that the proposed windblown sand extraction area was located in a geomorphically complex and dynamic context. Three periods of dune transgression were noted for the outer barrier, described by ERM as follows: the first occurred approximately 4000 years ago, the second approximately 1200 years ago and the third, which is still active and is overriding the 1200 year old outer transgressive dune, began approximately 300 years ago. The entirety of the Windblown Project was located on the active, 300 year old transgressive dune. Analysis and discussion of the previous MDL mineral sand extraction operation concluded that the entirety of the previously dredged area had been subject to severe disturbance to a level several metres below the water table. It was noted that shell and gravel material occurred throughout the processed sands and were occasionally left as lag deposits on the 'dune' surfaces. Ongoing disturbance from recreational 4WD activity along the active dunes was also considered likely to have impacted on cultural material.

Review of background archaeological information indicated that the majority of the sites recorded along the Stockton Bight were located on or near the deflation basin between the frontal dune and the main transgressive dune mass; however it was noted that this patterning may have been the result of better visibility and exposure in comparison to the stable, vegetated Phase 1 and 2 dunes. This accorded with the findings of the Newcastle Bight Aboriginal Sites Study, which identified this as a particularly archaeologically sensitive part of the outer barrier. Previous assessment had recorded few sites on the active Phase 3 transgressive dune mass landward of the deflation basin.

It was identified during background information review that several previously recorded AHIMS sites near Boral's property boundary were likely located slightly further seaward than their registered coordinates. There were no recorded sites within the proposed Windblown extraction area, and recent dredging meant there was considered to be almost no archaeological potential (ERM 2005a:82). There was considered to be low to moderate archaeological potential in the corridor between the dredge path and native vegetation on the Phase 1/2 dunes, and one new site (named BFB 1) was recorded here during the subsequent field survey. The site comprised a shell midden of moderate density, highly fragmented pipi on an exposure of the darker old Holocene land surface. No artefacts were recorded. The proposed windblown sand project impact area was changed in order to avoid the site, which has not been registered on AHIMS.

The Aboriginal cultural assessment found that the overall landscape, native vegetation, waterholes, and archaeological sites were all significant to the Aboriginal community. Significance assessment for BFB 1 found the site to have low archaeological significance. Following modification of the proposed extraction area to avoid BFB 1, impact assessment considered that the Windblown project would not impact on any Aboriginal cultural heritage. In particular, the potential for Aboriginal cultural material to occur in the area previously subject to dredging was assessed as minimal given the severe levels of disturbance. No further archaeological work was recommended and the project was granted consent from the then Minister for Planning in 2006.

Summary

The review of background information revealed there were no known Aboriginal archaeological sites within the study area and proposed extraction area associated with the Project. Previous assessment for the original extraction EIS (1994) in consultation with the Worimi LALC did not identify any Aboriginal archaeological sites or project constraints within the study area. The potential for subsurface Aboriginal archaeological material in the current study area is low and has not been indicated by previous investigations including an extensive drill sampling program. The current study area is generally highly disturbed due to the existing extraction operation.

6 Site Inspection

A site inspection was carried out as part of the Aboriginal heritage assessment of the study area. The visual inspection included a pedestrian walkover and assessment of the study area. Inspection was undertaken by Dr Matthew Kelleher (KNC) accompanied by Neil Gascoyne (Boral) and Registered Aboriginal Stakeholders for the Stockton Sand Quarry property. Aboriginal community participation in the site inspection is detailed in Section 2.

The site inspection aimed to identify Aboriginal objects or sites (if present), assess the archaeological potential and sensitivity of the study area, and confirm the nature and extent of previous disturbance.

The majority of the study area was confirmed to be severely disturbed following the previous sand extraction program. Large sections of the former dunes are absent, with the expansion of the central low-lying basin landform following extraction. The adjoining slopes to the west have also been modified as part of the rehabilitation program, which included shaping and contouring of the finished batters to merge more harmoniously with the remaining portion of the adjacent unworked dune body. A revegetation program has also been undertaken and the reinstated higher elevation slopes and crests to the south and west are heavily vegetated with native regrowth, primarily from the Coastal Sand Apple – Blackbutt open forest vegetation community. Ferns, grasses and stripped saplings provide ground cover and leaf litter is abundant. The aerial imagery from 2004 (Figure 5) indicates the widespread nature of extraction disturbance in this area despite current rehabilitated conditions.



Plate 3. Typical regrowth vegetation cover in south western part of study area



Plate 4. Patchy exposures in vegetated south western part of study area

Topsoil has been reintroduced to a number of areas in order to support the vegetation. Ground surface exposures were infrequent, and where present the visibility was generally low. Exposures were primarily of clean, cream- to buff-coloured sand with little podzol development or organic A horizon evident. No shell midden material or Aboriginal objects were observed in these areas. Scattered introduced fill and other rubble (used onsite to construct haul roads) was present on the surface in some of the larger exposures.



Plate 5. Typical cleared area with scattered fill material on surface in former extraction area



Plate 6. View to north east from south western elevation showing central basin extraction area

The central basin formed by the previous extraction program is undulating and vegetated with a mixture of cereal grasses (stabiliser crop introduced to protect against immediate aeolian erosion) and scattered spinifex, as well as regrowth shrubs and smaller native saplings around the margins of the basin. Ground disturbance from tracks and the former haul roads was evident. Areas of lower apparent disturbance along the southern margin of the study area where the future haul road is proposed were closely inspected but no archaeological sites or areas of potential were identified.



Plate 7. View to south west from edge of central basin looking towards vegetated higher dunes to the south



Plate 8. View to north across central basin

The eastern portion of the study area was also closely inspected due to the presence of small areas of remnant landform with low apparent disturbance and larger mature regrowth trees. These were present in between larger areas of disturbance associated with previous extraction activities and vegetation clearance (cf. Figure 5). Ground surface visibility was generally low due to thick vegetation cover, restricted to small areas around trees and on the slopes where downhill sand movement had created exposures. No shell material or archaeological sites were identified.



Plate 9. View up slope north of current haul road showing exposures



Plate 10. View to south from crest above current haul road showing vegetation coverage and landform

Summary

Visual inspection confirmed the extent and nature of previous extraction disturbance within the study area. These areas have little to no archaeological potential given the previous removal of the dune mass to 5 metres AHD. Ground surface exposure within the study area varied from high to low, with archaeological visibility obscured by vegetation and disturbed sands.

Areas of lower apparent disturbance (i.e. apparent remnant slope/crest landforms on the edges of the former extraction area) were closely inspected but no archaeological material was identified despite frequent exposure and localised disturbance of the ground surface.

No archaeological sites, Aboriginal objects or areas of Aboriginal archaeological potential were identified. No shell material was identified. Archaeological potential for subsurface archaeological deposits was assessed as very low to nil given the extent of previous disturbance and the findings of previous assessments.

7 Cultural heritage values and statement of significance

7.1 Significance assessment criteria

One of the primary steps in the process of cultural heritage management is the assessment of significance. Not all sites are equally significant and not all are worthy of equal consideration and management (Sullivan and Bowdler 1984, Pearson and Sullivan 1995:7). The determination of significance can be a difficult process as the social and scientific context within which these decisions are made is subject to change (Sullivan and Bowdler 1984). This does not lessen the value of the heritage approach, but enriches both the process and the long-term outcomes for future generations, as the nature of what is conserved and why, also changes over time.

