

5. ASSESSMENT OF ENVIRONMENTAL IMPACTS

In addition to the Environmental Planning Instruments and planning policies addressed above, the key issues considered in the Department's assessment of the Environmental Assessment includes the following:

- Flooding and Climate Change Impacts
- Traffic & Road Safety
- Subdivision Layout
- Riparian Corridor Rehabilitation
- Flora and Fauna
- Defendable spaces for bushfire protection
- Aboriginal Heritage
- Contributions
- The Public Interest

5.1 FLOODING AND CLIMATE CHANGE IMPACTS

The major water courses flowing through the subject site are Hewitts Creek, Woodlands Creek and Tramway Creek. Hewitts Creek runs through the northern part of the site and Woodlands Creek runs through the central part of the site. Tramway Creek runs through the southern part of the site along the northern boundary of Stage 5 of the subdivision. The catchments of these creeks are bounded by the ocean to the east and the Illawarra escarpment to the west. The creeks discharge to the ocean across McCauleys Beach. All three creeks are subject to flooding.

Flooding was raised as an issue in the Concept Plan approval by several public and agency submissions, including Wollongong City Council and DECC. The Department raised particular concern with regard to flood risks and sought confirmation on the sustainability of the creeks for conveying proposed peak flows and the impact that these may have on downstream properties. To ensure this issue was appropriately addressed Modification A2 in Schedule 2 of the Concept Plan Approval required detailed creek design to be undertaken with performance criteria that aimed to minimise the risk to life and property from periodic flood events. The Concept Plan also approved a developable footprint and provided for an 'Investigation area' along Woodland's Creek where development could occur if matters (outlined in Schedule 2 of the Determination) relating to creek design to minimise flood risk, were addressed appropriately.

In addition, consistent with comments made in the Court of Appeal (which overturned an earlier decision by the Land and Environment Court invalidating the Concept Plan approval) the assessment of this current proposal has also included consideration of the effects of climate change, including climate change flood risk. The documents submitted by the Proponent as part of the Project Application have been assessed against these requirements.

The Department engaged Sinclair Knight Merz (SKM) to undertake a review of the flood studies and climate change impact reports submitted as part of the Project Application. SKM identified the following issues with the proposed design in the Proponent's EA:

- *Concern regarding channel stability and the effects of development on geomorphological processes.*
- *Lack of consideration of the impact of sedimentation rates on channel form, hydraulics and flooding.*
- *Inadequate channel designs for maintenance of channel stability up to the 20-year ARI flood level and over the long term.*

The Proponent subsequently submitted further information and amended the creek designs to address the concerns raised by SKM. The *Sandon Point Flood Study Addendum No 1* (Cardno Forbes Rigby 18 May 2009) (**Appendix E**) was then reviewed by SKM who conducted a site inspection and concluded that the responses in this report have satisfactorily addressed each of the issues highlighted by their review. SKM concluded that the updated creek designs were acceptable given the urban setting. They further conclude, based on clarification by the Proponent, that the Proponent's design for the current proposal is satisfactory from a geomorphologic and channel stability viewpoint and that the potential for actual 100 year ARI event flood flows being 20% higher than estimated, which may occur due to modelling uncertainties, would not adversely affect the proposed development.

SKM has also confirmed that given the latest creek designs and modelling results, they are satisfied that all proposed lots, as well as the existing lot on adjacent property at Seabreeze Place that was affected by the former design, would be above the 100 year flood for the existing climate and climate change scenarios. SKM note that several issues will be followed up at the detailed design stage and suggest conditions of consent be added to the development regarding:

- *More detailed analysis of shear stresses and rock armour stability/rock sizing, using 2D dynamic modelling;*
- *Detailing of the rock treatment construction; and*

- *Establishment stage vegetation management.*

Based on the independent advice, the Department is satisfied that the amended creek designs and mitigation measures are considered appropriate to ensure the development is unlikely to be adversely affected by flooding or impacts of climate change on sea level rise or rainfall intensity during the design 100 year ARI flood event. The development is also unlikely to adversely affect surrounding properties in regards to these matters. The matters outlined in Modification A2 in Schedule 2 of the Concept Plan Approval Determination in regards to creek design have also been appropriately addressed and therefore development may occur within the 'investigation area' of the development footprint as outlined in the Concept Plan approval. The Department will add conditions of approval as recommended by SKM above.

5.2 TRAFFIC & ROAD SAFETY

5.2.1 Laurence Hargrave Drive/Wrexham Road Intersection

The proposed subdivision proposes to utilise Point Street (to Sandon Point Drive and the North-South Link) in the south and Wrexham Road in the north for the main access points as approved in the Concept Plan. The proponent submitted plans for the upgrade of the Wrexham Road/Lawrence Hargrave drive intersection to cater for increased traffic associated with the proposal.

