Legend

Study area

Landforms

Creekline

Crest

Hill slope

Figure 6 Landforms within the study area

0 50 100 150 200

Metres

Scale: 1:4,000 @ A3

Coordinate System: GDA 1994 NSW Lambert

N

Biosis Pty Ltd

Albury, Ballarat, Melbourne,
Newcastle, Sydney, Wangaratta & Wollongong

Matter: 30437
Date: 21 October 2019,
Checked by: SJK, Drawn by: LW, Last edited by: amurray
Location:P:\30400s\30437\Mapping
30437_AR_F6_Landforms

Acknowledgements: Basemap © Land and Property Information 2016

3.1.4 Landscape resources

The Coastal Plain of the Illawarra region provides a number of resources used by Aboriginal inhabitants. The geology of the region provides an abundant supply of raw materials. Quartz is the main stone raw-material type suitable for Aboriginal tool manufacture that is likely to occur in the vicinity of the study area in any abundance. This would have been available locally and also from trading with other groups (Donlon & Sefton 1988, p.23). Igneous material would have come from the south of the study area in areas like Gerringong (Donlon & Sefton 1988, p.55) due to its volcanic nature. Some of the other fined grain siliceous material may have come from the Cumberland Plain. Silcrete cobbles are known to have occurred along the Cumberland Plain (McDonald 1992), to the north of the study area. Elsewhere on the Plain, the potential raw materials for stone artefact making include silicified wood, tuff, mudstone, quartz, quartzite and basalt. River gravels and cobbles containing silcrete, chert, and other fine grained volcanic rocks were also used (Attenbrow 2010). While previous archaeological work within the region has not identified any specific stone sources, the presence of the volcanic Dapto Latite Member in the region may have provided a suitable source of raw material, providing lithic material for stone axes. Resources would have been accessible in the outcrops of siltstone, shale and tuffaceous sandstones of the Berry Siltstone formation.

Aerial imagery and vegetation mapping undertaken by the National parks and Wildlife Service (NPWS) shows that the study are has been cleared of native vegetation; however, native vegetation communities in the vicinity of the study area and around Lake Illawarra would have been comparable to vegetation found in the study area prior to clearing. These vegetation communities include

- Lowland Woollybutt–Melaleuca Forest located on flat low-lying Shoalhaven Group sediments at elevations between 10 and 35 metres above sea level. It is characterised by the presence of Woolybutt (*Eucalyptus longifolia*), Stringybark (*E. globoidea/E. eugenioides*), and Honey Myrtle (*Melaleuca decora).*
- Coastal Swamp Oak Forest occurring in estuarine environment that include low-lying areas of coastal floodplain and the fringes of lakes and lagoons. Common and abundant species that occur include Swamp Oak (*Casuarina glauca*), Common Reed (*Phragmites australis*), and various sedges

A number of these plant species would have been used by Aboriginal groups to make various wooden implements. Wood from the Swamp Oak was used to make tools such as nulla nullas, while the bark was removed and made into canoe hulls (Robinson 1991, p.152).

Local Aboriginal groups would have had access to an abundant range of marine, terrestrial and avian species present in the coastal resource zone which would have provided a variety of uses. Marine animals such as cockles, lobster and periwinkles were eaten (Wesson 2009). Abalone and stingrays were also used to make fish hooks and tools in addition to their use as a food source (Wesson 2009). Terrestrial species on the coastal plain, such as kangaroos, possums and wombats would have been exploited for food and to make cloaks, and tools (Attenbrow 2010). Avian species were used as a food source, and in the case of the pelican and black duck were often totem animals for Aboriginal groups (Wesson 2009).

3.1.5 Land use history

Within the proposed study area, soil disturbance is associated with historic pastoral land-use practices and recreational usage. The entire area between Koonawarra and Yallah bays have been subjected to extensive grazing and agricultural practices from the 1880s onwards. As well as vegetation clearing for pasture and agriculture, other land disturbances within the property include construction of the high voltage transmission lines and towers; recreational usage resulting in impact trails particularly by trail bikes and pedestrian traffic in the low lying areas along the foreshore.

Although these past land activities caused disturbances, they may have impacted only the surface contexts of any existing Aboriginal archaeological site; it is unlikely that they would have destroyed sites. Clearing of the

land would have most likely removed any native culturally modified trees that were originally present in the study area.

3.2 Previous archaeological work

The majority of South Coast sites date to the last 6,000 years when the sea-level stabilised following the last ice age. Prior to this, sea-levels were lower and the coast-line was located approximately 14 kilometres to the east of its current position. Coastal sites older than 6,000 years are rare, as most would have been inundated by the rising sea. Pleistocene-aged Aboriginal sites on the South Coast include Bass Point, dated at 17,010+/-650 BP (ANU-536) (Bowdler 1970, p.254) and Burrill Lake rock shelter, dated at 20,830+/-810 BP (ANU-138) (Lampert 1971, p.122). Test excavations undertaken at the Wollingurry Point midden dated the site to 3360 +/- 90 years BP (Navin Officer 1987, p.104)

Several studies of site patterns and distribution have been completed for the Illawarra and South Coast. Regional overview (Figure 7).

Sefton's (1984) study formed part of the Local Environmental Study prior to the Stage 1 of the West Dapto Release Area (WDRA) development in Horsley, north of the study area. A copy of the Sefton's report could not be obtained, but the review was revised from the AMBS study (2006).

The following key elements constitute Sefton's site predictive model of the WDRA:

- Archaeological sites at Bass Point provide evidence of Pleistocene occupation, and there is no evidence to suggest West Dapto could not have been occupied at this time.
- It is possible that stratified occupational deposit could be located in the Pleistocene sediments of the flood plains at West Dapto. Stratified occupational deposit of Holocene age is also likely (and more possible) to occur in the floodplain sediments.
- Ethnohistorical records suggest two major zones of exploitation: (1) the coastal zone, including the shoreline, off shore islands and Lake Illawarra; and (2) the inland zone, including undulating tablelands. Groups who used both areas were small, mobile, and associated with a locality, but also ranged over larger areas. On this basis, it could be expected that the West Dapto area could have been exploited from both east and west directions, in addition to tracks along ridgelines.
- The Lake Illawarra shoreline presents restricted areas for campsites relative to the concentrated resources. Midden sites may not represent base camps (occupation sites) but instead preferred sites for resource exploitation. These preferred sites are expected to occur within two kilometers of the Lake Illawarra shoreline, and would have been established around the lake shore.
- The resources of West Dapto (flora, fauna, available water) would have made the locality attractive to occupation and exploitation. However, resources would have been scattered and at low density in comparison to the lake, and the locality was probably not economically self-contained. Base camps would not have been suitable for exploitation of these resources.
- Stone materials are not sourced within the area, with the exception of latite cobbles and occasional quartz pebbles. Consequently, stone would have been conserved at camp sites.
- Tracks connecting the coast to the interior would be expected through the West Dapto area, due to its geographic location between the two. Aboriginal tracks are usually along ridges, and consequently, sites could be expected in the saddles of ridges.
- Along the eastern coastal plain and the foothills of the escarpment to the west, sites are likely to occur on ridgelines or on dry level land within 100 metres of a creek line.

- In the foothills of the Escarpment to the west, sites may also occur further away from water on saddles of the Marshall Mount spur and on level areas of smaller ridgelines along the escarpment slopes and foothills.
- Extractive sites will also be located in West Dapto. These would occur as scarred trees, isolated large cores, tools of latite or small isolated stone artefacts. These sites may occur in all landform contexts, although scarred trees could only be identified in areas where trees have not been fired or cleared.
- It is not expected that latite quarry sites will occur at West Dapto. Although these tools have been located in adjacent areas on the shores of Lake Illawarra, those tools have been prepared from pebbles or cobbles and not from quarried materials (AMBS 2006, pp.87–88).

The following four areas were identified in WDRA as having high archaeological potential:

- All level areas of the Western foothills zone and the Coastal Plain within 100 metres of a creek located on:
  - Quaternary deposited flood plains.
  - Budgong Sandstone.
  - Berry Siltstone.
- Saddles on the ridges of Marshall Point spur.
- Level areas in the Forest Creek Valley in the Escarpment Protection Zone.
- Level areas of the escarpment slopes on the topographic benches and bluffs.

Three main categories of sites being of potential significance were also identified:

- Stratified occupational deposits: may occur in the flood plain deposits of West Dapto, these deposits would have significant research potential and would be rare. Such a site may contain stone artefacts, food refuse and charcoal, which could be dated to establish a chronology of occupation of West Dapto. This would be significant to the public and be of educational significance. If the site were of Pleistocene age, it would be of major heritage significance to the Australian people, such as that identified at Bass Point.
- Surface camp sites: these unstratified deposits are likely to contain stone artefacts, and possibly, remnants of shell and charcoal. Bone is unlikely to have survived. These sites may provide information on settlement patterns, economic exploitation and stone tool manufacture and maintenance. These sites have research potential, but it is also predicted that they will be the most common site type at West Dapto.
- Scarred trees: although the identification of scarred trees is recognized to be problematical, any found in West Dapto will be of research potential (i.e. study of individual tree scars, relationship with other site types). Scarred trees are rare in the North Illawarra as in most areas, mature native trees have been burnt, and the rarity of scarred trees increases their significance (AMBS 2006, p.90).

Sefton (1990) completed an archaeological survey for West Dapto Stage One Release Area in 1990, located to the west of the study area, south of Bong Bong Road. The survey targeted areas previously identified as having high archaeological potential, i.e. all level areas 100 metres of a creek situated on Quaternary deposits (floodplains) and/or Budgong Sandstone, and areas with remnant mature native vegetation. Three new Aboriginal sites were identified: two scarred trees Bong Bong 1 (AHIMS 52-2-1542) and Bong Bong 3 (52-2-1543) and an artefact scatter, Bong Bong 2 (AHIMS 52-2-1544). Two scars are located on Forest Red Gum *Eucalyptus tereticornis* and Narrow-leaf Stringybark *Eucalyptus eugenoides* trees. Two stone artefacts associated with Bong Bong 2 were located in an erosion gully above a cow track, approximately 2 metres from Reid Creek. Sefton concluded that the alluvium of the Robins Creek floodplains would contain significant stratified

archaeological deposits. However, floodplains associated with the Mullet Creek tributary, derived from Budgong Sandstone, would have been waterlogged and sites were unlikely to be present below alluvial deposits.

Koettig (1992) conducted an assessment of Aboriginal sites for the electrification of the Dapto to Kiama railway line. Landforms surveyed included the low lying coastal plain and foothills. Due to the levels of previous disturbance during the construction of the railway it was considered that any possible archaeological sites would have been destroyed. No sites were located during the survey. Since the railway crosses areas that are deemed as having high archaeological sensitivity, such as dunes, old terraces, areas close to water sources that have not been affected by the recent development, archaeological material could still remain. Any new development outside the boundary of the railway easement was assessed as having archaeological sensitivity.

Navin Officer (1993) completed archaeological testing of a proposed residential subdivision on the southern side of Bong Bong Road, West Dapto. This investigation followed on from Silcox's 1993 recommendation that the site had three areas of potential archaeological sensitivity. Area WD1 located within the lower slope and undulating creek flat landform was divided into five transects which were then sampled with a 35 test excavation units consisting of combination of auger holes and spade probes. One surface artefact was located at the western end of the identified WD1 Area. A series of ten random probes was excavated at 1to2 metres apart averaging 28 centimetres in depth. Four additional artefacts were recovered and the area was deemed as a site WD1, registered on AHIMS 52-2-1688. WD 2 Area located within a low rise landform between a creek and a swampy cut-off channel had a single transect running through it with a total of five test excavation units and no artefacts recovered. WD 3 Area was subject to only three random spade probes as it had a similar landform as WD 2; no artefacts were recovered.

Artefacts at the site WD1 (AHIMS 52-2-1688) were recovered from upper 26 centimetre of the loam deposit within 1 metre by 2 metre area, and consisted of silicified wood, chert and quartz flakes and one unidentified sedimentary core. Navin Officer stated that it was unlikely the artefacts were *in situ*, due to the extensive land use modifications of the topsoil from where artefacts were recovered. Given the dense grass cover, size of the test area and the limitations of subsurface testing, Navin Officer considered that there was a possibility that more artefacts were present both on surface and subsurface in WD1 Area. However, potential for archaeologically significant sites and/or undisturbed archaeological deposits was assessed to be minimal. Consent to Destroy was issued by the National Parks and Wildlife Service in 1993 in order to destroy the site WD1 (AHIMS 52-2-1688).

Navin Officer (1994) was commissioned by Camp Scott and Furphy to undertake an archaeological survey of the proposed Illawarra water quality project installation at Kembla Grange. The survey was a targeted survey of creek banks and flats, areas of exposure around an existing dam, and flat ground on the southern part of their study area. These areas had higher degree of ground surface visibility and were considered as being favoured by Aboriginal people for occupation activities. Footslopes, creek banks, creek flats and plains were all aggrading landforms due to colluvial deposition and mass soil movement and deposition of sediments by water. The steep slopes on the spurs and in the north were sampled (1994, p. 7). During this survey there were no new Aboriginal sites identified. It was argued that archaeological potential in the proposed works area was low due to the results of previous testing in the similar landforms.

AMBS (2006) completed an Aboriginal Heritage Management Plan for the West Dapto Release Area (WDRA). This large scale study was commissioned by the Wollongong City Council and encompasses the study area. From the initial survey program, a total of 24 archaeological sites; 13 open camp sites, 6 isolated finds, 5 scarred trees were located within the boundaries of the WDRA study area. These were positioned on all landforms including creek lines (6), alluvial flats (3), spanning creek lines and alluvial flats (3), hillslopes (8) and spur crests (4). A second stage of assessment consisted of subsurface testing of a 100 square metres area

(100, 1 metre by 1 metre test pits) was undertaken across all representative landforms of the Mullet, Duck and Marshall Mount Creek catchment area.

A total of 425 artefacts (353 from within < 20 centimetres of deposit) were recovered from the following landscape contexts:

- Hillslopes (158, of which 146 were from one test pit).
- Alluvial flats -Pleistocene and Holocene terraces more than 10 metres away from stream channels (118).
- Streams- edges of Pleistocene and Holocene terraces within 10 metres of stream channels (86).
- Spur crests (63).

A range of raw materials were represented including, chert, quartz, quartzite, silcrete, silicified tuff and fine-grained siliceous. Artefact types included broken flakes, flakes, flaked pieces and cores. The range of raw materials and artefact types was considered characteristic of the region by AMBS.

AMBS concluded that from known site patterning it is likely that additional archaeological sites may occur throughout all landforms of the WDRA, although at varying site and artefact densities, and subsequently all parts of the WDRA are considered to have some archaeological potential. AMBS classified the current study area as low to moderate potential. In general, the highest artefact density was encountered along second-order streams, followed by the first order streams, spur crests and then hillslopes. Although artefact numbers recovered from individual test pit was low, high artefact recovery across all the landforms illustrate that the use of WDRA area was widespread, but not intensive. It was concluded that low density artefact scatters would be relatively common within the entire WDRA area.

The report recommended further investigation and management of those areas considered to have higher archaeological potential, including a number of spur crests within the Mullet Creek corridor, the benched foot slopes within the Escarpment foothills adjacent to creek lines and the lower tributaries of major creeks. These landforms would have provided camping sites, functioned as travel routes or provided a range of resources.

Areas of cultural value highlighted by the Aboriginal stakeholders throughout the development of this report are closely related to the archaeological record and the natural environment. All archaeological sites were identified as having cultural values, with the connection between cultural and natural values being emphasised. Large scatters and scarred trees were considered of higher significance, as were those sites retained within a natural setting. Conservation of important archaeological sites and natural areas such as creek lines and vegetated areas was a common theme identified among the Aboriginal

As part of the WDRA, AMBS commissioned Philip Hughes to complete a geomorphology / archaeological testing program prior to the commencement of the larger sub-surface investigation program. Hughes (2005) excavated a series of test pits using a combination of hand excavation and a backhoe within various landforms identified by AMBS (2006). The geomorphic testing revealed that while all landforms had the potential to contain artefact-bearing deposits, archaeological evidence for Aboriginal occupation and use of the Pleistocene terraces would be restricted to the Holocene period. Artefact bearing deposits across all landforms comprise soft to firm soils and sediment. The depth of deposits varies across landforms, with the shallowest sediments occurring on ridges and hill slopes, and the deepest sediments occurring on Holocene terraces. 'Richer' archaeological deposits could be expected within Holocene terraces, but they would be disturbed by floods and perhaps buried in deeper alluvium. Artefacts were retrieved from alluvial flats at a maximum depth of 60 to 70 centimetres.

Biosis (2009) was commissioned by Connectland Pty Ltd to undertake Aboriginal archaeological and cultural heritage assessment for the proposed Illawarra Employment and Teaching Centre, West Dapto, located approximately 3.3km North West of the study area. The assessed area encompassed 42.88 hectares to the

north of Bong Bong Road and west of Mullet Creek. Archaeological survey was targeted towards areas that will be impacted by the proposed development, and landforms and areas identified in the predictive modelling as having high likelihood for the presence of sites, i.e. ridgelines and waterways. Two Isolated artefacts were identified during the site survey, Bong Bong Road IA1 (AHIMS 52-2-3659) to the immediate north of Bong Bong Road within the exposure around the tree, and Bong Bong Road IA2 (AHIMS 52-2-3660). Comprehensive review of AMBS study (2006) indicated that the newly recorded site 52-2-3660 was most likely already recorded site WDRA_AX_01 (AHIMS 52-2-3289). Both Bong Bong Road IA1 and Bong Bong Road IA2 were assessed as having low scientific significance and they were considered to be a common occurrence within the region (Biosis 2009, p.42-3). Their presence conforms to the site predictive model for the region where Aboriginal sites are likely to occur on level, well-drained ground adjacent to wetlands and resources. It was recommended that both sites be salvaged and relocated in the event impacts cannot be avoided.

3.2.1 Local overview

A number of Aboriginal cultural heritage investigations have been conducted within the region (within approximately five kilometres of the study area). Most of these investigations were undertaken as part of development applications and included surface and sub-surface investigations. These investigations are summarised below.

Sefton (1980) undertook an archaeological survey of the proposed transmission line routes in the West Dapto-Yallah Area of the City of Wollongong. During this survey two archaeological sites were identified. Registered site Yallah Site 1 (52-5-0123) consisted of one isolated artefact that was located on the northern bank of a tributary of Duck Creek, made from fossilised wood. Site Yallah Site 2 (52-5-0122) was located within 150 metres of the Lake Illawarra on a lower slope and is a sparse scatter of seven artefacts made from chert, jasper and rhyolite. This site was located on a gradual slope, and has been previously disturbed by quarrying, erosion and underground services. Both sites are approximately 3 kilometres south-east of the study area and are within close proximity to reliable, permanent sources of water on flat elevated grounds. It was recommended that any excavations in the vicinity of site Yallah 2 be monitored, and no impacts were proposed to site Yallah 1.

Dallas and Navin (1987) conducted an archaeological survey along the southern foreshore of Lake Illawarra and on Bevans, Picnic, Berageree and Werrang islands approximately 7 kilometres south east of the current study area. The survey identified five new shell midden sites and one previously recorded midden site (AHIMS 52-5-0119). In their discussion of the survey results Dallas and Navin suggested that the locations of the middens on the islands was not necessarily indicative of preferential use. Rather, they suggest it was more likely that the lack of disturbances on the islands compared to the more heavily disturbed Illawarra Lake foreshore has resulted in the destruction of foreshore middens and the preservation of island middens.

Navin Officer (1997) undertook an archaeological investigation of a proposed residential subdivision at Lot 1 DP253917, Mount Brown Road in South Dapto, approximately 2.5 kilometres west of the current study area. A survey was conducted as part of this assessment, but the survey did not identify any Aboriginal sites. The absence of sites was attributed to a number of factors including the very low ground surface visibility, a lack of specific resources in the area, and shallow soils with an absence of colluvium material adjacent to drainage lines. Previous land use practices also indicated that little material would have remained *in situ* due to disturbances. The results of this survey were consistent with those obtained from other archaeological surveys in the local area and with the regional pattern of sparse site occurrence in the low hilly lands interior of Lake Illawarra and the coastal plain.

Comber Consultants Pty Ltd (2010) undertook an Aboriginal archaeological assessment for the proposed bike and pedestrian path around Lake Illawarra, which the current study area partly lies within. As part of this assessment Comber undertook basic predictive modelling and developed predictive statements for various

site types. These statements indicated that there was a possibility for middens, burials, open camp sites, axe grinding grooves and isolated finds to be present in the study area.

Following background research, Comber conducted a survey of their study area. No Aboriginal archaeological sites were recorded during this survey, but Area 2, which the current study area lies partially in, and Area 4 of their study area were identified as having a high potential to contain sub surface archaeological deposits.

Considering a high number of previously recorded Aboriginal archaeological sites (13) within the vicinity of the study area and the landform they were in (Lake Illawarra foreshore), it was recommended that archaeological sub-surface testing be undertaken in Areas 2 and 4 in order to determine the existence, and then nature and extent of any such deposits.

3.2.2 Previous Aboriginal archaeological test excavations within the study area

Biosis (2010) conducted an Aboriginal Archaeological Assessment of the Tallawarra lands for TRUenergy which encompassed the current study area. Biosis was commissioned to conduct sub-surface testing for a number of areas assessed by Kelleher and Nightingale as having moderate and high archaeological sensitivity.

A total of 10 areas were excavated across five landform types (Figure 7). These landforms included foreshore, spur line, drainage line, hill slope, and creek line landforms. The excavations identified 24 stone artefacts and one piece of ochre across the 10 excavation areas; the highest number of artefacts were uncovered in the creek line landform (n=13) followed by the drainage line landform (n=10). The foreshore and hill slope landforms each contained one artefact and the spur line did not contain any. The artefact assemblage consisted of a range of raw materials including chert, quartzite, silcrete, basalt, chalcedony and siltstone.