Significance assessments can generally be described under three broad headings (Pearson and Sullivan 1995:7):

- value to groups such as Aboriginal communities;
- value to scientists and other information gatherers; and
- value to the general public in the context of regional, state and national heritage.

The assessment of significance is a key step in the process of impact assessment for a proposed activity as the significance or value of an object, site or place will be reflected in resultant recommendations for conservation, management or mitigation.

The *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (OEH 2010a) requires significance assessment according to criteria established in the *Australia ICOMOS Burra Charter* (Australia ICOMOS 2013). The *Burra Charter* and its accompanying guidelines are considered best practice standard for cultural heritage management, specifically conservation, in Australia. Guidelines to the *Burra Charter* set out four criteria for the assessment of cultural significance:

- Aesthetic value - relates to the sense of the beauty of a place, object, site or item;
- Historic value - relates to the association of a place, object, site or item with historical events, people, activities or periods;
- Scientific value - scientific (or research) value relates to the importance of the data available for a place, object, site or item, based on its rarity, quality or representativeness, as well as on the degree to which the place (object, site or item) may contribute further substantial information; and
- Social value - relates to the qualities for which a place, object, site or item has become a focus of spiritual, political, national or other cultural sentiment to a group of people. In accordance with the *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW*, the social or cultural value of a place (object, site or item) may be related to spiritual, traditional, historical or contemporary associations. "Social or cultural value can only be identified through consultation with Aboriginal people" (OEH 2011:8).

Significance assessment focusses on the social/cultural, historic, scientific and aesthetic significance of Aboriginal heritage values as identified in *The Burra Charter* (Australia ICOMOS 2013). The identification of significance is developed in consultation with the registered Aboriginal stakeholders. Assessed values for the study area are detailed below.

Cultural / social significance

This area of assessment concerns the value(s) of a place, feature or site to a particular community group, in this case the local Aboriginal community. Aspects of social significance are relevant to sites, objects and landscapes that are important or have become important to the local Aboriginal community. This importance involves both traditional links with specific areas as well as an overall concern by Aboriginal people for sites generally and their continued protection. Aboriginal cultural significance may include social, spiritual, historic and archaeological values and is determined by the Aboriginal community.

It has been identified during the consultation process that the general area has high cultural heritage value (social value) to the local Aboriginal community. Cultural or social values provided by the registered Aboriginal stakeholders are discussed in Section 2. No specific cultural values for the study area have been identified to date.

Historic significance

Community consultation and historical research has not identified any information regarding specific historical significance of the study area. No specific historical significance for the project area has been provided by the registered Aboriginal stakeholders to date. Archaeologically, the study area does not contain these values in relation to Aboriginal heritage.

Scientific / archaeological significance

For archaeologists, scientific significance refers to the potential of a site to contribute to current research questions. Alternately, a site may be an in situ repository of demonstrably important information, for example rare artefacts of unusually high antiquity.

Scientific significance is assessed using criteria to evaluate the contents of a site, state of preservation, integrity of deposits, representativeness of the site type, rarity/uniqueness and potential to answer research questions on past human behaviour. Recommended criteria for assessing archaeological significance include:

- Archaeological Research Potential - significance may be based on the potential of a site or landscape to explain past human behaviour and can incorporate the intactness, stratigraphic integrity or state of preservation of a site, the association of the site to other sites in the region (connectivity), or a datable chronology;
- Representativeness - all sites are representative of those in their class (site type/subtype) however the issue here relates to whether particular sites should be conserved to ensure a representative sample of the archaeological record is retained. Representativeness is based on an understanding of the regional archaeological context in terms of site variability in and around the study area, the resources already conserved and the relationship of sites across the landscape; and
- Rarity – which defines how distinctive a site may be, based on an understanding of what is unique in the archaeological record and consideration of key archaeological research questions (i.e. some sites are considered more important due to their ability to provide certain information). It may be assessed at local, regional, state and national levels.

High significance is usually attributed to sites which are so rare or unique that the loss of the site would affect our ability to understand an aspect of past Aboriginal use/occupation of an area. In some cases a site may be considered highly significant because it is now rare due to destruction of the archaeological record through development. Moderate (medium) significance is attributed to sites which provide information on an established research question. Sites with moderate significance are those that offer the potential to yield information that will contribute to the growing holistic understanding of the Aboriginal cultural landscape of the project area. Archaeological investigation of moderately significant sites will contribute knowledge regarding site type interrelationships, cultural use of landscape features and occupation patterns. Low significance is attributed to sites which cannot contribute new information about past Aboriginal use/occupation of an area. This may be due to site disturbance or the nature of the site's contents.

The study area does not display any scientific/archaeological significance as it does not contain any identified Aboriginal archaeological sites or areas of potential. The area displays no archaeological research potential and is not representative of the wider Phase 1-2 Holocene dune landscape bordering the Stockton Bight due to the extent of previous disturbance.

Aesthetic Values

Aesthetic values are often closely related to the social values of a site or broader cultural landscape. Aspects may include scenic sights, smells and sounds, architectural fabric and creative aspects of a place. No specific aesthetic values for the study area have been identified by registered Aboriginal stakeholders to date. Archaeologically, the study area does not contain these values in relation to Aboriginal heritage due to the extent of previous disturbance. Neighbouring landforms (outside the study area) retain aesthetic values representative of the Phase 1-2 Holocene dune landscape along the Stockton Bight.

7.2 Statement of significance

The wider local area has cultural value for the local Aboriginal community. The identified cultural value is a feeling of attachment and responsibility for the land. Registered Aboriginal stakeholders have expressed that traditional knowledge indicates significant areas in the surrounding dune field (outside of the Boral property and proposed impact area).

To date, no areas of Aboriginal cultural significance have been identified within the study area. Stakeholders concurred with the assessment of existing severe disturbance within the study area and proposed extraction area. The study area does not display any identified archaeological, historic or aesthetic significance in relation to Aboriginal heritage values.

8 Discussion and impact assessment

Boral is seeking approval for continued operations at the site through an SSD application (SSD 9490) to the DPIE. Boral propose to extract sand from the former sandpit by excavator and dredging. This assessment has considered the impact to Aboriginal heritage values within the study area as a result of the proposed surface disturbance and sand extraction activities.

The review of background information revealed there were no known Aboriginal archaeological sites within the study area and proposed extraction area. Previous assessment for the original extraction EIS (1994) in consultation with the Worimi LALC did not identify any Aboriginal archaeological sites or project constraints within the study area. The potential for Aboriginal archaeological material in the current study area is low and has not been indicated by previous investigations.

The potential for subsurface midden sites has consistently been assessed as low to minimal and it was noted that extensive previous drilling programs across the property did not detect any subsurface shell deposits or archaeological material.

The previous extraction program removed the dune bodies within the extraction area to a depth of 5 metres AHD. Extraction to this depth is likely to have removed any once present archaeological material associated with the earlier Holocene foredune ridge plain at 5-10 metres AHD. Given the indications from previous studies that midden material within the Phase 1-2 dune field occurs within the top ~50cm of the profile, potential for deposit associated with these geomorphological elements has also been removed. The Project area is therefore considered unlikely to contain any buried deposits associated with Aboriginal occupation.

The study area is generally highly disturbed due to the previous operations associated with the inland extraction area. Site inspection confirmed the extent and nature of previous disturbance and no Aboriginal objects, archaeological sites or areas of archaeological potential were identified. Areas of lower apparent disturbance (i.e. apparent remnant slope/crest landforms on the edges of the former extraction area) were closely inspected but no archaeological material was identified despite frequent exposure and localised disturbance of the ground surface.