The RTA reviewed the proposed upgrade works and required further analysis of the impact the development will have upon the intersection of Lawrence Hargrave Drive and Wrexham Road (**Figure 10**). They were concerned with the availability of appropriate sight distance for vehicles turning right into Wrexham Road from Lawrence Hargrave Drive, as there is potential for direct conflict with through southbound vehicles creating a safety concern.

The Proponent undertook additional modelling and prepared a plan of the intersection to address the RTA concerns and concluded that installation of traffic signals with three-phase operation is appropriate alongside the use of a kerbside through lane for through traffic on Lawrence Hargrave Drive.

The RTA have maintained their concerns in relation to right turning movements from Lawrence Hargrave Drive into Wrexham Road, particularly with the future impacts associated with allowing this movement on road safety and traffic efficiency in the precinct. To address this issue, the RTA recommended conditions of approval including:

- *Submission of a plan demonstrating that Lawrence Hargrave Drive can be upgraded to four lanes between High Street and Lachlan Street; and*
- *Lawrence Hargrave Drive to be upgraded to four lanes (between Lachlan Street and High Street) and Wrexham Road to be upgraded to allow three lanes and traffic signals and lighting installed prior to any traffic accessing the proposal.*
- *Wrexham Road shall be upgraded to allow three lanes (two westbound, one eastbound). The pavement on Wrexham Road shall be suitably upgraded to accommodate the traffic signal infrastructure.*
- *Traffic signals shall be provided at the junction of Lawrence Hargrave Drive (MR 185) and Wrexham Road. The traffic signals shall be constructed as a three-phased arrangement.*
- *Lighting shall be provided at the junction of Lawrence Hargrave Drive (MR185) and Wrexham Road in accordance with Australian Standard AS/NZS1158.*

The Proponent has responded to these proposed conditions in their letter titled "Sandon Point Project Application Consolidated Response to Agency Submissions" (**Appendix E**) noting that they believe they are largely unnecessary, particularly in regards to the length of additional lanes on Lawrence Hargrave Drive and the timing of the upgrade works to the intersection.

The Department has considered the Proponent's response and, given the Proponent's modelling suggests that queue lengths of 175m and 196m in the morning and evening peaks may occur, considers that the upgrade of Lawrence Hargrave Drive to four lanes between Lachlan Street and High Street is reasonable. While not all of the traffic that will be queuing up along this distance will be directly attributable to the new subdivision, the proposal does require the upgrade of the intersection at Wrexham Road which in turn will require the upgrade of the roads leading up to this intersection. Given the distance of expected queuing and the fact that the new development will add to the traffic demands along this road, the Department considers that the upgrade of Lawrence Hargrave Drive to four lanes between Lachlan Street and High Street is a reasonable request.

Further, that given the safety concerns of the RTA, the recommended timing of the works is acceptable and should be in place prior to construction traffic accessing the site via Wrexham Road. The Department has considered the issues

raised by the RTA and supports the addition of the recommended conditions to ensure an appropriate outcome for this intersection.

