

25 January 2010

Appendix

Gwandalan

Lower Hunter Lands Project Preliminary Environmental Assessment

Water Sensitive Urban Design, Flooding and Stormwater Management

1 Description of the proposal

It is proposed that the entire Coal & Allied Industries Limited (Coal & Allied) owned Gwandalan site be rezoned/listed as a 'State Significant Site' (SSS) in Schedule 3 of State Environmental Planning Policy (Major Development). A draft Schedule 3 listing will be prepared with the Concept Plan Application.

The Concept Plan for a residential subdivision of the Gwandalan site will apply to the entire 268ha Gwandalan site. The key parameters for the future development of the site are as follows:

- ▶ Dedication of 205.75ha of conservation land to the New South Wales Government (NSWG) that is identified in the Lower Hunter Regional Strategy and Lower Hunter Regional Conservation Plan, comprising approximately 77% of the Gwandalan site.
- ▶ Maximum dwelling yield of 623 dwellings over 62.24ha.
- ▶ Indicative development staging. The number of lots and extent of staging for release areas will be largely dictated by the service infrastructure requirements as well as responding to market forces.
- ▶ The provision of associated infrastructure.
- ▶ Torrens title subdivision of the Gwandalan site. The Torrens title subdivision and boundary realignment of Coal & Allied land will enable land 205.75ha in area that is owned by Coal & Allied to be excised and dedicated to NSWG for conservation land.

Approval will not be sought under the Concept Plan for a specific lot layout. An indicative lot layout will indicate how the maximum dwelling yield of 623 dwellings could be achieved on the site.

Similarly, approval will not be sought under the Concept Plan for subdivision or construction of individual houses. However, the desired future character of the proposed concept plan will be included in Urban Design Guidelines. Urban Design Guidelines will be prepared to inform the Concept Plan in respect of urban form, built form, open space and landscape, access and movement and visual impact for the site.

It is proposed to dedicate land for conservation purposes as part of the Major Project Application via a Voluntary Planning Agreement (VPA) between Coal & Allied and the NSWG in accordance with s.93F of the Environmental Planning & Assessment Act, 1979 (EP&A Act).

The proposed Concept Plan and a Plan showing the proposed development areas and conservation areas is included in the Preliminary Environmental Assessment (PEA) prepared by Urbis.

2 Statutory Requirements

In addition to the statutory requirements under the Part 3A of the *Environmental Planning and Assessment Act 1979 (EPAA)* process, the discipline specific guidelines relating to Water Sensitive Urban Design, Flooding and Stormwater Management which should be considered include:

- ▶ Integrated Catchment Management Plan for the Central Coast 2002 and Draft Hunter Central Rivers Catchment Management Authority (HCRCMA) Catchment Action Plan 2006 – both plans are administered by the HCRCMA and priorities investment in natural resource management for this area;
- ▶ Wyong Shire Council (WSC) LEP – outlines requirements for development within or near water bodies, floodplains, steep lands, acid sulfate soils, mine subsidence districts and heritage conservation areas;
- ▶ LMCC Coastline Management Plan – adopted by Council in 1999, identifies works required to along the Lake Macquarie Coastline in order to maintain and enhance its natural, visual and recreational amenity;
- ▶ The Australian and New Zealand Guidelines for Fresh and Marine Water Quality, 2000; and
- ▶ NSW Floodplain Development Manual, 2005 - which outlines guidelines relating to floodplain management.

3 Existing Environment

Gwandalan experiences a sub-tropical climate with rainfall predominantly occurring in late summer and autumn. The nearest operational daily rainfall station is located at Norah Head lighthouse (BOM Stn 061273), which registered a mean annual rainfall of 1227 mm for the period of 1969 to 2006. The Norah Head station records elevated monthly rainfalls in the months of January to June, with the least rainfall being recorded in July to December. The mean number of rain days varies between approximately 9 and 13 days per month.

Topography is an important consideration when planning the location of stormwater management facilities such as detention basins. The Gwandalan land parcel generally has steep gradients with an average grade in the order of 6%, flattening towards the banks of Lake Macquarie.

The site is drained by Strangers Gully, and several smaller gullies draining to Lake Macquarie. The land generally slopes east towards Lake Macquarie and portion of the site discharges to Lake Macquarie via dispersed overland flow.

Flooding associated with Lake Macquarie is a risk that needs to be considered and managed, in accordance with the NSW Floodplain Development Manual, 2005. Flooding would be associated with predominantly floodwaters backing onto the site.

The marine environment adjacent to the site is largely shallow and deepens >1.5 metres at 40 metres from shore. The flat nature of the shoreline, stable bank structure and shallow nature of the receiving environment characterise the marine environment at this site. Seagrass beds are well established and provide good benthic stability.

Groundwater matters are considered in a separate Preliminary Environmental Assessment, being compiled by Douglas and Partners.