The study area does not display any scientific/archaeological significance as it does not contain any identified Aboriginal archaeological sites or areas of potential. The wider landscape encompassing the Boral property retains Aboriginal cultural value and significance, including nearby traditional areas, movement routes, flora and fauna communities, natural landscape values and the linkages the landscape provides to ancestors and storylines.

The configuration of the Project has been developed having regard to the constraints of the land, the desire to mitigate and avoid impacts where possible, whilst balancing the commercial viability of the Project and the extent of the known resource. The Project seeks to capitalise on sand availability within the area of existing and previous operations, maximising output from existing production facilities. This results in a smaller disturbance footprint and minimises environmental impacts compared to expansion into un-quarried adjacent areas within the wider property. Impact to intrinsic Aboriginal cultural values of the surrounding landscape is also minimal.

No Aboriginal heritage constraints have been identified for the Project. No avoidance or mitigation measures are required for the Project on Aboriginal heritage grounds.

Management measures should be implemented for adjacent areas (outside of proposed impact area and study area). Aboriginal objects are known to occur in adjacent landforms and these must be avoided by all proposed extraction activities. Management measures to be implemented should include clear delineation of the boundary of the approved impact area and the inclusion of Aboriginal heritage in the existing Environmental Management Strategy (EMS) for the quarry. Documented toolbox talks should also be held to ensure all on-site staff and contractors are aware of obligations and requirements regarding the protection of Aboriginal heritage.

9 Management and Recommendations

The following management recommendations have been made for the Project, based on the findings of the CHAR assessment and in consultation with Registered Aboriginal Stakeholders.

No impact to Aboriginal heritage was identified for the Project.

The management measures detailed below provide an additional process to manage Aboriginal cultural heritage through the operation lifetime of the extraction area.

9.1 Heritage Training and Induction Process

- **Aboriginal heritage management procedures will be included in quarry personnel training and induction processes.**

Aboriginal heritage management procedures and responsibilities for compliance will form part of the project induction for quarry personnel (employees, contractors, subcontractors and/or agents). This will include site identification (including heritage site map) to ensure all personnel are aware of Aboriginal heritage management responsibilities, issues affecting their activities and procedures for dealing with unexpected finds including human remains.

9.2 Avoiding Impact to Adjacent Areas

The CHAR and recommendations made herein are specific to the area assessed for the Project as described in this report and referred to as the 'study area' (refer Figures 1 and 2). All works associated with the Project should be contained within the study area. Additional archaeological or Aboriginal heritage assessment would be required for any proposed impacts outside the current study area.

Aboriginal objects are known to occur in adjacent landforms and these must be avoided by all proposed extraction activities. Management measures to be implemented should include clear delineation of the boundary of the approved impact zone and the inclusion of Aboriginal heritage in the existing Environmental Management Strategy (EMS) for the quarry. Documented toolbox talks will also be held to ensure all on-site staff and contractors are aware of obligations and requirements regarding the protection of Aboriginal heritage.

9.3 Unexpected Finds Procedure

- **Any unexpected Aboriginal heritage items (Aboriginal objects) will be managed appropriately.**

In the event that an unexpected find (Aboriginal object) is encountered the following procedure will apply:

1. Stop work and protect find area and report to environmental manager;
2. Contact heritage advisor for identification;
 - a. No further action if the find is not an Aboriginal object; and
 - b. If the find is an Aboriginal object proceed to next step;
3. Undertake relevant regulatory requirements and contact with DPIE where required;
4. Implement conservation or mitigation strategy;
5. Obtain approval if required and comply with conditions; and
6. Recommence work.

9.4 Procedures for Handling Human Remains

- **Note that Project Approvals do not include the destruction of human remains**
- **Any potential human remains encountered will be protected and managed appropriately.**

This section outlines the procedure for handling human remains in accordance with the Skeletal Remains – Guidelines for the Management of Human Skeletal Remains under the *Heritage Act 1977* (NSW Heritage Office 1998) and the Aboriginal Cultural Heritage Standards and Guidelines Kit (NPWS 1997). In the event that quarry operations reveal possible human skeletal material (remains), the following procedure is to be followed:

1. as soon as remains are exposed, all work is to halt at that location immediately and the Quarry Manager on site is to be immediately notified to allow assessment and management;
 - i. stop all activities;
 - ii. secure the site; and
 - iii. not further harm the remains.

2. contact police: the discovery of human remains triggers a process which assumes that they are associated with a crime. The NSW Police retain carriage of the process until such time as the remains are confirmed to be Aboriginal or historic;
3. DPIE, as the approval authority, will be notified when human remains are found;
4. once the police process is complete and if remains are not associated with a contemporary crime, DPIE will determine the process:
 - i. if the remains are identified as Aboriginal, the site is to be secured and all Aboriginal stakeholders are to be notified in writing; or
 - ii. if the remains are identified as non-Aboriginal (historical) remains then DPIE heritage division will be contacted as appropriate;
5. once the police process is complete and if the remains are identified as not being human work can recommence once the appropriate clearances have been given.

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Appendix A Advertisement for registration of interest

Notice for Registration of Interest

Boral Resources (NSW) Pty Ltd (Boral) owns and operates the Stockton Sand Quarry, a long standing operation that extracts and transports sand product for use in the building, landscaping and construction markets. The current operation extracts sand from the windblown dunes and has consent to transport up to 500,000 tonnes of sand product per year.

Due to current and future demand for sand in the Hunter and Sydney regions, Boral is seeking approval for continued and expanded operations at the site through a State Significant Development (SSD) application under Part 4 of the NSW Environmental Planning & Assessment Act 1979. The proposal will seek to extract sand from a former sandpit, located in the central portion of the site, by excavator and dredge (the project). Boral is seeking approval to excavate and dredge an estimated 8 million tonnes of sand at a rate of up to 500,000 tonnes per annum (tpa) from the former extraction area.

The proposal will seek approval to increase transportation of product by 250,000 tpa allowing for a total of 750,000 tpa of product to be transported from the site under two development consents. When extraction from the windblown dunes ceases, transportation limits will be reduced to 500,000 tpa.

The project is located at Coxs Lane, Fullerton Cove, NSW in the Port Stephens Local Government Area. The proponent is Boral Resources (NSW) Pty Ltd (Rachael Snape, Planning & Development Manager (NSW /ACT) – PO Box 6041, North Ryde NSW 2113).

Boral proposes to carry out consultation with Aboriginal people in accordance with the Office of Environment and Heritage Aboriginal cultural heritage consultation requirements for proponents 2010. The purpose of this consultation process is to inform the preparation of environmental assessment documentation and to assist the Department of Planning and Environment in its consideration of the project.

Boral invites Aboriginal groups and/or Aboriginal people who hold cultural knowledge relevant to determining the significance of Aboriginal objects and/or places within the vicinity of Stockton, NSW to register interest in a process of community consultation with the contact shown below (on behalf of Boral):

Boral Resources (NSW) Pty Ltd c/o Kelleher Nightingale Consulting
Level 10, 25 Bligh Street
Sydney NSW 2000
Phone: 9232 5373
Fax: 9223 0680

The closing date for registration is **21 March 2019**.

