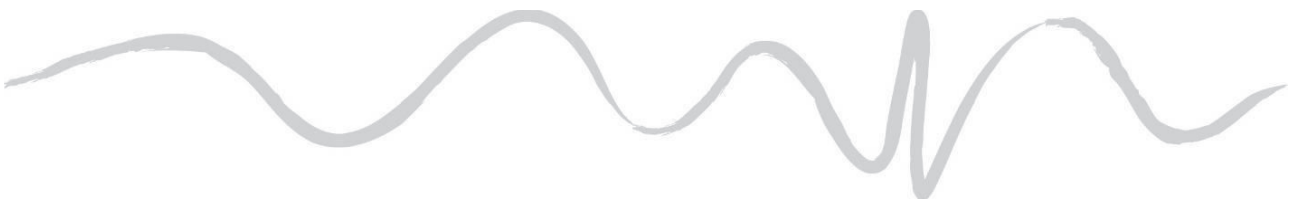


Local Environmental Study

George Booth Drive, Edgeworth



quality solutions **sustainable** future

Local Environmental Study

George Booth Drive, Edgeworth

Prepared for: Lake Macquarie City Council
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B	Ecological Assessment
C	Urban Capability Assessment
D	Archaeological Assessment
E	Social Impact Assessment
F	Economic Impact Assessment
G	Bushfire Hazard Assessment
H	Acoustic Impact Assessment
I	Traffic Study
J	Brown Consulting Modelling Report
K	Development Scenarios



Executive Summary

This Local Environmental Study (LES) relates to a draft Local Environmental Plan being prepared for Lake Macquarie City Council for land known as George Booth Drive, Edgeworth. The purpose of this study is to assess the capability and suitability of the land for a range of land uses including residential, business, industry, open space, recreation and environmental protection. The Local Environmental Study also addresses all statutory obligations under the *Environmental Planning and Assessment Act 1979* relevant to the draft Local Environmental Plan.

The study area is made up of Lot 88 DP755262, Lot 107 DP100048, Lot 17 DP849003 and part Lots 6 and 7 DP 4647. It has a total area of approximately 95ha. The study area is bound by George Booth Drive to the North, existing residential development to the east and south, and undeveloped environmental protection zoned land to the west. The site is generally vegetated, with cleared land corresponding to three electricity easements that transect the site.

The LES considers a range of factors including the physical and ecological environment, the visual / scenic environment and the socio-cultural environment. From these factors, the LES analyses all of the opportunities and constraints of the site. These include: slope, soils and geotechnical, flooding and drainage, flora and fauna, wildlife corridors, infrastructure servicing, traffic and access, rehabilitation of conservation areas, visual amenity, agricultural viability, archaeological and bushfire.

A comprehensive review of the statutory and strategic planning framework has been undertaken, including review and assessment against all relevant State and local environmental planning instruments, strategies, policies and codes.

From the aforementioned investigations, an overarching Structure Plan has been prepared to demonstrate how the site could be developed and guide the rezoning of the site. This LES recommends a number of land uses for the site, including environmental conservation and urban development. It also outlines the preferred rezoning and development strategy to inform the preparation of the draft Local Environmental Plan Amendment.

The area designated for future urban development covers approximately 46.7ha, which represents 49% of the total site area. This reflects the need to retain a large proportion of the site for environmental purposes because of the various environmental, visual, engineering and planning constraints outlined in this Local Environmental Study.

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Introduction

1.1 Background

GeoLINK has been engaged by Lake Macquarie City Council (LMCC) to prepare a Local Environmental Study (LES) relating to a proposal to rezone an area of land south of George Booth Drive, Edgeworth. The site is currently vacant, and is vegetated with the exception of cleared land corresponding to the three electricity easements that transect the site.

The subject site has been identified in the LMCC's Lifestyle 2020 Strategy as part of a new town centre for Edgeworth. The remaining portion of the intended new town centre is the Pambulong Forest Estate. In 2005 LMCC approved the application for the Pambulong Forest Estate residential and commercial subdivision to the land north of George Booth Drive. The proposed rezoning would allow for the full development of the proposed town centre for Edgeworth under the Lifestyle 2020 Strategy.

In January 2008, LMCC prepared a City Urban Development Program. The Program identified areas within the LGA according to an urban development type; that is areas which are under investigation, and areas which are likely to be rezoned for development. The site is illustrated in the Program as rezoning for residential / industrial. The Program further estimated a lot yield for the site of 400 lots, based on an estimated 40ha of developable land. An approximate gazettal date was late 2010.

The proposed project therefore presents an opportunity to facilitate the urban development of the area. The proposed redevelopment of the site is an important step in the fulfilment of the objectives for the new town centre and urban development projected for the area by LMCC.

The location of the subject land is shown in **Illustration 1.1**.

1.2 Structure of Report and Its Scope

Section 1 of this report provides a description of the subject land and its planning context. **Section 2** of this report provides a description of the subject land and its planning context. **Section 3** provides an assessment of key environmental and social factors relevant to the site. **Section 4** identifies and illustrates the opportunities and constraints that exist within the site. **Section 5** sets out an examination of statutory and strategic planning relating to the land. The guiding principles for ecologically sustainable development are outlined in **Section 6**. A structure plan including recommended guidelines for the future development of the site is included in **Section 7**. Land use options, based on the findings of Sections 2, 3, 4, 5, 6 and 7 are considered in **Section 8**.

The final section of the report (**Section 9**) provides LEP zoning recommendations with regard to the suitability of the land for urban development (including open space), based on the environmental and social factors applying to the site and land use needs in the locality.

Appendices to this LES contain the following information:

- A Consultation Responses
- B Ecological Assessment
- C Urban Capability Assessment
- D Archaeological Assessment
- E Social Impact Assessment
- F Economic Impact Assessment
- G Bushfire Hazard Assessment

H	Acoustic Impact Assessment
I	Traffic Study
J	Brown Consulting Modelling Report
K	Development Scenarios

1.3 Consultation

In response to LMCC's Section 54 notification, under the *Environmental Planning and Assessment Act 1979* (EP&A Act), indicating its intent to prepare a draft Local Environmental Plan, the Department of Planning (DoP) advised LMCC that an LES would be required to inform the LEP amendment..

In accordance with Section 62 of the EP&A Act, LMCC consulted with a number of public authorities prior to the commencement of this study. DoP advised in its response to Council's Section 54 notification, that consultation with the Department under Section 62 of the Act was not required in this instance. The authorities consulted and a summary of the issues raised is set out in **Table 1.1**. Copies of the responses received are contained in **Appendix A**.

Table 1.1 Consultation Summary

Authority and Date of Response**	Summary of Issues	Section of LES where matter is addressed
Mine Subsidence Board (23/01/07)	- The Mine Subsidence Board has advised that it has no objections to the proposed rezoning. - The applicant should be advised to seek the board's approval for any proposed subdivision or the erection of improvements at the appropriate time.	Section 3.2
Hunter Water (20/03/07)	- It is likely the site will be adequately serviced, subject to the 2008 Edgeworth Servicing Strategy. - A sewer servicing strategy will need to be prepared in the Section 50 "Notice of Requirements" consultations, which should be finalised prior to any construction certificate issued by Council.	Section 3.9
NSW Rural Fire Service (28/05/07)	No further comments to the response dated 27/03/07.	Section 3.11
NSW RFS Initial comments (27/03/07)	- The subject site is bushfire prone. - A bushfire threat assessment should be conducted. - Bushfire requirements should be considered during all planning stages of the development.	Section 3.11
Heritage Council of NSW (23/02/07)	The Heritage Office has advised that it has no objection to the proposed rezoning; provided that all future development applications provide a Heritage Impact Statement for any works adjacent to the West Wallsend Steam Tram Line.	Section 3.6 (Heritage Impact Statement Appendix D)
Hunter New England Health (05/02/07)	The Hunter New England Population Health have advised that: - A mosquito risk assessment should be performed for the site; - A slope and soils assessment should determine lot size and capability for onsite disposal of water; - The Social Impact Assessment should include opportunities for local	Section 3.2 and Section 3.10

Authority and Date of Response**	Summary of Issues	Section of LES where matter is addressed
	employment; - Best practice design principles should be implemented in regards to water and energy saving practices; and - Footpaths, cycleways and public transport access should be included in the design.	
Department of Natural Resources (20/02/07)	Relevant issues identified for the site include: - possible groundwater dependant ecosystems; - the sites large amount of intact vegetation; - it has an important connectivity role in that area; and - and its proximity to Cockle Creek. DNR recommends the consideration of the following matters: - development be confined to disturbed cleared areas, and where vegetation quality is low; - future design of urban areas close to Cockle Creek should employ water sensitive urban design to control drainage to the creek; - buffer strips along the western and eastern boundary should be used to manage drainage and connectivity with the remaining vegetation; and - the presence of groundwater dependant ecosystems should be investigated.	Section 3
Department of Environment and Conservation (31/01/07)	Prior to the finalising of an LES, Council should be satisfied that; - any potential landuse conflicts associated with air, noise and odour impacts are adequately addressed in accordance with the provisions of the <i>Protection of the Environment Operations Act 1997</i>. - The proposed rezoning, where possible, minimises the impacts on areas of native vegetation by concentrating urban and industrial uses to the most degraded parts of the site. Minimal impacts and mitigation measures should be strived for in relation to threatened species. Where this cannot occur, offsets are recommended. - Adequate consideration is given to the EPA Act, SEPP 44 and SEPP 71 Coastal Protection. - Important corridor functions have been retained. It is noted the proposal footprint includes a 100m long corridor to the southern boundary. - An appropriate level of Aboriginal cultural heritage significance assessment is undertaken and the views of local aboriginal groups sought. The proposed LES is not likely to impact upon Aboriginal cultural heritage. - Potential direct and indirect on DEC estate, wilderness, wild rivers or high conservation value areas have been adequately considered and avoided. - Any areas of contamination are identified and dealt with in accordance with the <i>Contaminated Land Management Act 1997</i>. - Stormwater emanating from the site is managed in a sustainable manner.	Section 3

Authority and Date of Response**	Summary of Issues	Section of LES where matter is addressed
	If the proposed LES affects any species requiring consideration under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> then consultation with Department of Environment and Heritage may be required.	
Roads and Traffic Authority (RTA) (20/02/07)	The RTA advises: - The RTA expects the LES will be accompanied by a Traffic Study prepared to RTA guidelines; - A signalised intersections has been provided on George Booth Drive to access the North Lakes development area. Access to the study site should be made via this intersection; - Section 94 contributions or a Deed Containing Agreement should be entered prior to gaining consent for the provision of future infrastructure within the site; - SEPP 11 should be addressed and resolved in the LES; and - The applicant is responsible for noise attenuation measures. The RTA holds an objection to the proposed rezoning until the above matters are addressed. Further consultation with the RTA prior to the LEP amendment adoption will be required.	Section 3.7
Department of Primary Industries (DPI) (21/02/07)	The DPI department relevant to the proposed rezoning is the Mineral Resources Division. The site is located in a Coal Lease and Petroleum Exploration License Area. Any development is to be in accordance with the Mines Subsidence Board Guidelines.	Section 3.2
Energy Australia (14/02/07)	Energy Australia advises that the site contains three existing transmission lines. These lines require 24 hour access at all times. Any encroachment on these easements will require the prior approval of Energy Australia.	Section 4.4
Ministry of Transport (02/04/07)	The Ministry has no objection to the proposal, but draws attention to the Strategic Planning Documents for the area. The Ministry recommends further future consultation between Council and Landholders.	Section 5.1

1.4 Special Technical Advice

GeoLINK engaged the following consultants to provide specialist technical advice for the preparation of this LES. These include:

- Coffey Geotechnics** were engaged to undertake an urban capability assessment for the subject site which involved investigations into soils, contamination and mine subsidence and can be found in Appendix C;
- Insite Heritage** to undertake heritage and archaeological investigations. A copy of the Heritage and Archaeological Assessment report can be found in **Appendix D**. Heritage is discussed in **Section 3.6** of this report;
- Eastcoast Flora Survey and Forest Fauna Surveys Pty Ltd** to assist GeoLINK with the ecological assessment. A copy of their findings can be found in **Appendix B**. Flora and Fauna is discussed in **Section 3.1** of this report; and
- RoadNet** to conduct a traffic study and a road traffic noise assessment. A copy of the Traffic Study is contained in **Appendix I**. The Road Traffic Noise Assessment report can be found in **Appendix H**. Traffic is discussed in **Section 3.7** of this report.

1.5 Further Information

Should Council require any additional information, or wish to clarify any matter raised by this Local Environmental Study, please contact **Simon Waterworth** of **GeoLINK** on telephone (02) 6651 7666.

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LES: George Booth Drive, Edgeworth
1062367

Locality Plan

Illustration 1.1

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The Site and Its Context

2.1 Cadastral Description

The location of the subject site is shown in **Illustration 1.1**. The study area contains the following allotments:

- Lot 88 DP755262;
- Lot 107 DP100048;
- Lot 17 DP849003 and
- Part Lots 6 and 7 DP 4647.

The total area of the site is approximately 95ha and it is located in the Parish of Teralba, County of Northumberland. A Cadastre Plan is shown in **Illustration 2.1**.

2.2 Site Context

The site is located approximately 110km north east of Sydney and 4.5km west of the Glendale town centre. The site is bound by George Booth Drive to the north, Edgeworth to the east, Homesville to the west, and Nelson Street to the south.

2.3 Physical Attributes

The site is currently unused (vacant) land and contains three major easements for electricity purposes. The site also has a small section of the West Wallsend Steam Tram Line adjoining George Booth Drive. The site is mostly vegetated which is intercepted by cleared areas associated with the electricity easements. **Illustration 2.2** shows an aerial image of the site.

Topographically, the area is typified by moderately undulating terrain with relief over the site estimated to be in the order of RL 20m to RL 60m. The study area is dominated by a rounded ridgeline which lies north / north-west with a prominent rounded peak located in the centre of the site. Drainage of the site occurs by infiltration and overland flow into the gully catchment system which flows to Slatey Creek to the west and Cocked Hat Creek to the east. Both Creeks feed into Cockle Creek that in turn flows into the northern reaches of Lake Macquarie (Coffey Geotechnics 2008).

2.4 Zoning

Pursuant to the provisions of Lake Macquarie Local Environmental Plan 2004, the subject site is zoned 10(d) Investigation Zone (refer to **Illustration 2.3**).

2.5 Site History

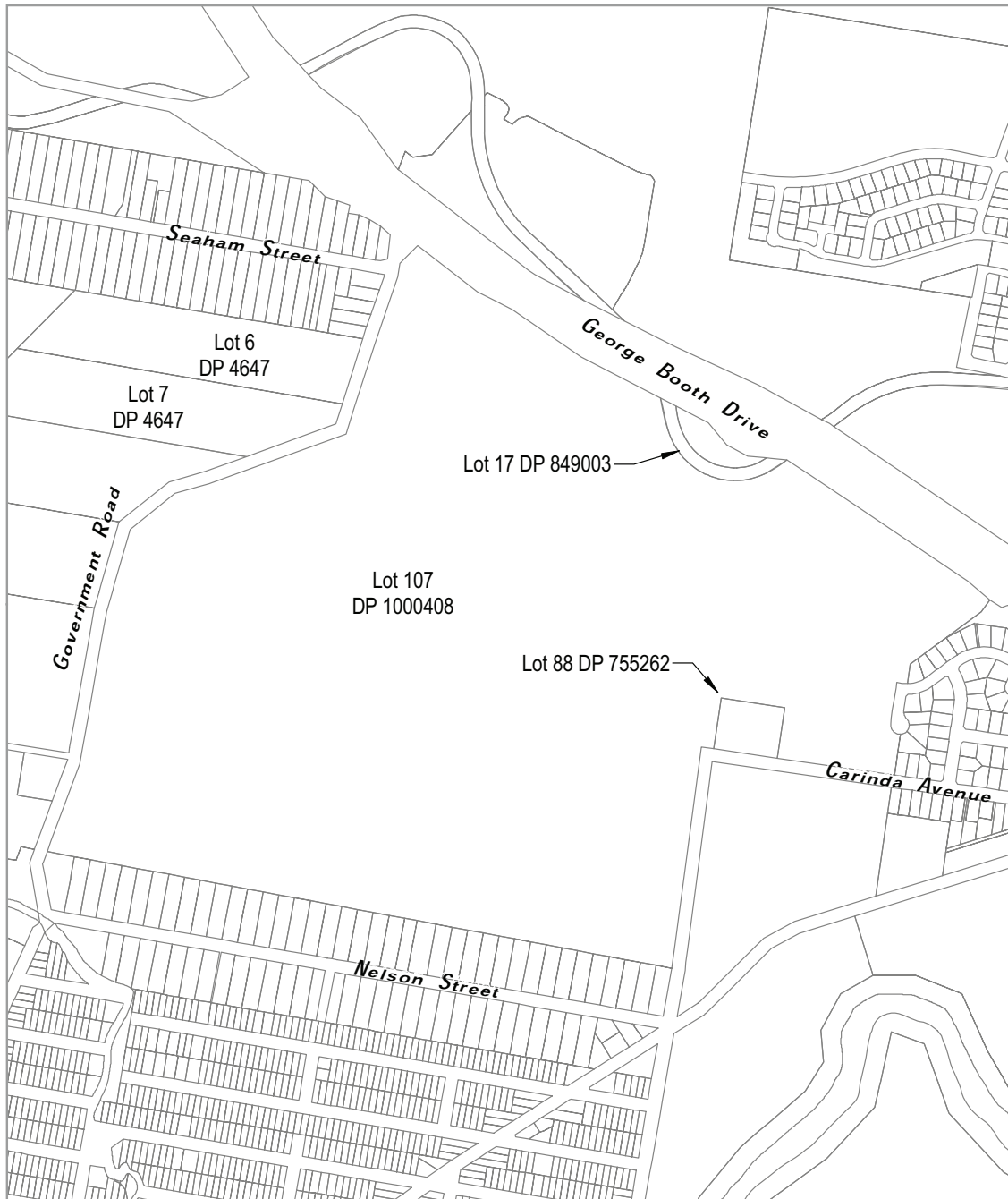
There are no known approvals that specifically relate to the site. Significant approvals relating to adjoining sites are outlined below in **Table 2.1**.

Table 2.1 **Recent Development History and Status**

Particulars*	Date of Development Consent	Status
DA2433/2004 Proposed Commercial and Residential Subdivision - Pambulong Forest Estate	26/04/2005	Approved
DA2207/2007 Proposed Retail Centre - Pambulong Forest Marketplace	03/06/2010	Approved

* Only recent DAs for development that impact upon the study area have been included.

In addition to the above, several modifications to DA2433/2004 have been approved. These range from minor alterations to the consent conditions to increases in the number of lots in the estate. Approval of the Pambulong Forest Estate and the Pambulong Forest Marketplace on the opposite side of George Booth Drive creates an opportunity to create linkages between that development and the study area, forming a new town centre in Edgeworth.



LEGEND

 Cadastre



0 200

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LES: George Booth Drive, Edgeworth
1062368

Cadastral Plan

Illustration 2.1

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LEGEND

 Site boundary



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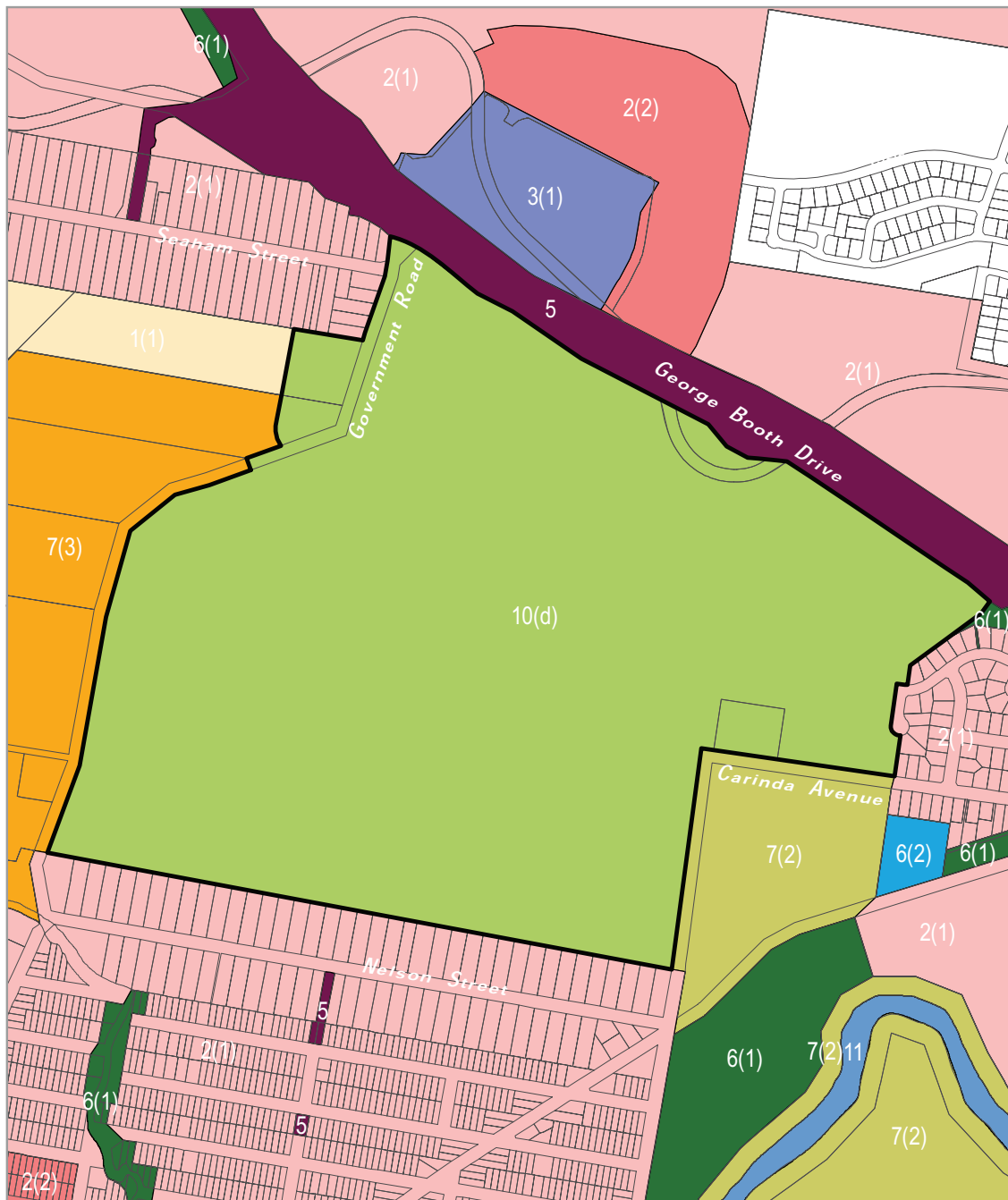


LES: George Booth Drive, Edgeworth
1062369

Aerial Image

Illustration 2.2

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LEGEND

	Site boundary		6(2) Tourism and Recreation
	1(1) Rural Production		7(2) Conservation (Secondary)
	2(1) Residential		7(3) Conservation (General)
	2(2) Residential (Urban Living)		10(d) Investigation Zone
	3(1) Urban Centre		11 Lake and Waterways
	5 Infrastructure		Deferred Matter
	6(1) Open Space		



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1062847

LEP Zoning

Illustration 2.3

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Environmental and Social Considerations

3.1 Flora and Fauna

Flora and fauna assessments were prepared by Eastcoast Flora Survey and Forest Fauna Surveys Pty Ltd for the subject site. These assessments are contained in full in **Appendix B** of this report. The findings of the assessments are summarised below.

3.1.1 Flora

Survey Methodology

A vegetation survey, classification and mapping of the subject site were carried out during 2008. A targeted sampling methodology using eighteen 0.04ha survey plots was performed on the vegetation of the site. Classification of collected data was undertaken with *Primer v6*, using hierarchical clustering and ordination techniques and defining vegetation communities at 51% similarity (0.49 dissimilarity). There was strong congruence between the cluster analysis and 2-dimensional non-metric multidimensional scaling. This classification was also informed by a regional data analysis, which showed each defined community to be robust. Mapping of vegetation communities incorporated the resultant clusters with aerial photographic interpretation and extensive ground truthing.

Existing Conditions – Vegetation Communities

The subject site is approximately 96 ha in area and mostly covered by forest vegetation communities, except along three north-east to south-west running powerline easements, and at the former quarry in the north of the site. Five forest vegetation communities were identified across the sites as follows:

- Hinderland Spotted Gum – Red Ironbark Forest which occupies approximately 38.34 ha;
- Coastal Plains Stringybark – Apple Forest which occupies approximately 19.36 ha;
- Red Mahogany – Apple Paperbark Forest which occupies approximately 0.19 ha;
- Red Ironbark – Paperbark Forest which occupies approximately 12.82 ha; and
- Depression Paperbark Forest which occupies approximately 0.26 ha.

In the most part, community definition allowed reasonable comparisons with regional vegetation classifications undertaken in the Lower Hunter and Central Coast bioregion, and consequently statements of conservation significance for each community have been made.

Two Endangered Ecological Communities (EECs), as listed in the *Threatened Species Conservation Act 1995* (TSC Act) occur within the subject site:

- *Lower Hunter Spotted Gum – Ironbark Forest of the Sydney Basin bioregion*. This encompasses the Hinderland Spotted Gum – Red Ironbark Forest and Red Ironbark – Paperbark Forest on the site, and has a total area of 51.16 ha; and
- *Swamp Sclerophyll Forest on Coastal Floodplains of the North Coast, Sydney Basin & South-East Corner bioregions*. This encompassed the Red Mahogany – Apple Paperbark Forest on the site, and has a total area of 0.19 ha.

