DM & RD DOSSOR

COASTAL GROVE, LENNOX HEAD WATER CYCLE MANAGEMENT

Issue No. 2
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Patterson Britton
& Partners Pty Ltd
consulting engineers

DM & RD DOSSOR

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Water Cycle Management

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EXECUTIVE SUMMARY

Patterson Britton & Partners (PBP) has been engaged to formulate a sustainable water cycle management strategy for the proposed 45 residential lot development of Coastal Grove at Lennox Heads. This report details this strategy for the Project Application and Environmental Assessment submission required under Part 3A of the EP & A Act. This report should be read in conjunction with the PBP Infrastructure Strategy and PBP Construction Environmental and Waste Management Plan reports dated September 2006.

The issues addressed in this report include those raised in the Department on Planning Director General's requirements dated 15 May 2006 and those raised by various stakeholders during consultation meetings.

The Director Generals requirements have requested consultation with the following government agencies relevant to the proposed water cycle management strategy for the site:

- Department of Natural Resources (DNR);
- Department of Environment and Conservation (DEC);
- Department of Primary Industries (DPI);
- Northern Rivers Catchment Management Authority (NRCMA);
- Ballina Council.

In addition to consulting government agencies, the local community was consulted at a community information night.

The proposed development has been presented to the abovementioned group/agencies and comments from them have been considered in the formulation of the proposed subdivision design.

The total site area is approximately 14.7ha, comprising 10ha of developable land with the remaining portion containing the escarpment to the Coast Road, retained vegetation and riparian corridor.

The site is located within a minor valley falling generally to the south. The drainage line at the base of the valley conveys stormwater runoff from both the site and external subcatchments. Photographs of the site have been attached at **Appendix A**.

The flora and fauna investigation by Peter Parker has identified threatened flora on and adjacent to the site. These are located in the littoral rainforest on the southern boundary of the site, the coastal fontainea is located in Amber Drive Reserve and the hairy-joint grass is located in a small area on the bank of the proposed riparian corridor. Peter Parker has recommended suitable buffer distances between development and the littoral rainforest and the Amber Drive Reserve. An "ecological polygon" has been established by Peter Parker in the area of the hairy-joint grass to define buffer protection (refer **Figure 1**). No works are permitted in this polygon and special

precautions have been incorporated in the erosion and sediment control works during construction of the development as detailed in the PBP Construction Environmental and Waste Management Plan report. This Water Cycle Management report details measures to ensure the hydrology of the site and especially the area of the hairy-joint grass is not significantly affected by the development.

The design of the water components of the development has been based on an integrated water cycle management approach in order to promote an environmentally sustainable outcome for water. The water cycle management approach deals with all aspects of the cycle including stormwater runoff, groundwater, potable water and sewage. The aims of the water cycle management strategy formulated for this development to achieve a sustainable outcome are to:

- maintain peak flow rates of stormwater runoff as the same as for existing conditions – this would ensure no adverse impacts on flooding behaviour downstream and on bank stability in drainage lines;

- mimic the existing stormwater runoff frequency as closely as possible to control impacts on creek stability and aquatic habitats in downstream creeks;

- maintain or improve stormwater runoff water quality to contribute to the long term improvement in receiving water quality;

- maintain subsoil throughflows in order to maintain a contribution to baseflows in the downstream creeks and aquatic habitats;

- minimise potable water use to reduce the pressure on the limited water resources and extraction of water from existing water bodies; and

- maximise reuse of recycled water (either effluent or stormwater) to minimise use of potable water and the discharge of effluent to water bodies.

This report deals with stormwater management while the proposed water and sewer infrastructure are detailed in a separate report entitled Infrastructure Strategy.

The proposed Coastal Grove development would incorporate an integrated water cycle approach achieving a sustainable water outcome which responds to the constraints of the threatened vegetation and the practical requirements of Ballina Council for long term maintenance of the stormwater management system.

The stormwater management system would reduce peak flows below existing rates and substantially reduce pollutant loads compared with existing conditions. It will alleviate the erosion and deposition of sediment in downstream waterways caused by uncontrolled runoff from external areas. The development will therefore provide a significant contribution to the long term improvement in receiving water quality.

The stormwater management system has been formulated to mimic as closely as possible the existing runoff frequency, especially for light rainfall. In addition, the spring waters would

continue to flow to the proposed riparian corridor via trench drains to further assist to maintain the existing hydrology of the site.

