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SALAMANDER SHORES HOTEL PTY LTD

# Salamander Shores Hotel

## Water Management, Flooding and Coastal Processes Report

301015-02132 – EN-TEN-0001[E]

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# SYNOPSIS

This report has been produced for Salamander Shores Hotel Pty Ltd in support of the redevelopment of the Salamander Shores Hotel. This report covers and addresses stormwater, flooding and coastal issues raised as part of a Part 3A submission to the New South Wales Department of Planning for a Concept Plan and Part Projects Plans.

**Disclaimer**



**PROJECT 301015-02132 - SALAMANDER SHORES HOTEL**

| REV | DESCRIPTION | ORIG | REVIEW | WORLEY-PARSONS APPROVAL | DATE | CLIENT APPROVAL | DATE |
|---|---|---|---|---|---|---|---|
| B | DRAFT - Issued for client review | JNH | FMC | N/A | 31-May-10 | N/A | |
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| E | Groundwater Amendments | JNH | FMC | MJS | 01-Sep-10 | | |

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## Appendices

# 1. EXECUTIVE SUMMARY

Salamander Shores Hotel Pty Ltd proposes to re-develop the existing Salamander Shores Hotel, located at 147 Soldiers Points Road, Soldiers Point. The re-development would include the demolition of the existing hotel and the construction of a new hotel resort that includes modern-contemporary tourist facilities with mid to high end accommodation and amenities to cater for Port Stephens adventure tourists and the corporate/conference market.

A plan of the site is shown in **Figure 1**.

The site is immediately surrounded by forested parklands to the east and south, cleared parklands to the west and low density housing along the foreshore to the north. The Soldiers Point Bowling Club is located to the north west of the site, while the Port Stephens Sailing and Aquatic Club is located to the east of the site, housed in a brick building. A public jetty is located to the northeast.

The Salamander Shores Hotel is located on a lot that covers an area of approximately 1.2 ha. The lot currently has a hotel operating on site and is surrounded by parklands covered densely with tall large trees to the east and south of the lot.

The proposed development has been identified by the Director General of New South Wales Department of Planning (DoP) as a significant project. The issues to be addressed in the Concept and Part Project application (Director General's requirements) are listed in **Table 1-1** along with a summary of the compliance measures and the location of further detailed discussions in this report.

**Table 1-1 – Director General's Requirements**

| Issue | Location in this report |
|---|---|
| **4. Hazard Management and Mitigation** | |
| **Coastal Processes** | |
| *4.1 Address Coastal hazards and the provisions of the Coastline Management Manual. In particular consider impacts associated with wave and wind action, coastal erosion, sea level rise and more frequent and intense storms* | An investigation into coastal processes at the site was undertaken and is discussed in **Section 7**. The assessment found the site is located well above the 100 year flood level and that there are no impacts on the site as a result of wind and wave action and coastal erosion. The assessment was undertaken in accordance to the guidelines set by the Coastline Management Manual. |
| **Flooding** | |
| *4.6. Provide an assessment of any flood risk on site in consideration of any relevant provisions of the NSW Floodplain Development Manual (2005)* | Issues relating to flooding are discussed in **Section 6**. Investigations found no defined overland flow paths traversing either through or |