In total, 51.35 ha or 54% of the total subject site supports EECs. No *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) listed vulnerable or endangered ecological communities were present.

Existing Conditions – Flora Species

The subject site was found to support over 173 native plant taxa. Significant recordings were:

- *Callistemon linearifolius* which is listed as vulnerable under the TSC Act. The site population consist of two plants within the Coastal Plain Stringybark-Apple Forest, in the eastern portion of the site. Based on

available records, the occurrence of this species on the subject site forms a disjunct local population, though given the presence of only two plants, it is not considered a significant population.

- *Tetratheca juncea* which is listed as a vulnerable species under the *EPBC Act and TSC Act*. Eleven plant clumps were located within the north-eastern portion of the site, within the Coastal Plains Stringybark-Apple Forest. *Tetratheca juncea* is widespread throughout the Lake Macquarie area and detailed surveys at several locations within the area suggest that many populations exceed 100 plants. Populations within close proximity to the site include the Pambulong Forest development site (to the north of the subject site) which was found to have more than 1632 clumps of *Tetratheca juncea*, 94 % of which fell within proposed conservation area (Andrews 2004). Overall relative to the number populations within the general Lake Macquarie area with populations of >100 plant clumps, the site population is not considered of high local significance.
- *Eucalyptus fergusonii* subsp. *fergusonii* which is listed as Rare 3KC on the Rare or Threatened Australian Plant (RoTAP) list. A few trees were located within the eastern portion of the site

These are shown in the constraints map in **Illustration 4.1**.

Impact

The proposed development area would allow development of 47.7ha (~50%) of the total 96 ha site. This would be a substantial modification of the site from its current form and contribute to listed Key Threatening Processes such as Clearing of Native Vegetation. The *Eucalyptus fergusonii* subsp. *fergusonii* are located in the proposed conservation area and would not be impacted by the proposal. Impacts per significant legislative threatened species and EEC is summarised below:

Callistemon linearifolius

The proposed development layout would see removal of approximately 13.5 ha Coastal Plains Stringybark-Apple Forest which is assumed to constitute potential habitat for *Callistemon linearifolius* given the presence of two specimens. Approximately 5.8 ha of Stringybark-Apple Forest would be retained including the two *Callistemon linearifolius* specimens. Given the paucity of confirmed records of this species in the northern Lake Macquarie area, it is assumed that the two plants of *Callistemon linearifolius* are already isolated from other populations, and that further fragmentation of potential habitat through the proposed development will not occur. Overall the proposal is unlikely to have a significant impact on *Callistemon linearifolius*.

Tetratheca juncea

The proposed development layout is likely to have a significant impact on the site population of *Tetratheca juncea* with all plant clumps likely to be removed. Approximately 13.5 ha of the Coastal Plains Stringybark-Apple Forest which supports this species on the site is likely to be removed; however *Tetratheca juncea* occupies a wide range of habitats and no other specimens were recorded despite intensive targeted surveys. This suggests this habitat is not ideal.

Overall while the proposed development layout would have a detrimental impact on the site's *Tetratheca juncea* population, and contribute incrementally to the species loss and recognised key threatening processes locally; it is not considered likely to have a significant impact on the broader local *Tetratheca juncea* population as:

- the site population forms only a minor fraction of the broader local population and is not considered locally significant;
- substantial number of other plants occur within the northern Lake Macquarie area (including many hundreds in the conservation reserves);
- given the current fragmented nature of habitat within the locality, it is unlikely that further fragmentation or isolation of populations within the locality would occur; and
- the nature of the development proposal is such that the occurrence and movement of pollinators (at least two sonicating bees) would not be detrimentally affected.

Lower Hunter Spotted Gum – Ironbark Forest

Approximately 22 ha (43%) of Lower Hunter Spotted Gum-Ironbark Forest on the site would be removed as a result of the proposal. This is a substantial reduction in the area of this EEC on the site and would contribute to

the cumulative loss and fragmentation of this community within the locality. However the local occurrence of this community is unlikely to be placed at significant risk of extinction as a result of the proposal as:

- approximately 29 ha (57%) would be retained on the subject site;
- the Lake Macquarie LGA and broader region supports substantial large stands of this community which would not be affected by the proposal; and
- further isolation than that which currently exists will not occur to any great degree.

Swamp Sclerophyll Forest on Coastal Floodplains

The 0.19 ha of Swamp Sclerophyll Forest on Coastal Floodplains would not be directly affected by the proposal. It would be retained in the proposed conservation area. The single stand of Swamp Sclerophyll Forest on Coastal Floodplains is already isolated from other stands of similar vegetation due to previous developments. No further fragmentation or isolation will occur as a result of the proposal.

Overall while the proposal would result in substantial modification of the habitat on the site, it is considered unlikely to result in a significant impact on Swamp Sclerophyll Forest on Coastal Floodplains.

Recommendations

Approximately 50% of the site should be retained and managed for conservation purposes. Appropriate offsets are determined in consultation with Department of Environment, Climate Change and Water and implemented to counterbalance loss of vegetation and impacts on biodiversity.

3.1.2 Fauna

Survey Methodology

Fauna investigations were conducted at the subject site between May 2008 and March 2010 to assess the ecological significance of the subject site. A full range of fauna surveying techniques were undertaken seasonally, targeting all fauna groups.

Existing Conditions – Survey Results

In total, 59 bird species, 16 mammal species, three reptiles and seven frog species were recorded within, or immediately adjacent to the subject site. A total of six threatened species were recorded including:

- Masked Owl (*Tyto novaehollandiae*);
- Squirrel Glider (*Petaurus norfolcensis*);
- Little Bent-wing Bat (*Miniopterus australis*);
- Eastern Bent-wing Bat (*Miniopterus schreibersii oceanensis*);
- Large-eared Pied Bat (*Chalinolobus dwyeri*); and
- Grey-headed Flying-fox (*Pteropus poliocephalus*).

A further two threatened species, the Greater Broad-nosed Bat or Eastern Falsistrelle, could possibly occur on the subject site as calls resembling both species were tentatively identified from Anabat call recordings. Analysis of threatened fauna species recorded in the locality (<10km radius) revealed an additional 29 threatened species. However, for many of the additional 29 species, no suitable habitat exists in the subject site to suggest their likely occurrence. The following additional threatened species were considered potential occurrences:

- Little Lorikeet (*Glossopsitta pusilla*);
- Powerful Owl (*Ninox strenua*);
- Varied Sitella (*Daphoenositta chrysoptera*);
- East-coast Free-tail Bat (*Micronomus norfolkensis*);
- Swift Parrot (*Lathamus discolor*);
- Regent Honeyeater (*Anthochaera phrygia*);
- Little Eagle (*Hieraaetus morphnoides*); and
- Large-footed Myotis (*Myotis adversus*).

Two habitat types occur within the subject site; open forest and open grassland, although there is variation in dominant tree species within the open forest distributed across the subject site. The subject site has experienced a high degree of disturbance to the native vegetation by impacts of logging (past and present), vehicle and pedestrian tracks, dumping of domestic and commercial waste, weeds, clearing of easements for infrastructure utilities (powerlines), and fire. Parts of the subject site experience a high to very high fire frequency. The general age of the forest structure is juvenile aged trees with an average of 1.3 habitat trees per hectare (very low). Vegetation within the subject site is fragmented due to wide cleared easements for three powerline easements, and is also fragmented from adjoining bushland areas by both major and minor roadways surrounding the perimeter.

Land use zones under the LMCC LEP (2004) immediately to the north of the subject site support a mix of developments with limited opportunities for retention of native vegetation, fauna habitat and vegetation corridors. To the west of the subject site, corridor connectivity to remnant forest is also fragmented due to clearings for powerline easements, minor roads (Appletree Road) and residential allotments. To the south and east of the subject site are residential suburbs with no habitat values for the majority of fauna species that utilise the site. However, a narrow corridor of remnant forest exists which connects the subject site to Cockle Creek. This large creek retains riparian vegetation and provides connectivity to large areas of remnant vegetation and fauna habitat in the creek's upper catchment. The only barrier to dispersal of fauna between the subject sites is a powerline easement and Northville Road.

An additional survey of specific habitat trees was undertaken by Forest Fauna Surveys Pty Ltd for LMCC. This survey targeted potential large forest owl habitat trees within the subject site. The threatened Masked Owl (*Tyto novaehollandiae*) utilises the subject site for both nesting and roosting. Tree number 13 was identified as a roost tree which is extensively utilised, whilst tree number 46 is a nest and also roost tree.

Impact

The proposed development area would allow development of 47.7ha (~50%) of the total 96ha area. This would be a substantial modification of the site from its current form and contribute to incremental habitat loss for the six known, two possible recordings and eight other potentially occurring threatened fauna species. It would also contribute to the listed Key Threatening Processes of Clearing of Native Vegetation and Loss of Hollow-bearing Trees that have contributed to losses in local fauna biodiversity.

In total 48 (approximately 38%) of the 128 hollow-bearing trees on the site would require removal. The value of the hollow-bearing trees to be removed and retained are summarised in **Table 3.1** below.

Table 3.1 Habitat Value of Hollow-bearing Trees to be Removed

Hollow size range	Number of trees with hollow-feature	
	Trees to be removed	Trees to be retained
Hollows with small openings <20mm or small fissures on dead branches, main trunk or split bark	35	57
Hollows with small openings >20mm <50 mm	28	50
Hollows with medium sized openings >50mm <150mm	27	50

Approximately 50% (48 ha) of the habitat on the site would be retained. Existing connectivity between adjacent habitats would be reduced to some extent, the proposal design aims to maintain connectivity between adjacent

habitats to the north-east and east and west. The retained habitats area includes the known Masked Owl nest and roost trees, as well as a surrounding 150 m buffer (refer to constraints map in **Illustration 4.1**).

Statutory assessments were undertaken for all known/potentially occurring threatened species under the *TSC Act* and *EPBC Act*, as well as for migratory listed species under the *EPBC Act*. These assessments suggest that the proposed development footprint would not significantly impact on any of the subject threatened or migratory fauna species, or their habitat.

Recommendations

Approximately 50% of the site should be retained and managed for conservation purposes. Appropriate offsets are determined in consultation with Department of Environment, Climate Change and Water and implemented to counterbalance loss of vegetation and impacts on biodiversity.

3.2 Landform and Soils

Landform and soils were assessed by Coffey Geotechnics as part of the urban capability assessment. The Coffey Geotechnics report is included in **Appendix C**.

3.2.1 Landform

The site is moderately undulating with relief in the order of RL 60m to RL 20m AHD. The site is characterised by a rounded ridgeline that trends north/north-west. The highest point of the site is a rounded peak toward the middle of the site. From the ridgeline, a series of broad convex spurs splay out around the ridge. Drainage gullies are situated between these spurs, which typically show sandstone outcrops at the base of the gullies. Little scour erosion and no creep or slump features are present within the banks of the gullies. The footslopes within the gullies present thicker alluvial / colluvial deposits, however soil depths are minor (<1m) with silty to sandy soils being the major component.

Drainage within the site is directed to Slaty Creek to the west and Cocked Hat Creek to the east. Both creeks feed into Cockle Creek, which in turn flows into Lake Macquarie. Drainage occurs through overland flows via a series of drainage gullies. Drainage is good to very good across most of the site. Drainage in a low-lying section of the site however is fair to poor drainage. Drainage to this area in the north-west portion of the site is directed into a channel which runs parallel to Governor's Road draining south west toward Slaty creek. The channel has dispersive erosion features such as vertical scour erosion, undercutting of the bank, and rill erosion within the creek bank. Saline resistant vegetation is present in this area.

Slopes within the site are generally 8° to 10° within the upper slopes and 5° to 8° toward the footslopes. Steep slopes up to 25° have been identified in the crest of gullies over the site. These steep slopes are attributed to a natural gully formation, and no significant instability was observed in these areas besides minor undercutting.

A spring has been identified within the site. It is located toward the middle-western side of the ridgeline, within the upper slopes of a drainage gully as shown in **Illustration 3.1**. The observed groundwater at the spring is a brown / red colour. Marshy vegetation is located below the spring.

A former 6-8 m deep quarry area has been identified in the north of the site as shown in **Illustration 3.1**.

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LEGEND

- Site boundary
- 5° Slope direction and angle
- 15 Outcrop strike and dip
- Sandstone outcrop
- Tuff outcrop
- Spring
- Contours at 2 m interval
- Powerlines
- Former quarry
- Domain A
- Domain B
- Domain C
- Domain D
- Domain E



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Landform

Illustration 3.1

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3.2.2 Geotechnical Domains

The study area was divided into geotechnical domains based on subsurface investigations and likely surface and subsurface conditions. The geotechnical units are defined in **Table 3.2** and illustrated in **Illustration 3.1**.

Table 3.2 **Geotechnical Domain Units**

ATTRIBUTE	DOMAIN A	DOMAIN B	DOMAIN C	DOMAIN D	DOMAIN E
SETTING	Ridge tops and crests	Mid-slope areas on flanks of undulating the ridgeline and spurs	Footslopes of the site broadly undulating areas uniform slope profile	Upper slopes and crests of gully areas	Low lying area of the site,
SLOPE	0 – 2°	8 – 10°	2° – 5°	20° – 25°	<2°
GEOLOGY	Weathered Sandstone and Tuff (Lower Croudace Bay Formation)	Weathered Sandstone / Siltstone / tuff and coal) (Upper Pilot Seam and associated inter-burden)	Weathered Sandstone / Siltstone (Seahampton Sandstone Member)	Predominantly weathered sandstone	Weathered Sandstone / Siltstone (Seahampton Sandstone Member)
SOIL TYPE	Thin topsoil layer overlying highly weathered rock	Residual Clays with deposits on the lower slopes	Residual Clays on upper slopes with a thin colluvial layer on the lower slopes	Thin sandy topsoil overlying highly weathered sandstone,	Colluvial clays overlying residual clays
ESTIMATED SOIL DEPTH	<0.5m	0.5m – 1m	1m – 1.5m	<0.5m	1.5m - >2m
DRAINAGE	Well drained by runoff	Well drained by runoff	Well drained by runoff	Some wet areas adjacent to spring features	Some wet areas during prolonged rainfall
EROSION	Some minor rill erosion	Some minor rill erosion on slopes	No significant erosion	Minor erosion in gully floor	Significant dispersive erosion within channel banks
CONSTRAINTS	Difficult excavation conditions in rock	Difficult excavation conditions in rock	Potentially wet subgrade conditions. Moderately to highly reactive soils	Potential for block instability, along steep rock exposures, difficult construction conditions on steep slopes.	Potentially silty moisture sensitive soils, water logged,

Source: Coffey Geotechnics: Urban capability Assessment November 2009

3.2.3 Slope Stability

No evidence of overall slope instability was identified on the site. The creek banks showed evidence of minor localised erosion and scouring. Minor potential toppling instability was identified at the head of the gullies where exposed sandstone outcrops were present. However, this was assessed to be associated with erosion and does not pose a risk to slope instability. Based on the slope instability risk levels (refer to **Table 3.3**), the site is suitable for urban development.

Table 3.3 **Assessed Geotechnical Risk of Slope Instability**

Geotechnical Domain	Assessed Instability Risk Classification	Comment
A	Low	No specific constraints. General constraints and recommendations of this report would apply.
B	Low	Design development to accommodate slope profile. Minimise disturbance to slopes.
C	Low	Development in low undulating areas should minimise disturbance to slopes and general constraints and recommendations in this report would apply.
D	Medium	Development toward the head/crest of incised gullies should minimise disturbance to slopes, especially enhancing any potential rock toppling failure, general constraints and recommendations in this report would apply most notably adequate drainage measures and sound engineering filling procedure.
E	Low	Development in low near level areas should minimise disturbance to slopes. Colluvial soils should not be used for structural fill/embankment unless treated accordingly. General constraints and recommendations in this report would apply.

Source: Coffey Geotechnics: Urban capability Assessment November 2009

3.2.4 Extractive Mineral Resources

The site has two mining leases on the site. However, subsurface investigations indicate that there is no substantial economic quarry resource on the site. Previous quarrying operations are noted in the northern section of the site, however DPI and a land title search show no record of this. It is concluded that the site was likely used as a borrow for general fill, possibly in operation in the 1970's.

3.2.5 Mine Subsidence

The site has been previously undermined by West Wallsend Colliery during the early 1990's at depths of 190–235m below ground surface. The Mine Subsidence Board (MSB) has advised that further mining under the site is unlikely. Previous mine subsidence studies across Newcastle indicate that the depth of cover is suitable for residential development on the site without restrictions imposed by the MSB. As the site is within the Mine Subsidence District, MSB is a consenting authority and all development will require its approval.

3.2.6 Urban Salinity

Salinity is not likely to have a significant impact on the site provided that management strategies are implemented which minimise the effect of altered water and salt movements. The area in which concern would be raised for the site is the possibility of a rising water table in low lying areas. If the water table is allowed to rise, urban salinity effects may be experienced. Development that maintains existing drainage patterns across the site will reduce the effect of a rising water table. It is recommended that further salinity testing be carried out at development application stage, particularly in the low lying areas of the site.

Sandy soils and acid soils that have leached are often characterised by low levels of exchangeable calcium and magnesium, which limits plant growth. Results from sodicity and cation exchange rate investigations for the site have indicated low levels of exchangeable calcium. The addition of lime to the soil will increase the concentration of calcium in the soil structure that should encourage plant growth and minimise dispersion. This would assist in the management of urban salinity on the site.

3.2.7 Erodibility

Erosion is not considered a significant issue for the development of the site provided standard erosion control measures are adopted. Erosion on the site is partly influenced by the dispersive nature of soils. Dispersible soils greatly limit water movement through the soil, resulting in poor drainage and waterlogging. Test results from the site conclude the soils are considered to be slightly sodic to sodic, and non to partially dispersive. It is also recommended that liming or addition of gypsum to the soil be undertaken to improve the soil structure.

3.2.8 Acid Sulfate Soils

Reference to the relevant acid sulfate soil risk map indicates that the subject area contains Class 5 acid sulfate soils (refer **Illustration 3.3**). Coffey Geotechnics was engaged to investigate whether or not acid sulfate soils may be present on the site (refer **Appendix C**). The site contains land within 500 metres of Class 1, 2, 3 or 4 land and therefore contains Class 5 land. However, the Coffey report indicates that the presence of stiff to hard residual soils weathered in place derived from rocks from a Permian age of deposition (250Ma) underlying the investigation site, combined with the lowest elevation onsite of approximately RL20m AHD suggest that the occurrence of acid sulfate soils at the site is highly unlikely, therefore an acid sulfate soil management plan will not be required for the future development of the site.

3.3 Contamination

Coffey Geotechnics assessed contamination as part of the Urban Capability Assessment. That report is contained in **Appendix C**. A search of NSW Dangerous Goods Records for Stored Chemical Information Database did not show any records pertaining to the site. Further to this, no records of notices issued under the *Environmentally Hazardous Chemicals Act 1985* or the *Contaminated Land Management Act 1997* were found for the site.

Site history indicates that in general the site has not been developed, with the exception of the powerline corridors and the former quarry, and the two rural-residential lots on the western side.

It is considered that the potential contamination on the site is restricted to surface soils. Groundwater has not been considered as a likely receptor for contamination due to the significant depth to groundwater in the areas of concern. Potential contamination on the site is associated with:

- illegally dumped rubbish – primarily in the former quarry area (domestic and demolition rubbish) and near the north-east boundary between the power lines (domestic rubbish) as shown in **Illustration 3.2**. Scattered rubbish is also found throughout the bushland; and
- potential asbestos building materials on the two rural-residential lots.

The above areas are detailed in **Illustration 3.2**.

If the site remains as its current use, the risk to human health or the environment from potential contamination is considered low. Further assessment would not be necessary if the site remained in its current use. However, measures should be employed to restrict further illegal dumping at the site to limit its future liability.

If the site is redeveloped it is recommended the following sampling is undertaken:

- former quarry area and the dumped rubbish area between the power lines: sampling of soils in accordance with the NSW EPA (1995) Sampling Design Guidelines;
- bushland areas: sampling of surface soils at a low sampling location density; and
- two rural-residential lots (Lot 6 and Lot 7): sampling of surface soils around the residences and sheds and a hazardous materials assessment of the structures.

Depending on the results of the above sampling a Remediation Action Plan may need to be prepared to address the cleanup of areas with contamination.

Table 3.4 Contamination – Areas of Environmental Concern

AEC Identifier	Description	Potential Contaminants of Concern	Potential Receptors
AEC1	Former quarry. This area may have been partially filled in with fill from unknown sources. It is possible the fill comes from onsite as well. Rubbish comprising of household domestic waste and demolition waste has been dumped in the quarry area. No obvious large stains were observed, however there was an odour in the area.	TPH, BTEX, PAH, Metals, OCPs, OPPs, PCBs and asbestos	Surrounding soil, surface water
AEC2	Area of dumped rubbish where two of the power line corridors and George Booth Drive intersect. The rubbish mainly comprised of household domestic waste. A water truck was observed dumping water during the site walkover, indicating that liquids are also potentially illegally dumped in the area. No obvious large stains or odours were observed	TPH, BTEX, PAH, Metals, OCPs, OPPs, PCBs and asbestos	Surrounding soil, surface water
AEC3	Scattered, isolated rubbish across the bushland area	TPH, BTEX, PAH, Metals, OCPs, OPPs, PCBs and asbestos	Surrounding soil, surface water
AEC4	Residences and sheds on Lot 6 and Lot 7. There is the potential for use of asbestos containing materials (ACM), lead paint in the buildings, and spraying of pesticides around the buildings. There is the potential for imported fill to have been on placed Lot 6 in the early 1908's.	Metals, OCPs, OPPs, and asbestos	Surrounding soil and imported fill soil

Note: TPH = total petroleum hydrocarbons; BTEX = benzene, toluene, ethyl-benzene, xylene; PAH = poly-aromatic hydrocarbons; Heavy Metals = arsenic, cadmium, chromium, copper, lead, nickel, zinc and mercury; OCPs – organochlorine pesticides; OPPs = organophosphorous pesticides; PCBs = poly-chlorinated biphenyls.



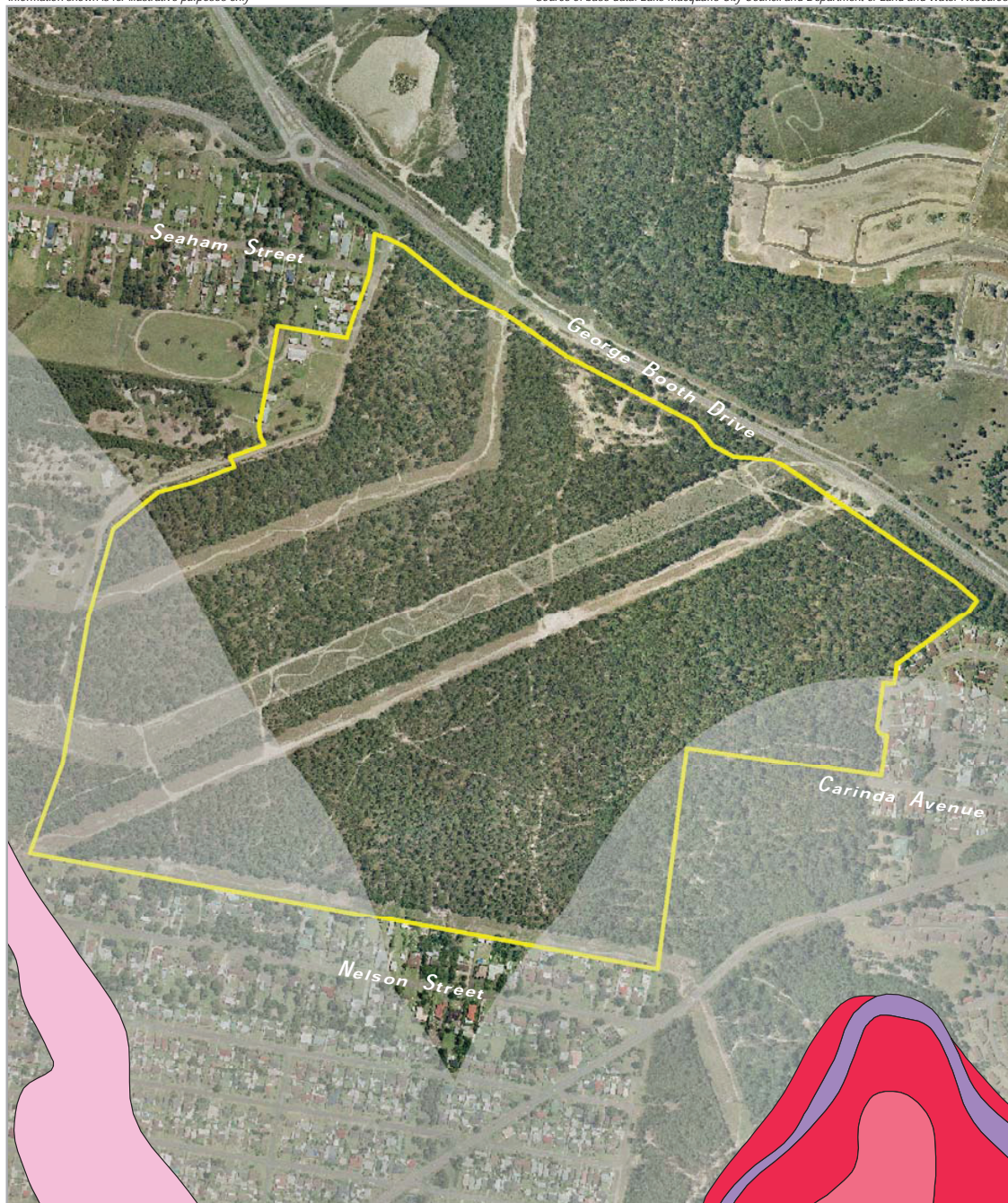
LEGEND

- Site boundary
- Test pit location
- Borehole location
- Powerline corridor
- Former quarry area (AEC 1)
- Area of dumped rubbish (AEC 2)
- Bushland area (AEC 3)
- Residential area (AEC 4)
- Contours at 0.5 m intervals



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LEGEND

- Site boundary
- Below water level bottom sediments
- High probability of occurrence within 1 metre of the ground surface
- High probability of occurrence between 1 and 3 metres below the ground surface
- High probability of occurrence greater than 3 metres below the ground surface
- Class five acid sulfate soil risk areas



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Acid Sulfate Soils Risk Map

Illustration 3.3

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3.4 Flooding

The 1 in 100 year flood extent does not impact on the site as shown in **Illustration 3.4**. The nearest 1 in 100 year flood extent is in Slatey Creek near the south-west corner of the site. Data in the Cockle Creek Floodplain Management Study (NSW Public Works, 1993) indicates that the 1 in 100 year flood level at this location is 8.98m AHD (at the corner of Nelson Street and Government Road). The lowest elevation of the subject site at this location is approximately 10.5m AHD based on 0.5m contour data supplied by Council. The vast majority of the site is elevated above 20m AHD.

