Sydney WATER

Appendix O Aboriginal Cultural Heritage Assessment

UPPER SOUTH CREEK ADVANCED WATER RECYCLING CENTRE

Aboriginal Cultural Heritage Assessment Report

Prepared for Sydney Water

Canterbury-Bankstown, Fairfield, Liverpool, Penrith and Wollondilly Local Government Areas

June 2021

Ref. 1929

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Document Information

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Executive Summary

Sydney Water is planning to build and operate new wastewater infrastructure to service the South West and Western Sydney Aerotropolis Growth Areas. The proposed development (referred to as the 'project') will include a wastewater treatment plant in Western Sydney, known as the Upper South Creek Advanced Water Recycling Centre, and the associated treated water and brine pipelines.

Sydney Water is seeking State Significant Infrastructure (SSI) approval for the project and is preparing an Environmental Impact Statement (EIS), which will be assessed in accordance with Planning Secretary's Environmental Assessment Requirements (SEARs). SEARs for the project were issued by the Department of Planning, Industry and Environment (DPIE) on 28 January 2021 (SSI-8609189) with requirements for the assessment of Aboriginal cultural heritage, including an Aboriginal cultural heritage assessment report (ACHAR). Sydney Water engaged Kelleher Nightingale Consulting Pty Ltd (KNC) to prepare a ACHAR to inform the EIS and address the SEARs. The impact assessment area comprised the proposed development footprint (impact area) and additional adjacent areas to provide flexibility for redesigning the impact area to avoid or minimise impact to Aboriginal objects and ecological constraints.

Archaeological assessment undertaken for the project has identified 15 Aboriginal archaeological sites and one area of potential archaeological deposit within the impact assessment area. The assessment determined the archaeological character of the impact assessment area by incorporating the results of extensive previous archaeological investigations with the environmental context and verifying the previous results with an archaeological field survey. Where appropriate archaeological test excavations were undertaken to support the assessment. Archaeological test excavation was undertaken at Aboriginal archaeological site Fleurs 1, Fleurs Radio Telescope (AHIMS 45-5-0496) due to the size of proposed impact in this area and limited information from previous archaeological investigations.

Sydney Water has accommodated design changes to avoid and minimise impacts to Aboriginal objects, but not all impacts could be avoided. Early identification of Aboriginal heritage allowed refinement of the impact area to avoid Wylde MTB PAD2 and limit the impact on the remaining sites to areas subject to past and ongoing land use activities or fluvial processes. The impact area has been restricted further at sites P-CP7 and PP-F3 to areas with visible disturbance while avoiding adjacent areas. These sites are located within the Western Sydney Parklands where future development is restricted.

The 15 Aboriginal archaeological sites listed below would be at least partially impacted by the proposed works within the impact area:

Badgerys Creek West B (BWB)	45-5-5298	Low (impacted portion)	Partial loss of value
Baines Creek Wallacia AFT 1	tbc	Moderate	Partial loss of value
Bents Basin Road Wallacia AFT 1	tbc	Moderate	Partial loss of value
Elizabeth Drive/Adams Road AFT 1	45-5-5105	Moderate	Partial loss of value
Elizabeth Drive AFT 1 (including Elizabeth Precinct PAD 01, Elizabeth Precinct PAD 03, Elizabeth Precinct Isolated Find 04 and Elizabeth Precinct Isolated Find 05)	45-5-5259 (including 45-5-5234, 45-5-5236, 45-5-5330 and 45-5-5331)	Moderate	Partial loss of value
Fleurs1 Fleurs Radio Telescope (including M12 A4 and South Creek East (SCE))	45-5-0496 (including 45-5-4749 and 45-5-5306	Moderate	Partial loss of value

GLC1 (including Artefact Scatter PAD 2023-846)	45-5-2561 (including 45-5-4022)	None	No loss of value (partially within AHIP C0005620 and Cecil Park Reservoir AHIP application area)
IFSC 7 Cecil Park	45-5-2430	None	No loss of value (within AHIP C0005620)
P-CP7	45-5-2306	Low (impacted portion)	Partial loss of value
P-CP12	45-5-2378	Moderate	Partial loss of value
PAD-OS-5	45-5-2723	Moderate	Partial loss of value
PP-F3	45-5-3298	Low (impacted portion)	Partial loss of value
TNR AFT 15	45-5-4788	Moderate	Partial loss of value
Wallacia Weir AFT 1	tbc	Moderate	Partial loss of value

Three Aboriginal archaeological sites were located within existing or planned approval and Aboriginal Heritage Impact Permit (AHIP) areas. The approval for the Northern Road upgrade (SSI 7127) included total impact to Aboriginal archaeological site TNR AFT 16. The AHIP for the Prospect to Macarthur Drinking Link (AHIP C0005620) included total impact to IFSC 7 Cecil Park and partially impact to GLC1 (including Artefact Scatter PAD 2023-846). An AHIP application for further works at the Cecil Park Reservoir has been submitted which will, once approved, encompass the remaining areas of the site within the impact assessment area.

The proposed works within the AHIP C0005620 area may be completed under the existing AHIP, provided that works are undertaken in accordance with the AHIP conditions. The proposed works within the Cecil Park Reservoir AHIP application area, once approved, may be completed under the AHIP, provided that works are undertaken in accordance with the AHIP conditions. Sydney Water will obtain authorisation from the SSI 7127 approval holders to complete the proposed works under the approval.

Mitigative salvage excavation would be required for the nine archaeological sites exhibiting moderate significance. The impact to the remaining three archaeological sites would be minimal and confined to areas exhibiting low levels of significance that do not require mitigative action. Management measures should be implemented for Aboriginal objects situated outside the impact area to ensure avoidance of objects not covered by the approval. Management measures to be implemented include protective fencing and identification of ‘no-go zones’ on maps within the Construction Environmental Management Plan.

This Aboriginal cultural heritage assessment report addresses the Aboriginal heritage requirements identified in the project SEARs and is in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010a), Guide *to investigation, assessing and reporting on Aboriginal Cultural Heritage in NSW* (OEH 2011) and *Aboriginal cultural heritage consultation requirements for proponents 2010* (DECCW 2010b).

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1 Introduction

1.1 Project background

Sydney Water is planning to build and operate new wastewater infrastructure to service the South West and Western Sydney Aerotropolis Growth Areas. The proposed development will include a wastewater treatment plant in Western Sydney, known as the Upper South Creek Advanced Water Recycling Centre. Together, this Water Recycling Centre and the associated treated water and brine pipelines, will be known as the 'project'. An overview of the location of the proposed infrastructure is provided in Figure 1. Project Overview.

1.2 Proponent and consultants

Sydney Water is seeking State Significant Infrastructure (SSI) approval for the project and is preparing an Environmental Impact Statement (EIS), which will be assessed in accordance with Planning Secretary's Environmental Assessment Requirements (SEARs). SEARs for the project were issued by the Department of Planning, Industry and Environment (DPIE) on 28 January 2021 (SSI-8609189) with requirements for the assessment of Aboriginal cultural heritage, including an Aboriginal cultural heritage assessment report (ACHAR).

Sydney Water engaged Kelleher Nightingale Consulting Pty Ltd (KNC) to prepare a ACHAR to inform the EIS and address the SEARs. It has been prepared in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010a), *Guide to investigation, assessing and reporting on Aboriginal Cultural Heritage in NSW* (OEH 2011) and *Aboriginal cultural heritage consultation requirements for proponents 2010* (DECCW 2010b).

1.3 Location and scope of activity

The project consists of a generally linear corridor that extends from Warragamba in the west to Lansdowne in the east and the Advanced Water Recycling Centre site, adjacent to the eastern bank of Wianamatta/South Creek in the suburb of Kemps Creek. The project is approximately 32 kilometres in length and traverses the Canterbury-Bankstown, Fairfield, Liverpool, Penrith and Wollondilly Local Government Areas. Further details of each component of the project are provided below.

Advanced Water Recycling Centre

- a wastewater treatment plant with the capacity to treat up to 50 ML of wastewater per day, with ultimate capacity of up to 100ML per day
- the Advanced Water Recycling Centre will produce:
    - high-quality treated water suitable for a range of uses including recycling and environmental flows
    - renewable energy, including through the capturing of heat for cogeneration
    - biosolids suitable for beneficial reuse
    - brine, as a by-product of reverse osmosis treatment

Treated water pipelines

- a pipeline about 17 kilometres long from the Advanced Water Recycling Centre to the Nepean River at Wallacia Weir, for the release of treated water
- infrastructure from the Advanced Water Recycling Centre to Wianamatta/South Creek to release excess treated water and wet weather flows

- a pipeline about five kilometres long from the main treated water pipeline at Wallacia to a location between the Warragamba Dam and Warragamba Weir, to release high-quality treated water to the Warragamba River as environmental flows.

Brine pipeline

- a pipeline about 24 kilometres long that transfers brine from the Advanced Water Recycling Centre to Lansdowne, in south-west Sydney, where it connects to Sydney Water's existing Malabar wastewater network

Sydney Water is planning to deliver the project in stages, with Stage 1 comprising:

- building and operating the Advanced Water Recycling Centre to treat an average dry weather flow of up to 50ML per day
- building all pipelines to their ultimate capacity, but only operating them to transport and release volumes produced by the Stage 1 Advanced Water Recycling Centre

The timing and scale of future stages will be phased to respond to drivers including population growth rate and the most efficient way for Sydney Water to optimise its wastewater systems.

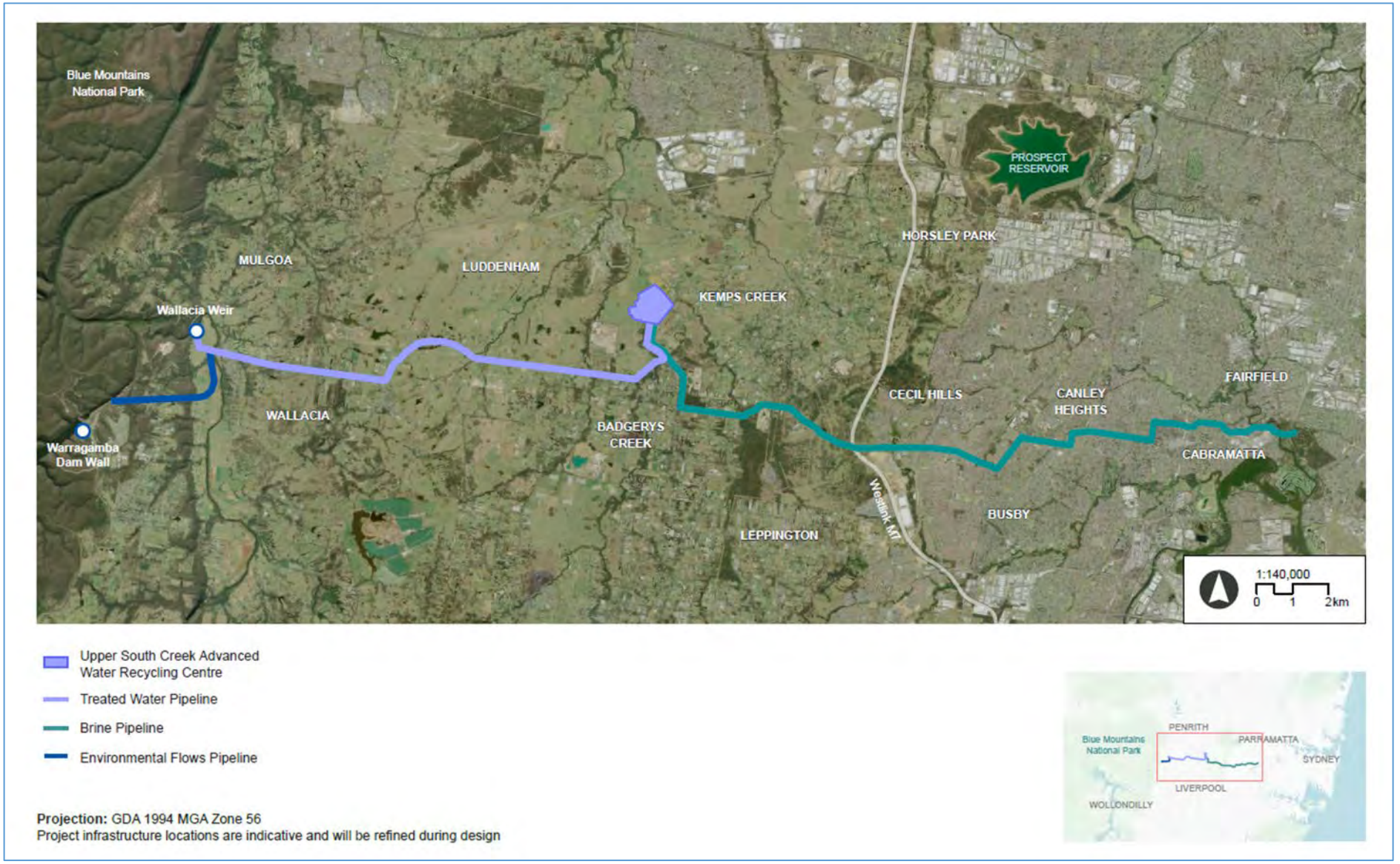

Figure 1. Project overview

The impact assessment area (IAA; Figures 2 and 3) included additional adjacent areas to accommodate for potential design changes to the proposed plant and pipeline corridors (impact area). Several areas where existing approvals and Aboriginal Heritage Impact Permits (AHIP) have been granted in the vicinity of the impact assessment area. The impact assessment area overlaps Sydney Water's AHIP area for the Prospect to Macarthur Drinking Water Link (C0005620) and the approval area for The Northern Road Upgrade, Mersey Road, Bringelly, to Glenmore Parkway, Glenmore Park (SSI 7127). An AHIP application for further works at the Cecil Park Reservoir has been submitted which will, once approved, encompass part of the impact assessment area.

The proposed works within the AHIP C0005620 area may be completed under the existing AHIP, provided that works are undertaken in accordance with the AHIP conditions. The proposed works within the Cecil Park Reservoir AHIP application area, once approved, may be completed under the AHIP, provided that works are undertaken in accordance with the AHIP conditions. Sydney Water will obtain authorisation from the SSI 7127 approval holders to complete the proposed works under the approval.

1.4 Project requirements

The Aboriginal cultural heritage assessment for the project was designed to meet the requirements of the SEARs. This included:

- Identifying and describing the Aboriginal cultural heritage values that exist across the impact assessment area
- Consultation with Aboriginal communities to assess impacts and develop mitigation measures and
- Assessment of impacts to Aboriginal heritage (both cultural and archaeological significance).

This Aboriginal cultural heritage assessment report has combined Aboriginal community consultation with an archaeological investigation in accordance with:

- SEARs
- *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010a)
- *Guide to investigation, assessing and reporting on Aboriginal Cultural Heritage in NSW* (OEH 2011) and
- *Aboriginal cultural heritage consultation requirements for proponents 2010* (DECCW 2010b).

Specific requirements of the SEARs in relation to Aboriginal heritage are outlined in the table below.

Table 1. SEARs for Aboriginal heritage

Secretary's Environmental Assessment Requirements	Where addressed in this document
Aboriginal Cultural Heritage – including:	
20. Identifying and describing the Aboriginal cultural heritage values that exist across the whole area that will be affected by the project and document these in an Aboriginal Cultural Heritage Assessment Report (ACHAR). This may include the need for surface survey and test excavation. The identification of cultural heritage values must be conducted in accordance with the Code of Practice for Archaeological Investigations of Aboriginal Objects in NSW (OEH 2010), and be guided by the Guide to investigating, assessing and reporting on Aboriginal Cultural Heritage in NSW (DECCW, 2011) and consultation with Heritage NSW.	This document

Secretary's Environmental Assessment Requirements	Where addressed in this document
21. Consulting with Aboriginal people must be undertaken and documented in accordance with the Aboriginal cultural heritage consultation requirements for proponents 2010 (DECCW). The significance of cultural heritage values for Aboriginal people who have a cultural association with the land must be documented in the ACHAR.	Sections 5 and 7
22. Assessing and documenting impacts to Aboriginal cultural heritage values in an 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 Heritage NSW.	Sections 8 and 9
23. The ACHAR must outline procedures to be followed if Aboriginal objects are found at any stage of the life of the [development/project] to formulate appropriate measures to manage unforeseen impacts.	Section 11

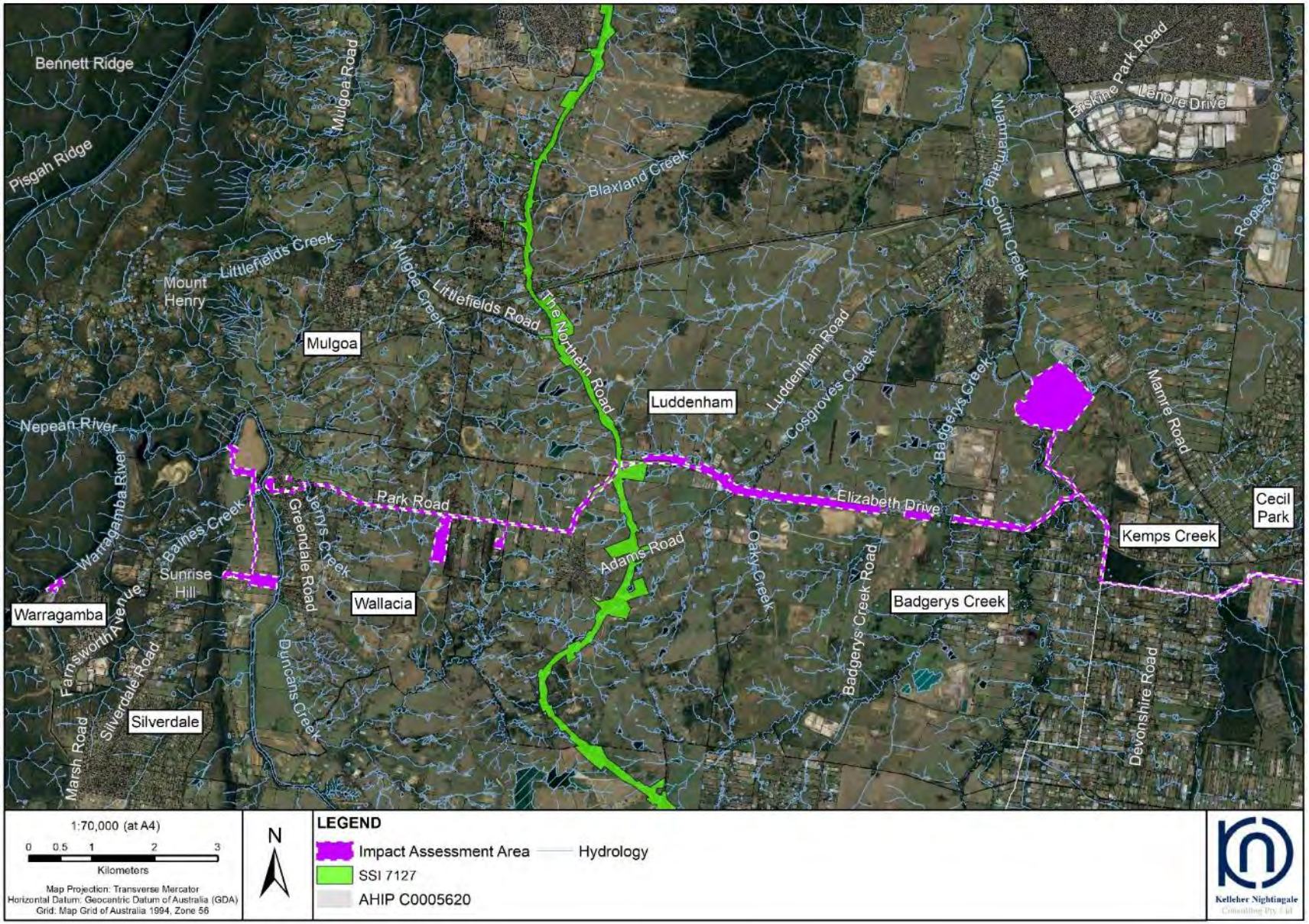

Figure 2. Details of the western part of the IAA with overlapping AHIP and approval areas

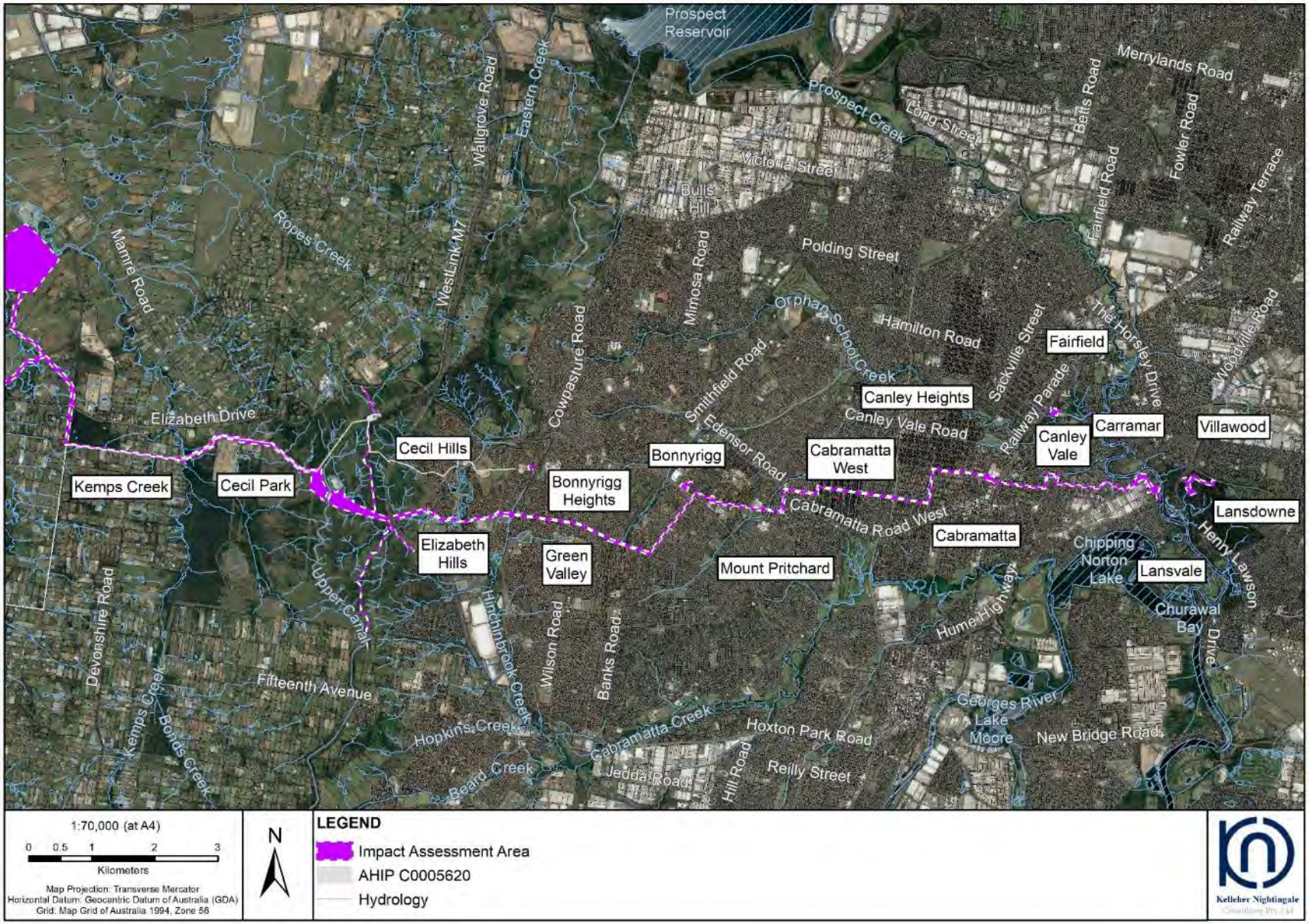

Figure 3. Details of the eastern part of the IAA with overlapping AHIP area

2 Landscape Context

2.1 Topography and hydrology

The impact assessment area traverses the catchment areas of the Nepean River in the west, Wianamatta/South Creek and the Georges River in the east (Figure 4). The catchment areas are divided by two ridgelines that extend from the Woronora Plateau at Menangle Sugarloaf in the south and separate at Badgery Hill, with one ridgeline extending to the north east towards Prospect Hill and the other to the north west towards Luddenham. The impact assessment area contains a range of distinct landforms from the foothills of the Blue Mountains in the west, the terraces, paleochannels and active channel of Nepean River, the undulating, low lying ridges and alluvial flats of the Wianamatta/South Creek catchment area and wide low lying terraces and floodplains of Georges River catchment area in the east.

The Nepean River flows north through the western portion of the impact assessment area and is flanked by high terraces and paleochannels. Tributary creeks form steep valleys through the sandstone geology to the west while wider floodplains occur adjacent to major tributaries, including Jerrys Creek and Mulgoa Creek to the east. The Nepean River continues north along the western edge of the Cumberland Plain for approximately 30 kilometres to the confluence with the Grose River where the two rivers combine to form the Hawkesbury River which in turn flows north-east and east through a steep sandstone valley before entering Broken Bay approximately 60 kilometres north east of the impact assessment area.

Wianamatta/South Creek flows north through the impact assessment area within an active floodplain that is flanked by terrace flats and paleochannels. Several major tributaries including Badgerys Creek, Cosgroves Creek and Kemps Creek flow north and north east through the impact assessment area across active floodplains to confluences approximately one to three kilometres north of the impact assessment area. Wianamatta/South Creek continues flowing north for approximately 30 kilometres before converging with the Hawkesbury River near Windsor.

The Georges River flows east immediately south of the impact assessment area through a wide floodplain where several east and south east flowing tributaries including Cabramatta Creek, Hinchinbrook Creek and Prospect Creek converge with the river. The Georges River flows south east and east through a steep sandstone valley before entering Botany Bay approximately 20 kilometres south east of the impact assessment area. Prior to the extensive modifications which have occurred over the past 200 years, the creeks were more akin to a series of ponds with tidal lower reaches.

The Sydney coastline was subject to episodic sea level fluctuations during the late Quaternary Period (within the last 120,000 years) with sea levels reaching a maximum of five metres above present sea level during the last Pleistocene highstand (120,000 years ago) and a minimum of 110-130 metres below present level during the Last Glacial Maximum (26,000-14,500 years ago). During this period, the Nepean River and Georges River would have been lower and the portions of these rivers within the impact assessment area may have contained less water. Wianamatta/South Creek and its tributaries are also likely to have contained less water. Sea levels then rose until 5,000 years ago when they reached the present-day level.

2.2 Geology and soil landscapes

The impact assessment area traverses the south western Cumberland Plain and the transitional zone between the plain in the east and the Blue Mountains Plateau in the west. The Cumberland Plain and Blue Mountains Plateau are structural subdivisions of the Sydney Basin, a large geological feature stretching from Batemans Bay in the south to Newcastle in the north and Lithgow in the west. The basin contains up to 1,350 metres of shale and sandstone geology that derived from

marine and alluvial sediments deposited between the Late Permian and Triassic in a number of discrete episodes in response to tectonic events or sea level change (Carter 2011: 5-8).

The underlying geology of the impact assessment area is dominated by sedimentary rocks of Hawkesbury Sandstone (Rh) and the Wianamatta Group (Rwa, Rwb and Rwm) (Figure 5). The variation in the near surface and surface geology of the impact assessment area is the result of subsequent weather and the uplifting of the Blue Mountains and Woronora Plateau. Weathering of the underlying geology has resulted in removal of more recent geological units, the exposure of older geological units and the formation of geological units with the reworked material from other geological units.

Silcrete, the predominant raw material type used by Aboriginal people to make flaked stone artefacts generally occurs as cobbles within the St Marys Formation (Ts) geology or with indurated mudstone/tuff (IMT), quartz and hornfels in the Rickabys Creek Gravel (Tr) geology. St Marys Formation and Rickabys Creek Gravel geology are believed to have extended across a larger area of the Cumberland Plain; however, subsequent weathering has reduced the mapped distribution of St Marys Formation to ridge tops and Rickabys Creek Gravel to areas of remnant paleochannels, both of which are primarily located in the north western Cumberland Plain (Figure 5).