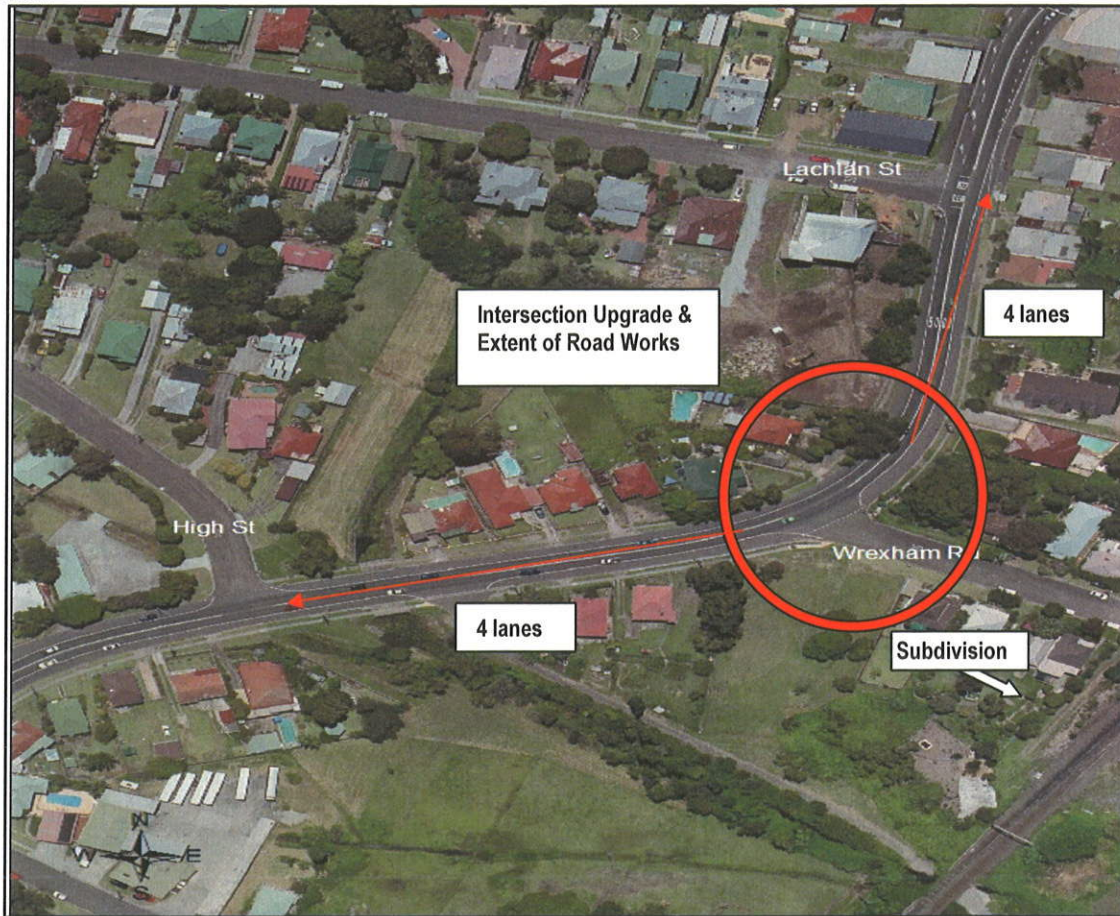


Figure 9. *Intersection of Wrexham Road and Lawrence Hargrave Drive & Extent of Road Upgrade Works*

5.3 SUBDIVISION LAYOUT

The proposed street pattern generally responds to the topography, promotes way-finding and legibility, provides views of important natural features such as the coastline, foreshore and creek corridors and integrates land use and transport functions in line with the objectives of the Coastal Design Guidelines for NSW. The subdivision layout further respects the Design Guidelines in providing edge streets fronting open space, a grid design to provide high accessibility and permeability for pedestrians and vehicles and minimises road crossings over waterways. The subdivision layout is therefore considered to be acceptable.

5.3.1 Access

The Department and Council raised concerns regarding access where lots do not have street frontage and are accessed by an easement across other properties or via a narrow handle in the case of battle-axe lots. Where houses do not have direct access to the street there are concerns regarding safety and surveillance and the ongoing maintenance and management of the access easements. A total of 7 lots do not have direct street access as illustrated in **Figure 10** below.

These lots represent a minor proportion of the overall development. They front the riparian corridors and will have an area of defensible space including an eco-trail at the front of the property, which will allow for natural surveillance and emergency access to the properties. However, the Department considers that each allotment should have direct access to the street for safety and access reasons and recommends a condition of approval.

It is also recommended that the access for the lot adjacent to the railway lane on the north side of Woodlands Creek (lot 225) be moved to the northern side of the property to ensure it is outside the Probable Maximum Flood (PMF) level identified in the drawing titled 'Post-development Flood Extents for Hewitts and Woodlands Creeks' no SK07 Rev P2 (**Figure 11**).

The access lane to the rear of townhouse lots in 'Precinct 2', fronting Road 4 and Woodlands Creek, is proposed to be managed as a right-of-way with reciprocal rights to access each lot. The Department recommends the creation of a

formal public laneway for vehicular access to the rear of these lots with subsequent dedication to Council to ensure this lane is managed and maintained appropriately (as per Coastal Design Guidelines for NSW).