An analysis of the soil profiles within various landform units in the study area indicated that depth of deposit increased with proximity to water (specifically Duck Creek). Disturbances to the soil stratigraphy were found to be limited to the upper (top soil) layer, with lower stratigraphic units showing very low to no evidence of previous disturbance. Two areas (TLPD-2 and TLPD-3) within the current study area were tested during the 2010 test excavation program. The test pit soil profiles within TLPD-2 and TLPD-3 (AHIMS 52-5-0613), were all noted to have four distinct stratigraphic units displaying little to no evidence of previous disturbance in the topsoil and lower layers.

Biosis concluded that the low number of artefacts indicated that Aboriginal people were using the Tallawarra Lands, with occupation focusing on Duck Creek, but it was likely sporadic or low density.

Biosis (2011) were commissioned by the Lake Illawarra Authority to undertake archaeological assessment and test excavations of the Tallawarra recreational shareway based on the recommendations of Comber. The Tallawarra Lands development encompasses parts of the area assessed by Biosis.

As part of this assessment Biosis undertook background research and used it to construct several predictive statements for the study area. These statements indicated that:

- Midden shell and lithic material have been known to occur on sand bodies such as coastal beach dune systems, elevated ground adjacent to wetlands such as low gradient basal colluvial slopes, terminal spur line crests and alluvial terraces along valley floor drainage corridors.
- Artefact scatters may be identified anywhere within the study area but they are more likely to be identified near water-related landforms and on gently inclined slopes within 100 metres of water. Stone artefacts are more likely to consist of sandstone, quartz or volcanics.
- Shelters, grinding grooves and raw materials suitable for stone tool manufacture will not occur within the study area due to a lack of suitable geology.

- Scarred trees may occur anywhere within the study area where mature trees remain.
- A burial was recorded on the shores of Lake Illawarra. Due to alluvial deposits within the study area and previously recorded burial, there is a possibility that unrecorded burials may be located in the area.

The test excavations undertaken as part of the assessment involved 157 auger holes along the foreshore. The excavations identified one new artefact scatter Tallawarra Point 1 (AHIMS and extended the pre-existing site Tallawarra Power Station Midden (AHIMS 52-5-0070). Two artefacts consisting of a quartz flake fragment and a silcrete geometric microlith were identified at Tallawarra Point 1. It was suggested that this site was likely representative of transient occupation. Six stone artefacts were also excavated in a tidal creek landform directly south of Tallawarra Power Station Midden (AHIMS 52-5-0070). The artefacts consisted of four chert flakes, one quartz flake and one silcrete flake. This scatter was identified as part of the Tallawarra Power Station Midden (AHIMS 52-5-0070). Biosis suggested that the Tallwara Power Station Midden was representative of camping activities or frequent travel through the area. No midden material was encountered during the test excavations.

Acknowledgements: Basemap © Land and Property Information 2016

Legend

Study area

Biosis 2010 Test Pits

- No artefacts present
- Artefact(s) present

Figure 7 Previous test excavations

0 100 200 300 400 500

Metres
Scale: 1:9,000 @ A3
Coordinate System: GDA 1994 MGA Zone 56

N

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Albury, Ballarat, Melbourne,
Newcastle, Sydney, Wangaratta & Wollongong

Matter: 24090
Date: 21 October 2019,
Checked by: RAM, Drawn by: LH, Last edited by: amurray
Location:P:\30400s\30437\Mapping
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3.2.3 AHIMS site analysis

A search of the Aboriginal Heritage Information Management System (AHIMS) database (Client Service ID: 455755) identified 107 Aboriginal archaeological sites within a three square kilometre search area, centred on the proposed study area. AHIMS search results are provided in Appendix 1.

Two AHIMS sites are located within the study area and two within 10 metres of the study area:

- Boomberry Point 1 (AHIMS 52-5-0223) is recorded as a small dispersed shell midden comprising of *Andara trapezia*. It is likely that Boomberry Point 1 has been mapped incorrectly as the site card describes its location as being located on the track running from Tallawarra Power Station to Boomberry Point across Tallawarra Point Headland, three metres south of an unnamed creekline. It was noted that the soil matrix is slightly darker than the surrounding soil and is probably related to the breakdown of charcoal. The highly fragmented shell was visibly exposed on the track and extended under the grass on the side of the track towards the creekline. No artefacts were found even though visibility on the track was 100%. The site is heavily disturbed by horse traffic and the deposition of building rubble and rubbish.
- Elizabeth Point (AHIMS 52-5-0225) is recorded as an isolated artefact consisting of a grey chert flake fragement. The site is located along a walking track from Tallawarra Power Station to Boomberry Point across Tallawarra Point Headland. It is also likely that Elizabeth Point has been mapped incorrectly as its current location is further west.
- Gilba Road 1 (52-5-0642) is recorded as an isolated artefact located at the beginning of a walking track towards Boomberry Point. This site is currently mapped in the middle of Lake Illawarra; therefore, is also incorrectly mapped and the site is likely located at the end of Gilba Road within 10 metres of the study area.
- Gilba Road 2 Fill 1 (AHIMS 52-5-0643) is recorded as an isolated artefact; however, the location is not described. The site card does include a map showing the location of shell scatter adjacent to the walking track, which extends for approximately 120 metres.

Table 3 provides the frequencies of Aboriginal site types in the vicinity of the study area. The mapping coordinates recorded for these sites were checked for consistency with their descriptions and location on maps from Aboriginal heritage reports where available. The descriptions and maps were relied upon when notable discrepancies occurred in the locations of sites.

It should be noted that the AHIMS database reflects Aboriginal sites that have been officially recorded and included on the list. Large areas of NSW have not been subject to systematic, archaeological survey; hence AHIMS listings may reflect previous survey patterns and should not be considered a complete list of Aboriginal sites within a given area. Some recorded sites consist of more than one element, for example artefacts and a modified tree, however for the purposes of this breakdown and the predictive modelling, all individual site types will be studied and compared. This explains why there are 129 results presented here, compared to the 107 sites identified in AHIMS.

Table 3 AHIMS site type frequency

Site type	Number of occurrences	Frequency (%)
Aboriginal ceremony and dreaming	4	3.10
Artefact	83	64.34
Modified tree	1	0.77
PAD	15	11.63

Site type	Number of occurrences	Frequency (%)
Shell	25	19.38
Stone Arrangement	1	0.77
Total	**129**	**100**

A simple analysis of the Aboriginal cultural heritage sites registered within the three square kilometre buffer of the study area indicates that artefacts are the most commonly recorded site type (n=83, 64.34%). This is followed by shells sites (n=25, 19.38%) and PAD sites (n=15, 11.63%). Aboriginal ceremony and dreaming (n=4, 3.10%), modified tree (n=1, 0.77%) and stone arrangement (n=1, 0.77%) were also recorded in the region.

Legend

- Study area
- AHIMS record

Figure 8 AHIMS records near the study area

NOT TO BE MADE PUBLIC

0 500 1,000 1,500

Metres
Scale: 1:35,000 @ A3
Coordinate System: GCS GDA 1994

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Matter: 30437
Date: 21 October 2019,
Checked by: amurray, Generated by: amurray
Location:P:\30400s\30437\Mapping
30437_AR_F8_AHIMS.mxd

3.3 Discussion

Ethno-historical information regarding the study area indicates that the region was intensively occupied by the Wodi Wodi of the Dharawal language group before European occupation.

The current study area is characterised by the coastal plain landscape, and is situated on the open banks of Lake Illawarra backing onto the slopes of the Mount Brown. The proximity to Lake Illawarra would have provided access to aquatic animals which would have been used by Aboriginal groups in the area as a food source and for tool production. The easy access to aquatic species should result in the potential for shell middens to be present in the study area. This is supported by AHIMS data which showed that middens were the second most common site type in the region. Geology of the Illawarra region also provided access to stone resources useful for tool manufacture. The AHIMS data indicated that stone artefacts are the most common site type in the region so they are likely to be present in the study area

Previous archaeological work within the study area has not only focussed on specific development activities but has recognised the archaeological and cultural landscape values of the locality. The previous studies provide a general overview of Aboriginal archaeological site modelling and predictive behaviour within the current study area. In general, previous archaeological work indicates that areas of archaeological potential will occur where disturbance has been limited, and the most likely site type to be encountered will be middens sites and artefacts.

3.3.1 Predictive Statements

A number of predictive statements have been formulated to broadly predict the type and character of Aboriginal cultural heritage sites likely to exist(ed) throughout the study area and where they are more likely to be located.

The predictive statements are based on:

- Site distribution in relation to landscape descriptions within the study area.
- Consideration of site type, raw material types and site densities likely to be present within the study area.
- Findings of the ethnohistorical research on the potential for material traces to present within the study area.
- Potential Aboriginal use of natural resources present or once present within the study area.
- Consideration of the temporal and spatial relationships of sites within the study area and surrounding region.

Based on this information, a number of predictive statements have been developed, indicating the site types most likely to be encountered during the survey and subsequent sub-surface investigations across the present study area (Table 4). The definition of each site type is described firstly, followed by the predicted likelihood of this site type occurring within the study area.

Table 4 Aboriginal site prediction statements

Site type	Site description	Potential
Flaked stone artefact scatters and isolated artefacts	Artefact scatter sites can range from high-density concentrations of flaked stone and ground stone artefacts to sparse, low-density 'background' scatters and isolated finds.	High: Stone artefact sites are the most common previously recorded site in the region, occurring across a wide range of landforms and within the study area. They have high potential to be present in undisturbed areas within the study area.
Shell middens	Deposits of shells accumulated over either singular large resource gathering events or over longer periods of time.	Moderate: Shell midden sites have been recorded within the vicinity of study area. The proximity of the study area to Lake Illawarra indicates a high potential for the presence of shell middens
Quarries	Raw stone material procurement sites.	Low: There is no record of any quarries being within or surrounding the study area.
Potential archaeological deposits (PADs)	Potential sub surface deposits of cultural material.	Moderate: PADs have been recorded in the region across a wide range of landforms. They have the potential to be present in undisturbed landforms of the study area
Modified trees	Trees with cultural modifications	Low: Due to extensive vegetation clearing from of the study area there is low potential for modified trees.
Axe grinding grooves	Grooves created in stone platforms through ground stone tool manufacture.	Low: The geology of the study area lacks suitable horizontal sandstone rock outcrops for axe-grinding grooves. Therefore there is low potential for axe grinding grooves to occur in the study area.
Burials	Aboriginal burial sites.	Low: Aboriginal burial sites are generally situated within deep, soft sediments, caves or hollow trees. Areas of deep sandy deposits will have the potential for Aboriginal burials. The soil profiles associated with the study area are not commonly associated with burials.
Rock shelters with art and / or deposit	Rock shelter sites include rock overhangs, shelters or caves, and generally occur on, or next to, moderate to steeply sloping ground characterised by cliff lines and escarpments. These naturally formed features may contain rock art, stone artefacts or midden deposits and may also be associated with grinding grooves.	Low: The sites will only occur where suitable sandstone exposures or overhangs possessing sufficient sheltered space exist, which are not present in the study area.
Aboriginal ceremony and Dreaming Sites	Such sites are often intangible places and features and are identified through oral histories, ethnohistoric data, or Aboriginal	Low: There are currently no recorded mythological stories for the study area.

Site type	Site description	Potential
	informants.	
Post-contact sites	These are sites relating to the shared history of Aboriginal and non-Aboriginal people of an area and may include places such as missions, massacre sites, post-contact camp sites and buildings associated with post-contact Aboriginal use.	Low: There are no post-contact sites previously recorded in the study area and historical sources do not identify one.
Aboriginal places	Aboriginal places may not contain any "archaeological" indicators of a site, but are nonetheless important to Aboriginal people. They may be places of cultural, spiritual or historic significance. Often they are places tied to community history and may include natural features (such as swimming and fishing holes), places where Aboriginal political events commenced or particular buildings.	Low: There are currently no recorded Aboriginal historical associations for the study area.

4 Archaeological survey

A field survey of the study area was undertaken on 29 June 2017. The field survey sampling strategy, methodology and a discussion of results are provided below.

4.1 Archaeological survey objectives

The objectives of the survey were to:

- To attempt to re-identify Aboriginal archaeological sites Boomberry Point 1 (AHIMS 52-5-0223), Elizabeth Point (AHIMS 52-5-0225), Gilba Road 1 (AHIMS 52-5-0642) and Gilba Road 2 Fill (AHIMS 52-5-0643) previously identified in or immediately adjacent to the study area.
- To undertake a systematic survey of the study area targeting areas with the potential for Aboriginal heritage.
- Identify and record Aboriginal archaeological sites visible on the ground surface.
- Identify and record areas of potential archaeological deposits (PADs).

4.2 Archaeological survey methodology

The survey methods were intended to assess and understand the landforms and to determine whether any archaeological material from Aboriginal occupation or land use exists within the study area.

4.2.1 Sampling strategy

The survey effort targeted these portions of the study area:

- All landforms (including each occurrence of a specific landform type that will be impacted) that will be potentially be impacted.
- Landforms with a higher potential for Aboriginal heritage and justifying the selection of these landforms.

4.2.2 Survey methods

The archaeological survey was conducted on foot with a field team of one archaeologist. Recording during the survey followed the archaeological survey requirements of the code and industry best practice methodology. Information that recorded during the survey included:

- Aboriginal objects or sites present in the study area during the survey.
- Survey coverage.
- Any resources that may have potentially have been exploited by Aboriginal people.
- Landform.
- Photographs of the site indicating landform.
- Evidence of disturbance.
- Aboriginal artefacts, culturally modified trees or any other Aboriginal sites.

Where possible, Identification of natural soil deposits within the study area was undertaken. Photographs and recording techniques were incorporated into the survey including representative photographs of survey units, landform, vegetation coverage, ground surface visibility and the recording of soil information for each survey unit were possible. Any potential Aboriginal objects observed during the survey were documented and photographed. The location of Aboriginal cultural heritage and points marking the boundary of the landform elements were recorded using a hand-held Global Positioning System and the Map Grid of Australia (94) coordinate system.

4.3 Archaeological survey results

A total of five transects were walked across three landforms (Figure 9). This follows the methodology set out in Burke and Smith (Burke & Smith 2004, p.65) which states that a single person can only effectively visually survey an area of two linear metres. No new Aboriginal sites or PADs were identified in the study area. The results from the field survey have been summarised in Table 5 below.

The Northern Precinct consists of a crest running through the southern portion of the study area, an open drainage depression in the centre and a simple slope and flats associated with Lake Illawarra (Table 6, Plate 3 and Plate 4).

4.3.1 Constraints to the survey

With any archaeological survey there are several factors that influence the effectiveness (the likelihood of finding sites) of the survey. The factors that contributed most to the effectiveness of the survey within the study area were visibility, exposure and disturbance.

4.3.2 Visibility

In most archaeological reports and guidelines visibility refers to ground surface visibility, and is usually a percentage estimate of the ground surface that is visible and allowing for the detection of (usually stone) artefacts that may be present on the ground surface (NPWS 1997). Visibility within the study area was generally poor, with areas of exposure isolated to disturbance associated with the horse ring, dam and fence lines. Visibility was 80% within these areas (Plate 1).

4.3.3 Exposure

Exposure refers to the geomorphic conditions of the local landform being surveyed, and attempts to describe the relationship between those conditions and the likelihood the prevailing conditions provide for the exposure of (buried) archaeological materials. Whilst also usually expressed as a percentage estimate, exposure is different to visibility in that it is in part a summation of geomorphic processes, rather than a simple observation of the ground surface (Burke & Smith 2004, NPWS 1997). Overall, the study area displayed areas of exposure of approximately 5%.

4.3.4 Disturbances

Disturbance in the study area is associated with natural and human agents. Natural agents generally affect small areas and include the burrowing and scratching in soil by animals, such as wombats, foxes, rabbits and wallabies, and sometimes exposure from slumping or scouring. Disturbances associated with recent human action are prevalent in the study area and cover large sections of the land surface. The agents include residential development such as landscaping and construction of residential buildings; farming practices, such as initial vegetation clearance for creation of paddocks, fencing and stock grazing; light industrial practices such as creation of artificial dams within the study area. Areas that have gone through disturbance are associated with horse ring, dams, fence lines and infrastructure associated with the Tallawarra Power Station (Plate 2).

Plate 1 **The study area showing poor surface visibility due to vegetaton cover, facing south**

Plate 2 **Disturbance associated with the construction of horse ring and dams, facing north**

Plate 3 **Crest running through the southern part of the study area, facing west**

Plate 4 **Simple slope down towards open drainage depression, facing east**

Table 5 Survey coverage

Survey Unit	Landform	Survey unit area (m²)	Visibility (%)	Exposure (%)	Effective coverage area (m²)	Effective coverage (%)
1	Creek line	53,175	80	5	1,329	2.49
2	Crest	64,767	80	5	1,619	2.49
3	Hill slope	272,730	80	5	10,909	3.99

Table 6 Landform summary

Landform	Landform area (m²)	Area effectively surveyed (m²)	Landform effectively surveyed (%)	No. of Aboriginal sites	No. of artefacts or features
Creek line	53,175	1,329	2.49	0	0
Hill slope	64,767	1,619	2.49	0	0
Crest	272,730	10,909	3.99	0	0

Legend

- Study area
- Transcect

Figure 9 Survey coverage

0 50 100 150 200

Metres
Scale: 1:4,000 @ A3
Coordinate System: GDA 1994 NSW Lambert

N

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Albury, Ballarat, Melbourne,
Newcastle, Sydney, Wangaratta & Wollongong

Matter: 30437
Date: 21 October 2019,
Checked by: SJK, Drawn by: LW, Last edited by: amurray
Location:P:\30400s\30437\Mapping
30437_AR_F9_SurveyCoverage

Acknowledgements: Basemap © Land and Property Information 2016

4.3.5 Discussion of archaeological survey results

The study area is located within a crest and simple slope landform pattern associated with a creek line that drains into Lake Illawarra. There is one soil landscaped present within the study area, an erosional soil landscape called the Shellharbour soil landscape. Erosional soils have a high to very high erodibility rating and would therefore be susceptible to frequent soil movement and result in poor preservation of archaeological material at shallow depths but would potentially lead to exposures of any deeper archaeological deposits were topsoil has eroded away.

The field survey revealed that parts of the study area had been subject to previous ground disturbance due to construction of towers for the Tallawarra Power Station. These areas would have displaced surface cultural material and disturbed deeper buried archaeological deposits. Having said that, most of the study area had only limited disturbance that was due to the construction of horse training rings, dams and fence lines, animal trampling from horse agistment. Although these processes would displace surface cultural material, they would not affect deeper buried archaeological deposits. Due to the low levels of ground surface visibility and exposure the AHIMS sites recorded in and adjacent to the study area could not be relocated.

A review of previous archaeological studies, surveys, test excavations and regional predictive modelling indicates that all landforms within the study area were utilised to some degree by Aboriginal people in the past. This has concluded that:

- Majority of the test pits conducted by AMBS (2006) in the West Dapto Release Area contained artefacts were located within alluvial flats, following by hillslopes, then spur crests , then 3rd order, then 2nd order, then 4th and at last 1st order creek lines.
- AHMS (2012) in excavations further along Robins Creek determined that alluvial flats had the highest density of artefacts (30.2 per metre square), followed by hillslope (17.3 metre square) and spur crest (16.9 metre square).
- Previous investigations along Robins Creek have determined that the alluvial terraces associated with this landform have the potential to contain cultural material which appears to be well preserved *in situ*. Artefacts within the *Fairy Meadow* soil landscape at this location were retrieved from between 60 to 80 centimetres depth.
- Predictive modelling indicates that of sites located on stream landforms, majority were along the 3rd order, following by 4th, then 2nd and last 1st order creek lines.

Based on the site survey and previous assessments the low spur/crest running roughly east-west through the center of the study area has been assessed as having moderate subsurface archaeological potential (Figure 10). Previous research indicates that the landform is likely contain low density artefact sites or isolated artefacts that were discarded as Aboriginal people travelled through the landscape. The test excavation program conducted by Biosis in 2010 indicated that this landform unit has been subject to low levels of previous ground disturbance with four distinct and intact soil horizons identified throughout the testing locations in the northern precinct.

Areas that have undergone significant previous disturbance would have removed sub-surface deposits from their original contexts and were assessed as low potential as a result (Figure 10). Hillslopes were also assessed as low potential as they tended to be sloped and at the time of survey were heavily waterlogged and unsuitable for occupation or travel.

Legend

Study area

Archaeological potential

Moderate

Low

Figure 10 Archaeological potential

0 50 100 150 200

Metres

Scale: 1:4,000 @ A3

Coordinate System: GDA 1994 NSW Lambert

N

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Albury, Ballarat, Melbourne,
Newcastle, Sydney, Wangaratta & Wollongong

Matter: 30437
Date: 21 October 2019,
Checked by: SJK, Drawn by: LW, Last edited by: amurray
Location:P:\30400s\30437\Mapping
30437_AR_F10_ArchPotential

Acknowledgements: Basemap © Land and Property Information 2016

5 Test excavation methodology

The principle objectives of the sub-surface test excavation program is to identify and understand the nature, extent and significance of any subsurface archaeological material located within areas of archaeological sensitivity within the study area.

The aims of the testing program are to:

- Determine whether sub-surface archaeological deposits exist which may be impacted upon by the development. If so, to determine the extent and nature of such deposits.
- Identify whether the archaeological material occurs in an intact, undisturbed context, by examining the soil profile and stratigraphy.
- Analyse and interpret any archaeological finds (such as stone artefacts, shell, hearths, knapping floors etc.) recovered during the testing program.
- Inform current knowledge of Aboriginal occupation and land use models of the region.
- Provide management and mitigation measures for Aboriginal archaeological objects identified during the subsurface testing program.