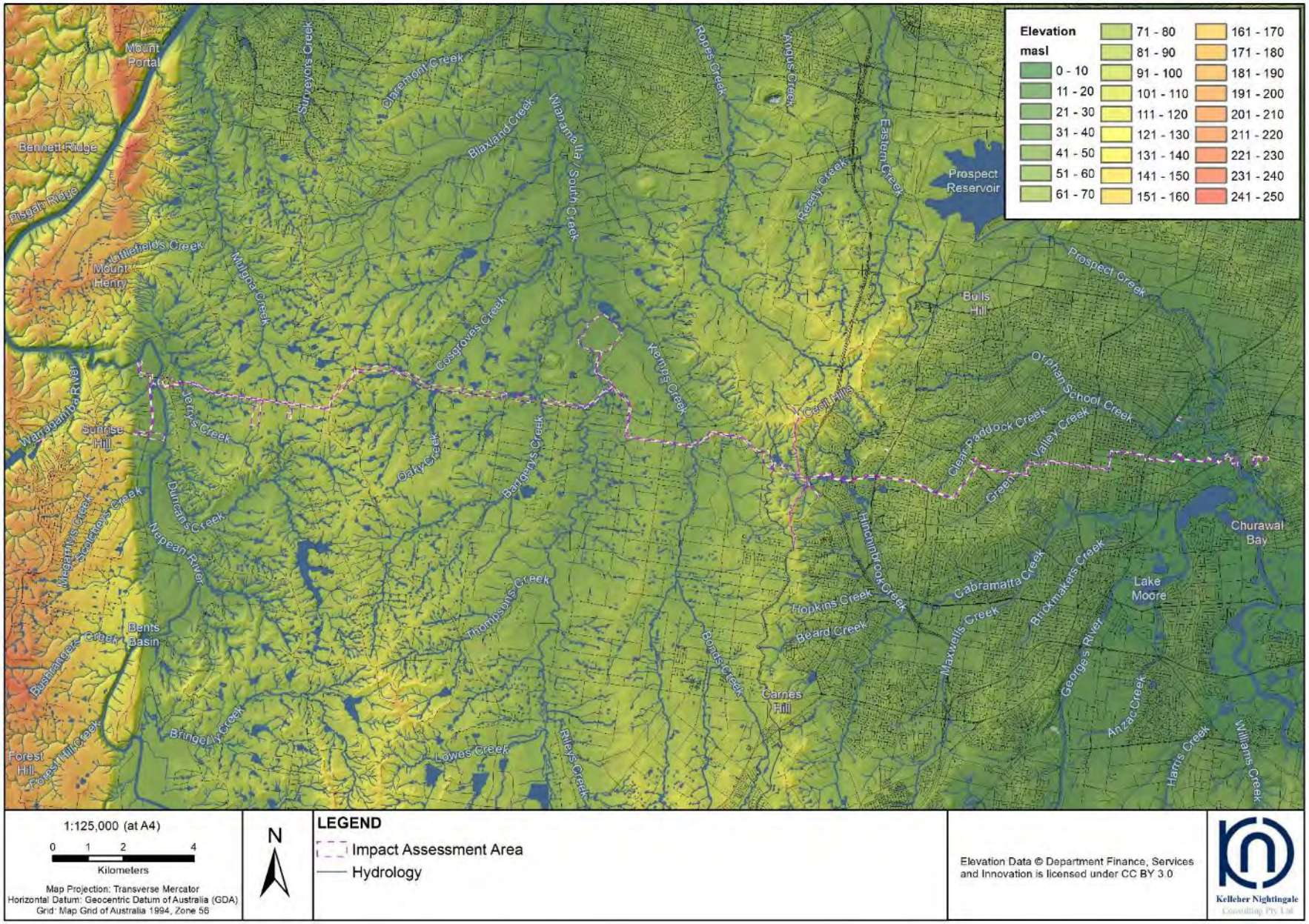

Figure 4. Relief map of the IAA

Hawkesbury Sandstone occurs the western portion of the study area where it forms the predominant near surface geology of the Blue Mountains Plateau and outcrops on exposed crests, within incised drainage channels and on steep slopes. Hawkesbury Sandstone geology is characterised by fine to coarse grained quartzose sandstone with minor interbeds of siltstone/sandstone laminate, siltstone and claystone.

Ashfield Shale (Rwa) forms the near surface geology of the slopes and crests adjacent to Prospect Creek at Lansdowne in the eastern portion of the impact assessment area and the crest landform west of the Lapstone Monocline at Warragamba. Ashfield Shale is the oldest formation of the Wianamatta Group and formed during Middle Triassic from subaqueous sedimentary deposits. The formation consists of dark-grey to black sideritic claystone and siltstone, grading upward into a fine sandstone-siltstone laminate (Clark and Jones 1991).

Minchinbury Sandstone (Rwm) comprises a thin horizontal band along the eastern boundary of the Ashfield Shale geology at Lansdowne. Minchinbury Sandstone is comprised mostly of quartz and quartzose rock and represents the original strandline boundary between the alluvial plain sediments of the more recent Bringelly Shale (Rwb) and the older shallow-water subaqueous Ashfield Shale (Clark and Jones 1991: 24). Bringelly Shale (Rwb) is the dominant near surface geology of the impact assessment area. The formation formed during the late Triassic Period and consists of shale, carbonaceous claystone, claystone, laminate, fine to medium-grained lithic sandstone, rare coal and tuff.

Talus breccia (Tt) accumulated along the scarp of the Blue Mountains Plateau near Wallacia from material that has eroded from the plateau. The colluvium contains angular fragments of sandstone and shale that have been cemented by mottled clay (Clark and Jones 1991: 37). Fine-grained (Qal) and medium grained (Qpn) Quaternary Alluvium has been deposited within the flood prone areas adjacent to the major rivers and creeks of the region (Figure 5). Quaternary Alluvium comprises sand, silt and clay deposited in association with fluvial activity.

Stone suitable for the creation of stone artefacts is not present within the mapped geology of the impact assessment area; however unmapped sources of silcrete have been identified within the Quaternary alluvial deposits of the Wianamatta/South Creek catchment area. These sources may represent the fluvial redeposition of silcrete cobbles within active or former floodplains and creek channels. Outcrops of sandstone have also been identified within the mapped Quaternary Alluvium of the Wianamatta/South Creek catchment that were utilised by Aboriginal people who left grooves from the probable edge grinding of stone hatchet heads. The sandstone is most likely unmapped Minchinbury Sandstone.

2.3 Soil landscape

The impact assessment area encompasses eight soil landscapes (Figure 6). The active floodplains of the major rivers and creeks contain alluvial South Creek soils while some adjacent areas of older Berkshire Park and Richmond alluvial soils occur on the terraces of the Nepean River and Georges River. The alluvial South Creek soil landscape is characterised by flat landforms with incised channels that are subject to frequent episodes of inundation, erosion and aggradation. The landscape contains deep structured loams and clays overlying bedrock or relict soils. The South Creek soil landscape may retain archaeological deposits but due to its location on active floodplains the integrity may be compromised due to repeated episodes of erosion and deposition caused by fluvial activity.

The alluvial Berkshire Park soil landscape is characterised by flat terraces dissected by small drainage channels and narrow drainage lines with exposed areas of underlying geology due to erosion. These soils are derived from geology created by three depositional phases known as St Marys formation, Rickabys Creek gravel formation and the Londonderry Clay formation. Berkshire Park soils consist of weakly pedal orange heavy clays and clayey sands, often mottled. Iron nodules

are common throughout the profile (Bannerman and Hazelton 1989: 26). Solods, yellow Podzolic soils, red Podzolic soils, chocolate soils, structure plastic clays and structure clays are all present within the soil profile. Berkshire Park soils are susceptible to flooding and becoming waterlogged, as well as erosion if vegetation clearance has occurred. Stone artefacts and subsurface archaeological deposits may be present in this soil landscape but their context and stratigraphic integrity will be variably affected by erosion. Berkshire Park derived from St Marys formation or Rickabys Creek gravel formation geologies may contain stone suitable for the creation of stone artefacts and have been utilised as sources for these materials by Aboriginal people.

The alluvial Richmond soil landscape is associated with the elevated terraces of the Nepean River and Georges River catchments and consists of reddish brown loamy sand overlying brown sandy clay loam to fine sandy clay loam and alternating layers of reddish to yellowish brown light or medium light clay and heavier, reddish brown to yellowish brown medium to heavy clay, with occasional lenses of reddish brown sandy clay. Iron-indurated gravels may occur in concentrated bands or dispersed throughout these layers. Richmond soils are susceptible to flooding and becoming waterlogged. Stone artefacts and subsurface archaeological deposits may be present in this soil landscape but context and stratigraphic integrity will be variably affected by flooding.

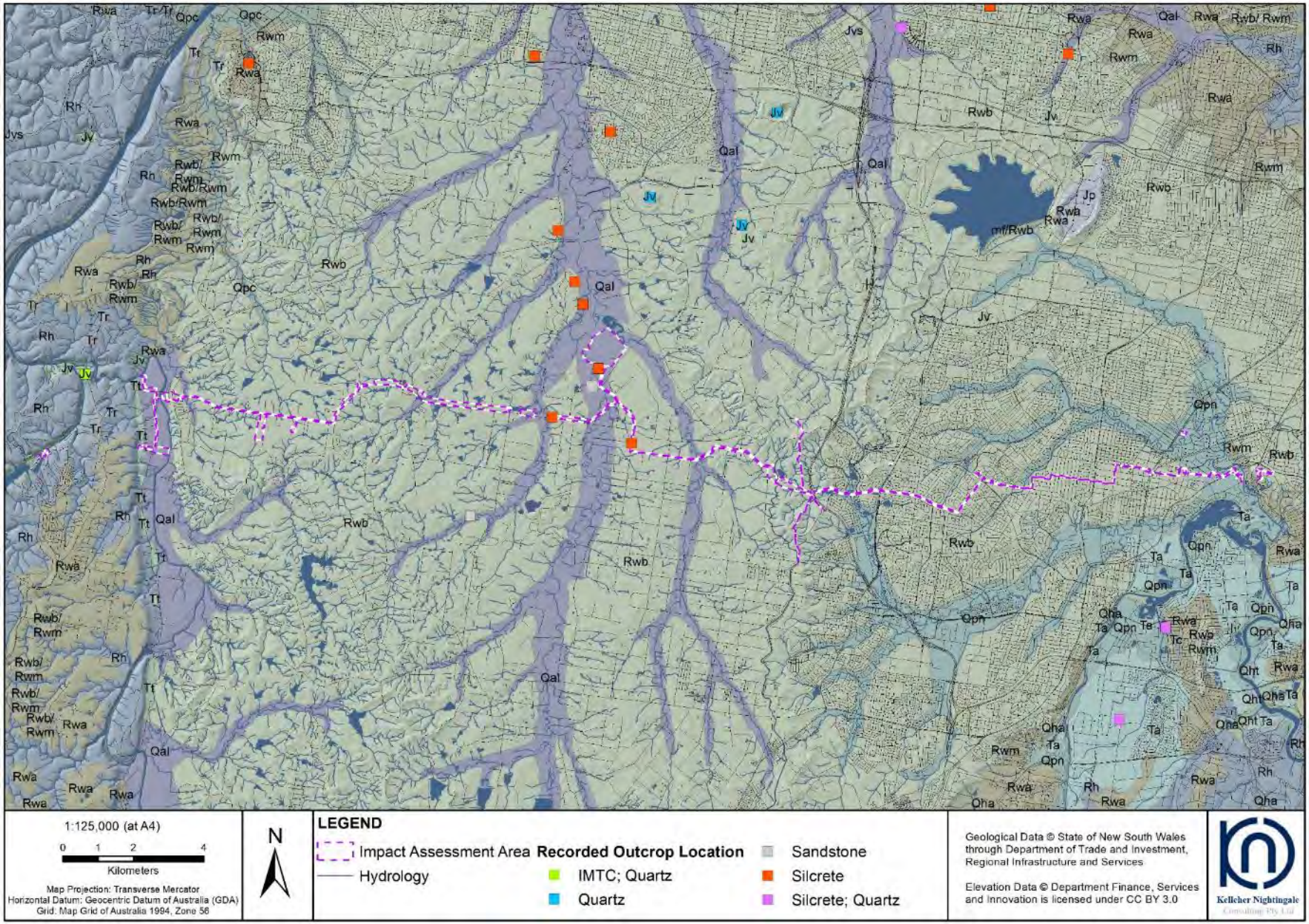

Figure 5. Geology of the IAA

The residual Blacktown soil landscape occurs on gently undulating rises of broad rounded ridges and crests with gently inclined concave slopes. The gently undulating rises have slope gradients that are usually less than 5%. The landscape is characterised by shallow to moderately deep red and brown podzolic soils on crests grading to yellow podzolic soils on lower slopes and drainage lines. Erosional susceptibility of this soil landscape is relatively low but is increased where surface vegetation is not maintained. Blacktown soils are conducive to the preservation of subsurface archaeological deposits; however, their acid chemistry quickly removes organics and their deflationary tendency often results in a temporal collapse, where stone artefacts from multiple time periods accumulate within a single soil layer.

The erosional Luddenham soil landscape occurs on low rolling to steep hills with local relief between 50 and 80 metres and slopes gradients of 5-20%. The hills have narrow convex ridges and crests, moderately inclined slopes and narrow drainage lines. The landscape comprises shallow dark podzolic soils or massive earthy clays on crests, moderately deep red podzolic soils on upper slopes and moderately deep yellow podzolic soils and prairie soils on lower slopes and drainage lines. The Luddenham soil landscape has a high erosional susceptibility with moderate surface movement potential. The steeper hill slopes of the Luddenham soil landscapes are subject to minor gully erosion and moderate sheet erosion in areas that have been stripped of vegetation. The preservation of subsurface archaeological deposits of stone artefacts within Luddenham soils is unlikely due to erosion and, where present, stone artefacts are likely to be within disturbed low density scatters exposed by the eroding landscape; however, landforms and vegetation that create soil stability can preserve subsurface archaeological deposits.

The colluvial Hawkesbury Soil Landscape is located on the rolling to very steep hills with the local relief of 100-200 metres that are present in the western portion of the impact assessment area. The Hawkesbury Soil Landscape is characterised by shallow, discontinuous and generally sandy soils that vary according to landform from siliceous and earthy sands on the crests to lithosols and siliceous sands around the sandstone outcrops. Rock outcrops, surface boulders and cobbles comprise more than 50 percent of the ground surface. Within open contexts, Hawkesbury soils are prone to extreme soil erosion and are not conducive to the preservation of intact subsurface archaeological deposits except where vegetation or the underlying geology (such as rock shelters or outcropping) impede soil movement. Colluvial soil landscapes associated with sandstone boulders and cliff lines are generally archaeologically sensitive as the blocks and weathered scarps provide overhangs and exposures of the underlying geology where painted/engraved art, grinding grooves or archaeological deposits may occur.

The colluvial Hazelwood Soil Landscape is located within a narrow and steep eastern slope of unconsolidated talus between the Blue Mountains escarpment and the Nepean River. The soils are highly variable due to the parent material and are usually less than 300 centimetres deep yellow solodic soils, chocolate soils and earthy sands. The Hazelwood soil landscape is susceptible to localised mass movement and erosion. The preservation of subsurface archaeological deposits of stone artefacts within Hazelwood soils are likely to be variably affected by the nature of the underlying talus material with areas where this material has created stability, more likely to retain sediment and have the potential for intact archaeological deposits.

The colluvial Picton soil landscape is situated on steep low hills with local relief between 90 and 300 metres and slopes with gradients over 20%. The landscape consists of shallow to deep red and brown podzolic soils on upper slopes, brown and yellow podzolic soils on colluvial material and yellow podzolic soils on lower slopes and within drainage lines. The Picton soil landscape has a high to very high erosional susceptibility with moderate surface movement potential and the potential for mass movement on steep slopes when saturated. The preservation of subsurface archaeological deposits of stone artefacts within Picton soils are likely to be detrimentally affected by erosion and stone artefacts are likely to have been displaced down slope; however,

where landforms or vegetation have created stability, deep soils with the potential for intact archaeological deposits may occur.

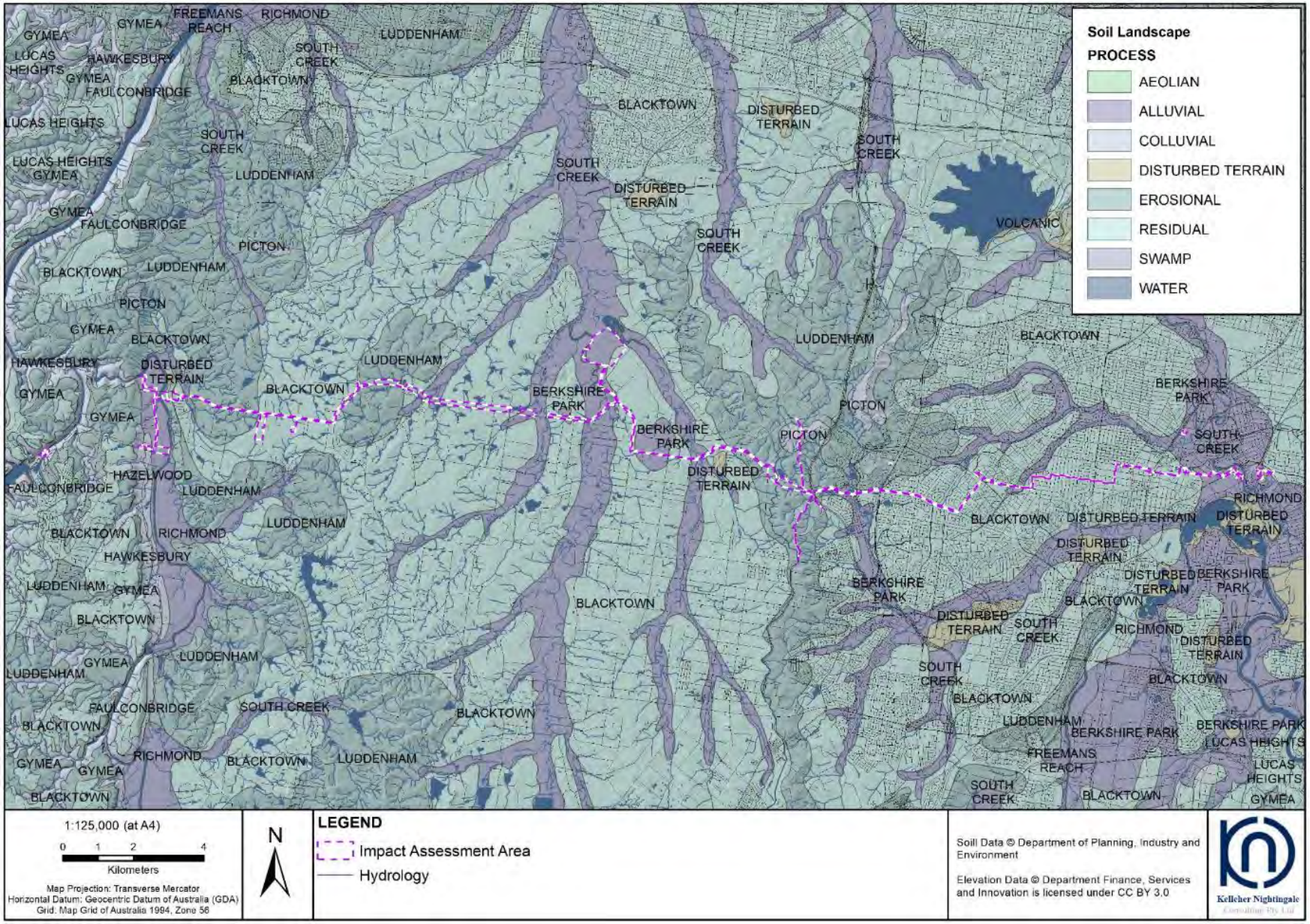

Figure 6. Soil landscape of the IAA

2.4 Vegetation and land use history

The distribution of native vegetation within the impact assessment area has been affected by historic and contemporary land use practices in the region. Prior to 1788, a mixture of native vegetation communities would have extended across the entire region with distribution determined by a combination of factors including soil, terrain and climate. Vegetation within the impact assessment area consists of areas of exotic grasses with scattered clusters of remnant native vegetation or areas of remnant native vegetation within regional parks and along the riparian corridors of large waterways.

The remnant native vegetation communities consist of Sydney Sandstone Ridgetop Woodland on the steep slopes and crests of the Blue Mountains hinterland in the west, Grey Box Woodland on the slopes adjacent to waterways, Shale/Gravel Transitional Forest on the crest and upper slopes of ridges and spurs, and River-flat Forest on the low lying floodplains of the Georges River and the major north flowing creeks. The variety of native vegetation and sources of permanent water would have made the region an attractive locale for past Aboriginal people due to the subsistence and material resources available. Aboriginal land use practices shaped the environment and would have influenced the distribution and numbers of plants and animals within the region; however, the extensive modifications to the landscape visible today area almost entirely the result of the land use practices that occurred during the past 200 years.

British settlement in the region began with the several land grants on the southern and eastern slopes of Prospect Hill in 1791. Over the next 30 years, British occupation expanded across the region with the allocation of land grants, including a large land grant to John Blaxland encompassing most of the western portion of the impact assessment area and the development of regional centres at Liverpool, Campbelltown, Camden and Narellan (Casey and Lowe 2010, Paul Davies 2011).

Land use within the impact assessment area between the Warragamba River and the Westlink M7 has remained predominantly rural to the present day. Residential, commercial and recreational properties are generally restricted to properties within and adjacent to the townships at Warragamba, Wallacia and Luddenham. Several major roads traverse the area which connect the townships and the regional centres including Elizabeth Drive, Luddenham Road, Mamre Road, Park Road, Silverdale Road and The Northern Road.

The area also contains an extensive network of water infrastructure that was constructed to provide consistent water supply to the residents of the Cumberland Plain and the wider Sydney region. The Upper Canal System was constructed between 1880 and 1888 to divert water from the headwaters of the Nepean River and its tributaries, through a system of tunnels, aqueducts and open canals to Prospect Reservoir. The Liverpool Offtake Reservoir, which is supplied by an inlet from the canal, was constructed in the late nineteenth century and enlarged in 1933. An additional reservoir and pumping station were constructed on the crest of the hill north of the Liverpool Offtake Reservoir during the twentieth century.

Warragamba Emergency Scheme was constructed between 1937 and 1940 during what would become an eight year drought. The scheme consisted of a weir on the Warragamba River and a 52 kilometre pipeline connecting the weir to the Prospect Reservoir. The Warragamba Dam was constructed between 1948 and 1960 to hold 2,031 gigalitres of water within the flooded Burragorang Valley, known as Lake Burragorang. The dam is connected to the Prospect Reservoir by two parallel pipelines.

At the confluence of Wianamatta/South Creek and Kemps Creek, a diversionary airfield was built in 1942. The airfield was called the Fleurs Aerodrome after the property of the same name. In 1954, the Fleurs Radio Telescope station was established on the property immediately to the north of the

Fleurs Aerodrome. Between 1954 and 1964, three major telescopes were constructed at the station (Mills Cross, Shain Cross and Chris Cross). The three telescopes consisted of two lines of dipoles or parabolic dishes (known as arms) oriented east-west or north-south and intersecting to form a cross. Several associated structures were also constructed at the site. Several quarries were established during the second half of the twentieth century to extract material from within the elevated areas adjacent to Wianamatta/South Creek and its tributary creeks between Luddenham Road and Mamre Road. South of Elizabeth Drive, the Western Sydney Airport is currently under construction.

The impact assessment area between the Westlink M7 and the Georges River is predominantly residential, commercial and recreational. The transition from earlier agricultural properties primarily occurred during the second half of the twentieth century. Sand mining within the Quaternary Alluvium along the Georges River resulted in the creation of several large pits that were subsequently incorporated into the river channel as bays or modified to create artificial lakes, including Chipping Norton Lake.

Land use practices over the past 200 years have caused varying levels of disturbance within the impact assessment area. In areas of intensive agriculture, quarrying, infrastructure construction or residential, commercial or industrial development, disturbance is generally higher. The construction of the Warragamba Dam and sand mining along the Georges River have caused significant disturbance and have altered the drainage characteristics of these areas. Channelisation, drainage works and inline dams have also altered the drainage characteristics of the area and contributed to disturbance along the waterways.

3 Ethnohistoric Context

Aboriginal people living throughout Australia in the late eighteenth century belonged to a multitude of groups that spoke approximately 250 distinct languages and several hundred dialects (Walsh 1993: 1). Prior to the British invasion, the impact assessment area was inhabited by Aboriginal people who spoke or understood three distinct languages (Troy 1994: 1; Attenbrow 2002). Dialects of the Sydney Language were spoken or understood by Aboriginal people who lived in an area extending along the coast from Broken Bay to the Georges River and inland to the Hawkesbury River. Dharug (also referred to as Daruk or Darug) is generally used to referred to the inland dialect and Eora (also referred to as Iyora) is generally used to refer to the coastal dialect.

Dialects of the Dharawal (also referred to as Tharawal, Thurrawal or Thur'rawal) language were spoken or understood by Aboriginal people living south of Botany Bay and the Georges River, east of Camden and Appin, and north of the Shoalhaven River and Jervis Bay (Bursill et al 2007: 9; DEC 2005: 6). Dialects of the Gundungurra (also referred to as Gun-dung-gorra, Gundungura or Gandangara) language were spoken or understood by Aboriginal people living in areas further west and south west including the catchments of the Wollondilly River, the Coxs River and some territory west of the Great Dividing Range (Russell 1914; Attenbrow 2002).

Prior to the British invasion, Aboriginal people living in the region transferred knowledge of history and culture through oral and artistic means. An account by Werriberrie (also known as William or Bill Russell), a Burra-ga-rang man who spoke Gun-dun-gorra (now generally spelt Gundungurra) and lived during the nineteenth century, is one of very few contemporary Aboriginal accounts from the Sydney region in which the name of an Aboriginal language, as it was known to speakers of that language, was published (Russell 1914: 9, 20; Troy 1994: 1). Most of the information used to study Aboriginal languages was published in the second half of the nineteenth century by amateur anthropologists who interpreted, often without acknowledgement, information given to them by individuals from the contemporary Aboriginal community (Thomas 2007: 89; Attenbrow 2010: 30).

Individuals generally lived in groups of one or more extended families that were associated with particular areas (Attenbrow 2002: 29; Watt 2019:5). These groups were interconnected through marriage and large gatherings of several groups occurred for specific purposes such as communal participation in subsistence gathering activities, initiations, funerals and ritual combat (Attenbrow 2002: 29; Bursill et al 2007: 9). Aboriginal Customary law and practices, while varying across Australia shared "included responsibilities of various kinds for land and for objects and ideas associated with land, complex structures of kinship and family groupings, patterns and rules of marriage and child care, and procedures for the conduct and resolution of disputes" (ALRC 1986: The Character of Aboriginal Customary Laws, parra. 1).

Aboriginal people living in the region during the late eighteenth and nineteenth centuries made a range of items including canoes, huts, containers, nets, spears, womera, clubs and shields. Cloaks made from skins were also worn by Aboriginal people living in the mountainous areas (Bladen 1897: 753). Most of the items made by Aboriginal people during the late eighteenth and nineteenth centuries were made from perishable materials and the small number that have survived are generally kept in museum collections (Megaw 1993). Ochres of red, yellow and white were used on items and as personal decoration while body piercings and scarification were also practiced. Rock art was created as pictographs (drawings) using ochres and charcoal or petroglyphs (rock engravings). Motifs (dendroglyphs) were also carved into the hardwood of trees of the south western Cumberland plain as cultural markers.

Aboriginal people living along the coast of the Sydney region during the late eighteenth century and nineteenth century utilised both aquatic and terrestrial resources on a seasonal basis (Attenbrow 2002; Watt 2019:5). The aquatic resources of coastal and estuarine areas included a wide variety of fish and shellfish species, crabs, and cray fish while aquatic mammals such as whales and seals were

consumed when stranded (Watt 2017: 5). Aboriginal women fished from bark canoes or on rock platforms using fishing hooks made from shell and lines made from bark fibres. They also gathered shellfish and terrestrial resources (Attenbrow 2010: 81). Aboriginal men fished using spears from canoes, on rock platforms or in shallow waters.

Aboriginal people living inland were not as dependant on fish and shellfish as groups closer to the coast, but relied on small animals and plant foods in addition to seasonally available freshwater mullet and eels (Kohen 1986:77; Tench 1793:230). Possums and gliders were hunted in a number of ways, including smoking out the animal by lighting a fire in the base of a hollow tree or cutting toe holds to climb trees and capture them (Kohen 1993:10; Tench 1793:82). Traps were constructed along waterways for catching birds and small animals (Hunter 1793). Large groups of Aboriginal people participated in hunting kangaroos, which were flushed out toward awaiting hunters by lighting small grass fires (Bladen 1897: 751).

A variety of plant based resources were also utilised. Wild yams and other roots, were harvested in considerable quantities along the alluvial flats and terraces of Nepean River and Hawkesbury River while berries, Banksia flowers and wild honey were also recorded as foods of the local inhabitants (Attenbrow 2010: 41; Collins 1798; Hunter 1793; Tench 1793:230). A commensalism between the Aboriginal people of the Sydney region and dingos was also present during the late eighteenth and nineteenth centuries with dingos often observed with Aboriginal people by the British (Tench 1789).

The history of Aboriginal people who lived in Australia during the eighteenth and nineteenth centuries is disproportionately reliant on contemporary documents created by a small number of individuals from Europe or of European descent. Initially, the British were unable to converse with the Aboriginal people living in the Sydney region. Watkin Tench, who published a contemporary account of the British occupation in Australia during the late eighteenth century noted that his information on Aboriginal people was “made up of detached observations, taken at different times, and not from a regular series of knowledge of the customs and manners of a people with whom opportunities of communication are so scarce as to have been seldom obtained” (Tench 1793: 51).