3.5 Hydrology

3.5.1 Drainage Characteristics

Drainage within the site is directed to Slatey Creek to the west, Cocked Hat Creek to the north-east and Cockle Creek to the south-east. Both Slatey Creek and Cocked Hat Creek feed into Cockle Creek, which in turn flows into Lake Macquarie. Drainage from the site occurs through overland flows via a series of drainage gullies. Drainage within the site generally occurs along well defined drainage lines with the exception of a low-lying area in the north-west portion of the site in which drainage is directed into a channel which runs parallel to Governor's Road draining south west toward Slatey creek. The channel has dispersive erosion features such as vertical scour erosion, undercutting of the bank, and rill erosion within the creek bank. Drainage patterns are shown in **Illustration 3.5**.

A spring has been identified within the site. It is located toward the middle-western side of the ridgeline, within the upper slopes of a drainage gully as shown in **Illustration 3.5**.

3.5.2 Groundwater Characteristics

It is expected that groundwater from the site would flow towards Slatey Creek which is located approximately 350m south-east of the site (Coffey Geotechnics, 2009).

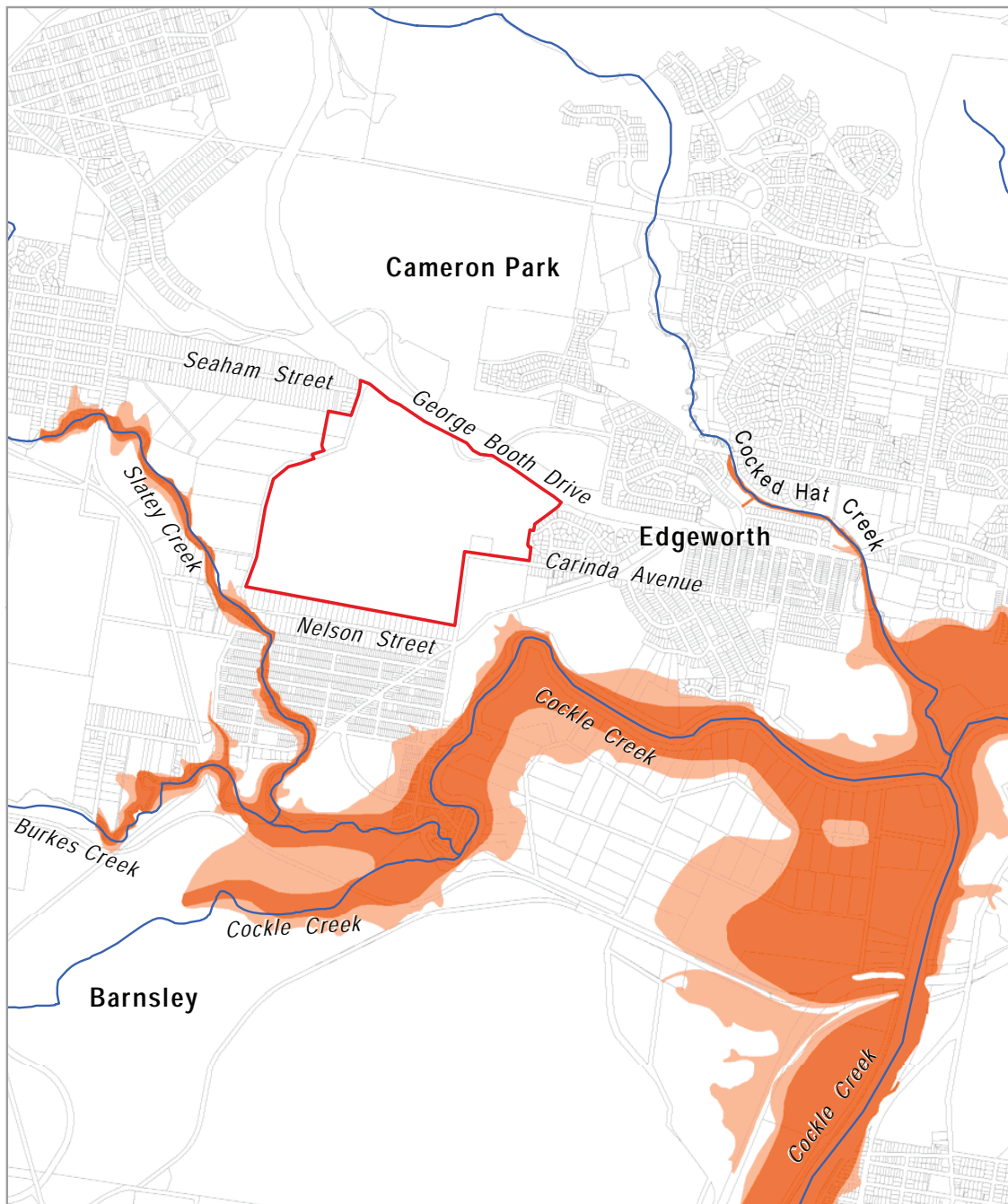
A search of the NSW Department of Water and Energy (NSW DWE) groundwater bore information indicated that there were no groundwater bores registered within 1km of the site. The NSW DWE indicated that the nearest bore was approximately 2km from the site, but no information was provided on this bore (Coffey Geotechnics, 2009).

No groundwater seepage was encountered within the test pits undertaken by Coffey Geotechnics during the limited time the test pits remained open. The field investigation was conducted following a period of heavy rain and water was observed to be ponding in the eastern area of the site which is considered to be in a slight low lying gully. Groundwater seepage was noted within a gully on the western side of the ridgeline at approximate RL 35m AHD and it is considered that this is associated with subcrop of a coal seam (Coffey Geotechnics, 2009).

The depth to the regional groundwater table beneath the site is expected to be in the order of 5m or less over the lower western and eastern parts of the site increasing to in the order of 10m to 15m below the central hillside knoll, where natural mounding of the groundwater surface is expected to occur due to infiltration recharge. Localised groundwater seepages are likely to occur at subcrop of coal seams, as the occurrence of lateral seepage along coal seams is a common phenomenon in the Newcastle and Lake Macquarie region (Coffey Geotechnics, 2009).

No adverse impacts on groundwater are anticipated from development of the site.

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LEGEND

- Site boundary
- High hazard
- Low hazard



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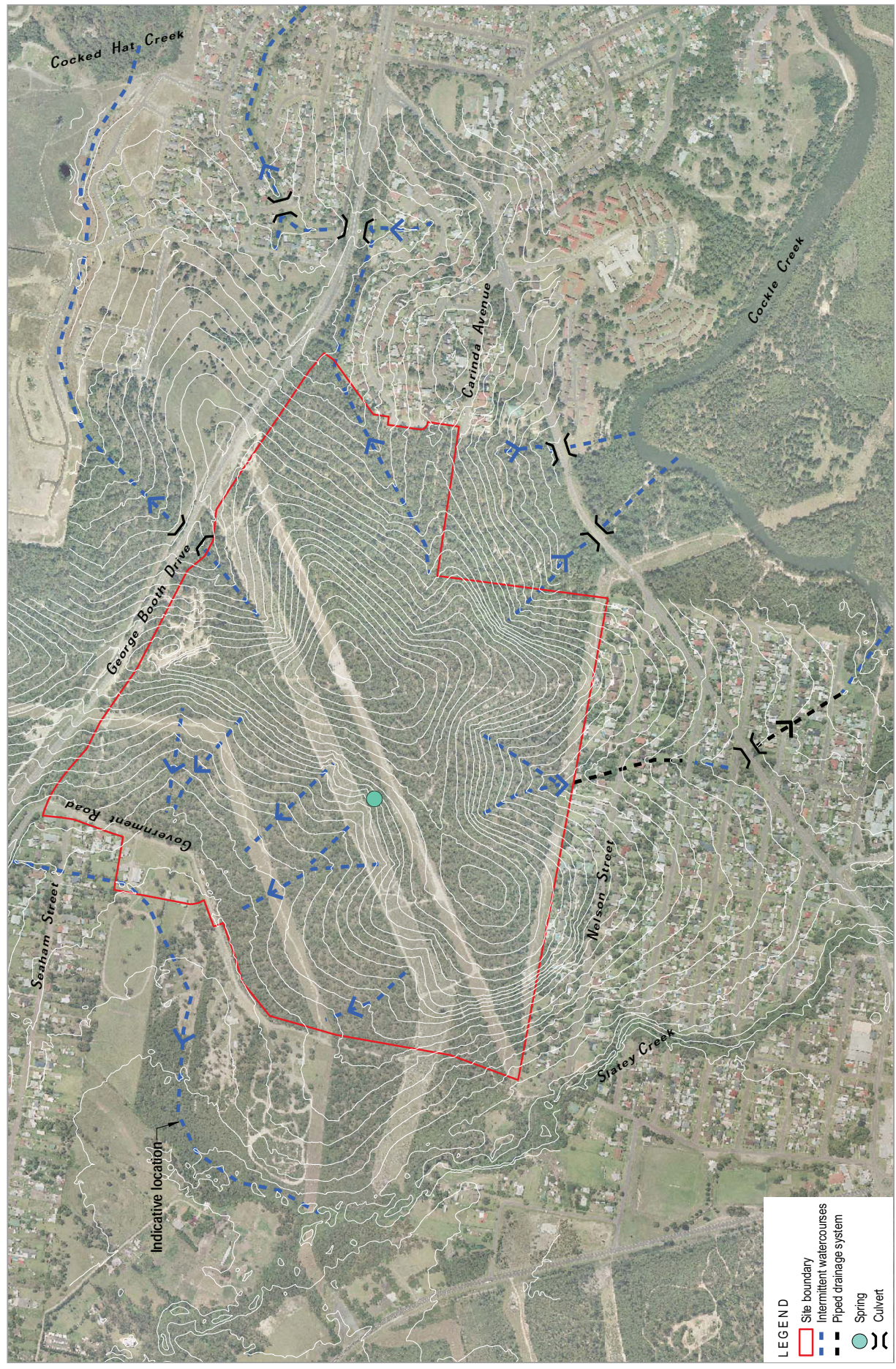
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1 in 100 Year Flood Extent

Illustration 3.4

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3.5.3 Stormwater Management

3.5.3.1 Objectives

Development of the site has the potential to increase stormwater flow rates and impact on stormwater quality from increased sediment, nutrients and other pollutants. These impacts can in turn exacerbate downstream flooding and impact on stream ecology downstream of the site. The general objectives for stormwater management of the site are:

- ensure no increase in peak flow rates from the site;
- treatment of stormwater flows from the developed portions of the site to achieve contemporary water quality objectives; and
- incorporation of other general Water Sensitive Urban Design (WSUD) objectives including:
 - protecting riparian vegetation; and
 - integrating stormwater management measures with community open space to improve the scenic and recreational amenity.

Specific objectives and performance criteria will be based on the requirements of the stormwater management component of Council's DCP No.1 and contemporary WSUD design principles.

3.5.3.2 Existing Issues

Existing stormwater management issues include erosion along unsealed roadways, in particular along the power line corridors. There are also a number of drainage line crossings over the surface of unsealed roadways in the north-west portion of the site. These issues result in sediment export to downstream watercourses.



Plate 3.1 Eroded Access Tracks along Powerline Easement

3.5.3.3 Proposed Measures

The above objectives can be adequately addressed with the implementation of contemporary stormwater detention and treatment measures incorporated into the urban design of the sites development. The location and sizing of the stormwater management measures is dependent on the future development of the land. Further details in regard to possible stormwater measures are discussed in detail in **Section 7**. However, in general the strategy provides total stormwater treatment and detention areas equivalent to approximately 5% of the developed catchment area. This allowance provides for the total footprint of the stormwater measure which includes the actual treatment / detention area and an allowance for associated earthworks, maintenance access, offsets to roadways, etc. The treatment area requirement will vary depending on the type of treatment measure, e.g. the filter area of a bioretention basin is generally 2% of the catchment area whereas a wetland requires an area of approximately 5% to 6% of the catchment area to achieve contemporary water quality objectives. These percentage areas are based on the recent WSUD Technical Design Guidelines for South East Queensland (Moreton Bay Waterways and Catchments Partnership, 2006). Therefore an allowance of 5% of the developed catchment area is considered a reasonable average for the treatment area and the additional footprint area.

In respect to the existing erosion issues, it is recommended these are addressed in the following manner:

- any unsealed roadways not required for access purposes along the power line corridors will be revegetated with appropriate groundcover vegetation;

- any unsealed roadways required for access purposes along the power line corridors will have appropriate drainage and sediment control measures implemented to minimise erosion and capture and sediment runoff;
- in respect to the drainage line crossings over the surface of unsealed roadways in the north-west portion of the site: where the roadways are to be retained the drainage issues will be addressed by construction of either culvert or ford type crossings with appropriate surface treatment of the roadway for ford crossings to avoid erosion.

3.6 Heritage

An Aboriginal and historical archaeological assessment was prepared by Insite Heritage for the subject site. The Assessment is contained in **Appendix D** of this report. The findings of the assessment are summarised below.

3.6.1 Indigenous Heritage

Foot surveys were conducted by Insite Heritage consultants in company of the representatives from Awabakal Local Aboriginal Land Council.

The assessment concluded that a possible scar tree was located on the site. The tree is a large spotted gum, and is located near the southern boundary north of the electricity easement. The diameter of the trunk at breast height was approximately 3.3m. The scar was located approximately 1m above the ground and was 1900mm in length and 530mm in width at its widest point. The thickness of the scar was approximately 80mm. No other items of significance were identified on the site; however the search was hindered by surface disturbance and vegetation cover.

In general, scar trees are of high significance to the Aboriginal people. Insite Heritage's assessment indicates that the tree has moderate significance due to the difficulty in identifying scar trees. Insite Heritage recommends that the tree be preserved as part of any future development of the site. Any proposal that would impact on the tree would require approval by the Director General under the NPW Act 1974.

3.6.2 European Heritage

There is one item of European Heritage located within the study area which is a section of the West Wallsend Steam Tramline. The whole tramline is listed in Schedule 4 of the Lake Macquarie LEP as a Heritage Item (RT-01). The tram line runs through the subject site near the northern boundary to George Booth Drive creating an arc shape. The Tram Line is also listed on the State Heritage Inventory (the NSW Heritage Branch's online Database) as an item of local significance within the Lake Macquarie area. Insite Heritage conducted a foot survey of the site on the 26 May 2008 over the area identified as the tramline.

The survey identified that the embankment for the tramline still remains largely intact in the eastern portion (around the mid section of the arc) for approximately 150m. No evidence remains of the western portion or eastern portion of the tramline adjoining George Booth Drive. It appears to have been disturbed by later activities. No evidence of the original tram line tracks were found within the site.

Insite recommends that the portion of the tramline embankment located in the study area be preserved; and consideration given to the possibility of construction a cycle way along the route.

3.7 Traffic and Access

3.7.1 Introduction

A traffic study for the George Booth Drive, Edgeworth Local Environmental Study (LES) was prepared by RoadNet Pty Ltd. The full report is contained in **Appendix I**. The objective of the traffic study was to identify:

- potential vehicular traffic routes and intersections for access to and from the study area;

- current traffic counts for all traffic routes and intersections;
- anticipated traffic generation from the proposed rezoning and other development / rezonings in the area and existing development within the locality;
- traffic impacts on the existing intersections and capacity of George Booth Drive to safely and efficiently cater for additional traffic;
- the ultimate staged traffic generation from within the area over the time of the development and associated staged / ultimate road and transport infrastructure requirements;
- possible future road connections, road upgrades, additional links or interchange requirements and any intersection upgrade requirements;
- preferred access locations and intersections design;
- provision for cycleways and pedestrian movements and access to public transport within the study area; and
- traffic analysis of existing and future intersections using an appropriate traffic model.

It should be noted that the owners of the land have previously engaged Brown Consulting to undertake traffic modelling for the proposed George Booth Drive intersection. This modelling report from Brown Consulting is attached as **Appendix J**. The RoadNet report has undertaken a review of this modelling to inform its report.

The Brown Consulting report modelled all traffic entering and exiting the study area at one intersection on George Booth Drive. RoadNet undertook additional modelling to investigate other options for traffic ingress and egress including access along Government Road which is located on the western boundary of the site.

The traffic study gave consideration to the approved commercial / retail and residential development approved to the north of the site and also considered other existing and potential development in the general locality.

3.7.2 Traffic Generation

3.7.2.1 Brown Consulting Study

The Brown Consulting study assumes that all traffic from the study area will enter and leave via one access onto George Booth Drive. The Brown Consulting report also modelled a straight residential development with 400 lot and 750 lot scenarios.

3.7.2.2 RoadNet Report

The RoadNet report includes the Brown Consulting modelling for a residential development and also investigates a mixed use development scenario including low density residential, medium residential, commercial and light industry. The RoadNet report also considers other road connections to Government Road and Northville Drive as well as the proposed intersection on George Booth Drive.

3.7.3 Traffic Report Findings

3.7.3.1 Brown Consulting Study

The Brown Consulting report, as discussed previously, modelled all traffic entering and exiting the study area through one intersection at George Booth Drive. This report modelled a development scenario of up to 750 residential lots within the study area and recommended an appropriate intersection configuration to cater for traffic. The Brown Consulting report demonstrates that the recommended traffic intersection configuration would operate at a satisfactory level of service in the future for both am and pm peak periods for the 750 residential lot development within the study area.

3.7.3.2 RoadNet Report

RoadNet in its traffic study undertook a review of the Brown Consulting report as well as investigated other traffic and development scenarios for the study area. The additional traffic scenarios included a mixed land use scenario including low and medium residential and commercial/light industrial development within the study area. The RoadNet report also assessed other access scenarios onto Government Road and Northville Drive from the

study area. The RoadNet report found that the proposed traffic intersection configuration as recommended by Brown Consulting would adequately address traffic from both a straight residential development and a mixed use residential/commercial/light industrial development. It also determined that use of other intersections to Government Road and Northville Drive would not have a significant impact on existing traffic volumes and the operating of that road network system.

3.7.3.3 Public Transport

The future development of the study area as well as the approved residential and commercial development to the north will generate additional demand for public transport services. The size and likely layout of the future development of the study area would not necessarily attract bus routes through any potential future subdivision. Buses would be more likely to pick up and put down along George Booth Drive. Buses may travel along the south western boundary of the site (i.e. Corinda Avenue and Government Road) provisions for bus stops should be made along these routes. Bus stops and bus bays should be provided along both sides of George Booth Drive either side of the proposed intersection.

3.7.3.4 Provision for Pedestrians and Cyclists

A major shopping centre is approved north of the study area which would see a strong pedestrian desire line across north George Booth Drive from any potential future development of the subdivision. Traffic signals with pedestrian facilities are proposed at the cross intersection. RoadNet has determined this will be adequate to provide for pedestrian cyclists to cross George Booth Drive. RoadNet also recommend consideration of cyclist facilities at the traffic lights. Footpath improvements/connections are considered necessary throughout the locality to link precincts and to access public transport nodes. Pedestrian linkages should be provided to link any development of the site to proposed development to the north and existing residential development to the south. A pedestrian footpath network should be provided throughout any future residential subdivision.

The road layout will allow traffic to distribute resulting in relatively low traffic volumes on each street and accordingly cyclists would be able to use local streets in safety and not require separate cycle facilities within the future potential subdivision. Cycling links should be considered to link the study area to any existing and future development areas.

3.7.4 Conclusions

Both the Brown Consulting report and RoadNet report have provided traffic and access solutions that demonstrate the study area is able to be rezoned for urban development. There are a number of options available to provide for traffic, pedestrians and cyclists without impacting on the existing traffic network and existing development within the locality. The actual traffic network will be determined at the development application stage but is likely to include as a minimum a new intersection at George Booth Drive linking in with the approved commercial/retail development to the north of the study area. Other intersections to Government Road and Corinda Avenue / Northville Drive are also options which will need to be considered at the development application stage.

It is therefore considered that there are no traffic implications that would prohibit the rezoning of the study area for urban development.

3.8 Local Amenity

This section examines the impact additional urban development within the study area would have on local amenity and character. A land use analysis was undertaken and value judgements applied to determine the influence of additional urban development within the locality compared to its current state.

3.8.1 Local Land Uses

The site is currently unused (vacant) land and contains three major easements for electricity purposes. The site is mostly vegetated which is transected by cleared areas associated with the easements. The site is identified as an investigation area under the LMLEP 2004 zoning provisions.

Numerous land uses occur within the locality and within 1km of the site boundaries. The urban form of the surroundings constitutes a fragmented urban environment, with clusters of development spread amongst natural bushland and semi-rural areas. Zoning within 1km of the site boundaries consists predominately of residential and environmental protection areas. Some industrial and commercial/business zoning also occurs nearby. To the east, south and west, the predominate zoning and existing land use consists of developed residential areas. To the north, much of the land is zoned as residential with a small section of commercial land, however this area is generally still undeveloped.

In terms of existing development, the site falls in between a number of residential development clusters. When viewing the locality from an aerial (**Plate 3.2**), the area seems to have been subject to fragmented development with no particular centre or urban form. However, the current zoning provisions, Pambulong Forest Area Plan and the Draft Lifestyle 2020 Strategy suggest a more strategic approach to help unify and consolidate existing and future urban development.



Plate 3.2 Aerial of Site and Surrounding Locality

According to the LEP zoning provisions, local planning strategies and current development approvals, the area will generally transform significantly, irrespective of whether or not the subject site is developed. Approval has been given to develop a commercial shopping centre opposite the northern boundary of the site, on George Booth Drive. This development and the intent of the local planning instruments aim to deliver a town centre for the area and signifies the vision and future development objectives of the area. Such a development and existing zoning provisions north of site, combined with the visions and objectives of local planning instruments, suggests a significant land use transformation is highly probable.

3.8.2 Amenity, Character and Visual Environment

Clusters of typical fringe suburban development occur to the west and south of the site, separated from the periphery of the main urban body located east of the site. Much of the existing urban areas surrounding the site generally lack appeal and vibrancy. As mentioned, the existing fragmented and fringe suburban developments do not support an urban centre or strategic urban form. These factors tend to restrict the area's potential for a well planned and integrated urban character.

The existing visual environment and character of the site itself contrasts to the surrounding clusters of suburbia. The site consists of mostly vegetated land as shown in **Plate 3.3** and **Plate 3.4** and is transected by cleared areas associated with powerline easements as shown in **Plate 3.5** and **Plate 3.6**. The natural environment contained within the site does provide amenity values, however the bushland seems degraded in places and the transecting powerlines and large associated easements scar the landscape significantly detracting from its visual quality.



Plate 3.3 Existing Vegetation



Plate 3.4 Existing Vegetation



Plate 3.5 Powerlines



Plate 3.6 Powerlines

The Pambulong Forest Area Plan and Draft Lifestyle 2020 Strategy outline that a new community within the area, particularly north of George Booth Drive, is already being developed. The planning provisions in place (north of the site) would greatly transform the surrounding character and existing natural bushland amenity values. The

planning provisions in place aim to develop an urban centre supported by an approved shopping centre located immediately north of the site. Such development provisions are likely to attract development and establish a community and hub character for the area. It can be easily envisaged, considering existing planning provisions, approved development, the strategic location of the area and general demand for housing that the area would experience considerable change with expected development and growth in the near future. Such development would unify the existing fragmented suburban fringe developments, help to support a stronger sense of community, improve the built environment character and amenity of the area and increase the vibrancy and liveability of the area, albeit at a cost to the natural environment and associated amenity values.

3.8.3 Impact of the Proposal on Local Amenity and Character

The visual landscape of the study area comprises semi-rural, forested and urban settings; hence the study area has mixed character. Some of the amenity and character features of the area are appealing and others less so. Typically this landscape would be susceptible to visual modification and character changes induced by significant urban development. The nature and visual characteristics of the site in its existing form contrasts strongly with the nature and characteristics of typical urban and suburban development. The surrounding area however, is characterised by clusters of low density suburban housing and land to the north of the site is zoned for residential and commercial development, with approval already granted for the establishment of a town centre / shopping centre and residential development. Considering the strategic location of the study area, with regard to the approved town centre, proximity to the Sydney-Newcastle Freeway and existing development, development of site would be consistent with planning provisions to the north and support urban integration.