5.1 Research questions

Research questions provide a framework for undertaking sub-surface investigations and ensure that the information collected during the sub-surface testing program contributes to the knowledge of the sites and the broader archaeological record. Research questions include:

- *Do non-disturbed or minimally-disturbed soil profiles exist within the potential archaeological deposits associated with sites AHIMS 52-5-0223/Boomberry Point 1 and AHIMS 52-5-0643/Gilba Road 2 Fill 1?*
- *What species of shell or vertebrate exist within the deposits and what can they tell us about the subsistence patterns of Aboriginal people living in the area?*
- *Are the species of shell or vertebrate remains found within the deposit comparable with the species found in other excavated middens within the region?*
- *What management is appropriate? Does the area warrant further investigation, conservation, or could proposed development works proceed as planned?*

5.2 Test excavation methodology

Test excavations will be conducted within the study area and be conducted by hand. Test excavation within the study area will conform to the following methodology:

- Test excavation will be undertaken within areas of moderate potential identified and within the vicinity of Boomberry Point 1 (AHIMS 52-5-0223) and Elizabeth Point (AHIMS 52-5-0225).
- At Boomberry Point 1, auger holes will be dug at 10 metre intervals to establish the presence of absence of midden material. Where augering shows dense archaeological deposit, a 1 metre x 1 metre pit will be excavated in order to determine the presence and nature of the sub-surface deposit.

- It is possible that Boomberry Point 1 has been mapped incorrectly as the site card describes its location as on the track between Tallawarra Point and Boomberry Point, 3 metres south of an unnamed creekline. Therefore, auger holes will placed as close as possible to the boundary of the study area in the vicinity of this location. Auger holes will be dug at 10 metre intervals, or other justifiable and regular spacing, to establish the extent of the midden, if encountered. Where augering shows dense archaeological deposit, a 1 x 1 metre pit will only be excavated in order to determine the presence and nature of subsurface deposits.
- At Elizabeth Point, up to four 1 metre x 1 metre pits (with a provision of joining two test pits together) will be excavated in order to determine the presence and nature of subsurface deposits. The test pits will be spaced between 5 and 15 metres apart or other justifiable and regular spacing (being no smaller than five metres).
- Additional test excavations will also be undertaken as close as possible to the location of Gilba Road 2 Fill 1 (AHIMS 52-5-0643), which is located on the boundary of the study area, and at Gilba Road 1 (52-5-0642), which is located 15 metres north of the study area.
- At Gilba Road 2 Fill 1, a grid will also be established along the length of the shells scatter identified and indicated on the site card (approximately 120 metres in length). Auger holes will be dug at 10 metre intervals, or other justifiable and regular spacing, to establish the extent of the midden, if encountered. Where augering shows dense archaeological deposit, a 1 x 1 metre pit will only be excavated in order to determine the presence and nature of subsurface deposits.
- Gilba Road 1 is located just outside the study area; therefore, 50 x 50 centimetre units along one transect will be placed as close as possible to this site. The test pits will be 20 metres or other justifiable and regular spacing (being no smaller than five metres). Test excavations units may be combined up to 1 metre x 1 metre to understand the site characteristics and to accommodate deep deposits if encountered.
- In areas of moderate potential, test excavations will be conducted in 50 x 50 centimetre units along transects at intervals of 40 metres or other justifiable and regular spacing (being no smaller than five metres). Test excavations units may be combined up to 1 metre x 1 metre to understand the site characteristics and to accommodate deep deposits if encountered.
- Test excavations units must be excavated using hand tools only including spades, handle shovels, hand auger and trowels.
- The first test excavation unit within Boomberry Point 1, Elizabeth Point, Gilba Road 1 and Gilba Road 2 Fill 1 will be excavated and documented in 5 centimetre spits. Based on the evidence of the first excavation unit, 10 centimetre spits or sediment profile/stratigraphic excavation (whichever is smaller) will then be implemented. If shell material is discovered, the pit will be excavated and documented in stratigraphic contexts.
- All material excavated from the test excavation units will be sieved using 3 millimetre aperture wire-mesh sieves.
- Test excavation units must be excavated to at least the base of the identified Aboriginal object-bearing units (where safe excavation permits), and must continue to confirm the soils below are culturally sterile.
- All cultural material recovered from the test pits will be collected and brought to the Biosis office at 30 Wentworth Street, Port Kembla for analysis.
- All faunal remains recovered from the test pits will be analysed using the following method:

  - Minimum number of individual (MNI) animals represented in each discrete area and on site overall.
  - Minimum number of elements (MNE) represented in each discrete area and on site overall.
  - Number of species (NISP) represented in each discrete area and on site overall.
  - Dimensions of each element.
  - Butchery/heat marks.
  - Pathologies.
  - All faunal remains will be photographed in-situ to understand the relationship of the remains with other artefactual material.
- For each test pit or auger hole that is excavated, the following documentation will be taken:
  - Unique test pit identification number.
  - GPS coordinate of each test pit.
  - Munsell soil colour, texture and pH.
  - Amount and location of cultural material within the deposit.
  - Nature of disturbance where present.
  - Stratigraphy.
  - Archaeological features (if present).
  - Photographic records.
  - Context records.
- Test excavation units must be backfilled as soon as practicable due to safety issues.
- Any datable material will be collected for the purposes of radiometric, AMS or OSL dating. Datable materials will be collected, bagged and clearly labelled. They will be temporarily stored in the Biosis office before being sent to the University of Waikato Radiocarbon Dating Laboratory.
- Test excavations can cease when enough information* has been recovered to adequately characterise the cultural material present with regard to their nature and significance within the study area.
- Following test excavation, an AHIMS Aboriginal Site Recording form must be completed and submitted to the AHIMS Registrar as soon as practicable, for each site that has been identified.

*Enough information is defined by OEH as meaning "the sample of excavated material clearly and self-evidently demonstrates the deposit's nature and significance. This may include things like locally or regionally high object density: presence of rare or representative objects: presence of archaeological features: or locally or regionally significant deposits stratified or not" (DECCW 2010b, pp. 28).

5.3 Objects recovered during excavation

All cultural material recovered from the test pits will be labelled and bagged appropriately, including pit number. Aboriginal objects will be recorded in accordance with requirements 19 and 20 (where applicable) of the code. For the purposes of recording and analysis the artefacts will be temporarily stored at the Biosis

Wollongong office (30 Wentworth Street, Port Kembla 2505). Once the cultural material has been analysed, the cultural material can be managed in the following manners:

- Cultural material can be held by the Aboriginal community under a care and control agreement.
- Cultural material can be returned to country and reburied as soon as practicable in a secure location in accordance with requirements 16b and 26 of the Code of Practice.

6 Scientific values and significance assessment

The two main values addressed when assessing the significance of Aboriginal sites are cultural values to the Aboriginal community and archaeological (scientific) values. This report will assess scientific values while the Aboriginal Cultural Heritage Assessment Report will detail the cultural values of Aboriginal sites in the study area.

6.1 Introduction to the assessment process

Heritage assessment criteria in NSW fall broadly within the significance values outlined in the Australia International Council on Monuments and Sites (ICOMOS) Burra Charter (Australia ICOMOS 2013). This approach to heritage has been adopted by cultural heritage managers and government agencies as the set of guidelines for best practice heritage management in Australia. These values are provided as background and include:

- **Historical significance** (evolution and association) refers to historic values and encompasses the history of aesthetics, science and society, and therefore to a large extent underlies all of the terms set out in this section. A place may have historic value because it has influenced, or has been influenced by, an historic figure, event, phase or activity. It may also have historic value as the site of an important event. For any given place the significance will be greater where evidence of the association or event survives in situ, or where the settings are substantially intact, than where it has been changed or evidence does not survive. However, some events or associations may be so important that the place retains significance regardless of subsequent treatment.
- **Aesthetic significance** (Scenic/architectural qualities, creative accomplishment) refers to the sensory, scenic, architectural and creative aspects of the place. It is often closely linked with social values and may include consideration of form, scale, colour, texture, and material of the fabric or landscape, and the smell and sounds associated with the place and its use.
- **Social significance** (contemporary community esteem) refers to the spiritual, traditional, historical or contemporary associations and attachment that the place or area has for the present-day community. Places of social significance have associations with contemporary community identity. These places can have associations with tragic or warmly remembered experiences, periods or events. Communities can experience a sense of loss should a place of social significance be damaged or destroyed. These aspects of heritage significance can only be determined through consultative processes with local communities.
- **Scientific significance** (Archaeological, industrial, educational, research potential and scientific significance values) refers to the importance of a landscape, area, place or object because of its archaeological and/or other technical aspects. Assessment of scientific value is often based on the likely research potential of the area, place or object and will consider the importance of the data involved, its rarity, quality or representativeness, and the degree to which it may contribute further substantial information.

The cultural and archaeological significance of Aboriginal and historic sites and places is assessed on the basis of the significance values outlined above. As well as the ICOMOS Burra Charter significance values guidelines, various government agencies have developed formal criteria and guidelines that have application when assessing the significance of heritage places within NSW. Of primary interest are guidelines prepared by the Commonwealth Department of the Environment and Energy, DPIE and the Heritage Branch, NSW Department of Planning and Environment. The relevant sections of these guidelines are presented below.

These guidelines state that an area may contain evidence and associations which demonstrate one or any combination of the ICOMOS Burra Charter significance values outlined above in reference to Aboriginal heritage. Reference to each of the values should be made when evaluating archaeological and cultural significance for Aboriginal sites and places.

In addition to the previously outlined heritage values, the DPIE Guidelines (OEH 2011) also specify the importance of considering cultural landscapes when determining and assessing Aboriginal heritage values. The principle behind a cultural landscape is that 'the significance of individual features is derived from their inter-relatedness within the cultural landscape'. This means that sites or places cannot be 'assessed in isolation' but must be considered as parts of the wider cultural landscape. Hence the site or place will possibly have values derived from its association with other sites and places. By investigating the associations between sites, places, and (for example) natural resources in the cultural landscape the stories behind the features can be told. The context of the cultural landscape can unlock 'better understanding of the cultural meaning and importance' of sites and places.

Although other values may be considered – such as educational or tourism values – the two principal values that are likely to be addressed in a consideration of Aboriginal sites and places are the cultural/social significance to Aboriginal people and their archaeological or scientific significance to archaeologists. The determinations of archaeological and cultural significance for sites and places should then be expressed as statements of significance that preface a concise discussion of the contributing factors to Aboriginal cultural heritage significance.

6.2 Archaeological (scientific significance) values

Archaeological significance (also called scientific significance, as per the ICOMOS Burra Charter) refers to the value of archaeological objects or sites as they relate to research questions that are of importance to the archaeological community, including indigenous communities, heritage managers and academic archaeologists. Generally the value of this type of significance is determined on the basis of the potential for sites and objects to provide information regarding the past life-ways of people (Burke & Smith 2004, p.249, NPWS 1997), For this reason, the NPWS summarises the situation as 'while various criteria for archaeological significance assessment have been advanced over the years, most of them fall under the heading of archaeological research potential' (NPWS 1997, p.26). The NPWS criteria for archaeological significance assessment are based largely on the ICOMOS Burra Charter.

Research potential

Research potential is assessed by examining site content and site condition. Site content refers to all cultural materials and organic remains associated with human activity at a site. Site content also refers to the site structure – the size of the site, the patterning of cultural materials within the site, the presence of any stratified deposits and the rarity of particular artefact types. As the site contents criterion is not applicable to scarred trees, the assessment of scarred trees is outlined separately below. The site content ratings used for archaeological sites are provided in Table 7. Site condition refers to the degree of disturbance to the contents of a site at the time it was recorded. The site condition ratings used for archaeological sites are provided in Table 8.

Table 7 Site contents ratings used for archaeological sites.

Rating	Description
0	No cultural material remaining.
1	Site contains a small number (e.g. 0–10 artefacts) or limited range of cultural materials with no evident

Rating	Description
	stratification.
2	Site contains a larger number, but limited range of cultural materials; and/or some intact stratified deposit remains; and/or are or unusual example(s) of a particular artefact type.
3	Site contains a large number and diverse range of cultural materials; and/or largely intact stratified deposit; and/or surface spatial patterning of cultural materials that still reflect the way in which the cultural materials were deposited.

Table 8 Site condition ratings used for archaeological sites.

Rating	Description
0	Site destroyed.
1	Site in a deteriorated condition with a high degree of disturbance; lack of stratified deposits; some cultural materials remaining.
2	Site in a fair to good condition, but with some disturbance.
3	Site in an excellent condition with little or no disturbance. For surface artefact scatters this may mean that the spatial patterning of cultural materials still reflects the way in which the cultural materials were laid down.

Pearson and Sullivan (1995, p.149) note that Aboriginal archaeological sites are generally of high research potential because 'they are the major source of information about Aboriginal prehistory'. Indeed, the often great time depth of Aboriginal archaeological sites gives them research value from a global perspective, as they are an important record of humanity's history. Research potential can also refer to specific local circumstances in space and time – a site may have particular characteristics (well preserved samples for absolute dating, or a series of refitting artefacts, for example) that mean it can provide information about certain aspects of Aboriginal life in the past that other less or alternatively valuable sites may not (Burke & Smith 2004, pp.247–8). When determining research potential value particular emphasis has been placed on the potential for absolute dating of sites.

The following sections provide statements of significance for the Aboriginal archaeological sites recorded during the surface survey for the assessment. The significance of each site follows the assessment process outlined above. This includes a statement of significance based on the categories defined in the Burra Charter. These categories include social, historic, scientific, aesthetic and cultural (in this case archaeological) landscape values. Nomination of the level of value—high, moderate, low or not applicable—for each relevant category is also proposed. Where suitable the determination of cultural (archaeological) landscape value is applied to both individual sites and places (to explore their associations) and also, to the Study Area as a whole. The nomination levels for the archaeological significance of each site are summarised below.

Representativeness

Representativeness refers to the regional distribution of a particular site type. Representativeness is assessed by whether the site is common, occasional, or rare in a given region. Assessments of representativeness are subjectively biased by current knowledge of the distribution and number of archaeological sites in a region. This varies from place to place depending on the extent of archaeological research. Consequently, a site that is assigned low significance values for contents and condition, but a high significance value for representativeness, can only be regarded as significant in terms of knowledge of the regional archaeology. Any such site should be subject to re-assessment as more archaeological research is undertaken.

Assessment of representativeness also takes into account the contents and condition of a site. For example, in any region there may only be a limited number of sites of any type that have suffered minimal disturbance. Such sites would therefore be given a high significance rating for representativeness, although they may occur commonly within the region. The representativeness ratings used for archaeological sites are provided in Table 9.

Table 9 Site representativeness ratings used for archaeological sites

Rating	Description
1	Common occurrence.
2	Occasional occurrence.
3	Rare occurrence.

Overall scientific significance ratings for sites, based on a cumulative score for site contents, site integrity and representativeness are provided in Table 10.

Table 10 Scientific significance ratings used for archaeological sites

Rating	Description
1-3	Low scientific significance.
4-6	Moderate scientific significance.
7-9	High scientific significance.

Each site is given a score on the basis of these criteria – the overall scientific significance is determined by the cumulative score. This scoring procedure has been applied to the Aboriginal archaeological sites identified during the survey. The results are in Table 11.

6.2.1 Statements of archaeological significance

The following archaeological significance assessment is based on Requirement 11 of the Code. Using the assessment criteria detailed in Scientific Values and Significance Assessment, an assessment of significance was determined and a rating for each site was determined. The results of the archaeological significance assessment are given in Table 12 below.

Table 11 Scientific significance assessment of archaeological sites recorded within the study area.

Site name	Site content	Site condition	Representativeness	Scientific significance
Boomberry Point 1 52-5-0223	1	1	1	3 - Low
Elizabeth Point 52-5-0225	1	1	1	3 - Low
Gilba Road 1 52-5-0642	1	1	1	3 - Low
Gilba Road 2 Fill 52-5-0643	1	1	1	3 - Low

Table 12 Statements of scientific significance for archaeological sites recorded within the study area.

Site Name	Statement of Significance
Boomberry Point 1 52-5-0223	This site consisted of shell midden containing one shell species. The site was exposed on the side of a track in a hill slope landform. The site was noted to be badly disturbed with highly fragmented shell. The site has been assessed as having low archaeological significance.
Elizabeth Point 52-5-0225	Elizabeth Point (52-5-0225) was recorded as an isolated stone artefact located on a walking track. The artefact was a grey chert flake piece, common in the region and was observed to have been disturbed by the walking track. The site has been assessed as having low archaeological significance.
Gilba Road 1 52-5-0642	Site was recorded as a stone artefact located at the very beginning of a concrete pathway. Based on the location of this artefact and current aerial imagery the artefact has been disturbed as the concrete pathway now extends through the area the artefact was initially found in. The site has been assessed as having low archaeological significance.
Gilba Road 2 Fill 52-5-0643	The site was recorded as an artefact and was located in an area of fill, with shell and pottery also present. This location of the artefact in an area of fill indicates that the site has been disturbed and therefore has low archaeological significance.

7 Impact assessment

As previously outlined, the Project proposes to modify the existing concept approval for the Northern Precinct (MP 09_0131 MOD 1) to allow an increased residential lot yield. The DA and modification to the concept approval seeks to create the footprint and increase residential yield for the Northern Precincts.

7.1 Predicted physical impacts

The proposed works will include earthworks, the construction of new residential dwellings and associated infrastructure including roads, underground piping and cabling, and associated earthworks.

Within the study area, there are two recorded Aboriginal sites that may be subject to harm (52-5-0223, and 52-5-0225). It is expected that the potential of harm to 52-5-0223, and 52-5-0225 from the proposed development will be direct, with a total loss of value (Figure 11). Two AHIMS sites (52-5-0642, and 52-5-0643) are located within 10 metres of the study area, and may be subject to harm (Figure 11). It is expected that the potential of harm to 52-5-0642, and 52-5-0643 from the proposed development will be indirect, with a partial loss of value.

Strategies to avoid or minimise harm to Aboriginal heritage in or near the study area are discussed below. A summary of impacts is provided below in Table 13.

Table 13 Summary of potential archaeological impacts

AHIMS site no.	Site name	Significance	Type of harm	Degree of harm	Consequence of harm
52-5-0223	Boomberry Point 1	Low	Direct	Total	Total loss of value
52-5-0225	Elizabeth Point	Low	Direct	Total	Total loss of value
52-5-0642	Gilba Road 1	Low	Indirect	Partial	Partial loss of value
52-5-0643	Gilba Road 2 Fill	Low	Indirect	Partial	Partial loss of value

7.2 Management and mitigation measures

Ideally, heritage management involves conservation of sites through the preservation and conservation of fabric and context within a framework of 'doing as much as necessary, as little as possible' (Australia ICOMOS 2013). In cases where conservation is not practical, several options for management are available. For sites, management often involves the salvage of features or artefacts, retrieval of information through excavation or collection (especially where impact cannot be avoided) and interpretation.

Avoidance of impact to archaeological and cultural heritage sites through design of the development is the primary mitigation and management strategy, and should be implemented where practicable.

Boomberry Point 1 (AHIMS 52-5-0223) and Elizabeth Point (AHIMS 52-5-0225) are currently located within the proposed development area and impacts cannot be avoided. It is therefore recommended that an archaeological test excavation program be conducted within the vicinity of these two sites. Under Requirement 14 of the Code, test excavations within 50 metres of known or suspected shell midden sites are

not permitted without an AHIP. Due to the presence of AHIMS 52-5-0223 (Boomberry Point 1) within the study area and the proximity of one possible midden, AHIMS 52-5-0643 (Gilba Road 2 Fill 1), it will be necessary to apply for an AHIP to conduct test excavations.

Previous assessments, including a limited archaeological test excavation program conducted by Biosis (2010), identified an area of moderate subsurface archaeological potential within the study area. Further testing is therefore recommended in the area of moderate archaeological potential prior to development, to fully identify the nature and extent of Aboriginal occupation within the study area.

Legend

- Study area
- Proposed development
- AHIMS record

Figure 11 Proposed development with AHIMS

0 50 100 150 200

Metres
Scale: 1:4,000 @ A3
Coordinate System: GDA 1994 NSW Lambert

N

biosis

Biosis Pty Ltd

Albury, Ballarat, Melbourne,
Newcastle, Sydney, Wangaratta & Wollongong

Matter: 30437
Date: 21 October 2019,
Checked by: SJK, Drawn by: LW, Last edited by: amurray
Location:P:\30400s\30437\Mapping
30437_ACHA_F6_AHIMSDevelop

8 Recommendations

Strategies have been developed based on the archaeological (significance) of cultural heritage relevant to the study area and influenced by:

- Predicted impacts to Aboriginal cultural heritage.
- The planning approvals framework.
- Current best conservation practise, widely considered to include:
  - Ethos of the Australia ICOMOS Burra Charter.
  - The Code.

Prior to any impacts occurring within the study area, the following is recommended:

Recommendation 1: Application for an AHIP to conduct test excavations

Under Requirement 14 of the Code, test excavations within 50 metres of known or suspected shell midden sites are not permitted without an AHIP. Due to the presence of AHIMS 52-5-0223 (Boomberry Point 1) within the study area and the proximity of one possible midden, AHIMS 52-5-0643 (Gilba Road 2 Fill 1), it will be necessary to apply for an AHIP to conduct test excavations.

For information about AHIPs and their preparation, see below.

Advice preparing AHIPs

An AHIP is required for any activities likely to have an impact on Aboriginal objects or Places or cause land to be disturbed for the purposes of discovering an Aboriginal object. The EES issues AHIPs under Part 6 of the NPW Act.

AHIPs should be prepared by a qualified archaeologist and lodged with the EES. Once the application is lodged processing time can take between 8-12 weeks. It should be noted that there will be an application fee levied by the EES for the processing of AHIPs, which is dependent on the estimated total cost of the development project. Where there are multiple sites within one study area an application for an AHIP to cover the entire study area is recommended.