The study of society, culture and material culture by Europeans during the eighteenth and nineteenth centuries was influential in the development of many social sciences that exist today and, as such, prominence has been given to the documents created by Europeans during this time and, in consequence, the perceptions, beliefs and bias of their authors. As a result, the Aboriginal people who were involved in these events and the history of the eighteen and nineteenth centuries incorrectly appear “invisible, unrelated to important local historical events, or passive victims of colonisation” (Heritage NSW 2011: 6). Darug Custodian Aboriginal Corporation during consultation for the current project, noted that:

> *It has been discussed by our group and with many consultants and researches that our history is generic and is usually from an early colonists perspective or solely based on archaeology and sites. These histories are adequate but they lack the people’s stories and parts of important events and connections of the Darug people and also other Aboriginal people that now call this area home and have done so for numerous generations* (Darug Custodian Aboriginal Corporation, letter dated 24/05/2020).

In 1770, the crew of a British Royal Navy research vessel called the HM Bark Endeavour charted the eastern coastline of a continent largely unknown to the Europeans at the time. As the coastline was charted, landmarks were given names by the crew who also documented several observations of Aboriginal people which they could see on the shoreline. While the crew of the HM Bark Endeavour were unsuccessful in their attempts to interact with the Aboriginal people living in the Sydney region and unable to know what the landmarks they recorded were called, the British from this period onwards generally failed to acknowledge the existence of existing Aboriginal placenames,

despite often being aware of their existence, and "subsequently assigned European names to features that commemorated important events, people and places from their own culture" (Windsor 2009: 72). The renaming of the topographic features, animals and plants of Australia by the British effectively erased existing Aboriginal names that may have been used for thousands of years.

On 22 August 1770, Lieutenant James Cook who commanded the Endeavour claimed the eastern half of the continent, which he called New South Wales, for the United Kingdom. Cook did so in complete disregard for the rights of the Aboriginal people already inhabiting the continent and despite failing to gain the consent of Aboriginal people as he was instructed to do by the British Admiralty. The actions of Cook were part of a series of territorial acquisitions that were ruled or administered by the United Kingdom and would become known as the British Empire which encompassed almost a quarter of the world's population and landmass by 1909 (Ferguson 2003: 240). The British Empire was driven by commercial gain and utilised military, civil and religious coercion to control the often larger local populations of its foreign territories (Ferguson 2003: 240). In Australia, the claim of sovereignty and subsequent colonisation of Australia was founded and implemented on the erroneous belief in the superiority of the British civilisation which continues to have ramifications to the present day (Banner 2005; Doukakis 2006).

The British First Fleet, under the command of Arthur Phillip, arrived on the eastern coast of the Australian continent in 1788 and established a penal colony at Warrane (also spelt Waran, War-ran, Warrang and Wee-rong), a small bay which they would call Sydney Cove. The British First Fleet contained over 1,000 people including marines, officials and convicts. Phillip, who was commissioned Captain General and Governor in Chief of the Territory of New South Wales by King George III of the United Kingdom, was instructed to take precautions to protect the British colony against attack from them in addition to documenting information on the numbers of Aboriginal people living in the region and advising the British government on a "manner Our Intercourse with these people may be turned to the advantage of this country" (Governor Phillip's Instructions 25 April 1787).

The British were governed by legal regime based on the common law and classified Aboriginal people living in New South Wales as British subjects who were entitled to individual protection under the law (ALRC 1986). In practice, a legal pluralism existed within the region until 1816 with the British largely unable to enforce colonial laws outside the occupied areas where Aboriginal customary laws continued to be practiced (ALRC 1986; Ford and Salter 2008: 74-75). Aboriginal people who the British perceived to have committed crimes such as theft or murder, were treated as enemies of the state and while "at least 17 Aboriginal people had been incarcerated in the colony before 1816, all were held as hostages, not criminals" (Ford and Salter 2008: 72).

The British were frequently intimidated by armed groups or attacked outside the settlement and David Collins, who was Deputy Judge Advocate and Lieutenant-Governor of the colony, attributed the responsibility to the British individuals involved who were often convicts and who he believed had been punished for committing crimes such as theft. Karskens suggests that these actions were part of an attempt by Aboriginal groups living in the area to restrict the expansion of British occupation which by November of 1788, had extended to Parramatta where the British establish a government farm called Rose Hill (Karskens 2016: 44). British exploration and occupation in the late eighteenth century were influenced by the administration's desire to grant land to emancipists, in addition to the need to produce food to support the colony. Exploration and occupation were focused along the major waterways in the region which could be traversed by European style watercraft and where well-watered alluvial soils suitable for cultivation were found (Gill 1965: 543-544). Between 1788 and 1791, the British sent parties to survey the Parramatta River, Broken Bay, Botany Bay and the Hawkesbury River and lower reaches of Georges Rivers.

Early British accounts described the Sydney region as a mosaic of Aboriginal family groups that were associated with particular areas of land (Collins 1798: 545). The British noted that there were differences between the Aboriginal people living along the coast, the Aboriginal people living inland who they referred to as the 'woods tribes' (also called the Hunter's or Woodman's tribe) and the Aboriginal people who lived in the adjacent mountains. David Collins noted that the inland and coastal groups had a different dialect, songs, dances, subsistence and some implements (Collins 1798: 557-589).

The British use of the term 'tribes' when referencing specific Aboriginal groups continued into the late nineteenth century and was used with other derogatory language to invoke a perception of the European social superiority over the Aboriginal people of Australia that is incorrect and inappropriate today. It is likely these groups were small territorial clans and local clans of extended family groups, forming larger mobs or bands through social and cultural links including marriage and communal participation in subsistence activities.

Several of the groups were identified during the late eighteenth and nineteenth centuries in the vicinity of the impact assessment area including the Burra-ga-rang, Cubbitch Barta, Gahbrogal, Gomerrigal and the Mulgowy. The Burra-ga-rang were associated with an area in south western Sydney that included the Burragorang Valley (now Lake Burragorang) and the catchments of the Warragamba, Wollondilly and Coxes Rivers (Russell 1914). The Cubbitch Barta who were associated with the area around of Camden (Russell 1914: 20). The Gomerrigal (Gomerigal or Gomerrigal-Tongarra) who were possibly the later named 'South Creek Tribe' associated with Wianamatta/South Creek to the confluence of the creek with the Hawkesbury River (Attenbrow 2002: 24-26). The Gahbrogal (Cah-bro-gal or Cobrakall) who were associated with the area around Cabramatta (Gapps 2009: 30, 33). The Mulgowy (also referred to as the 'Mulgoa Tribe') were associated with the Mulgoa Valley (Attenbrow 2002: 24-26).

Confusion over the names and territories attributed to different Aboriginal groups by the British was the result of a range of issues including the knowledge of sources and the changes to Aboriginal groups during this period due to the British occupation. The testimony from Maroot (also called Boatswain Maroot or Mahroot), a Gameygal man from the north shore of Botany Bay, to the NSW Select Committee in 1845 described the neighbouring groups as the Liverpool tribe, which he called the Cobrakalls after a kind of a worm eaten in the wood, and the Five Islands tribe who spoke a different language. The attribution of the 'Liverpool Tribe' with the Cobrakalls (Gahbrogal) would indicate that the territory of this group extended further south; however, Gapps suggests that this association between the 'Liverpool Tribe' and the Gahbrogal was the result a later re-grouping of several different groups (Gapps 2009: 34).

The organisation of territory and groups was also likely to have been more complex than the British were aware of (Yamanouchi 2007: 109). The Georges River and the Nepean/Hawkesbury River appear to have formed the boundaries between the different language groups in the region; however, these were not boarders as the British understood them and these areas are believed to have been 'shared zones' where groups may have had certain rights and access despite the area being owned by another group (Gapps 2009: 32).

By 1789, the British found that their previous attempts to engage with Aboriginal people had been unsuccessful. Governor Phillip decided to capture and detain Aboriginal individuals by force and against their will in the belief that subsequent kind treatment would result in the engagement they desired (Hunter 1793[2003]: 118). The British kidnapped Arabanoo, an Aboriginal man who died of smallpox in April 1789, and then Coleby and Woollarwarree Bennalong who subsequently escaped their captivity. Phillip was speared when attempting to contact Woollarwarree Bennalong after his escape; however, his decision not to retaliate but instead to negotiate is thought to have resulted in the change in relations with Woollarwarree Bennelong, his family and friends who subsequently moved into the colony (Karskens 2016: 48).

During March and May 1789, the British documented widespread fatalities amongst the Aboriginal population of the Sydney region which they attributed to an outbreak of smallpox. The British were familiar with smallpox which was the most widespread and deadly disease in the British Isles in the eighteenth century (Dowling 1997: 89). Prior exposure of the British to smallpox and the policy of isolation of infected individuals are likely to have contributed to the low level of infection within colony (Dowling 1997: 89); however, outbreak was devastating to the Aboriginal community. Governor Phillip estimating that "one half of those who inhabit this part of the country died" (Phillip 1790: 159). Collins (1798: 496) recorded that:

> *At that time a native was living with us; and on taking him down to the harbour to look for his former companions, those who witnessed his expression and agony can never forget either. He looked anxiously around him in the different coves we visited; not a vestige on the sand was to be found of human foot; ... not a living person was anywhere to be met with. It seemed as if, flying from the contagion, they had left the dead to bury the dead. He lifted up his hands and eyes in silent agony for some time; at last he exclaimed, `All dead! all dead!' and then hung his head in mournful silence.*

Later accounts from British explorers of Aboriginal people who bore smallpox scars from the outbreak indicate that the disease spread over a large area that possibly included the Wellington Valley in the west and Jervis Bay and Port Phillip in the south (Dowling 1997: 63). The source of the smallpox outbreak is unclear due to the limited information in contemporary accounts; however, the virus was almost certainly brought to Australia by ship as was the case with seven other outbreaks of smallpox in Australia that were recorded during the nineteenth century (Dowling 1997: 52). The smallpox outbreak of 1789 drastically altered the size and structure of the Aboriginal population living in the Sydney region and in the aftermath, a number of Aboriginal people moved into the British settlement (Troy 1994: 8).

Aboriginal people living across the Sydney region during the last decade of the eighteenth century were living in a range of circumstances due to proximity to the areas occupied by the British and the connections and associations of Aboriginal groups and individuals. Aboriginal people played a crucial role as guides and translators for the British. Colebee and an Aboriginal man called Boladaree guided the British and acted as intermediaries with the Aboriginal people that they encountered between Parramatta and the Hawkesbury. The British used European items as gifts during these journeys and found that metal hatchets were particularly sought after (Attenbrow 2002: 103). The metal hatchet of Tommy Bundle is in the collection of the Australian Museum in Sydney (Attenbrow 2002: 103; Figure 8.16).

A young Aboriginal man called Bundle (also spelt Bon-del, Bundal, Bundell or Burreach) travelled with Captain Hill to Norfolk Island on board the brig *Supply* in 1791 becoming the first Aboriginal person to have sailed on a British ship beyond Australia (SLNSW 2010: 1). Bennelong and Yemmerrawanne sailed with Arthur Philip to England in the following year and several other Aboriginal people were listed as crew on British ships during this period including Nanbarry and Bungaree (SLNSW 2010: 17). Cultural practices continued within and on the peripheries of the British settlements with an initiation ceremony taking place at Wogganmully, which the British called Farm Cove, in February 1795. The initiates included Nanbarry, Colebee's nephew and Pemulwuy, a member of the Bè-dia-gal, who had speared John McEntire in 1790 was also present.

In 1791, small lots on the fertile eastern and western slopes of Prospect Hill were granted by Governor Philip to time-expired convicts and a further government farm was established at Toongabbie in April 1792; however, it was not until the British occupation along the Hawkesbury River, which began in 1794, that the colony began to be self-sustaining (Gill 1965: 543-544). Land along the Hawkesbury was granted to free settlers, many of whom were former soldiers and by 1795, an estimated 400 people occupied 30 miles of the riverfront (Gill 1965: 543-544). In the same

year, a herd of wild cattle that had escaped from the colony seven years earlier was relocated by two convicts on a hunting expedition south of the Nepean River. The Campbelltown-Camden area became known to the British as the Cow Pastures (also called the Cowpastures Plain or Vaccary Forest) and remained largely unoccupied by the British until the early nineteenth century in order to preserve the herd. John Warby, a former convict who had been granted 50 acres at Prospect in 1792, was appointed stockman of the herd in 1803. The presence of the herd was known by the Aboriginal people living in the area who drew them beside a depiction of kangaroo on the wall of a sandstone rock shelter located in the suburb of Kentlyn which is known as Bull Cave.

British occupation along the Parramatta River, Hawkesbury River and Georges River during last decade of the eighteenth century impeded Aboriginal people's use of the landscape by restricting access to and removing food sources (Ferguson 1941: 88). Several droughts during this time are likely to have placed further strain of the resources used by Aboriginal people. In 1795, David Collins reported that large groups of Aboriginal people had been taking corn from the British farms on the Hawkesbury and that "an open war seemed about this time to have commenced between the natives and the settlers" (Collins 1798: 415-416). Raiding by Aboriginal groups and retaliatory killings by Aboriginal people and the British was reported on the peripheries of the colony along Hawkesbury River and at Prospect Hill, Toongabbie and outside Parramatta during the last decade of the eighteenth century (Collins 1798: 178, 275-276, 292, 304, 326-327).

In June 1795, the acting governor Captain William Paterson sent a detachment of the NSW Corps "from Parramatta, with instructions to destroy as many as they could meet with of the wood tribe (Bè-dia-gal); and, in the hope of striking terror, to erect gibblets [sic] in different places, whereon the bodies of all they might kill were to be hung" (Collins 1798: 416). Paterson stated that the soldiers were sent to the Hawkesbury after five British settlers had been killed and several wounded in the preceding weeks and that he "very much feared they would abandon the settlement entirely, and given[sic] up the most fertile spot which has yet been discovered in the colony" (Bladen 1895: 307). On the night after the arrival of the detachment, the soldiers fired on and pursued Aboriginal people that they believed had come to a farm to plunder it (Bladen 1895: 307). The officer stated that between seven and eight people were killed and one man, five women and some children were taken captive back to Sydney, including a women and child that had been wounded by shot (Bladen 1895: 307-8; Collins 1798: 416).

In March 1797, Pemulwuy led a large group of at least a hundred Aboriginal warriors in a raid on the Government Farm at Toongabbie. After the raid, Pemulwuy's group was followed to the outskirts of Parramatta by armed soldiers and settlers. During the ensuing 'Battle of Parramatta', Pemulwuy was shot at least seven times and taken to a government hospital. Although he was wearing leg irons and still had buckshot in his body and head, Pemulwuy escaped the hospital and by April appeared to have recovered when he was seen with a group of Aboriginal people on the Georges River near Botany Bay (Collins 1798: 44). In the same year, land along the Georges River and Prospect Creek was granted, which Governor Hunter called 'Bank's Town' after Sir Joseph Banks. Grants made to George Bass and Matthew Flinders covered the area immediately north of the junction of the Georges River and Prospect Creek.

The violence between the British and Aboriginal people continued through the first decade of the nineteenth century and followed British occupation across the Cumberland Plain where large areas of land were granted to former soldiers and free settlers. The south western Cumberland Plain, largely owing to the presence of the government herd at what the British called the Cowpastures and the regions distance from rivers navigable by European style watercraft remained on the peripheries of British occupation until 1805 when the Colonial Secretary Lord Camden, ordered Governor King to grant John Macarthur 5,000 acres of the Cowpastures. In 1809, 840 acres were granted to James Badgery on the north of Orphan School Creek Road (now Elizabeth Drive) between Wianamatta/South Creek and what would become Badgerys Creek. Badgery called the property Exeter Farm.

On 1 May 1801, Governor King issued a government and general order that the Aboriginal people living near Parramatta, the Georges River and Prospect Hill should be driven back from the British habitations by firing at them and in November of that year he outlawed Pemulwuy and offered a reward for his capture (Kohen 2005). A detachment of the New South Wales Corps was posted to the Georges River from 1801 to protect crops from Pemulway and his warriors (Gapps 2009: 104). A small garrison of the New South Wales Corps remained at 'Gabramatta' until 1812 (Gapps 2009: 104). Pemulwuy was killed in June 1802 and Governor King ordered that his head should be preserved in spirits and sent to Sir Joseph Banks for study in England (Philip Gidley King, Government and General Order, 1 May 1801, HRNSW Vol.V: 362; Kohen 2005). King wrote to the Botanist Joseph Banks that although Pemulwuy had been "a terrible pest to the colony, he was a brave and independent character" (Kohen 2005).

During 1804 and 1805 several raids were made by Aboriginal people across the region including an attack on James Dunlap at Prospect in May 1805 (Natives 1804: 2; Natives 1805b: 3), the killing of two stockmen on John Macarthur's Farm at Camden by Aboriginal people 'from the interior of the mountains" (Sydney 1805e: 3) and raids associated with an Aboriginal man called Musquito (also spelt Mosquito, Musquetta, Bush Muschetta or Muskito) on properties in the Hawkesbury River and Georges River districts. In July 1804, the Sydney Gazette reported that Reverend Samuel Marsden and the residentiary magistrate Mr Arndell met with two Aboriginal men from Richmond Hill called Yaragowby and Yaramandy (Yellowmundee) and requested their help in ending the conflict while providing gifts of food and clothes to take back to Aboriginal people who were friendly to the British (Natives 1804b:2). Two weeks later, it was reported that Major White and Nabbin (also referred to as Terribandy), two Aboriginal men who the British believed were involved in the violence, had been killed at Richmond Hill (Sydney 1804b: 2).

In April 1805, a series of meetings between Reverend Samuel Marsden and Aboriginal people under the protection of John Kennedy were held at Prospect Hill to reconcile the groups (Postscript 1805: 4). Marsden insisted that reconciliation was not possible until the names of the 'principal murders' were provided. The attendees provided Marsden with the names of six individuals. In May 1805, the Aboriginal people well known to the British around Prospect and Parramatta in addition to some strangers from the Cowpastures were sit down under the protection of the magistrates at Parramatta at the 'brush' between Prospect and the Georges River (Government and General Order, 5 May 1805, HRNSW, Vol. V: 616). The exact location of the 'brush' between Prospect and the Georges River is unknown; however, contemporary oral history places a traditional sit down place at what is now Shortland Brush in Mirambeena Regional Park approximately 200 metres south of the impact assessment area (Gapps 2009: 101).

Tedbury (also spelt Tjedboro), son of Pemulwuy, was seen by the British as one of the main perpetrators of the violence during this time and was arrested at Pennant Hills in May 1805 (Sydney 1805b: 3). Tedbury was released in August 1805 after assurances from Aboriginal people who assisted the British in capturing Musquito where given for Tedbury's future good conduct (Sydney 1805b: 2). During 1809, Tedbury was believed to part of a group of Aboriginal people who threw spears at British landholders on the Georges River and was reported waylaying a man named Tunks near Parramatta with Bundle and another assailant (Sydney 1809a: 2; Sydney 1809b: 2; Liston 1988: 58). Tedbury was shot by Edward Luttrell Jnr at Parramatta in 1810 and is believed to have died the same year.

British occupation and policy changed significantly under Lachlan Macquarie, who became Governor of New South Wales on 1 January 1810. During his time as governor, there was a rapid expansion of the British population in New South Wales from approximately 10,000 in 1810 to almost 30,000 in 1821 (Australian Bureau of Statistics 2008). Macquarie established several towns on the Hawkesbury/Nepean Rivers and approved the 1813 expedition, led by Gregory Blaxland, William Lawson and William Charles Wentworth, which enabled the British to expand west of the

Blue Mountains and, from 1815, oversaw the subsequent of British occupation west of the mountains and into the Illawarra.

During 1810 and 1811, Macquarie toured the occupied areas and met with several Aboriginal people at the Cow Pastures including Kogi (also been spelt Gogy, Goguey, Gogie or Koggie), who Macquarie recorded as "Chief of the Cow-Pasture Tribe" and his wives Nantz and Mary, Bootbarrie and his wife Mary, and Bundle (Macquarie Organ 1990: 34). Kogi, a Dharawal man from the Camden area had previously acted as a guide for Francis Barrallier of the New South Wales Corps who attempted to cross the Blue Mountains from the south west Cumberland Plain in 1802.

On 29 November 2011, Macquarie journey along the Nepean River in 1811 to inspect a river which flowed into the Nepean River and noted in his journal that:

> *One of the Natives born near this part of the Country, and who made one of our Party on this day's Excursion, tells us that the real and proper native name of this newly discovered River that we are now exploring is the Warragombie, by which name I have directed it to be called in future.*

Warragombie, which would become the Warragamba River is believed to have been a Dharug word for the lower reaches of the river and it is unclear what this section of the river was called by Aboriginal people speaking Gundungurra (Smith 2009: 101).

The British occupation of south western Sydney expanded during the governorship of Macquarie who made several land grants to former soldiers and free settlers. In 1810, Anthony Kemp was granted 300 acres around the present-day Elizabeth Drive and Mamre Road while Nicholas Bayly was granted 550 acres which he named Bayly Park and would later become Fleurs. Larger grants included 950 acres granted to Charles Throsby (Glenfield) in 1811, 1,100 acres granted to Charles Hook (Denbigh) in 1812, 6,710 acres grated to John Blaxland (Luddenham) between the Nepean and the western Branch of Wianamatta/South Creek in 1813, and 3,000 acres granted to William Howe (Glenlee) in 1818. Major roads including Cowpasture Road (part of present-day Camden Valley Way), Orphan School Creek Road (now Elizabeth Drive) and Bringelly Road in addition to several towns including Liverpool, Campbelltown, Camden and Narellan were also established during governorship of Macquarie (Casey and Lowe 2010, Liston 1988: 50; Paul Davies 2011).

The expansion of European settlements and a period of drought during 1814-1816 saw another period of intensive conflict involving a series of raids and retaliatory killings between Aboriginal groups and the British at Bringelly, Appin and along the Nepean/Hawkesbury River (Liston 1988: 50-51). Macquarie, in response to conflict in the Appin region during 1814, conducted an enquiry which found that the settlers and their convict labourers had initiated the aggression and Macquarie warned the British colonists not to take the law into their own hands and that Aboriginal people were protected under colonial law (Hale and Koeneman 2010: 3).

Macquarie issued a Government and General Order for the establishment of the Native Institution at Parramatta on 10 December 1814, which would be a residential school for Aboriginal children aged between four and sixteen where they would "be instructed in common, Reading, Writing, and Arithmetic; That the Boys shall also be instructed in Agriculture, Mechanical Arts, and such common Manufactures as may best suit their Ages, and respective Dispositions; That the Girls Shall also be taught Needle-work". The order also stipulated that "no Child, after having been admitted into the Institution, shall be permitted to leave it, or be taken away by any Person whatever (whether Parents or other Relatives) until such Time as the Boys shall have attained the Age of Sixteen Years, and the Girls Fourteen Years; at which Ages they shall be respectively discharged".

On 28 December 1814, Macquarie convened a meeting at the marketplace in Parramatta which he had invited and requested that Aboriginal people attend. The meeting, which would be the first of

an annual conference, feast and distribution of goods held at Parramatta until 1835 was attended by approximately 60 Aboriginal families and several Aboriginal children who attended were enrolled in the Native Institution at Parramatta (Sydney 1814: 2). The establishment of the native Institution and annual conference were part a change in policy that occurred during the governorship of Macquarie that exerted greater control over Aboriginal people and focused on changing the way in which Aboriginal people lived by promoting Christianity, British social practices and European farming techniques.

The actions taken by Macquarie in 1814 did not stop the hostilities and, in April 1816, he ordered soldiers from the 46th Regiment (South Devonshire) under the command of Captain Schaw, Captain James Wallis and Lieutenant Charles Dawe to form three military reprisal raids to track down, capture or kill all Aboriginal people they came across with no distinction between 'friendly' and 'hostile' (Sydney 1816: 2; Brook and Kohen 1991: 22-36).

The response of Aboriginal people and the British to the reprisal raids varied. A group of Aboriginal people including Kogi, Bundle, Boodbury and their families sheltered with Charles Throsby at Glenfield during this period and were actively protected by Throsby who stopped Kogi from being apprehended (Organ 1990: 61). Throsby was a large landholder at this time and had previously used his connections with two Aboriginal men to find a route into the Illawarra in 1815 which further expanded his landholdings (Organ 1990: 48). The reprisal raids were provided with Aboriginal guides including Bundle, Budbury, Colebee (son of Yellowmundee), Nurragingy (Creek Jemmy) and Tindale. It is unclear what the Aboriginal guides thought of the raids; however, the raids had met with little success prior to Captain Wallis being deserted by his Aboriginal guides Bundle and Budbury and British guide John Warby (Liston 1988: 54).

Reported sightings of Aboriginal people on Broughton's farm at Appin led Wallis' group further south and on the morning of 17 April 1816 they killed at least 14 Aboriginal men, women and children by shooting and driving the group over the gorge of the Cataract River. The bodies of two men, Durelle and Conibigal (Cannabayagal) were "hung from trees on Broughton's farm as a warning to others" (Liston 1988: 54).

In May 1816, Governor Macquarie proclaimed that in response to the killing of British settlers and the destruction of cattle, grain and property along the Nepean, Grose and Hawkesbury Rivers a military force had been sent to drive Aboriginal people away from the settlements which resulted in the death and wounding of several Aboriginal people that may have included innocent men, women and children (Macquarie 1816: 1). The proclamation declared that Aboriginal people were no longer allowed to be armed with weapons within one mile of British settlements or farms occupied or owned by a British subject and were no longer allowed to gather in groups exceeding six individuals near a farm "on Pain of being considered Enemies, and treated accordingly" (Macquarie 1816: 1). Governor Macquarie's proclamation from May 1816 also stated that Aboriginal people:

> *assembling in large Bodies or Parties armed, and or fighting and attacking each other on the Plea of inflicting Punishments on Transgressors of their own Customs and Manners, at or near Sydney, and other principle Towns and Settlements in the Colony, shall be henceforth wholly abolished, as a barbarous Custom, repugnant to the British Laws, and strongly militating against the Civilisation of the Natives, which is an Object of the Highest Importance to effect, if possible* (Macquarie 1816: 1).

Accounts of combat between Aboriginal parties practicing customary law was relatively common within the Sydney Gazette prior to Macquarie's proclamation. Sydney Gazette reported that in March 1805 a punishment ordeal was endured by Kogi near Prospect. The ordeal was punishment for killing an Aboriginal person and involved Bennelong and Nanberry who threw barbed spears at Kogi from four metres away while he used a shield to defend himself, resulting in Kogi being

speared in the hip and back (Natives 1805a: 3; Konishi 2016: 15). A subsequent report in the Sydney Gazette three weeks later noted that Kogi had recovered from his wounds and was traveling to the Hawksbury to assist in the trial of an offender (Sydney 1805a: 3). Despite Macquarie's attempt to stop the practice within the occupied area, Kogi and his group were noted attending a gathering in Sydney in 1824 at which customary law combat occurred.

The conflict eventually ended through the outlawing of individuals and an eventual amnesty in November 1816 (Liston 1988: 54-55). On 25 May 1816, Macquarie noted in his journal that:

> *On this occasion I invested Nurragingy, alias Creek Jemmy with my Order of Merit by presenting him with a handsome Brass Gorset or Breast Plate, having his name inscribed thereon in full - as chief of the South Creek Tribe - I also promised him and his friend Colebee a Grant of 30 acres of land on the South Creek between them as an additional Reward for their fidelity to Government and their recent good conduct.*

Macquarie established the practice of giving metal breastplates (also referred to as kingplates, gorets or badges) to individuals that the British identified as 'chief' of the district they resided in and who would be accountable to the British governor for the conduct of Aboriginal people in that district (Irish 2017: 30-31). The practice of giving breastplates was "an attempt in many instances at social control and domination in the form of 'a badge of distinction', equating and imposing European values and social hierarchy on Aboriginal people and societies (Norris 2019: 32).

Colebee and Nurragingy selected an area in the suburb of Colebee as the location of the grant which Brook and Kohen (1991: 44-45) suggest they chose based on its proximity to the abundant raw materials located at Plumpton Ridge and proximity to the important watercourses of Eastern Creek and Bells Creek. The grant was registered on 31 August 1819 in Colebee's name alone and his heirs "to have and to hold for ever" (Macquarie 1819 [in Brook and Kohen 1991: 38]). A further three land grants along Richmond Road were registered on the same date to three British colonists, including Reverend Robert Cartwright, who Brook and Kohen (1991: 42-43) suggest were part of a plan by Macquarie to shape the nature of the settlement.

During the first half of the nineteenth century, the Aboriginal people of the Sydney Region lived in a range of circumstances that were increasingly entangled with the British. Settlements and land grants restricted movement across and access to traditional lands that Aboriginal people relied upon for subsistence and cultural activities. The displaced had to either move away from their Country or seek employment, often as labourers in settlements and on rural properties or as crew on ships (Backhouse 1843: 304; Hassall 1902: 3; Liston 1988: 59). Others occupied areas on the fringes of the settlement where the British believed the land was unsuitable for agriculture. At the junction of Harris Creek and Williams Creek in what is now Voyager Point, Kogi, and his descendants fished and grew crops until at least the 1840's (Goodall and Cadzow 2009: 57-58).