Although the site's forested nature is already degraded in parts by clearing associated with powerline easements and sporadic dirt tracks / roads, if the site were developed, significant alterations to visual amenity and character would eventuate and may have the potential to further degrade the natural bushland amenity values of the area. These impacts however, are generally considered not to be adverse if development progressed in an appropriate and sensitive manner. Undoubtedly, significant visual amenity and character changes would occur to the site and locality. Yet, with careful planning and design, which considers the best balance of development and retention of natural vegetation, development of the site is not considered inappropriate from a visual amenity perspective. Ultimately, such a development not only has the potential to greatly improve the site's appeal, amenity and character but that of the locality also.

Considering the development provisions immediately north of the site and approved town centre, sound planning principles would support the mixed use development of the site. Development of the site would aid the establishment and prosperity of the town centre, link existing fragments of residential development and build a community atmosphere for the Pambulong Forest area. The development of the site would generally impose significant and permanent changes to visual amenity and character in the area. However, the outcome of development which retains appropriate vegetated buffers, primarily along the south of George Booth Drive and along the powerline easements (refer to structure plan in **Section 7**) would be positive. Development of the site has the potential to enhance the locality's amenity and character, improve urban form and capitalise on the area's strategic location. The inclusion of appropriate vegetated buffers and sound urban design is considered to be integral to achieving positive outcomes and would minimise the potential for adverse amenity and character impacts.

3.9 Services

The following assessment of water supply and sewerage services is based on information obtained from the water and sewerage servicing strategy report for Pambulong Forest Development (Hammersmith Management Pty Ltd, 2009). The strategy report was initiated by Hunter Water Australia to address future development of lands adjacent to George Booth Drive including the subject site addressed in this LES. Hunter Water issued "conditional" approval of the strategy on 23/10/2009.

Consideration of the subject site in the water and sewerage servicing strategy report assumed a maximum potential development of 700 equivalent tenements for the site comprising 500 residential dwellings and 300

medium density dwellings. These figures are larger than the estimated lot yield likely to result from the recommendations of this LES.

3.9.1 Water Supply

3.9.1.1 Existing Water Supply

The site is located in the Pambulong Development area and is located in the South Wallsend Water Supply System. The water supply system is sourced from the Grahamstown / Tomago Water Treatment Plant (WTP) and Chichester Dam / Dungog WTP. Three trunk mains connect these sources to the Wallsend Pump Station located at Newcastle Road, Wallsend. The Wallsend Pump Station supplies the South Wallsend Reservoir located off Lake Road, Glendale. The South Wallsend low level system is supplied via this pump station and reservoir.

There are three high level systems operating within the South Wallsend low level system servicing elevated areas (Silver Ridge, Christina Street and Macquarie Hills). Hunter Water Corporation (HWC) is proposing to install a fourth high level water supply system at Cameron Park (approximately 3km north of the site) to service new surrounding residential lots elevated above 50m AHD in the area (50m AHD is around the maximum lot level that can be serviced directly from South Wallsend Reservoir). A portion of the central ridgeline in the subject site is above 50m AHD (maximum elevation of approximately 61m AHD) and pressure limits within the existing supply system will require utilisation of the Cameron Park high level system. It is expected that the Cameron Park Station would have been operational since the end of 2009 (Hunter Water Australia, 2009).

3.9.1.2 Low Level Supply Reservoir

The water and sewerage servicing strategy report indicates the subject site is located in the low level water supply zone. The strategy report does not indicate that there would be insufficient capacity to service development of the site and other surrounding developments.

3.9.1.3 Low Level Supply Mains

The site could be serviced by a connection to the existing system at the point where the DN300 trunk-main (nominal diameter 300mm) meets George Booth Drive (proposed as part of HWC's ultimate strategy), with a secondary connection along Northville Drive (Hunter Water Australia 2009). The DN300 main would require upgrading to a DN375 main between George Booth Drive and the intersection of Oakville Road and Harris Street – refer to **Illustration 3.6**. This upgrade length is approximately 2,500m.

An additional DN200 trunk-main parallel to two existing DN200 mains is also required to service development of the site. This additional DN200 trunk-main would connect between where the proposed DN375 (described above) connects to the DN200 trunk-main on George Booth Drive and where the two existing parallel DN200 trunk-mains meet at an existing DN300 trunk-main near the north-west corner of the site - refer to **Illustration 3.6**. This additional DN200 trunk-main is approximately 800m long. This will provide the necessary pressure to service the lots on the site.

Despite some upgrades being required, there is currently some system capacity to service a limited number of lots on the site. A DN300 trunk-main (proposed as part of HWC's ultimate strategy) and no augmentation of the DN200 trunk-main would provide service capacity for up to approximately 200 ET (equivalent tenements). Any additional development however, is likely to require the upgrades mentioned. If the entire site were to be developed (approximately 700 ET) then all of the above suggested upgrades would be required (Hunter Water Australia, 2009). However, considering the current proposed development footprint, development of the site in its entirety would not occur and only approximately 560 ET would be developed. Considering that this still exceeds the capability of existing mains (able to support 200 ET), water service infrastructure would require upgrades.

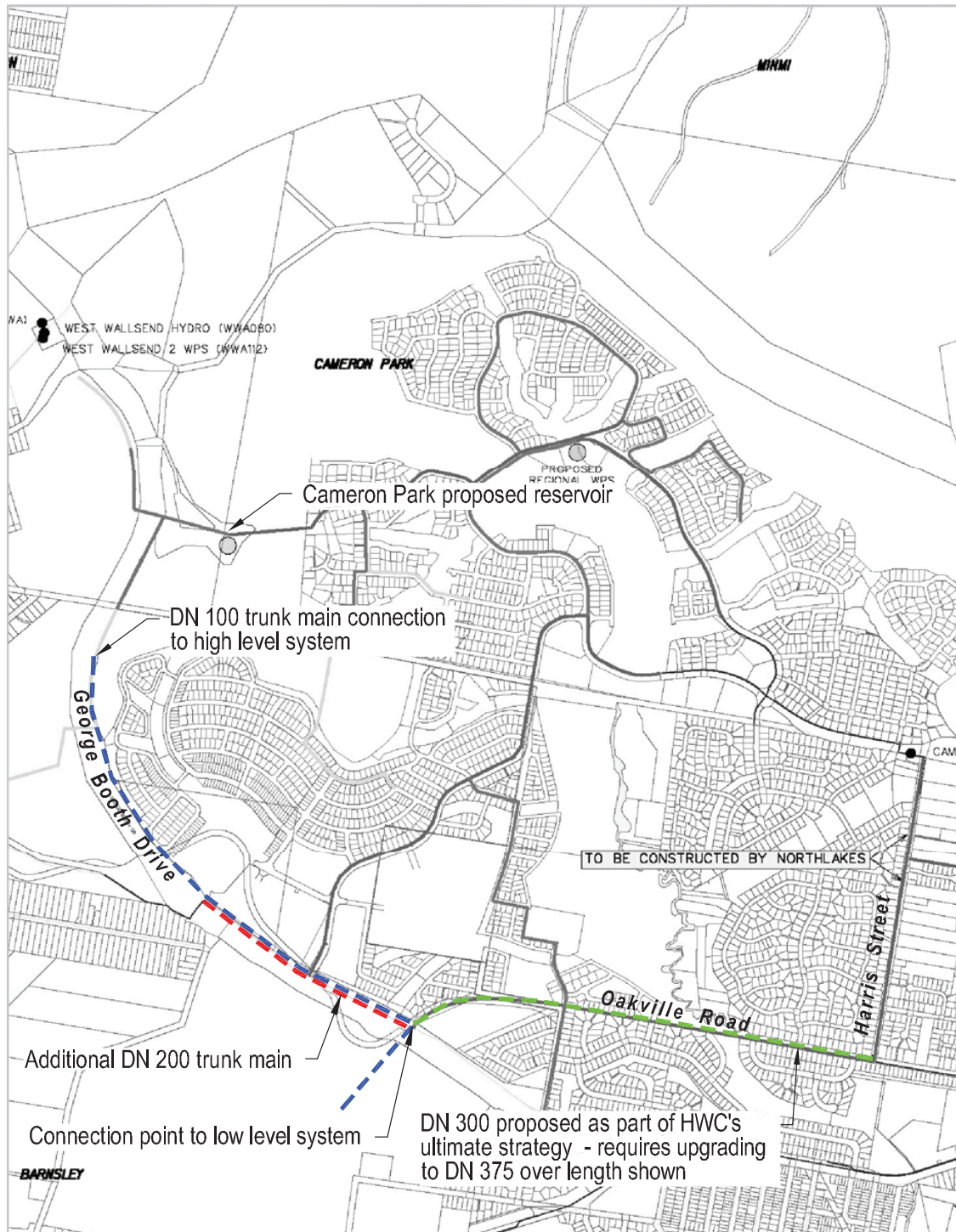
The timing of these works would coincide with the timing of the land release to these zones. Indicative cost estimates for the construction of these trunk mains are estimated at \$2,190,000 if the site were developed in its

entirety (700 ET) (Hunter Water Australia, 2009). Considering that the site would not be developed in its entirety, it's possible upgrade costs would be less.

3.9.1.4 *High Level System*

The water and sewerage servicing strategy report did not consider connection of the higher portion of the subject site to the high level system. The portion of the subject site above 50m AHD elevation will include approximately 5.6ha of developable area (low-density residential including roads) based on the Structure Plan in **Section 7**. It is assumed that servicing this portion of the site will require connection to the high level system. This will require a pipeline approximately 2,000m in length to connect to the proposed high level system mains for Pambulong located on George Booth Drive to the north-west of the site. Assuming a DN100 main the cost would be approximately \$660,000.

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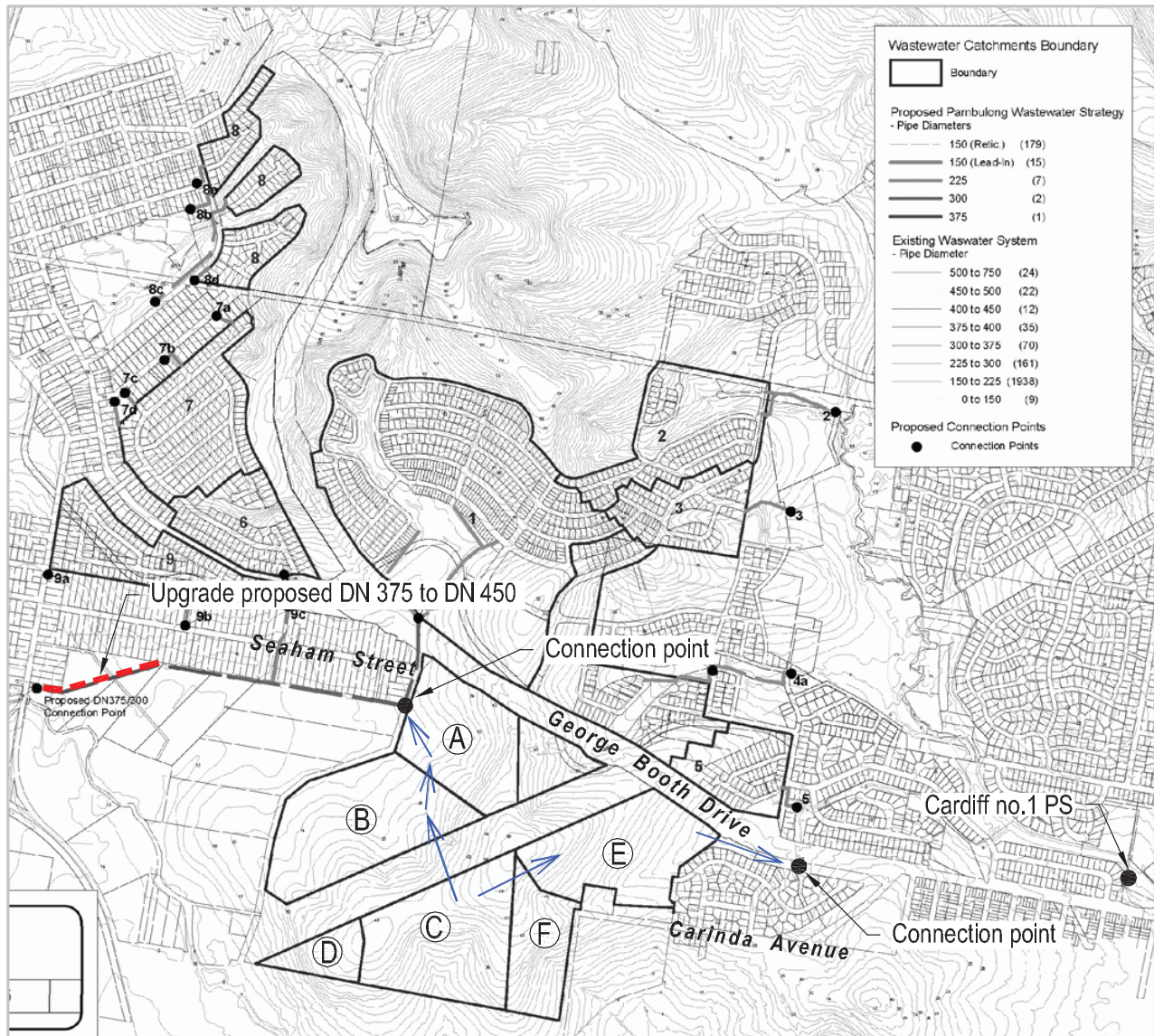
GeoLINK
environmental management and design

LES: George Booth Drive, Edgeworth
1062443

Water Supply Upgrades

Illustration 3.6

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GeoLINK
environmental management and design

LES: George Booth Drive, Edgeworth
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Sewerage Servicing Plan

Illustration 3.7

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3.9.2 Sewerage

3.9.2.1 Existing Sewerage System

The site is located in the Edgeworth Waste Water Treatment Works (WWTW) catchment. The site's catchments shown in **Illustration 3.7** drain to the following sewerage catchments:

- the sites western portion (Catchments A and B shown in **Illustration 3.7**) drain west towards West Wallsend No.1A PS (pump station);
- the sites southern portion (Catchments C and D shown in **Illustration 3.7**) drain south towards Barnsley No.1 or Barnsley No.2 PS; and
- the sites eastern portion (Catchments E and F shown in **Illustration 3.7**) drain east towards Cardiff No.1 PS.

The Structure Plan proposed in **Section 7** would only require draining either west or east. West Wallsend No.1A PS is a large regional station and HWC advised that it has the capacity to service an additional 1715 ET (Hunter Water Australia). Cardiff No.1 PS, east of the site, does not have sufficient capacity to service additional lots until the pump station is upgraded. This is scheduled to occur by the end of 2010 (Hunter Water Australia, 2009) and therefore could potentially service the site.

3.9.2.2 Connection to Sewerage System

Development on the site would involve construction of gravity and pumped sewer mains to collect and transfer sewage into the existing sewerage system and proposed upgrades resultant from the Pambulong Forest development. Development on the site is likely to connect into one of five sewer pump station catchments. The site has been broken down into six catchments (A, B, C, D, E, and F). These catchments and their connections to existing or already proposed mains (Pambulong Forest development) are shown in **Illustration 3.7** and include:

- Catchment A would drain into the DN300/375 main (capacity to support an additional 300 ET) that was proposed under the Pambulong Forest development. This would connect to West Wallsend No.1A PS.
- Catchment B would be pumped into the DN300/375 main that was proposed under the Pambulong Forest development. The DN375 segment of the main however, would require upgrading to DN450 to support the additional ET of catchment B. This would connect to West Wallsend No.1A PS. However the Structure Plan in **Section 7** would result in sewage flows from development in this catchment flowing into Catchment A;
- Catchment C would gravitate into the Barnsley No.1 PS (if there is spare capacity) or this catchment could be pumped to the West Wallsend No.1A PS which has the capacity to service additional development (560ET) without the need to upgrade the pump station. However the Structure Plan in **Section 7** would result in sewage flows from development in this catchment flowing west into Catchment A;
- Catchment D would gravitate into the Barnsley No.2 PS (if there is spare capacity) or this catchment could be pumped to the West Wallsend No.1A PS which has the appropriate capacity to service this catchment without the need to upgrade the pump station. However the Structure Plan in **Section 7** does not propose any development in this catchment;
- Catchment E would gravitate into the Cardiff No.1 PS (would be upgrade by end 2010 and therefore have additional capacity) or this catchment could be pumped to the West Wallsend No.1A PS.
- Catchment F would gravitate into the Edgeworth No.1 PS (if there is spare capacity) or this catchment could also be pumped to the West Wallsend No.1A PS (Hunter Water Australia 2009). However the Structure Plan in **Section 7** would result in sewage flows from this catchment flowing into Catchment E.

If all the catchments were drained / pumped to the West Wallsend No.1A PS, the development could not exceed 560ET or a third pump would be required at the West Wallsend No.1A PS (Hunter Water Australia 2009). Under the proposed structure plan, the site would not be developed in its entirety and therefore 560ET would be a reasonable estimate.

3.9.3 Power

Energy Australia advised the following in regards to the site:

- three existing Transmission Lines are located within in the study area, including two 132kV Transmission lines, which are an essential part of the Newcastle / Lake Macquarie electricity supply;
- 24 hours access to these lines is to be maintained at all times; and
- there are strict regulations as to the construction of buildings and the like within the easement.

Energy Australia was contacted to determine future servicing requirements for the site and capabilities of the existing network to service potential development of the site. To date no response has been received.

3.9.4 Telecommunications

Telstra were consulted and provided the following response:

- Telstra maintain the existing network adjacent to the site;
- a review of the infrastructure in the area has indicated that it is not sufficient to meet the likely demand of development of the site;
- the current telecommunications network in the area would require an upgrade;
- Telstra advised that they have no objection to the rezoning of the site;
- any infrastructure services provided would be determined closer to the time of development commencement, and be dependent on any changes to government policies on the provision of infrastructure in new developments; and
- Telstra requires protection and relocation of its telecommunications infrastructure that may be impacted by activities on the site. Telstra request that further discussion for network expansion occur once detailed planning for the development is in progress.

3.10 Social and Economic Considerations

3.10.1 Social Impact

A social impact assessment has been prepared to examine the ability of the draft LEP Amendment to provide a vibrant and resilient local community on the site, with functional links to the nearby areas, including the Pambulong urban centre. The Social Impact Assessment is outlined below and attached in full at **Appendix E**.

The SIA aims to assess the existing and future social requirements of the local community and ascertain how development of the site might trigger a change in the existing community's way of life, their culture and their community, and how it might generate a need for certain facilities or services. The following actions were completed as part of the SIA:

- review of the local and regional planning context;
- profiling of the existing demographic of the local community;
- identification of existing social services and facilities as well as any social infrastructure proposed as part of the Pambulong commercial centre;
- assessment of existing transportation scenario including accessibility and mobility; and
- assessment of potential positive and negative social impacts and development of mitigation measures.

Key findings of the demographic assessment were:

Population and Household Structure

- From 2001 to 2006, there was high population growth in West Wallsend Planning District (WWPD) (8.2%) which is predicted to continue in line with the relevant strategic planning documents for the area; and
- WWPD contains more young nuclear families than Lake Macquarie Local Government Area (LM LGA) and NSW and is not experiencing an ageing in population to the same extent as LM LGA and NSW.

Ethnicity

- A greater than average amount of Aboriginals and Torres Strait Islanders reside in Edgeworth and WWPDP than the LM LGA and NSW average; and
- Edgeworth and WWPDP have smaller percentages of residents with one or both parents born overseas than the LM LGA and NSW average.

Housing Type and Affordability

- Edgeworth and WWPDP have a similar amount of detached houses as LM LGA, but a much higher proportion than NSW;
- Edgeworth and WWPDP have very low levels of flats, units and apartments when compared to the NSW average;
- Mean household income in Edgeworth is significantly lower than WWPDP and NSW as a whole. It is lower than LM LGA but not to the same extent; and
- Mean loan repayments are similar for Edgeworth and WWPDP (both are slightly lower than LM LGA mean repayment and significantly lower than the NSW mean repayment).

Employment and Education

- The unemployment rate for Edgeworth is similar to that of LM LGA, but higher than the NSW unemployment rate. The unemployment rate for WWPDP is also higher than the NSW rate;
- The largest two sectors of employment in WWPDP are manufacturing and retail trade; and
- The level of education achieved by residents of Edgeworth and WWPDP is lower than LM LGA and significantly lower than the NSW average.

Rezoning of the site has the potential to alleviate current demographic challenges occurring in Edgeworth and surrounding suburbs. Growth in the West Wallsend Planning District is higher than the Lake Macquarie Local Government Area and higher than the NSW average and therefore there is a high demand for housing in the area. Through the rezoning, much needed residential land can be created.

The unemployment rate in Edgeworth and the West Wallsend Planning District is higher than the NSW rate and therefore there is demand for employment opportunities in the area. There is a high proportion of residents of this area that are either unskilled or technicians and trades people, meaning that rezoning to create land that provides for a mix of uses would be valuable.

The population of Edgeworth and surrounding suburbs tends to be younger than Lake Macquarie and NSW as a whole and there are more nuclear families residing in the area. Therefore educational facilities, recreational opportunities and family and youth services would be beneficial.

Furthermore, Edgeworth and WWPDP residents have a high level of car ownership and car dependence which has the potential to either be exacerbated or relieved through the rezoning. Design of the ultimate development and its level of connectivity to the proposed bus transport node at the Pambulong Forest Marketplace will be one of the determining factors.

The proposed rezoning is supported from a sociology perspective as it is believed that the potential negative impacts of development at this site are outweighed by the potential positive impacts.

The proposed rezoning is supported by the findings of the Social Impact Assessment. Overall, it is recommended that a variety of land uses be provided for within the study area, including residential and mixed use lands. Residential development must contain a mix of housing types and densities, catering to a range of household incomes.

Good quality urban design must be achieved to ensure no land use conflicts arise. Road noise from George Booth Drive is likely to be a constraint so appropriate buffering and design must be applied to ensure the wellbeing of people living or working near this road. Safe access must be provided across the road to the proposed Pambulong Forest Marketplace. Car dependence must be reduced and therefore the internal layout

must be conducive to walking and cycling, both for recreational purposes and commuter purposes, and must aim to connect with other pathways. The rezoning must create recreational spaces suitable for the younger demographic that tends to reside within WWPDP. Ongoing monitoring is recommended to ascertain whether new residents experience any difficulty in accessing community services and facilities.

3.10.2 Economic Impact

An Economic Impact Assessment has been prepared by GeoLINK to determine the likely future demand for employment land within the study area. The Economic Impact Assessment is attached as **Appendix F**. This report provides an Economic Overview of the study area in its wider context, as a basis for the Local Environmental Study.

The objectives of the Economic Impact Assessment are to;

- assess the existing and future demand for employment lands in the locality. This assessment includes an analysis of the demand for commercial, retail and industrial development as well as community facilities.
- ascertain how development of the subject site might impact on other surrounding employment lands in terms of supply and land take up;
- determine economic impacts of rezoning the site for a mixture of urban development and conservation; and
- make recommendations on the zoning of the study area based on the aforementioned economic analysis.

The following methodology was used to achieve the above objectives:

- review of the local and regional planning framework;
- undertake a socio-economic profile of the locality;
- conduct a retail, commercial, industrial profile and community facilities profile to determine floorspace, employment lands mix, and turnover rates for the future development of the land;
- analyse other employment generating developments within the catchment and determine economic impact as a result of the proposed rezoning;
- assess and document the ability of the rezoning to generate economic benefits for the LMCC LGA;
- analyse access to the study area by potential employees and users of the likely future development of the site;
- assess the rezoning potential to trigger additional development and/or relocation of commercial/ industrial or retail activities from their current location;
- identify the most appropriate types of land uses; and
- identify appropriate zone locations based on the aforementioned analysis.

In developing the Economic Overview of the study area, this report has studied and analysed the socio-economic profile of the surrounding suburbs and the Local Government Area (LGA). Planning Instruments relevant to the Lake Macquarie LGA were also considered, along with the LGA's retail, commercial and industrial supply and demand profiles.

From 2001 to 2006, the population of the West Wallsend Planning District (WWPD) grew by 951 people, which equates to 8.2 percent. This is far greater than the Lake Macquarie LGA which grew by 3% and NSW which grew by 2.7%. Accordingly, it can be said that WWPD including Edgeworth is experiencing high population growth, which is consistent with the information contained in the Lower Hunter Regional Strategy. The Lake Macquarie Draft Lifestyle 2020 Strategy indicates that by 2020 the population of WWPD will have surged to around 18,000 people.

Council's Lifestyle 2020 Strategy generally outlines that development activity should focus on Centres to allow for the appropriate and adequate provision of land, services and infrastructure. The Site forms part of the Pambulong Forest area and is located directly adjacent to the approved Pambulong Forest Marketplace which is described as a new and establishing town centre. Through appropriate rezoning, the study area is ideally

situated to contribute to the future economic success of the LGA through the provision of key services where required, provision of housing, mixed use land and facilities for recreation.

Study of the LGA's retail profile shows that a total of 9.2% growth in the number of businesses and 23.4% growth in net lettable area occurred between 1997 and 2008. This has delivered a modest annual average growth rate of around 0.84% for businesses and a higher average annual growth rate of about 2.1% for net lettable area. However the main growth experienced in both the number of retail businesses and lettable floor space occurred between 1997 and 2002.