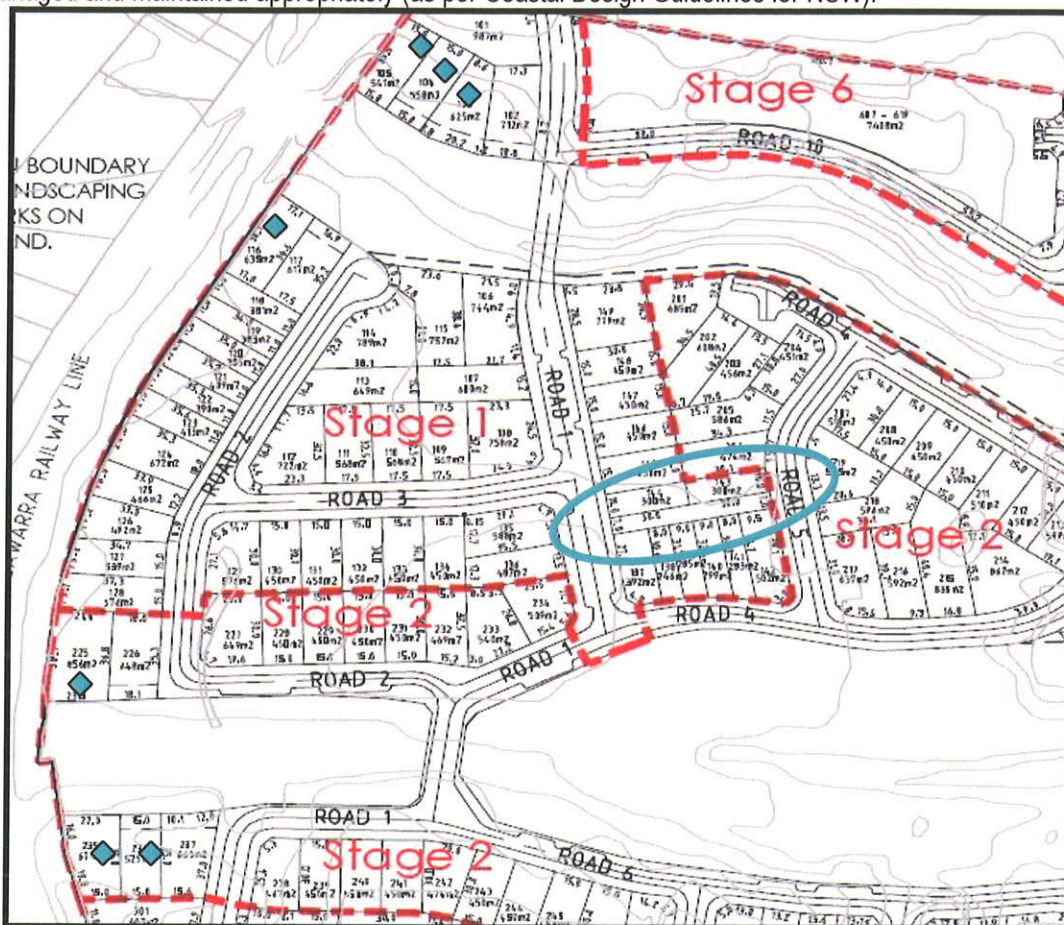


Figure 10. Lots without direct street access (blue diamond) and Precinct 2 townhouse lots rear laneway (in blue circle)

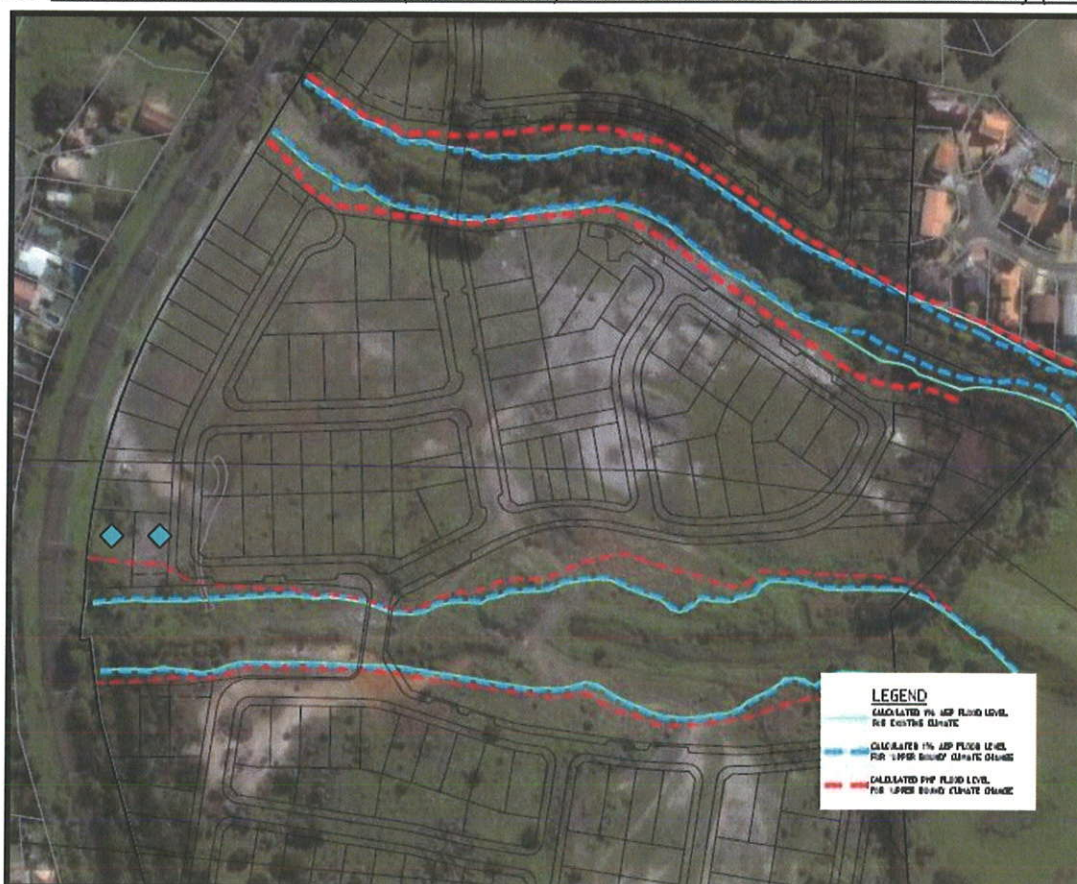


Figure 11. Lot access affected (blue diamond) by the Probable Maximum Flood level (dashed red line) (excerpt of 'Post-development Flood Extents for Hewitts and Woodlands Creeks' Drawing no SK07 Rev P2- 28/10/08 by Cardno Forbes Rigby)