A list of the Aboriginal groups living in the region was compiled in 1821 by the Weslyan missionary William Walker noted the 'chiefs', location and approximate size of the Aboriginal groups and noted that some groups had settled or were likely to settle soon (Walker cited in Organ 1990: 109-110). The names used to describe the groups indicates that the territory of several groups had changed with Jemmy (Nurragingy) listed as the 'chief' of the Hawkesbury and Cogie (Kogi) at Liverpool while Boodberrie was listed as the 'chief' at Cow Pasture and Mary Mary remained at Muloga (Walker cited in Organ 1990: 110). Some access to traditional lands continued, possibly associated with employment on the larger estates, with corroborees documented until at least the 1850s on properties including Camden Park, Denbigh and Denham Court (Liston 1988: 57; Hassall 1902: 3).

Werriberrie provides one of the few known primary sources by an Aboriginal person from the region in this period and documents some of the changes that were occurring to in the lives of

Aboriginal people during his lifetime. Werriberrie's account depicts a complex network of relationships with the British who now occupied the region, including the presence of Aboriginal labours on several properties including Winbourne, George Cox's property at Mulgoa (Russell 1914: 22).

He noted that while he knew that stone axes had been sharped at the property of a Mr Luther, he hadn't seen a stone hatchet used in his lifetime and instead used British iron hatchets or hatchets made by the local blacksmith. Werriberrie also witnessed the rapid changes that occurred in the landscape as British land use practices changed to capitalise on new markets. In 1825, 800 acres at the confluence of the Nepean River and Warragamba River was allotted to John Blaxland who, with his son Edward Blaxland, built and operated a dam, flour mill and brewery complex before the entire estate was sold to Sir Charles Nicholson in 1851 who subsequently subdivided the estate (O'Sullivan 1977: 1-2). Werriberrie recounted:

> *A Mr. Davy was the manager of the mill. He used to also act as brewer. I remember seeing two large wagons loaded with great casks of beer ready for Sydney, The men of our tribe used to enjoy a fill of beer whenever they could get it. At these times, when some would get too much, they would try to cross over the mill race of the weir across the Nepean river, these tipsy men would get dizzy looking down at the water through the mill race, and would fall in and be quickly swept down stream, there would then be great excitement and shouting and rushing about, while the others pulled them out. Once when I was leading Old Bundle across, I was frightened he would pull me in too, but I managed to just get clear while he had a good ducking* (Russell 1914: 22)

Aboriginal people continued to act as guides for the British as they explored areas outside the Cumberland Plain with Budbury guiding Governor Macquarie to the Nattai River in 1815 and Bundle guiding Meehan, Throsby and Hume on their attempt to find an overland route to Jervis Bay in 1818 (Yamanouchi 2007: 24). Some individuals were appointed as constables including Bundle, who was appointed a constable of Upper Minto in 1822 and Colebee, who was appointed a constable of the District of Windsor in 1825 (GGO 1825: 4. Liston 1988: 57-59).

Daniel Moowattin (also spelt Mow-watty, Mowwatting, Moowatting and Moowattye), a Darug man born at Parramatta around 1791, became the guide, interpreter and helper of George Caley who collected botanical specimens for Joseph Banks and travelled to Norfolk, Tasmania and England with him (Smith 2005). Aboriginal people continued to be listed as crew on British ships including Bundle, Willamanna and Boatswain Maroot (SLNSW 2010: 18).

Despite the increasing entanglement of the British and Aboriginal people living in the Sydney regions, they remained socially divided. The Sydney Gazette published the response given by an Aboriginal sailor when asked why he returned to his group:

> *Will you, said he, keep me company: or will any white man or woman keep me company? white women will marry white men; but no white woman will have me; then why wish me to keep away from my own people, when no other will look upon me?* (Sydney 1814: 2)

Further north, a settlement developed around the Colebee and Nurragingy land grant, with other Aboriginal families including Bobby Nurragingy (son of Nurragingy) and his wife settling on lands along Richmond Road adjacent to the land grant. By 1821, thirteen residents were living in the area and the settlement became known as Black Town (GML 2004: 22). In 1843 the grant was transferred to Maria Lock, Colebee's younger sister and continued to be owned by her descendants until the twentieth Century when the title was revoked by the Aborigines Protection Board (Parry 2005).

The Native Institution was moved from Parramatta to land adjoining the Colebee and Nurragingy land grant in 1823 where it operated until 1833. Reverend Samuel Marsden was appointed the school committee's chairman by Governor Brisbane in 1823 but was dismissed in 1824. From 1823 onwards, historical records also indicate that a number of Aboriginal people were present in the area and were camping along Bells Creek in order to remain near their children who were in the Institution (Bickford 1981:15). The Blacktown Native Institution shut down in 1824 and four boys were transferred to the Orphan School at Liverpool (Gapps 2009: 149). The boys returned to the institution when it reopened in 1826 (Gapps 20019: 149).

The trial, conviction and execution of Daniel Moowattin in 1816 represented a shift in British judicial practice from the existing legal pluralism to the enforcement of territorial sovereignty (Ford and Salter 2008). While the trial ultimately focused on Daniel Moowattin's familiarity with British law and customs, it was also part of the wide scale reform of colonial governance in the Macquarie period which sought to expand British territorial sovereignty and jurisdiction (Ford and Salter 2008: 64-65).

The expansion of British occupation beyond the Cumberland Plain resulted in the movement of Aboriginal people from the peripheries and within the occupied area with the annual feasts at Parramatta attracting Aboriginal people from further afield including west of the Blue Mountains and Port Macquarie. The annual feasts appear to have been a time when parents were able to see their children at the Native Institution, as noted by Macquarie in his journal on 12 January 1817:

> *This day Nurragingy (als. Creek Jemmy) the Chief of the South Creek, and Mary-Mary the Chief of the Mulgowy – Natives – with their respective Tribes amounting to 51 (men, women & children) Persons, paid me a visit at Parramatta – and were entertained in the Govt. Domain there by direction of Mrs. Macquarie with Breakfast and Dinner this Day; the 17 Native Children at the Institution having also been entertained with Fruit and presented to their Parents & Relatives belonging to those two Tribes.*

Reverend James Hassell noted that on one occasion in the 1830s, an estimated 600 to 700 Aboriginal people were camped between Paramatta and Prospect for the annual feast (Hassell 1902: 17). Aboriginal people traveling from the Illawarra and Cowpastures to and from the annual feast during the 1820s are believed to have camped at the high point on the Hume Highway between Cabramatta and Liverpool, known as Hoys Hill (Gapps 2009: 150).

The humanitarian movement in Britain in the 1830's drove a change in government policy towards the Indigenous inhabitants of the British Empire that recognised the harmful process of colonisation and dispossession (Perche 2015: 51). In 1837, a British Parliamentary Select Committee published a report on the situation of Aboriginal peoples in British colonies around the world that acknowledged that it didn't appear that the territorial rights of Aboriginal people in Australia were considered and that Aboriginal people had been the victims of many acts of murder and violence that had been committed by British civilians and military parties (PSCAPS 1837: 10). Aboriginal cultural and traditions were not acknowledged by the report which instead recommended the protection of Aboriginal people from abuses, the provision of critical supplies and conversion to Christianity. In 1837, the governor of New South Wales was directed by the Colonial Office:

> *that it is necessary from the moment the Aborigines of this Country are declared British Subjects they should, as far as possible, be taught that the British Laws are to supersede their own, so that any native, who is suffering under their own customs, may have the power of an appeal to those of Great Britain, or, to put this in its true light, that all authorized persons should in all instances be required to*

> *protect a native from the violence of his fellows, even though they be in the execution of their own laws.* (HRA 1924: 34)

The publication of Darwin's *On the Origin of Species* in 1859 and an increasing interest in the study of human behaviour and societies during the mid-nineteenth century in Europe resulted in the publication of several studies on Aboriginal culture and languages by anthropologists including M. Everritt, R. H. Matthews, A.W. Howitt and W Baldwin Spencer (Thomas 2007: 89). The information within the publications was gathered from Aboriginal people who were often unacknowledged including Emma Timbery, a Dharawal woman who was living at La Perouse and Jimmy Lowndes who provided Matthews with information on the Dharug, Dharawal and Gundungurra (Goodall and Cadzow 2009: 86; Thomas 2007: 3). William Clarke, who between 1848 and 1870 published a series of papers on the youngest geological member of the Sydney Basin named the member Wianamatta after the Dharug name for what was then known as South Creek (Lovering 1954: 170). The dual name of Wianamatta/South Creek was assigned in 2003.

In February 1883, the NSW Legislative Assembly established the NSW Board for the Protection of Aborigines (NSWBPA) to financially support existing stations, administer missions, and to provide blankets and rations (Doukakis 2006: 9). The protection advocated by the NSWBPA was not the preservation of Aboriginal culture and beliefs, but instead a continuation of the belief that Aboriginal people needed to change their lifestyle and beliefs in order to assimilate (SCLCA 2006: 14). The NSWBPA was tasked with "the elevation of the race, by affording rudimentary instruction, and by aiding in the cost of maintenance or clothing where necessary, as well as by grants of land, gifts of boats, or implements of industrial work" (NSWLA 1883: 920). The NSWBPA determined whether an individual was Aboriginal, primarily on the basis of skin colour which resulted in the separation and alienation of members of the Aboriginal community (HREOC 1997: 24).

The migration of Aboriginal people from outside the Cumberland Plain for economic or social reasons was also documented in the second half of the nineteenth century and became a dominant issue for George Thornton (Goodall and Cadzow 2009: 110-113). The formation of the NSWBPA saw the adoption of an isolationist policy that shut down most informal Aboriginal settlements across the Sydney region and moved the inhabitants into reserves at La Perouse, Sackville, the Burragorang Valley and elsewhere in the state. The Aboriginal people living within the reserves were effectively segregated from the rest of the population and many were moved away from their traditional lands.

On 1 January 1901, the Commonwealth of Australia was established, and the Constitution of Australia came into effect. The constitution mentioned Aboriginal people in Section 51(xxvi) where they were excluded from part of the people which the Commonwealth government could make *laws for the peace, order and good government* and Section 127 which excluded Aboriginal people from *reckoning the numbers of the people of the Commonwealth, or of a State or other part of the Commonwealth*. The reason for the wording of these sections was not recorded; however, the ramifications of Section 51(xxvi) was to keep the administration and control of Aboriginal people in the hands of the state governments while Section 127 excluded Aboriginal people from having a role in Federal politics (Gardiner-Garden 2007: 4).

Between 1909 and 1969, the NSW Government introduced legislation that is commonly referred to as the 'Protection Acts' which gave the NSWBPA increasing control over the lives of Aboriginal people and were used to implement "policies of protection, separation, absorption and assimilation of Indigenous populations, depending on the prevailing philosophy of governments at the time" (SCLCA 2006: 7). The *Aborigines Protection Act 1909* gave the NSWBPA statutory powers in relation to reserves which it defined as "area of land heretofore or hereafter reserved from sale or lease by the Governor, or given by or acquired from any private person, for the use of aborigines". The statutory powers included the appointment of managers, power to remove people from reserves, ownership of structures, livestock and other items within the reserves, and the ability to apprentice

Aboriginal children living in the reserve. The *Aborigines Protection Amending Act 1915* gave the board full control of Aboriginal children, including with the ability to apprentice Aboriginal children under circumstances the board thought were desirable, and to removing them to a home or institution if they refused.

The Protection Acts were used by the NSWBPA to implement policies separating Aboriginal children from their parents in order to encourage "the conversion of the children to Christianity and distancing them from their Indigenous lifestyle" (SCLCA 2006: 8). The children were placed into state run homes including Cootamundra Girls Home and Kinchela Aboriginal Boys Training Home and would become known as the stolen generation. The *Bringing them Home Report*, published in 1997 documented the harsh and often abusive treatment of the children in state run homes that lead to multitude of disadvantages (HREOC 1997: 11-13).

In 1937, the Australian Aborigines' League was established to campaign against discriminatory legislation. The Aborigines Progressive Association was cofounded in the same year. On 26 January 1938, the 150th anniversary of the beginning of British occupation in Australia, the Aborigines Progressive Association supported by the Australian Aborigines' League, held the Day of Mourning & Protest in Sydney. The Day of Mourning & Protest was organised to generate public awareness of the civil rights issues and included many Aboriginal civil rights activists. An appeal to the citizens of the Australian Commonwealth was published as part of the Day of Mourning & Protest in which it was argued that state policies towards Aboriginal people were hypocritical and did not protect them but instead made Aboriginal people "deprived of ordinary civil legal rights and citizenship, and we[sic] are made a pariah caste within this so-called democratic community" (Patten and Ferguson 1938: 3). It argued against charity and instead demanded "FULL CITIZEN STATUS and EQUALITY WITHIN THE COMMUNITY" (Patten and Ferguson 1938: 12).

By the mid-1960's, Aboriginal opposition to assimilation was strengthening and an Indigenous civil rights movement was growing under the banner of self-determination. On 27 May 1967, a referendum was held in which Australians voted to change the Australian Constitution to give the Commonwealth Parliament power to make laws with respect to Aboriginal people wherever they lived in Australia and to make it possible to include Aboriginal people in national censuses. The Protection Acts were predominantly repealed by the *Aborigines Act 1969* and the Aboriginal community were, for the first time since 1788, granted the same rights as other Australian citizens.

In 1972, the Whitlam government officially changed the approach to Aboriginal affairs from a policy of assimilation to one of self-determination. The Aboriginal and Torres Strait Islander Commission (ATSIC) was established, composed of Indigenous peoples whose role was to maximise participation of the community in the development and implementation of policies that affected them. Self-determination brought significant challenges to many Aboriginal communities, who were often left under-resourced and unequipped to meet the challenges imposed upon them by top-down approach of the new system. ATSIC was abolished following election of the Howard government in 1996.

The long struggle for recognition, self-determination and acknowledgement forms part of the Aboriginal cultural heritage story and lived experience of contemporary Aboriginal people. New South Wales has the largest Aboriginal population in Australia and the Aboriginal people of New South Wales "continue to fight to protect cultural heritage and maintain cultural practices" (Hunt and Ellsmore 2016: 78). Members of the contemporary Aboriginal community continue to experience connection with the area through cultural and family associations.

4 Archaeological Context

The current scientific understanding of the human occupation of the Australian continent is that Aboriginal people have lived in Australia for at least the last 40,000-60,000 years (Bowdler 2010: 182). Archaeological evidence shows that the Sydney Region has been occupied since at least 18,000 years ago (Attenbrow 2010: 3). Aboriginal archaeological sites with deposits that have returned earlier dates have been reported; however, these dates are problematic due to the limitations of the technology and evidence being used (Attenbrow 2010: 3-4).

Archaeological investigation is reliant on the artefacts or physical evidence of human activities which have survived anywhere from centuries to thousands of years. The oldest of these artefacts are likely to represent a small fraction of the objects that were used by Aboriginal people with even the most robust organic materials unlikely to survive in contexts older than 6,500 years (Attenbrow 2010: 3).

The most numerous artefacts at Aboriginal archaeological sites in the Sydney Region are made from stone and were discarded in either open landscape settings or within closed landscape settings, primarily rock shelters. The accumulation of stone artefacts in both contexts may have occurred over a long period of time and subject to a range of natural processes and human activities. Closed context sites are generally more likely to preserve the chronological association of artefacts within stratigraphically distinct units due to the nature and often remote location of these sites. Conversely, open context sites are often palimpsests in which chronological association between stone artefacts and any datable features that may be present are often difficult to determine (see Attenbrow 2010; White 2018).

British accounts from the late eighteenth and nineteenth centuries portrayed the lifestyle and culture of Aboriginal people as static and unchanging; however, information from archaeological investigations demonstrate that this is incorrect. Instead, archaeological investigations have shown that significant changes have occurred within the types of artefacts used, artefact raw materials and the spatial distribution and density of Aboriginal archaeological sites while Aboriginal people adapted to an ever-changing landscape and environment.

Archaeological excavations at Aboriginal archaeological sites with stratified deposits during the twentieth century, such as Emu Cave near Lapstone Creek and Henry Lawson Drive Rockshelter, demonstrated that the types and abundance of artefacts and raw materials changed over the last 10,000 years (Attenbrow 2012: 102-103; Megaw 1974). Around 10,000 years ago, the artefact assemblage from Aboriginal archaeological sites in the region was characterised by a preference for relatively large artefacts made from indurated mudstone/tuff (IMT) that were made using free hand percussion. Formal tools were predominantly retouched flakes while flaked pebble tools have also found at some sites dating to this phase.

Approximately 5,000 years ago, there was a general decline in IMT artefacts, an increase in smaller artefacts made from locally available materials, higher artefact density and the introduction of backed artefacts and edge ground artefacts. Small, flaked stone artefacts with steep retouch known as backed artefacts were extensively made across the region between 3,500 and 1,500 years ago (Robertson, Attenbrow, and Hiscock 2009: 296). Residue and use-ware analysis of backed artefacts indicate that they were used for cutting, incising, and scraping of animal and plant materials (Robertson, Attenbrow, and Hiscock 2009: 298).

Edge ground hatchets, which are frequently referred to by the British during the late eighteenth and early nineteenth centuries, occur in the archaeological record of south eastern Australia from around 4,000 years ago while significantly older examples have been recovered in the north of Australia (Attenbrow 2012: 102). Edge ground hatchets were made primarily made from water worn metamorphic stone that was ground on an abrasive surface, such as sandstone, to produce an

edge and were used primarily for cutting wood, stripping bark and other woodworking tasks (Corkill 2005: 48; Stokes 2015: 70). Analysis of edge ground hatchets from the region have shown that the metamorphic and igneous stone required were only accessible at certain locations such as the Hawkesbury/Nepean River and the Shoalhaven River (Stokes 2015). The distribution of sandstone outcrops would have also influenced the creation and maintenance of edge ground hatchets.

During the last 1,500 years, the use of backed artefacts substantially decreased or disappeared across the region and there was a general increase in edge ground hatchets during this period. Along the coast and within sandstone geology, archaeological assemblages from this period contain a larger proportion of quartz and bipolar artefacts while silcrete and IMT continued to be used on the western Cumberland Plain. The general variation in artefact assemblages from Aboriginal archaeological sites on coastal and inland sites has been interpreted as suggesting social changes occurred during this period which restricted the access of coastal groups to the raw materials of the western Cumberland Plain (Attenbrow 2012: 156).

The expansion of British occupation across the Sydney region brought a range of previously unknown materials including cloth, glass, pottery and metal that, from the late eighteenth century, were exchanged for goods or services with Aboriginal people, or gifted to favourably influence them (Attenbrow 2002: 103; 124). As noted by Werriberri (see Section 3), the acquisition of some European goods, such as metal hatchets, was accompanied by a decline in the creation of similar tools from traditional materials. While less visible archaeologically, the occupation of traditional lands by the British and would have restricted access to and removed resources used by Aboriginal people.

4.1 Upper South Creek Advanced Water Recycling Centre Archaeological Assessment

An archaeological assessment was undertaken for the proposed Upper South Creek Advanced Water Recycling Centre (KNC 2021). The assessment included a desktop review of previous archaeological investigations and the environmental context of a study area that included the impact assessment area. A targeted archaeological field survey was undertaken in areas identified by the desktop assessment as having favourable topographic location and low visible disturbance or where further investigation was required to confirm the location and status of previously recorded Aboriginal archaeological sites. The archaeological field survey area included portions of the impact assessment area.

4.1.1. Desktop assessment

The assessment noted that the nature and extent of previous archaeological investigations within and in the vicinity of the impact assessment area were generally influenced by urban expansion and legislation. Previously recorded Aboriginal archaeological sites were predominantly the result of archaeological investigations undertaken during the past 40 years after legislation to protect Aboriginal sites and objects was enacted. In areas where urban expansion and infrastructure projects had occurred prior to the enactment of the legislation, such as Cabramatta, Bonnyrig and Lansvale, significantly fewer Aboriginal archaeological sites had been recorded than in areas where redevelopment projects had occurred afterwards, such as Elizabeth Hills, Middleton Grange and Badgerys Creek.

The number of recorded archaeological sites were also lower around the townships of Luddenham, Wallacia and Warragamba where fewer and less intensive archaeological investigations have been undertaken due to the limited redevelopment of these areas after the enactment of the legislation. The assessment noted that the study of Aboriginal artefacts developed from the western European scientific theories and associated preconceptions of the late eighteenth century (see Section 3) and that during the twentieth century, archaeological investigations transitioned from studies generally undertaken without the involvement of the Aboriginal community to increasing community involvement and collaboration (Byrne Brayshaw and Ireland 2003).

A review of the available information on the previously recorded sites within and in the vicinity of the impact assessment area was undertaken and found that that several had conflicting spatial information and/or site types. Others were duplicate recordings of existing sites and some contained limited information that made reidentification problematic.

The majority recorded Aboriginal archaeological sites contained stone artefacts; however, other features were also identified including art (pigment or engraved), modified tree (carved or scarred) and grinding groove. Previous studies generally found higher stone artefact densities within artefact scatters that were located on relatively elevated landforms along the margins of creeks (especially those offering permanent water) and rivers, potentially reflecting repeated or more intensive use. The surface stone artefact scatters and isolated stone artefacts were almost exclusively found in close proximity to water (within 250 metres of a river, creek or drainage line) and the majority located within 100 metres. Elevated locations on hilltops and ridge crests further from water sources tended to display a different archaeological signature, chiefly a sparser stone artefact distribution which indicate these areas were utilised differently.

The assessment noted that the Wianamatta shale geology which has been mapped across the majority of the impact assessment area do not contain suitable stone for making artefacts and that several unmapped sources had been identified, primarily as redeposited gravels within alluvial deposits along Wianamatta/South Creek. Other sources were noted near the Nepean River and Georges River. The absence of locally accessible stone suitable for making stone artefacts across the remainder of the study area did not appear to have had a significant impact on the distribution of Aboriginal archaeological sites in the region which appeared instead to be influenced by the proximity and reliability of fresh water.

Several archaeological investigations in the region included surveys that revisited previously recorded Aboriginal archaeological sites in an attempt to identify the previously recorded features. The results of these surveys indicate that the number of visible stone artefacts within a surface artefact scatter can substantially vary and, in general, most of the surface artefact scatters contained substantially fewer or no visible artefacts when they were revisited. The investigations generally attributed the results to changes in vegetation density and additional subsurface disturbance.

Subsurface archaeological deposits of stone artefacts had been identified by test excavation programs at one surface artefact scatter site (Fleurs 1) and three areas of PAD (Badgerys Creek West B (BWB), Elizabeth Drive AFT 1 and PAD-OS-5 PAD). All four sites were located on elevated landforms adjacent to larger watercourses. The highest artefact density occurred at Fleurs 1 which was located on the south side of the confluence of Wianamatta/South Creek and Kemps Creek. Elizabeth Drive AFT 1 was located adjacent to Wianamatta/South Creek, approximately 800 metres south of Fleurs 1 while Badgerys Creek West B (BWB) was adjacent Badgerys Creek and PAD-OS-5 PAD was adjacent to Hinchinbrook Creek. The assessment noted that the results of the test excavations at the four sites demonstrate that subsurface artefacts maybe present where there were no visible surface artefacts and that the subsurface archaeological deposits were generally different in density, nature and extent than those identified on the surface. As a result of previous investigations, it was determined that areas of potential archaeological deposit could be identified based on attributes of an area including the distance to and permanency of water, landform, degree of slope, soil landscape and/or proximity to environmental resources.
The spatial distribution of the Aboriginal archaeological sites associated with rock shelters and overhangs (closed context) and open context sites with art (pigment or engraved) or grinding groove features were restricted by geology. Close context sites in the vicinity of the impact assessment area sites were primarily located in the western and eastern portions of the study area where the underlying geology was predominantly Hawkesbury Sandstone which formed steep slopes overlooking the Georges River and Nepean River (see Section 2). Isolated outcrops of

sandstone, possibly the Minchinbury Sandstone member of the Wianamatta Group, were identified with grinding grooves in the vicinity of Badgerys Creek to the north and south of Elizabeth Drive. The assessment noted that the lack of sandstone outcrops across most of the study area would have influenced the creation and use of ground edge hatchets which would have required this material for creation and maintenance.

Culturally modified trees were few in number due to subsequent land use practices and tree clearance. Trees with bark removal scars had also been identified in the region and eight carved trees in the Australian Museum collection were recorded as being collected from the Greendale Estate near Narellan (Etheridge 1918: 50).

The desktop assessment identified several areas where archaeological field survey was required due to limited available information from previous archaeological investigations, favourable topographic location and limited known historical disturbance or where further investigation was required to confirm the location and status of previously recorded Aboriginal archaeological sites. The areas included the terraces, flats and slopes adjacent to the Nepean River and Jerrys Creek, the floodplains, elevated flats and adjacent north-south oriented ridges that formed parts of Badgerys Creek, Cosgroves Creek, Kemps Creek and Wianamatta/South Creek catchment areas near Elizabeth Drive, the north-south oriented ridgeline and adjacent watercourses including Hinchinbrook Creek near Cecil Hills, and the elevated flats and slopes adjacent to Prospect Creek on the south side of the Hume Highway.

4.1.2. Archaeological survey

An archaeological field survey of the areas identified by the desktop assessment (see Section 4.1.1) was carried out with representatives from Deerubbin Local Aboriginal Land Council (DLALC) and Gandangarra Local Aboriginal Land Council (GLALC). The survey focused on establishing a detailed appreciation of archaeologically sensitive landforms to assist in identifying the full spatial extent of identified archaeological sites. Assessment of archaeological potential was based on topographic location and visible disturbance. The survey inspected areas of exposed ground, such as eroded surfaces, for stone artefacts, or evidence of intact soils. Sandstone outcrops were inspected for grinding grooves, rock shelters and engravings while mature trees were inspected for evidence of Aboriginal bark removal or carving.

Ground surface visibility varied greatly across the surveyed areas and was generally higher in areas where natural processes, such as erosion, or land use practices had removed vegetation or restricted its growth. The survey noted that areas where low intensity agriculture or native vegetation were present had generally been subject to low levels of visible disturbance while areas where structures, roads and utilities had been constructed had localised high levels of visible surface disturbance.

The survey identified four previously unrecorded surface artefact scatters and associated areas of PAD within the impact assessment area. The locations of two previously recorded Aboriginal archaeological sites were confirmed to be outside the impact assessment area and one previously unrecorded culturally modified tree was also identified outside the impact assessment area.

Baines Creek Wallacia AFT 1, Bents Basin Road Wallacia AFT 1 and Wallacia Weir AFT 1 were identified on terrace landforms overlooking the Nepean River at Wallacia. Baines Creek Wallacia AFT 1 was located adjacent to Baines Creek and overlooking the western bank of the Nepean River. Bents Basin Road Wallacia AFT 1 was situated on a mid terrace immediately east of an unnamed north flowing creek and approximately 80 metres west of the Nepean River. The survey noted the presence of possible paleochannels indicating that some of the higher terraces may relate to the course of the ancient Nepean River.

Wallacia Weir AFT 1 was adjacent to two north flowing unnamed creeks and overlooking the southern bank of the Nepean River. The site was adjacent to the remains of several structures which research indicates were part of an industrial complex that included a mill and brewery, established and run by John Blaxland and his son Edward Blaxland in the mid eighteenth century. The mill and brewery were mentioned by Werriberrie in association with events involving Gundungurra and Dharawal men during this time (see Section 3).

The location of the previously recorded modified tree (Silverdale Road 1 – AHIMS 45-5-3103), which is registered within the impact assessment area on the northern side of the intersection of Silverdale Road and Bents Basin Road was inspected during the survey. The survey confirmed that there was not a modified tree within the impact assessment area at the registered location or in the vicinity.

The AHIMS coordinates of a previously recorded surface artefact scatter (WAL 1 - AHIMS 45-5-0987) and an isolated surface artefact (WAL 2 - AHIMS 45-5-0988) were inspected during the survey. No artefacts were identified at either location. The registered AHIMS location of WAL 1 had been heavily disturbed by the existing roads and residential development. Ground surface visibility at the registered location of WAL 2 was low due to dense vegetation. Consultation with the Gandangara LALC representative during the survey was unable to provide any further information on the location of the artefact. The survey noted that the area had visible disturbance from the existing embankment of Park Road, an above ground powerline corridor and below ground utilities.

The field survey of the floodplains, elevated flats and adjacent ridges between The Northern Road and Western Road inspected the locations of several previously recorded Aboriginal archaeological sites and areas of potential archaeological deposits. The survey identified one previously unrecorded Aboriginal culturally modified tree with a single bark removal scar (Wianamatta/South Creek, Exeter House TRE 1) outside the impact assessment area. The modified tree was located on the western side of Wianamatta/South Creek, approximate 20 metres east of the previously recorded grinding grooves (South Creek - AHIMS 45-5-0215) and 190 metres west of the impact assessment area. The grinding grooves (South Creek - AHIMS 45-5-0215) were found approximately 450 metres north west of the registered AHIMS location and 210 metres west of the impact assessment area.

The archaeological field survey of the north-south oriented ridge and adjacent watercourses at Cecil Hills, Cecil Park and Elizabeth Hills confirmed that previously recorded Aboriginal archaeological sites: IFSC 7 Cecil Park, GLC1, P-CP7, P-CP12, PAD-OS-5 and PP-F3 were located either partially or wholly within the impact assessment area. The location of one previously recorded Aboriginal archaeological site CH05 (Mirvac) was found to have been disturbed by residential redevelopment at Elizabeth Hills and the survey determined that the site was no longer extant.