Please be advised that in accordance with OEH requirements, we are required to record the names and contact details of each Aboriginal person who has registered an interest in this project and provide a copy of that record to the relevant OEH office and Local Aboriginal Land Council (LALC). If you are registering your interest, please let us know if you do not want your details forwarded to these organisations.

Appeared in: *Port Stephens Examiner* (Thursday 7 March 2019, p.34)

Appendix B Aboriginal community consultation log

RECORD OF ABORIGINAL COMMUNITY CONSULTATION AND CONSULTATION LOG

Aboriginal cultural heritage consultation requirements for proponents 2010 (OEH)

STOCKTON SAND QUARRY DREDGING PROJECT (SSD 9490)

Step	Task Requirement	Action	Outcome
4.1.1	Identify if native title exists in relation to the project area.	Conducted National Native TitleVision (NNTV) search on 15/02/2019. Wrote to National Native Title Tribunal (NNTT) for a list of registered native title claimants, native title holders and registered Indigenous Land Use Agreements (letter dated 15/02/2019).	NNTV search showed no native title holders or registered Indigenous Land Use Agreements in the project area. 19/02/2019 NNTT: Provided data for the Port Stephens LGA. No native title holders or registered Indigenous Land Use Agreements for the project area.
4.1.2	Ascertain, from reasonable sources of information, the names of Aboriginal people who may hold cultural knowledge relevant to determining the significance of Aboriginal objects and/or places. Compile a list of Aboriginal people who may have an interest for the proposed project area and hold knowledge relevant to determining the cultural significance of Aboriginal objects and/or places	Wrote to various government agencies to obtain names and contact details of parties that may have an interest or hold cultural knowledge for the project area (letters dated 15/02/2019): Port Stephens Council (PSC); Hunter Central Coast ROG, Office of Environment and Heritage (OEH); Worimi Local Aboriginal Land Council (WLALC); The Registrar, <i>Aboriginal Land Rights Act 1983</i> for a list of Aboriginal owners (ORALRA); The National Native Title Tribunal (NNTT) for a list of registered native title claimants, native title holders and registered Indigenous Land Use Agreements; Native Title Services Corporation (NTSCORP Limited); and Local Land Services (LLS). (Letters dated 15/02/2019).	Responses received from: 19/02/2019 NNTT: Provided data for the Port Stephens LGA. No native title holders or registered Indigenous Land Use Agreements for the project area. 25/02/2019 OEH: Provided a list of Aboriginal stakeholders known to OEH that may have an interest in the project. Notes that consultation must be carried out before making an application for an AHIP and that consultation does not equal employment. Advises consultants must still advertise for interested parties. 07/03/2019 ORALRA: Advised that a search of the Register of Aboriginal Owners returned no results for the project area. Noted proximity of Worimi Conservation Lands (WCL). Suggested contacting WCL and WLALC for further assistance. 21/02/2019 PSC: Suggested contacting WLALC for further assistance.
4.1.3	Written notification and advertisement: Write to the Aboriginal people whose names were obtained in step 4.1.2 and the relevant LALC(s) to notify them of the proposed project. Place a notice in the local newspaper circulating in the general location of the proposed project, explaining the project and its exact	Notification letters (dated 05/03/2019) and invitation to register interest sent to people and groups identified in step 4.1.2. A1 Indigenous Services AGA Services Carol Ridgeway-Bissett Cacatua Culture Consultants Crimson-Rosie Divine Diggers Aboriginal Cultural Consultants Didge Ngunawal Clan Hunters and Collectors	Responses for registration of interest from written notification and advertisement were received from: Worimi LALC (via email 06/03/2019) Murra Bidgee Mullangari Aboriginal Corporation (via email 05/03/2019) Didge Ngunawal Clan (via email 05/03/2019) Merrigarn Indigenous Corporation (via email 05/03/2019) Muragadi Heritage Indigenous

Step	Task Requirement	Action	Outcome
4.1.3 contd.	<p>location.</p> <p>Notification by letter and newspaper must include:</p> <p>(a) the name and contact details of the proponent</p> <p>(b) a brief overview of the proposed project that may be the subject of an application for an AHIP, including the location of the proposed project</p> <p>(c) a statement that the purpose of community consultation with Aboriginal people is to assist the proposed applicant in the preparation of an application for an AHIP and to assist the Director-General of OEH in his or her consideration and determination of the application</p> <p>(d) an invitation for Aboriginal people who hold cultural knowledge relevant to determining the significance of Aboriginal object(s) and/or place(s) in the area of the proposed project to register an interest in a process of community consultation with the proposed applicant regarding the proposed activity</p> <p>(e) a closing date for the registration of interests.</p>	<p>Kawul Pty Ltd T/A Wonn1 Sites</p> <p>Karuah Indigenous Corporation</p> <p>Karuah LALC</p> <p>Lower Hunter Aboriginal Incorporated</p> <p>Lower Hunter Wonnarua Cultural Services</p> <p>Lakkari NTCG</p> <p>Murra Bidgee Mullangari</p> <p>Aboriginal Corporation</p> <p>Mindaribba LALC</p> <p>Mur-Roo-Ma Inc</p> <p>Nur-Run-Gee Pty Ltd</p> <p>Roger Matthews Consultancy</p> <p>Steve Talbott</p> <p>Worimi Conservation Lands</p> <p>Wonnarua Elders Council</p> <p>Widescope Indigenous Group</p> <p>Worimi LALC</p> <p>Worimi Traditional Owners Indigenous Corporation</p> <p>Wattaka Wonnarua CC Service</p> <p>Advertisement inviting people to register interest in consultation published in the <i>Port Stephens Examiner</i> on 07/03/2019. Advertisement attached as Appendix A.</p> <p>Closing date for registration of interest was 21/03/2019.</p>	<p>Corporation (via email 05/03/2019)</p> <p>Nur-Run-Gee Pty Ltd (via email 07/03/2019)</p> <p>Lower Hunter Wonnarua Cultural Services (via email 07/03/2019)</p> <p>Worimi Traditional Owners Indigenous Corporation (via email 07/03/2019)</p> <p>A1 Indigenous Services (via email 09/03/2019)</p> <p>Murrooma Incorporated (via email 11/03/2019)</p> <p>Karuah Indigenous Corporation (via email 11/03/2019)</p> <p>Widescope Indigenous Group (via email 12/03/2019)</p> <p>Worimi Conservation Lands (Board of Management) (via phone 13/03/2019)</p> <p>Amanda Hickey Cultural Services (via email 14/03/2019)</p> <p>Two additional stakeholders registered for consultation but specified they did not want their details released, in accordance with Step 4.1.5.</p> <p>A total of 16 stakeholders registered for the project.</p>
4.1.4	A minimum of 14 days from the date the letter was sent or notice published in the newspaper to register an interest.	<p>Closing date for registration of interest included in the notification letters and notice in the newspaper was at least 14 days from the date the letters were sent and notice appeared in the newspaper.</p> <p>Closing date for registration of interest was 21/03/2019.</p>	<p>A minimum of 14 days was provided.</p> <p>Letters were sent on 05/03/2019, advertisement was published on 07/03/2019, and the closing date for registration of interest was 21/03/2019.</p>