5.3.2 Development Footprint

The subdivision layout in the EA report included 3 lots (220, 224 and 515) that are partly outside the development footprint approved by the Concept Plan, as illustrated in **Figure 13** below. The Proponent explained that plans utilised were not totally accurate in reflecting the development footprint and indicated will accept a condition of approval to rectify this error. It is recommended that a condition of approval be imposed requiring the Proponent to submit revised plans that address this issue to ensure all lots are within the approved development footprint.

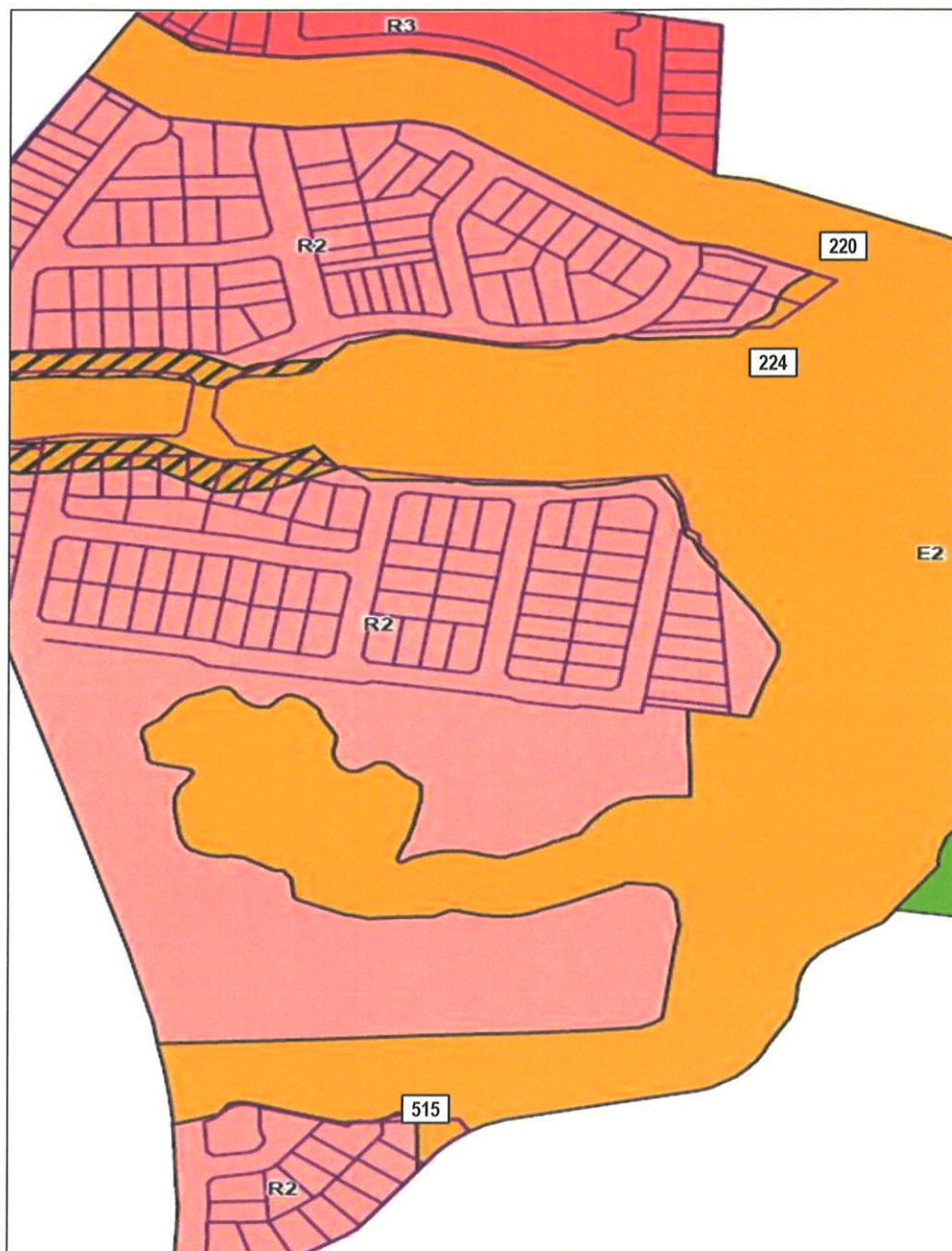


Figure 12. Lots (purple line) partly outside the development footprint (black line) [Note: underlying zoning shown is as proposed in MD SEPP Amendment]

5.4 RIPARIAN CORRIDOR REHABILITATION

The proposed rehabilitation of the riparian corridors of Hewitts and Woodlands Creeks is detailed in the Vegetation Management Plans in the Proponent's EA (**Appendix B**). Concerns were raised that the proposed vegetation structure may not be appropriate to ensure the restoration of the riparian corridors. The Proponent has outlined that the proposed riparian plantings are in accordance with the DNR Riparian Corridor Study 2004 and will create a sub-tropical rainforest vegetation environment with an associated enclosed canopy, while providing progressively thinner densities of vegetation towards the outer edge in order to provide view shafts into the corridor.