The field survey of the elevated flats and slopes adjacent to Prospect Creek on the south side of the Hume Highway at Lansvale and Lansdowne found that the current green areas had been disturbed by historical land use and that the elevated areas of the impact assessment area adjacent to Prospect Creek did not contain archaeological potential. The survey confirmed the location of several previously recorded Aboriginal archaeological sites, including Mirambeena Regional Park 2 (AHIMS 45-5-2909) which was located approximately 280 metres north of the registered AHIMS location. The sites were determined to be outside the impact assessment area.

4.1.3. Archaeological test excavation

The assessment determined the archaeological character of the impact assessment area by incorporating the results of extensive previous archaeological investigations with the environmental context and verifying the previous results with an archaeological field survey. The distribution of Aboriginal archaeological sites in the region has been highly influenced by the reliability and permanence of fresh water sources in addition to underlying geology, soils and subsequent disturbance.

Archaeological test excavation was undertaken at Aboriginal archaeological site Fleurs 1, Fleurs Radio Telescope (AHIMS 45-5-0496) due to the size of proposed impact in this area and limited information from previous archaeological investigations. Archaeological test excavation was not required at the remaining Aboriginal archaeological sites within the impact assessment area due to the relatively high levels of existing archaeological information and/or disturbance which was adequate to determine archaeological significance.

The impact area of the proposed Advanced Water Recycling Centre is located within the former Fleurs field station, approximately one kilometre north of Elizabeth Drive and overlooking the confluence of Wianamatta/South Creek and Kemps Creek. Previous archaeological investigations identified a surface artefact scatter within the former Fleurs field station property on an elevated landform east of Wianamatta/South Creek and in the vicinity of a concrete bridge (Fleurs 1, Fleurs Radio Telescope).

In 2018, an archaeological test excavation was undertaken within the area of the site that the proposed M12 Motorway corridor overlapped. The tested area was located immediately south of the proposed Advanced Water Recycling Centre impact area. A total of 333 artefacts were recovered during the test excavation program giving a mean artefact density across the tested area of 19.59 artefacts/square metre. The subsurface deposit was characterised by a general low to moderate artefact density with a localised moderate density in the east and a localised moderate to high density in the west. The highest artefact density was recovered from the western most test square where 154 artefacts were identified. The test square was the closest square to Wianamatta/ South Creek, approximately 35 metres to the west.

The proposed Advanced Water Recycling Centre impact area is located on the same landform as the surface artefact scatter and tested area; however, due to the limited area tested, the nature and extent of any subsurface archaeological deposits within the proposed impact area for the Advanced Water Recycling Centre was unclear. LIDAR and historical aerial photographs indicated that parts of the proposed Advanced Water Recycling Centre impact area had be variably disturbed by the construction and operation of a series of radio telescopes and associated structures within the Fleurs Field Station between 1953 and 1991. An archaeological test excavation program was recommended to determine the nature and extent of any archaeological deposits and the extent of any existing subsurface disturbance that may be present within the impact area of the proposed Advanced Water Recycling Centre.

Figure 7. Test excavation squares and artefact density at Fleurs 1

FIGURE REDACTED FOR PUBLIC EXHIBITION DUE TO SENSITIVITY OF IMAGE

In June and July 2020, archaeologists from KNC and representatives of the registered Aboriginal parties undertook an archaeological test excavation program within the impact area of the proposed Advanced Water Recycling Centre in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010a). The test excavation program employed three strategies for sampling the area, which encompassed approximately 83 hectares and a total of 237 test squares that measured 0.5 x 0.5 metres were excavated.

An initial 72 test squares were excavated at 50 metre intervals along seven north-south oriented transects on the crest and upper slope of the spur, west of the former north-south arms of the Mills Cross, Shain Cross and Chriss Cross telescopes. A further 15 test squares were excavated on three north-south oriented transects within the more visibly disturbed portion of the impact area, east of the former north-south oriented arms and 10 test squares were excavated on the low lying areas to the north, east and west of the spur.

Eleven test squares were expanded, with an additional test square excavated immediately south of original test square at three locations while a further five test squares were excavated at eight locations immediately south of the original test square to form a north-south oriented trench. A further 97 test squares were excavated at 10 or 40 metre intervals along 10 transects to further define the nature and extent of the deposit in areas where the initial testing had indicated relatively intact subsurface deposits were present or to better understand the connection between the subsurface archaeological deposit identified during the initial testing and the previously recorded subsurface deposit (Fleurs 1).

The subsurface deposit varied in depth across the tested area with test squares on the crest of the elevated landform and elevated predominantly less than 40 centimetres in depth and characterised by silty or sandy loam overlying basal clay. The test squares located on slopes and within open drainage depressions were generally between 50 and 60 centimetres deep sandy silty loam. An transect of slightly deeper deposit was uncovered approximate 85 metres south west of the intersection of two of the former telescope arms. The deposit within this area comprised a bleached silty loam with ferromanganese overlying basal clay.

The test excavation noted that despite the known history of land use practices at the site, visible subsurface disturbance was limited to localised fill and burnt tree roots. Layers of fill had been deposited above a truncated natural deposit in three test squares that were in close proximity to current or former access tracks and the fill appeared to have been deposited to elevate or stabilise these areas. Disturbance from burnt tree roots was present in several test squares and varied from charcoal flecking and pieces to deposit discolouration and in some instances, baked clay and large charcoal pieces within the former root channels.

A total of 313 artefacts were recovered from 109 of the 237 test squares excavated, giving a mean artefact density across the tested area of 5.72 artefacts/square metre. The horizontal distribution of artefacts within the tested area was irregular and generally characterised by dispersed and isolated artefacts, three areas of low density and an area of low density with localised moderate and moderate-high density. The artefacts were predominantly recovered from the upper 20 centimetres of the deposit.

Artefacts were recovered from eight of the areas where six test squares had been excavated in a row to form a north-south oriented trenches despite only three of the original test squares containing artefacts. The two test squares where one additional test square had been excavated immediately to the south did not contain artefacts. The results demonstrated that due to the dispersed and low density nature of the subsurface deposit, the absence of artefacts within individual test squares was not a reliable indicator for determining spatial extent.

The test squares with moderate and moderate-high artefact density were generally located in the vicinity of the concrete bridge that spanned Wianamatta/South Creek in south western portion of the tested area. Artefacts were predominantly recovered from the upper 20 centimetres of the deposit. A total of 21 artefacts were recovered between 20 and 30 centimetres below the ground surface and six artefact were recovered below 30 centimetres.

The artefacts were predominantly made from silcrete while the remaining artefacts were made from IMT, quartz , chert , quartzite, sedimentary stone and basalt. Artefacts were generally less than 30 millimetres in length. The proportion of silcrete and IMT artefacts within in each size range was generally consistent, except for artefacts between 40-44 millimetres. The artefacts made from other materials were predominantly less than 30 millimetres in size. Cortex was present on approximately 40 percent of the assemblage with the materials with the highest proportions of artefacts retaining cortex consisting of quartz, quartzite (n=2) and sedimentary (n=2). Cortical surfaces were present on 85 silcrete artefacts with only 26 artefacts retaining over 30 percent cortex. Cortex was present on 18 IMT, 15 of which retained less than 30% cortex and three artefacts retained 31-69% cortex.

The artefact assemblage was predominantly unmodified flakes and flaked fragments. A total of 21 complete cores, three core fragments, six backed artefacts and a basalt fragment of a possible ground edge artefact were also recovered. Dorsal cortex was identified on complete flakes made from silcrete, IMT, quartz and quartzite. Retouch was present on one complete flake and three flake fragments. The retouch on two flake fragments created single notches while a proximal flake fragment had been steeply retouched along the right distal margin. Three complete flakes and six flake fragments with useware were also identified.

Six backed artefacts, comprising five silcrete and one IMT, were identified within six test squares located in the south western corner of the tested area while an additional backed silcrete artefact was recovered from a low artefact density area adjacent to the former northern arm of the Fleurs telescopes. Only one of the backed artefacts was located in test square with more than 10 other artefacts. Backing was predominantly unifacial (n=4) while one artefact had alternate edge backing and one artefact had bifacial backing. The backed artefact forms comprised two trapeze, one triangular, one asymmetrical and two end scrapers.

A total of 21 complete cores were recovered during the test excavation and were made from silcrete (n=13), chert (n=3), quartz (n=4) and quartzite (n=1). Several cores had a negative flake scars which were often small in size, possible due to the shape of the core or internal faults. The cores exhibited rotated (n=15), unidirectional (n=5) and bidirectional (n=1) flaking. Cortex was present on two chert, four quartz, one quartzite and 11 silcrete cores. The heaviest artefact recovered during the test excavation was a silcrete core (175.09 grams) that retained 31-69% rounded and nodular cortex. The silcrete was reddened on what would have been the areas closest to the outside of the cobble prior to flaking while the inner material was light brown. Despite the size and weight of the core it had few negative flake scars.

The presence of a several cores with small negative flakes scars and limited use was interpreted as indicative of the availability of a local source of raw material which allowed for an increased level of selectivity when knapping. The relatively low proportion of artefacts with cortical surfaces, presence of backed artefacts and artefacts with retouch or use-ware demonstrated that the site was not exclusively used for the primary reduction of locally sourced stone.

The results of the test excavation program demonstrated that the crest and upper slope landforms within the impact area for the proposed Advanced Water Recycling Centre contained a subsurface archaeological deposit; however, the spatial distribution of artefacts was irregular and, while a low artefact density was present across the tested area, a moderate to high artefact density was present in the south western portion of the tested area. This area was located in close proximity to

the surface artefact scatter on a crest landform that slopes relatively steeply to Wianamatta/South Creek. Slightly shallower depth of deposit and surface artefacts within this area were interpreted as indicating that the removal of some of the upper deposit may have occurred in the past.

The results of the test excavation program undertaken for the current project in addition to the previous archaeological test excavation and surveys at the site indicate that the crest landform immediately adjacent to Wianamatta/South Creek contained a moderate to high artefact density while a low artefact density with localised instances of moderate artefact density was present across the remainder of the site. The proximity of the moderate to high density area to silcrete cobbles within the creek bank and the landforms relatively high elevation in close proximity to the creek may have influenced the selection of this location for these activities.

5 Aboriginal Community Consultation and Participation

5.1 Aboriginal stakeholder consultation

The aim of 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* (DECCW 2010b), the requirements of Clause 61 of the *National Parks and Wildlife Regulation 2019*, and the SEARs for the project. The formal consultation process has included:

- Government agency notification letters (letters dated 1/04/2020);
- Advertising for registered stakeholders in local media (*The Sydney Morning Herald* 16/04/2020: refer Appendix A);
- Notification of closing date for registration (final closing date 30/04/2020);
- Provision of project information and proposed cultural heritage assessment methodology, allowing for a 28 day review period (closing date 29/05/2020);
- Provision of draft ACHAR for review (a minimum 28 day review period will be provided), and;
- Ongoing consultation with the local Aboriginal community.

5.2 Registration of interest

Aboriginal people who hold knowledge relevant to determining the cultural heritage significance of Aboriginal objects and Aboriginal places in the area in which the proposed activity was to occur were invited to register an interest in a process of community consultation. Investigations for the project have included consultation with 26 Aboriginal community groups and individuals as listed in Table 2.

Table 2. Registered Aboriginal stakeholders

Registered Aboriginal Stakeholder	Representative and/or Contact Person
Deerubbin Local Aboriginal Land Council	Steven Randall
Gandangara Local Aboriginal Land Council	Darren Duncan and Ruth Sheridan
Tharawal Local Aboriginal Land Council	Robyn Straub
A1 Indigenous Services	Carolyn Hickey
Aragung Aboriginal Cultural Heritage Site Assessments	James Eastwood
Aunty Fran Bodkin	Aunty Fran Bodkin
Barking Owl Aboriginal Corporation	Jody Kulakowski
Barraby Cultural Services	Lee Field
Butucarbin Aboriginal Corporation	Jennifer Beale and Lowanna Gibson
Cubbitch Barta	Glenda Chalker
Darug Custodian Aboriginal Corporation	Justine Coplin
Dhinawan Culture and Heritage	Stephen Fields
Didge Ngunawal Clan	Paul Boyd & Lilly Carroll
Galamaay Cultural Consultants	Robert Slater
Ginninderra Aboriginal Corporation	Krystle Carroll-Elliott
Goodradigbee Cultural & Heritage Aboriginal Corporation	Caine Carroll
Kamilaroi Yankuntjatjara Working Group	Phil Khan
Merrigarn	Shaun Carroll

Registered Aboriginal Stakeholder	Representative and/or Contact Person
Muragadi Heritage Indigenous Corporation	Anthony Johnson and Jesse Johnson
Murra Bidgee Mullangari Aboriginal Corporation	Darleen Johnson
Widescope Indigenous Group	Steven Hickey
Yulay Cultural Services	Arika Jalomaki
Yurrandaali	Bo Field
Waawaar Awaa Aboriginal Corporation	Rodney Gunther
Registered Aboriginal Stakeholders [details withheld]*	Registered Aboriginal Stakeholders [details withheld]*

* Two additional Aboriginal stakeholders have registered for the project but have chosen to withhold their details in accordance with item 4.1.5 of the Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010 (DECCW 2010a).

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

Project information and the proposed cultural heritage assessment methodology were provided to stakeholders for a 28 day review and comment period (closing date 29/05/2020). Formal responses were received from A1 Indigenous Services, Aragung Aboriginal Cultural Heritage Site Assessments, Cubbitch Barta Native Title Claimants, Darug Custodian Aboriginal Corporation, Dhinawan Culture and Heritage, Didge Ngunawal Clan, Galamaay Cultural Consultants, Kamilaroi Yankuntjatjara Working Group, Murra Bidgee Mullangari Aboriginal Corporation, Muragadi Heritage Indigenous Corporation, Waawaar Awaa Aboriginal Corporation and Yurrandaali.

A1 Indigenous Services stated that they had reviewed the project information and supported the assessment methodology (email received 3/05/2020).

Aragung Aboriginal Cultural Heritage Site Assessments noted that they had "reviewed the proposed project information and methodology in the report provided and agrees with the recommendations put forward" (letter dated 5/05/2020).

Cubbitch Barta Native Title Claimants raised concerns regarding the amount of information provided to stakeholders stating that "there is not enough information for me to make an informed comment on this project" and that cultural input was not part of the project planning process (letter dated 11/05/2020). KNC clarified that the information provided related to project information and the proposed assessment methodology for the ACHAR and that detailed information would be provided in a draft ACHAR would be provided to stakeholders once completed. Cubbitch Barta Native Title Claimants were advised that the project planning process had not been completed and that Sydney Water would consider cultural input provided by stakeholders.

Cubbitch Barta Native Title Claimants also had concerns regarding the impact of the project on waterways, stating that

> *I am concerned about more sewerage water going into the Nepean River, and the Warragamba River has also been mentioned. As far as I am aware this is a first, but the Warragamba joins the Nepean, so it is cumulative. This is a cultural issue for all Aboriginal people, and we should have the right to talk about it before now. This is not just about the sites, it is about the land and water, cultural landscapes. This is about harm to the County, not just the "objects".*

Sydney Water is working towards the inclusion of cultural values of water in the Wianamatta/South Creek catchment and parts of the Nepean River as part of the ACHAR and related assessments.

Information provided by Aboriginal knowledge holders will be incorporated into and help refine the ACHAR.

Cubbitch Barta Native Title Claimants stated that they would need to be included in any archaeological survey of the impact assessment area to make an informed comment (letter dated 11/05/2020). While it was not feasible to undertake the archaeological field surveys with representatives from each stakeholder group, representatives from the relevant local Aboriginal land councils participated in the archaeological survey and representatives from the stakeholder groups participated in the test excavation program.

Darug Custodian Aboriginal Corporation noted that they had reviewed the project information and supported the assessment methodology (letter received 25/05/2020). Darug Custodian Aboriginal Corporation stated that "this area is significant to the Darug people due to the evidence of continued occupation, within close proximity to this project site there is a complex of significant sites" (letter received 25/05/2020) and noted that

> *Darug sites are all connected, our country has a complex of sites that hold our heritage and past history, evidence of the Darug lifestyle and occupation are all across our country, due to the rapid development of Sydney many of our sites have been destroyed, our sites are thousands of years old and within the short period of time that Australia has been developed pre contact our sites have disappeared.*

Dhinawan Culture and Heritage stated that they had reviewed the project information and agreed with the assessment methodology (email received 24/05/2020).

Didge Ngunawal Clan advised that they were happy with the methodology (email received 1/05/2020).

Galamaay Cultural Consultants advised that they supported the methodology for the project (email received 3/05/2020).

Kamilaroi Yankuntjatjara Working Group advised that they supported the methodology (email received 13/05/2020).

Murra Bidgee Mullangari Aboriginal Corporation stated that they had read the project information and endorsed the recommendations (email received 12/05/2020).

Muragadi Heritage Indigenous Corporation stated that they had read the project information and endorsed the recommendations (email received 12/05/2020).

Waawaar Awaa Aboriginal Corporation stated that they supported the proposed methodology (letter dated 8/05/2020).

Yurrandaali noted that they agreed with the methodology (email received 12/05/2020).

Comments and information that were received from stakeholders during this period will be attached in full in Appendix B

5.4 Review of draft ACHAR and stakeholder responses

The draft ACHAR was provided to stakeholders for a 28 day review and comment period (closing date 2/06/2021). Formal responses were received from Cubbitch Barta Native Title Claimants, Kamilaroi Yankuntjatjara Working Group, Waawaar Awaa Aboriginal Corporation and two additional Aboriginal stakeholders have registered for the project but have chosen to withhold their

details in accordance with item 4.1.5 of the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW 2010a).

Cubbitch Barta Native Title Claimants stated a concern with the sampling and participants of the archaeological survey (letter dated 20/05/2021). KNC can confirm that a full survey/assessment was completed for the entire IAA.

In regards to Aboriginal stakeholder participation in the survey, all survey was completed with representatives from the relevant local land councils Deerubbin LALC and Gandangura LALC. A portion of the IAA was also located within the Tharawal LALC area; however, they were unavailable to participate in the survey.

Cubbitch Barta Native Title Claimants raised concerns relating to the difficulty in making informed recommendations based on small details on the maps within the ACHAR. In response, KNC has supplied additional maps of the information provided in the ACHAR with larger details.

Cubbitch Barta Native Title Claimants stated that "[t]he response that Sydney Water is working towards the inclusion of cultural values of water as part of the CHAR, is too late once the destruction has taken place over seventeen kilometres of a possible forty metre wide corridor" (letter dated 20/05/2021). The early identification of Aboriginal cultural values is an important aim of the CHAR and the formal Heritage NSW consultation process was completed/exceeded for the project; however, to date no location-specific cultural values in the IAA have been identified for the project.

Kamilaroi Yankuntjatjara Working Group stated that they supported the report (email received 19/05/2021).

Waawaar Awaa Aboriginal Corporation advised that they "support[ed] the draft ACHAR for the Upper South Creek advanced water recycling centre project and the proposed salvage excavation (Table 8) to mitigate the impacts to ACH" (email received 1/06/2021).

An Aboriginal stakeholder that registered for the project and asked to withhold their details in accordance with item 4.1.5 of the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW 2010a) advised that they agreed with review (email dated 10/05/2021).

An Aboriginal stakeholder that registered for the project and asked to withhold their details in accordance with item 4.1.5 of the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW 2010a) advised that they agreed with the report (email dated 9/05/2021).

Comments and information received from stakeholders during this period are attached in full in Appendix B.

5.5 Aboriginal cultural values

It has been identified during the consultation process that the wider impact assessment 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, rivers, creeks and the land itself
- Aboriginal culturally modified trees

- artefact sites and landscape features
- waterways, particularly the Nepean River, the Georges River, Wianamatta/South Creek and their tributaries
- indigenous plants and animals
- general concern for burials, as their locations are not always known and they can be found anywhere.

Aragung Aboriginal Cultural Heritage Site Assessments stated (letter dated 5/05/2020) that:

> *As the Proposed project area is situated closely to waterways, these area [sic] would have been highly value for their natural resources. And used by both Durug Aboriginal People and neighbouring Aboriginal people of the past.*
>
> *With evidence of Archaeological Deposits – Artefacts – and open sites found during previous Archaeological investigations around these area [sic], it is with my strong Aboriginal spiritual feeling that these area [sic] would have been occupied by Darug Aboriginal people of the past and may have been a possible meeting place, trading place and ceremony place used by Neighbouring Clans.*
>
> *Given the extensive association of waterways and creeks related to the proposed project area, the area can be considered to be of highly cultural significant. Naturally occurring land forms, creeks and rivers have always held deep cultural heritage values through song lines – or as cultural clan boundary markers. The same creeks and river are held with great respect by Aboriginal People to this day.*

Barking Owl Aboriginal Corporation stated (letter dated 25/04/2020) that:

> *The area is an important part of our culture due to previous generations living in and around the area, we maintain a special connection and responsibility as current generations whom continue to reside nearby and share in stories of our history relating to the location.*

Darug Custodian Aboriginal Corporation advised during the consultation process (letter received 25/05/2020) that:

> *Landscapes and landforms are significant to us for the information that they hold and the connection to Darug people. Aboriginal people (Darug) had a complex lifestyle that was based on respect and belonging to the land, all aspects of life and survival did not impact on the land but helped to care for and conserve land and the sustenance that the land provided. As Darug people moved through the land there were no impacts left, although there was evidence of movement and lifestyle, the people moved through areas with knowledge of their areas and followed signs that were left in the landscape. Darug people knew which areas were not to be entered and respected the areas that were sacred.*
>
> *Knowledge of culture, lifestyle and lore have been part of Darug people's lives for thousands of years, this was passed down to the next generations and this started with birth and continued for a lifetime. Darug people spent a lifetime learning and as people grew older they passed through stages of knowledge, elders became elders with the learning of stages of knowledge not by their age, being an elder is part of the kinship system this was a very complicated system based on respect.*

Kamilaroi Yankuntjatjara Working Group stated that (email dated 19/05/2021):

the study area is a highly sensitive area for the Aboriginal people. There are main water ways that are used by Aboriginal people. It was utilized for food and resources, ceremonies and also would have camped in the area. We hold a spiritual connection to the land and all that she holds.

6 Summary and Analysis of Background Information

Analysis of the background information presented in the preceding chapters allows an assessment of the cultural heritage values within the impact assessment area to be made. Combining data from historical/ethnographic sources, Aboriginal community consultation, landscape evaluation and archaeological context provides an insight into how the landscape within and around the impact assessment area was used and what sort of events took place in the past.

The impact assessment area and surrounding region are known to have been important to and extensively used by past Aboriginal people. The British occupation of the region restricted the access of Aboriginal people to areas they had previously used for a range of purposes including subsistence activities and cultural practices. The response to the occupation varied between groups, individuals and over time due to a range of factors including proximity to the occupied area, personal associations and external factors, such as periods of drought. Pemulwuy, Tedbury and Musquito became synonymous with the conflict between the British and Aboriginal people through the late eighteenth and early nineteenth centuries. Aboriginal people living in New South Wales were defined as British subjects and entitled to the protection of British Law; however, prior to 1816, a legal pluralism existed within the region with the British largely unable to enforce colonial laws outside the occupied areas. Aboriginal people who the British perceived as committing crimes such as theft or murder, were instead treated as enemies of the state. The British sent military personnel on punitive raids to areas of conflict in addition to using bribery and coercion to supress resistance from Aboriginal people.

The lives of others, such as Kogi, Bundle, Budbury, Colebee and Nurragingy, became increasingly entangled with the British through proximity to settlements and land grants in addition to personal association with British individuals and families such as Lachlan Macquarie, Charles Throsby and John Macarthur. Aboriginal people played a crucial role as guides and intermediaries during this period and were actively engaged in the developing agricultural or maritime industries. The legal pluralism which exited prior to the mid nineteenth century allowed for the continuation of Aboriginal customary laws and cultural practices with numerous instances reported across the region in newspapers and journals.

The governorship of Lachlan Macquarie saw the rapid expansion of the British population and occupation in the first half of the eighteenth century. Macquarie's time as governor also resulted in several judicial and policy changes that led in part to the policies which dictated race relations in Australia during the nineteenth and twentieth centuries. During the second half of nineteenth century, the construction of railways facilitated the expansion of British occupation into previously fringe areas and further restricted the areas in which Aboriginal people living outside British occupation could inhabit with Aboriginal settlements consolidating at locations such as La Perouse, in the Burragorang Valley and Sacksville which became reserves.

In the first half of the twentieth century, Aboriginal people living across Australia were increasingly isolated and restricted by the Constitution of Australia and legislation known as the Protection Acts; however, the activism of the Aboriginal community generated increasing public awareness and lead to the repeal of the Protection Acts in the second half of the twentieth century. The long struggle for recognition, self-determination and acknowledgement forms part of the Aboriginal cultural heritage story and lived experience of contemporary Aboriginal people. Members of the contemporary Aboriginal community continue to experience connection with the area through cultural and family associations.

Archaeological investigations have been undertaken in the region over several decades and have revealed physical traces of a range of Aboriginal land use activities which have survived in the form of Aboriginal archaeological sites. The investigations have shown that changes occurred in the spatial distribution and density of Aboriginal archaeological sites, the types of artefacts and artefact

raw materials over the last 10,000 years that are likely to reflect the adaptation of Aboriginal people to an ever-changing landscape and environment. Variations between the artefact assemblages of coastal and inland Aboriginal archaeological sites in the last 1,500 years may reflect social changes.

Aboriginal archaeological sites identified in the region have been predominantly surface artefact scatters, isolated artefacts and subsurface archaeological deposits of varying artefact density and integrity. Stone artefacts represent the most durable objects made by Aboriginal people and are likely to represent a small fraction of the objects that were used. Culturally modified trees with bark removal scars or carvings, rock shelters with deposit and/or art and areas of grinding grooves have also been recorded but in significantly lower numbers. The distribution of these site types was restricted by a range of factors such as geology, proximity to water and subsequent land use practices.

Soil landscape, vegetation and land use practices have been identified as factors influencing the preservation of Aboriginal archaeological sites in the region. Soil landscapes subject to high levels of erosion or fluvial activity are unlikely to retain in situ Aboriginal objects while areas where sediment has been deposited contain Aboriginal objects that are without spatial context. Land use practices, including vegetation clearance, construction, trenching and bulk earthworks have variable effects on the preservation of Aboriginal archaeological sites. These processes, and the intensity of previous archaeological studies, distort our perception of Aboriginal land use through the spatial distribution of known sites.

Despite this imbalance, general trends can still be observed. Previous archaeological investigations have shown that the distribution of Aboriginal archaeological sites in the region has been highly influenced by the reliability and permanence of fresh water sources in addition to underlying geology. Investigations in the region have found higher stone artefact density and site frequency along the margins of major watercourses including Wianamatta/South Creek, the Nepean River and the Georges River where elevated and stable micro-topographic landforms have suffered minimal disturbance. Elevated locations on hilltops and ridge crests further from major watercourses tend to display a different archaeological signature, chiefly a sparser artefact and site density. This may have been due to the unsuitability of these areas for the activities which resulted in the discarding of higher densities of stone artefacts or an intentional use of these areas for a different purpose to those closer to more permanent water sources.

6.1 Summary of known Aboriginal archaeological sites/areas of PAD within the IAA

Review of background information, Aboriginal community consultation, and archaeological assessment has identified 15 Aboriginal archaeological sites and one area of potential archaeological deposit within the impact assessment area. The distribution of Aboriginal archaeological sites in the region has been highly influenced by the reliability and permanence of fresh water sources in addition to underlying geology, soils and subsequent disturbance. Significant archaeological information existed for much of the study area, allowing a degree of confidence when assessing archaeological significance. Archaeological test excavation was undertaken at Aboriginal archaeological site Fleurs 1, Fleurs Radio Telescope (AHIMS 45-5-0496) due to the size of proposed impact in this area and limited information from previous archaeological investigations.

Three additional AHIMS items had been registered within the impact assessment area; however, one had been subsequently destroyed by residential redevelopment at Elizabeth Hills (CH05 (Mirvac)) and two were determined to not be sites (Silverdale Road 1 and Elizabeth Precinct PAD 02).

Three Aboriginal archaeological sites were located within existing or planned approval and AHIP areas. The approval for the Northern Road upgrade (SSI 7127) included total impact to Aboriginal

archaeological site TNR AFT 16. The AHIP for the Prospect to Macarthur Drinking Link (AHIP C0005620) included total impact to IFSC 7 Cecil Park and partially impact to GLC1 (including Artefact Scatter PAD 2023-846). An AHIP application for further works at the Cecil Park Reservoir has been submitted which will, once approved, encompass the remaining areas of the site within the impact assessment area.

The proposed works within the AHIP C0005620 area may be completed under the existing AHIP, provided that works are undertaken in accordance with the AHIP conditions. The proposed works within the Cecil Park Reservoir AHIP application area, once approved, may be completed under the AHIP, provided that works are undertaken in accordance with the AHIP conditions. Sydney Water will obtain authorisation from the SSI 7127 approval holders to complete the proposed works under the approval.