Recommendation 2: Discovery of Unanticipated Aboriginal Objects

All Aboriginal objects and Places are protected under the NPW Act. It is an offence to knowingly disturb an Aboriginal site without a consent permit issued by the EES. Should any Aboriginal objects be encountered during works associated with this proposal, works must cease in the vicinity and the find should not be moved until assessed by a qualified archaeologist. If the find is determined to be an Aboriginal object, the archaeologist will provide further recommendations. These may include notifying the EES and Aboriginal stakeholders.

Recommendation 3: Discovery of Aboriginal Ancestral Remains

Aboriginal ancestral remains may be found in a variety of landscapes in NSW, including middens and sandy or soft sedimentary soils. If any suspected human remains are discovered during any activity you must:

1. Immediately cease all work at that location and not further move or disturb the remains.

2. Notify the NSW Police and EES's Environmental Line on 131 555 as soon as practicable and provide details of the remains and their location.
3. Not recommence work at that location unless authorised in writing by EES.

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Appendices

Appendix 1 AHIMS results

E.1

FINAL TRAFFIC AND TRANSPORT ANALYSIS AND FINAL RESPONSE TO TRAFFIC AND TRANSPORT ISSUES

Our Ref: 8201714202 No:CA
Contact: Christos Apostolopoulos

9 September 2019

Department of Planning, Industry and Environment
320 Pitt Street
GPO Box 39
Sydney NSW 2001

Attention: Michelle Niles

Cardno (NSW/ACT) Pty Ltd
ABN 95 001 145 035

Level 9 - The Forum
203 Pacific Highway
St Leonards NSW 2065
Australia

Phone +61 2 9496 7700
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Dear Michelle,

TALLAWARRA LANDS MIXED USE DEVELOPMENT (MP09_0131 MOD 1) – RESPONSE TO SUBMISSIONS
TRAFFIC IMPACT ASSESSMENT (8201714202, VERSION 4, 18 APRIL 2019) – RESPONSE TO COMMENTS

I refer to the above documentation and the letter received from the Department (your reference MP 09_0131 MOD 1) dated 25 July 2019. The letter has been reviewed and Cardno has prepared a response within this letter to respond to *Key Issue 5 – Road and Connectivity*. Other key issues identified in the letter have been addressed elsewhere.

The structure of the responses contained within this letter have been set up to be consistent with the letter provided by Roads and Maritime Services (RMS) to the Department dated 19 July 2019 (RMS reference STH09/01095/17).

Within this letter, RMS identified a number of outstanding concerns that required further clarification. The responses in the table below seeks to provide clarification/additional information as required to address these concerns.

RMS Comment

The modelling provided in the updated TIA appears to be based on 1,144 proposed lots. The submitted RtS details a lot yield of 1,310 proposed lots (although the figure of 1,320 is also used). It is unclear as to why there is a difference between the lot yields in the TIA and RtS. As such, RMS seeks clarification as to what the correct lot yield is and if the yield in the TIA is incorrect the associated modelling should be updated to reflect the correct yield.

Response

The modelling was based on the revised yield scenarios of 1,144 residential lots (northern and central precincts only) and 1,494 residential lots (all precincts combined). Since the completion of the modelling assessment, multiple revisions of layout plans for the Central and Northern precincts has occurred with the total number of residential lots ultimately defined at 1,251. The modelling reflective of 1,494 lots is therefore based on a conservative (higher) number of lots.

RMS Comment

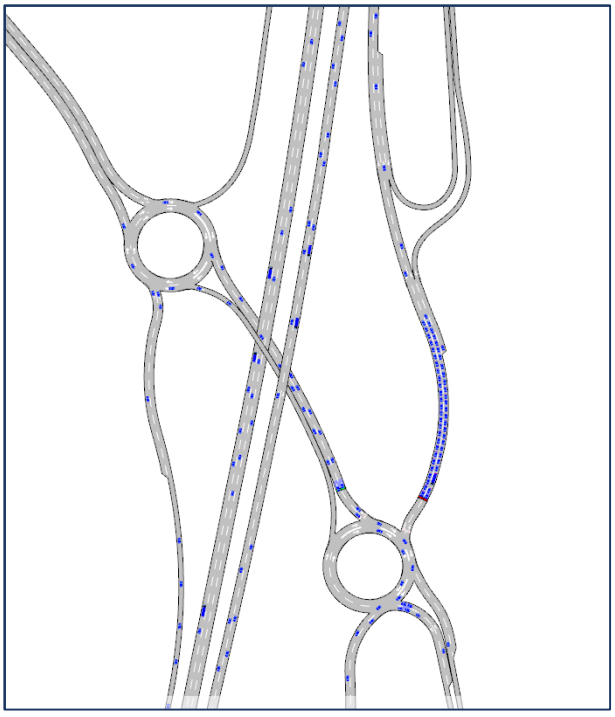
The modelling provided indicates that a Level of Service (Los) D will be provided in the AM and PM peak period for the southbound offload. This appears to be due to the fact that the TIA has not modelled a signalized roundabout (eastern roundabout) which RMS has determined is required in 2041. Refer to Attachment 2 for additional details;

Response

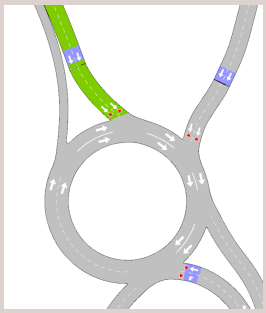
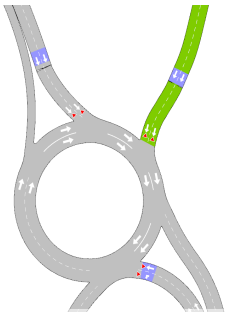
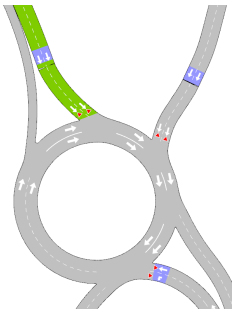
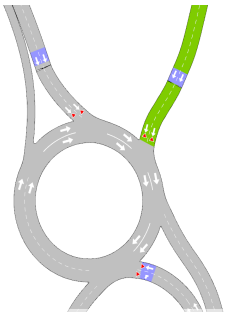
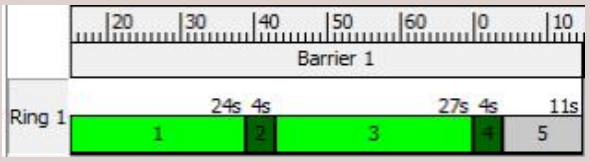
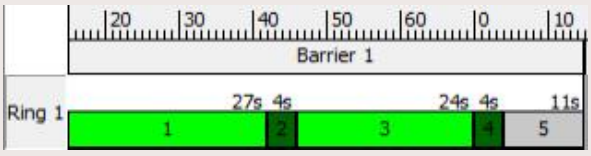
1. Roundabout Metering

Ramp metering has been implemented at the eastern roundabout (northern and western approaches). This is consistent with RMS APRB Design for Approval models.

RMS requires all intersections to operate at a LoS C or better. Revised signal phasing was tested for Scenario 6 (with 1,494 lots). This resulted in improved intersection performance at the eastern roundabout from LoS D to C. The actual signal operation is more likely to be based on vehicle actuation, therefore optimising the phasing arrangement at all times (based on traffic demand on each approach).



The summary below illustrates the signal timing changes (PM peak) applied at the eastern roundabout of the northern interchange:

Adopted APRB Design for Approval model signal timings *(also used in the traffic impact assessment report - Job reference: 8201714202, Version 4, dated 18 April 2019)*		***Revised signal timing operation***	
A phase	*B phase*	*A phase*	*B phase*
			
			

2. Off-Ramp LoS Calculation

The other model location showing a LoS D was the southbound exit ramp. Upon reviewing the LoS calculations adopted, it was found that capacity of 2000 pcus//hour was erroneously assumed (this capacity refers to segments with 1 lane). A capacity of 4000 pcus//hour should have been assumed (given the 2 lane layout at this location). The LoS calculation was revised and the LoS improved from D to B.

3. APRB Report Revision

The traffic impact assessment report (Job reference: 8201714202, Version 4, dated 18 April 2019) compared the intersection performance under Scenario 6 with the Albion Park Rail Bypass "Addendum Traffic and Transport Assessment Report revision 04". A new comparison with the most recent revision ("Revision 08") was undertaken as part of his response. A summary of all scenarios and comparisons is shown below.

Sce.	Model Used	Location	APRB Revision 04 (1,010 Lots)		APRB Revision 08 (1,010 Lots)		Previous Modelling Scenario 6 (1,494 Lots) TIA (8201714202) – 18 April 2019		Revised Modelling (1,494 Lots)*	
			AM	PM	AM	PM	AM	PM	AM	PM
6	2041 Design for Approval	Northbound Entry Ramp	A	A	A	A	A	A	A	A
		Northbound Exit Ramp	C	C	C	C	C	C	C	C
		Southbound Entry Ramp	C	B	C	C	C	C	C	C
		Southbound Exit Ramp	D	D	B	B	C	D	B	B
		Western Rdbt	A	A	A	A	A	A	A	A
		Eastern Rdbt	B	B	B	B	B	D	B	C

**including roundabout metering changes and off-ramp revised calculations*

RMS Comment

RMS disagrees with the conclusion in the TIA that a LoS D is ok. RMS' capacity requirement has always been a LoS C or better. As such, additional details are required on how the proposed development will provide a LoS C or better;

Response

Revised modelling shows LoS performance of C or better across all intersections and mid-block locations – see above.

RMS Comment

It is RMS' understanding that the current Tallawarra Lands Concept Plan approval requires the proponent to upgrade the Yallah Bay Road and Princes Highway intersection. RMS seeks confirmation that this still will be undertaken as part of the approved development. It is unclear to RMS how this intersection will be able to perform at a satisfactory LoS without some changes to its configuration. This should be modelled by the proponent with and required changes being clearly detailed;

Response

Yallah Bay Road / Princes Highway intersection performs at LoS C or better across all assessed scenarios (traffic signal installation at some scenarios has been proposed with existing layout geometry and a 2-phase signal operation)

RMS Comment

The increased traffic yield scenarios in the TIA have been modelled with a Haywood Bay link in place, whereas the scenarios within the approve development yield do not appear to have been. As such, any approval for an additional lot yield, as currently sought, should ensure that the Haywards Bay link/connection is provided and should not be deferred until the Lakeside/Southern Precinct is develop. Additional comments on the issue of 'Connectivity' are provided in a separate point below;

Response

It was discussed during a meeting with RMS on 9 Aug 2019 how a timeframe for the delivery of the road could not be imposed at this point in time. RMS highlighted the need for the road to be a crucial part of the development and to ensure provision of a road corridor between Tallawarra and Haywards Bay is preserved. During the meeting, it was agreed that no work would be done as part of the northern and central precincts that would preclude the delivery of this road corridor. This road corridor should be wide enough to accommodate the construction of a road category suitable for bus movements in both directions and sufficient space for a shared path.

RMS Comment

RMS is unclear as to how some of the Traffic Impact Assessment/Modelling issues detailed in its response dated 15 August 2018 have been addressed in the RtS and the updated TIA that has been submitted (refer to Attachment 3 – yellow highlighted sections).

> No traffic volume changes have been documented. The models provided assess the modified land use scenarios but nothing has been shown as to how this translated into volume increases across the network. RMS requires additional information to enable it to understand the volume changes resulting from the modification.

Response

Traffic flow plots comparing the old residential yield of 1,010 lots to the 1,494 lots scenario have been prepared and attached in Appendix A

RMS Comment

RMS is unclear as to how some of the Traffic Impact Assessment/Modelling issues detailed in its response dated 15 August 2018 have been addressed in the RtS and the updated TIA that has been submitted (refer to Attachment 3 – yellow highlighted sections).

> The Tallawarra Lands development, based on the information in the TIA, will generate an estimated 2,760 jobs (1,640 direct jobs and 1,121 indirect jobs – as noted in the TIA). Only direct jobs have been considered in the updated TIA. While it is noted that the TIA states that "indirect jobs would have been included in the overall regional employment growth applied in TRACKS for the 2026 and 2041 design horizon years", RMS requires confirmation that this was the case and if not, the modelling for this modification needs to be updated to reflect the traffic impacts for both the direct and indirect employment opportunities.

Response

The indirect jobs mentioned in the TIA have been spread throughout the background growth in regional jobs included in the future year models. Jobs in the future models were made up of specifically identified areas of job growth, mainly associated with the developments in Port Kembla, West Dapto, Calderwood, Tallawarra etc, and a general increase in jobs distributed throughout the model on a pro-rata basis to maintain a realistic employment to population ratio.

RMS Comment

RMS is unclear as to how some of the Traffic Impact Assessment/Modelling issues detailed in its response dated 15 August 2018 have been addressed in the RtS and the updated TIA that has been submitted (refer to Attachment 3 – yellow highlighted sections).

> The updated employment numbers show that in the northern precinct there will be 612 jobs (refer to Figure 3.5 – Employment Distribution revised). Noting that this precinct only contains residential lands and open space/environmental land with no employment lands it is unclear as to how the number of jobs shown in the northern precinct has been determined. RMS requires clarification;

Response

The figure of 612 jobs was derived from a vision that was created for the site b that included potential foreshore development works. To ensure that traffic modelling was conservative, this number of jobs was identified for the north shore precinct and used in the modelling. This has been done to ensure that future road works could cater for the possibility of foreshore job creation. Given the foreshore work may not occur it is assumed that the modelling is conservative and ensures flexibility in the future.

Yours sincerely,

Christos Apostolopoulos
Traffic Engineer
for Cardno
Direct Line: +61 2 9496 7735
Email: chris.apostolopoulos@cardno.com.au

Appendix A – Traffic Flow Plots

Appendix B – RMS Response to Submissions Letter

Appendix A

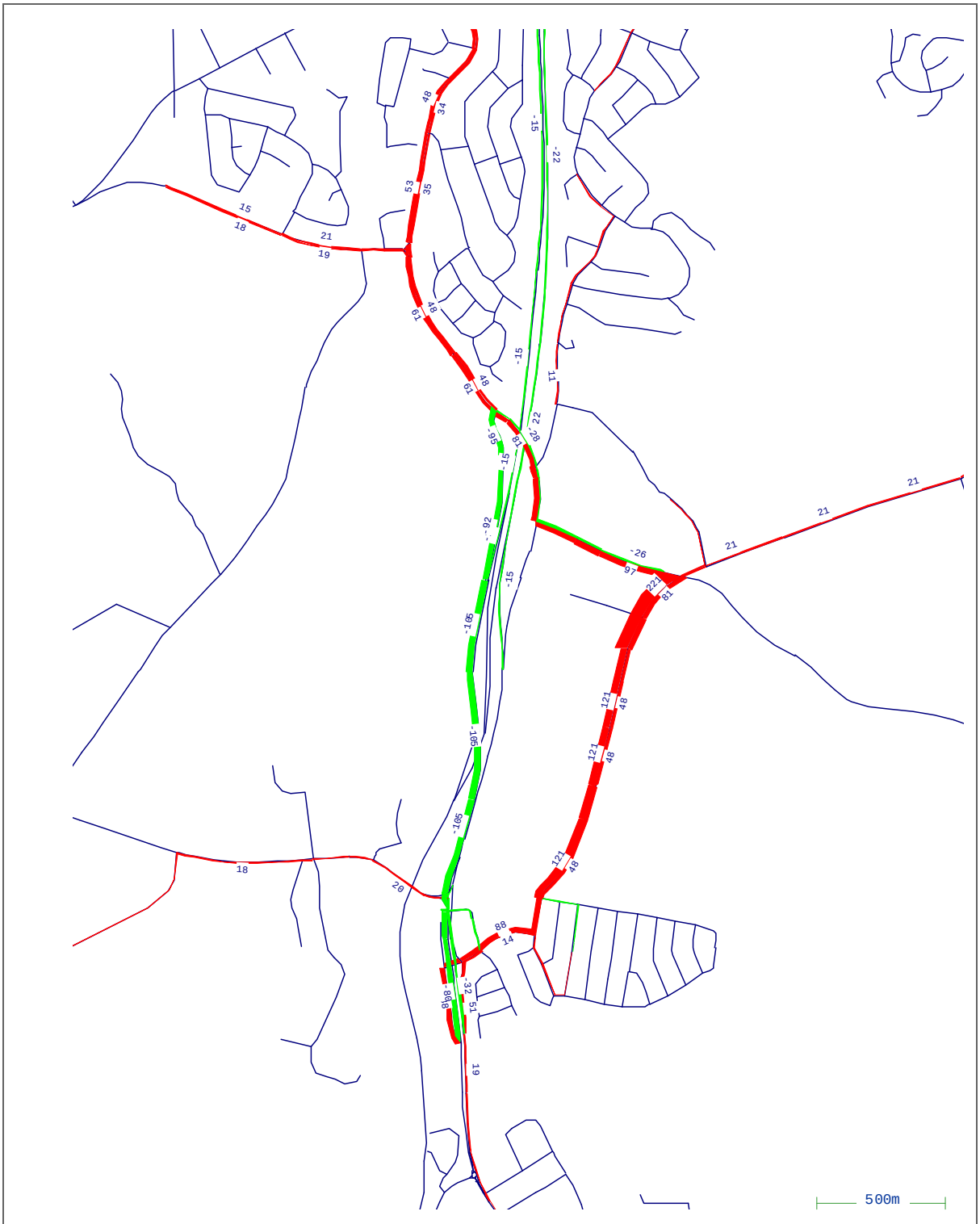
2041 AM Peak 1HR All Vehicle
Change in Flow – 1494HH Stage 2 vs 1144HH Stage 1

TDG now Stantec

1

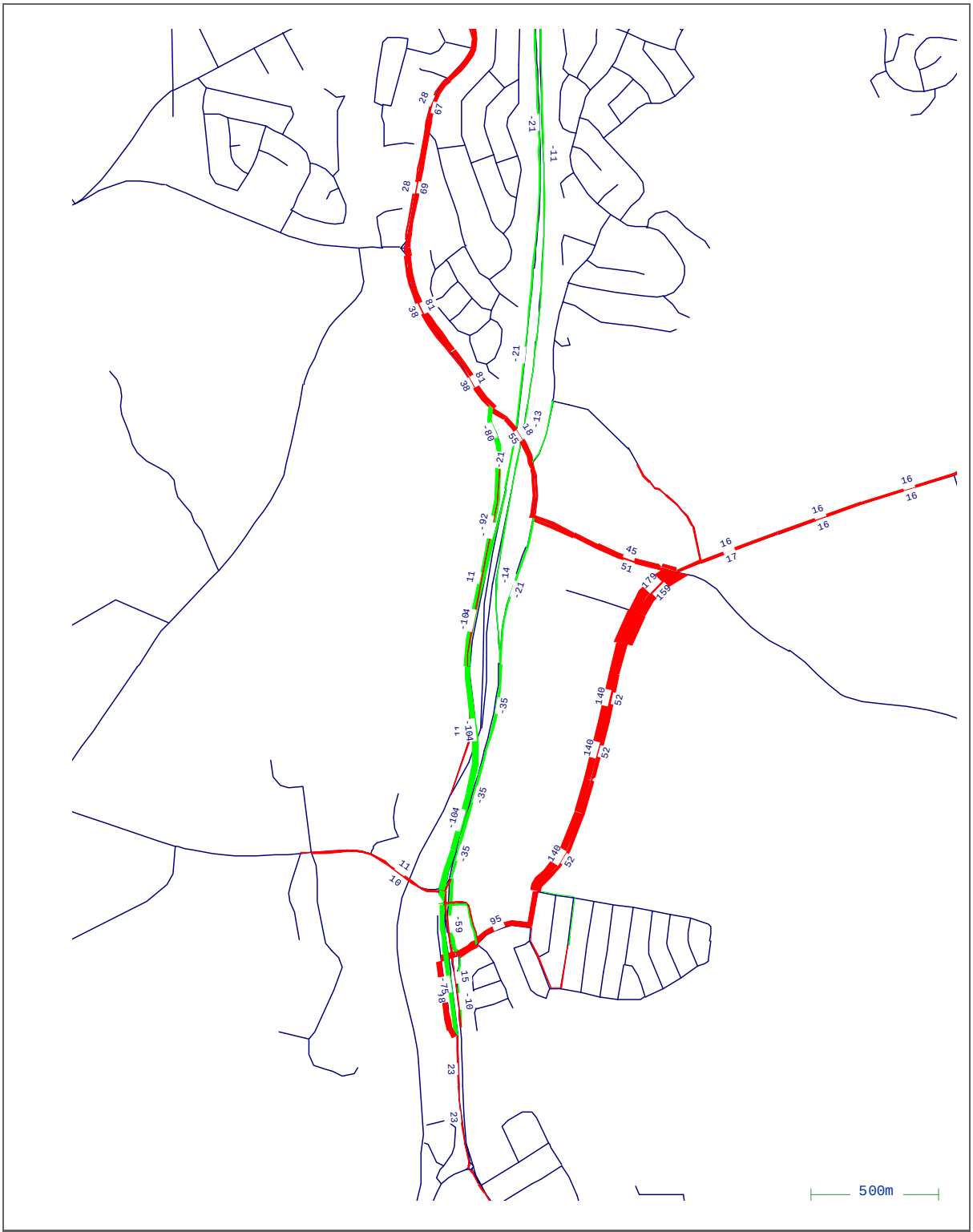
2041 PM Peak 1HR All Vehicle
Change in Flow – 1494HH Stage 2 vs 1144HH Stage 1

TDG now Stantec



2041 AM Peak 1HR All Vehicle – Detailed View
Change in Flow – 1494HH Stage 2 vs 1144HH Stage 1

TDG now Stantec



2041 PM Peak 1HR All Vehicle – Detailed View
Change in Flow – 1494HH Stage 2 vs 1144HH Stage 1

TDG now Stantec

Appendix B

Transport
Roads & Maritime
Services

Our ref: STH09/01095/17
Contact: Andrew Lissenden
Your ref: MP09_0131 MOD 1

19 July 2019

Michelle Niles
Senior Planner – Regional Assessments
NSW Department of Planning, Industry and Environment
BY EMAIL: information@planning.nsw.gov.au

TALLAWARRA LANDS MIXED USE DEVELOPMENT (MP09_0131 MOD 1) – RESPONSE TO SUBMISSIONS

Dear Michelle,

Roads and Maritime Services (RMS) refers to the proponents Response to Submissions (RtS) relating to the above modification that has been forwarded to RMS for comment.