| Issue | Location in this report |
|---|---|
| *including the potential effects of sea level rise and an increase in rainfall intensity.* | around the proposed site. The assessment of flooding found the site is located well above the 100 year flood level including an allowance of 0.9m for sea level rise. The investigation was undertaken in accordance with the principles outlined in the NSW Floodplain Development Manual. |
| *4.7. Consider the potential impacts of any filling on the flood regime of the site and adjacent lands.* | As discussed above and in **Section 6**, the proposed development is unlikely to impact flood levels either within the site or towards its surrounding environment. It is also noted that the development does not propose any significant filling on site. |
| *4.8. A risk management assessment of climate change impacts to the year 2100 is to be undertaken using the latest available information from the International Panel on Climate change (IPCC), Department of Environment and Climate change and Water (DECCW) and the CSIRO. This should include sensitivity analyses for low level, mid range and high level ocean impacts as set out in relevant DECCW guideline (Floodplain risk Management guideline: Practical Consideration of Climate Change 2007) and the Draft NSW Coastal Planning Guideline: Adapting to Sea Level Rise (DoP 2009).* | An assessment of the impacts of climate change on flood levels has been undertaken and is discussed in **Section 6**. The investigation found that the changes in sea levels would not have an adverse affect on flooding on the site, as the site is located well above the 100 year flood level, including a 0.9m allowance for sea level rise. |
| 5. Water Cycle Management | |
| *5.1. Address and outline measures for Integrated Water Cycle Management (including stormwater) based on Water Sensitive Urban Design principles which addresses impacts on the surrounding environment, drainage and water quality controls for the catchment, and erosion and sedimentation controls at construction and operation stages.* | The adopted Integrated Water Cycle Management (IWCM) and water sensitive urban design (WSUD) principles on site are discussed in **Section 8**. The development reduces the amount of impervious area on site and utilises available rainwater resources. Impacts on receiving environments and waterways are not predicted. Construction phase soil and water management measures are discussed in **Section 12**. |
| *5.2. Assess the impacts of the proposal on surface and groundwater hydrology and quality* | Investigations into surface and groundwater hydrology and quality have been undertaken and |

| Issue | Location in this report |
|---|---|
| *during both construction and occupation of the site; including consistency with the rules of the Gazetted Water Sharing Plan for the Tomago Tomaree Stockton Groundwater Sources, where relevant.* | are discussed in **Sections 9** and **10**. Investigations into the proposed development impacts on stormwater volumes, peak flows and water quality showed no adverse effects. It is also noted that the site contributes little groundwater infiltration to the regional Tomaree groundwater catchment and further enforces the insignificant impact of the site on groundwater resources.<br>Further comments are discussed in **Section 11**. |
| *5.3. Provided details of works likely to intercept, infiltrate or connect with the groundwater sources; details of any proposed groundwater extraction, details on prevention of groundwater pollution, and on protective measures for any groundwater dependant ecosystems.* | Interception of local groundwater is likely to occur as a result of the basement car park. At this stage it is envisaged that the collected groundwater would either be pumped or drained into the sewer network.<br>Irrigation on site under existing conditions is currently achieved using a groundwater bore. This bore is located within the north west corner of the site. No additional bores or groundwater extraction points are proposed for this redevelopment.<br>Further comments are discussed in **Section 11** |

A preliminary soil and water management plan (SWMP) and a stormwater concept plan for the proposed development are illustrated in **Figures 6** and **7** respectively.

## 2. INTRODUCTION

WorleyParsons was engaged by Salamander Shores Pty Ltd to address the stormwater, flooding and coastal processes including climate change impacts as part of a concept plan and part project plan application to the Minister for Planning, for the Salamander Shores Hotel re-development at Soldiers Point, Port Stephens.

The application seeks approval for a concept plan including serviced apartments, hotel and associated tourist facilities such as conference facilities, bars and leisure and permanent residential accommodation. The plan provides for 275 car parking spaces, parking for coach and mini vans and overall landscaping and public domain improvements.

The part project plan relates to the demolition of existing structures.

The Director General of NSW Planning has provided the issues to be addressed in the application in the Director General's Requirements (refer to **Appendix 1**).

This report addresses the proposed water management, flooding and coastal strategies and demonstrates how the development would address issues raised by the Director General.

## 3. EXISTING SITE CONDITIONS

The Salamander Shores Hotel is located at 147 Soldiers Point Road, Soldiers Point and is situated on a lot that covers an area of approximately 1.2 ha, close to the foreshore of the Soldiers Point Peninsula. Soldiers Point forms the northern boundary of Salamander Bay, within Port Stephens.

The site is immediately surrounded by forested parklands to the east and south, cleared parklands to the west and low density housing along the foreshore to the north. The Soldiers Point Bowling Club is located to the north west of the site.