The Aboriginal archaeological sites and the area of potential archaeological deposit identified in the impact assessment area are shown in Figures 8-11 and are detailed in Table 3 below. The AHIMS registered items within the impact assessment area that have been previously destroyed, determined not to be an Aboriginal archaeological site or are within existing or future AHIP/approval areas are highlighted in grey in Table 3.

Table 3. Identified Aboriginal archaeological sites/area of PAD within the IAA

Suburb	Name	AHIMS number	Features	Status
Wallacia	Baines Creek Wallacia AFT 1	tbc	Artefact	Valid
	Bents Basin Road Wallacia AFT 1	tbc	Artefact	Valid
	Silverdale Road 1	45-5-3103	Not a site	Not a site
	Wallacia Weir AFT 1	tbc	Artefact	Valid
Luddenham	Elizabeth Drive/Adams Road AFT 1	45-5-5105	Artefact	Valid
	TNR AFT 15	45-5-4788	Artefact	Valid
	TNR AFT 16	45-5-4783	Artefact	Within SSI 7127
Badgerys Creek/ Kemps Creek	Badgerys Creek West B (BWB)	45-5-5298	Artefact	Valid
	Elizabeth Drive AFT 1 (including Elizabeth Precinct PAD 01, Elizabeth Precinct PAD 03, Elizabeth Precinct Isolated Find 04 and Elizabeth Precinct Isolated Find 05)	45-5-5259 (including 45-5-5234, 45-5-5236, 45-5-5330 and 45-5-5331)	Artefact	Valid
	Elizabeth Precinct PAD 02	45-5-5235	Not a site	Not a site
	Fleurs1 Fleurs Radio Telescope (including M12 A4 and South Creek East (SCE))	45-5-0496 (including 45-5-4749 and 45-5-5306	Artefact	Valid
Cecil Hills/ Cecil Park/ Elizabeth Hills	CH05 (Mirvac)	45-5-3557	Artefact	Destroyed
	GLC1 (including Artefact Scatter PAD 2023-846)	45-5-2561 (including 45-5-4022)	Artefact	Partially within AHIP C0005620 and Cecil Park Reservoir AHIP application area
	IFSC 7 Cecil Park	45-5-2430	Artefact	Within AHIP C0005620
	P-CP7	45-5-2306	Artefact	Valid
	P-CP12	45-5-2378	Artefact	Valid

Suburb	Name	AHIMS number	Features	Status
	PAD-OS-5	45-5-2723	Artefact	Valid
	PP-F3	45-5-3298	Artefact	Valid
	Wylde MTB PAD2	45-5-5261	Potential Archaeological Deposit	Valid

6.1.1. Aboriginal sites within IAA at Wallacia

Site name: Baines Creek Wallacia AFT 1
AHIMS ID: tbc

Baines Creek Wallacia AFT 1 consisted of a surface artefact scatter and three associated areas of potential archaeological deposit situated on an upper terrace adjacent to Baines Creek and overlooking the western bank of the Nepean River. The Aboriginal archaeological site was located within Lot 12 DP573571 and Lot 6 DP1067758 on either side of Bents Basin Road and immediately south of Silverdale Road.

The surface artefact scatter consisted of two silcrete flakes that were identified within a cutting of the existing Bents Basin Road on the south side of Baines Creek. Vegetation was predominantly dense grasses with timbered areas adjacent to the Nepean River and Baines Creek. Ground surface visibility was low; however, the area was assessed as having the potential for subsurface archaeological deposits due to the presence of surface artefacts, proximity to Baines Creek and the Nepean River and low visible disturbance.

Site name: Bents Basin Road Wallacia AFT 1
AHIMS ID: N/A

Bents Basin Road Wallacia AFT 1 comprised a surface artefacts scatter located within a mid terrance deposit immediately east of an unnamed north flowing creek and approximately 80 metres west of the Nepean River. The surface deposit contained three tuff artefacts: one core and two flakes. The site area was located within Lot 121 DP231163, Lot 81 DP565585, Lot 821 DP586115 and Lot 3 DP583435 approximately 140 metres east of Bents Basin Road and approximately 1.2 kilometres south of Silverdale Road. The terrace was dissected by two north south oriented depressions that appeared to be paleochannels. Ground surface visibility was low due to dense grasses; however, the area was assessed as having intactness for subsurface archaeological deposits due to topographic location and low levels of visible and known historical disturbance.

Site name: Silverdale Road 1
AHIMS ID: 45-5-3103

Silverdale Road 1 was a culturally modified tree which was registered on AHIMS at the intersection of Silverdale Road and Bents Basin Road, Wallacia. No further information regarding the site was available.

The area was inspected and assessed during an archaeological field survey for the current project. While several trees were located adjacent to the intersection, none were found to have bark removal scars, carving or evidence of cultural modifications. The survey confirmed that the site was not located within the impact assessment area; however, its actual location is unknown.

Figure 8. Archaeological sites within IAA at Wallacia

FIGURE REDACTED FOR PUBLIC EXHIBITION DUE TO SENSITIVITY OF IMAGE

Site name: Wallacia Weir AFT 1
AHIMS ID: tbc

Wallacia Weir AFT 1 was a surface artefact and an associated area of potential archaeological deposit that were situated on an upper terrace adjacent to two north flowing unnamed creeks and overlooking the southern bank of the Nepean River. The Aboriginal archaeological site was located within Lot 1 DP1154130 on the northern western side of the intersection of Silverdale Road and Bents Basin Road.

The surface artefact consisted of a split flake that was identified within the cutting of a vehicle track on the north eastern side of the site area. The site is adjacent to the remains of several structures which research indicates were part of an industrial complex that included a mill and brewery, established and run by John Blaxland and his son Edward Blaxland in the mid eighteenth century. The mill and brewery were mentioned by Werriberrie in association with events involving Gundungurra and Dharawal men during this time (see Section 3).

The site was located in a field used for growing fodder. Ground surface visibility was low; however, the area was assessed as having the potential for subsurface archaeological deposits due to the presence of a surface artefact, the historical association of the area with Aboriginal people and topographic location in proximity to the Nepean River.

6.1.2. Aboriginal sites within IAA at Luddenham

Site name: Elizabeth Drive/Adams Road AFT 1 (formerly PAD 1)
AHIMS ID: 45-5-5105

Elizabeth Drive/Adams Road AFT 1 was an archaeological site complex that consisted of two surface artefacts associated areas of potential archaeological deposit that encompassed the elevated areas adjacent to the confluence of Cosgroves Creek and Oaky Creek. The site complex was located within Lot 13 DP32026, Lot 101 DP848215, Lot 1 DP838361 on the northern side of Elizabeth Drive and Lot 2 DP220176 and 106 DP846962 on the southern side of Elizabeth Drive and west of Adams Road.

The site complex was initially recorded as an area of potential archaeological deposit (PAD 1). An archaeological survey, undertaken for the current project, identified one IMT flake adjacent to Oaky Creek and one silcrete core adjacent to Cosgroves Creek. Both artefacts were located within the recorded extent of PAD 1 and adjacent to the northern boundary of Elizabeth Drive.

Surface visibility across the site complex was generally low. Vegetation comprised short dense grasses with the areas adjacent to the creeks containing regrowth and some older Grey Box trees. The low rise that separated the two creeks and the existing road corridors were found to have been disturbed by past land use practices; however, visible disturbance within the elevated areas adjacent to the creeks was low. Elizabeth Drive/Adams Road AFT 1 was assessed as having the potential for subsurface archaeological deposits due to the presence of surface artefacts, topographic location and low levels of visible disturbance.

Site name: TNR AFT 15
AHIMS ID: 45-5-4788

TNR AFT 15 was a low density surface artefact scatter and an associated area of potential archaeological deposit situated on a cleared ridge crest overlooking a tributary of Mulgoa Creek to the west and a tributary of Cosgroves Creek to the east. The site was located in the eastern portion

of Lot 1 DP1169433 and approximately 40 metres south west of the intersection of the Northern Road and Elizabeth Drive.

The site was identified during the archaeological survey for The Northern Road Upgrade (KNC 2016). The surface artefacts were identified across a disturbed area adjacent to a fence line that marked the eastern boundary of the site. The artefacts consisted of one silcrete flake, one IMT flake and one IMT split flake.

The site was inspected and assessed during an archaeological field survey for the current project. Ground surface visibility was low and no further artefacts were identified. The survey noted that visible surface disturbance was present along the eastern edge of the site in the vicinity of The Northern Road.

Figure 9. Archaeological sites within IAA at Luddenham

FIGURE REDACTED FOR PUBLIC EXHIBITION DUE TO SENSITIVITY OF IMAGE

Site name: TNR AFT 16
AHIMS ID: 45-5-4783

TNR AFT 16 was an isolated surface artefact and associated area of potential archaeological deposit situated on the crest of a major north-south oriented ridge overlooking an unnamed tributary of Cosgroves Creek to the east. The site was located across properties on the eastern side of The Northern Road immediately north of the intersection of The Northern Road and Park Road.

An archaeological salvage excavation was undertaken at TNR AFT 16 in accordance with the approval for The Northern Road Upgrade (SS1 7127). The salvage excavation at site TNR AFT 16 comprised 23, one-metre Phase 1 squares that were positioned across the mapped site extent. A total of eight artefacts were recovered from six of the 23 Phase 1 squares with one square containing more than one artefact. An additional eight Phase 2 squares were excavated around the square with more than one artefact and another Phase 1 square. A total of 14 artefacts were recovered from eight of the 16 Phase 2 squares excavated at TNR AFT 16.

The lithics were predominantly angular fragments while two complete flakes, two medial flake fragments and one distal flake fragment were also recovered. Raw materials were primarily a mix of silcrete, IMT and quartz, with a single chert artefact. The deposit at TNR AFT 16 was characterised by a shallow silty loam overlying basal clay. Some disturbance was noted, including redeposited soil in one Phase 1 square. The artefact assemblage from TNR AFT 16 contained little indication of systematic reduction and/or tool use. Despite the low number of artefacts, there was a wide variety of lithic materials present, suggesting that this was a transitory area with occasional curation or discarding of lithic materials derived from multiple sources.

6.1.3. Aboriginal sites within IAA at Badgerys Creek and Kemps Creek

Site name: Elizabeth Drive AFT 1 (including Elizabeth Precinct PAD 01, Elizabeth Precinct PAD 03,
Elizabeth Precinct Isolated Find 04 and Elizabeth Precinct Isolated Find 05)
AHIMS ID: 45-5-5259 (including 45-5-5234, 45-5-5236, 45-5-5331 and 45-5-5330)

Elizabeth Drive AFT 1 was an archaeological site complex that was located across the eastern slope and elevated flat adjacent to the western bank of Wianamatta/South Creek. The Aboriginal archaeological site was located in the southern portion of Lot 5 DP860456, immediately north of the Elizabeth Drive corridor and approximately 200 metres east the intersection with of Lawson Road.

The site complex was initially identified as three areas of potential archaeological deposit (Elizabeth Precinct PADs 01-03) and a surface artefact scatter (Elizabeth Drive AFT 1). The surface artefacts were identified across a large area of sheet erosion that was located above a cutting adjacent to the northern boundary of the existing Elizabeth Drive corridor. The artefacts consisted of one silcrete core fragment, three silcrete flakes and one silcrete medial flake fragment.

An archaeological test excavation was undertaken at two of the areas of PAD as part of a further archaeological assessment for the proposed Elizabeth Enterprise Precinct. The results of the test excavation indicated that the subsurface deposit consisted of a low density artefact scatter with two localized moderate density areas. As a result of the test excavation, the AHIMS recording for one area of PAD (Elizabeth Precinct PAD 02) to change its status to not a site. The archaeological investigations for the proposed Elizabeth Enterprise Precinct also identified two further surface isolated artefacts (Elizabeth Precinct Isolated Find 04 and Elizabeth Precinct Isolated Find 05). The

artefacts consisted of a silcrete proximal flake and a silcrete medial flake fragment which were identified on a slope landform associated with an east flowing drainage line.

The site was inspected and assessed during an archaeological field survey for the current project. Surface visibility was low and no further surface artefacts were identified. The previous registrations were determined to be part of a larger archaeological site complex that extended across the eastern slope and elevated flat adjacent to the western bank of Wianamatta/South Creek. The site complex was assessed as having potential for subsurface archaeological deposit.

Figure 10. Archaeological sites within IAA at Badgerys Creek and Kemps Creek

FIGURE REDACTED FOR PUBLIC EXHIBITION DUE TO SENSITIVITY OF IMAGE

Site name: Badgerys Creek West B (BWB)
AHIMS ID: 45-5-5298

Badgerys Creek West B (BWB) was a subsurface archaeological deposit situated on a gentle slope overlooking the junction of Badgerys Creek and an unnamed north east flowing tributary creek. The site was located within the south eastern portion of Lot 63 DP1087838, immediately north of Elizabeth Drive and approximately 300 metres east of the intersection of Elizabeth Drive and Badgerys Creek Road. The site was initially identified by predictive modelling as an area of PAD during an archaeological assessment for the proposed M12 Motorway and was subsequently tested.

The test excavation consisted of nine, one metre squares that were positioned at 40 metre intervals along one transect, parallel to and approximately 15 metres north of the existing Elizabeth Drive corridor. The deposit was generally shallow with moderately deep deposits within the test square adjacent to an unnamed north flowing tributary of Badgerys Creek.

A total of 60 artefacts were recorded from eight of the nine test squares. The artefacts were predominantly flakes and flaked fragments while three cores, one backed artefact and one retouched artefact were also found. The artefacts were primarily made from silcrete and IMT. Four quartz artefacts were also recovered. Several pieces of unworked silcrete gravel were also noted. The spatial distribution of artefacts within the tested area was characterised by a low artefact density across the site with moderate artefact density at the eastern and western ends of the transect.

The site was inspected and assessed during an archaeological field survey for the current project. Surface visibility was generally low and limited to areas within sheet erosion adjacent to dams and the creek. Visible disturbance varied across the site with areas of moderate to high disturbance associated with the construction of the dams and erosion on the creek banks. A shallow depression was noted immediately south of the dams where the ground had become waterlogged. The areas of the site to the north and south of the shallow depression and adjacent to the dams and creek had low visible surface disturbance and was assessed as having potential for subsurface archaeological deposit.

Site name: Fleurs 1 Fleurs Radio Telescope (including M12 A4 and South Creek East (SCE))
AHIMS ID: 45-5-0496 (including 45-5-4749 and 45-5-5306)

Fleurs 1, Fleurs Radio Telescope was a surface artefact scatter and subsurface archaeological deposit that was situated on an elevated flat on the southern side of the confluence of Wianamatta/South Creek and Kemps Creek. The flat was located at the northern extent of a spur that descended to the north west from a low lying north-south oriented ridge. Surface artefacts were recorded on an unsealed track immediately north of the Wianamatta/South Creek crossing and within cattle tracks at the site in 1984. The artefacts were predominantly debitage made from silcrete with smaller quantities of chert and quartzite. Rotated and single platform cores were also identified. Silcrete cobbles were noted within the Wianamatta/South Creek channel, approximately 100 metres south of the crossing.

An archaeological test excavation was undertaken at the site within an assessment corridor for the proposed M12 Motorway. The test excavation comprised 11, one metre squares that were generally positioned at 40 metre intervals along one east-west transect while a square was positioned at a 20 metre intervals to further investigate an area of high artefact density. An additional two geotechnical pits were also excavated at the site, approximately 40 metres south of the transect. A total of 333 artefacts were recovered during the test excavation program with the subsurface deposit characterised by a general low to moderate artefact density with a localised moderate density in the east and a localised moderate to high density in the west. The

highest artefact density was recovered from the western most test square where 154 artefacts were identified. The test square was the closest square to Wianamatta/ South Creek, approximately 35 metres to the west. The artefacts assemblage primarily consisted of unmodified flaking debitage with 14 silcrete cores, one silcrete retouched flake, three silcrete backed artefacts, one asymmetrical backed artefact made from IMT, three silcrete scrapers and one anvil of igneous material were also recovered. The artefacts were predominantly made from silcrete (n=260) or IMT (n=48) with small quantities of other materials including quartz, petrified wood, and quartzite.

In June and July 2020, archaeologists from KNC and representatives of the registered Aboriginal parties undertook an archaeological test excavation program at the site within the impact area of the proposed Advanced Water Recycling Centre. The test excavation was undertaken to determine if the subsurface deposit extended into the proposed impact area of the proposed Advanced Water Recycling Centre and, if so, to determine it's the nature and extent). The test excavation program employed three strategies for sampling the area, which encompassed approximately 83 hectares and a total of 237 test squares that measured 0.5 x 0.5 metres were excavated. A total of 309 artefacts were recovered from 109 of the 237 test squares excavated, giving a mean artefact density across the tested area of 1.30 artefacts/test square. The artefact assemblage consisted of 21 complete cores, three core fragments, 85 complete flakes, 199 flake fragments and a basalt fragment that may have been part of a ground-edged artefact. The complete flakes consisted of 61 conchoidal flakes, 20 bending flakes, three bipolar flakes and one twisted conchoidal flake. The artefacts were predominantly made from silcrete (n=219) while the remaining artefacts were made from IMT (n=63), quartz (n=17), chert (n=5), quartzite (n=2), sedimentary (n=2) and basalt (n=1). Artefacts were generally small in size with 267 (86.4%) less than 30 millimetres in length.

The horizontal distribution of artefacts within the tested area was irregular and generally characterised by three low density areas on crest and upper slope landforms in the northern portion of the test area, low to high density across the crest and slope landforms in the south west and dispersed isolated artefacts within a former drainage line and on a low lying crest in the south east. Visible subsurface disturbance was low despite the previous construction and operation of telescopes and associated structures and was limited to burnt tree roots which had excavated channels into the basal clay. Charcoal flecking was also present in other but without focus.

6.1.4. Aboriginal sites and area of PAD within IAA at Cecil Hills, Cecil Park and Elizabeth Hills

Site name: CH05 (Mirvac)
AHIMS ID: 45-5-3557

CH05 (Mirvac) was a low density surface artefact scatter that was identified eroding from the embankment of Stirling Street prior to the residential redevelopment at Elizabeth Hills. The site was located within Lot 108 DP1162114 immediately south of Stirling Street and approximately 20 metres north of Hinchinbrook Creek. The artefacts consisted of one silcrete flake and one silcrete core.

The site was inspected and assessed during an archaeological field survey for the current project. Surface visibility was low, and no further artefacts were identified. The area had been disturbed by the construction of Stirling Street and modifications to Hinchinbrook Creek and was no longer extant.

Site name: GLC1 (including Artefact Scatter PAD 2023-846)
AHIMS ID: 45-5-2561 (including 45-5-4022)

Site GLC1 (including Artefact Scatter PAD 2023-846) was an artefact scatter and associated area of PAD that was situated on the crest of the hilltop at the Cecil Park Water Reservoir. The hill formed part of a north running ridge that extended from Mount Annan in the south to Prospect Hill in the north and which formed the watershed between the catchment areas of Wianamatta/South Creek to the west and the Georges River to the east. The site was located approximately 850 metres west of the M7 Motorway and approximately 540 metres south of Elizabeth Drive.

The site was originally recorded as a surface artefact scatter (GLC1) during an archaeological survey conducted for a section of the proposed Eastern Gas Pipeline between Wilton and Horsley Park. A total of 27 artefacts were identified on a surface exposure within an access track that ran across the crest of the hill. The less disturbed portions of the crest were identified as having potential for subsurface archaeological material. Over 30 additional artefacts were recorded at the site during a survey for Sydney Water in 2011. The additional artefacts were identified along the access road to the west of the original recording and included one red silcrete backed artefact and one red silcrete scraper. Artefact materials included silcrete and quartz. Disturbance across the ridgetop varied, with impacts from a water reservoir, communications tower, radar stations and roads evident; however, some areas of the hilltop remained relatively intact. The additional artefacts were registered as Artefact Scatter PAD 2023-846 (AHIMS 45-5-4022)

The site was revisited during an archaeological survey for the Prospect to Macarthur Drinking Water Link project. The access track was found to have been surfaced with gravels and a water main had been constructed through the existing archaeological deposit within the track. The survey identified one IMT flake and one silcrete angular fragment within a ground surface exposure. The portions of the crest that were located outside the access tracks, reservoirs and associated services appeared to have relatively intact subsurface deposit with only minor disturbances. The less visibly disturbed portions of the site were assessed as having a potential for further archaeological material.

AHIP C0005620 was grated on 2 March 2020 for the Prospect to Macarthur System Drinking Water Link and included the partial impact of Aboriginal archaeological site GLC1. An AHIP application for further works at the Cecil Park Reservoir has been submitted which will, once approved, encompass the remaining areas of the site within the impact assessment area.

Figure 11. Archaeological sites within IAA – Cecil Hills, Cecil Park and Elizabeth Hills

FIGURE REDACTED FOR PUBLIC EXHIBITION DUE TO SENSITIVITY OF IMAGE

Site name: IFSC 7 Cecil Park
AHIMS ID: 45-5-2430

Site ISC7; Cecil Park was an isolated artefact on the western slope of a low lying saddle that connected the hilltop at the Cecil Park Water Reservoir to the north with a ridgeline that extended from Mount Annan in the south. The area overlooked a south west flowing tributary of Kemps Creek. The site was located within Lot 1 DP 875790 and approximately 130 metres west of the Upper Canal and 1.2 kilometres south east of the intersection of Range Road and Elizabeth Drive.

The artefact was a silcrete broken flake which was identified on a surface exposure within a vehicle track. The vehicle track ran parallel to an existing high pressure gas pipeline easement. The site was determined to be of low archaeological significance due to visible disturbance and was assessed as having a low likelihood of subsurface archaeological deposit. AHIP C0005620 was grated on 2 March 2020 for the Prospect to Macarthur System Drinking Water Link and included the total impact of Aboriginal archaeological site IFSC 7 Cecil Park.

Site name: P-CP7
AHIMS ID: 45-5-2306

P-CP7 was a surface artefact scatter and associated areas of potential archaeological deposit that were situated on the elevated banks at the confluence of Hinchinbrook Creek and two tributary creeks. The site was located within Lot 3 DP1087825 and Lot 213 DP1111381, immediately south of the Westlink M7 corridor and 600 metres west of the intersection of Sherrard Avenue and Vidal Avenue. The surface artefact scatter consisted of 53 artefacts that included a cobble tool, bipolar cores, flakes, backed pieces, a core and utilised pieces. The artefacts were predominantly made from silcrete with small quantities of IMT and quartz.

The site was inspected and assessed during an archaeological field survey for the current project. Surface visibility was generally low and limited to areas within access tracks and sheet erosion adjacent to the creeks. Visible disturbance varied across the site with areas of moderate to high disturbance associated with the construction of in-line dams and erosion within access tracks and on the creek banks; however, the adjacent areas had low visible surface disturbance and was assessed as having potential for subsurface archaeological deposit.

Site name: P-CP12
AHIMS ID: 45-5-2378

P-CP12 was a surface artefact scatter and associated areas of potential archaeological deposit that were situated on the elevated banks at the confluence of Hinchinbrook Creek and an unnamed tributary creek. The site was located within Lot 3 DP1087825, approximately 200 metres west of the Westlink M7 and 430 metres south east of the Liverpool Offtake Reservoir. The surface artefact scatter consisted of four silcrete artefact which were identified adjacent to the creek and on the dry creek bed. An additional 17 undiagnostic silcrete fragments were also found.

The site was inspected and assessed during an archaeological field survey for the current project. Surface visibility was generally low and limited to areas within access tracks and sheet erosion adjacent to the creeks. Visible disturbance varied across the site with areas of moderate to high disturbance associated with erosion within the access tracks and on the creek banks; however, the adjacent areas had low visible surface disturbance and was assessed as having potential for subsurface archaeological deposit.

Site name: PP-F3
AHIMS ID: 45-5-3298

PP-F3 was a surface artefact scatter and associated area of potential archaeological deposit that was situated on the crest of a ridge which formed the watershed between Kemps Creek in the west and Hinchinbrook Creek in the east. The site was located within Lot 3 DP1087825, approximately 170 metres north of the intersection of McIver Avenue and Twenty Seventh Avenue. The surface artefact was identified within an unsealed vehicle track that ran along the crest of the ridge and consisted of a silcrete fragment with at least four unifacial step or hinge terminated scars and one heat fractured surface.

The site was inspected and assessed during an archaeological field survey for the current project. The track had been disturbed by sheet erosion and vehicle movement; however, the areas adjacent to the track appeared less disturbed. Surface visibility was low within the adjacent areas and no further artefacts were identified; however, the adjacent areas exhibited low visible surface disturbance and were assessed as having potential for subsurface archaeological deposit.

Site name: PAD-OS-5 PAD
AHIMS ID: 45-5-2793

PAD-OS-5 PAD was a subsurface archaeological deposit that was situated on an elevated bank and lower southern slope on the northern side of the confluence of Hinchinbrook Creek and an unnamed south west flowing tributary. The area was located at the south western end of spur that descended from a ridge. The area was located within Lot 3 DP1087825, Lot 12 DP1041391 and Lot 217 DP1111381, on either side of the Westlink M7 and approximately 440 metres west of the intersection of Kensington Close and Stirling Street.

An archaeological test excavation was undertaken at the site as part of an assessment for the Western Sydney Orbital (now Westlink M7). The program comprised 38 auger pits, which were excavated across the elevated bank adjacent to Hinchinbrook Creek on a five metre grid, and one 200 centimetre square was excavated around the auger pit where the highest artefact density (n=8) was identified. A total of 13 artefacts were recovered from the auger pits and a further 127 artefacts were recovered from the square. The artefact assemblage primarily consisted of unmodified flakes and flake pieces while five cores, 14 backed artefacts and 10 scrapers were also recovered. The artefacts were almost entirely made from silcrete with only two IMT and two chert artefacts.

The site was inspected and assessed during an archaeological field survey for the current project. Surface visibility was generally low and limited to areas within access tracks and sheet erosion adjacent to the creeks. Visible disturbance varied across the site with areas of moderate to high disturbance associated with the construction of the Westlink M7 and erosion within the access tracks and on the creek banks; however, the adjacent areas had low visible surface disturbance and was assessed as having potential for subsurface archaeological deposit.

Site name: Wylde MTB PAD2
AHIMS ID: 45-5-5261

Wylde MTB PAD2 consisted of two areas of potential archaeological deposit that were situated on an elevated bank and lower southern slope on the northern side of an unnamed south west flowing creek. Wylde MTB PAD2 was located within Lot 3 DP1087825, approximately 200 metres west of the Upper Cannal and 660 metres south of Elizabeth Drive. Vegetation comprised dense grasses with scattered trees. The site was inspected and assessed during an archaeological field survey for the current project. Surface visibility was low, and no artefacts were identified;

however, the area was assessed as having the potential for subsurface archaeological deposits due to topographic location.

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.

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* (DECCW 2010a) requires significance assessment according to criteria established in the Australia ICOMOS Burra Charter, 1999 (Australia ICOMOS 1999). 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
- 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. According to OEH, "social or cultural value can only be identified though consultation with Aboriginal people" (OEH 2011:8).

Significance assessment for identified archaeological sites 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 site within the impact assessment area are detailed below.

Social Values

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.

It has been identified during the consultation process that the impact assessment area has cultural heritage value (social value) to the local Aboriginal community. Regarding Aboriginal sites identified within the impact assessment area, no specific cultural or social values expressed by these sites have been identified to date.

Historic Values

Historical research did not identify any information regarding specific historical significance of identified Aboriginal archaeological sites within the impact assessment area; however, an account by Werriberrie (also known as William or Bill Russell) links the former brewery and mill owned by Edward Blaxland with Burra-ga-rang men, Werriberrie and Old Bundle, an elder of the Cubbitch Barta during the first half of the nineteenth century (see Section 3).

No specific historic values for the Aboriginal archaeological sites within the impact assessment area have been identified to date.

Scientific Values

Scientific values have been assessed for the identified Aboriginal archaeological sites located in the impact assessment area. These values have been developed based on significance criteria of research potential (including integrity/condition, complexity and archaeological potential), representativeness and rarity. Identified archaeological sites in the impact assessment area displayed both moderate and low scientific significance.

Sites of low significance are those that do not offer this potential and are unlikely to provide any further scientifically valuable information. 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 south western Cumberland Plain. Archaeological investigation of moderately significant sites will contribute knowledge regarding site type interrelationships, cultural use of landscape features and occupation patterns.

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 Aboriginal archaeological sites within the impact assessment area have been identified to date.