Step	Task Requirement	Action	Outcome
4.1.5	Must advise Aboriginal people who are registering an interest that their details will be forwarded to OEH and the LALC unless they specify that they do not want their details released.	Groups informed by letters (dated 05/03/2019) or verbally over the phone if they registered by phone.	Two registered Aboriginal stakeholder groups specified that they did not want their details to be released.
4.1.6	Make a record of the names of each Aboriginal person who registered an interest. Provide a copy of that record and copy of the notification from step 4.1.3 to the relevant OEH EPRG regional office and LALC	<p>List of registered stakeholders compiled. A total of 16 stakeholders registered for the project.</p> <p>Two registered Aboriginal stakeholder group specified that they did not want their details to be released.</p>	<p>Letters sent to OEH and Worimi LALC with list of registered Aboriginal stakeholders (letters dated 03/04/2019).</p> <p>Two registered Aboriginal stakeholder group specified that they did not want their details to be released.</p>
4.1.7	LALCs holding cultural knowledge relevant to determining the significance of Aboriginal objects and places in the proposed project area who wish to register an interest to be involved in consultation must register their interest as an Aboriginal organisation rather than individuals.	Worimi LALC registered interest to be involved in consultation.	Worimi LALC registered interest as an organisation. Provided contact details for the LALC and the name of a LALC representative to act as contact person (Jamie Merrick).
4.1.8	<p>Where an Aboriginal organisation representing Aboriginal people who hold cultural knowledge has registered an interest, a contact person for that organisation must be nominated.</p> <p>Aboriginal cultural knowledge holders who have registered an interest may indicate they have appointed a representative to act on their behalf. Where this occurs, the registered Aboriginal party must provide written confirmation and contact details of those individuals to act on their behalf.</p>	<p>Responses received from organisations and individuals registering interest in the project.</p> <p>Contact details and names of representatives were also provided.</p>	<p>Aboriginal stakeholders have registered as an organisation name or as individuals.</p> <p>Contact details and names of representatives for the organisations were provided and confirmed during the registration of interest process.</p>
4.2	Presentation of information about the proposed project	<p>Information regarding the proposed project provided throughout the consultation process including letters sent on 05/03/2019 and 03/04/2019.</p> <p>Information included an outline of the Project, location of the study area, development approval context and an invitation to consult during the assessment. Informal discussions also held during the registration of interest period.</p>	No responses to the provision of project information. Outcome of site visit is discussed below.

Step	Task Requirement	Action	Outcome
4.2 contd.		Stakeholders were also invited to attend a site inspection to discuss the project and Aboriginal cultural heritage.	
4.3.1- 4.3.2	Notification of proposed assessment methodology	<p>Copy of the proposed assessment methodology sent to all registered stakeholders with an invitation to provide comment (letters dated 03/04/2019).</p> <p>A 28 day review period was provided.</p>	<p>Responses to the proposed assessment methodology were received from A1 Indigenous Services (A1), Murra Bidgee Mullangari Aboriginal Corporation (MBMAC), Muragadi Heritage Indigenous Corporation (MHIC), Murrooma Incorporated (Murrooma), Merrigarn Indigenous Corporation (Merrigarn), Widescope Indigenous Group (WIG), and Worimi Traditional Owners Indigenous Corporation (WTOIC).</p> <p>A1 stated that they supported the proposed CHAR methodology and expressed interest in being involved in any potential fieldwork associated with the project (email dated 13/04/2019).</p> <p>MBMAC stated they had read the project information and proposed assessment methodology and endorsed the proposed approach (email dated 03/04/2019).</p> <p>MHIC stated that they endorsed KNC's assessment recommendations and had reviewed the project information and methodology (email dated 03/04/2019).</p> <p>Murrooma responded via email (09/04/2019) and requested some additional information prior to making comment, including a map of the proposed dredging area. KNC responded on 09/04/2019 and provided a map. Further comment was then provided by Murrooma on 23/04/2019. Murrooma stated that they agreed with the proposed assessment methodology and consultation process for the Project, and noted their involvement with previous assessments in the area. In particular, Murrooma identified the dune ridges as traditional transit routes along the coast, and noted the presence of culturally significant Worimi sites in the surrounding area. Murrooma also stressed the importance of having local knowledge holders involved in the consultation process.</p> <p>Merrigarn stated that they had read the project information and proposed assessment methodology and supported the recommendations made by KNC (email dated</p>

Step	Task Requirement	Action	Outcome
4.3.1- 4.3.2 contd.			<p>03/04/2019).</p> <p>WIG expressed support for the proposed methodology (email dated 19/04/2019).</p> <p>WTOIC expressed that the Project area held cultural significance for the Worimi people (email dated 06/05/2019) and recommended further assessment of the area due to the potential to find artefacts. WTOIC affirmed that it was “extremely important to our Worimi people to gain the best outcome for protection and preservation of our local sites/objects”.</p>
4.3.3	Gathering information about cultural significance	<p>Aboriginal stakeholders invited to provide information about cultural significance of the area (letters dated 05/03/2019, 03/04/2019 and 09/09/2019)). Previous comments recognised and additional comments sought.</p> <p>Stakeholders also invited to attend a site visit.</p>	<p>Throughout the assessment process, cultural knowledge regarding the Aboriginal cultural/social values of the study area and identified archaeological sites was sought from registered stakeholders. Stakeholders also invited to attend a site visit.</p> <p>Numerous stakeholders have expressed close familial and traditional connections with the area, and stakeholders retain oral histories and cultural knowledge of the area. Stakeholders expressed the importance of education and protection of Aboriginal cultural heritage, and consideration of the landscape as a whole when assessing archaeological sites and their connections across Country. Aboriginal cultural values and knowledge of the area have been provided by registered stakeholders throughout the consultation process to date and are summarised below.</p> <p>Murrooma highlighted the importance of the general area, stating that “there are many places within this area that have significant cultural value to Worimi people and are in close proximity to the proposed project. These places of social, spiritual and cultural value are traditional areas with direct linkage to our ancestors and storylines” (letter dated 23 April 2019). Murrooma noted that traditional uses of the area included transit routes across the dune fingers and stressed that local knowledge holders and Traditional Owners from the area should be the source of specific cultural information for the study area.</p> <p>WTOIC noted that the area was culturally significant to Worimi people (email dated 06/05/2019).</p>

Step	Task Requirement	Action	Outcome
-	Site inspection.	Stakeholders were invited to attend a site inspection of the study area with the proponent and project archaeologist. All stakeholders were invited to attend (invitations sent 18 June 2019) or provide a representative. The site inspection took place on 27 June 2019.	<p>Stakeholders attended across two sessions in the morning and afternoon. Representatives from Worimi LALC, Didge Ngunawal Clan, Nur-Run-Gee Pty Ltd, Murrooma, Worimi Conservation Lands, Karuah Indigenous Corporation, Widescope Indigenous Group and Amanda Hickey Cultural Services attended the inspection and Worimi LALC, Didge Ngunawal Clan, Nur-Run-Gee Pty Ltd, Murrooma, Worimi Conservation Lands and Karuah Indigenous Corporation representatives took part in the site walkover. Representatives were accompanied by project archaeologist Dr Matthew Kelleher (KNC) and Neil Gascoyne (Quarry Manager, Boral).</p> <p>The site inspection included a discussion of the site history and existing quarrying disturbance, further discussion of the Project, proposed extraction staging, remediation and archaeological context of the local area including location of nearby previously recorded sites. A site walkover was undertaken of the study area.</p> <p>No Aboriginal objects were identified and representatives concurred with the assessment of existing severe disturbance within the study area and proposed extraction area.</p>
4.4	Review of draft cultural heritage assessment report	<p>Stakeholders were provided with a copy of the draft CHAR and invited to review and provide comments/feedback (review package sent 23/08/2019).</p> <p>A 28 day review period was provided, ending on 23/09/2019.</p>	<p>Two responses to the draft CHAR were received from stakeholders (Appendix C).</p> <p>MBMAC stated that they had received and reviewed the draft CHAR, and endorsed the recommendations made in the document (email dated 12 September 2019).</p> <p>Muragadi stated that they agreed with the recommendations made in the report (email dated 13 September 2019).</p>