Study of the LGA's commercial profile shows that there has been a total of 46.3% growth in net lettable area between 1997 and 2008. This equates to an average annual growth rate of around 4.2% for net lettable commercial floor area. It should be noted however that most of the growth occurred between 1997 and 2002. Growth between 2002 and 2008 slowed considerably to only 1.5% growth occurring over the whole 6 year period of 2002 to 2008.

Despite growth having slowed in the retail and commercial sectors between 2002 and 2008, combined retail and commercial data for 2009 suggests a boost in growth. It is suggested that growth in floor area for the retail and commercial sector increased significantly by 27.4% between 2008 and 2009 alone. Floor space in the LGA has more than doubled since 1997 to 2009. In addition there is currently 56,800 square metres of retail and commercial floor space planned for development in the LGA in 2010 and this represents a 15% increase in the total currently available.

Study of the LGA's industrial profile shows that there is currently approximately 620.50ha of total existing industrial land stock and 91.61ha of land zoned for industrial development currently vacant in the LGA (Townson 2007). In addition, rezoning of land for industrial purposes has occurred in some areas and this will provide for an average annual growth rate of industrial development between 2.42% and 1.21% (assessed over a 5 and 10 year period respectively). Despite this land supply, Townson (2007) estimates that this would only be adequate to meet the two to five year land supply requirements based on current demand.

It has been identified that future growth in retail and commercial office space could be expected to be in the order of 186,000 square metres by 2030, which equates to an average growth rate of 9,300 square metres per annum or 1.7% per annum. Despite the continuing demand for retail and commercial floor space at the LGA level through to 2030, the locality of Edgeworth and the surrounding suburbs are well serviced for retail facilities. The proposed development site fronting the south of George Booth Drive would be well serviced by retail facilities through the establishment of the Pambulong Forest Marketplace located directly opposite.

It is considered that traditional supplies of industrial land will be or have been catered for with the relatively recent rezoning of land on Gimbert's Road Morisset and within the Pasminco land. However, "in order to facilitate knowledge based industry, consideration should be given to new enterprise living zones that are located close to major centres" (Townson 2007). In addition, Hooper (in Townson 2007) "highlighted the changing trends in the business mix, the need for identification of smaller parcels of urban industrial land to meet the demand of mixed residential/light trade and knowledge based industry". Hooper also highlighted that with the continual growth of the region and demand for freeway accessible land would grow (Townson 2007).

The findings of this economic assessment suggest that the provision of some commercial and low impact light industrial uses, considering the surrounding residential growth and establishment of the Pambulong town centre, would be a reasonable inclusion within a mixed use development scenario on the site. Predominately however, the site would be best suited to residential uses with the inclusion of mixed use precincts supporting low impact light industrial, light commercial and residential uses. Areas that support a live/work scenario and knowledge-based industries that also require efficient freeway access would be well suited to the site.

Zoning provisions/development consisting of residential (low and medium density) and mixed use (catering for low impact light urban industrial and some commercial inclusions) would be appropriate for the area and LGA and would help develop the Pambulong town centre. Such provisions should be sustained by demand for

residential and light knowledge based industrial zoning in particular, proximal transport services and the development of the Pambulong Forest/Edgeworth urban areas and Pambulong town centre. The inclusion of mixed use zoning, rather than industrial zoning within a predominantly residential area would also help to avoid any potential land use conflicts which can arise if residential and industrial zonings are located close to one another.

3.11 Bushfire

GeoLINK has prepared a preliminary bushfire hazard assessment for the subject site which is attached in full in **Appendix G**.

LMCC's bushfire prone land mapping indicates that the site contains category one and category two vegetation as well as the associated buffers and is therefore classified as bushfire prone land (refer **Illustration 3.8**).

The site contains extensive stands of native vegetation, three powerline easements and numerous tracks and trails. Five vegetation communities were recorded within the site (Eastcoast Flora Surveys 2008) identified as:

- Hinterland Spotted Gum – Red Ironbark Forest;
- Coastal Plains Stringybark-Apple Forest;
- Red Mahogany-Apple Paperbark Forest;
- Red Ironbark – Paperbark Forest; and
- Depression Paperbark Forest.

Development of the site will require substantial vegetation removal which has been assessed within the Local Environmental Study. It is not expected that there will be any adverse impacts to any items of environmental or cultural significance as a result of implementing and/or maintenance of bushfire protection measures.

The site is typified by moderately undulating terrain, dominated by a rounded ridgeline which lies north/north-west with a prominent rounded peak located in the centre of the site. Elevation on the site ranges from 18 to 61m AHD.

The APZ requirements have been calculated based on the effective slope, Fire Danger Index (FDI) rating and vegetation formations. APZs outlined below are for residential subdivision.

Development that is classified as Special Fire Protection Purposes (SFPP) such as aged care facilities, schools, childcare centres and tourist accommodation require greater APZs and would require reassessment at development application stage.

The APZs for the potential development foot print are shown in **Illustration 3.9**.

Table 3.5 **APZ Requirements for Area 1**

<i>Aspect</i>	<i>Dominant Vegetation Formation</i>	<i>Effective Slope Category</i>	<i>Inner Protection Area (IPA)</i>	<i>Outer Protection Area (OPA)</i>	<i>Total Asset Protection Zone (m)</i>
North	Forest	>0-5°	15	10	25
North-east	Forest	>0-5°	15	10	25
East	Forest	>0-5°	15	10	25
South-east	Forest	>5-10°	20	15	35
South	Forest	>5-10°	20	15	35

Aspect	Dominant Vegetation Formation	Effective Slope Category	Inner Protection Area (IPA)	Outer Protection Area (OPA)	Total Asset Protection Zone (m)
South-west	Forest	>0-5°	15	10	25
West	Forest	>0-5°	15	10	25
North-west	Managed Land	>0-5°	APZ not required		

Table 3.6 APZ Requirements for Area 2

Aspect	Dominant Vegetation Formation	Effective Slope Category	Inner Protection Area (IPA)	Outer Protection Area (OPA)	Total Asset Protection Zone (m)
North	Forest	>0-5°	15	10	25
North-east	Managed Land	>0-5°	APZ not required		
East	Managed Land	>0-5°	APZ not required		
South-east	Managed Land	>0-5°	APZ not required		
South	Forest	>0-5°	15	10	25
South-west	Forest	>0-5°	15	10	25
West	Forest	>0-5°	15	10	25
North-west	Forest	>0-5°	15	10	25

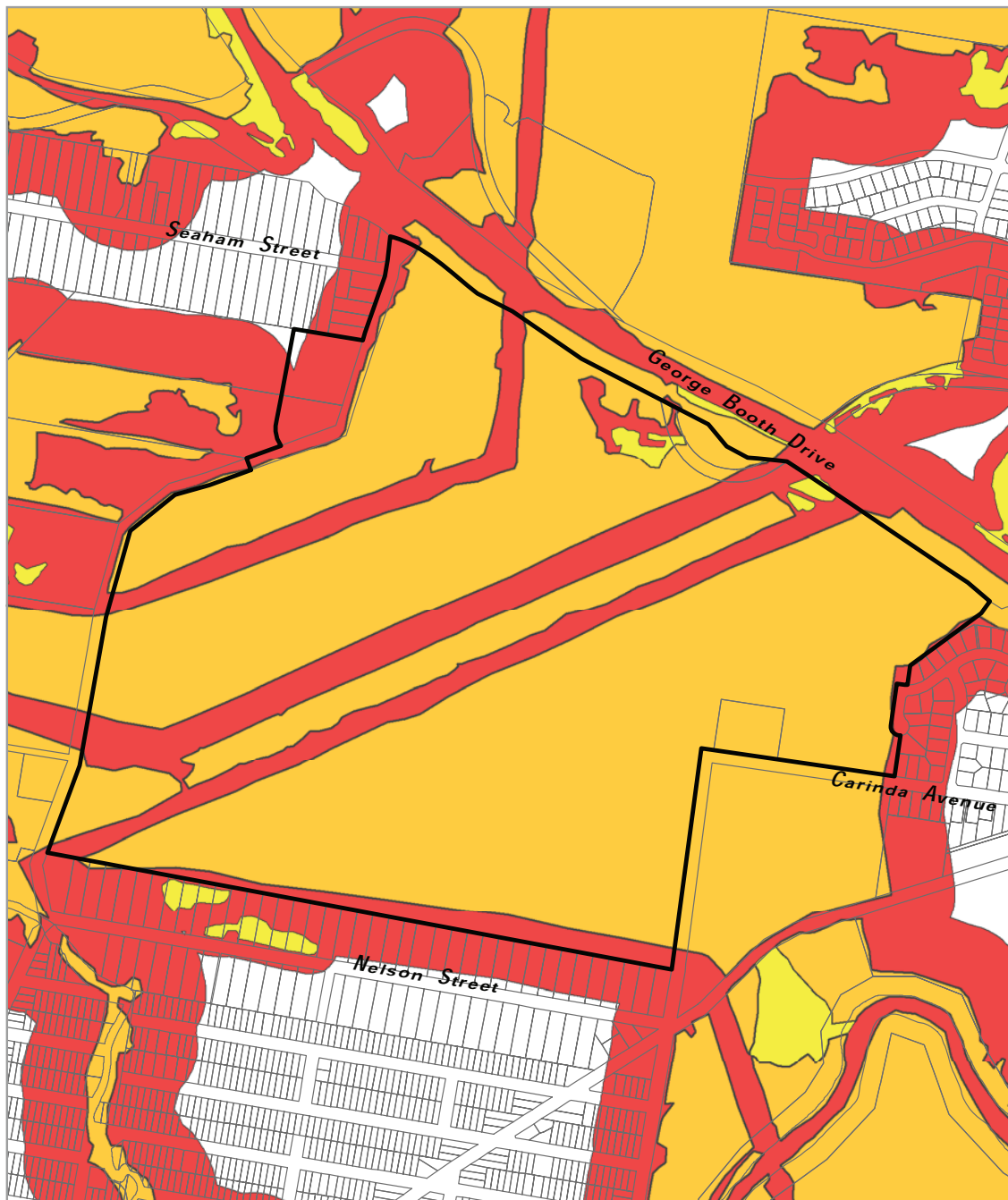
The level of bushfire attack is required to be calculated in accordance with Addendum: Appendix 3 (2010) of PBP for class 1, 2, 3 and 4 habitable buildings. The levels of bushfire attack are translated into required building construction level standards (AS 3959 – 2009). Bushfire construction requirements apply to any proposed building located within 100m of a bushfire hazard. It is recommended that BALs be assessed at the DA stage for each proposed lot to determine the final bushfire construction level.

If a separation distance between the proposed building and the bushfire hazard of more than 100m is achieved, no bushfire construction standards apply. The level of construction cannot fall to less than Bushfire Attack Level (BAL) 12.5 construction level where any part of the building is closer than 100 m to the source of a bushfire attack. A building with any façade identified as requiring a construction level must build all facades to at least BAL 12.5. Where more than one façade is exposed to a hazard, then the façade with the highest construction requirement is used to determine the appropriate level of construction. All other facades may be reduced by one level of construction unless that façade is also subject to the same category of bushfire attack.

Bushfire protection measures are required on bushfire prone land at the development application (DA) stage therefore a further assessment must be undertaken at the DA stage for each proposed lot.

Based on consideration of the vegetation, effective slope and fire danger index, the assessment has identified that adequate and appropriate bushfire hazard protection measures are available, and can be implemented to facilitate future urban development of the site. The proposed rezoning conforms to the standards, specific objectives and performance criteria set out in Planning for Bushfire Protection 2006.

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LEGEND

- Site boundary
- Cadastre
- Bushfire vegetation buffer (100 m and 30 m)
- Vegetation category 1
- Vegetation category 2



0 200

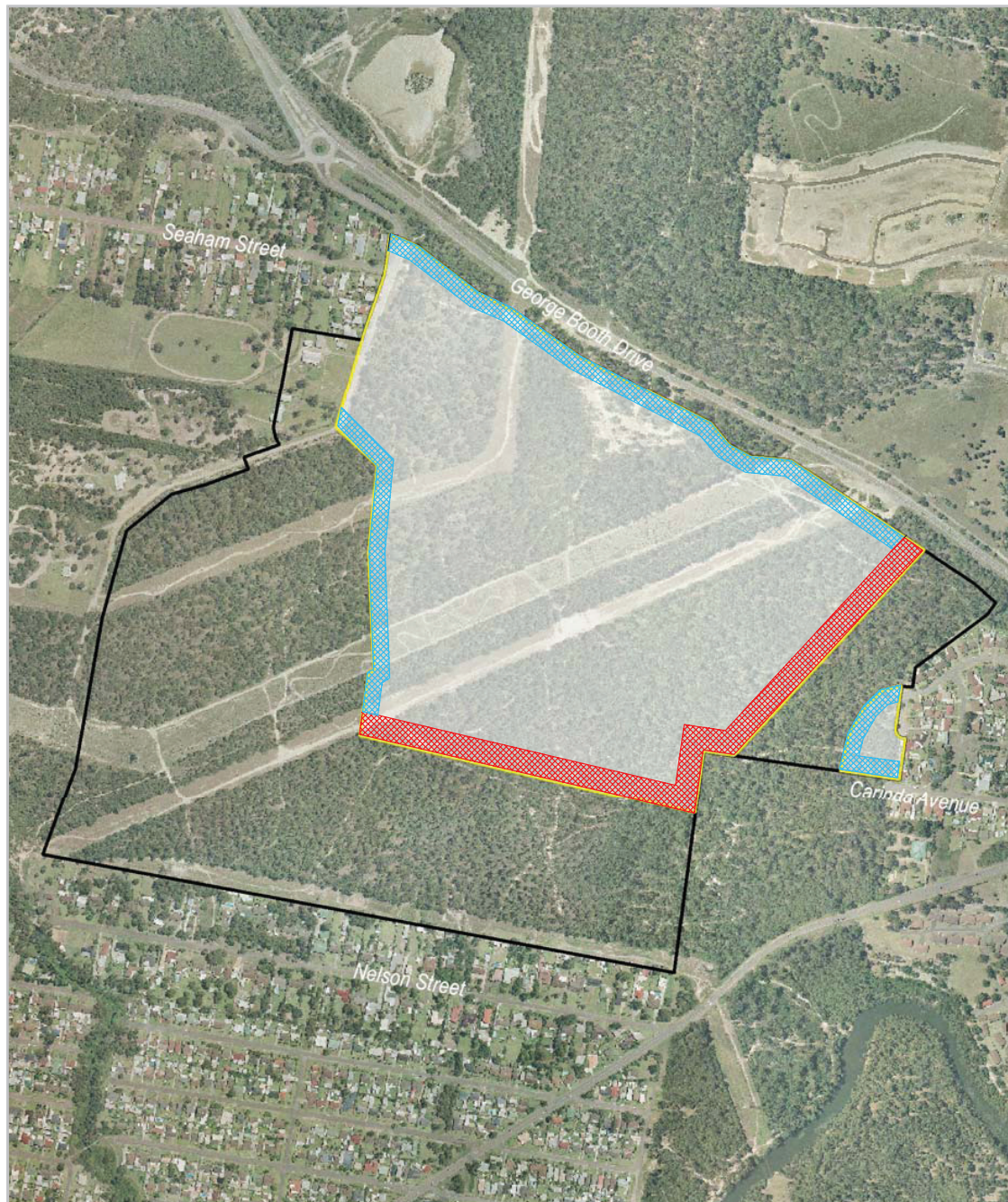
GeoLINK
environmental management and design

LES: George Booth Drive, Edgeworth
1062372

Bushfire Prone Land

Illustration 3.8

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LEGEND

-  Site boundary
-  Development area
-  25 metre asset protection zone
-  35 metre asset protection zone



0 200

GeoLINK
environmental management and design

LES: George Booth Drive, Edgeworth
1062423

Asset Protection Zones

Illustration 3.9

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3.12 Noise

A road traffic noise assessment of the site was completed by Heggies in January 2009 (see **Appendix H**). The report identifies the extent of noise impacts on the development and outlines practical noise mitigation techniques to minimise potential impacts. The assessment was prepared based on the assumption that residential development would occur immediately adjacent to George Booth Drive, and that it would be two storeys in height.

Heggies determined that George Booth Drive is classed as a collector road and therefore development of the site is subject to the road traffic noise criteria provided in **Table 3.7**.

Table 3.7 **Road Traffic Noise Criteria**

Type of Development	Criteria		
	Day 7 am – 10 pm (dBA)	Night 10 pm – 7 am (dBA)	Where Criteria are Already Exceeded
External			
New residential land use developments affected by collector traffic noise	LA _{eq(1hour)} 60	LA _{eq(1hour)} 55	Where feasible and reasonable existing noise levels should be reduced to meet the noise criteria via judicious design and construction off the development Locations, internal layouts, building materials and construction should be chosen so as to minimise noise impacts
Internal			
New residential land use developments affected by collector traffic noise	LA _{eq(1hour)} 50	LA _{eq(1hour)} 45	-

In addition to the criteria provided in **Table 3.7**, further criteria for certain internal living spaces are provided in **Table 3.8**.

Table 3.8 **AS/NZS 2107-2000 Recommended Internal Design Sound Levels**

Type of Occupancy/ Activity	Recommended Design Sound Level dBA	
	Satisfactory	Maximum
Houses and Apartments near Major Roads		
'Work areas'	35 dBA	45 dBA
Living areas	35 dBA	45 dBA
Sleeping areas	30 dBA	40 dBA

Noise monitoring was carried out by Heggies to determine the existing level of road noise. The unattended noise measurements are summarised in **Table 3.9** below. These results were entered into a SoundPLAN computer noise model to determine noise levels across the site and their predicted impact.

Table 3.9 Ambient Noise Monitoring Results

Location	Measured Noise Level		
	LA _{eq} (1hour) Day	LA _{eq} (1hour) Night	LA10 (18hour)
30m from George Booth Drive	64	63	65

The results from the SoundPLAN noise model for the design Year 2019 for the daytime and night-time assessment periods, in the form of noise contour plots, are presented in **Plate 3.7** and **Plate 3.8** respectively. Regions of the contour shaded in red represent exceedances of the relevant time period criterion. The modelling outputs indicate that both assessment time periods result in exceedances for the assessment Year 2019, and therefore noise mitigation measures will be required. As it is the night-time period that presents the largest exceedance, the night-time criterion is the defining period for which noise mitigation options have been designed.

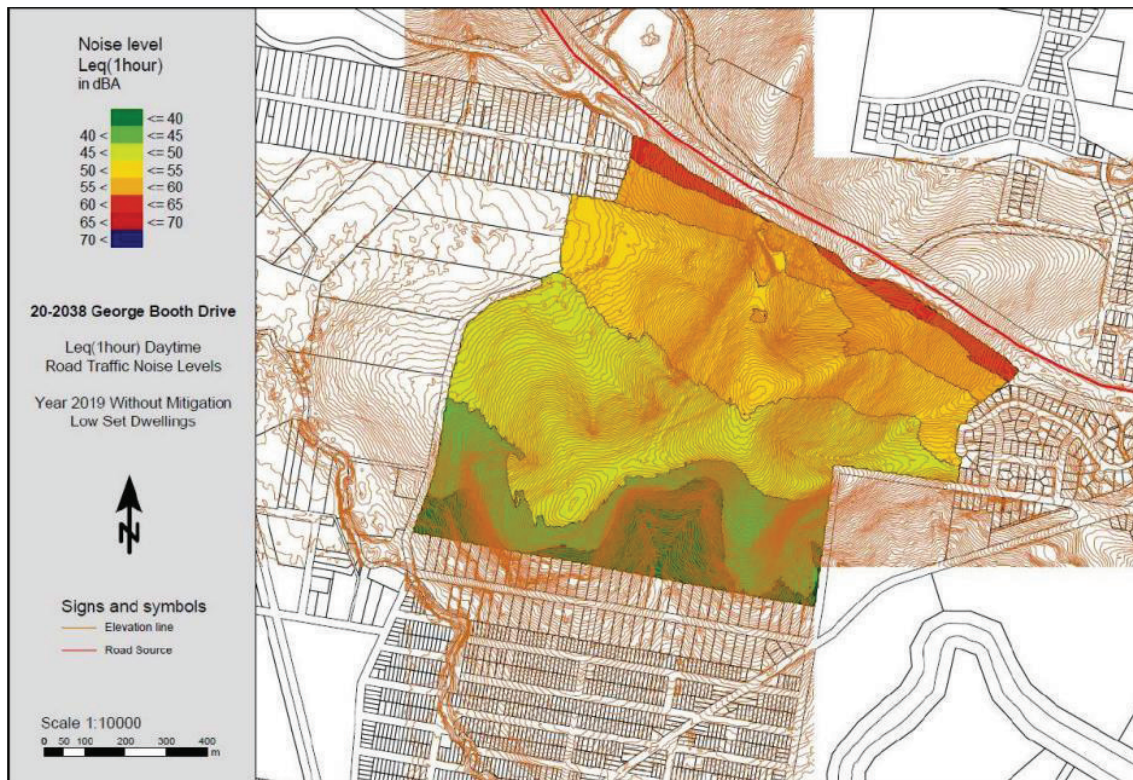


Plate 3.7 Year 2019 Daytime LA_{eq} (1hour) Road Traffic Noise Levels – No Mitigation

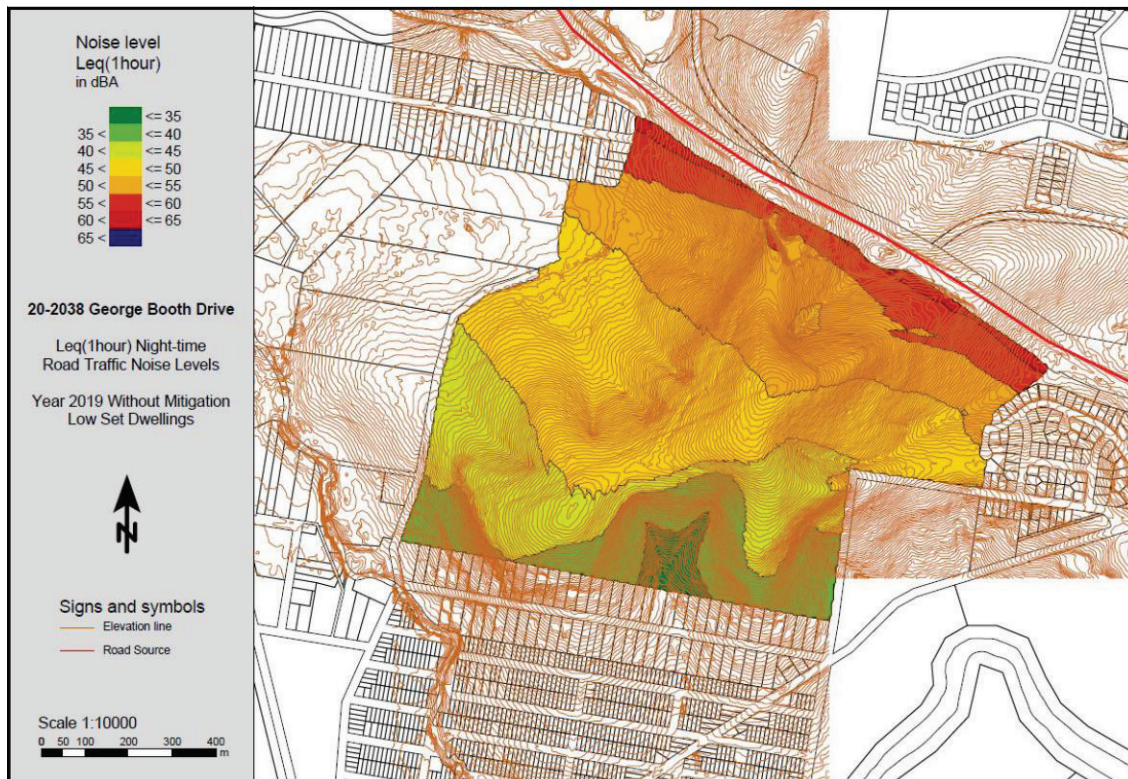


Plate 3.8 Year 2019 Night-time LA_{eq} (1hour) Road Traffic Noise Levels – No Mitigation

Noise levels were modelled again by Heggies based on four different heights of noise barriers (4.0m, 4.5m, 5.0m and 5.5m). Depending on the layout of development on the site, it was determined that it is feasible to design the lots in such a way as to achieve compliance with the ECRTN criterion for low set dwellings with the construction of a barrier lower than 5.5m in height. However, within 100m of George Booth Drive, dwellings with a second storey would need architectural treatment to their northern facades to achieve compliance.

In most cases, *Category 2* construction would be required to achieve the internal design noise level of 35 dBA LA_{eq} (1hour) for the night-time period (ie sleeping areas) and 40 dBA LA_{eq} (1hour) for the daytime period (i.e. living areas). The extent of final architectural treatment should be determined upon finalisation of the building design and layout.

3.13 Cumulative Impacts

Cumulative impacts may result from a number of activities with similar impacts interacting with the environment in a region. They may also be caused by the synergistic and antagonistic effects of different individual impacts. They may be due to the temporal or spatial characteristics of the activities and impacts.

The study area is located in the Cardiff Planning District as described in Council's Lifestyle 2020 Strategy. West Wallsend is identified as a neighbourhood urban centre (or Local Centre) and will increasingly support the nearest sub-regional centre of Glendale/Cardiff as the area redevelops. Although the 2020 Strategy does not specifically refer to the site, it provides a strategic framework for increasing population in the locality.

Potential impacts associated with rezoning and residential development in the locality stem from:

- loss of vegetation, fauna habitat or corridors;
- increase in local traffic;
- servicing and community facility requirements; and

- adverse changes to runoff into water courses or water bodies.