7.2 Statements of Significance

The impact assessment area contains 12 Aboriginal archaeological sites as defined under the *National Parks and Wildlife Act 1974* and one area of potential archaeological deposit that are not located within existing or planned approval and AHIP areas. Based on the values assessment, the following levels of significance/potential were attached to these Aboriginal archaeological sites and area of PAD within the impact assessment area:

Table 4. Assessed significance/potential of Aboriginal archaeological sites/area of PAD within the IAA

Significance/ potential	Site/area of PAD	Justification
Moderate	Baines Creek Wallacia AFT 1 Bents Basin Road Wallacia AFT 1 Elizabeth Drive/Adams Road AFT 1 Elizabeth Drive AFT 1 Fleurs1 Fleurs Radio Telescope P-CP12 PAD-OS-5 TNR AFT 15 Wallacia Weir AFT 1 Wylde MTB PAD2	• These sites/PAD offer good research potential as they represent intact archaeological deposits within the impact assessment area • Further investigation would add to our understanding of Aboriginal activities on the ridgelines and along major water courses in the region
Low	Badgerys Creek West B (BWB) (impacted portion) P-CP7 (impacted portion) PP-F3 (impacted portion)	• The portion of these sites within the impact assessment area are highly disturbed and showed very little potential for further archaeology research • Every Aboriginal site is important to the local Aboriginal community, however, there are more intact or better examples of this site type within the impact assessment area and wider local area

8 The Proposed Activity and Impact Assessment

8.1 Proposed activities

Sydney Water is planning to build and operate new wastewater infrastructure to service the South West and Western Sydney Aerotropolis Growth Areas.

The proposed development will include the following components:

- A wastewater treatment plant known as the Upper South Creek Advanced Water Recycling Centre
- a pipeline about 17 kilometres long from the Advanced Water Recycling Centre to the Nepean River at Wallacia Weir, for the release of treated water
- infrastructure from the Advanced Water Recycling Centre to Wianamatta/South Creek to release excess treated water and wet weather flows
- a pipeline about five kilometres long from the main treated water pipeline at Wallacia to a location between the Warragamba Dam and Warragamba Weir, to release high-quality treated water to the Warragamba River as environmental flows
- a pipeline about 24 kilometres long that transfers brine from the Advanced Water Recycling Centre to Lansdowne, in south-west Sydney, where it connects to Sydney Water's existing Malabar wastewater network

Construction activities associated with the wastewater treatment plant would consist of:

- site establishment including the installation of environmental controls, ancillary construction such as roads and fences, grubbing and removal of surface vegetation, demolition of existing buildings and contamination management
- earthworks including cut and fill, temporary drainage and soil management controls and excavation of detention basins and underground infrastructure
- civil works and structural construction including the construction of roads and stormwater infrastructure and landscaping

Pipeline construction

The main construction technique for pipelines will be trenching, with trenches ranging from about 1.5 metres to 7 metres deep. Where trenching is required, the construction corridor will vary from 15 metres to 30 metres, and occasionally wider to accommodate specific access or construction needs. Trenchless pipelines may be deeper depending on ground conditions and topography. Launch/receive pits for trenchless pipelines would be approximately 10 metres long and 5 metres wide.

Construction activities associated with pipeline construction include:

- ancillary construction works including roads site compounds and fencing
- trench excavation, including stockpiling of spoil material
- landscaping

The extent of the proposed plant and pipeline corridors are shown as the impact area (IA) on Figures 12 to 15.

Figure 12. Detail of the western section of the IAA with the proposed impact area

FIGURE REDACTED FOR PUBLIC EXHIBITION DUE TO SENSITIVITY OF IMAGE

Figure 13. Detail of the central western section of the IAA with the proposed impact area

FIGURE REDACTED FOR PUBLIC EXHIBITION DUE TO SENSITIVITY OF IMAGE

Figure 14. Detail of the central eastern section of the IAA with the proposed impact area

FIGURE REDACTED FOR PUBLIC EXHIBITION DUE TO SENSITIVITY OF IMAGE

Figure 15. Detail of the eastern section of the IAA with the proposed impact area

FIGURE REDACTED FOR PUBLIC EXHIBITION DUE TO SENSITIVITY OF IMAGE

8.2 Impact assessment

A total of 15 Aboriginal archaeological sites and one areas of potential archaeological deposit have been identified within the impact assessment area. The proposed impact area (IA) for the project would avoid one area of PAD (Wylde MTB PAD2).

Three Aboriginal archaeological sites were located within existing or planned approval and AHIP areas. The approval for the Northern Road upgrade (SSI 7127) included total impact to Aboriginal archaeological site TNR AFT 16. The AHIP for the Prospect to Macarthur Drinking Link (AHIP C0005620) included total impact to IFSC 7 Cecil Park and partially impact to GLC1 (including Artefact Scatter PAD 2023-846). An AHIP application for further works at the Cecil Park Reservoir has been submitted which will, once approved, encompass the remaining areas of the site within the impact assessment area.

The proposed works within the AHIP C0005620 area may be completed under the existing AHIP, provided that works are undertaken in accordance with the AHIP conditions. The proposed works within the Cecil Park Reservoir AHIP application area, once approved, may be completed under the AHIP, provided that works are undertaken in accordance with the AHIP conditions. Sydney Water will obtain authorisation from the SSI 7127 approval holders to complete the proposed works under the approval.

Assessed impact to the Aboriginal archaeological sites and area of potential archaeological deposit identified in the impact assessment area is shown in Figures 16-19 and detailed in Table 5 below. The Aboriginal archaeological sites/areas of PAD within the impact assessment area that will be avoided by proposed works or are within an existing AHIP/ approval area are highlighted in grey in Table 5.

Table 5. Proposed impact to Aboriginal archaeological sites/area of PAD within the IAA

Name	AHIMS ID	Type of harm	Degree of harm	Consequence of harm	Significance of harm
Badgerys Creek West B (BWB)	45-5-5298	Direct	Partial	Partial loss of value	Low (impacted portion)
Baines Creek Wallacia AFT 1	tbc	Direct	Partial	Partial loss of value	Moderate
Bents Basin Road Wallacia AFT 1	tbc	Direct	Partial	Partial loss of value	Moderate
Elizabeth Drive/Adams Road AFT 1	45-5-5105	Direct	Partial	Partial loss of value	Moderate
Elizabeth Drive AFT 1 (including Elizabeth Precinct PAD 01, Elizabeth Precinct PAD 03, Elizabeth Precinct Isolated Find 04 and Elizabeth Precinct Isolated Find 05)	45-5-5259 (including 45-5-5234, 45-5-5236, 45-5-5330 and 45-5-5331)	Direct	Partial	Partial loss of value	Moderate
Fleurs1 Fleurs Radio Telescope (including M12 A4 and South Creek East (SCE))	45-5-0496 (including 45-5-4749 and 45-5-5306	Direct	Partial	Partial loss of value	Moderate
GLC1 (including Artefact Scatter PAD 2023-846)	45-5-2561 (including 45-5-4022)	None	None	No loss of value	None
IFSC 7 Cecil Park	45-5-2430	None	None	No loss of value	None

Name	AHIMS ID	Type of harm	Degree of harm	Consequence of harm	Significance of harm
P-CP7	45-5-2306	Direct	Partial	Partial loss of value	Low (impacted portion)
P-CP12	45-5-2378	Direct	Partial	Partial loss of value	Moderate
PAD-OS-5	45-5-2723	Direct	Partial	Partial loss of value	Moderate
PP-F3	45-5-3298	Direct	Partial	Partial loss of value	Low (impacted portion)
TNR AFT 15	45-5-4788	Direct	Partial	Partial loss of value	Moderate
TNR AFT 16	45-5-4783	None	None	No loss of value	None
Wallacia Weir AFT 1	tbc	Direct	Partial	Partial loss of value	Moderate
Wylde MTB PAD2	45-5-5261	None	None	No loss of value	None

Figure 16. Proposed impact area and Aboriginal heritage at Wallacia

FIGURE REDACTED FOR PUBLIC EXHIBITION DUE TO SENSITIVITY OF IMAGE

Figure 17. Proposed impact area and Aboriginal heritage at Luddenham

FIGURE REDACTED FOR PUBLIC EXHIBITION DUE TO SENSITIVITY OF IMAGE

Figure 18. Proposed impact area and Aboriginal heritage at Badgerys Creek and Kemps Creek

FIGURE REDACTED FOR PUBLIC EXHIBITION DUE TO SENSITIVITY OF IMAGE

Figure 19. Proposed impact area and Aboriginal heritage at Cecil Hills and Cecil Park

FIGURE REDACTED FOR PUBLIC EXHIBITION DUE TO SENSITIVITY OF IMAGE

9 Mitigating Harm

The assessment applied the principles of Ecologically Sustainable Development (ESD) to the current proposal. The principles of Ecologically Sustainable Development are defined in Section 6 of the NSW *Protection of the Environment Administration Act 1991*. The ESD principles relevant to Aboriginal cultural heritage within the proposal area are: the Precautionary Principle and the Principle of Inter-Generational Equity. The application of these principles in relation to the current proposal is discussed below.

The Precautionary Principle
The Precautionary Principle states "that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation".

Scientific confidence has been achieved through archaeological investigations (Section 4). Regarding Aboriginal cultural heritage value confidence, no specific cultural or social values expressed by these sites have been identified to date (Section 5). As detailed in Section 7, the assessment has determined that the impact assessment area contains Aboriginal archaeological sites with a mix of low and moderate significance.

The Principle of Inter-Generational Equity
The Principle of Inter-Generational Equity states "that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations".

The archaeological sites located within the impact assessment area were evaluated in relation to intergenerational equality and in particular, the cumulative impact of the proposal on the Aboriginal heritage of the region. As discussed in Section 4, redevelopment and infrastructure projects undertaken over the last 40 years have impacted a significant number of the identified Aboriginal archaeological sites in the region. As such, the conservation of archaeological sites in situ is generally regarded as the best approach when considering intergenerational equality (Bonnie 2011).

The total avoidance of Aboriginal archaeological sites within the impact assessment area was not possible due to the requirements of the project and limited area in which it could occur. Adjacent construction and redevelopment have restricted the proposed impact assessment area. Much of the impact assessment area is subject to ongoing land use activities while areas in the vicinity of water courses are variably affected by fluvial activity. Sydney Water have considered the identified Aboriginal archaeological sites in relation to past and ongoing land use activities in order to conserve, where possible, sites with stable deposits that are unlikely to be further impacted such as areas of remnant or revegetated bushland. Sydney Water have also considered the conservation of all identified Aboriginal archaeological sites regardless of scientific significance to preserve the diversity of the archaeological record in the region.

Early identification of Aboriginal heritage allowed refinement of the impact area to avoid Wylde MTB PAD2 and limit the impact on the remaining sites to areas subject to past and ongoing land use activities or fluvial processes. The impact area has been restricted further at sites P-CP7 and PP-F3 to areas with visible disturbance while avoiding adjacent areas. These sites are located within the Western Sydney Parklands where future development is restricted.

9.1 Mitigation Measures

Suitable recommendations for the identified impacts to the Aboriginal archaeological sites within the impact area have been developed based on ESD, environmental context and condition, background research and consultation with registered Aboriginal stakeholders. As discussed in Section 7, the impact area contains a mix of low and moderate significance sites.

The impacted portions of Aboriginal archaeological sites Badgerys Creek West B (BWB), P-CP7 and PP-F3 are considered to display low significance based on the disturbed nature of these areas and lack of subsurface archaeological deposits. Archaeological mitigation is not required within the impacted areas of these sites.

Aboriginal archaeological sites of at least moderate significance and areas of archaeological potential require mitigation through salvage excavation. Sites Baines Creek Wallacia AFT 1, Bents Basin Road Wallacia PAD 1, Baines Creek Wallacia AFT 1, Bents Basin Road Wallacia AFT 1, Elizabeth Drive/Adams Road AFT 1, Elizabeth Drive AFT 1, Fleurs1 Fleurs Radio Telescope, P-CP12, PAD-OS-5, TNR AFT 15 and Wallacia Weir AFT 1 are considered to display moderate significance based on their scientific value and potential to inform on Aboriginal landscape use within the south western Cumberland Plain.

Their archaeological value is linked to the information that they contain. Recovery of this information through archaeological salvage excavation would mitigate the impact of the proposal and offer an opportunity to better understand the distribution of Aboriginal archaeological material in these locations. The loss of intrinsic Aboriginal cultural value of impacted sites cannot be offset or mitigated; however, the salvaged information will assist in a better understanding of the local archaeological context. Measures for mitigating harm to the sites are outlined in Table 6 below.

Table 6. Mitigation measures for impacted Aboriginal sites within the impact area

Name	AHIMS ID	Degree of harm	Significance of harm	Management and mitigation measures
Badgerys Creek West B (BWB)	45-5-5298	Partial	Low	Barrier fencing to be erected on the project approval boundary for the extent of the site to ensure that no construction impact extends into the portion of the site outside the impact area. Portion of site area outside of impact area should be identified on the Construction Environmental Management Plan (CEMP) as environmentally sensitive no-go zone to ensure no impact. Relevant project approval required prior to commencement of works affecting the site.
Baines Creek Wallacia AFT 1	tbc	Partial	Moderate	Barrier fencing to be erected on the project approval boundary for the extent of the area to ensure that no construction impact extends into the portion of the site outside the impact area. Portion of area outside of impact area should be identified on the Construction Environmental Management Plan (CEMP) as environmentally sensitive no-go zone to ensure no impact. Archaeological salvage excavation of impacted portion of site. Relevant project approval required prior to commencement of works affecting the area.
Bents Basin Road Wallacia AFT 1	tbc	Partial	Moderate	Barrier fencing to be erected on the project approval boundary for the extent of the area to ensure that no construction impact extends into the portion of the site outside the impact area. Portion of area outside of impact area should be identified on the Construction Environmental Management Plan (CEMP) as environmentally sensitive no-go zone to ensure no impact. Archaeological salvage excavation of impacted portion of area. Relevant project approval required prior to commencement of works affecting the area.
Elizabeth Drive/Adams Road AFT 1	45-5-5105	Partial	Moderate	Barrier fencing to be erected on the project approval boundary for the extent of the site to ensure that no construction impact extends into the portion of the site outside the impact area. Portion of site area outside of impact area should be identified on the Construction Environmental Management Plan (CEMP) as environmentally sensitive no-go zone to ensure no impact. Archaeological salvage excavation of impacted portion of site. Relevant project approval required prior to commencement of works affecting the site.

Name	AHIMS ID	Degree of harm	Significance of harm	Management and mitigation measures
Elizabeth Drive AFT 1 (including Elizabeth Precinct PAD 01, Elizabeth Precinct PAD 03, Elizabeth Precinct Isolated Find 04 and Elizabeth Precinct Isolated Find 05)	45-5-5259 (including 45-5-5234, 45-5-5236, 45-5-5330 and 45-5-5331)	Partial	Moderate	Barrier fencing to be erected on the project approval boundary for the extent of the site to ensure that no construction impact extends into the portion of the site outside the impact area. Portion of site area outside of impact area should be identified on the Construction Environmental Management Plan (CEMP) as environmentally sensitive no-go zone to ensure no impact. Archaeological salvage excavation of impacted portion of site. Relevant project approval required prior to commencement of works affecting the site.
Fleurs1 Fleurs Radio Telescope (including M12 A4 and South Creek East (SCE))	45-5-0496 (including 45-5-4749 and 45-5-5306	Partial	Moderate	Barrier fencing to be erected on the project approval boundary for the extent of the site to ensure that no construction impact extends into the portion of the site outside the impact area. Portion of site area outside of impact area should be identified on the Construction Environmental Management Plan (CEMP) as environmentally sensitive no-go zone to ensure no impact. Archaeological salvage excavation of impacted portion of site. Relevant project approval required prior to commencement of works affecting the site.
GLC1 (including Artefact Scatter PAD 2023-846)	45-5-2561 (including 45-5-4022)	None	None	The proposed works within the AHIP C0005620 area may be completed under the existing AHIP, provided that works are undertaken in accordance with the AHIP conditions. The proposed works within the Cecil Park Reservoir AHIP application area, once approved, may be completed under the AHIP, provided that works are undertaken in accordance with the AHIP conditions.
IFSC 7 Cecil Park	45-5-2430	None	None	The proposed works within the AHIP C0005620 area may be completed under the existing AHIP, provided that works are undertaken in accordance with the AHIP conditions.
P-CP7	45-5-2306	Partial	Low	Barrier fencing to be erected on the project approval boundary for the extent of the site to ensure that no construction impact extends into the portion of the site outside the impact area. Portion of site area outside of impact area should be identified on the Construction Environmental Management Plan (CEMP) as environmentally sensitive no-go zone to ensure no impact. Relevant project approval required prior to commencement of works affecting the site.

Name	AHIMS ID	Degree of harm	Significance of harm	Management and mitigation measures
P-CP12	45-5-2378	Partial	Moderate	Barrier fencing to be erected on the project approval boundary for the extent of the site to ensure that no construction impact extends into the portion of the site outside the impact area. Portion of site area outside of impact area should be identified on the Construction Environmental Management Plan (CEMP) as environmentally sensitive no-go zone to ensure no impact. Archaeological salvage excavation of impacted portion of site. Relevant project approval required prior to commencement of works affecting the site.
PAD-OS-5	45-5-2723	Partial	Moderate	Barrier fencing to be erected on the project approval boundary for the extent of the site to ensure that no construction impact extends into the portion of the site outside the impact area. Portion of site area outside of impact area should be identified on the Construction Environmental Management Plan (CEMP) as environmentally sensitive no-go zone to ensure no impact. Archaeological salvage excavation of impacted portion of site. Relevant project approval required prior to commencement of works affecting the site.
PP-F3	45-5-3298	Partial	Low	Barrier fencing to be erected on the project approval boundary for the extent of the site to ensure that no construction impact extends into the portion of the site outside the impact area. Portion of site area outside of impact area should be identified on the Construction Environmental Management Plan (CEMP) as environmentally sensitive no-go zone to ensure no impact. Relevant project approval required prior to commencement of works affecting the site.
TNR AFT 15	45-5-4788	Partial	Moderate	Barrier fencing to be erected on the project approval boundary for the extent of the site to ensure that no construction impact extends into the portion of the site outside the impact area. Portion of site area outside of impact area should be identified on the Construction Environmental Management Plan (CEMP) as environmentally sensitive no-go zone to ensure no impact. Archaeological salvage excavation of impacted portion of site. Relevant project approval required prior to commencement of works affecting the site.

Name	AHIMS ID	Degree of harm	Significance of harm	Management and mitigation measures
Wallacia Weir AFT 1	tbc	Partial	Moderate	Barrier fencing to be erected on the project approval boundary for the extent of the area to ensure that no construction impact extends into the portion of the site outside the impact area. Portion of area outside of impact area should be identified on the Construction Environmental Management Plan (CEMP) as environmentally sensitive no-go zone to ensure no impact. Archaeological salvage excavation of impacted portion of site. Relevant project approval required prior to commencement of works affecting the area.

10 Management Outcomes

The following general management outcomes will be implemented in accordance with the management procedures for the proposal as outlined in Section 11.

10.1 Conservation of portion of Aboriginal archaeological sites outside impact area

The Aboriginal archaeological sites in Table 7 would be partially impacted by the project. The location of the portions of these sites to be conserved should be identified in the Construction Environmental Management Plan, Construction Heritage Sites Map and Project Inductions to ensure they are not inadvertently damaged as a result of construction works.

In addition, the portion of the site outside the impact area boundary should be fenced off prior to the commencement of construction works to ensure that the area is not inadvertently affected as a result of construction work. At a minimum the fencing should clearly define the impact area in relation to the archaeological sites. Fencing would be maintained throughout the duration of works.

Required mitigation of the impacted portions of the Aboriginal archaeological sites are listed in Table 6 and described in the following sections.

Table 7. Aboriginal sites requiring fencing for non-impacted portion

Aboriginal sites requiring fencing for non-impacted portion	
Badgerys Creek West B (BWB)	P-CP7
Baines Creek Wallacia AFT 1	P-CP12
Bents Basin Road Wallacia PAD 1	PAD-OS-5
Elizabeth Drive/Adams Road AFT 1	PP-F3
Elizabeth Drive AFT 1	TNR AFT 15
Fleurs1 Fleurs Radio Telescope	Wallacia Weir AFT 1

10.2 Mitigation through archaeological salvage excavation

A portion of the Aboriginal archaeological sites in Table 8 will be impacted by the project and are of moderate Aboriginal heritage significance. The impacted portions of these sites require archaeological salvage excavation to mitigate the impacts. Salvage excavation can only occur after project approval is obtained.

Salvage excavation must be completed prior to any activities which may harm Aboriginal objects at these locations. Salvage excavation activities would be undertaken in accordance with the methodology attached as Appendix C.

Table 8. Aboriginal sites requiring salvage excavation of impacted portion

Archaeological sites requiring salvage excavation of impacted portion	
Baines Creek Wallacia AFT 1	P-CP12
Bents Basin Road Wallacia PAD 1	PAD-OS-5
Elizabeth Drive/Adams Road AFT 1	TNR AFT 15
Elizabeth Drive AFT 1	Wallacia Weir AFT 1
Fleurs1 Fleurs Radio Telescope	

10.3 No archaeological mitigation required

No archaeological mitigation is required for the impacted areas of the Aboriginal archaeological sites in Table 9. The sites may only be impacted after project approval is obtained.

Table 9. Aboriginal sites with no further archaeological mitigation required within the impact area

Aboriginal sites with no further archaeological mitigation required within the impact area
Badgerys Creek West B (BWB) P-CP7 PP-F3

10.4 Archaeological sites requiring impact in accordance with existing or planned AHIP conditions

The Aboriginal archaeological sites listed in Table 10 are within existing or planned AHIP areas. No archaeological mitigation is required for the portion of the Aboriginal archaeological sites within the existing or planned AHIP areas, provided that work is undertaken in accordance with the AHIP conditions.

The proposed works within the AHIP C0005620 area may be completed under the existing AHIP, provided that works are undertaken in accordance with the AHIP conditions. The proposed works within the Cecil Park Reservoir AHIP application area, once approved, may be completed under the AHIP, provided that works are undertaken in accordance with the AHIP conditions.

Table 10. Aboriginal archaeological sites requiring impact in accordance with existing or planned AHIP conditions

Aboriginal archaeological sites requiring impact in accordance with existing or planned AHIP conditions
GLC1 IFSC 7 Cecil Park

11 Management Procedures

11.1 Management policy for Aboriginal heritage

The policy for the management and conservation of Aboriginal heritage in relation to salvage activities and construction activities (or fencing, geotechnical investigations, minor clearing, establishing site compounds, adjustment to services/utilities etc.) is described below:

Responsibility for compliance with Management Policy

1. The Proponent must ensure all of its employees, contractors and subcontractors and agents are made aware of and comply with this management policy.
2. The Proponent must appoint a suitably qualified and experienced environmental manager who is responsible for overseeing the activities related to this management policy.
3. The Proponent must appoint a suitably qualified and experienced Archaeologist who is responsible for overseeing, for and on behalf of the Proponent, the archaeological activities relating to the project.

Operational constraints

4. Where archaeological salvage excavation has been nominated for impacted sites, no construction activities (or fencing, geotechnical investigations, contamination testing, minor clearing, establishing site compounds, adjustment to services/utilities etc.) can occur on the lands to be investigated until the relevant archaeological salvage excavation at the nominated site have been completed. This restriction only relates to the specifically identified portion of an archaeological site to be excavated and not the entire archaeological site (unless specified). Construction activities may proceed on the portion of a site not designated for salvage provided they do not impact or impede the archaeological salvage excavation and that the area to be excavated is identified in consultation with the Archaeologist prior to the commencement of those construction activities.
5. Prior to the commencement of early works activity (e.g. fencing, minor clearing, establishing site compounds etc.) a construction heritage site map identifying Aboriginal sites to be excavated must be prepared. The construction heritage site map should be prepared to the satisfaction of Sydney Water.
6. All employees, contractors, subcontractors and agents carrying out early works activities (e.g. fencing, minor clearing, geotechnical investigations, contamination testing, establishing site compounds etc.) must undertake a Project induction (including the distribution of a construction heritage site map). A record of attendance signed by each participant must be kept ensuring participants have an understanding and are aware of the Aboriginal heritage issues affecting the activity.

Areas of Aboriginal archaeological sites and objects to be impacted

7. The areas of archaeological sites and objects identified as being impacted by construction activities are listed in Table 6 of this report and are in accordance with the Project Approval.

Human Remains

8. This management policy does not authorise any damage of human remains.
9. If potential human remains are disturbed the Proponent must follow the procedures outlined in Section 11.2 below.

Salvage Activities

10. Archaeological salvage excavation where appropriate must be carried out in accordance with the methodology specified in Appendix C and the Project Approval.

Involvement of Aboriginal groups and/or individuals

11. Opportunity may be provided to the registered Aboriginal stakeholders to be involved in the following activities:
    a. assist with the salvage excavation.

Conservation of salvaged Aboriginal objects

12. Department of Planning, Industry and Environment (DPIE), as the approval authority, will be consulted;
13. Aboriginal objects will be transferred to the Australian Museum in accordance with legislative requirements, *Australian Museum Archaeological Collection Deposition Policy v1.0 January 2012;*
14. In the event the Australian Museum is unable to accept the objects, the objects will be transferred in accordance with a Care Agreement or similar agreement to an Aboriginal community;
15. In the event that neither the Australian Museum nor the Aboriginal community are able to accept the archaeological objects, the Aboriginal heritage specialists will seek a Care Agreement or similar agreement to curate the objects. The Care Agreement may be made on behalf of Sydney Water.

Reporting requirements

16. A written archaeological excavation report must be provided to Sydney Water within a reasonable period of time in accordance with the Project Approval following the completion of the archaeological program.
17. Site card updates to account for impacts (as part of this project and confirmed during preparation of this assessment) will be lodged with the AHIMS Manager within a reasonable period of time

Notification and reporting about incidents that breach this management policy

18. Incident reporting requirements in accordance with the Project Approval is to include Aboriginal heritage.

11.2 Procedures for handling human remains

- **Note that Project Approvals do not include the destruction of Aboriginal remains**

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 construction activity reveals 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 Project environmental manager on site is to be immediately notified to allow assessment and management;
    i. stop all activities; and
    ii. secure the site.
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 contact DPIE. DPIE will determine the process, in consultation with Heritage NSW as appropriate;
    i. if the remains are identified as Aboriginal, the site is to be secured and DPIE and all Aboriginal stakeholders are to be notified in writing. DPIE will act in consultation with Heritage NSW as appropriate. Heritage NSW will be notified in writing according to DPIE instructions; or
    ii. if the remains are identified as non-Aboriginal (historical) remains, the site is to be secured and the DPIE is to be contacted. DPIE will act in consultation with the Heritage NSW as appropriate. Heritage NSW will be notified in writing according to DPIE instructions;
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.

11.3 Procedure for proposed changes to Approved Projects

Sydney Water recognises that during construction, project design alterations or other changes to the Approved Project may be required.

A proposed change to the Approved Project (such as an alteration of the current design, the location of ancillary facilities) within the project corridor may result in a:

- Reduced impact to Aboriginal cultural heritage; or an
- Increased impact to Aboriginal cultural heritage.

Note: the use of the word impact in this section is defined as an impact on the significance of Aboriginal cultural heritage rather than simply an increased physical impact.

To ensure consistency with the Approved Project and this document any change in the overall impact on Aboriginal cultural heritage will need to be considered. The process to determine consistency is outlined in Section 11.4.1 below.

Where a proposed change to the Approved Project occurs outside of the impact area considered for the EIS further heritage assessment will be required to determine if there would be an impact on Aboriginal cultural heritage and whether this represents a modification to the Approved Project (outlined below).

11.4 Changes in heritage impact

Where the Proponent seeks to make a change to the design and construction of the Approved Project which changes the assessed impact on Aboriginal cultural heritage the Proponent will need to prepare an assessment of the new impacts of this work in consultation with the

appointed Archaeologist. The continued involvement of the Aboriginal stakeholders in this process is outlined in Section 11.5.

New impacts consistent with previously identified impacts

- If a proposed change to the Approved Project is considered to have a neutral or lesser significant impact on Aboriginal cultural heritage than that identified in this document it would be considered a consistent impact.
- If the proposed change is considered to be consistent with the Approved Project Sydney Water may approve the change with no requirements to seek further approval. However, in certain circumstances, further consultation with Aboriginal stakeholders may still be required (see Section 11.5 below).

New impacts inconsistent with previously identified impacts

- If a proposed change to the Approved Project is considered to have a more significant impact on Aboriginal cultural heritage than that identified in the EIS it would be considered an inconsistent impact.
- If the proposed change is considered inconsistent with the assessed impact on Aboriginal cultural heritage, as detailed in the Project Approval, Sydney Water would require an amendment to the mitigation measures agreed in this report. If this proposed change is considered inconsistent with the Approved Project Sydney Water may require a modification of the Approved Project. Further consultation with Aboriginal stakeholders will be undertaken (see Section 11.5 below).

11.5 Process for continued consultation with Aboriginal stakeholders

The extent to which Sydney Water will continue to consult with Aboriginal stakeholders is dependent upon the level of impact and whether the area was assessed as part of the EIS. The types of potential impacts are identified as reduced/neutral impacts, increased impacts or unknown impacts.

a) Reduced or neutral impact
If as a result of alterations to the project design a previously identified impact to an Aboriginal heritage item is reduced or neutral then no further consultation is required.