RMS has reviewed the information provided and apologies for the delay in providing its formal comments. RMS' review has focused on the impact to the state road network. RMS as a result of its review/assessment notes the following:

- For this development, the key state road is the Princes Highway;
- The modification (as amended) seeks to:
    - Increase the density of development within the northern and central portion of the site (i.e. increase in the residential and industrial footprints as well as reduce the opens space, commercial and retail footprints);
    - Increase the maximum number of residential lots from 1,010 lots to 1,310 lots (previously the increase was to 1,480 lots). This to occur within the northern and central precincts;
    - Separate the northern and central precincts of the concept approval from the southern precinct; and
    - Amend a number of conditions some of which relate to infrastructure upgrades and state public infrastructure provision;
- RMS is currently undertaking works relating to the extension of the M1 Princes Motorway between Yallah and Oak Flats to bypass Albion Park Rail (i.e. the Albion Park Rail bypass project). Part of the extension works that are being undertaken adjoin the western boundary of the development site; and
- RMS has previously provided advice to the proponent's consultant Cardno on the proposed modification prior to its formal lodgement (RMS letter dated 14 September 2017). Advice has also been provided to the Department of Planning and Environment (DP&E) as part of the proposals public exhibition (RMS letter dated 15 August 2018 and email dated 11 September 2018).

Having regard for the above RMS advises that it still has concerns with the proposal as currently provided for comment. More detailed comments are provided in **Attachment 1** to this letter.

RMS again requests that the determination of the modification request not occur until the proponent has amended the current application to addresses the issues detailed in **Attachment 1**. This ensuring that the modification, if approved, has minimal impacts on the state road network and correctly reflects the works required to be provided by the developer as part of any future development applications lodged.

If you have any questions please contact Andrew Lissenden on 4221 2769.

RMS notes that Transport for NSW has provided separate comments to DP&E in relation to the submitted RtS in relation to bus routes, active transport infrastructure and public transport capable infrastructure.

Please ensure that any further email correspondence is sent to 'development.southern@rms.nsw.gov.au'.

Yours sincerely

Chris Millet
Manager Land Use
Southern Region

Cc: Michelle.Niles@planning.nsw.gov.au

- **Issues to be Addressed:**

  - *Traffic Impact Assessment/Modelling:* RMS from reviewing the updated *Traffic Impact Assessment* (TIA) prepared by Cardno (Job Ref: 8201714202, Version 04, dated 18 April 2019) provides the following comments:

    - The modelling provided in the updated TIA appears to be based on 1,144 proposed lots. The submitted RtS details a lot yield of 1,310 proposed lots (although the figure of 1,320 is also used). It is unclear as to why there is a difference between the lot yields in the TIA and RtS. As such, RMS seeks clarification as to what the correct lot yield is and if the yield in the TIA is incorrect the associated modelling should be updated to reflect the correct yield;
    - The modelling provided indicates that a Level of Service (Los) D will be provided in the AM and PM peak period for the southbound offload. This appears to be due to the fact that the TIA has not modelled a signalised roundabout (eastern roundabout) which RMS has determined is required in 2041. Refer to **Attachment 2** for additional details;
    - RMS disagrees with the conclusion in the TIA that a LoS D is ok. RMS' capacity requirement has always been a LoS C or better. As such, additional details are required on how the proposed development will provide a LoS C or better;
    - It is RMS' understanding that the current Tallawarra Lands Concept Plan approval requires the proponent to upgrade the Yallah Bay Road and Princes Highway intersection. RMS seeks confirmation that this still will be undertaken as part of the approved development. It is unclear to RMS how this intersection will be able to perform at a satisfactory LoS without some changes to its configuration. This should be modelled by the proponent with and required changes being clearly detailed;
    - The increased traffic yield scenarios in the TIA have been modelled with a Haywood Bay link in place, whereas the scenarios within the approve development yield do not appear to have been. As such, any approval for an additional lot yield, as currently sought, should ensure that the Haywards Bay link/connection is provided and should not be deferred until the Lakeside/Southern Precinct is develop. Additional comments on the issue of 'Connectivity' are provided in a separate point below; and
    - RMS is unclear as to how some of the Traffic Impact Assessment/Modelling issues detailed in its response dated 15 August 2018 have been addressed in the RtS and the updated TIA that has been submitted (refer to **Attachment 3** – yellow highlighted sections).

  - *Noise Mitigation:* As the average annual daily traffic (AADT) along the adjoining section of the Princes Highway is greater than 20,000 vehicles per day, RMS acknowledges that appropriate measures must be identified that will ensure noise levels as specified in Clause 102 of *State Environmental Policy (Infrastructure) 2007* are not exceeded. RMS from reviewing the updated Noise Assessment prepared by Pacific Environmental (Doc No. ACO-NSW-000-21909, Version I, dated 26.10.2018) still has concerns that the updated report only mentions treatment of future receivers by way of architectural treatment. There is no mention of considering noise walls which are preferred as they provide noise reduction for both the external and internal areas.

    In addition, concern is raised in regards to the mapped zones for acceptable areas (refer to Figure 8.1 in Section 8). The updated report shows a "Provisional Zone" (in orange) where mechanical ventilation and upgraded façade elements such as windows, doors and roof insulation may be required. It is however acknowledged that it does set the area where noise mitigation would be considered. RMS believes that the area shown is indicative only and as such some additional wording should be added to this figure advising that this zone is only indicative and that further investigation

would be required at the detailed design stage of Tallawarra Lands to determine the extent of the area where noise mitigation would be considered/required.

RMS maintains its position that the responsibility for noise mitigation lies with the developer when approval for the road project is determined prior to the approval for the construction of the dwelling (as is the current situation). As has been previously advised the approval for a sub-division is not enough to relinquish responsibility of noise mitigation for the developer. Only if the developer has approval for the construction of the dwelling prior to the determination of the road project then RMS would be responsible for mitigation and this would depend on the stage of construction for the dwelling. Noise mitigation by way of the hierarchy outlined in EPA's "*Road Noise Policy*" would be provided when the dwelling has already been constructed however in the situation where construction has not commenced then RMS' obligation is to provide at-source mitigation assuming a single storey residence (Practice Note 2 of RMS' "Environmental Noise Management Manual".

Having regard for the above the Albion Park Rail Bypass project would not be responsible for noise mitigation for the Tallawarra Lands Concept Plan Approval Modification. It is up to the determining authority/DP&E to ensure that the relevant requirements (e.g. *Development Near Rail Corridors and Busy Roads – Interim Guideline*) are adhered to.

- *Connectivity:* RMS notes that the RtS still seeks to separate the northern and central precincts from the southern precinct, which is currently owned by a different land owner, however forms part of the same major project approval.

  RMS maintains its objection to this split and that connectivity of the development, as approved, to Haywards Bay that adjoins the southern boundary of the site is vital to minimise local trips on the state road network. As such, from a network perspective it is important that this link is provided prior to the creation/registration of the neighbourhood centre land and industrial land which are employment generating and will provide services and employment opportunities to the communities that exist to the south (i.e. Haywards Bay). This connectivity ensuring suburbs are appropriately connected. Without this link, local trips between Haywards Bay and Tallawarra will need to be made via the Princes Motorway and Princes Highway which is considered inappropriate. Connected neighbourhoods are also desirable from a comprehensive bus network perspective and given the focus required on alternative modes of transport it is considered that this link should be provided as part of the creation of the employment lands in the central precinct. Given the proposed lot layout the majority of traffic that would use this link would be residential traffic rather than heavy vehicles as the commercial and industrial precincts have more convenient access to the freeway/highway. RMS does not accept the proponent's position that "*this road corridor will not be feasible until such time as the Lakeside precinct is developed (owned by Energy Australia).*" The proponents submission noting that at that the Tallawarra Lands development will provide a mix of services that will be required residents in Haywards Bay on a day to day basis as well as stating that Energy Australia representatives have confirmed that the development of their land (i.e. the southern/lakeside precinct) will not be in place by 2026 and most unlikely by 2041.

  Previous advice provided by RMS to both the proponent and DPE has detailed the RMS concerns on the non-provision of connectivity to/from Haywards Bay for vehicles (cars, buses, etc), pedestrians and cyclists. With the above advice on the timeframe for future development of the southern/lakeside precinct unlikely by 2041, the proposed non provision of the road link between Haywards Bay and the neighbourhood centre land, industrial land in the central precinct until after 2041 is not supported. RMS maintains that connectivity to Haywards Bay is vital to minimise local trips on the state road network.

- **Other General Comments:**
  - *Albion Park Rail Bypass:* As noted above RMS is currently undertaking works for the upgrade of the Princes Highway as per the planning approval that has been issued. A portion of these works occurring in the vicinity of the subject sites western boundary.

    Based on the information that has now been provided RMS is satisfied that the amended subdivision layout in the southwestern portion of the Central Precinct as detailed in the RtS (i.e. as shown in Figure 5.6 on Page 45 of the *Tallawarra Lands - Response to Submissions* prepared by Cardno Job Ref: 82017142-02, Version 5, dated 13 May 2019) has now been adjusted to have regard for the latest road boundaries for the Albion Park Rail bypass project. As such, no proposed lots and/or works associated with the proposed modified development appear to be in the area required by RMS for RMS Albion Park Rail bypass project. Noting the comments above it is recommended that any approval, when issued, is conditioned such that no works associated with the development are to occur within the Albion Park Rail bypass project boundaries (inclusive of the future Stage 3 Yallah Interchange) and must be wholly located outside the currently identified and required road reserve area as has been advised by RMS. This including, but not limited to, proposed local roads, bicycle paths, noise mitigation measures, landscaping works and infrastructure required to service the proposed development.
  - *Open Space/Landscape Plans:* RMS from reviewing the updated landscape plans prepared by Cardno (with reference Project No.82017142-02, Drawings L1002, L1003, L1006, Issue 4, dated 10.5.19) notes that land in the vicinity of the sites western boundary that is affected by the Albion Park Rail Bypass is no longer shown as containing tree planting and bicycle path linkages or identified as open space lands that are being provided to service the proposed development. As such, RMS raises no concerns with the amended plans that have been submitted with the RtS. It is however recommended that any approval, when issued, is conditioned such that no works associated with the development are to occur within the Albion Park Rail bypass project boundaries (i.e. new tree planting, bicycle path linkages, noise attenuation, etc).
  - *Amendments to Conditions:* As per RMS' previous advice (RMS letter dated 15 August 2018), it is noted that the current modification still seeks to amend the requirements of Conditions 15, 16 and 25 of the concept approval. On the basis that the comments above under the dot point 'Issues to be Addressed' can be satisfactorily addressed the following comments are provided:
    - *Condition 15 - Upgrade of the junction of the Princes Highway and Yallah Bay Road to a roundabout:* This modification seeks to amend the requirements of Condition 15 to provide clarity on when the design for the upgrade of the junction of the Princes Highway and Yallah Bay Road to a roundabout is required. RMS raises no objection with the proponent's proposal to amend the timing of the design to be required in connection with the future subdivision of the Central Precinct and not as part of the DA for superlot subdivision;
    - *Condition 16 - Requirements for a Concept Design for the Closure of Cormack Avenue:* This modification seeks to amend the requirements of Condition 16 to provide clarity on when the design for the closure of Cormack Avenue is to be provided. RMS raises no objection with the proponent's proposal to amend the timing of the design so it is required in connection with the future subdivision of the Central Precinct and not as part of the DA for superlot subdivision; and
    - *Condition 25 - Satisfactory Arrangements for the provision of designated State public infrastructure:* The modification seeks to amend the requirements of Condition 25 so as to enable the lodgement of a DA for superlot subdivision that "*does not include any physical works or subsequent applications*" prior to satisfactory arrangements for the provision of designated State public infrastructure in accordance with Clause 6.1 of WLEP 2009 being demonstrated. Subject to

the land within the development site that is required for the Albion Park Rail Bypass project being identified as a separate lot on any superlot subdivision plan that is lodged for the central precinct and written approval being obtained from RMS prior to registration of the superlot for the central precinct confirming that sufficient land has been provided for the works required for the Albion Park Rail Bypass project, RMS raised no objection.

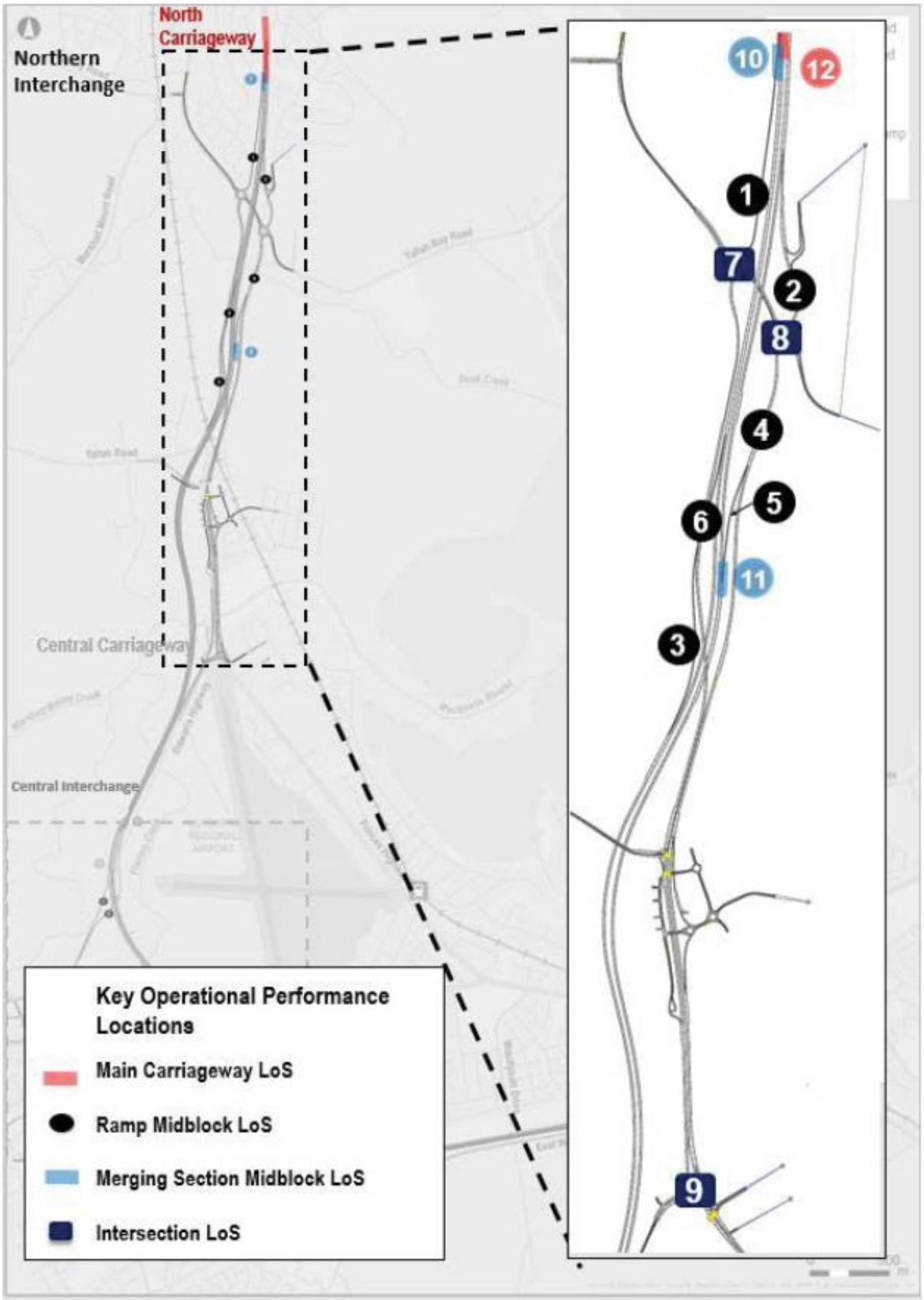


Figure 5-7 Northern Interchange Performance Locations

Table 5-4 and Table 5-5 summarise the results for the Northern interchange in the 2041 Aimsun model in comparison with the 2041 EIS results.

This is 'C' in the updated Traffic Report submitted which is a change from current.

Table 5-4 Northern Interchange Performance Results – AM Results

ID	Location		EIS		Current Design	
Ramp Midblock Level of service		**No. of lanes**	**LoS**		**LoS**	
1	Northbound entry ramp	1	A		A	
2	Southbound exit ramp	1	C		B	
3	Northbound exit ramp	1	B		C	
4	Southbound entry ramp	1	A		C	
5	Southbound entry ramp	1	-*		B	
6	Northbound exit ramp	1	C		C	
Intersection Level of service		**Type**	**Average Delay (seconds)**	**LoS**	**Average Delay (seconds)**	**LoS**
7	Western roundabout	Roundabout	11	A	13	A
8	Eastern Roundabout	Signalised	17	B	25	B
9	Illawarra Highway / Princes Hwy	Roundabout	7	A	15	B
Merging Section Level of Service			**LoS**		**LoS**	
10	Northbound entry ramp		B		C	
11	Southbound entry ramp		C		B	
Main Carriageway Sections Midblock LoS			**LoS**		**LoS**	
12	North		Northbound: C Southbound: C		Northbound: C Southbound: B	

Source: Aimsun Model (2016).

* This ramp location has been changed equivalent performance results not comparable to the EIS

This is 'D' in the updated Traffic Report submitted which is concern for RMS.

Table 5-5 Northern Interchange Performance Results – PM Results

ID	Location		EIS		Current Design	
Ramp Midblock Level of service		**No. of lanes**	**LoS**		**LoS**	
1	Northbound entry ramp	1	A		A	
2	Southbound exit ramp	1	C		B	
3	Northbound exit ramp	1	B		B	
4	Southbound entry ramp	1	B		C	
5	Southbound entry ramp	1	-*		B	
6	Northbound exit ramp	1	C		C	
Intersection Level of service		**Type**	**Average Delay (seconds)**	**LoS**	**Average Delay (seconds)**	**LoS**
7	Western roundabout	Roundabout	12	A	11	A
8	Eastern Roundabout	Signalised	22	B	26	B
9	Illawarra Highway / Princes Highway	Roundabout	7	A	11	A
Merging Section Level of Service			**LoS**		**LoS**	
10	Northbound entry ramp		B		B	
11	Southbound entry ramp		C		C	
Main Carriageway Sections Midblock LoS			**LoS**		**LoS**	
12	North		Northbound: B Southbound: D		Northbound: C Southbound: C	

Source: Aimsun Model (2016).

RMS assumed this was a signalised roundabout in 2041 and as a result RMS has 'B' not 'D' as contained in the updated Traffic Report submitted.

* This ramp location has been changed equivalent performance result

The midblock performance of the ramps (ID 1-6) all operate at an adequate LoS C or better in both AM and PM peak periods.

The merging sections (ID 10 and 11) on the motorway for the northbound and southbound entry ramps operate at LoS C or better in both peak periods.

The eastern roundabout at the Northern interchange (ID 8) is forecast to operate at LoS B in both AM and PM peak periods, with an average delay of 25 seconds in the AM peak hour and 26 seconds in the PM peak hour.

Ramp metering has been implemented at this roundabout on the northern and western approaches to allow sufficient opportunity for Yallah Bay Road traffic to exit. As shown in Table 5-6, all approaches perform at LoS C or better. It is anticipated that this metering will be further considered and refined at detailed design, including consideration of delaying the implementation of metering until it is necessary.

Noting the concerns above, RMS requests that the plans submitted (e.g. Figures 3.1, 3.4, 3.5, 5.3, etc) are updated to clearly show the current Albion Park Rail bypass project boundaries so as to demonstrate that all works proposed and required as part of this concept approval are wholly located outside the currently identified/required road reserve area (e.g. local roads, bicycle paths, noise mitigation measures, etc).

- *Traffic Impact Assessment/Modelling:* RMS from reviewing the Traffic Impact Assessment (TIA) prepared by Cardno (Job Ref: 8201714202, Version 02, dated 8 September 2017) provides the following comments:

  - No traffic volume changes have been documented. The models provided assess the modified land use scenarios, but nothing has been shown as to how this translated into volume increases across the network. RMS requires additional information to enable it to understand the volume changes resulting from the modification;
  - The Tallawarra Lands development, based on the information in the TIA, will generate an estimated 2,760 jobs (1,640 direct jobs and 1,121 indirect jobs - as noted in the TIA). Only direct jobs have been considered in the updated TIA. While it is noted that the TIA states that "*indirect jobs would have been included in the overall regional employment growth applied in TRACKS for the 2026 and 2041 design horizon years*", RMS requires confirmation that this was the case and if not, the modelling for this modification needs to be updated to reflect the traffic impacts for both the direct and indirect employment opportunities;
  - The updated employment numbers show that in the northern precinct there will be 612 jobs (refer to Figure 3.5 – Employment Distribution revised). Noting that this precinct only contains residential lands and open space/environmental land with no employment lands it is unclear as to how the number of jobs shown in the northern precinct has been determined. RMS requires clarification;
  - By 2041 there are some Level of Service (LOS) changes as well as intersection capacity issues, particularly in the PM peak at the northbound offload to Princes Highway (LOS B to E). LOS B was with the original approved 1010 lot residential yield. LOS E/F was with the full modified 1494 lots at 2041. RMS notes that this intersection was sensitive to volume changes when the APRB models were being worked on. RMS also notes that this may require an intersection upgrade to roundabout or signals if northern interchange is not built. RMS requires details on any proposal as part of this modification to make improvements at this intersection to ensure it operates at a satisfactory level;

E.2

RMS EMAIL CONFIRMING NOISE ATTENUATION SATISFACTORILY ADDRESSED

Adam Clarke

From:	Con Tsitsos <Con.TSITSOS@rms.nsw.gov.au>
Sent:	Thursday, 31 October 2019 8:05 AM
To:	Adam Clarke
Cc:	Aaron Mckenzie; Andrew Lissenden
Subject:	RE: Tallawarra Lands Submission to DPIE (MP 09_0131 MOD 1) - RMS Interim Comments (Your Ref: 82017142-01:SP, RMS Ref: STH09/01095/18) [Filed 31 Oct 2019 08:20]

Hi Adam,

Happy with the proposal from Aaron.