The Port Stephens Sailing and Aquatic Club is located to the east of the site, housed in a brick building. A public jetty is also located to the northeast of the site.

The site is located within a low density suburban region within the Port Stephens Local Government Area (LGA).

The location of the site is illustrated in **Plate 1**.

**Plate 1 – Site Location**

## 3.1 Topography

The site and existing hotel are located on a steep rocky hill face which fronts and slopes towards Soldiers Point Road and overlooks the foreshore of the Soldiers Point Peninsula.

Grades across the site range from a maximum of 10%, at the centre of the site, to about 5% along the north and eastern boundaries of the site.

The majority of the site drains to the north west towards Soldiers Point Road. Stormwater generated across the site is ultimately discharged into Salamander Bay via underground site drainage and the stormwater drainage network within Soldiers Point Road. A small catchment along the eastern boundary of the site is believed to drain directly into Salamander Bay via a 525 mm stormwater line, which outlets near the jetty.

It is understood that the existing 525 mm pipe is draining roof water from the hotel bistro within the site, while the remainder of the hotel and the car park drains toward Soldiers Point Road via site drainage.

There are no defined overland flowpaths traversing across the site, nor immediately surrounding it.

A plan of the existing topography is illustrated in **Figure 1**.

## 3.2 Land Use and Site History

The site is believed to be currently zoned as commercial and is surrounded by forested parklands to the east and south which are owned by the Port Stephens – Great Lakes Marine Park Authority.

The site itself is generally cleared of vegetation with minor outcrops of large trees within the north east and south west of the site. The surface is mainly impervious, dominated largely by bitumen (car park spaces) and roof area.

## 3.3 Geotechnical Conditions

A geotechnical assessment for the site was conducted by Coffey Geotechnics, with field work undertaken on the 9th of December 2009 and the 23rd of February 2010. The assessment consisted of drilling seven boreholes using hand auger methods and another two boreholes using diamond bit coring.

The assessment found the site to be sitting on a large rock mass of high strength rhyodacite, a form of volcanic rock. The site is covered with numerous outcrops of rhyodacite along the eastern foreshore. The surface of the site is covered with alluvial soils to a maximum depth of 0.5 m followed by a layer of extremely weathered rhyodacite rock up to a maximum depth of approximately 0.8 m above fresh rhyodacite.

According to the geotechnical report, the groundwater behaviour in the rock mass is controlled by the defects (e.g. cracks) within the rock mass which control rainfall recharge entering from the overlying aeolian sandy soils.

Coffey noted that the excavation conditions of the site will pose the most significant geotechnical constraint to the project.

# 4. PROPOSED DEVELOPMENT

The proposed development consists of the demolition and re-development of the existing Salamander Shores Hotel as a modern contemporary tourist facility with mid to high end accommodation and amenities to cater for Port Stephens adventure tourists and the corporate/conference market.

The application seeks approval for a concept plan including serviced apartments, hotel and associated tourist facilities such as conference facilities, bars and leisure and permanent residential accommodation. The plan provides for 275 car parking spaces, parking for coach and mini vans and overall landscaping and public domain improvements.

The proposed development will be facilitated within a number of building structures interconnected via sealed walkways and underground car park, unlike the existing site where the hotel it is contained within in a single structure. The proposed development layout is present in **Figure 2**.

# 5. LEGAL REQUIREMENTS

The Department of Planning requires consultation with local and state agencies as part of this assessment to gather any preliminary advice to ensure all major issues are raised to allow the development to progress without any major obstacles in future. The following agencies were approached for advice:

- Port Stephens Council (Council);
- Department of Environment, Climate Change and Water (DECCW);
- Department of Industries and Investments (DII); and
- Port Stephens – Great Lakes Marine Park Authority.

Outcomes of these discussions are discussed in brief in **Section 5.1**.

Key issues noted in the Director-General's Environmental Assessment Requirements that are relevant to water management are listed in **Table 1-1**. A summary of the manner in which the issue is addressed is provided in **Table 1-1** along with the section of this report in which there is a detailed assessment of the issue.