If as a result of alterations to the project design an impact to an Aboriginal heritage item is proposed that results in a reduced impact on the overall heritage significance of the impact assessment area (i.e. the cumulative impact is reduced), then further consultation with Aboriginal stakeholders will be undertaken. This consultation may entail a phone call and phone log of comments received or the provision of a report for comment (10 working days).

b) Increased Impact
Where as a result of alterations to the project design an impact on Aboriginal heritage is considered to be greater than identified by the Approved Project further consultation will be undertaken. This consultation will either entail a phone call and phone log of comments received or the provision of a report for comment (10 working days).

c) Unknown impacts: Assessment process
Where a proposed change is an area located outside of the impact area assessed as part of the Approved Project the impact on Aboriginal cultural heritage is considered to be unknown. This

area would require preliminary assessment to determine any impacts upon Aboriginal heritage. Should no impacts be identified then no consultation with Aboriginal stakeholders is required. Should potential impacts be identified consultation with Aboriginal stakeholders will be undertaken. This consultation will entail the provision of a report for stakeholder comment (10 working days) detailing the impacts and mitigation strategies proposed.

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Appendix A - Advertisement for registration of interest

Notice for Registration of Interest

Sydney Water is proposing new wastewater infrastructure to service growth in the South West Growth Area and the Western Sydney Aerotropolis Growth Area in western Sydney, NSW. The proposal is located across the Wollondilly, Penrith, Liverpool, Fairfield and Canterbury-Bankstown local government areas. The proponent is Sydney Water (Matt Dignam, Senior Project Manager, Level 10, 1 Smith Street, Parramatta NSW 2150).

The proposal is State Significant Infrastructure subject to assessment and approval under the NSW Environmental Planning and Assessment Act 1979. The purpose of this consultation is to inform the preparation of an Environmental Impact Statement for the proposal in accordance with Secretary's Environmental Assessment Requirements to be issued by the Department of Planning, Industry and Environment (DPIE), and to assist DPIE in its consideration of the proposal.

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

Kelleher Nightingale Consulting
Level 10, 25 Bligh Street
Sydney NSW 2000
phone 9232 5373

The closing date for registration is 30 April 2020.

Please be advised that in accordance with DPIE 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 DPIE office and Local Aboriginal Land Council(s). If you are registering your interest, please let us know if you do not want your details forwarded to these organisations.

Appeared in:
Sydney Morning Herald, Thursday 16 April 2020.

Appendix B - Aboriginal Community Comments

INDIGENOUS SERVICES PTY LTD
Contact: Carolyn Hickey
[redacted]
A: 10 Marie Pitt Place, Glenmore Park, NSW 2745
ACN: 639 868 876

Hi Zac,
I have reviewed the project information and support the assessment Methodology.

I would like the proponent and Kelleher Nightingale to consider including A1's, Kawalkan youth employees for all future field work.
The Kawalkan Youth Program is a designed program created to employ young indigenous youths between the ages of (18-29) years of age.

OUR MISSION

Building strength in aboriginal families, communities and services.

It is our mission to commit to an innovative approach to a better future for our indigenous youth.

Giving our youth the opportunity to be employed or gain work experience in a culturally sensitive work environment also giving our youth the opportunity to work on country and continue the tradition of passing down

Cultural knowledge from one generation to the next – continuing the importance of keeping culture.

Kind Regards,
Carolyn Hickey

ARAGUNG

33 Bulolo Dr Whalan NSW 2770

[redacted]

Aboriginal Cultural Heritage Site Assessments

Protecting the Past Preserving the Future

05/05/2020

Zac Tomas

Kelleher Nightingale Consultants

RE: UPPER SOUTH CREEK WASTEWATER TREAMENT INFRASTRUCTURE

NOTIFICATION OF RESPONSE TO PROJECT INFORMATION AND METHODOLOGY

Dear Zac

I am writing to you in response to the above mention project. Having worked extensively in and around the the proposed archaeological study area for many years as an Aboriginal site Officer, I believe that the proposed developments will impact on Aboriginal objects, and culturally significant places.

With a strong cultural connection to the waterways associated with the study Area and as an Aboriginal Darug community member I believe that I may hold relevant cultural knowledge to determine the significance of Aboriginal objects and places in this area.

As the Proposed project area is situated closely to waterways, these area would have been highly value for their natural resources. And used by both Durug Aboriginal People and neighbouring Aboriginal people of the past.

With evidence of Archaeological Deposits – Artefacts – and open sites found during previous Archaeological investigations around these area, it is with my strong Aboriginal spiritual feeling that these area would have been occupied by Darug Aboriginal people of the past and may have been a possible meeting place, trading place and ceremony place used by Neighbouring Clans.

Given the extensive association of waterways and creeks related to the proposed project area, the area can be considered to be of highly cultural significant. Naturally occurring land forms, creeks and rivers have always held deep cultural heritage values through song lines – or as cultural clan boundary markers. The same creeks and river are held with great respect by Aboriginal People to this day.

I have reviewed the proposed project information and methodology in the report provided and agrees with the recommendations put forward. It is within all of my utmost cultural interest that I would like to be involved in all aspects of the proposed project by offering my cultural understanding of the area my connection to country and my cultural feedback as a local Indigenous person. Should you require any further information from me please do not hesitate to contact me.

Aragung Aboriginal Cultural Heritage Site Assessments has a team of four Indigenous site officers who are highly experience in Aboriginal archaeological field excavation, are physical fit, and can conduct their work duties in a safe and productive way. Should filed work or archaeological Aboriginal heritage site surveys be required? Attach to this email is my current insurance (certificate of Currency and workers Compensation insurance)

Contact detail nominated person

Jamie Eastwood

[redacted]

Yours sincerely

Cubbitch Barta Native Title Claimants
Aboriginal Corporation
55 Nightingale Road,
PHEASANTS NEST. N.S.W. 2574
11th May, 2020.

Kelleher Nightingale Consulting Pty Ltd.
Level 10, 25 Bligh Street,
SYDNEY. N.S.W. 2000.

Dear Zac,

RE; UPPER SOUTH CREEK
WASTEWATER.

Thank you for the information in regards to the methodology for this proposed project. The information provided does not give me any plans or maps of the proposed project. It talks about the project information, but nothing else. There is not enough information for me to make an informed comment on this project.

Consultation is not only about cultural input, but it should also include the planning of these big projects. This is the first that I have received anything about it, and I would be sure that all the planning has already been done with no consultation with Aboriginal people.

I am concerned about more sewerage water going into the Nepean River, and the Warragamba River has also been mentioned. As far as I am aware this is a first, but the Warragamba joins the Nepean, so it is cumulative. This is a cultural issue for all Aboriginal people, and we should have the right to talk about it before now. This is not just about the sites, it is about the land and water, cultural landscapes. This is about harm to the County, not just the "objects".

How are we supposed to provide any information, without having the knowledge of the whole project. This project would appear to cover a large area, and all the information that is given to us, is virtually a two page document. If you want an informed comment, then firstly we need more information, and to be also involved in any survey of the area. This document suggests that the survey may have already taken place.

Yours faithfully,

G. Chalker.

Glenda Chalker
Phone/Fax 0246841129 [redacted]
[redacted]

DARUG CUSTODIAN
ABORIGINAL CORPORATION

DARUG CUSTODIAN
ABORIGINAL
CORPORATION

PO BOX 81 WINDSOR 2756
PHONE: 0245775181 FAX: 0245775098
MOBILE: [redacted] Justine Coplin
EMAIL: [redacted]

Attention: KNC **Date:** 25052020

Subject: project information and proposed assessment methodology Upper South Creek wastewater treatment infrastructure project

Dear Zac

Our group is a non- profit organisation that has been active for over forty years in Western Sydney, we are a Darug community group with over three hundred members. The main aim in our constitution is the care of Darug sites, places, wildlife and to promote our culture and provide education on the Darug history.

Our group promotes Darug Culture and works on numerous projects that are culturally based as a proud and diverse group. It has been discussed by our group and with many consultants and researches that our history is generic and is usually from an early colonists perspective or solely based on archaeology and sites. These histories are adequate but they lack the people's stories and parts of important events and connections of the Darug people and also other Aboriginal people that now call this area home and have done so for numerous generations.

This area is significant to the Darug people due to the evidence of continued occupation, within close proximity to this project site there is a complex of significant sites.

Landscapes and landforms are significant to us for the information that they hold and the connection to Darug people. Aboriginal people (Darug) had a complex lifestyle that was based on respect and belonging to the land, all aspects of life and survival did not impact on

the land but helped to care for and conserve land and the sustenance that the land provided. As Darug people moved through the land there were no impacts left, although there was evidence of movement and lifestyle, the people moved through areas with knowledge of their areas

and followed signs that were left in the landscape. Darug people knew which areas were not to be entered and respected the areas that were sacred.

Knowledge of culture, lifestyle and lore have been part of Darug people's lives for thousands of years, this was passed down to the next generations and this started with birth and continued for a lifetime. Darug people spent a lifetime learning and as people grew older they passed through stages of knowledge, elders became elders with the learning of stages of knowledge not by their age, being an elder is part of the kinship system this was a very complicated system based on respect.

Darug sites are all connected, our country has a complex of sites that hold our heritage and past history, evidence of the Darug lifestyle and occupation are all across our country, due to the rapid development of Sydney many of our sites have been destroyed, our sites are thousands of years old and within the short period of time that Australia has been developed pre contact our sites have disappeared.

The *Aboriginal cultural heritage consultation requirements for proponents* Section 4.1.8 refers to "Aboriginal organisations representing Aboriginal people who hold cultural knowledge". Recent consultation meetings have revealed that many of these Aboriginal organisations and individuals do not hold cultural knowledge of the Western Sydney area. The increasing involvement of such parties in cultural heritage management means that genuine local Aboriginal organisations are unable to properly care for our cultural heritage.

Many Aboriginal organisations listed in the OEH response letter do not contribute to the Aboriginal community of Western Sydney. Individuals listed in the OEH response letter do not represent the community and while they may be consulted with, should not be employed for their own personal financial benefit.

Our organisation is committed to providing benefits back to our local Aboriginal community through such measures as funding the local Aboriginal juniors' touch football team, painting classes for the local children and donating money to various charities. Employment in cultural heritage activities is source of income that organisations such as ours can use to contribute to beneficial activities and support within the community.

Darug custodian Aboriginal Corporation's site officers have knowledge of Darug land, Darug Culture,Oral histories, landforms, sites, Darug history, wildlife, flora and legislative requirements. We have worked with consultants and developers for many years in Western

Sydney (Darug Land) for conservation, site works, developments and interpretation/education strategie

Darug Custodian Aboriginal Corporation have received and reviewed project information and proposed assessment methodology Upper South Creek wastewater treatment infrastructure project

We support the recommendations set out in this report.

Please contact us with all further enquiries on the above contacts.

Regards

Justine Coplin

We acknowledge and pay respect to the Darug people,the traditional Aboriginal custodians of this land.

Zac Thomas

From: Stephen Fields <dhinawan.ch@gmail.com>
Sent: Sunday, 24 May 2020 11:25 AM
To: Zac Thomas
Subject: Re: Project Info & Methodology Letter - 1929 Upper South Creek Wastewater Treatment Infrastructure - DCH

Hi Zac,

Thank you for the opportunity to review the project information and proposed assessment methodology paper for the Upper South Creek Wastewater Treatment Infrastructure project.

.Our organisation agrees with the assessment methodology outlined in the report.

Please let me know if you require anything further.

Regards,

Stephen Fields
Director
Dhinawan Culture and Heritage
[redacted]

Zac Thomas

From: Robert Slater <Galamaay@hotmail.com>
Sent: Sunday, 3 May 2020 9:42 AM
To: Zac Thomas
Subject: Re: Project Info & Methodology Letter - 1929 Upper South Creek Wastewater Treatment Infrastructure - GCC

Dear Zac

Galamaay Cultural Consultants supports the methodology for this project

Thanks
Robert Slater

Zac Thomas

From: philip khan <philipkhan.acn@live.com.au>
Sent: Wednesday, 13 May 2020 12:43 PM
To: Zac Thomas
Subject: RE: Project Info & Methodology Letter - 1929 Upper South Creek Wastewater Treatment Infrastructure - KYWG

Hi Zac,

Thank you for your report, we agree and support your methodology regarding 1929 Upper South Creek Wastewater Treatment Infrastructure.

We look forward to working on this project with you and your team.

Thanks
Philip

Zac Thomas

From: Ryan Johnson <murrabidgeemullangari@yahoo.com.au>
Sent: Tuesday, 12 May 2020 12:43 PM
To: Zac Thomas
Subject: RE: Project Info & Methodology Letter - 1929 Upper South Creek Wastewater Treatment Infrastructure - MBMAC

Hi Zac,
I have read the project information and methodology for the above project, I endorse the recommendations made.
Thanks
Darleen 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

Note: Privileged/Confidential information may be contained in this message and may be subject to legal privilege. Access to this e-mail by anyone other than the intended is unauthorised. If you are not the intended recipient (or responsible for delivery of the message to such person), you may not use, copy, distribute or deliver to anyone this message (or any part of its contents) or take any action in reliance on it. In such case, you should destroy this message, and notify us immediately. If you have received this email in error, please notify us immediately by e-mail or telephone and delete the e-mail from any computer. If you or your employer does not consent to internet e-mail messages of this kind, please notify us immediately. All reasonable precautions have been taken to ensure no viruses are present in this e-mail. As our company cannot accept responsibility for any loss or damage arising from the use of this e-mail or attachments we recommend that you subject these to your virus checking procedures prior to use. The views, opinions, conclusions and other informations expressed in this electronic mail are not given or endorsed by the company unless otherwise indicated by an authorized representative independent of this message.

Zac Thomas

From: Muragadi <muragadi@yahoo.com.au>
Sent: Tuesday, 12 May 2020 2:13 PM
To: Zac Thomas
Subject: RE: Project Info & Methodology Letter - 1929 Upper South Creek Wastewater Treatment Infrastructure - MHIC

Hi Zac,
I have read the project information and methodology for the above project, I endorse the recommendations made.
Thanks
Jesse Carroll Johnson

Waawaar Awaaa Aboriginal Corporation

08/05/2020

Zac Thomas
Kelleher Nightingale Consulting Pty Ltd
Level 10, 25 Bligh St
SYDNEY NSW 2000

Dear Zac,

Waawaar Awaaa Aboriginal Corporation **supports** the proposed methodology report for the proposed Upper South Creek wastewater treatment infrastructure project.

regards

Rodney Gunther
Director
Waawaar Awaaa Aboriginal Corporation
[redacted]
Waawaar.awaa@gmail.com

Zac Thomas

From: yurrandaali_cs@hotmail.com
Sent: Tuesday, 12 May 2020 12:32 PM
To: Zac Thomas
Subject: Re: Project Info & Methodology Letter - 1929 Upper South Creek Wastewater Treatment Infrastructure - Yurrandaali

Dear Zac

I on behalf of Yurrandaali Pty Ltd agrees with the methodology for this project

Thanks
Bo Field

Zac Thomas

From: [redacted]
Sent: Sunday, 9 May 2021 8:09 PM
To: Zac Thomas
Subject: Re: Draft CHAR Review - 1929 Upper South Creek Advanced Water Recycling Centre [redacted]

Hello Zac
We agree with report

Cheers
[redacted]

Zac Thomas

From: [redacted]
Sent: Monday, 10 May 2021 10:59 AM
To: Zac Thomas
Subject: Re: Draft CHAR Review - 1929 Upper South Creek Advanced Water Recycling Centre [redacted]

Hey Zac
We agree with review.

Kind regards
[redacted]

Cubbitch Barta Native Title Claimants
Aboriginal Corporation
55 Nightingale Road,
PHEASANTS NEST. N.S.W. 2574.
20th May, 2021.

Kelleher Nightingale Consulting Pty Ltd.
Level 10, 25 Bligh Street,
SYDNEY. N.S.W. 2000

Dear Zac,

RE; UPPER SOUTH CREEK
RECYCLING

Thank you for the opportunity of commenting on the proposed project by Sydney Water. I do not believe that a field survey based on a desktop assessment is satisfactory, which identifies sensitive landforms to be carried out. This is a large project and the whole of the project area should have been surveyed. There are 26 registered stakeholders, and only Gundangarra and Deerubbin LAL'e participated in the SAMPLING survey.
I also note that the area around Wallacia is in the Tharawal LALC and they did not participate. This is not only a large project, but has very little information about the whole of the project. I made the comment about the lack of good mapping in 2020, and this document is no different. Little maps with little information to be able to make informed recommendations. There is not enough detail.

Why were there at least two test excavations carried out prior to this document of May 2021. Who participated in those test excavations? The only excavations that we participated was a salvage at the Cecil Hills reservoir in 2020 with KNC. The first I knew of this project was in May 2020, to which I responded. I don't believe that I have had any further correspondence to now. The response to my letter of May 2020 on page 31, "representatives from the stakeholder groups participated in the test excavation program" It would appear that one test excavation was carried out in June and July 2020, with no knowledge or participation by Cubbitch Barta. There is no mention of test excavations to be carried out or any methodology for them in the letter dated 1st May, 2020. The date of my response was the 11th May, 2020

The areas that have been identified as sites or PAD's on the maps provided have extensive areas in between each of these locations. Why wasn't the whole length of the pipeline and associated works surveyed
The response that Sydney Water is working towards the inclusion of cultural values of water as part of the CHAR, is too late once the destruction has taken place over seventeen kilometres of a possible forty metre wide corridor.

In regards to the management options, item 4, why isn't the whole of the archaeological area have restrictions placed upon it. Does this mean that other secondary impacts can occur outside of the proposed AHIP area.

Any written archaeological excavation report must also be provided to all registered stakeholders, not just Sydney Water, as on Page 59. There is no mention of what will be the procedure or protocols for artefacts excavated.

On page 61, states in the last paragraph that a report for stakeholder comment will be (10days), it is insufficient time for anyone to satisfactorily reply to any report.

The proposed archaeological program as mentioned on page 67, has already begun with no consultation with the whole of the registered stakeholders. The phase 1 excavation methodology is for hand excavation in stratigraphic units. This should apply to all phases, including open salvage areas. There should be no bulk excavating carried out at all. There is no information in answering the research questions by bulk excavating, apart from how many artefacts came out of which hole. It should all be done stratigraphically.

Any historic artefacts should also be collected as part of this project. In my previous letter of the 11th May, I was concerned about the use of two culturally significant rivers for recycled water to be dumped in. I am aware that there are other locations along the river where this is already happening, talk about cumulative affect. Perhaps Water NSW needs to look at the impact of recycled sewerage water can have on the flood plains during a flood event, and leave Warragamba dam alone.

Once again traditional custodians are left out of the planning stage, and are meant to pick up the pieces that are left over, or just be excluded from the process altogether.

Yours faithfully,

G Chalker

Glenda Chalker

[redacted]

Zac Thomas

From: philip khan <philipkhan.acn@live.com.au>
Sent: Wednesday, 19 May 2021 9:42 AM
To: Zac Thomas
Subject: Re: Draft CHAR Review - 1929 Upper South Creek Advanced Water Recycling Centre - KYWG

Follow Up Flag: Follow up
Flag Status: Flagged

Dear Zac,

Thank you for your CHAR for Upper South Creek Advanced Water Recycling Centre. I have assessed your report and believe that the study area is a highly sensitive area for the Aboriginal people. There are main water ways that are used by Aboriginal people. It was utilized for food and resources, ceremonies and also would have camped in the area. We hold a spiritual connection to the land and all that she holds. We would like to support your report and we look forward to working alongside you on this project.

Kind Regards

Kadibulla Khan

Zac Thomas

From: Rodney Gunther <waawaar.awaa@gmail.com>
Sent: Tuesday, 1 June 2021 4:14 PM
To: Zac Thomas
Subject: Re: Draft CHAR Review - 1929 Upper South Creek Advanced Water Recycling Centre - WAAC
Attachments: [redacted]

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Zac,

Waawaar Awaa Aboriginal Corporation supports the draft ACHAR for the Upper South Creek advanced water recycling centre project and the proposed salvage excavation (Table 8) to mitigate the impacts to ACH.

Waawaar Awaa Aboriginal Corporation were not invited to participate in the testing excavations however we request active involvement and participation in the salvage fieldwork proposal.

Attached are relevant insurances.

regards

Rodney Gunther

Appendix C - Salvage Excavation Methodology

Methodology

Research Aims

The main aims of the proposed salvage excavation program are:

- To salvage a representative sample of identified archaeological sites prior to development impact.
- To analyse the salvaged archaeological material to gain and conserve knowledge and understanding of the scientific and cultural information exhibited by the activities associated with ridgelines and along major water courses in the region.
- To use the excavation results to gain insight into the subsurface archaeology of the adjacent areas not being impacted by the proposal. This would increase future educational opportunities and allow more informed management of Aboriginal heritage.

The further scientific aim of the salvage excavation program would be to determine the subsurface integrity, extent, spatial distribution and nature of the cultural deposit and the specific types of associated archaeological/cultural activities.

- Determining the integrity of the deposit involves assessing the degree of disturbance which is present.
- Determining the statistical extent of the sites and/or activity areas involves identifying the boundaries associated with the identified archaeological deposit.
- Assessing the spatial distribution involves identifying the presence/absence of archaeological material across the identified archaeological sites.
- The nature of the sites refers to the type of activities indicated by the artefactual material (e.g. primary production, domestic knapping, hunting camps). The goal would be to retrieve entire assemblages from specific activities if such activities were present.
- Retrieved assemblages would be compared with the results from other relevant archaeological projects in order to assess significance.

Research Questions

The results of the proposed salvage excavation would increase our understanding of subsurface archaeology of the impact assessment area. In particular, research would focus on the archaeologically identifiable cultural activities that took place on landforms within the Hinchinbrook Creek, Nepean River and Wianamatta/South Creek catchments.

Question 1: Are cultural activities archaeologically identifiable within the Nepean River catchment area at Aboriginal archaeological sites: Baines Creek Wallacia AFT 1, Bents Basin Road Wallacia AFT 1 and Wallacia Weir AFT 1? What cultural activities are archaeologically identifiable and are there any differences in the identifiable activities at these locations?

Question 2: Are cultural activities archaeologically identifiable within the Wianamatta/South Creek catchment area at Aboriginal archaeological sites: Elizabeth Drive AFT 1, Elizabeth Drive/Adams Road AFT 1, TNR AFT 15 and Fleurs1 Fleurs Radio Telescope? What cultural activities are archaeologically identifiable and are there any differences in the identifiable activities at these locations?

Question 3: What cultural activities are archaeologically identifiable within the Hinchinbrook Creek catchment area at sites: P-CP12 and PAD-OS-5? Are there differences in activities between these three locations?

Question 4: Do the artefact assemblages from the Aboriginal archaeological sites differ between the sites located within Hinchinbrook Creek, Nepean River and Wianamatta/South Creek catchments? Are there differences in raw material or artefact type and how do these differences compare to other sites in the vicinity and the wider region?

Question 5: What are the taphonomic features of the Aboriginal archaeological sites and what does this indicate about site integrity and artefact survivability for similar landforms?

What can we expect?

It is anticipated that differences in stone tool assemblages may be related to different cultural activities (e.g. primary reduction vs maintenance flaking). The science of archaeology is paramount to any research question and it is important to stress that the goal for the salvage program for all excavated sites is straight forward: to retrieve a viable sample for comparative analysis using established techniques (see Field Methods below). In this regard interpretation would not precede data collection. The proposed archaeological program would systematically sample the relevant area using standard techniques with the outcome being a viable, robust and comparable sample. Analysis of the sample would follow and interpretations would be made distinctly separate from the results.

Archaeological Salvage Areas

Salvage excavation would be undertaken at Aboriginal archaeological sites:

Baines Creek Wallacia AFT 1, Bents Basin Road Wallacia PAD 1, Elizabeth Drive/Adams Road AFT 1, Elizabeth Drive AFT 1, Fleurs1 Fleurs Radio Telescope, P-CP12, PAD-OS-5, TNR AFT 15 and Wallacia Weir AFT 1. Salvage excavation of the sites and areas of PAD would focus on the extraction of collections of artefacts related to activity areas and geomorphic information.

Historical Heritage

Historic heritage within the impact area has been assessed in a separate specialist report. Several of the proposed archaeological salvage excavation areas intersect locations of known historic heritage significance. Archaeological salvage excavations in these areas must be undertaken in consultation with the approved historic heritage specialist and relevant government agencies as required. Likewise, any historical heritage excavation must be undertaken in consultation with the approved Aboriginal heritage specialist and relevant government agencies as required.

The archaeological salvage excavations for Aboriginal heritage will be purposefully located outside of any known physical locations of historic objects. If archaeological salvage excavations for Aboriginal heritage need to be undertaken within the physical locations of historic objects, excavations in these areas may need to be monitored by historic heritage specialists.

The archaeological salvage excavations for Aboriginal heritage will desist if significant or potentially significant historic heritage is encountered.

FIELD METHODS

The goal of the field excavation program is to recover significant assemblages of artefacts

Salvage Program

In order to achieve the most robust and comparable result, KNC advocates an open area salvage excavation. The first phase in open area salvage is to establish the statistical boundaries of the archaeological deposit. In other words, recording the spread of activities across the site/landscape. This approach is designed to salvage the spatial properties of the site as shown in the lithic continuum.

Phase 1

A series of 1 m^2 squares are excavated on a transect grid at 15 metre intervals overlain on each site to mark the spread of lithics and related geomorphic activity.

GDA 94 coordinates would be recorded for each square to enable three dimensional modelling. Statistical salvage following this method is highly beneficial because it creates a robust inter-site sample, sufficiently random, critical for regional comparative analysis. No other method is as efficient or effective. It is anticipated that a minimum of 10 m^2 would be excavated within each site during Phase 1.

Individual excavation squares measuring 1 m^2 would be hand excavated in stratigraphic units (Unit A, Unit B, etc.). Squares would be excavated until the basal layer or culturally sterile deposit is reached (usually 25-35 cm). Previous excavation of the podzolic soils associated with the area indicates no archaeological stratigraphy within units. As such the A1 and A2 soil layers are culturally one layer (suffering from cyclical soil transfer resulting in a mixed cultural profile within the soil) and can be salvaged as one unit where possible. All excavated deposit would be sieved using nested 5.0 mm and 2.5 mm sieves. Where potential micro-debitage is recovered 1.0mm sieves will be utilised.

The location of each excavated square would be identified on a surveyed plan of the site. Stratigraphic sections detailing the stratigraphy and features within the excavated deposit would be drawn and all squares would be photographed. Soil samples as well as thin section profiles (where feasible) would also be collected. The stratigraphy of all excavated areas would be fully documented and appropriate records archived.

Phase 2

Open area salvage of significant deposit follows the Phase 1 assessment. Additional 1 m^2 squares, constituting an open area, will be excavated around information bearing deposits along the excavation grid. Information bearing deposits are identified by triggers such as: significant quantities of artefacts, variations in raw material, unusual artefacts, chronological material and/or taphonomic indicators. In this context chronologic material is anything that can be used to date artefacts or deposit: charcoal or charcoal bearing deposit (e.g. hearth ash), sandy deposit, gravels (e.g. aluminium feldspar). Phase 2 open area investigation would expand to encompass entire activity areas. The location of Phase 2 open area investigation would be based on Phase 1 results.

Where possible, carbon samples will be collected and analysed for material relating to both the archaeology and geomorphology. Where appropriate cosmogenic and radiometric dating of soils and rock surfaces will be applied (Nishiizumi et al. 1986, 1993).

Analysis

Artefacts would be analysed on a comparable level with previous analyses of excavated assemblages. Information derived from this analysis; in particular the identification of specific artefact types and their distributions and associations; would be used to put together interpretations about how sites were used, where sites were located across the landscape, the age of sites and to assess cultural heritage values. By comparing different areas it would be possible to determine whether there were differences in the kinds of activities carried out and if different activities were related to different landforms.

A range of stone artefacts may be present across the salvage areas and the analysis would expand accordingly to account for artefact variability. All information would be recorded in database form (MS Excel). Various types of evidence would be used to determine the kinds of activities that were carried out. A short description of the proposed analysis in outlined below.

- Field analysis would record basic data, such as material type, number and any significant technological characteristics, such as backing or bipolar techniques; added to this would be any provenance data such as pit ID and spit number. The purpose of the field recording is twofold: 1) establish a basic recording of artefacts retrieved and 2) to allow on-going assessment of the excavation regime (e.g. whether higher stratigraphic resolution is required while digging).
- Detailed (laboratory) analysis would entail recording a larger number of characteristics for each individual artefact. These details would be recorded in matrices suitable for comparative analysis (e.g. multivariate and univariate) of the excavated assemblage on a local and regional basis.
- Lithic characteristics to be recorded cover a range of basic information but are not limited to these categories (see example below). For transparency, terms and category types would in large part be derived from Holdaway and Stern (2004).

Sample Categories		
Record Number	% Cortex	Flake Type
Pit ID	Length	Termination Type
Spit Number	Width	Core Type
Count	Thickness	Number of Scars (Core)
Raw Material	Weight	Scar Type (Core)
Colour	Modification	Shape of Flake
Quality	Reduction Type	Platform Type

- A detailed explanation and glossary would be provided with the final excavation report.
- Minimum Number of Flake (MNF) calculations formulated by Hiscock (2000, 2002) would be undertaken where applicable (although past experience indicates MNF calculations would not be required for this excavation program).

The analysis of artefacts recovered during the excavation program would be undertaken in a transparent and replicable fashion so as to permit the comparison of the entire excavated assemblage with data from other areas. This would also allow for an interpretation of the impact assessment area's archaeological significance.