The rehabilitation works aim to reverse some of the damage that was done on the site such as the straightening of both Hewitts and Woodlands creeks and the piping and diversion of Woodlands Creek. The rehabilitated riparian corridors aim to provide an improved habitat for local native flora and fauna and have been designed to form part of an overall public open space system, linking to existing public reserves, particularly those located on the coastal fringe.

The Department considers that the riparian corridor rehabilitation will result in an improved outcome on the site with the restoration and replanting of vegetation along the creeks that are currently highly degraded and that planting is in accordance with the DNR Riparian Corridor Study 2004. It is considered that the proposal aims to minimise risk to life and property and ensure safety with lots providing an active frontage to the open space. It will further maintain and enhance environmental attributes including channel stability and biological diversity, achieve multi-use of riparian zones including aesthetic landscape and recreation opportunities, and meet water quality and environmental flow objectives in line with principles of urban stream management.

5.5 FLORA AND FAUNA

Various surveys and assessments have been carried out at the site (by specialist consultants for the Proponent, the National Parks and Wildlife Service and the Tramway Wetlands Planning Committee) dating between 2001 and 2006. These assessments confirmed that there are no matters of EPBC or RAMSAR wetlands importance on the site. One Endangered Ecological Community (EEC) was identified, Swamp Sclerophyll Forest, at the site within the Woodlands Creek corridor (proposed to be zoned for environmental protection) and locally and regionally significant flora species were also identified. No threatened fauna species were identified though it is noted that there have been previous records of threatened or significant fauna species on the site, including the Green and Golden Bell Frog, Latham's Snipe, Southern Emu-wren and White-cheeked Honeyeater.

An eight part test was undertaken (by Connell Wagner in 2001 and again in 2003 as discussed in the Commission of Inquiry (Col) report) in accordance with Section 5A of the EP&A Act that revealed that the proposed development is not likely to have a significant effect on any threatened fauna, including the Green and Golden Bell Frog. The studies also concluded that the Concept Plan proposal will not have a significant impact on threatened flora communities.

The studies recommended that any possible impacts be minimised through the conservation of vegetation where possible and the creation of riparian zones that will provide improved habitat. This forms an important aspect of this Project Application for residential subdivision. The impacts of major earthworks and riparian corridor recreation need to be balanced with the objectives of rehabilitating the creek which is essential to maintaining the presence of the EEC. The Concept Plan approval included a reduced development footprint at the site, partly in order to address this issue. This Project Application proposes measures in the Proponent's Vegetation Management Plan (VMP) in association with the integrated water sensitive urban design (WSUD) to significantly reduce the sedimentation and weed invasion presently threatening the EEC. Based on the surveys and eight part test, the Department is satisfied that impact on flora and fauna is acceptable.

With regard to existing vegetation on the site, the proponent states that tree retention opportunities will be limited, with only a small number potentially retained along Hewitts and Woodlands creeks corridors. The Department recommends that such trees be identified prior to construction starting at the site, with protection measures implemented as per the Vegetation Management Plan (VMP). A condition of approval is recommended to ensure that tree retention identification occurs appropriately.

5.6 DEFENDABLE SPACES FOR BUSHFIRE PROTECTION

The Concept Plan approval contained the following modification:

"C5 Bushfire Protection Requirements

Future applications lodged by the Proponent for development on the subject site must be consistent with the Planning for Bushfire Protection Guidelines."

It has since been confirmed by the Rural Fire Service (RFS) that the subject land is not mapped as Bushfire Prone Land and given that the riparian corridors are expected to pose a very low threat to the surrounding development there is no requirement to provide Asset Protection Zones (APZs) under the *Planning for Bushfire Protection Guidelines*.

The Proponent outlined in the EA that the Rural Fire Service (RFS) requested a 'defendable space' between the riparian zones and the development be provided to ensure access to fire fighters and their vehicles. The Proponent has provided a 'Defendable Spaces Plan' that outlines vehicular and pedestrian defendable space as well as the planned location for fire hydrants.

In their submission of 18 June 2008, the RFS raised no issues in relation to bush fire for the development based on the information provided to them, which included the proposed 'Defendable Spaces Plan'.