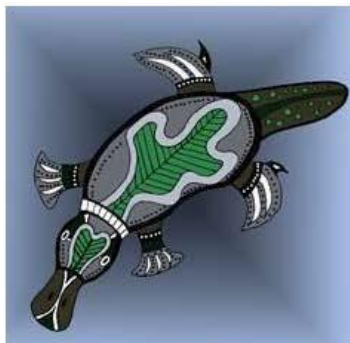
Appendix C Aboriginal stakeholder comments on draft CHAR

Zac Thomas

From: Ryan Johnson <murrabidgeemullangari@yahoo.com.au>
Sent: Thursday, 12 September 2019 3:22 PM
To: Zac Thomas
Subject: RE: 1828 Draft CHAR Review - Stockton Sand Quarry Dredging Project - MBMAC

Hi Zac,
I have read the Draft Char review for the above project, I endorse the recommendations made by Kelleher Nightingale.
Kind regards
Darleen Carroll Johnson

Ryan Johnson | **Murra Bidgee Mullangari**



Aboriginal Corporation Cultural Heritage

A: PO Box 246, Seven Hills, NSW, 2147
E: murrabidgeemullangari@yahoo.com.au
ICN: 8112

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From: Zac Thomas [<mailto:zac.thomas@knconsult.com.au>]
Sent: Monday, 9 September 2019 4:25 PM
To: Ryan Johnson <murrabidgeemullangari@yahoo.com.au>
Subject: 1828 Draft CHAR Review - Stockton Sand Quarry Dredging Project - MBMAC

Dear Registered Aboriginal Stakeholder,

Please find attached a cover letter and a copy of the draft Aboriginal Cultural Heritage Assessment Report for the proposed Stockton Sand Quarry Dredging Project at Stockton, NSW.

Zac Thomas

From: Muragadi <muragadi@yahoo.com.au>
Sent: Friday, 13 September 2019 4:19 PM
To: Zac Thomas
Subject: RE: 1828 Draft CHAR Review - Stockton Sand Quarry Dredging Project - MHIC

Hi Zac,
I agree with the recommendations made by Kelleher Nightingale for the above project.
Thanks
Anthony
0418970389

From: Zac Thomas [<mailto:zac.thomas@knconsult.com.au>]
Sent: Monday, 9 September 2019 4:26 PM
To: Muragadi <muragadi@yahoo.com.au>
Subject: 1828 Draft CHAR Review - Stockton Sand Quarry Dredging Project - MHIC

Dear Registered Aboriginal Stakeholder,

Please find attached a cover letter and a copy of the draft Aboriginal Cultural Heritage Assessment Report for the proposed Stockton Sand Quarry Dredging Project at Stockton, NSW.

No impact to Aboriginal heritage was identified for the project. While sites do occur within the wider Boral property, the proposed extraction area is highly disturbed due to the previous quarrying operations and removal of the bulk of the dune mass.

Aboriginal objects that are known to occur in adjacent landforms must be avoided by all proposed extraction activities. We have included management measures for protecting these areas (outside of proposed impact area) and an Unexpected Finds Procedure for the project has also been included.

As a registered Aboriginal stakeholder for this project, we would like to invite you to review the report and provide us with any comments or feedback you may have.

Please forward any comments to myself or the office by **7 October 2019**. Thank you and we look forward to receiving your comments.

Kind regards,

Zac Thomas
Heritage Administration Assistant
Kelleher Nightingale Consulting Pty Ltd
Level 10, 25 Bligh St
Sydney NSW 2000
p 02 9232 5373

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Appendix D Extensive AHIMS search results



Office of
Environment
& Heritage

AHIMS Web Services (AWS) Extensive search - Site list report

Your Ref/PO Number : 1828 Stockton

Client Service ID : 437444

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
	<u>Contact</u>	<u>Recorders</u>	Umwelt (Australia) Pty Limited					<u>Permits</u>		
38-4-0644	Fullerton Site 36	AGD	56	391496	6363762	Open site	Valid	Artefact : 1		
	<u>Contact</u>	<u>Recorders</u>	Umwelt (Australia) Pty Limited					<u>Permits</u>		
38-4-0262	Fern Bay_6;	AGD	56	391500	6363900	Open site	Valid	Shell : -, Artefact : -	Midden	1845
	<u>Contact</u>	<u>Recorders</u>	Pam Dean-Jones,Mr.Luke Godwin,M Heath					<u>Permits</u>		
38-4-0263	Fern Bay_7;	AGD	56	391600	6364000	Open site	Valid	Shell : -, Artefact : -	Midden	1845
	<u>Contact</u>	<u>Recorders</u>	Pam Dean-Jones,Mr.Luke Godwin,M Heath					<u>Permits</u>		
38-4-0322	Newcastle Bight 1;	AGD	56	391670	6364600	Open site	Valid	Shell : -, Artefact : -	Midden	2250
	<u>Contact</u>	<u>Recorders</u>	Mr.Matthew Barber					<u>Permits</u>		
38-4-0264	Fern Bay_8;	AGD	56	391800	6364100	Open site	Valid	Shell : -, Artefact : -	Midden	1845
	<u>Contact</u>	<u>Recorders</u>	Pam Dean-Jones,Mr.Luke Godwin,M Heath					<u>Permits</u>		
38-4-0564	Fullerton 3	AGD	56	391828	6364079	Open site	Valid	Shell : 1		
	<u>Contact</u>	<u>Recorders</u>	Umwelt (Australia) Pty Limited					<u>Permits</u>		
38-4-0265	Fern Bay_9;	AGD	56	391900	6364200	Open site	Valid	Shell : -, Artefact : -	Midden	1845
	<u>Contact</u>	<u>Recorders</u>	Pam Dean-Jones,Mr.Luke Godwin,M Heath					<u>Permits</u>		
38-4-0565	Fullerton 4	AGD	56	391904	6364081	Open site	Valid	Shell : 1		
	<u>Contact</u>	<u>Recorders</u>	Umwelt (Australia) Pty Limited					<u>Permits</u>		
38-4-0566	Fullerton 5	AGD	56	392065	6364201	Open site	Valid	Shell : 1		
	<u>Contact</u>	<u>Recorders</u>	Umwelt (Australia) Pty Limited					<u>Permits</u>		
38-4-0266	Fern Bay_10;	AGD	56	392100	6364200	Open site	Valid	Shell : -, Artefact : -	Midden	1845
	<u>Contact</u>	<u>Recorders</u>	Pam Dean-Jones,Mr.Luke Godwin,M Heath					<u>Permits</u>		
38-4-0267	Fern Bay_11;	AGD	56	392200	6364300	Open site	Valid	Shell : -, Artefact : -	Midden	1845
	<u>Contact</u>	<u>Recorders</u>	Pam Dean-Jones,Mr.Luke Godwin,M Heath					<u>Permits</u>		
38-4-0567	Fullerton 7	AGD	56	392285	6364371	Open site	Valid	Shell : 1		
	<u>Contact</u>	<u>Recorders</u>	Umwelt (Australia) Pty Limited					<u>Permits</u>		
38-4-0268	Fern Bay_12;	AGD	56	392300	6364400	Open site	Valid	Shell : -, Artefact : -	Midden	1845
	<u>Contact</u>	<u>Recorders</u>	Pam Dean-Jones,Mr.Luke Godwin,M Heath					<u>Permits</u>		
38-4-0054	Newcastle Bight;	AGD	56	392377	6364161	Open site	Valid	Artefact : -	Open Camp Site	
	<u>Contact</u>	<u>Recorders</u>	J.A Starling					<u>Permits</u>		
38-4-0269	Fern Bay_13;	AGD	56	392400	6364400	Open site	Valid	Shell : -, Artefact : -	Midden	1845
	<u>Contact</u>	<u>Recorders</u>	Pam Dean-Jones,Mr.Luke Godwin,M Heath					<u>Permits</u>		
38-4-0568	Fullerton 8	AGD	56	392465	6364420	Open site	Valid	Shell : 1		
	<u>Contact</u>	<u>Recorders</u>	Umwelt (Australia) Pty Limited					<u>Permits</u>		
38-4-0569	Fullerton 9	AGD	56	392710	6364583	Open site	Valid	Artefact : 19, Shell : 1		