Regards,

Con Tsitsos
Environment Officer
Environment | Safety, Environment and Regulation
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www.rms.nsw.gov.au
Every journey matters

Roads and Maritime Services
Level 3, 27 Argyle Street, Parramatta NSW 2150
PO Box 973 Parramatta NSW 2124

From: Adam Clarke [mailto:adam.clarke@cardno.com.au]
Sent: Thursday, 31 October 2019 7:34 AM
To: Aaron Mckenzie; Con Tsitsos
Subject: RE: Tallawarra Lands Submission to DPIE (MP 09_0131 MOD 1) - RMS Interim Comments (Your Ref: 82017142-01:SP, RMS Ref: STH09/01095/18)

Hi Con

We are looking to re-submit to the Department. Can you confirm you are happy with what Aaron has proposed below?

Regards

Adam Clarke
MANAGER - CIVIL INFRASTRUCTURE - PROJECT DELIVERY
CARDNO

Phone +61 2 4231 9600 Fax +61 2 4228 6811 Direct +61 2 4231 9629
Address Ground Floor, 16 Burelli Street, Wollongong, New South Wales 2500 Australia
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Email adam.clarke@cardno.com.au Web www.cardno.com

CONNECT WITH CARDNO

From: Aaron Mckenzie <Aaron.Mckenzie@erm.com>
Sent: Friday, 25 October 2019 4:07 PM
To: Con Tsitsos <Con.TSITSOS@rms.nsw.gov.au>
Cc: Adam Clarke <adam.clarke@cardno.com.au>
Subject: RE: Tallawarra Lands Submission to DPIE (MP 09_0131 MOD 1) - RMS Interim Comments (Your Ref: 82017142-01:SP, RMS Ref: STH09/01095/18)

HI Con

Following our discussion earlier this week, see below proposed text to be included in the submission clarifying the approach for managing noise impacts from the Princes Hwy on the proposed Tallawarra Lands development.

To ensure road traffic noise impacts from the Princes Highway do not adversely impact future residents on the western boundary of the central precinct further noise assessment would be undertaken at allotment design and DA approval stage. This would include:

- *Noise modelling of highway noise impacts (taking into account approved highway upgrade alignment and future traffic volume growth) on the allotment layout design taking into account proposed landform geometry and positioning of dwellings.*
- *Receiver noise levels assessed with reference to the Road Noise Policy Criteria (EPA 2011) and relevant RMS road noise modelling and mitigation guidelines*

Noise modelling of the allotment design will inform the need for mitigation such as noise barriers and/or architectural treatments to achieve external and internal noise criteria.

Trust this mitigates RMS concerns.

Kind regards

Aaron McKenzie
Principal Consultant

ERM
309 Kent St, Sydney, NSW 2000
Direct (02) 8584 8804 | **Mobile** 0422 701 300
E aaron.mckenzie@erm.com | **W** www.erm.com

ERM *The business of sustainability*

From: Con Tsitsos <Con.TSITSOS@rms.nsw.gov.au>
Sent: Tuesday, October 15, 2019 4:31 PM
To: Aaron Mckenzie <Aaron.Mckenzie@erm.com>

Cc: Adam Clarke <adam.clarke@cardno.com.au>
Subject: RE: Tallawarra Lands Submission to DPIE (MP 09_0131 MOD 1) - RMS Interim Comments (Your Ref: 82017142-01:SP, RMS Ref: STH09/01095/18)

Thanks Aaron.

Regards,

Con Tsitsos
Environment Officer
Environment | Safety, Environment and Regulation
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www.rms.nsw.gov.au
Every journey matters

Roads and Maritime Services
Level 3, 27 Argyle Street, Parramatta NSW 2150
PO Box 973 Parramatta NSW 2124

From: Aaron Mckenzie [mailto:Aaron.Mckenzie@erm.com]
Sent: Tuesday, 15 October 2019 4:23 PM
To: Con Tsitsos
Cc: Adam Clarke
Subject: RE: Tallawarra Lands Submission to DPIE (MP 09_0131 MOD 1) - RMS Interim Comments (Your Ref: 82017142-01:SP, RMS Ref: STH09/01095/18)

HI Con,

I am tied up tomorrow and Friday, lets aim for Monday, I will send a meeting invite to lock it in.

Kind regards
Aaron

From: Con Tsitsos <Con.TSITSOS@rms.nsw.gov.au>
Sent: Tuesday, October 15, 2019 1:41 PM
To: Aaron Mckenzie <Aaron.Mckenzie@erm.com>
Cc: Adam Clarke <adam.clarke@cardno.com.au>
Subject: RE: Tallawarra Lands Submission to DPIE (MP 09_0131 MOD 1) - RMS Interim Comments (Your Ref: 82017142-01:SP, RMS Ref: STH09/01095/18)

Hi Aaron,

I am tied up this afternoon and all day Thursday. I'm good for tomorrow afternoon or Friday afternoon. If not then Monday is also fine.

Regards,

Con Tsitsos
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PO Box 973 Parramatta NSW 2124

From: Aaron Mckenzie [mailto:Aaron.Mckenzie@erm.com]
Sent: Tuesday, 15 October 2019 10:07 AM
To: Con Tsitsos
Cc: Adam Clarke
Subject: FW: Tallawarra Lands Submission to DPIE (MP 09_0131 MOD 1) - RMS Interim Comments (Your Ref: 82017142-01:SP, RMS Ref: STH09/01095/18)

Hi Con

Possible to line up a discussion regarding the Tallawarra Lands Project?

As a starting point I have availability this afternoon or possibly Thursday morning

Kind regards

Aaron McKenzie
Principal Consultant

ERM
309 Kent St, Sydney, NSW 2000
Direct (02) 8584 8804 | **Mobile** 0422 701 300
E aaron.mckenzie@erm.com | **W** www.erm.com

From: Adam Clarke <adam.clarke@cardno.com.au>
Sent: Thursday, October 3, 2019 8:29 AM
To: Aaron Mckenzie <Aaron.Mckenzie@erm.com>
Subject: FW: Tallawarra Lands Submission to DPIE (MP 09_0131 MOD 1) - RMS Interim Comments (Your Ref: 82017142-01:SP, RMS Ref: STH09/01095/18)

Hi Aaron

Further to our discussion last week, see correspondence below from RMS re Noise Walls. Can you please try and contact Con and document outcomes so we can provide to RMS in an updated submission?

Thanks again for your help.

Regards

Adam Clarke
MANAGER - CIVIL INFRASTRUCTURE - PROJECT DELIVERY
CARDNO

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From: Andrew Lissenden <andrew.lissenden@rms.nsw.gov.au>
Sent: Thursday, 3 October 2019 8:10 AM
To: Adam Clarke <adam.clarke@cardno.com.au>
Cc: Sophie Perry <sophie.perry@cardno.com.au>; Michelle Niles <Michelle.Niles@planning.nsw.gov.au>
Subject: Tallawarra Lands Submission to DPIE (MP 09_0131 MOD 1) - RMS Interim Comments (Your Ref: 82017142-01:SP, RMS Ref: STH09/01095/18)

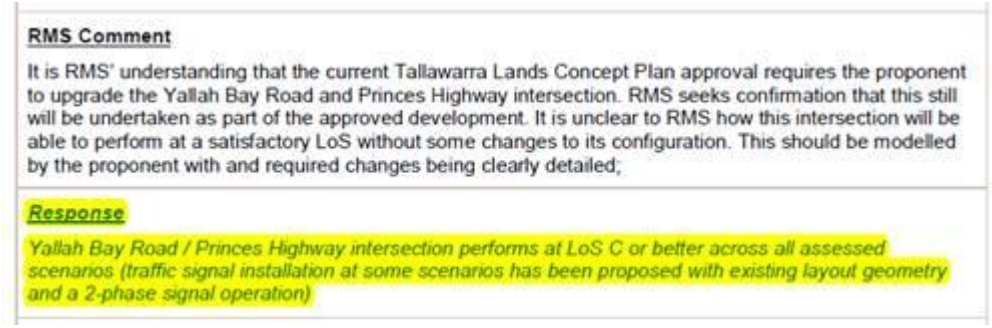
Hi Adam,

Thanks for your email below and the subsequent phone discussion that was had on 27 September 2019. Please be advised that Roads and Maritime Services (RMS) has reviewed Cardno's letter dated 13 September 2019 (with associated attachments) and provides the following interim comments noting that the NSW Department of Planning, Industry and Environment (DPI&E) is yet to formally refer the additional submission to RMS for comment. In summary, the additional information provided does not provide enough information to address some of the concerns previously raised. As such, RMS requests the submission of additional information so as to ensure the matters outlined below are addressed and can be closed out:

- *Noise:* RMS' submission dated 19 July 2019 identified a concern with noise mitigation issues. As discussed in the subsequent meeting had on 9 August 2019 at the RMS offices in Wollongong, Cardno's noise consultant was going to contact Con Tsitsos (RMS Environmental Officer – 8843 3065) to discuss the noise concerns raised and to ensure this issue is addressed and as such the future subdivision would provide and can accommodate any potential noise mitigation measures required (e.g. noise walls). Details of the outcomes from the above discussion were to be provided in the updated submission that has now been provided. A review of the latest submission has failed to locate any details on this discussion and how the noise mitigation concerns that have been raised by RMS will be adequately addressed to RMS' satisfaction. RMS therefore requests that a discussion be had with Con Tsitsos and agreement reach in relation to noise issues with updated details being provided (e.g. details of the discussion, details on how the concerns will be resolved as part of the development, etc).

- *Cormack Avenue Closure:* RMS notes that the original documentation lodged for MP 09_0131 Mod 1 (i.e. Cardno Report with Job Ref: 82017142-02, dated 13 May 2019, Version 5) sought to amend Condition 16 of the issued approval in relation to the closure of Cormack Avenue so the design is submitted with the first application for development in the Central Precinct (not with the Super lot Subdivision application) and the road closure implemented with the development of the Central Precinct. RMS seek confirmation that Cormack Avenue is still to be closed as part of the development of the Central Precinct as well as confirmation that any required works will completed prior to the issue of a subdivision certificate for the smaller residential lots in the central precinct where dwelling entitlements will be created.

- *Intersection Of Yallah Bay Road/Princes Highway:* RMS notes that Appendix E of the Cardno letter dated 13 September 2019 (refer to extract below) infers that the intersection of Yallah Bay Road and the Princes Highway will be traffic signals not a roundabout. The RMS design for the Albion Park Rail Bypass for the northern interchange and specifically this intersection is a roundabout. This being consistent with the design and modelling information that RMS has provided access to for the Albion Park Rail Bypass project as well as the infrastructure approval that has been issued by DPI&E for the same project. RMS seeks clarification on what intersection treatment the submission has indicated will be provided at the Yallah Bay Road and the Princes Highway intersection.



RMS Comment

It is RMS' understanding that the current Tallawarra Lands Concept Plan approval requires the proponent to upgrade the Yallah Bay Road and Princes Highway intersection. RMS seeks confirmation that this still will be undertaken as part of the approved development. It is unclear to RMS how this intersection will be able to perform at a satisfactory LoS without some changes to its configuration. This should be modelled by the proponent with and required changes being clearly detailed;

Response

Yallah Bay Road / Princes Highway intersection performs at LoS C or better across all assessed scenarios (traffic signal installation at some scenarios has been proposed with existing layout geometry and a 2-phase signal operation)

Please note that the above are interim comments as a result of an initial review of the Cardno submission. A formal response will be provided to DPI&E once an updated submission is formally referred to RMS for comment. Should you have any further questions in relation to the above please give me a call.

Regards

Andrew Lissenden
Development Assessment, Regional Customer Services
Southern Region | Regional and Outer Metropolitan Division
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www.rms.nsw.gov.au
Roads and Maritime Services
Level 4 90 Crown Street Wollongong NSW

From: Adam Clarke [mailto:adam.clarke@cardno.com.au]
Sent: Wednesday, 18 September 2019 10:26 AM
To: Andrew Lissenden; Development Southern
Cc: Sophie Perry; Klaude Lania (Klaude.Lania@bridgehill.com.au)
Subject: Tallawarra Lands: Submission to DPEI

Hi Andrew

As discussed at our meeting a few weeks back we were to provide updated documentation to RMS at the same time we lodged with the department. I meant to send this link to you Monday but time got away.

Link below contains the full submission. Any issues with access, please let me know.

https://fileshare.cardno.com/wl/?id=K2IIcq3pfqkcAU2UdRO8n72YH64r8nXr

Regards

Adam Clarke
MANAGER - CIVIL INFRASTRUCTURE - PROJECT DELIVERY
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APPENDIX

F

RESPONSE TO NON-KEY ISSUES RAISED BY AGENCIES FROM SECOND ROUND OF CONSULTATION

APPENDIX F - Summary RTS Second Round of Submissions

Submissions have been received from:

Wollongong City Council (WCC)

NSW Environment Protection Agency (EPA)

NSW Office of Environment and Heritage (OEH) (now Department of Energy, Environment and Sustainability DEES)

Sydney Water (SW)

Transport for NSW (TfNSW)

Roads and Maritime Service (RMS).

The following matrix summarises the issues raised in submissions by specific assessment matters:

	Strategic Planning	Contamination	Heritage	Flooding	Water Quality	Transport/ Traffic	Noise	Visual	Utilities/ Services	Social Planning/ Open Space
WCC	X	X	X	X		X		X		X
EPA		X					X			
OEH/ DEES			X	X	X					
SW									X	
TfNSW						X				
RMS	X					X				

9.2 Detailed Comments List by Agency

Organisation	Comment	Response
	Strategic Planning	
WCC	"*Council would like to reiterate its ongoing concerns regarding the extent of additional residential development proposed under the modification. Whilst the number of additional lots sought has dropped, there remains an almost a 30% increase in residential development outcomes in a land release area where the primary focus was on employment lands*."	The percentage change in residential land use is not a reasonable measure of the strategic benefits of the Concept Approval to deliver new land uses. The Concept Approval seeks to optimise the future use of the entire in a manner which is compatible with creation of new employment lands and

		protection of the existing power plant site and opportunities for the power plant expansion. The total number of new residential lots in the original Concept Approval was 1,010. The modification application proposes 1,257 new residential lots. The total change in residential land area is mostly the result of undergrounding power lines in the Northern Precinct. There are multiple benefits from undergrounding the electricity infrastructure including improvements in visual amenity and the ability to provide a continuous ecological corridor along the southern edge of the Northern Precinct from the lake foreshore to Mount Brown. Lot sizes and densities have been improved consistent with objectives for housing variety in: - Illawarra Shoalhaven Regional Plan. - Draft West Dapto Urban Release Area - Low Rise Medium Density Housing Code. The primary focus for the Concept Approval remains a mix of land uses. The total area of Neighbourhood Centre land in the Central Precinct has been reduced from 5.38 hectares to 4.75 hectares due to the need for an open space buffer to the western edge separating the Neighbourhood centre from land reserved for the Albion Park Rail Bypass (APRB). The diversity of employment lands has been maintained with the inclusion of both IN1 General Industrial and IN2 Light Industrial land use zones. The total area of industrial lands in the Central Precinct has been increased slightly from 14.25 hectares to 14.65 hectares. The reduction in the total area of employment lands is a result of increasing buffer separation from residential land, improving the continuity of environmental corridors to the western and northern edges of the industrial lands in the Central Precinct and accommodating for land dedicated to the APRB. There is a reduction in the land uses that have potential to generate employment in the Southern (Lakeside) Precinct as a consequence of existing Condition B1 Part B – Modifications which requires the primary school and retirement living areas to be deleted. ***This matter is considered to have been addressed and resolved.***
WCC	*"Commentary provided by the applicant indicates that they see the solution to addressing potential land use conflicts as being the restriction of industrial uses to benefit the proposed residential development. This approach is not considered to be*	Council originally supported light industrial (IN2) as a buffer to General Industrial (IN1) in its letter dated 31 July 2018. Specifically Council's comments were as follows: "*Council could support the proposed change to the zoning of industrial land from IN1 to IN2 in the central precinct.*

	satisfactory, as residential development should only be permitted where it does not threaten the viability of industrial or employment lands. *Additionally, the application documentation indicates that the proposed buffer area is located within the industrial lands, subsequently limiting their use. There is sufficient supply of residential land within the nearby West Dapto Urban Release Area -Council maintains that any buffers or restrictions required to facilitate the proposed development should be provided within the residential zones."*	*The proposed change to zoning to address potential future impacts from industrial development on surrounding residential development is appropriate in this instance. However, it is noted that the proposal also increases the industrial land footprint such that there is a much reduced buffer proposed between the industrial land and residential footprint. The proposed buffer is considered to be insufficient and Council considers that the previous buffer should be retained.*" WLEP 2009 lists the following objectives for all development in Zone IN2: *"To minimise any adverse effect of industry on other land uses"* Light industrial uses are to contain impacts within the site in order to be consistent with this objective. It is not the intention of the IN2 land use zone to require buffers on adjoining non-industrial land. Conditions of development consent specific to any future land use within the IN2 zone will be expected to control and contain detrimental impacts within the site. The approved Statement of Commitments requires future industrial development applications to incude measures to contain impacts within the site. It is not feasible, practical or possible to install a spatial buffer on residential land to accommodate for any possible externalities from nearby industrial land due to the diversity of potential future uses and the need to control detrimental impacts at the source subject to development consents for any future land use. There are many examples of light industrial land immediately adjacent to residential land in WLEP 2009 such as Woonona, Russell Vale, Corrimal, Bellambi, Towradgi, North Wollongong, Coniston and Warrawong. The final version of the modified Concept Plan increases the width of the buffer area of environmental lands between the residential lots and land in Zone IN2 (see Appendix A). The buffer does not limit the future use of industrial lands and allows for continuity between the future riparian lands and environmental lands with associated ecological benefits. The total area of industrial zoned land in the Central Precinct under the original Concept Approval is 14.25 hectares. The total area of industrial lands in the final version of the Concept Plan is 14.65 hectares. The viability and efficient use of proposed industrial lands will not be compromised by the layout of land uses in the modified Concept Plan. ***This matter is considered to have been addressed and resolved.***

WCC	*"It is clear that the proposed modification can only progress at the expense of employment lands, and as such, Council considers the modification to be contrary to the intent behind the original Concept Plan approval by failing to give due regard to the importance of scarce employment lands."*	The modification is not contrary to the intent to deliver a range of land uses that suitably protect the long term operational viability of the power station. Some land uses with potential to generate employment in the Southern Precinct (retirement and school) were required to be deleted by the conditions of the Concept Approval and are not a consequence of the modification application. The buffer between industrial and residential lands has been improved as previously requested by Council with a network of environmental lands and despite the precedent elsewhere in the WLEP 2009 of residential land adjoining IN2 land. ***This matter is considered to have been addressed and resolved.***
Environment / Contamination		
WCC	*"Council does not support the applicant's proposed changes to the wording of conditions 11 and 12. The following wording (in italics) is considered by Council to appropriately reflect the desired delivery of the condition requirements if the Department is of a mind to support the modification request:* **11 -** Further Investigation of the Areas of Environmental Concern and engagement of a Site Auditor accredited under the Contaminated Land Management Act 1997 Future applications that include works on those lands nominated as Areas of Environmental Concern (AECs) in the Coffey Environments report (December 2010) must be accompanied by a further environmental assessment report. In addition to adopting the recommendations contained in Section 12 of the Coffey Environments Groundwater Modelling Assessment report, the further investigations must consider: ▪ the potential for contaminants present in the soil and groundwater in the vicinity of the ash ponds to be mobilised and transported to the adjacent shallow aquifer, Duck Creek and ultimately to the receiving waters of Lake Illawarra, and measures to address this including the feasibility of remediation of contaminated soils and/ or the containment of the sources of contamination; ▪ measures to ensure that the environmental attributes of conservation lands on the site are not adversely impacted on by contaminants present in the soil and groundwater; ▪ recommendations for the ongoing management of contaminated groundwater; ▪ the potential for the contamination present in soil and groundwater in the vicinity of the ash ponds to adversely affect groundwater dependent ecosystems on the site; and ▪ any risks to human health or the environment.	Council's comments are not compatible with the anticipated transfer of land, the first future superlot subdivision and the anticipated practical sequence of works. Contamination conditions are addressed by EPA comments and response below. Seek modification as proposed. Site investigations and RAP to be completed for all lands. RAP to recommend spatial sequence of remediation. Remediation will require a time frame that exceeds Superlot DA lodgement due to monitoring timeframes. Remediation can be achieved prior to the issue of DAs for subdivision other than superlot DA Council's suggestion is intended to: ▪ achieve DSI and RAP prior to the issue of any Construction Certificate; and ▪ site auditor statement prior to the issue of any Subdivision Certificate. As explained in Section 1.6 to the Key Issues letter – the recommended modifications to Conditions 11 and 12 will meet WCC requirements. ***This matter is considered to have been addressed and resolved.***