The Department considers that the issue of bushfire protection can be adequately addressed with the implementation of the 'Defendable Spaces Plan'. The Department recommends a condition of approval be imposed requiring defendable spaces to be provided in accordance with the Statement of Commitments and the 'Defendable Spaces Plan' (Drawing SK23) to ensure the proposed development incorporates these spaces.

5.7 ABORIGINAL HERITAGE

The Department considered Aboriginal Heritage at the Concept Plan stage and commissioned an assessment of Aboriginal cultural heritage that resulted in the 'Huys Report' (Australian Archaeological Survey Consultants, *Sandon Point Col Area: Aboriginal Cultural Heritage Assessment - A report to DIPNR*, June 2006). The Huys Report outlined that Sandon Point was of high local significance and moderate regional significance but not of State or National significance in terms of Aboriginal heritage. The areas that were identified to be of significance were outside the area of the current project application site. However, the Concept Plan approval for the Sandon Point site included several commitments and an additional Departmental condition in relation to heritage issues. These included undertaking further archaeological investigation on the northern part of Stockland's land, preparation of a Heritage Interpretation Plan, entering into a Voluntary Conservation Agreement (VCA) with DEC (now DECC) and pursuing the establishment of a keeping place for artefacts discovered during excavation works.

The VCA and keeping place are to be established in conjunction with development at the adjoining site, The Point 'Stages 2 to 6'. These commitments have yet to be implemented as resolution is contingent on the outcomes of consultation and negotiation between Council, DECC and the local Aboriginal community, which is ongoing. The Proponent has committed to establish the keeping place in their Statement of Commitments (**Appendix E**).

The Proponent's heritage consultant has prepared a Desktop Assessment of Archaeological Potential (see **Appendix B**) that has recommended areas for precautionary testing (**Figure 14**) to be undertaken where they consider there is some potential for the land to contain Aboriginal objects. The report also includes a Heritage Interpretation Plan for the site that outlines themes and interpretive features for the site and establishes the appropriate means of recording or storing artefacts from past uses of the site.

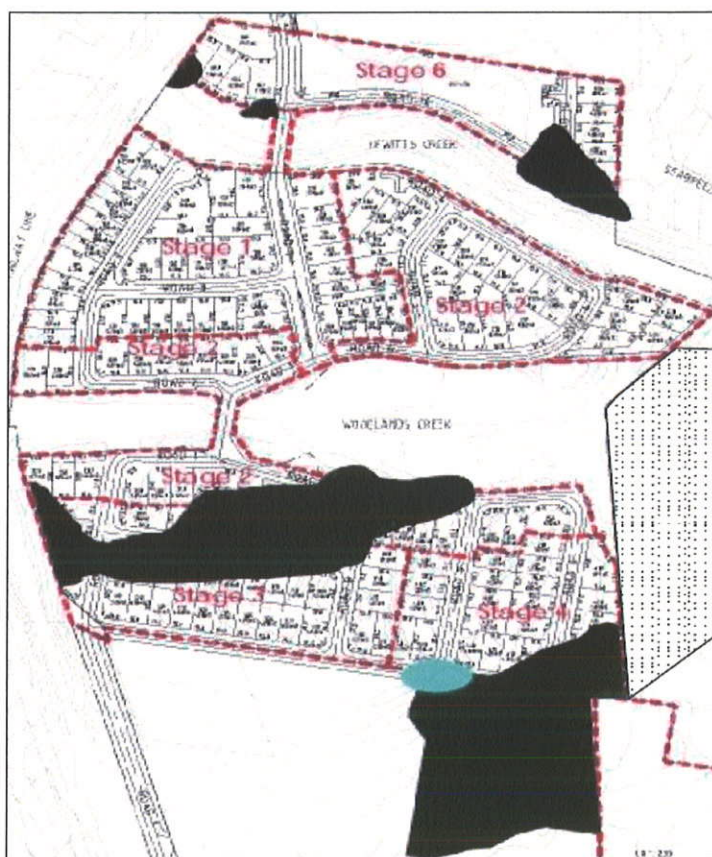


Figure 13. Indicative areas (black) to be covered by sample test excavation (stippled area outside current subdivision, blue area also has potential for non-indigenous heritage)

The Department considers that the Proponent's Statement of Commitments appropriately address most of the issues raised in relation to Aboriginal heritage at the site and recommends the following additional conditions of approval:

- Sample test excavation shall be carried out in the areas identified in Figure 6 of the 'Desktop Assessment of Archaeological Potential' (prepared by Susan McIntyre-Tamwoy Heritage Consultant April 2007), prior to commencement of works. All Archaeological Investigations must be done in consultation with the Aboriginal community as outlined in the Statement of Commitments.
- If any relics are uncovered at any stage or if any works disturb Aboriginal cultural materials, all work shall cease immediately and the relevant organisations contacted.
- Inform those engaged in earthworks of the requirement to obtain consent from DECC prior to knowingly destroying, defacing, damaging a relic or Aboriginal place.