Report generated by AHIMS Web Service on 25/07/2019 for Cristany Milich for the following area at Datum : GDA, Zone : 56, Eastings : 388850 - 393800, Northings : 6363000 - 6366500 with a Buffer of 0 meters. Additional Info : Archaeological assessment. Number of Aboriginal sites and Aboriginal objects found is 75

This information is not guaranteed to be free from error omission. Office of Environment and Heritage (NSW) and its employees disclaim liability for any act done or omission made on the information and consequences of such acts or omission.



Office of
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AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 1828 Stockton

Client Service ID : 437444

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
38-4-0950	Fern Bay Estate 17	AGD	56	389785	6364535	Open site	Valid	Artefact : -, Shell : -		
	<u>Contact</u> T Russell							<u>Permits</u>		
38-4-0948	Fern Bay Estate 15	AGD	56	389847	6364460	Open site	Valid	Artefact : 1		
	<u>Contact</u> T Russell							<u>Permits</u>		
38-4-0129	NBR7;	AGD	56	389850	6364380	Open site	Valid	Artefact : -	Open Camp Site	1269,101086
	<u>Contact</u>							<u>Permits</u>		
38-5-0157	Fullerton Site 1;Newcastle Bight;	AGD	56	389930	6362840	Open site	Valid	Shell : -, Artefact : -	Midden, Open Camp Site	845,916
	<u>Contact</u>							<u>Permits</u>		
38-4-0321	Newcastle Bight 2;	AGD	56	390050	6364760	Open site	Valid	Artefact : -	Open Camp Site	2250,101086
	<u>Contact</u>							<u>Permits</u>		
38-5-0161	Fullerton Site 5;Newcastle Bight;	AGD	56	390090	6363090	Open site	Valid	Shell : -, Artefact : -	Midden, Open Camp Site	916
	<u>Contact</u>							<u>Permits</u>		
38-5-0158	Fullerton Site 2;Newcastle Bight;	AGD	56	390260	6363040	Open site	Valid	Shell : -, Artefact : -	Midden, Open Camp Site	845,916
	<u>Contact</u>							<u>Permits</u>		
38-4-0706	FC 1	AGD	56	390580	6365650	Open site	Valid	Artefact : 9		
	<u>Contact</u>							<u>Permits</u>		
38-5-0159	Fullerton Site 3;Newcastle Bight;	AGD	56	390640	6363260	Open site	Valid	Shell : -, Artefact : -	Midden, Open Camp Site	845,916
	<u>Contact</u>							<u>Permits</u>		
38-5-0160	Fullerton Site 4;Newcastle Bight;	AGD	56	390960	6363500	Open site	Valid	Shell : -, Artefact : -	Midden, Open Camp Site	916
	<u>Contact</u>							<u>Permits</u>		
38-4-0260	Fern Bay 4;	AGD	56	391000	6363500	Open site	Valid	Artefact : -	Open Camp Site	1845
	<u>Contact</u>							<u>Permits</u>		
38-5-0162	Fullerton Site 6;Newcastle Bight;	AGD	56	391040	6363460	Open site	Valid	Shell : -, Artefact : -	Midden	
	<u>Contact</u>							<u>Permits</u>	916	
38-4-0340	Williamstown 1; WT-1;	AGD	56	391100	6365500	Open site	Valid	Artefact : -	Open Camp Site	
	<u>Contact</u>							<u>Permits</u>		
38-4-1035	Fullerton Cove Extraction 1	AGD	56	391149	6366046	Open site	Valid	Artefact : 100		
	<u>Contact</u> Searle							<u>Permits</u>	3033	
38-4-0261	Fern Bay 5;	AGD	56	391200	6363700	Open site	Valid	Shell : -, Artefact : -	Midden	1845
	<u>Contact</u>							<u>Permits</u>		
38-4-0563	Fullerton 1	AGD	56	391352	6363717	Open site	Valid	Shell : -		

Report generated by AHIMS Web Service on 25/07/2019 for Cristany Milichich for the following area at Datum : GDA, Zone : 56, Eastings : 388850 - 393800, Northings : 6363000 - 6366500 with a Buffer of 0 meters. Additional Info : Archaeological assessment. Number of Aboriginal sites and Aboriginal objects found is 75

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AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 1828 Stockton

Client Service ID : 437444

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
	<u>Contact</u>	<u>Recorders</u>	Mr.Warren Mayers					<u>Permits</u>		
38-4-1856	Restriction applied. Please contact ahims@environment.nsw.gov.au.					Open site	Valid			
	<u>Contact</u>	<u>Recorders</u>	Mr.Warren Mayers					<u>Permits</u>		
38-4-1859	Restriction applied. Please contact ahims@environment.nsw.gov.au.					Open site	Valid			
	<u>Contact</u>	<u>Recorders</u>	Mr.Warren Mayers					<u>Permits</u>		
38-4-1855	Restriction applied. Please contact ahims@environment.nsw.gov.au.					Open site	Valid			
	<u>Contact</u>	<u>Recorders</u>	Mr.Warren Mayers					<u>Permits</u>		
38-4-1854	Restriction applied. Please contact ahims@environment.nsw.gov.au.					Open site	Valid			
	<u>Contact</u>	<u>Recorders</u>	Mr.Warren Mayers					<u>Permits</u>		
38-4-1853	Restriction applied. Please contact ahims@environment.nsw.gov.au.					Open site	Valid			
	<u>Contact</u>	<u>Recorders</u>	Mr.Warren Mayers					<u>Permits</u>		
38-4-0791	Fern Bay Estate 8	AGD	56	388750	6363700	Open site	Valid	Artefact :-, Shell :-		
	<u>Contact</u>	<u>Recorders</u>	Pam Dean-Jones					<u>Permits</u>		
38-4-0787	Fern Bay Estate 9	AGD	56	388790	6363344	Open site	Valid	Artefact :-		
	<u>Contact</u>	<u>Recorders</u>	Jim Wheeler					<u>Permits</u>	2026	
38-4-0861	Fern Bay Estate 9	AGD	56	388790	6363440	Open site	Valid	Shell : 1		
	<u>Contact</u> T Russell	<u>Recorders</u>	Jim Wheeler					<u>Permits</u>		
38-4-0789	Fern bay Estate 11	AGD	56	388850	6363850	Open site	Valid	Artefact :-		
	<u>Contact</u>	<u>Recorders</u>	Pam Dean-Jones					<u>Permits</u>		
38-4-0131	NBR5;	AGD	56	388920	6364080	Open site	Valid	Artefact :-	Open Camp Site	1269
	<u>Contact</u>	<u>Recorders</u>	Margrit Koettig Rex Silcox					<u>Permits</u>		
38-4-0788	Fern Bay Estate 10	AGD	56	388950	6363900	Open site	Valid	Shell :-		
	<u>Contact</u>	<u>Recorders</u>	Pam Dean-Jones					<u>Permits</u>	2355	
38-4-0951	Fern Bay Estate 18	AGD	56	389035	6364110	Open site	Valid	Shell : 2, Artefact : 81		
	<u>Contact</u> T Russell	<u>Recorders</u>	ERM Australia Pty Ltd- Sydney CBD					<u>Permits</u>		
38-4-0130	NBR6;	AGD	56	389260	6364220	Open site	Valid	Shell :-, Artefact :-	Midden	1269,101086
	<u>Contact</u>	<u>Recorders</u>	Margrit Koettig Rex Silcox					<u>Permits</u>		
38-4-0127	NBR9;	AGD	56	389360	6364400	Open site	Valid	Shell :-, Artefact :-	Midden	1269,101086
	<u>Contact</u>	<u>Recorders</u>	Margrit Koettig Rex Silcox					<u>Permits</u>		
38-4-0949	Fern Bay Estate 16	AGD	56	389772	6364185	Open site	Valid	Artefact : 4		
	<u>Contact</u> T Russell	<u>Recorders</u>	ERM Australia Pty Ltd- Sydney CBD					<u>Permits</u>		