The establishment of a riparian corridor along the drainage corridor would provide important habitat and visual benefits as well as providing further stability to the corridor. It will assist in the protection of the threatened hairy-joint grass located in a small area of the riparian corridor.

An 'ecological polygon' buffer area has been established to provide a buffer area for the hairy-joint grass. In addition, no works are proposed in the corridor in the vicinity of the polygon, the stormwater measures would be located outside the corridor and special protection measures are proposed during the subdivision construction for the hairy-joint grass as well as the coastal fontainea in Amber Drive Reserve and the littoral rainforest on the southern boundary.

The proposed development would not be adversely affected by flood levels caused by the ultimate development of the external catchment. The stormwater drainage system would be designed to provide safe access for pedestrians and vehicles in the development during floods.

The use of recycled water and water saving devices in the proposed dwellings would reduce potable water use by 55%. This reduction could increase to 68% when recycled water is approved for use in washing machines. This readily exceeds the BASIX requirement for a 40% reduction in potable water use. This provides a significant contribution to the sustainability of the potable water supplies as well as to the improvement in the environmental flows in source rivers.

The reuse of effluent *(recycled water)* in the development would reduce the effluent load discharged from the Council's SPP to receiving waters from this development by 74%. This would increase to 93% when recycled water is approved for use in washing machines. This provides a considerable contribution to the long term improvement in receiving water quality and their sustainability.

Stormwater management measures have been formulated to conform to Council's DCP No. 13 – Stormwater Management, do not provide a mosquito risk in accord with DCP No. 11 and match Council's skills and existing equipment for maintenance of these measures.

Consultation with government authorities, stakeholders and residents has provided comments which have been considered during the formulation of the development concept and stormwater management strategy.

The water related components and infrastructure proposed in the development conform to the Director General's requirements, as well as the Council and government authority policies and guidelines.

This water cycle management and infrastructure strategy formulated for this development is considered a demonstration project for achieving water sustainable outcomes within a sensitive environment which will contribute to the long term improvements in receiving water conditions and protect the threatened species on and adjoining the site.

1 INTRODUCTION

1.1 GENERAL

Patterson Britton & Partners (PBP) has been engaged to formulate a sustainable water cycle management strategy for the proposed 45 residential lot development of Coastal Grove at Lennox Heads. This report details this strategy for the Project Application and Environmental Assessment submission required under Part 3A of the EP & A Act. This report should be read in conjunction with the PBP Infrastructure Strategy and PBP Construction Environmental and Waste Management Plan reports dated September 2006.

The issues addressed in this report include those raised in the Department on Planning Director General's requirements dated 15 May 2006 and those raised by various stakeholders during consultation meetings.

The Director Generals requirements have requested consultation with the following government agencies relevant to the proposed water cycle management strategy for the site:

- Department of Natural Resources (DNR);
- Department of Environment and Conservation (DEC);
- Department of Primary Industries (DPI);
- Northern Rivers Catchment Management Authority (NRCMA);
- Ballina Council.

In addition to consulting government agencies, the local community was consulted at a community information night.

The proposed development has been presented to the abovementioned group/agencies and comments from them have been considered in the formulation of the proposed development.

1.2 SITE DESCRIPTION

The site is located approximately 1km south east of the Lennox Head town centre, as shown in **Figure 1.1**.

The total site area is approximately 14.7ha, comprising 10ha of developable land with the remaining portion containing the escarpment to the Coast Road, retained vegetation and riparian corridor.

The site is located within a minor valley falling generally to the south. The drainage line at the base of the valley conveys stormwater runoff from both the site and external subcatchments. Photographs of the site have been attached at **Appendix A**.

The site receives untreated stormwater runoff from the external residential areas around its boundary. This runoff is discharged from pipes at the site boundary and has caused extensive

erosion and formation of a large gully on the western slope (refer to photographs in **Appendix A**). This erosion by flows from external areas would result in significant sedimentation in downstream creek lines leading to destruction of aquatic habitats and increased bank erosion.

Figure 1.1 – Locality Plan

1.3 BACKGROUND

Applications for development of the site by other developers have previously been rejected both by Ballina Council and the Land and Environment Court. Rejections of these previous proposals have been largely based on the lack of information provided for consideration.

During consultation with both Council and local residents it has been made clear that the management of stormwater on the site is an important issue.

This report aims to provide information regarding the proposed stormwater management measures on the site to allow any concerns regarding this issue to be addressed. It is expected that implementation of the proposed stormwater runoff treatment measures would allow the development of the site to proceed with significant improvement in runoff quality and no significant adverse affects on the existing stormwater runoff regime.