5.8 CONTRIBUTIONS

An agreement has been reached between the Proponent and Wollongong City Council in relation to acquisition of lands, and the dedication of the Wrexham Road connection as outlined in the report to the Council Meeting on 26 May 2009, Proposed Acquisition of Land at Sandon Point, Bulli (see **Figure 15**).

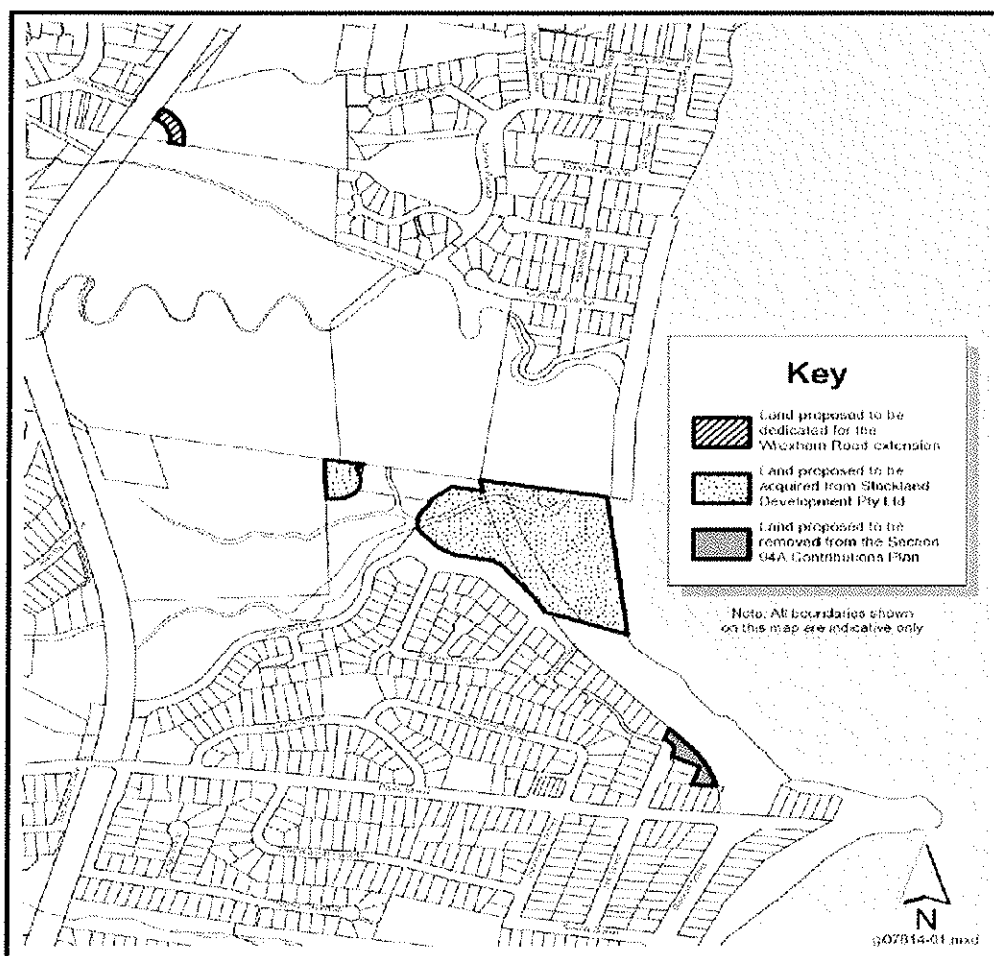


Figure 14. Wollongong City Council - Proposed Acquisition of Land at Sandon Point

The Department is satisfied that the level of contributions outlined in the Wollongong Council Combined City Wide and City Centre Section 94A Development Contributions plan July 2008 of \$220,400.00 and the agreements reached regarding acquisition of lands and delivery of works are acceptable. The Department recommends adding a condition of approval requiring payment of the Council's Section 94A contribution on an agreed timetable.

5.9 THE PUBLIC INTEREST

The Department believes the proposed Project Application is in the public interest for the following reasons:

- The proposal is generally consistent with the current statutory planning controls relating to the site and with the approved Concept Plan.
- It will provide lots for 181 new houses and a super lot for 80 apartments to assist in meeting the target for 38,000 new dwellings as outlined in the Illawarra Regional Strategy 2006-2031.

- It will provide a range of housing lots and dwelling types adjacent to an established area.
- It will provide regional benefits with the establishment and enhancement of a regional open space network with direct connections in the form of the riparian corridors.
- New and improved pedestrian paths and cycleways will be provided within the development and connect to neighbouring areas, the train station, regional open space, the beach and shops.
- The road network will be integrated with surrounding residential areas.
- Social, community and recreational infrastructure will be funded through Section 94A contributions.