4 Potential Impacts

Operational Impacts

Development results in increased impermeable surfaces (roofs, driveways, roads, pavements etc.), which could affect the hydrology. If not managed effectively, this 'hardening' of the surfaces could lead to the following operational impacts:

- Increased stormwater peak flows, leading to increased flood risk and erosion (on-site and off-site);
- Increase stormwater runoff volumes, which could impact downstream sensitive habitats in terms of flushing regimes (frequency, volume and rate), water quality, and wetting cycles;
- Increased stormwater pollution discharged to receiving environments as a result of pollutant entrainment in the increased runoff. The type of development and associated activities may introduce differing pollutant profiles, for example vehicular traffic could increase hydrocarbon introduction. In general, typical pollutants include litter, sediment, suspended solids, nutrients, hydrocarbons and toxicants;
- Reduce rainfall infiltration to the soil leading to impacts to the water balance, (including groundwater recharge and salinity impacts); and
- Impact groundwater flow due to site compaction, fill, landform reshaping and underground structures.

Construction Impacts

During construction there are additional impacts to pollution, erosion and sedimentation. Increased erosion and sedimentation on account of landform disturbances and accidental spills within unbunded areas of the site could discharge to the receiving environment. Clearing and earthmoving activities have the potential to impact on surface water quality in the vicinity of the site, especially during high rainfall events. The activities and aspects of the works that have potential to lead to erosion, sediment transport, siltation and contamination of natural waters include:

- Earthworks undertaken immediately prior to rainfall periods;
- Work areas that have not been stabilised and clearing of land in advance of construction works;
- Stripping of topsoil, particularly in advance of construction works;
- Bulk earthworks and construction of pavements;
- Washing of construction machinery;
- Works within drainage paths, including depressions;
- Stockpiling of excavated materials;
- Storage and transfer of oils, fuels, fertilisers and chemicals; and
- Maintenance of plant and equipment.

To reduce the potential pollutant export during construction, a detailed Sediment and Erosion control plan would need to be developed during the detail design phase of the project.

Foreshore erosion, loss of foreshore vegetation, loss of wetlands and saltmarsh, and damage to seagrass can affect water quality and change the balance of Lake Macquarie's ecology. Loss of seagrasses are of particular concern in Lake Macquarie and are protected under the Fisheries Management Act 1994.

Existing flood risk would need to be managed appropriately for the development, which would include appropriate development levels and evacuation planning up to and including the Probably Maximum Flood. In addition the increased stormwater runoff would need to be managed before discharged from the site to maintain existing flooding conditions and not increase flood risk on and off-site

The impacts of climate change need to be considered with respect to increases in rainfall intensity and sea level rise. This could be addressed in accordance with the DECC Practical Consideration of Climate Change, October 2007 guidelines, which recommends that a sensitivity analyses be undertaken for sea level, and the NSW Sea Level Rise Policy Statement, 2009.

Assessing Potential Impacts and Supporting Studies

Water Sensitive Urban Design, Flooding and Stormwater Management assessments and the formulation of management strategies would adequately more fully assess the issues identified above. The assessments and management studies would include:

- Flood Study – This would define existing flood regimes and would determine flood levels extents, flow velocities. In particular the flood study would define flooding for the 100-year ARI event to inform development levels and other infrastructure requirements and the Probable Maximum Flood to define flood liable land and inform flood evacuation planning. The flood study would be prepared in accordance with the NSW Floodplain Development Manual 2005 and would consider Climate Change impacts on rainfall intensity and volume together with sea level rise impacts on downstream backwater flooding;
- A Marine Baseline Condition Assessment – This assessment would outline the existing baseline marine condition adjacent to the site, summarise species potentially associated with the site, provide an assessment of existing habitat condition with regard to the potential to support listed species, and assess benefits and constraints to development of the site relating to the marine environment;
- Water Sensitive Urban Design (WSUD) and Stormwater Management - WSUD encompasses all aspects of urban water cycle management including water supply, wastewater and stormwater management. WSUD is a multi-disciplinary approach that promotes opportunities for linking water infrastructure, landscape design and the urban built form to minimise the impacts of development upon the water cycle and achieve more sustainable forms of urban development. This study would assess impacts of the development on surface runoff and develop strategies to mitigate these impacts in accordance with statutory requirements and guidelines.

These studies would influence the Concept Plan as follows:

- The Flood Study would identify flood liable land and influence the developable footprint and development levels. It would additionally influence road layouts and road crossings to facilitate evacuation; and
- Water Sensitive Urban Design (WSUD) and Stormwater Management, and Marine Baseline Assessments would quantify and identify the management facilities to manage stormwater from the site, before discharge to the receiving environment. The studies would also demonstrate that the design criteria and appropriate guidelines are met, and present a plan for management of stormwater runoff. In addition, a guide to future monitoring of the marine environment associated with the site would be presented.

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