3.13.1 Loss of vegetation, fauna habitat or corridors

At the Edgeworth site, ecological assessment has resulted in a recommendation to develop only 46.74ha, or 48.75%, of the site for urban purposes, leaving the remainder of the site in its current or an improved state. This recommendation is based on the need to provide an east-west vegetation and fauna corridor, protect three threatened flora species and one threatened fauna species observed at the site, and to protect two EECs that occur on the site (Lower Hunter Spotted Gum – Ironbark Forest and Swamp Sclerophyll Forest on Coastal Floodplains). Implementing this recommendation will not result in the rezoning having an adverse impact.

The Pambulong Forest Estate, located on the northern side of George Booth Drive (Lot 104 DP 1000408), will contain around 600 residential lots and a commercial centre. The total development site is 133 ha, of which 42ha (31.6 %) will remain undeveloped. The key environmental concerns raised when assessing this development were the impact on the Threatened Squirrel Glider, Masked Owl and Arboreal Bats, the Heath Monitor and the Threatened Plant *Tetratheca juncea*. In accordance with a condition of consent for that development, a Flora and Fauna Plan of Management has been prepared for the site, applying to the drainage reserves, riparian areas and land zoned environmental protection. Implementation of the Plan of Management will help to ameliorate the loss of habitat and provide vegetation corridors for the dispersal of wildlife during and after construction of the development.

Cumulatively, the developments represent approximately 229ha, of which approximately 40 % will remain undeveloped.

In addition, there are 278.3ha of land to the West of the study area that has been identified in LMCC's Urban Development Strategy as being Investigation Zone – Employment. The entirety of the land is owned by the State and Commonwealth Governments. The development of that land will need to be extremely mindful of maintaining the east-west fauna and habitat corridor that will maintained through the rezoning of the study area.

The proposed Edgeworth rezoning will not result in the compounding of any loss of fauna habitat or corridors. The approved urban layout of the Pambulong forest Estate means that there was no possibility of retaining a north-south corridor. Accordingly, urban development at the Edgeworth site would be positioned towards the George Booth Drive frontage, where there is already a fragmentation of ecological values. Within the Edgeworth site, it is proposed to retain the east-west corridor.

Whilst the development will have a negative environmental impact, there are management measures available to reduce that impact. The context of the site is that it is zoned 10 Investigation and is mapped in the Lower Hunter Regional Strategy as a Proposed Urban Area. Development of this site to accommodate population pressures will result in a better outcome than development of a site that is more remote, and less connected to the Lake Macquarie town centres.

3.13.2 Impacts from increases in local traffic

A new, large signalled intersection will be constructed on George Booth Drive that allows access from the Pambulong Forest Marketplace and from the Edgeworth Site. That intersection design was assessed as part of the traffic assessment for this LES (see **Appendix I**). It has been concluded that the intersection is more than sufficient for the anticipated lot yield of the Edgeworth site.

In terms of the cumulative impact of traffic increases on roads and intersections further away from the site, the traffic modelling undertaken by Brown Consulting (**Appendix J**) for the Pambulong Forest Estate took into account the full development potential of the Pambulong Forest Estate, the development of surrounding sites (including the entirety of the North Lakes urban release area and the study area), as well as the increase over time of the background traffic volumes. This modelling was conducted in June 2010.

Both the Brown Consulting report and RoadNet report have provided traffic and access solutions that demonstrate the study area is able to be rezoned for urban development. There are a number of options

available to provide for traffic, pedestrians and cyclists without impacting on the existing traffic network and existing development within the locality. The actual traffic network will be determined at the development application stage but is likely to include as a minimum a new intersection at George Booth Drive linking in with the approved commercial / retail development to the north of the study area. Other intersections to Government Road and Corinda Avenue / Northville Drive are also options which will need to be considered as part of the final design for the urban development. Further traffic assessment will be required at development application stage to determine the exact nature of all upgrades to the surrounding road network that are triggered by that development. That traffic assessment would also need to consider the cumulative impact.

3.13.3 Servicing and community facility requirements

Based on the findings of the Social Impact Assessment (see **Appendix E**) and the Lake Macquarie Social Plan 2009 – 2014, the rezoning and ultimate development of the study area is likely to result in increased shortages in the provision of certain community services. This includes the accessibility of Medicare and Centrelink branches, access to doctors (particularly bulk-billing GPs), dentists, carers and aged care workers. Presently, the ratio of residents in Lake Macquarie to doctors exceeds the recognised ideal ratio of 1,200:1. These existing shortages may be compounded by the development of North Lakes, the Pambulong Forest Estate and the study area.

However, as discussed previously in this LES, the approved Pambulong Forest Marketplace will ultimately contain around 6,800m² of specialty shop lease areas. Tenants of this space could include any of the services identified above as being underprovided. However there are limited ways of ensuring those tenants take up leases in that centre.

To mitigate the impact, the Lake Macquarie Social Plan 2009 – 2014 includes a Health Action Plan, an Education, Employment and Child Care Action Plan and a Leisure, Recreation and Culture Action Plan. These have been developed with the Lower Hunter Regional Strategy in mind, which identifies the level of population increase that is projected to occur in Lake Macquarie. Additionally, at the development application stage, Council will collect Section 94 contributions for the Edgeworth study area, with some of that contribution going towards community facilities.

3.13.4 Water quality

Drainage within the Edgeworth study area is directed to Slatery Creek to the west and Cocked Hat Creek to the east. Both creeks feed into Cockle Creek, which in turn flows into Lake Macquarie. Drainage occurs through overland flows via a series of drainage gullies. Detailed stormwater design of the area will occur at the development application stage. That design will be in accordance with the adopted best management practices to mitigate water quality impacts. Contemporary water quality targets (that are based on achieving a cumulative impact that is not significant) will be achieved for both the construction and operational phases of the site. This same principle applies to all other new development within Lake Macquarie local government area and therefore the cumulative impact on water quality will not be significant.

3.14 Climate Change

Cumulative impacts may result from a number of activities with similar impacts interacting with the environment in Climate change has been assessed in regard to:

- sea level rise impacts on coastal recession;
- sea level rise impacts on flood levels; and
- the impact of altered rainfall intensities on flood levels and stormwater management.

Coastal recession and the influence of sea level rise is unlikely to impact on the subject site or access to the site. This is due to the significant distance of the site from the present shoreline. The site is located a minimum of 13km from the ocean and a minimum of 4km from Lake Macquarie. Given the distance from shoreline and the elevation of the site it is highly unlikely that the site will be affected by sea level rise impacts.

The impact of altered rainfall intensities will also influence the design of stormwater management measures. Projected increases in rainfall intensity of flood-producing storm events associated with climate change have currently not been accurately quantified (DECCW, 2009c). However, it is considered the conservative footprint areas used in the stormwater management strategy will assist in accommodating the impact of altered rainfall intensities.

Opportunities and Constraints

4.1 Ecology

4.1.1 Flora

The subject site supports over 173 native plant taxa across five vegetation communities. Two of these taxa are currently listed on the Commonwealth *EPBC Act* or the NSW *TSC Act* (*Callistemon linearifolius* and *Tetratheca juncea*), and one is nationally rare (*Eucalyptus fergusonii* subsp. *fergusonii*). The vegetation communities present are all various forms of open forest. Two EECs occur within the subject site; Lower Hunter Spotted Gum – Ironbark Forest, Swamp Sclerophyll Forest on Coastal Floodplains, which collectively occupy 51.35ha or 54% of the total subject site.

4.1.2 Fauna

Potentially, there are two options for creation of, or maintenance of vegetation and habitat corridors between the subject site and adjoining forested areas. Based on the distribution of EECs within the subject site, the potential exists for the establishment of a north-south vegetation and fauna habitat corridor along a small drainage line on the eastern boundary of the subject site. However, examination of the LMCC LEP (2004) indicates land north of George Booth Drive (Pambulong Development), which would link to the potential north-south site corridor, will be developed in time. This will result in removal of native vegetation and the potential for corridor connectivity to remnant forest north of George Booth Drive. Therefore, any north south corridor that is retained on the subject site will not link to any significant adjoining forested areas.

4.1.3 Discussion

The flora and fauna constraints discussed above and in **Section 3.1** and **Appendix B** have had a significant role in determining the development footprint and recommended zoning (refer **Section 9**) for the site. Staff from Council's Integrated Planning Department, the Proponent and representatives from the Department of Environment, Climate Change and Water have had a series of meetings to discuss an appropriate development footprint for the site. A number of development scenarios were discussed. GeoLINK received correspondence from LMCC dated 6 April 2010 requesting it to finalise the LES taking into consideration 3 development scenarios. This correspondence is attached as **Appendix K**.

The LMCC LEP (2004) provides guidance for land use within the City. Based on the existing LEP, there is limited opportunity for establishment of a vegetation corridor network north of George Booth Drive. However, an east-west corridor along the southern boundary of the subject site has the potential due to existing land use zones sympathetic to conservation of remnant vegetation and fauna habitat. Land to the immediate south-east of the subject site is Zoned 7(2) – Conservation Secondary, with the riparian zone of Cockle Creek also zoned 7(2) – Conservation Secondary.

In the south-western corner, land adjoining the subject site also includes a mix of conservation zonings to suggest potential for establishment of a corridor network linking to Slatey Creek. The riparian zone of Slatey Creek and parts of the adjoining land support 7(3) – Environmental General. Several of the objectives of the 7(3) zone support the implementation of a formal corridor pathway linking the subject site to Slatey Creek. Objective (a) of the 7(3) zone is to maintain and enhance biodiversity, scenic quality and native riparian vegetation and habitat, and objective (b) is to protect, manage and enhance corridors to facilitate species movement, dispersal and interchange of genetic material.

The presence of the Masked Owl nest and roost tree is a constraint to development and requires a 150m conservation buffer for each habitat tree to provide protection of their key habitat roost and nest sites, and should assist in persistence of the Masked Owl on the subject site once development proceeds. An east to west

vegetation corridors in the southern portion of the subject site is recommended due to the width (~240m) of retained vegetation, fauna habitat and connectivity between Slatey Creek in the west to Cockle Creek in the east.

Overall, potential opportunities for development occurs within approximately 46.74ha, or 48.75% of the subject site. The remaining area (49.13 hectares, or 51.25%) should be conserved under an appropriate conservation zone due to the higher ecological values.

Of the development scenarios provided by Council (refer to **Appendix K**), the largest footprint may not be the most appropriate in terms of conservation and biodiversity as it will involve removal of more vegetation. However a larger footprint option is considered appropriate when other considerations, such as economic and social impacts/benefits, are given weight.

The site is adjacent to the approved and planned future Pambulong Market Place. Having urban development in proximity to this future town centre is considered necessary to ensure the viability of the centre and also having a range of housing densities in proximity to the centre. Releasing a larger proportion of the site for urban development would also play a role in meeting the existing and projected demand for housing within the region and is consistent with the Lower Hunter Regional Strategy and The Newcastle – Lake Macquarie Western Corridor Planning Strategy.

The proposed development footprint would aim to minimise the impact of future development by implementing strategies including .retention of a vegetative corridor through the site, retention of the majority of hollow-bearing trees, protection of identified Masked Owl trees, rezoning half of the site to an environmental conservation zone therefore protecting the remnant vegetation. Ecological assessments have found that despite the negative impacts of the proposal to the site's existing habitat values, the proposal is not considered likely to have a significant impact on any threatened species, endangered populations, EECs or migratory species listed under the TSC Act and EPBC Act.

ESD is about striking a balance between the built environment, retaining and managing the natural environment and building social equity. Considering the development of the new and establishing town centre associated with Pambulong Forest Marketplace, it is considered to be good practice to rezone and subsequently develop proximal land for residential and urban purposes. Based on the assessment undertaken and recommended mitigation measures, it is considered an appropriate balance between the natural and built environments has been reached. Development of the site would sensibly balance triple bottom line sustainability factors and therefore rezoning and development of the site would be justified.

4.2 Traffic

Traffic assessments have been conducted based on the provision of one intersection on George Booth Drive and up to 750 lots within the development. These took into consideration the approved development on the opposite side of George Booth Drive and the provision of various land uses and densities of residential development. The result is that a new intersection on George Booth Drive, as per the design in Brown Consulting's traffic study (see **Appendix J**) would achieve the required level of functionality for residents on the northern and southern side of George Booth Drive. Furthermore, it was determined that the rezoning would not have a significant impact on existing traffic volumes.

With regard to public transport, based on the projected amount of development to occur on the site, it is unlikely that a bus would enter the site. Rather, it would pick up and put down on George Booth Drive. This will result in residents of the south-western portion of the site needing to walk up to 600m to the bus stop. This is generally considered to be outside of the maximum convenient walking distance of 400m. However, there are opportunities to create excellent walk and cycle paths through the site to encourage walking and cycling to the bus stop.

Access for pedestrians and cyclists to the Pambulong Forest Marketplace will be possible via a new signalled intersection on George Booth Drive.

4.3 Noise

The site is susceptible to road noise from George Booth Drive. Acoustic assessment and modelling of the road noise indicates that dwellings constructed within approximately 100 metres of George Booth Drive will exceed the NSW Department of Environment and Climate Change's (DECC) Environmental Criteria for Road Traffic Noise (ECRTN) night time period criterion of 55 dBA LAeq(1hour) in 2019 with no mitigation in place. The Acoustic assessment and modelling report investigated various scenarios including no mitigation measures and construction of noise barriers of up to 5.5 metres in height on the property boundary along George Booth Drive. It was determined that noise could be effectively mitigated through either excluding residential buildings from areas that exceed the relevant ECRTN criterion, constructing noise barriers, architecturally treating buildings within exceedance areas or a combination of all three measures.

Although noise barriers can be an effective way of treating noise exceedances they do present other problems such as impacts on visual amenity, pedestrian permeability and air flow. Therefore in many cases noise barriers are not the preferred option especially if other less obtrusive measures are available. Ultimately however the preferred option for noise mitigation will need to be determined at Development Application Stage in consultation with Council.

4.4 Transmission Line Corridor

There are three electricity easements that transect the site, containing three transmission lines, two of which are an essential part of the Newcastle / Lake Macquarie electricity supply. Council has advised that it does not support development adjacent to or under the transmission lines. No development can occur within those easements. This presents a significant constraint to developing the site whilst ensuring a high level of visual amenity to future occupants of the site.

The density of surrounding development can play a key role in screening views of transmission lines. By placing non-residential buildings nearest to the transmission lines, views can be screened from public and residential areas. Higher density residential buildings close to transmission lines may create a negative perception to the residents. The lines may appear closer from the upper floors of a multi-storey building.

Additionally, when developing new subdivisions and communities, varying the alignment of streets and paths can reduce the number of views of transmission towers, minimising their impact and reducing the impression of a linear corridor.

At the building design stage, buildings should be oriented to minimise direct views of towers from residences. This can result in some developments facing the overhead powerlines, rather than the towers. Orienting building blocks parallel to the transmission route could increase the number of homes with views of the line.

Landscaping is one of the most effective methods to diffuse the effects of transmission lines. As there is significant vegetation surrounding the transmission lines at the site, the removal of vegetation should be considerate of leaving a visual buffer. A 50m wide vegetated buffer on both sides of the transmission lines is recommended.

4.5 Heritage

4.5.1 Indigenous Heritage

Upon inspecting the site for items of Indigenous heritage, a possible scar tree was located near the south-western extent of the site, approximately 100m in from the western property boundary. Generally, scar trees are of high significance to the Aboriginal people and this tree in particular has been assessed to have moderate significance. This tree must be preserved and any proposal that would impact on the tree would require approval from the Director General under the *National Parks and Wildlife Act 1974*.

4.5.2 European Heritage

A portion of the West Wallsend Steam Tramline traverses the northern boundary of the site. This item is included in the Lake Macquarie LEP schedule of heritage places and the NSW State Heritage Register. Advice from Insite Heritage is that the portion of the tramline embankment located in the Site should be preserved. An identified opportunity is to construct a cycleway along the route of the former tramline.

4.6 Contamination

Preliminary assessment of the site identified potential areas of contaminated surface soils, occurring as a result of illegal rubbish dumping and potential use of asbestos building materials in nearby dwellings. Further assessment of the following areas will need to be conducted prior to any development:

- former quarry area and the dumped rubbish area between the power lines;;
- bushland areas: sampling of surface soils at a low sampling location density; and
- two rural-residential lots (Lot 6 and Lot 7).

4.7 Bushfire

The preliminary bushfire hazard assessment for the subject site identifies that the site contains Category 1 and Category 2 vegetation as well as the associated buffers and is therefore classified as bushfire prone land. Development of the proposed footprint will require substantial vegetation removal. The preliminary bushfire hazard assessment has identified the likely need for asset protection zones to protect future development within the footprint. The likely asset protection zones have been included in the total constraints map shown as **Illustration 4.1**.

4.8 Total Constraints

The key constraints to rezoning the site discussed above have all been identified as manageable through careful structure planning. **Illustration 4.1** below maps the constraints, to guide the selection of areas that are appropriate for rezoning.



LEGEND

- Site boundary
- Swamp Sclerophyll Forest on Coastal Floodplain
- Lower Hunter Spotted Gum Ironbark Forest
- 100 metre acoustic impact zone
- Tram line (heritage item)
- Masked Owl habitat tree
- Scarred tree
- *Tetradlea juncea*
- Power lines
- *Callistemon linearifolius*
- ▲ *Eucalyptus fergusonii* spp *fergusonii*



0 200

GeoLINK
environmental management and design

LES: George Booth Drive, Edgeworth
1062377

Opportunities and Constraints

Illustration 4.1

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Strategic and Statutory Planning Framework

This section of the report identifies relevant planning instruments and discusses how these instruments relate to mixed use development on the subject land.

5.1 Strategic Planning – Strategies / Studies

5.1.1 State Plan

The NSW Government has prepared a State Plan for a new direction for NSW. The purpose of the State Plan is to deliver better results for the NSW community from government services. The State Plan focuses on five areas of activity of the NSW government:

- rights, respect and responsibility – the justice system and services to promote community involvement and citizenship;
- delivering better services – key services to the whole population including health, education and transport;
- fairness and opportunity – services that promote social justice and reduce disadvantage;
- growing prosperity across NSW – activities that promote productivity and economic growth, particularly in rural and regional NSW; and
- environment for living, planning for housing and jobs, environmental protection, arts and recreation.

There are a number of facets of the State Plan that are directly relevant to this LES and to future development and conservation of the site. Issues such as affordable housing, health and community services, transport, the environment, economic growth are all identified as priorities within the State Plan and are all relevant to this LES.

5.1.2 Lower Hunter Regional Strategy

The Lower Hunter Regional Strategy (LHRS), (October 2006) applies to five local government areas including Lake Macquarie. LHRS relates to the period 2006–31 and is to be reviewed every five years.

The primary purpose of the LHRS is to ensure that adequate land is available and appropriately located to sustainably accommodate the projected housing and employment needs of the region's population over the next 25 years. The strategy plans for the provision of sufficient new urban and employment lands to meet expected strong demands for growth.

The strategy includes planning to allow an additional 66,000 new jobs, 160,000 new residents and 115,000 new dwellings to be generated in the region by 2030, based on the 25 year life of the strategy. These estimates indicate that in 2031, the region will accommodate a population of approximately 675,000 people, an increase of 31% above the current population of 515,000. Based on current population dynamics, the population of the region will include an increasing proportion of older people, relative to that of the rest of NSW. This trend is identified in the LHRS as being the result of a net migration of young people out of the Lower Hunter and net migration of older persons into the Lower Hunter.

One of the identified challenges to the supply of housing for a growing population is to 'achieve higher residential densities in-and-around major centres to maximise proximity to employment and services and the use of existing infrastructure, while maintaining amenity'. The LHRS identifies the study area as a proposed future urban area. The rezoning of the site for urban purposes will provide opportunities to increase residential densities within a site that is in proximity to services and the Glendale-Cardiff regional centre and therefore assist Council in meeting its required targets for urban land release under the Strategy. The area also has potential to provide a mix of urban development so that residential development is located within walking distance to, shops, offices, community services and employment areas.

The Glendale–Cardiff area is identified in the strategy as an ‘emerging major regional centre’ and Main Road is identified as a ‘renewal corridor’ between Glendale and Edgeworth. Renewal corridors are situated along strategic transport routes and link strategic centres. These corridors present opportunities for economic renewal and/or housing renewal and intensification.

5.1.3 Lower Hunter Region Conservation Plan

The Lower Hunter Region Conservation Plan (LHRCP) sets out a 25-year program to direct and drive conservation efforts in the Lower Hunter Valley. It is a partner document to the Lower Hunter Regional Strategy that sets out the full range of Government planning priorities, and identifies the proposed areas for growth.

The plan has identified several new reserves and provides direction for local Councils who are preparing new Local Environmental Plans, so that they may merit biodiversity certification (certification by the Minister for the Environment streamlines development assessment and approvals where plans will ensure overall maintenance or improvement of biodiversity values).

There are no new reserves or identified important wildlife corridors that directly impact on the study area. The amending LEP is therefore not required to seek certification that it is consistent with the Lower Hunter Regional Conservation Plan. However as documented in **Section 3.1** the site has significant biodiversity value as it contains threatened fauna and flora species, areas of vegetation which are classified as Endangered Ecological Communities and acts as an important vegetation corridor for fauna species.

Depending on the adopted zones for the site, the LEP amendment for the subject site could impact on the sites biodiversity values. Discussions between DECCW, Council and the Proponent have highlighted the need to offset the loss of biodiversity as a result of the LEP amendment and future development of the site. Section 7 of the LHRCP identifies various ways in which biodiversity losses and gains can be assessed. Section 7.2 and 7.3 of LHRCP specifically discuss offsetting. The LHRCP states that the following principles must be considered when negotiating/developing biodiversity offsets to achieve conservation outcomes in situations where there is a loss of biodiversity:

1. Impacts must be avoided first by using prevention and mitigation measures. Offsets are then used to address remaining impacts;
2. All regulatory requirements must be met;
3. Offsets must never reward ongoing poor performance;
4. Offsets will complement other government programs;
5. Offsets must be underpinned by sound ecological principles;
6. Offsets should aim to result in a net improvement in biodiversity over time;
7. Offsets must be enduring – they must offset the impact of the development for at least the period that the impact occurs;
8. Offsets should be agreed prior to the impact occurring;
9. Offsets must be quantifiable – the impacts and benefits must be reliably estimated;
10. Offsets must be targeted – they must offset impacts on a like-for-like or better basis;
11. Offsets must be located appropriately – they must offset the impact in the same region;
12. Offsets must be supplementary – they must be beyond existing requirements and not already be funded under another scheme; and
13. Offsets and their actions must be enforceable – through development consent conditions, licence conditions, conservation agreements or a contract.

These principles must be considered when negotiating any proposed biodiversity offsets for the future development of the site. Offsets for the subject site is discussed in further detail in **Section 3.1**.

5.1.4 Hunter- Central Rivers CMA Catchment Action Plan (CAP)

The CAP, prepared in January 2006, and finalised in January 2007, outlines the most important natural resource issues in the region. The CAP also guides how improvements in natural resources will be achieved in ten years. It defines where effort and funding should be focused to get the best protection and improvement in natural resources and the most benefits for the community.

The CAP is a guide to protecting and improving the region's natural resources over the next ten years. It has been developed in consultation with local communities and is based on the collective expertise and efforts of hundreds of individual landholders, community members, and representatives of business, industry, and all levels of government.

The CAP will guide investment towards priority natural resource issues within the CMA region, ensuring the best outcomes for the environment and the community. It will also support efforts made by the CMA to secure funding from the Australian Government and other sources over the next ten years.

The CAP for the Hunter-Central Rivers CMA region applies to the area from Taree in the north to Gosford and the coastal waterways of the Central Coast in the south, and from the Merriwa Plateau and Great Dividing Range in the west to Newcastle in the east. It will build on the work of the Catchment Blueprints for the Central Coast, Hunter and Lower North Coast, which were endorsed by the NSW Government in February 2003 and have guided natural resource management in these areas since that time.

The draft CAP sets out a range of CMA Policies that outline how natural resource management should occur in the Hunter-Central Rivers region. One of these policies requires land use planning decisions consider the current and future values of the land. (The principles of ESD are discussed in **Section 6**.) The land use planning guiding principles are as follows:

1. *When developing a draft plan or strategy, state and local planning authorities should take into account the guiding principles of this CAP as well as the statewide natural resource management targets developed by the Natural Resources Commission.*

Council will be required to take into consideration the guiding principles of the CAP.

2. *A co-coordinated approach to biodiversity management should ensure consistency between the CAP and Regional Conservation Plans (RCP) on identifying priority areas for offsets. It may be appropriate for the CMA, in the future, to take on a brokering/facilitating role in the offsetting process to assist in the delivery of the management targets of this CAP.*

Assessment of the site has determined that approximately 50% of the site is suitable for development, and the remainder will remain intact as a conservation area / corridor. The CMA will have the opportunity to comment on this proposal during the draft LEP exhibition period.

3. *New release areas for residential and industrial development should be restricted to lands without significant natural resource constraints, including those areas already cleared of native vegetation (including significant native grassland), areas outside rural resource land, areas with less than 20 percent slope or those not comprising highly erodible soils (including acid sulfate soils).*

The subject site is not considered to be a significant natural resource as the land is not cleared and is not considered to be within a rural resource area. The site has some steeper lands (greater than 20 percent slope), however geotechnical investigations indicate that the risk of erosion is generally low throughout the site and can be mitigated with appropriate soil and erosion treatment measures during development. The proposed rezoning is therefore considered to be generally consistent with this principle.