	Following the completion of the further investigations, the proponent must engage a Site Auditor accredited under the Contaminated Land Management Act 1997 to verify the adequacy of the investigations (and any proposed remediation). *Prior to the issue of any construction certificate the proponent must undertake Stage - II (detail Site Investigation) and Stage III (Remediation Action Plan) for the entire area including Southern Precinct as stated in Tallawarra Lands Concept Plan. Prior to submission of Stage II and III reports, these reports must be reviewed by appointed site auditor.* Prior to issue of any Subdivision Certificate (other than for super lot subdivision), *the proponent must obtain a Site Auditor Statement which certifies that the site is suitable for its proposed use. No buildings may be erected on the land prior to the issue of a Site Auditor Statement certifying that the site is suitable for its proposed use.* **12 -** Engagement of a site auditor to verify the adequacy of asbestos soil sampling and asbestos contamination investigations The first future application to Council (refer to Condition A6) must include a verification from a Site Auditor accredited under the Contaminated Land Management Act 1997 to as to the adequacy of the investigations and asbestos soil sampling undertaken by Douglas Partners (July 2010) and any further investigations subsequently undertaken by the proponent and certification that the site can be made suitable for the proposed use. *Prior to issue of any Subdivision Certificate* (other than for super lot subdivision)*, the proponent must obtain a Site Auditor Statement which certifies that the site is suitable for its proposed use. No buildings may be erected on the land prior to the issue of a Site Auditor Statement certifying that the site is suitable for its proposed use."*	
EPA	"*Subdivision of Residential Precincts - While a holistic approach to contaminated site assessment of the Tallawarra Lands is preferred, EPA does not object to separating the residential areas into 2 broad groups as proposed by the Proponent. That is separating the Northern and Central precincts (as 1 group) from the Southern precinct. To ensure ongoing site contamination is managed holistically and efficiently, further divisions resulting in separate or piecemeal progression of contamination requirements are unlikely to be supported by the EPA*."	See Item 1 in Table 1-1 to the Key Issues letter. ***This matter is considered to have been addressed and resolved.***
EPA	"Completion of Contamination Sampling and Site Assessment - The remaining site contamination assessments investigations for the Areas of Environmental Concern (as listed in Condition 11) and asbestos (Condition 12) must be completed prior to the submission of any DA for subdivision development."	See Item 2 in Table 1-1 to the Key Issues letter. ***This matter is considered to have been addressed and resolved.***
EPA	Accredited Site Auditor Report on Contamination Sampling and Site Assessment - Any submission of a subdivision DA must be supported by a report from an NSW EPA Accredited Site Auditor which confirms the adequacy of the contamination investigations	See Item 3 in Table 1-1 to the Key Issues letter. ***This matter is considered to have been addressed and resolved.***

	and any remediation action plan and certifies that that the site/s can be made suitable for the proposed use.	
EPA	Remediation - Any remediation required must coincide with the first earthworks breaking of ground. This may include clearing or infrastructure installation. This must be in advance of any dwelling construction.	See Item 4 in Table 1-1 to the Key Issues letter. ***This matter is considered to have been addressed and resolved.***
EPA	Site Auditor Statement - Prior to any dwelling construction the Proponent must submit a NSW EPA Site Auditor Statement validating that any remediation has been completed as necessary and the site is suitable for the proposed use.	See Item 5 in Table 1-1 to the Key Issues letter. ***This matter is considered to have been addressed and resolved.***
Heritage		
WCC	*"1. The Heritage Impact Assessment Report prepared by Biosis should be amended to reflect the substantial additional historical records available through historical newspaper articles relating to property transactions to ensure that the conclusions made about potential archaeological sites are properly considered. The HIS should be updated to reflect the addition historical investigations that BIOSIS has undertaken and include clear archaeological significance and context mapping."*	A supplementary letter was prepared by Biosis that confirms articles were considered in the revised Heritage Impact Assessment. See the Biosis letter dated 19 October 2018 in Appendix H. Furthermore these articles will form part of the reference list to the CHMP to be submitted with the first future superlot subdivision application as required by Condition This matter is also addressed in Section 2.5 above and requested modification to Condition 8. ***This matter is considered to have been addressed and resolved.***
WCC	*"The modification to the concept plan appears to provide for an expansion of the potential heritage impacts on both Aboriginal and non-Aboriginal heritage sites, and would result in further encroachment of the development into areas higher on the development site. These additional impacts do not appear to be consistent with the aims and intentions of the earlier considerations relating to the development of the Tallawarra Lands and are generally not supported on heritage grounds."*	The adjustments to the Central and Northern Precinct development footprints and the further investigations triggered by these adjustments are explained in Section 2 above. As discussed with DEES (OEH), the required testing, consultation, AHIP and CHMP requirements will be fulfilled in accordance with the requested modifications to Condition 8 and on the clear understanding there will be no site disturbance associated with the first future superlot subdivision. ***This matter is considered to have been addressed and resolved.***
WCC	"*The Central Precinct subdivision layout should allow for the Fig Tree associated with AHMS site (52-5- 0614) to be retained. All future development within the Central Precinct should be suitably tailored to limit impacts upon the tree and to ensure its ongoing viability*."	This matter has been addressed in Section 2.4 of the Key Issues letter. ***This matter is considered to have been addressed and resolved.***

WCC	*"The concept plan should be undertaken in accordance with the recommendations of the final reports titled -Archaeological Report: North Precinct and Archaeological Report: Central Precinct prepared by BIOSIS in August 2017."*	The modified Concept Plan is consistent with these reports including the adjustment to the boundaries of the Central Precinct to provide clearance from PAD 52-5-0523. These reports are anticipated to be included in the Reference List to the CHMP to be submitted with the first future superlot subdivision application to ensure all future DAs are consistent with the CHMP. This is also addressed with the requested modification to Condition 8 as discussed in Section 2.5 of the Key Issues letter. ***This matter is considered to have been addressed and resolved.***
WCC	"*Further archaeological testing should be undertaken in the areas identified as having moderate archaeological potential as recommended by BIOSIS in the 2017 ACHAR and in the PAD3 area before finalisation and approval of the concept plan modification. This is essential to properly understand, measure and consider impacts.*"	This matter has been discussed in detail in Section 2 of the Key Issues letter. As discussed with DEES (OEH), the required testing, consultation, AHIP and CHMP requirements will be fulfilled in accordance with the requested modifications to Condition 8 and on the clear understanding there will be no site disturbance associated with the first future superlot subdivision. ***This matter is considered to have been addressed and resolved.***
WCC	"*The comments of the Office of Environment and Heritage should be sought in relation to the revised proposal and the applicant should be required to obtain an AHIP under the NSW National Parks and Wildlife Act 1974 for the impacts on the Aboriginal sites for impacts to sites Boomberry Point and Elizabeth Point (25-5-0223 and 52-5-0225) in the Northern Precinct as well as (52-5-0613), (52-5- 0614), (52-5-0615) and PAD 3 (52-5-0523).*"	This matter has been discussed in detail in Section 2 above. As discussed with DEES (OEH), the required testing, consultation, AHIP and CHMP requirements will be fulfilled in accordance with the requested modifications to Condition 8 and on the clear understanding there will be no site disturbance associated with the first future superlot subdivision. Specific to this matter, the CHMP will address the management of impacts on the Aboriginal sites of Boomberry Point and Elizabeth Point (25-5-0223 and 52-5-0225) in the Northern Precinct as well as (52-5-0613), (52-5- 0614), (52-5-0615) and PAD 3 (52-5-0523). There will be no impacts on these items with the first future superlot subdivision as there are no works or change of land use proposed at this stage. The CHMP will be submitted with the first future superlot subdivision and every subsequent DA will be consistent with the CHMP. ***This matter is considered to have been addressed and resolved.***

WCC	*"A Heritage Management Plan should be developed for the site as recommended in detail by the NSW Heritage Council in their referral on the original proposal."*	A CHMP will be required by modifications to Condition 8 as described in Section 2.5 of the Key Issues letter. ***This matter is considered to have been addressed and resolved.***
WCC	*"A Heritage Interpretation Plan should be required to be developed by the applicant and the recommendations and outcomes of this should be incorporated in any future development of the site. The plan should provide for the interpretation of both the Aboriginal and European history of the site and any significant sites/features identified within it. It should also ensure that Aboriginal objects are managed appropriately through further consultation with the local Aboriginal Community. Consideration should be given to planning for an on-site Keeping Place for removed objects. The plan should also be informed by the additional historical records Council holds from newspaper references related to the property."*	A CHMP will be required by modifications to Condition 8 as described in Section 2.5 of the Key Issues letter. The CHMP will be developed in consultation with Registered Aboriginal Parties. All available reference material will be included in the preparation of the CHMP and reference to Council's records is noted for inclusion in the CHMP. ***This matter is considered to have been addressed and resolved.***
OEH	"*We provided comments on 26 July 2018 in relation to the proposed Major Project modification. These comments remain relevant. Archaeological technical reports have been provided with the Response to Submissions (RtS), however, these reports do not include the recommended archaeological test excavation*."	Further testing is in progress as detailed in Section 2.2 to the Key Issues letter. As stated in Section 2 to the Key Issues letter, AHIP and CHMP details will be submitted with the application for the first future superlot subdivision as no site disturbance will occur prior to this time. This process is consistent with the advice and requirements clarified at a meeting with DEES on 14 August 2019. Testing results and site management methods will be resolved prior to any works proposed for the site. ***This matter is considered to have been addressed and resolved.***
OEH	"*Updated Aboriginal cultural heritage assessment reports (Biosis 2017a and b) have been provided with the outcomes of the Aboriginal community consultation process. Biosis (2017a, p.27 and 2017b, 0.26) report that the Registered Aboriginal Parties (RAPs) support the draft reports. Comments were received recommending reburial of excavated Aboriginal objects and regarding the cultural context of the land.* *The Aboriginal cultural heritage assessment must also consider any changed impacts as a result of changes to the impact footprint (including any ancillary works) through this Modification since the Aboriginal heritage assessment was completed.* *The key issues for the Aboriginal cultural heritage assessment are:* ▪ *Aboriginal cultural heritage conservation and open space conservation should be further considered.*	Consistent with OEH recommendations, an AHIP and CHMP will be prepared for approval with the first future superlot subdivision application. This is "pre-approval" as required by OEH's comment. RAP consultation is in progress as details in Section 2.2 to the Key issues letter and the final form of the AHIP and CHMP will account for the final versions of precinct boundaries and conceptual layouts as proposed with this modification. ***This matter is considered to have been addressed and resolved.***

	▪ *The timing of the additional archaeological investigation - we recommend this is pre-approval.* ▪ *Timing of preparing the Aboriginal heritage management plan (AHMP) - we recommend this is prepared pre-approval."*	
OEH	"*No Aboriginal heritage conservation outcomes are proposed. The RtS states that the applicant cannot commit to the conservation of the fig tree recorded as Aboriginal cultural heritage site 52-5-0615. The argument presented (Cardno p.64) is that earthworks may be required 'in the vicinity of this tree to achieve the approved Concept Plan'. The applicant suggests further detailed studies at the development application stage.* *Appropriate evidence has not been presented about why this heritage item cannot be conserved. This modification application is an opportunity to amend the proposed earthworks near the tree and build a conservation outcome into the Concept Plan*."	See Section 2.4 to the Key Issues letter for details on this matter. ***This matter is considered to have been addressed and resolved.***
OEH	"*The RtS (section 5.12, pp.63-64) indicates that the recommended archaeological test excavation have not yet been conducted. Without the test excavation results the full impact of the proposal on Aboriginal heritage is not known. Early assessment provides the best opportunity to achieve heritage conservation and provides certainty to all parties about the Aboriginal heritage management requirements.* *We also support preparing the AHMP at an early stage of the project development, ideally before project approval. The AHMP must be prepared in consultation with the RAPs.* *Completing the test excavation and AHMP before project approval may reduce the complexity of the Aboriginal heritage approvals process at the DA stage.*"	See Section 2 to the Key Issues letter. The provision of an AHIP and CHMP at the time of lodgement of the first superlot subdivision application will ensure the appropriate controls will be in place before the approval for any site disturbance. This will meet the requirements of OEH and the statutory and procedural requirements for the potential approval of any works prior to those works commencing. ***This matter is considered to have been addressed and resolved.***
OEH	*"The RtS does not respond to concerns raised in submissions from the general public and the Lake Illawarra Estuary Management Committee about the loss of open space and associated educational opportunities for the Aboriginal community. These matters should be addressed.* *We encourage the applicant to engage those Aboriginal community members who have provided comments, and who have cultural knowledge relevant to the project area, in the consultation process required by OEH. We reiterate our previous comment that the proponent should ensure consultation about this project is continuous. In general, breaks of more than 6 months may not constitute continuous consultation."*	The reduction in open space is a consequence of land reserved for the Albion Park Rail Bypass and is not in the vicinity of land identified as being of moderate or high potential for Aboriginal cultural and heritage significance. Consultation with RAPs is ongoing having recommenced as indicated in Section 2.2 to the Key Issues letter. Outcomes of consultation will inform any future AHIP and the CHMP. Potential educational opportunities are expected to be addressed in the CHMP and made available for public exhibition during the advertising and notification of the development application for the first future superlot subdivision. ***This matter is considered to have been addressed and resolved.***

Flooding and Stormwater		
WCC	*"The proposed modification to the Industrial Employment Precinct in the Central superlot results in the proposed road and industrial lot being directly within the location of the existing watercourse. The proposed development would appear to be proposing industrial lots or the road way (other than bridging of a watercourse} within an area of high flood risk precinct and high hydraulic hazard area. This is contrary to the objectives of Chapter E13 of the Wollongong DCP 2009 and clause 7.3 of the Wollongong LEP 2009. The development should be redesigned such that all proposed roads and lots (other than recreation uses} are located wholly outside the areas of high flood risk (either high hydraulic hazard or 10m from top of bank). It is recommended that the industrial precinct be relocated back to the north east away from the watercourse*."	As explained in Section 4 above the location of the active public recreational space and playing fields within the Central Precinct is the same as that approved with the original Concept Plan and Concept Approval. Existing Condition 4 in Schedule 3 requires a Flood Risk Assessment and Management Plan to be submitted with the first future superlot subdivision application. A site-specific DCP submitted with the first future superlot subdivision application will identify the areas of high flood risk and high hydraulic hazard and ensure the location and finished surface levels for industrial lots and roads are compatible prior to the submission of future DAs for any works. The VMP required by existing Condition 10 in Schedule 4 will need to be compatible with the Flood Risk Assessment and Management Plan and will also need to be submitted with the first future superlot subdivision DA. This will need to demonstrate a new top of bank for the drainage depression in the Central precinct. These existing conditions are adequate to address Council's concerns. ***This matter is considered to have been addressed and resolved.***
WCC	*"Shared paths proposed in watercourse areas should be designed to ensure overtopping/inundation in lower order storm events does not occur, limiting the potential for debris build up and ongoing maintenance."*	As explained in Section 4 above, existing Condition 4 in Schedule 3 requires a Flood Risk Assessment and Management Plan to be submitted with the first future superlot subdivision application. The VMP required by existing Condition 10 in Schedule 4 will include the location of shared paths in relation to the top of bank of future watercourses and will need to be compatible with the Flood Risk Assessment and Management Plan. The VMP will also need to be submitted with the first future superlot subdivision DA. These existing conditions are adequate to address Council's concerns. ***This matter is considered to have been addressed and resolved.***
OEH	"*The Technical Memorandum provided by Cardno (2019) as part of the Response to Submissions (RtS) does not address comments relating to isolation and accessibility for emergency services during floods. As noted in the Tallawarra Lands Flood Risk Assessment (Bewsher, 2010), the access road into the northern precinct is expected to be inundated during a 1 % Annual Exceedance Probability (AEP) flood.*	Access and egress for emergency vehicles at this conceptual level is not proposed to be modified in comparison to that already approved. Condition 4 in Schedule 3 to the Concept Approval required a Flood Risk Assessment and Management Plan (FRAMP) to be submitted with the first future superlot subdivision application. The FRAMP will determine

	Accessibility during floods greater than this and up to the Probable Maximum Flood (PMF) does not appear to have been assessed, nor have the implications to the safety of an increased population as proposed in the modification. *We suggest that the DPE liaise with council to determine whether the modification is appropriate in the context of council's current and future flood access strategy and associated emergency response arrangements to manage risks to public safety in the event of a flood.*"	the 1% AEP flood, the PMF and the implications for the safe future use of the site. These details will be included in a site-specific DCP. Subject to detailed analysis in the FRAMP, a stay in place strategy for occupants could be recommended as the length of inundation is expected to be reasonably short. Emergency vehicle access and egress routes will be further defined with the FRAMP. No further information is considered necessary for the assessment and determination of this modification application. ***This matter is considered to have been addressed and resolved.***
OEH	*"In terms of comments raised with respect to the potential impacts of increased magnitude, frequency and volume of flows associated with the proposed modification, the RtS proposes that this be assessed in future design stages. This may have implications to the current approval and as such DPE should consider whether this is an appropriate approach in the absence of an assessment supporting a mitigation strategy.*"	The site-specific DCP will require no net change to the pre- and post-development flows as well as the management of overland and stormwater flows throughout the site in a manner to be approved by Council for inclusion in the DCP. This must be resolved with the assessment and determination of the first future superlot subdivision application. The site-specific DCP and its supporting documents will make refinements to the future development concept prior to the approval for any works or change to land use on the site. It is therefore appropriate for these potential impacts to be addressed with the first future superlot subdivision development application. ***This matter is considered to have been addressed and resolved.***
Water Quality		
OEH	"*Whilst we acknowledge that additional water quality modelling has been undertaken that reflects the intensification of the proposed modification, the additional information does not identify how the proposal will impact estuary health. The water quality assessment has not been prepared in accordance with the NSW Government's Risk-based Framework for Considering Waterway Health Outcomes in Strategic Land-use Planning decisions (the Framework). The assessment also does not identify how the residual stormwater pollutant loads discharging to Lake Illawarra as a result of the proposal, will impact the receiving waters of Lake Illawarra. In this regard, the impacts of the proposed modification on estuary health including water quality, coastal wetlands and aquatic ecosystems have not been assessed or modified mitigation strategies determined.*"	This matter is addressed in detail in Section 3 to the Key Issues letter. The Framework is most appropriately applied at the time of preparation of a site-specific DCP. This allows for Council and the community to evaluate whether the water quality targets and treatment methods are acceptable. It is unreasonable and impractical to require additional assessment or mitigation strategies at this stage. ***This matter is considered to have been addressed and resolved.***
OEH	"*The draft Lake Illawarra Coastal Management Program, 2018 (CMP) identifies that the most significant threat to the estuary health is catchment development and associated impacts to water quality. To address the threats and pressures on Lake Illawarra and to facilitate an improvement to long term estuary health, several key objectives and*	The original documentation for this modification was submitted to the department January 2018, prior to the Draft Lake Illawarra Coastal Management Program.

	management strategies are detailed within the draft CMP. The information detailed within the RtS does not consider the objectives of the draft CMP. Similarly, the Illawarra Shoalhaven Regional Plan (ISRP) identifies priority strategic goals and actions to promote and foster sustainable growth and the protection of the region's natural resources. Goal 5 - A Region that Protects and Enhances the Natural Environment under the ISRP is relevant to the proposal which has also not been considered. These strategic documents identify current priority threats and pressures to Lake Illawarra and objectives for managing estuary health, which provide a basis for assessing the impacts of the proposed modification and to integrate mitigation strategies. *Application of the Framework and consideration of the CMP and IRSP is appropriate for assessing water quality and the impacts from the proposal to the sensitive receiving waters and estuary health of Lake Illawarra. This approach will assist in identifying relevant water quality objectives, suitable stormwater water quality improvement infrastructure and other mitigation measures*."	The Draft Lake Illawarra Coastal Management Program has been exhibited by both Wollongong Council and Shellharbour Council between 31July and 11 September. Many submissions have been received to date and it will be some time before the Program is considered for adoption. However, it is anticipated the Program may be adopted prior to the lodgement of the first future superlot development application. Therefore the Program can be considered in the preparation of the stormwater management strategy to be included in the site-specific DCP. As mentioned above and in Section 3 to the Key Issues letter, the site-specific DCP is the most appropriate time for water quality targets, stormwater management and monitoring to be assessed and adopted. This matter is adequately addressed by existing conditions of the Concept Approval. No further detail is considered necessary for the assessment and determination of this modification application. ***This matter is considered to have been addressed and resolved.***
Transport and Traffic		
WCC	"*The increased yield traffic scenarios have been modelled with the Haywards Bay Link in place, whereas the scenarios within the approved development yield were not. It is therefore considered that any approval for additional yield should include a condition for the Haywards Bay Link to be provided*."	See Appendix E which contains revised modelling based on the final version of the modification and concept layout for critical intersections. Notwithstanding that this modification application relates to fewer residential lots than the approved Concept Plan, the Haywards Bay link remains an essential element of the overall Tallawarra lands development program. This matter is resolved in detail in Section 5 of the key issues letter above. ***This matter is considered to have been addressed and resolved.***
WCC	*"RMS will need to monitor development progress in order to ensure adequate capacity and acceptable main road network operation, especially in relation to the northbound M1 Dapto off-ramp and timing of Stage 3 (northern interchange) of the Albion Park Rail Bypass project."*	See Appendix E which demonstrates appropriate monitoring and Level of Service measures to the satisfaction of RMS. ***This matter is considered to have been addressed and resolved.***
TfNSW	"*As mentioned in prior correspondence dated 09/09/2018 (Ref: CD18/05593), there are currently no regular bus services operating in the Tallawarra Lands vicinity. The Traffic Impact Assessment identifies modifications to existing bus routes to service the proposed development. These modifications may adversely impact the existing customer base.*	Existing and Proposed Bus Networks are included in **Appendix A** and demonstrate simple loop services extending from existing services. The recommendation to consult Premier Illawarra with future development applications is noted and can be addressed at the