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AHIMS Web Services (AWS) Extensive search - Site list report

Your Ref/PO Number : 1828 Stockton

Client Service ID : 437444

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
38-4-1645	Fullerton Cove Midden 2	GDA	56	390179	6365560	Open site	Valid	Artefact :-, Shell :-		
	Contact	Recorders	Ms.Erin Mein					Permits	4398	
38-4-2011	George St 1	GDA	56	390796	6366074	Open site	Valid	Artefact :-		
	Contact	Recorders	Umwelt (Australia) Pty LimitedMiss.Nicola Roche					Permits	4398	
38-4-1872	Worimi RVA 032	GDA	56	391356	6363899	Open site	Valid	Shell: 1		
	Contact	Recorders	Mr.Warren Mayers					Permits		
38-4-1871	Worimi RVA 031	GDA	56	391731	6364059	Open site	Valid	Shell: 1		
	Contact	Recorders	Mr.Warren Mayers					Permits		
38-4-1869	Worimi RVA 029	GDA	56	391857	6364253	Open site	Valid	Shell: 1		
	Contact	Recorders	Mr.Warren Mayers					Permits		
38-4-1870	Worimi RVA 030	GDA	56	391926	6364193	Open site	Valid	Shell: 1		
	Contact	Recorders	Mr.Warren Mayers					Permits		
38-4-1867	Worimi RVA 027	GDA	56	391965	6364382	Open site	Valid	Shell: 1		
	Contact	Recorders	Mr.Warren Mayers.Mr.Matthew Kelleher.Kelleher Nightingale Consulting Pty Ltd (C					Permits		
38-4-1868	Worimi RVA 028	GDA	56	391971	6364367	Open site	Valid	Shell: 1		
	Contact	Recorders	Mr.Warren Mayers					Permits		
38-4-1864	Worimi RVA 024	GDA	56	392464	6364646	Open site	Valid	Shell: 1		
	Contact	Recorders	Mr.Warren Mayers					Permits		
38-4-1865	Worimi RVA 025	GDA	56	392464	6364646	Open site	Valid	Shell: 1		
	Contact	Recorders	Mr.Warren Mayers					Permits		
38-4-1873	Worimi RVA 033	GDA	56	392600	6364679	Open site	Valid	Shell: 1		
	Contact	Recorders	Mr.Warren Mayers					Permits		
38-4-1863	Worimi RVA 023	GDA	56	392876	6364757	Open site	Valid	Shell: 1		
	Contact	Recorders	Mr.Warren Mayers					Permits		
38-4-1807	RVA site 1	GDA	56	393021	6364846	Open site	Valid	Shell :-, Artefact :-		
	Contact	Recorders	NPWS - Hunter District					Permits		
38-4-1861	Worimi RVA 021	GDA	56	393027	6364869	Open site	Valid	Shell: 1		
	Contact	Recorders	Mr.Warren Mayers					Permits		
38-4-1860	Worimi RVA 020	GDA	56	393069	6365020	Open site	Valid	Shell: 1		
	Contact	Recorders	Mr.Warren Mayers					Permits		
38-4-1858	Restriction applied. Please contact ahims@environment.nsw.gov.au.					Open site	Valid			
	Contact	Recorders	Mr.Warren Mayers					Permits		
38-4-1857	Restriction applied. Please contact ahims@environment.nsw.gov.au.					Open site	Valid			

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Your Ref/PO Number : 1828 Stockton

Client Service ID : 437444

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
	<u>Contact</u>	<u>Recorders</u>						<u>Permits</u>		
38-4-0068	Newcastle Eight;3;	AGD	56	392795	6366181	Open site	Valid	Artefact :-	Open Camp Site	
	<u>Contact</u>	<u>Recorders</u>						<u>Permits</u>		
38-4-0570	Fullerton 10	AGD	56	393049	6364716	Open site	Valid	Shell : 1		
	<u>Contact</u>	<u>Recorders</u>						<u>Permits</u>		
38-4-0645	Fullerton Site 37	AGD	56	393117	6364880	Open site	Valid	Shell : 1		
	<u>Contact</u>	<u>Recorders</u>						<u>Permits</u>		
38-4-0571	Fullerton 11	AGD	56	393188	6364916	Open site	Valid	Shell : 1		
	<u>Contact</u>	<u>Recorders</u>						<u>Permits</u>		
38-4-1030	Lagoons 4	AGD	56	393233	6366293	Open site	Valid	Aboriginal Resource and Gathering : 1. Artefact : 3000		
	<u>Contact</u> Searle	<u>Recorders</u>						<u>Permits</u>		
38-4-1032	Lagoons 3	AGD	56	393250	6366153	Open site	Valid	Artefact : 2		
	<u>Contact</u> Searle	<u>Recorders</u>						<u>Permits</u>		
38-4-1034	Lagoons 2	AGD	56	393271	6365983	Open site	Valid	Artefact : 3		
	<u>Contact</u> Searle	<u>Recorders</u>						<u>Permits</u>		
38-4-1033	Lagoons 1	AGD	56	393272	6365983	Open site	Valid	Artefact : 2100, Aboriginal Resource and Gathering : 1		
	<u>Contact</u> Searle	<u>Recorders</u>						<u>Permits</u>		
38-4-0056	Freshwater Lagoons;	AGD	56	393351	6365825	Open site	Valid	Artefact :-	Open Camp Site	315,703
	<u>Contact</u>	<u>Recorders</u>						<u>Permits</u>		
38-4-0572	Fullerton 12	AGD	56	393525	6366116	Open site	Valid	Shell : 1		
	<u>Contact</u>	<u>Recorders</u>						<u>Permits</u>		

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