4. *Residential development should be consolidated and in higher densities in existing centres, and around existing transport infrastructure, to reduce the demand for new 'greenfield' release areas;*
 - a. *The impact of development or land use change should be minimised on natural landscapes that have significance for Aboriginal people;*

- b. *The impact of the greenhouse effect on biodiversity should be taken into consideration in land use planning;*
- c. *The cumulative impacts of development activities on our natural resources should be taken into consideration in land use planning.*

The proposed rezoning will result in the development of part of a site that is classified as a 'greenfield' site. However if rezoned, the proposal will result in an urban development that provides for a variety of densities adjacent to an approved commercial and retail centre and within proximity to an approved residential area. In addition to this the site is identified as a potential urban area within an identified urban release area (Newcastle/Lake Macquarie Western Corridor). It is considered the rezoning is generally consistent with this principle

- 5. *The use and development of natural resources should be sustainable.*

The proposed rezoning will not result in an unsustainable use of natural resources.

- 6. *The LEP review panel, set up by the Department of Planning to review all new LEPs, should take into consideration the guiding principles of this CAP.*
- 7. *Consultation under Section 62 of the Environmental Planning and Assessment Act, 1979 on issues of relevance to this CAP by local government is encouraged.*

The CMA was consulted under section 62 of the EP&A Act. Their response is found in Consultation **Table 1.1**.

The CAP sets out guiding principles for vegetation clearance and habitat destruction. One of those principles is that the CMA is only able to approve clearing that meets the 'maintain or improve' principles of the *Native Vegetation Act 2003*.

The *Native Vegetation Act 2003* does not apply to land zoned "residential" (but not "rural-residential"), "village", "township", "industrial" or "business" under an Environmental Planning Instrument or having the purpose of the zone, having the substantial character of a zone so designated. The subject site is currently zoned 10 Investigation Zone. Therefore, how the site will ultimately be zoned will determine if vegetation removal on the site will require approval under the *Native Vegetation Act 2003*.

5.1.5 Lifestyle 2020 Strategy

The Lifestyle 2020 Strategy is Council's major planning initiative for Lake Macquarie, providing the strategies necessary to manage population and employment growth expected to occur in the city over the next 20 years. It underpins the land use strategy upon which the city wide Local Environmental Plan (Lake Macquarie LEP 2004) and complementary suite of development control standards (DCP No.1 and DCP No.2) are based. The core values underpinning the strategy are sustainability, equity, efficiency and liveability.

The strategy aims to:

- *provide local employment opportunities for residents and to promote economic development consistent with the City's natural, locational and community resources;*
- *guide the development of urban communities which are compact, distinct and diverse with a range of housing types and activities; and*
- *achieve a strong sense of positive community identity, through the development of local communities which are safe and liveable and offer a diversity of use, economic opportunity and ready access to services.*

The strategy also aims to ensure that development retains social diversity across the city, through:

- *providing a mixture of lot sizes and housing types that allow residents to meet their housing needs at different stages of their lifecycle, in one area if they so choose.*

The strategy aims to focus activities at centres to maximise accessibility, through:

- *encouraging home based businesses or home-based industries to locate in neighbourhoods in a way that does not compromise the amenity of the area; and*
- *encouraging industrial and other employment generating activities to locate within urban areas in a way that does not compromise the amenity of the area.*

The supply of adequate land and housing will be facilitated through:

- *encouraging housing in locations that support public transport and within Centres; and*
- *encouraging mixed-use development and maximising redevelopment and infill opportunities for medium density housing within a 5 to 10 minute walk of centres or public transport nodes or stops.*

The strategy promotes and encourages the establishment of responsible businesses and industries to provide sustainable economic growth and employment opportunities through:

- *locating new employment areas in proximity to emerging community areas; and*
- *encouraging home based businesses and home based industries in proximity to centres and along major transport routes.*

Social and economic change will be accommodated through:

- *providing opportunities for mixed-use development in centres.*

The above aims are considered to be relevant to this rezoning proposal. The proposal is capable of providing land use options that will meet the aims of Lifestyle 2020 Strategy.

The site is included in an area identified for urban development within the Strategy. It is also located within proximity to an identified Neighbourhood urban centre. The nearest subregional centre is Glendale / Cardiff. The nearby Pambulong centre will provide new retail/ commercial opportunities. A non centre based employment area for employment/ technology investigation is identified south west of the site. The site will provide for support to the emerging non centre based employment area and to the subregional centre of Glendale Cardiff.

5.1.6 Draft Lifestyle 2020 Strategy

The Draft Lifestyle 2020 Strategy presents particular goals and ideals for the future direction of specific areas. The aim is to provide a framework for the release and development of land in the LGA. The following elements of the Strategy are relevant to this LES.

The study area is located in the West Wallsend Planning District. George Booth Drive is identified as an area which is intended for a new Town Centre. The new centre would be well connected to the nearest sub-regional centre of Glendale/ Cardiff. It is also intended that the location would provide a “centre focus” for the planning district. Edgeworth is identified as maintaining a commercial and employment focus for surrounding residential areas. It is also intended to increase population levels and housing diversity within a walkable distance of the local centre.

The draft Strategy contains an opportunities plan that identifies:

- a substantial areas for retail and commercial floor space located on George Booth Drive;
- medium density housing within the walkable catchment of the Town Centre;
- a bulky goods retail area adjacent to electricity transmission lines on the eastern edge of the Town Centre;
- a small industrial area on the eastern side of the centre for urban manufacturing and support services;
- a road connection, via Government Road, to the new Killingworth employment area, to enable heavy vehicles to avoid West Wallsend, Barnsley and Holmesville;
- new schools, community facilities and sporting facilities; and
- water quality treatment facilities.

The LMCC Urban Development Program identifies the site as 'Rezoning – Residential/ Industrial'. Within the Vicinity of the site, there are significant tracts of land identified as 'Investigation Zone – Employment', Residential Zone – Undeveloped' and 'Industrial Zone – Undeveloped'.

5.1.7 Lake Macquarie Industrial Lands Strategy

Lake Macquarie City Council reviews its Industrial Lands Study on a triennial basis to review industrial lands stocks, monitor land stock levels and usage trends and to ensure adequate land is zoned for industrial purposes to meet economic demand. The latest version is the 2007 Industrial Lands Study prepared by Lake Macquarie City Council. The Industrial Land Study indicates that over the past decade a significant reduction in land stock has occurred with demand for industrial land outstripping supply. The only significant addition to supply over this period occurred at Cameron Park. The Industrial Land Study further indicates that the current stock is at currently around 91ha with additional land proposed to come from the redevelopment of the Pasminco site at Boolaroo (35 to 40ha) and from the rezoning of land at Gimberts Road (35ha) for industrial purposes. The study also notes that 36ha at Redhead was rezoned from Industrial land to Environmental Protection which has contributed to the large reduction in zoned industrial land.

Notwithstanding the aforementioned proposed rezonings the industrial land study indicates that the long term demand as a result of employment growth from projected population increases and the need to provide employment close to or adjacent to urban development areas indicates that further industrial land needs to be planned for in the short term to ensure adequate industrial land is available in the five to ten year period.

Although not specifically mentioned in the Industrial Lands Study, the study area has been identified as potentially being able to accommodate some industrial land. Further detail on the demand for industrial land within the Lake Macquarie City Local Government Area and the Edgeworth locality is discussed in the Economic Report which is attached as **Appendix F**.

5.1.8 Lake Macquarie Council Social Plan 2009 – 2014

The Lake Macquarie Social Plan provides information on the social needs and aspirations of its residents and sets actions and goals around how to respond to these. Development of the plan involved literature review, analysis of demographic data, and community and stakeholder consultation. Through this plan, the following specific social 'challenges' in the region relevant to this project have been identified:

- There is a lack of accessible, affordable and appropriate housing that meets the needs of residents;
- There is a lack of services for homeless people (including early intervention services);
- Community consultation undertaken by Lake Macquarie City Council in 2003 identified that creating employment opportunities remains a priority;
- 38% of all Hunter residents reported facing barriers to accessing a GP in the previous year, a significantly higher proportion than in the rest of the state. The main barriers were inability to get an appointment, lack of GP services in the local area, cost, and transport;
- Hunter residents visit the dentist less frequently than those in the remainder of NSW, with only 33% of Hunter residents visiting the dentist at least once a year compared with 41% for the State;
- At the time of the 2006 Census, Lake Macquarie had an unemployment rate of 6.7%, compared to 5.2% for Australia. Of those who were employed, 65% were employed full-time whilst 35% were employed part-time;
- Excluding those who work at home, 89.9% of Lake Macquarie residents travel to work by car, either as a driver or as a passenger. Only 4.6% of residents used public transport, and 2.8% walked or cycled to work. This compares to 74.9% of NSW residents who travel to work by car, either as a driver or as a passenger, 18.9% who use public transport, and 6.1% who walk or cycle to work; and
- Crime rates in Lake Macquarie are higher for some offences and lower for others. The types of crime which are more prevalent in Lake Macquarie are driving causing death, driving whilst over the permissible blood alcohol limit, sexual assault, breach of apprehended violence orders and stealing from a dwelling.

Through appropriate rezoning of the subject site, it is thought that some of these social challenges can be alleviated. For instance, a rezoning which creates opportunities for affordable housing and provides much

needed industrial land will create jobs and help to relieve housing stress. Increasing the density of residential development in Edgeworth will also provide a greater population base to enable improved public transport provision.

5.1.9 Newcastle - Lake Macquarie Western Corridor Planning Strategy

The Newcastle – Lake Macquarie Western Corridor Planning Strategy (NLMWCPS) was published by the Department of Planning in July 2010. The NLMWCPS sits under and informs the Lower Hunter Regional Strategy: 2006-2031 which identified lands to the west of Newcastle and Lake Macquarie as proposed urban, employment and environmental conservation lands. The broad objective of the NLMWCPS is to identify key planning principles and provide a broad strategic land use framework to guide future urban expansion and conservation outcomes in the identified western corridor area. The adopted planning principles and infrastructure requirements contained within the strategy are to be used as key considerations in the preparation of environmental studies that support rezoning proposals. The NLMWCPS provides a number of planning principles which must be considered when reviewing rezoning proposals. These planning principles were based on a constraints analysis, existing settlement parameters, future growth areas and planning principles in the Lower Hunter Regional Strategy and stakeholder consultation. The strategy identifies the following as neighbourhood planning principles:

- A range of land uses to provide the right mix of houses, jobs, open space, recreational space and green space;
- Jobs available locally and regionally reducing the demand for transport services;
- Public transport networks that link frequent buses into the rail system;
- Easy access to major town centres with a full range of shops, recreational facilities and services along with smaller village centres and neighbourhood shops. Streets and suburbs plans that ensure residents can walk to the shops for their daily needs;
- A wide range of housing choices to provide for different needs and different incomes. Traditional houses on individual blocks will be available along with smaller, lower maintenance homes, units and terraces for older people and young singles or couples; and
- Conservation land in and around the development sites to help protect biodiversity and provide open space for recreation.

From these neighbourhood planning principles a preferred land use strategy is contained within the NLMWCPS. This planning strategy identifies three types of preferred land use within the western corridor to accommodate around 8,000 new housing sites, 1,500 hectares of employment lands as well as conservation lands. **Map 4 – Western Corridor Planning Strategy** within the document identifies the subject site for residential investigation. This will need to be given due consideration when preparing the proposed zoning for the site.

5.2 Statutory Planning Framework

5.2.1 Lake Macquarie Local Environmental Plan 2004

Current Zoning

The study area is zoned 10 Investigation Zone as shown in **Illustration 2.3**.

The objectives of the current zone are as follows:

- provide land for future development and/or conservation,
- ensure that land in this zone is thoroughly assessed to identify and substantiate future uses,
- provide for limited development of the land and allow that development only where it can be proven not to prejudice or have the potential to prejudice future protection or use of the land,
- ensure that land is released in a strategic and efficient manner consistent with the Lifestyle 2020 Strategy,
- require comprehensive local environmental studies to substantiate the capability and suitability of land in this zone proposed for rezoning, and
- provide for sustainable water cycle management.

The purpose of this LES is to provide the necessary investigation, assessment and planning in order to determine the most appropriate zone(s) for the study area. To redevelop the site for a mixture of uses including residential, commercial, industrial and environmental protections requires the site to be rezoned. Recommendations for the rezoning of the site is outlined in **Section 9**.

Special Provisions within LMLEP 2004 that are Applicable to the LES

The following special provisions of the Lake Macquarie Local Environmental Plan 2004 apply to any future development within the subject site. These issues are considered to be relevant to this LES.

Clause 16 Development Consent—Matters for Consideration

This clause requires that consent must not be granted for development unless the consent authority:

- (a) has had regard to the vision, values and aims of the Lifestyle 2020 Strategy expressed in Part 2, and
- (b) is satisfied that such of the development as is proposed to be carried out within a zone is consistent with the relevant objectives for the zone, as set out in the Table to clause 15.

As part of this LES, an assessment has been made in regard to consistency with the Lake Macquarie Lifestyle 2020 Strategy (see **Section 5.1.6**). It is considered that the future development of the site will be consistent with the vision values and aims of the Lifestyle Strategy subject to the proposed recommended zonings and the preservation of ecologically significant vegetation.

Clause 17 Provision of essential infrastructure

This clause provides that consent must not be granted for development unless adequate arrangements have been made for the provision of any infrastructure that is essential for the proposed development, including the following:

- a supply of water;
- provision of energy;
- provision of telecommunications;
- a system for the disposal and management of sewage; and
- has considered the impacts of the provision of that infrastructure on the land to which the development application relates.

The LES assesses the provision of infrastructure in **Section 3.9**.

Clause 24 Subdivision

This clause requires that subdivision of land, other than that identified in Schedule 1 as exempt development, may be carried out only with development consent. The resulting lots must conform to the requirements in Schedule 2 (Subdivision Standards). This clause is only relevant once the land is rezoned.

Clause 33 Bushfire considerations

Lake Macquarie City Council's bushfire prone land mapping indicates that large sections of the subject site are classified as vegetation category one and the site is therefore classified as bushfire prone land. The provisions of the clause have been considered within the Preliminary Bushfire Assessment accompanying this LES in **Appendix G**.

Clause 34 Trees and native vegetation

This clause requires that a person must not clear any tree or any native vegetation unless in accordance with a development consent. Council must not grant consent for the clearing of any tree or native vegetation unless the consent authority has considered a statement of environmental effects that assesses, in respect of the vicinity of the proposed clearing:

- soil stability and prevention of land degradation,
- water quality and associated ecosystems such as streams, rivers, waterbodies or waterways,
- scenic or environmental amenity, and

- vegetation species, communities and natural wildlife habitats.

The study area is highly vegetated and as such, an Ecological Assessment of the site has been conducted. That assessment provided advice as to a development footprint that would result in an acceptable impact. That Ecological Assessment is located at **Appendix B**.

Clause 35 Acid Sulfate Soils

This clause relates to the carrying out of works on land affected by acid sulfate soils. The site is identified as Class 5 Acid Sulfate Soils. The clause specifies that for Class 5:

A person must not, without development consent, carry out works described in the following Table on land of the class specified for those works, except as provided by subclause (3).

Works within 500 metres of adjacent Class 1, 2, 3 or 4 land which are likely to lower the watertable below 1 metre AHD on adjacent Class 1, 2, 3 or 4 land. . Refer to Section 3.2 for further discussion on ASS.

Clause 36 Mixed use development

Consent must not be granted for mixed use development unless the consent authority is satisfied that:

- the gross floor area that will be used for commercial, retail or recreation facilities will be not less than 20 percent of the total gross floor area within the site area to which the development application relates, and
- the gross floor area that will be used for dwellings and any accommodation for tourists will be not less than 50 percent of that total.

Future mixed use development within the site is required to comply with this clause.

Clause 44 Protection of heritage items and heritage conservation areas

This clause provides that development consent is required for certain activities carried out on sites of heritage significance. Part of the study area is bounded by the West Wallsend Steam Tram Line which is listed in Schedule 4 of the LMLEP as an item of heritage significance. Development consent will be required for the subdivision of land within proximity to the Tram Line.

Recommendations for the protection of the heritage item have been included in **Section 3.6** of this LES.

Clause 50 Development affecting places or sites of known or potential Aboriginal heritage significance

This Clause requires that development within the vicinity of known or potential Aboriginal heritage places must not be carried out unless the appropriate assessment has been carried out. GeoLINK engaged Insite Heritage to undertake an archaeological investigation as part of this LES.

The assessment by Insite Heritage provides recommendations for the conservation of Aboriginal heritage within the site. The assessment has identified one item of Aboriginal heritage significance, being a scar tree, located near the southern boundary of the property. The assessment has recommends that if the area where the scar tree exists is to be developed, a conservation order should be considered in order to preserve it from any potential impacts of development.

Further discussion on heritage and archaeological matters is found in **Section 3.6**.

5.2.2 Lake Macquarie Development Control Plans

Development Control Plan (DCP) No. 1 – Principles of Development

DCP No. 1 was initially adopted by Council on 22 March 2004 and was revised and adopted on 29 January 2008 and is effective as of 19 February 2008. It applies to all development applications assessed after 9 February 2008 and will therefore apply to any new development within the study area. DCP No. 1 is a support document to

the LEP 2004 and provides guidance and detailed development requirements. DCP No. 1 has the following objectives:

The objectives of this Plan are to implement the Lifestyle 2020 Strategy (the strategy) by facilitating ecologically sustainable development. The objectives of this Plan support the core values of the strategy of sustainability, equity, efficiency and, liveability to:

- *promote environmentally sustainable and quality development in the City,*
- *provide detailed guidance to prospective applicants of Council's requirements for building, subdivision, and land development,*
- *elaborate on the requirements of the Lake Macquarie Local Environmental Plan (LEP) 2004, as a key tool in the LEP's implementation, and*
- *provide detailed criteria to assist Council in assessing Development Applications (as required by Section 79C(1)(a) of the Environmental Planning and Assessment Act).*

New development within the study area will trigger certain sections of Part 1 of the DCP. Part 2 of the DCP provides a table of performance criteria and acceptable solutions that guide the management of a range of site issues. New development within the study area will be assessed against the provisions of this DCP.

5.2.3 Lake Macquarie Section 94 Contributions Plans

The applicable Section 94 Contributions Plan to the study area is the Lake Macquarie Section 94 Contributions Plan No.1 – Citywide – Glendale Residential (2004) as Amended. The Plan has been prepared with the purpose of satisfying the requirements of the *Environmental Planning and Assessment Act 1979* and *Environmental Planning and Assessment Regulation 2000*, and to enable Council to require Section 94 contributions towards public amenities and services to meet the demand of new development within the City. The plan applies to all applications for development lodged within the catchment of the plan.

The plan collects funds required for the following purposes:

- Open Space and Recreation;
- Community Facilities;
- Roadworks, Traffic Management and Facilities;
- Drainage, Stormwater and Water Quality Control; and
- Management.

Based on the Contribution Rates Summary table of the Plan, each lot created at the site will be subject to a Section 94 contribution of around \$16,600. Further discussion on apportionment of additional infrastructure and servicing costs is outlined in **Section 7.5**.

5.3 Mine Subsidence Compensation Act 1961 (NSW)

Mine Subsidence is dealt with in the Urban Capability Assessment prepared by Coffey Geotechnics. Coffey Geotechnics (2008) advise that:

“Enquiries made with the Lake Macquarie section of the Mine Subsidence Board (MSB) reveal that the site was undermined by West Wallsend Colliery. It is understood that long wall mining panels five to ten were extracted from beneath the site between 1991 and 1995. It is understood that mining was conducted at an approximate depth of 190m to 235m below the existing surface level within the Borehole seam. Discussions with the MSB indicate that further mining is unlikely beneath the proposed study area. It is assessed from previous mine subsidence studies conducted in Newcastle, that this depth of cover would be adequate for construction residential development without restrictions being imposed by the MSB.”

The site is identified to be within a Mine Subsidence District. Section 15 of the *Mine Subsidence Compensation Act 1961* requires that an application for approval to alter or erect improvements within a mine subsidence district should be considered by the Mine Subsidence Board. An “improvement” in the Act is defined to mean as follows.

“Improvement includes any building or work erected or constructed on land; and formed road, street, path, walk or driveway; and pipeline, water, sewer, telephone, gas or other service main, whether above or below the surface of the land.”

The proposed works could be defined to constitute an improvement on the basis of the above definition, and, as such, in accordance with Section 91 of the Environmental Planning and Assessment Act 1979, any approval necessary of the Mine Subsidence Board pursuant to Section 15 of the Mine Subsidence Compensation Act 1961 classes a Development Application to be Integrated Development. Accordingly, Council has a responsibility to refer the Development Application to the Mine Subsidence Board for their comment.

5.4 State Environmental Planning Policies

5.4.1 State Environmental Planning Policy 19 – Bushland in Urban Areas

The general aim of this Policy is to protect and preserve bushland within the urban areas referred to in Schedule 1 because of its value to the community, its aesthetic value and its value as a recreational, education and scientific resource. The majority of the site contains vegetation. GeoLINK in association with Forest Fauna Surveys identified areas that will remain as bushland. This is in keeping with the aims and objectives of the SEPP. A more detailed assessment of flora and fauna is located in **Section 3.1**.

5.4.2 State Environmental Planning Policy 32 – Urban Consolidation

The intention of this SEPP is to ensure that urban consolidation objectives are met in all urban areas throughout the State. The policy focuses on the redevelopment of urban land that is no longer required for the purpose it is currently zoned or used. The policy encourages local Councils to pursue their own urban consolidation strategies to help implement the aims and objectives of the policy. Lifestyle 2020 reflects this policy in **Section 5.1.6** where the principles of urban consolidation are met through ‘*maximising redevelopment and infill opportunities and mixed-uses for medium density housing within a 5 to 10 minute walk of centres and public transport nodes or stops.*’

The suggested zones for the site have been selected to encourage urban consolidation have been.

5.4.3 State Environmental Planning Policy 44 – Koala Habitat Protection

Potential Koala habitat is a vegetation community with a minimum of 15% of trees in the upper and lower strata which are species listed in Schedule 2 of SEPP 44. The upper strata are those trees in the forest canopy and the lower strata are those trees in mid-understorey or sub-canopy trees. Core Koala Habitat is defined as an area of land with a resident population of Koalas, evidenced by attributes such as breeding females and recent sightings of, and historical records of a koala population.

Based on the SEPP 44 habitat assessment undertaken as part of the Ecological Assessment, no Schedule 2 tree species occur on the subject site with greater than 15% projective cover. Hence, no potential habitat as defined in SEPP 44 occurs on the subject site, as there was no evidence of a resident Koala population.

There is one record of Koala near Cameron Park in 1994 with no recent sightings of the species. Based on the results of the habitat assessment and spotlight / scat searches of the subject site, no Core Koala habitat occurs on the site.

5.4.4 State Environmental Planning Policy 55 – Remediation of Land

The object of this Policy is to provide a State wide approach to the remediation of contaminated land. Clause 6 of the policy is applicable to the consideration of contamination and remediation in relation to rezoning proposals. Council is required to consider whether there is the possibility that the land may be contaminated due to past land uses, and if so, whether the land is suitable for its proposed use in its current or remediated state.

Coffey Geotechnics were engaged to prepare a Phase 1 Environmental Site Assessment as part of their Urban Land Capability report. The Phase 1 Environmental Site Assessment indicates that in general the site has not been developed with the exception of the power line corridors and the former quarry, and the residential area on the western side. Four areas of environmental concern were identified in the Phase 1 Environmental Site Assessment. These were generally associated with the dumping of rubbish onto the site. Coffey Geotechnics have advised that based on the findings of the Phase 1 Environmental Assessment report that should the site be proposed to be redeveloped in the future a further Phase 2 Environmental Assessment investigation should be carried out. Coffey Geotechnics have further advised that should their land remain as its current use the risk to human health or the environment from the potential contamination is likely to be low, and further assessment would not be necessary.

5.4.5 State Environmental Planning Policy (Major Projects) 2005

This policy defines certain developments that are major projects under Part 3A of the Environmental Planning and Assessment Act 1979 and determined by the Minister for Planning. The SEPP also lists State significant sites. The policy repeals SEPP 34 and SEPP 38, as well as provisions in numerous other planning instruments, declarations and directions.

Depending on the future development of this site, the proposal may or may not be classified as a major project.

5.4.6 State Environmental Planning Policy (Infrastructure) 2007

The aim of this Policy is to facilitate the effective delivery of infrastructure across the State by:

- a) *improving regulatory certainty and efficiency through a consistent planning regime for infrastructure and the provision of services; and*
- b) *providing greater flexibility in the location of infrastructure and service facilities; and*
- c) *allowing for the efficient development, redevelopment or disposal of surplus government owned land; and*
- d) *identifying the environmental assessment category into which different types of infrastructure and services development fall (including identifying certain development of minimal environmental impact as exempt development); and*
- e) *identifying matters to be considered in the assessment of development adjacent to particular types of infrastructure development; and*
- f) *providing for consultation with relevant public authorities about certain development during the assessment process or prior to development commencing.*

The provisions of this SEPP pertaining to Traffic Generating development are relevant to this LES as components of the future development of the land are likely to trigger some type of referral to the RTA.

The proposal and traffic and access in general are discussed further in **Section 3.7**.

5.5 Section 117 Ministerial Directions

A number of directions under Section 117 of the EP&A Act 1979 apply to the study area. The following directions are relevant to this LES.