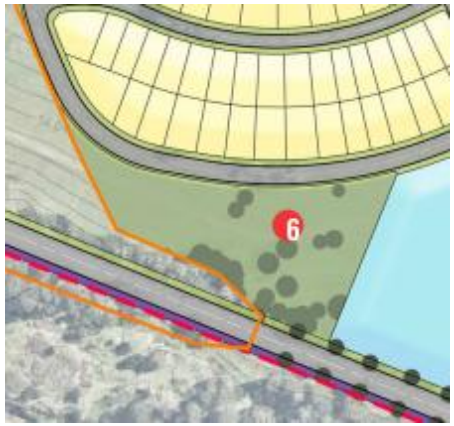
	The Proponent should consult the local bus operator, Premier Illawarra, in future development application stages to discuss the proposed modifications to the existing bus routes and explore any alternative servicing strategies, subject to demand and funding."	appropriate time. This matter does not prevent assessment and determination of the modification of the Concept Approval. ***This matter is considered to have been addressed and resolved.***
TfNSW	*"The RTS states the provision of walking and cycling paths are intended to form a connected network combining on-road, road verge and off road pathways. It is noted the NSW Planning Guidelines for Walking & Cycling (2004) and Wollongong City Council – Bicycle Plan support the inclusion of a cycleway along the north-south connector towards Howards Bay and on the east-west collector road.* *The Proponent should demonstrate in future development application stages that road reserve widths allow for adequate provision for foot, shared paths and cycle ways where supported."*	The Road Hierarchy and provision of active pathways will be resolved with the site-specific DCP to be submitted with the first future superlot subdivision application. All subsequent development applications for works will need to demonstrate consistency with the DCP. The recommendation for reference to *NSW Planning Guidelines for Walking & Cycling (2004) and Wollongong City Council – Bicycle Plan* is noted and can be addressed at the appropriate time. This matter does not prevent assessment and determination of the modification of the Concept Approval. ***This matter is considered to have been addressed and resolved.***
TfNSW	"*TfNSW has released the Guidelines for Public Transport Capable Infrastructure in Greenfield Sites which can be found at: https://www.transport.nsw.gov.au/industry/transport-planning-resources#Guidelines_for_Public_Transport_Capable_Infrastructure_in_Greenfield_Sites. The Guideline addresses the road network design and road infrastructure requirements for greenfield sites so that public transport can be successfully delivered.* *The Proponent should demonstrate at the development application stage that the detailed design of roads within the subject site is consistent with the Guidelines for Public Transport Capable Infrastructure in Greenfield Sites.*"	The Road Hierarchy and provision of public transport routes will be resolved with the site-specific DCP to be submitted with the first future superlot subdivision application. All subsequent development applications for works will need to demonstrate consistency with the DCP. The recommendation for reference to *Guidelines for Public Transport Capable Infrastructure in Greenfield Sites* is noted and can be addressed at the appropriate time. This matter does not prevent assessment and determination of the modification of the Concept Approval. ***This matter is considered to have been addressed and resolved.***
RMS	For all issues raised in the RMS letter dated 19 July 2019 see Appendix E	For a response to all issues raised in the RMS letter dated 19 July 2019 see Appendix E and Section 5 to the main letter. ***All matters are considered to have been addressed and resolved.***
Noise		
EPA	*"In our previous submission on this proposal of 16 August 2018 (our reference DOC18/584828), EPA raised concerns over the proposed residential precinct encroachment into previously established noise buffer zones and the assessment of low frequency noise from the operational power stations.*	EPA's letter acknowledges noise contours have been appropriately accommodated in the modified conceptual layout. No additional information is needed. ***This matter is considered to have been addressed and resolved.***

	This Response To Submissions report includes an updated Noise Impact Assessment (NIA) which addresses the above EPA concerns as follows: ▪ *The lot boundaries in the Northern Precinct now follow the modelled 40 decibel (A-weighted) (dBA) contour. This contour is listed in the Tallawarra B power station approval and establishes a noise buffer zone for power station operations. This amendment to the lot boundaries means that no residential development is now proposed in the existing buffer zone.* ▪ *A correction for low frequency noise is now included in the NIA and in combination with the updated lot boundaries, addresses EPA's concerns regarding low frequency noise.* *A key consideration is the prevention of noise related land use conflicts. A range of approaches to promote better noise outcomes include, but are not limited to the following:* ▪ *Reducing impacts at receivers through best practice design, siting, construction and operation.* ▪ *Implementing communication mechanisms to inform members of the public moving into noise-affected areas.* ▪ *Acoustic design input into planning controls such as the Subdivision Plans, Construction Certificate Plans and Specifications.* ▪ *Validation could also be required prior to the issue of an Occupation Certificate to ensure any acoustic design measures have been satisfactorily incorporated into the development as a further check and balance."*	
Visual		
WCC	"*The updated photomontage illustrates that the roofs of dwellings remain visible from the narrow strip of foreshore facing north-northeast and Oak Flats Boat Ramp. Council considers that no roofs should be visible from either vantage point by ensuring that maximum roof heights do not exceed the crest of the ridgeline*."	The visual impact assessment has not been updated to account for the extensive canopy tree planting within the ridgeline park of the Northern Precinct. Furthermore, building envelopes and building materials and finishes will be included in the site-specific DCP for dwellings on elevated land and dwellings on the large residential lots in the Central precinct to protect visual and scenic qualities. The modification proposes undergrounding of the high voltage power cables. This change will dramatically improve the visual quality of the Northern precinct area considered to be of much higher value than the mentioned rooftops. ***This matter is considered to have been addressed and resolved.***

Utilities/ Water Services		
Sydney Water	"*Last year, the consultant for the developer Bridgehill contacted us indicating - instead of 300 lots in the northern precinct as reported earlier, now there may be an increased yield of up to 540 lots. Sydney Water has carried out further hydraulic analysis and advised that up to 475 dwellings may be connected to our existing wastewater networks for initial developments in the northern part of Tallawarra without any trunk infrastructure delivery, and without the upgrading of storage capacity at SP0308 (sewage pumping station).*"	The final conceptual layout indicates 403 lots for the Northern Precinct. This is within the available capacity identified by Sydney Water. ***This matter is considered to have been addressed and resolved.***
Sydney Water	"*Further development beyond 475 lots cannot occur until Sydney Water carries out future planning and storage upgrade (capacity) at SP0308, and deliver other required trunk works to service middle and south precincts in the future. That project is on hold pending future demand for water related services. We deliver works based on demonstrated service demand.* *At least they can now proceed to service up to 475 lots through s73 process with local lead in and reticulation pipe extension at development stage. We will however need to see the proponent's design and accompanying flow schedule with extensions sized to serve a fully developed upstream catchment (ie. The full 540 plus any other development in the Precinct), and able to drain the full area – though we can support servicing of development up to 475 dwellings based on our current hydraulic analysis*."	Development can be staged and designed in consultation with Sydney Water to ensure sufficient supply. Any future development application for subdivision can only be granted consent if Wollongong Council is satisfied it is compliant with *Clause 7.1 Public Utility Infrastructure* to WLEP 2009.
Social Planning / Open Spaces / Public Benefits		
WCC	"*Council has continuing concerns around the lack of documentation that provides justification for the proposed reduction in open space and environmental lands in the central precinct. Council does not support the reduction of these lands to enable the expansion of the residential and industrial lands footprint.* *Whilst the applicant states that the SEARS did not require the preparation of a Social Impact Assessment, the modification proposes a significant increase in residential lot yield, even at the revised numbers. Council considers that open space should not be decreased unless there is justification for the same by way of a community/social infrastructure needs assessment or similar appropriate planning study detailing the amount of community use land required to accommodate the future Tallawarra Lands population. (Northern Precinct)*"	Council's estimation of the change in land areas is incorrect in two ways: (i) The reduction in 'open space and environmental lands' in the Central Precinct is a direct consequence of RMS request to set aside land for the Albion Park Rail Bypass corridor. (ii) The loss of 'open space and environmental lands' is not the result of an increase in residential and industrial land areas. Council's comments are also incorrect in referring to an "*increase in residential lot yield*". The total number of residential lots has decreased from 1,257 to 1,310. The variety of lot sizes in the conceptual layout has increased. The potential diversity of housing is consistent with the objectives of the ISRP and the Medium Density Housing Code and represents best practice in planning to increase diversity and choice of housing. As stated above, the increase in the total residential land area is mostly the result of undergrounding the HV power lines in the Northern Precinct

		which has significant environmental and visual benefits as well as improving connectivity and efficient layout. The concept plan for the ecological corridor along the southern edge of the Northern Precinct is superior to the previous approved Corkery Consulting Landscape Plan in providing a larger corridor and more continuous planting of canopy trees and shrubs and a more continuous link from the foreshore to Mount Brown. The key criteria for the delivery of open space in greenfield development are listed in the Department of Planning's 'Recreation and Open Space Planning Guideline (2010)' and the Government Architects 'Better Placed' (2017) and the 'Everyone Can Play Guideline' (DPE 2018). The key criteria are not defined by quantity and ratios but by access and connectivity, distribution, size and shape, quality, diversity and quantity (number of spaces rather than hectares). In addition to the open space and environmental lands proposed, there is potential for embellishment and restoration of the lake foreshore in accordance with a future VPA. Although the foreshore is outside the Tallawarra Lands boundary it will add to the useable open space and environmental lands accessible to future residents and enhance the quality of life for residents and visitors on local and regional scales. In summary the Concept Approval as modified represents potential delivery and enhancement of open space and environmental lands in a manner superior to the original Concept Approval. ***This matter is considered to have been addressed and resolved.***
WCC	**Northern Precinct** *"Road widths should accommodate two directional flow and on-street parking along the entire frontage of the foreshore and be wide enough to accommodate buses servicing the foreshore area. (Northern Precinct)."*	The road hierarchy plan in **Figure 5-7** of **Appendix A** shows the full length of the foreshore road as a Collector Road – Minor with a width of 20.4m suitable for two way traffic, on-street parking and buses. The Figure titled 'Proposed Bus Network' in **Appendix A** demonstrates the extension of Bus Route 33 can follow a loop service with a route along the foreshore road. Further details will be resolved with a future application for subdivision of the Northern Precinct. Road width and hierarchy will be included in the site-specific DCP to be submitted with the application for the first future superlot subdivision. ***This matter is considered to have been addressed and resolved.***

WCC	**Ridgeline Park – Northern Precinct** *"Road widths should accommodate two directional flow and on-street parking along the entire frontage of the park."*	The road hierarchy plan in **Figure 5-7** of **Appendix A** shows the road to the northern side of the ridgeline park as part Collector Road – Minor/Major being 22.4m wide and part Collector Road - Minor with a width of 20.4m. Both are suitable for two way traffic, on-street parking and buses. The Figure titled 'Proposed Bus Network' in **Appendix A** demonstrates the extension of Bus Route 33 can follow a loop service with a route along the road bordering the ridgeline park. Further details will be resolved with a future application for subdivision of the Northern Precinct. Road width and hierarchy will be included in the site-specific DCP to be submitted with the application for the first future superlot subdivision. ***This matter is considered to have been addressed and resolved.***
WCC	**Northern Precinct** "*The road separating the foreshore and park/cafe is likely to attract anti-social activity. The road should terminate at intersection of foreshore road and park frontage road as shown below. (Note attached image was illegible)* *The southern road off the roundabout should terminate at the roundabout as shown below. (Note attached image was illegible) (Ridgeline Park-Northern Precinct).*"	This section of road is shown in the road hierarchy plan in **Figure 5-7** of **Appendix A** as a Collector Road linking up with Yallah Bay Road. This will allow traffic to continue south from the foreshore area without looping back past the ridgeline park. The final road layout will be subject to further refinement with the site-specific DCP to be submitted with the application for the first future superlot subdivision and with future details subdivision applications for the Northern Precinct. ***This matter is considered to have been addressed and resolved.***
WCC	**Northern Precinct** *"The cafe will likely require parking and this should be shown on point park"*	The café is shown as a conceptual feature linking the ridgeline park with the foreshore. The actual provision of a café would be subject to a separate future development application and the provision of ancillary parking will also be considered with a future development application. This level of detail is not relevant to the modification of the Concept Approval. ***This matter is considered to have been addressed and resolved.***
WCC	**Northern Precinct** *"Community gardens are generally not supported by Council in this instance as their ongoing management is problematic (Ridgeline Park-Northern Precinct)"*	The community garden is shown as a conceptual feature. The actual provision of a community garden would be subject to a separate future development application. This level of detail is not relevant to the modification of the Concept Approval. ***This matter is considered to have been addressed and resolved.***

WCC	**Southern Precinct** "*The loss of a sports field is not supported. A 120m x 67m field with appropriate runoffs and distance from the roads should be provided. Ideally the land containing the sports field, hardcourts and proposed community centre should be one contiguous parcel. This would assist to reduce costs to Council by minimising the duplication of infrastructure through shared parking, amenities and so on for both the community facility and sporting infrastructure. (Southern Precinct)*"	The modification does not propose changes to the Southern (Lakeside) Precinct. The modification does not propose to change the location and set out of the playing fields in the Central Precinct. ***This matter is considered to have been addressed and resolved.***
WCC	**Southern Precinct** *"Area 6 as shown on Drawing number L1003 should be reconsidered in context with the surrounding land use. (Southern Precinct)"*	The modification does not propose changes to the Southern (Lakeside) Precinct. The area labelled '6' is an area of open space and environmental lands to achieve a buffer to the land set aside for the Albion Park Rail Bypass (see extract below). It is a suitable location for publicly accessible open space enhancing the setting of residential land to the north and the neighbourhood centre to the east.  ***This matter is considered to have been addressed and resolved.***

APPENDIX

G

EMAIL FROM PETERSON BUSHFIRE CONSULTANTS

Adam Clarke

From: David Peterson <david@petersonbushfire.com.au>
Sent: Tuesday, 20 August 2019 3:34 PM
To: Adam Clarke
Subject: Re: RE: Tallawarra Lands: Bushfire Query

Follow Up Flag: Follow up
Flag Status: Completed

Hi Adam,

I left a message on your office phone this afternoon.

I spoke to the assessing RFS office Brad Bourke. His concern is the potential for there to be a grassland hazard within the Council property. I explained that it is semi-managed and is occasionally slashed (as evident from Nearmap). More importantly, I explained that the grass fuel is purely Kikuyu grass and not native grasses assumed by the hazard and APZ tables in Planning for Bushfire Protection and AS 3959.

He said that a perimeter road is not essential but would like to see the dedication of a suitable APZ in the rear of the adjoining lots. An APZ dimension of 10 m would be required to address the grassland hazard. This distance could change on the release if the new Planning for Bushfire Protection (the new grassland provisions have not yet been released so we are planning in the dark so to speak).

Alternatively, we need to obtain written support from Council that the Kikuyu will be managed along the interface.

Regards
Dave

peterson bushfire.
expert consulting services

david peterson
0455 024 480 • david@petersonbushfire.com.au
po box 391 terrigal nsw 2260 • petersonbushfire.com.au

FPA AUSTRALIA (NO.BPAD18882) BPAD LEVEL 3 ACCREDITED PRACTITIONER
ABN 28 607 444 833

---- On Tue, 20 Aug 2019 14:09:34 +1000 Adam Clarke <adam.clarke@cardno.com.au> wrote ----

> Hi Dave
>
> Have you any feedback from RFS on this?
>
> Cheers

APPENDIX

H

BIOSIS LETTER DATED 19 OCTOBER 2018

19 October 2018

Michael St Clair
Planner
Cardno
Ground Floor, 16 Burelli Street,
Wollongong, New South Wales 2500

Dear Michael

Modification to concept plan approval – Tallawarra Lands, Yallah, New South Wales

Our Ref: Matter 24090

This letter addresses the comments received by Wollongong City Council on 31 July 2018 in relation to the rezoning of the Tallawarra Lands precinct (MP 09_0131 MOD 1) (the study area). Under point 11, Wollongong City Council have raised the following query in relation to the project:

> *"The Heritage Impact Assessment Report prepared by Biosis appears to indicate a downgrading of the potential archaeological significance of a range of identified Archaeological sites detailed in the earlier reporting. Evidence gathered by Council about this estate appears to indicate a significant history of transactions and history that is not reflected in the reporting and which may call into questions some of the assumptions and conclusions in the report. Council considers that the Heritage Impact Assessment Report prepared by Biosis should be amended to reflect the substantial additional historical records available to ensure that the conclusions made about the potential archaeological sites are properly considered and that the assumptions made in the absence of this evidence are correct."*

As part of the preparation of the Heritage Impact Assessment (HIA) report for this project Biosis undertake a substantial amount of supplementary research led to a reconsideration of the archaeological potential of the study area. The supplementary historical research included a review of title documents, parish maps, crown plans, historical aerial photography and historical subdivision plans held by the Mitchell Library and Illawarra Historical Society.

Biosis has considered the information supplied by Wollongong City Council and determined the following:

- The estate known as 'Athanlin' or 'Yallah' was a large property in excess of 3000 acres, of which the study area comprises a small component. The history of this property is considered as part of Section 3.5 of the report (Biosis 2017). Biosis acknowledges the historical context does not contain a detailed chain of title for the Central Precinct. This is due to the history of ownership for the study area being convoluted with limited information relating to precise transactions and the spatial relationship of the various owners and tenants that comprised the estate.
- Biosis undertook a review of crown plans in the vicinity of the Central Precinct, this includes a "*Plan of a road at Yallah. From the West boundary of Patrick Osbourne's property to the Dapto Road through the lands of Andrew Thompson*" surveyed in 1861 does not show any evidence of cottages or homesteads within the Central Precinct, it however does indicate that there is a lane leading to

numerous small farms located within Patrick Osbourne's property. A larger version of this map is appended to this letter.

- The 1904 "*Part of the Famous Lakelands Estate fronting the Main South Coast Road and extending to Lake Illawarra*" subdivision plan (Figure 9 in Biosis 2017) indicates that there are no cottages within the study area, however there are cottages immediately to the north and east. In particular, the farm to the east corresponds with the "land leading to numerous small farms" identified on the 1860 plan.
- Based upon the additional research, there is no evidence to suggest TH2 and TH3 date to the 19th century occupation of the study area. These structures are not identified on the 1904 or 1919 subdivision plans of the Lakelands estate. The earliest evidence of these structures is on the 1949 aerial of the study area (Figure 10, Biosis 2017).
- During the field inspection the entire study area was traversed. Limited physical evidence was identified outside of the known building locations (TH2, TH3) within the Central Precinct. Due to the steep topography within the study area and structures would have needed substantial landscaping works to create a level building envelope. No evidence for land preparation activities was identified outside of TH2 and TH3.

Biosis concurs with Wollongong City Council that archaeological remains associated with the early to mid 19th century occupation of the early land grants associated with the study area would have substantial potential to answer research questions relating to the early occupation of the region. However, Biosis believes that there is limited evidence for any dwellings or farms associated with this activity within the study area. The research completed by Biosis indicates that the farms located to the north and east of the Central Precinct however may yield this information. Evidence of mid to late 20th century farming practices is unlikely to contribute to the understanding of the region and therefore Biosis has concluded that TH2 and TH3 have limited archaeological potential.

As the study area does not contain any areas of identified potential, the management of any archaeological remains is ideally suited to the implementation of an unexpected finds protocol, as per Recommendation 2 within the Biosis 2017 report.

Please contact me on 0407 808 527 if you have any enquiries.

Yours sincerely

Alexander Beben
Principal Archaeologist – NSW

References

Biosis 2017. *Tallawarra Lands Northern and Central Precincts Statement of Heritage Impact. Report for Cardno on behalf of Bridgehill*. Authors: R. Morris & A. Beben, Biosis Pty Ltd, Sydney. Project no. 24090

Laid before the Executive Council the 27th September 1861. Minute 61/43.

PLAN

of a road at

YALLAH

From the West boundary of Patrick Osbornes property

to the DAPTO Road

Through the lands of Andrew Thompson

ILLAWARRA

Scale 8 chains to an inch

Isy Bank
Marshall

Pt. Osborne

B Corner Post

boundary of Browne's Grant

Surrey see plan 61/15

From Marshall Mount see plan 61/11

MAIN ROAD FROM DAPTO TO JAMBEROO

REFERENCE

From A	West 1°28' North	1·79 chains
	West 7°10' South	8·08 "
	West 3°30' South	2·84 "
	West 7° South	4·42 "
	West 18°15' North	2·46 "
	West 17°30' North	27·50 "
	North 35°15' West	1·40 "
	North 13°30' West	7·80 "
	North 30 min West	2·59 "
	North 35°45' West	4·45 "
	West 17°15' North	2·82 "
	West 31°33' North	12·91 "
	North 31°12' West	3·33 "
	North 27°15' West	12·35 "
	North 23°10' West	4·08 "
	North 21°8' West	4·21 to B
	Total	108·03

EVAN EVANS

W

E

Post marked A

For Open and dedicating remarking of this road ride R832/1603

Proposed road

West 19° North 30·62 chains

ANDREW THOMPSON land

50 links wide

West 5°30' South 17 chains

New fence

Fence

Post marked A

A

PATRICK OSBORNE

Lane leading to various small farms

Boundary

Proposed to be opened as a Parish road under Act of Council 4. Wm IV. No II.

Proclaimed by Gazette Notice of 31st October 1861 fol 2298

Confirmed " " " 6th February 1862 " 304

Opened " " " 28 August 1862 1644 62/9192

Transmitted with my letter and book of Reference of the same date

No 61/14. 6th

212-1603