5.5.1 Direction 1.1 Business and Industrial Zones

This direction applies to all Council's who are preparing a draft LEP that affects land within an existing or proposed business or industrial zone. Of specific relevance to this LES is the requirement for Council's to ensure that proposed new employment areas are in accordance with a strategy that is approved by the Director-General of the Department of Planning. The relevant Strategy is the Newcastle – Lake Macquarie Western Corridor Planning Strategy (NLMWCPS) (refer to discussion in **Section 5.1.9**). The NLMWCPS identifies the preferred land use of the subject site as residential and has accordingly mapped it as a Residential Investigation Area. Any use that significantly varies from this preferred land use will need to be justified as part of the rezoning process.

5.5.2 Direction No. 1.3 – Mining Petroleum and Extractive Industries

This direction applies when a council prepares a draft LEP that would have the effect of:

- prohibiting the mining of coal or other minerals, production of petroleum, or winning or obtaining of extractive materials; or
- restricting the potential development of resources of coal, other minerals, petroleum or extractive materials which are of State or regional significance by permitting a land use that is likely to be incompatible with such development.

If this direction applies a Council must:

- consult the Director-General of the Department of Primary Industries (DPI) to identify any:
 - resources of coal, other minerals, petroleum or extractive material that are of either State or regional significance, and
 - existing mines, petroleum production operations or extractive industries occurring in the area subject to the draft LEP, and
- seek advice from the Director-General of DPI on the development potential of resources identified under (4)(a)(i);
- identify and take into consideration issues likely to lead to land use conflict between other land uses and :
 - development of resources identified under (4)(a)(i), or
 - existing development identified under (4)(a)(ii).

The Department of Primary Industries was consulted as part of the original section 62 consultation and advised that the subject site lies within the lake Macquarie Mine Subsidence District and is covered by Consolidated Coal Lease (CCL) 725 which is part of the West Wallsend colliery owned by Oceanic Coal Limited. The area is also located within the Petroleum Exploration License (PEL) 267 held by Sydney Gas Operations Pty Ltd. The area is underlain by a potential coal resource and mine workings. The department further advised that any future development would need to comply with the Mines Subsidence Board guidelines. The Mines Subsidence Board was also consulted during the original Section 62 consultation and advised that the board has no objections to the proposed rezoning. The board further advised that the applicant should be advised to seek the boards' approval for any proposed subdivision or the erection of improvements at the appropriate time. Coffey Geotechnics was also engaged to investigate the urban capability of the site (refer **Appendix C**). Coffey advised that sub-surface investigation concluded that the site did not reveal any substantial economic quarry resource such as potential aggregate for concrete or road base manufacture or potential deep clay deposits for masonry or construction purposes. Coffey further advised that previous quarry operations were investigated within the site; however no documentation of the operation was found with DPI or a lands title search. Coffey concluded that the quarry was likely used as a borrow area for general fill.

Coffey advised that database research within the DPI archives show that a coal exploration investigation was carried out in the vicinity of the area within the Holmesville / Barnsley locality during the 1950's. Some areas of these reports suggest that open cut mining of the Australasian seam in this area would be uneconomical due to inferior quality of the coal. It is generally accepted that the upper pilot system (outcrops over the site) is of inferior coal quality and has not been extensively mined over the Newcastle area and does not constitute an economical mining target. It is therefore considered that the LEP is generally consistent with this Section 117 direction.

5.5.3 Direction No. 2.1 – Environment Protection Zones

This direction applies to all councils when preparing a draft LEP. The objective of this direction is to protect and conserve environmentally sensitive areas. The direction requires that a draft LEP shall include provisions that facilitate the protection and conservation of environmentally sensitive areas. As part of the LES a comprehensive ecological assessment has been carried out on the study area (see **Appendix B**). This ecological assessment has recommended areas to be retained for environmental protection zones which include environmentally sensitive areas. To compensate for areas that are proposed to be rezoned for urban development that contain environmentally sensitive areas it is recommended that adequate offsets are adopted to compensate for loss of these areas. Areas not as significant ecologically have been recommended for future urban development. It is therefore considered that the proposed LEP is consistent with this direction.

5.5.4 Direction No. 2.3 – Heritage Conservation

This direction applies to all councils when they prepare a draft LEP. The objective of the direction is to conserve items, areas, objects in places of environmental heritage significance and indigenous heritage. The direction states that a draft LEP shall contain provisions that facilitate the conservation of items that heritage significance. GeoLINK engaged Insite Heritage to prepare a aboriginal and historical archaeological assessment of the study area. These investigations determined that two items of heritage significance exist on the site. The aboriginal archaeological assessment identified one possible scarred tree located in the southern portion of the study area. Whilst the historical archaeological assessment identified the former tramline to West Wallsend which forms part of the northern boundary of the study area as an item of heritage significance. Recommendations are included in the LES to preserve both of these items. It is therefore considered that the LES is consistent with this ministerial direction.

5.5.5 Direction No. 3.1 – Residential Zones

This direction applies to all councils when preparing a draft LEP that affects land within an existing or proposed residential zone or any other zone in which significant residential development is permitted or proposed to be permitted. The objectives of the direction are:

- to encourage a variety and choice of housing types to provide for existing and future housing needs; and
- to make efficient use of existing infrastructure and services and to ensure that new housing has appropriate access to infrastructure and services and to minimise the impact of residential development on the environment and resource lands.

The draft LEP shall contain provisions that encourage the provision of housing that will:

- broaden the choice of building types and locations available in the housing market;
- make more efficient use of existing infrastructure and services;
- reduce the consumption of land for housing and associated urban development on the urban fringe; and
- be of good design.

The LES makes a number of recommendations to achieve variety in housing types and to ensure the most efficient use of available land. The LES also contains recommendations to ensure that residential development is of good design. It is therefore considered that the LES is consistent with this direction. These issues are discussed further in **Section 7** of the LES.

5.5.6 Direction No. 3.4 – Integrating Land Use and Transport

This direction applies to all councils when preparing a draft LEP that creates, alters or removes a zone, or provision relating to urban land including land zoned for residential, business, industrial, village or tourist purposes. The objective of this direction is to ensure that urban development achieves the following planning objectives:

- improving access to housing, jobs and servicing by walking, cycling and public transport;
- increasing the choice of available transport and reducing dependence on cars;

- reducing travel demand, including the number of trips generated by development and the distance travelled, especially by car;
- supporting the efficient and viable operation of public transport services; and
- provide for efficient movement of freight.

A draft LEP shall locate zones for urban purposes and include provisions that give effect to and are consistent with the aims and objectives of principles of:

- improving transport choice – guidelines for planning and development (DUAP, 2001); and
- the right place for business and services – planning policy (DUAP, 2001).

The LES proposes a zoning structure that provides a number of uses including residential business and industrial. The reason for this mix of land use is to ensure that dependence on private transport is minimised by locating jobs and services in reasonable proximity to existing and future residential land. The issue of integrating land use and transport is discussed in more detail in **Section 7**.

5.5.7 Direction No. 4.1 – Acid Sulfate Soils

This direction applies to all councils that contain land having a probability of containing acid sulfate soils as shown on acid sulfate soils planning maps held by the Department of Planning. Coffey Geotechnics was engaged to investigate whether or not acid sulfate soils may be present on the site (refer **Appendix C**). The site contains land within 500 metres of Class 1, 2, 3 or 4 lands and therefore contains Class 5 land. However, the Coffey report indicates that the presence of stiff to hard residual soils weathered in place derived from rocks from a Permian age of deposition (250Ma) underlying the investigation site combined with the lowest elevation onsite of approximately RL20m AHD suggest that the occurrence of acid sulfate soils at the site is highly unlikely, therefore an acid sulfate soil management plan will not be required for the future development of the site.

5.5.8 Direction No. 4.2 – Mine Subsidence and Unstable Land.

This direction applies when a Council prepares a draft LEP that permits development on land that is within a mine subsidence district. The study area is within a mine subsidence district. Accordingly the Mine Subsidence Board (MSB) was consulted as part of the rezoning process. The MSB advised that it had *“no objection to the proposed rezoning and requested that the proponent be advised to seek the Boards approval for any future subdivision of the land or erection of any improvements”*. This issue has been investigated further by Coffey Geotechnics in their Land Capability Assessment (**Appendix C**) and discussed further in **Section 3.2**.

5.5.9 Direction No. 4.3 – Flood Prone Land

This direction requires Council to ensure that development of flood prone land is consistent with the NSW Government's Flood Prone Land Policy and the principles of the Floodplain Development Manual 2005 when preparing a draft LEP.

The site is not subject to flooding. Please refer to **Section 3.4** of this report.

5.5.10 Direction No. 4.4 – Planning for Bushfire Protection

This direction applies when preparing a draft LEP for land that is identified as bushfire prone on a bushfire prone land map. It requires that draft LEPs have regard to Planning for Bushfire Protection 2006. The site is mapped and classified as bushfire prone. GeoLINK has prepared a Bushfire Risk Assessment in accordance with Planning for Bushfire Protection 2006 which is attached as **Appendix G**. Refer to **Section 3.11** for further discussion.

5.5.11 Direction No. 5.1 – Implementation of Regional Strategies

The objective of this direction is to give legal effect to the vision, land use strategy, policies, outcomes and actions contained in regional strategies. This direction applies as the Lower Hunter Regional Strategy (LHRS) applies to the study area.

The direction requires that the draft LEP be consistent with the LHRs. The subject site is identified as a proposed urban area within the LHRs. In addition to this Glendale–Cardiff area is identified as an ‘emerging major regional centre’ and Main Road (Glendale–Cardiff) is identified as a ‘renewal corridor’. Renewal corridors are situated along strategic transport routes and link strategic centres. These corridors present opportunities for economic renewal and / or housing renewal and intensification. This renewal corridor links the subject site to the Glendale–Cardiff Emerging Major Regional Centre.

Further discussion on how the proposed rezoning of the subject site is consistent with the objectives of the LHRs is contained in **Section 5.1.2**.

5.5.12 Direction No. 6.3 – Site Specific Provisions

This direction applies when a Council prepares a draft LEP to allow a particular development proposal to be carried out. This LES has been prepared to inform a draft LEP, which will be prepared pursuant to the recommendations of this report. Draft LEPs should rezone land using controls already provided in the current LEP and should not refer to indicative development plans.

Section 9 of this LES discuss a range of rezoning options and provide recommendations as to an appropriate zone. The proposed rezoning will not rely on drawing or indicative design proposals.

5.6 Other Studies and Investigations

5.6.1 Pambulong Forest Area Plan

This Plan is part of LMCC’s Development Control Plan No. 1. As discussed previously in this LES, Pambulong Forest is the residential and commercial precinct located on the opposite side of George Booth Drive to the study area. The Plan sets out the desired design and urban structure of development in the Pambulong Forest area, and provides performance criteria and acceptable solutions for the public realm, private realm and the town centre.

5.6.2 Traffic Studies

The following studies have been completed for the site. These studies will be considered in the traffic assessment that has been undertaken for the LES:

- Traffic Impact Statement (Mark Waugh Pty Ltd);
- Pambulong Forest Development Traffic Impact Assessment, SKM, November 2004;
- Review of section 94 Contributions Plans;
- Proposed Retail Development – Draft Traffic Impact Statement, Better Transport Futures (Current);
- Proposed Residential Subdivision – Draft Traffic Impact Statement, Better Transport Futures (Current); and
- 2007 traffic surveys on George Booth Drive at:
 - *Cameron Park Drive*
 - *Withers Street*,
 - *Dunbar Road*,
 - *Durham Drive*,
 - *Mowbray Avenue*

5.6.3 Ecological Studies

The following studies have been completed for the site. These studies will be considered in the ecological assessment undertaken for the LES:

- Species Impact Statement Lot 104 DP 1000408 George Booth Drive, West Wallsend (Hammersmith Pty Ltd);
- Statement of Effect on Threatened Flora & Fauna; (Wildthing Environmental Consultants); and

- Bushfire Threat Assessment for the proposed Residential Sub-division of Lot 104 DP 1000408 George Booth Drive, Estelville (ABSP).

5.6.4 Stormwater Studies

The following stormwater studies have been completed for the site. These studies will be considered in the stormwater assessment been undertaken for the LES:

- Stormwater Master Plan Lot 104 Pambulong Forest Estelville (WP Brown & Partners Pty Ltd)

5.6.5 DA 22074/2007 Pambulong Forest Retail Development – Social Impact Assessment

The Social Impact Assessment was prepared by Key Insights, November 2007 for the Pambulong Forest Retail Development, DA 22074/2007. The Retail Development relates to a proposed shopping centre for the Pambulong Forest release area. The proposed location of the centre is directly adjacent to the subject site. The Social Impact Assessment concentrated on a “Study Area” which covered West Wallsend, Barnsley, Holmesville, Seahampton, Cameron Park and Edgeworth, and included the subject site. The data collected in this Assessment is therefore relevant to this LES. The data was mainly sourced from ABS, and used the 2006 census data. However, at the time of publication, not all data from the 2006 census was released.

The summary of demographic findings is presented below;

- A marked difference in age structure for the study site as compared to Lake Macquarie and NSW; with a high proportion of young children and the 30-39 age bracket, which suggest young families;
- A low proportion of older residents;
- Low levels of overseas born residents;
- High proportion of children under 15 years of age;
- High representation of nuclear families, and low representation of lone households;
- High concentration of households in middle income bracket, low concentration of low and high income brackets;
- Significantly lower taxable incomes than NSW;
- Lake Macquarie has a similar unemployment rate to NSW;
- Overwhelming dominance of detached housing, with higher density housing (6%) concentrated primarily in Edgeworth;
- Low rates of volunteering (Volunteering is an indicator of social capital); and
- High levels of home purchasing and low levels of renting.

5.6.6 DA 22074/2007 Pambulong Forest Retail Development – Economic Impact Assessment

This Economic Impact Assessment was prepared by Hill PDA Consultants in October 2007 for the Pambulong Forest Marketplace (DA2207/2007). The first stage of the development includes a full-line supermarket shopping centre, around 2,300m² of specialty shops and around 300m² of office / commercial space. Stage two includes a discount department store, a liquor shop and a further 4,500m² (approximately) of specialty shops. The proposed location of the centre is directly adjacent to the subject site. The data collected in this Assessment is therefore relevant to this LES.

The data relates specifically to the impact of a new shopping centre on the surrounding centres located at Wallsend, Glendale, Fletcher, Maryland, Edgeworth, and Elernmore.

The Assessment identified that due to the proximity of other supermarkets at West Wallsend and Edgeworth will remain competitive and complementary. The existing IGA supermarket in West Wallsend aims at capturing expenditure from a different market than the proposed supermarket at Pambulong Forest. The proposed supermarket is more likely to appeal to cash-rich but time-poor consumers whilst the IGA in West Wallsend will continue to fulfil a top-up shopping function.

The Assessment concluded that the proposal will meeting growth in demand for retail services in the locality. Additionally, there is still sufficient growth in projected expenditure of the population to enable other existing centres, such as Glendale, to enjoy considerable capture of expenditure growth.

5.6.7 Proposed Harrigans Hotel, Pambulong Estate – Economic Impact Assessment

The Economic Impact Assessment for the proposed Harrigans Hotel was prepared by Castlecrest Consultants, January 2004. The economic impact assessment was prepared to inform the application assessment of the proposed Hotel. The economic impact assessment provides an analysis of the current economic climate for clubs and pubs within the area, an assessment of the proposed hotel, and how the hotel may impact upon the future economic viability of the area.

The assessment states that the proposed hotel will draw its trade primarily from the immediate surrounding areas, which includes the study site. Passing trade and tourism is predicted to supplement the local clientele to the hotel. The trade area for the proposed hotel encroaches on several existing local facilities. In determining the economic impact of the proposal, the assessment makes investigations into the population demographic for the area. It establishes that the future population for the Edgeworth area is ageing; however there will be a likely rise in the young family demographic due to the residential developments proposed for George Booth Drive, Edgeworth. The proposed developments for Edgeworth, including the study site, will create a substantial trade base for the area to 2021 for a club or licensed facility. Edgeworth is currently not serviced by a modern facility within the immediate locality of the proposed Harrigans Hotel.

The Hotel during operation will generate 9 full time jobs within the locality of the study site. When considering indirect fulltime equivalent positions, a total of 26 jobs will be created. The projected annual sales for the proposal are \$4.75 million, which represents 15% of the available market in 2006. Further to this, 30% of these sales will be generated through the tourist trade, which is not currently captured within the Pambulong area.

The assessment argues that the trading figure estimates do not indicate that the development will result in a dominant position in the trade area. The assessment predicts that the economic impacts to the locality will be positive in the creation of jobs. Negative effects arising from the proposed development relate specifically to the competition between surrounding clubs, however the assessment suggests that the development will attract tourism into the area which isn't currently able to be captured, and the development offers a unique experience.

5.6.8 Glendale Regional Centre Masterplan

The Glendale Regional Centre Masterplan was adopted in April 2010 by Lake Macquarie City Council and Strategy Hunter Consultants. This Masterplan for Glendale is significant to the Edgeworth development, due to the Glendale Regional Centre's proximity to the site. The Glendale Regional Centre includes the proposed Glendale Transport Interchange, a major transport node for both rail and road for the region.

The Masterplan provides principles for development for the facilitation of Glendale as a regional centre. Glendale is projected to become one of the three major centres of the Lake Macquarie Local Government Area, the others being Charlestown and Morisset. Due to Glendale's location, the centre of Glendale can provide the Lake Macquarie with a City Centre focal point.

The core of the Glendale Regional Centre generally comprises the land bounded by Main Road to the north, Lake Road to the west, the suburb of Argenton to the south and the railway line to the south east. Main Road provides a direct link to the Edgeworth area and study site. With the proposed train station and transport interchanges, it will provide a regional service in close proximity and easy access to the population of George Booth Drive, Edgeworth.

The associated background report to the Masterplan provides considerations for its implementation. One consideration which is relevant to this LES is ensuring that surrounding areas within the context corridors are not effectively sterilized in the long to medium term by new development. This can occur when short term development of the surrounding area is limiting in capacity, such as low density residential development which would affect the future carrying capacity of the site. This would in turn affect Glendale as a regional centre, as the

subsidiary areas would not be of a size to support a viable public transport system to the Glendale Regional Centre.

The development of the Edgeworth site, combined with development of Pambulong Forest Estate and Marketplace will complement the Glendale Regional Centre. Through the proposed development, there will be a new, sustainable transport hub at Edgeworth that will enable efficient shuttling to the Glendale Regional Centre.

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Guiding Principles for ESD

Ecologically Sustainable Development may be described as development that uses, conserves and enhances the community's resources so that the ecological processes on which life depends are maintained and the total quality of life now, and in the future, can be increased (CoA, 1992).

In determining the appropriate future zoning for this site, the principles of Ecologically Sustainable Development as defined in the *Local Government Act 1993* are relevant. Under that Act, *principles of ecologically sustainable development* means the following statements of principle:

Ecologically sustainable development requires the effective integration of economic and environmental considerations in decision-making processes. Ecologically sustainable development can be achieved through the implementation of the following principles and programs:

1. *the precautionary principle—namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.*
In the application of the precautionary principle, public and private decisions should be guided by:
 - i) *careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and*
 - ii) *an assessment of the risk-weighted consequences of various options;*
2. *inter-generational equity—namely, that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations,*
3. *conservation of biological diversity and ecological integrity—namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration;*
4. *improved valuation, pricing and incentive mechanisms—namely, that environmental factors should be included in the valuation of assets and services, such as:*
 - i) *polluter pays—that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement;*
 - ii) *the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste;*
 - iii) *environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.*

This LES has carefully evaluated the environmental, social and economic impacts associated with the proposed rezoning and has developed a suggested development pattern (refer **Section 9**) that has regard to the environmental, social and economic constraints and potential impacts of the proposed rezoning.

Environmental

The proposed development footprint would result in substantial modification of the site from its current state, with approximately 47.7 ha (50 %) of the forested vegetation on the site requiring removal. This is a substantial negative impact and would contribute to incremental key threatening processes responsible for the decline in biodiversity locally. However the proposed development footprint design aims to minimise the impact of the proposal (eg. by retaining the majority of hollow-bearing trees, connectivity between adjacent habitats, etc).

Statutory assessments have found that despite the negative impacts of the proposal to the site's existing habitat values, the proposal is not considered likely to have a significant impact on any threatened species, endangered populations, EECs or migratory species listed under the TSC Act and EPBC Act.

With consideration to other principles of ESD which demonstrate a high demand for the proposed development, it is consequently considered appropriate to develop the site as per the proposal footprint, and with active management of the remaining 50% of the site for conservation purposes.

Other Environmental Impacts have also been carefully considered in Section 3 of this report and it has been assessed that these impacts can be sufficiently mitigated to ensure that rezoning the recommended development footprint for urban purposes will not have a significant environmental impact.

Ecologically sustainable development is about striking a balance between the built environment, retaining and managing the natural environment and building social equity. Considering the development of the new and establishing town centre, it is sound planning to subsequently appropriately develop proximal land for residential purposes and based on the assessment undertaken and recommended mitigation measures, it is considered an appropriate balance between the natural and built environments has been struck. Development that helps to meet the demand for housing and is consistent with the Lower Hunter Regional Strategy and The Newcastle – Lake Macquarie Western Corridor Planning Strategy has been balanced with the retention of natural environment features on the site and therefore the rezoning would be justified.

Social

Under the Lower Hunter Regional Strategy, the site is within a Proposed Urban Area and along a designated Renewal Corridor. The regional strategy includes planning to allow an additional 66,000 new jobs, 160,000 new residents, and 115,000 new dwellings to be generated in the region by 2030. These estimates indicate that in 2031, the region will accommodate a population of approximately 675,000 people, an increase of 31 percent above the current population of 515,000.

The population of Edgeworth and surrounding suburbs, the area known as the West Wallsend Planning District (WWPD) is expected to continue to grow as the Lake Macquarie Draft Lifestyle 2020 Strategy indicates that by 2020 the population of WWPD will be 18,000, equating to a 44% increase on the 2006 population.

The proposed rezoning has the potential to have positive and negative social impacts. Impacts may affect housing supply and affordability, employment opportunities, accessibility, provision of services and facilities, and social interaction in either positive and or negative ways. The Social Impact Assessment (SIA) undertaken as part of this LES suggests that one of the main risks or potential negative impacts associated with the site's development may be that growth in community facilities and service provision does not keep pace with growth in population. This can be of substantial concern when continual population growth places pressure on the provision of infrastructure and services, and consequently planning and service provision is forced to be reactive rather than proactive. However, with the inclusion of recommend mitigation measures, the assessment undertaken has found that overall the rezoning would likely have a net positive impact, both on the existing community and future residents.

It is anticipated that the rezoning would deliver the following positive outcomes:

- improved housing stock for the area in terms of availability, choice and the opportunity for improved affordability;
- stimulate the provision of employment opportunities;
- improved provision of public transport and access;
- the needs of the elderly and people with a disability may be better served through improved access to goods and services with the creation of a well planned and designed urban centre located within the WWPD; the provision of well planned and designed developments can help develop a positive community identity and atmosphere; and
- the rezoning would create potential for the development of community services and facilities in the future.

Many of the potential benefits linked to rezoning would help to improve community liveability and socially sustainable outcomes. The positive outcomes identified by the SIA and LES indicate that the proposed rezoning of the area is justifiable from a socially sustainable perspective. Further, the minimisation of potential environmental impacts and their mitigation and management can also directly affect social impacts. Hence, since no significant environmental impacts are anticipated, the rezoning would also be socially acceptable and build upon triple bottom line sustainability outcomes.

On the basis of social considerations, it is considered that rezoning the subject site on George Booth Drive, Edgeworth should proceed on the basis of its potential to have a net positive social impact to the area.

Economic

Council's Lifestyle 2020 Strategy generally outlines that development activity should focus on Centres to allow for the appropriate and adequate provision of land, services and infrastructure. The Site forms part of the Pambulong Forest area and is located directly adjacent to the approved Pambulong Forest Marketplace which is described as a new and establishing town centre. Through rezoning, the study area is ideally situated to contribute to the future economic success of the LGA through the provision of housing, key services where required and some mixed use development.

The Economic Impact Assessment undertaken as part of this LES considers the site to be suitable for residential and mixed use rezoning. With the inclusion of predominantly residential zoning combined with reserves and open space and some mixed use provisions, it is anticipated that the site will ideally cater for residential land use demands with the LGA and region.

Retail and commercial development would be well catered for with the continual establishment of Pambulong Forest Marketplace, north of George Booth Drive. Therefore, it would not be optimal to suggest further intensive retail and commercial development south of George Booth Drive and secondly the provision of residential development adjacent to a developing town centre will provide economic stimulus and support.

Despite the demand for industrial lands within the LGA, in this particular case it is considered more appropriate to rezone the site predominantly residential due to the demand for residential land and the ability to locate residential uses directly adjacent to an establishing town centre. The inclusion of industrial and residential land uses within close proximity to one another can pose potential land use conflicts and therefore this has been considered and appropriate recommendations of residential and mixed use provisions have been proposed.

A predominantly residential rezoning with the inclusion of some mixed use provisions is considered the most appropriate for the site as it correlates to the needs of the area and LGA and would help support the development of the Pambulong town centre. Such provisions should be sustained by demand for residential zoning in particular, proximal transport services and the development of the Pambulong Forest/Edgeworth urban areas and Pambulong town centre.

The inclusion of residential land uses proximal to the a new and establishing town centre and related services would deliver improved economic, social and environmental outcomes compared to alternative options and demand for residential land uses would continue as projected by the Lower Hunter Regional Strategy. Non-significant and managed environmental impacts would also help ensure sound economic and balanced outcomes. Hence the suggested rezoning of the site would be economically sound and justifiable.

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