The other government policy implications are discussed in the following sections.

## 5.1 Local & State Authorities

A preliminary concept plan was forwarded to representatives of Port Stephens Council, The Great Lakes Marine Park Authority, The Department of Environment, Climate Change and Water and the Department of Industries and Investments (formerly the Department of Primary Industries) to identify any risks or issues that may arise as part of the development.

Discussions initiated with telephone conversations and followed on through e-mail correspondence. Correspondence between WorleyParsons and the above authorities is found in **Appendix 2**.

The issues that were raised as a result of these discussions are discussed below.

### 5.1.1 Port Stephens Council

WorleyParsons approached Port Stephens Council's Planner, Amanda Gale, for comments. Council however has not yet prepared any formal comments regarding the development.

Discussions with Council's stormwater engineer, Nalliah Sivabalan, have identified the stormwater and flooding requires and constraints that Council require for developments within the local government area. Council typically specifies these requirements as part of its DA approved consent conditions.

During talks, Council referred us to Council's Draft Stormwater Management Plan. The stormwater management plan requires develops undertake the necessary investigations and designs to ensure zero impact on flooding on site and towards downstream environments, zero impact on pollutant and peak flows discharged from the site.

Information on Council's existing stormwater infrastructure, within the catchment of the site, was also collected through these discussions.

### 5.1.2 Port Stephens – Great Lakes Marine Park Authority

The Port Stephens Great Lakes Marine Park Authority (LMPA) was primarily concerned with run-off, and the potential of the development to allow pollutants to enter the marine park. The LMPA was not concerned with the actual development as the layout of the proposed works are maintained with the site boundary, however was concerned with the impact the development may have on water quality and/or to adjacent habitats of the marine park. These impacts have been found to be negligible as discussed later in this report.

### 5.1.3 The Department of Environment, Climate Change and Water

WorleyParsons approached the Department of Environment, Climate Change and Water (DECCW) for comments, however DECCW was not prepared to make comments without a formal referral from the Department of Planning, following application.

### 5.1.4 Department of Industry and Investments

Correspondence with the Department of Industry and Investment (DII) found the DII supportive of the proposed development.

The Department recommends that:

- erosion and sediment measures are used to mitigate potential sedimentation impacts on the nearby waterway.
- there is no encroachment into the vegetated riparian buffer zone.
- impacts to the adjacent waterway and aquatic habitats from stormwater discharge are not increased and water sensitive urban design measures are used to minimise any such impacts.

These requirements are achieved as the extent of the works is defined and enclosed within the site, and modelling predicts no adverse effect on peak stormwater flows or pollutants. A detailed Soil and Water Management Plan will be produced in accordance with the "Blue Book" upon application for construction to mitigate any potential impacts as a result of construction works.

A concept soil and water management plan is illustrated in **Figure 6**. The plan encompasses the use of clean and dirty water diversion bunds with silt fencing, stabilised site access and a sediment detention basin.

## 5.2 NSW Coastal Policy

The overriding vision of the 1997 Coastal Policy (New South Wales Government) is the ecological sustainability of the NSW Coast. In order to give expression to this vision, nine goals have been adopted in the policy which represents a commitment to:

- Protecting, rehabilitating and improving the natural environment of the coastal zone;
- Recognising and accommodating the natural processes of the coastal zone;
- The natural processes (coastal, water) are provided for (refer to **Sections 6** and **7**);
- Protecting and enhancing the aesthetic qualities of the coastal zone;
- Protecting and conserving the cultural heritage of the coastal zone;
- Providing for ecologically sustainable development and use of resources;
- Providing for ecologically sustainable human settlement in the coastal zone;
- Providing for appropriate public access and use;
- Public access and use to the adjacent coast remains available as under existing conditions;
- Providing information to enable effective management of the coastal zone;
- Providing for integrated planning and management of the coastal zone.

The water management elements of the re-development conform to the NSW Coastal Policy by:-

- Improving the runoff water quality from the site into Salamander Bay;
- Maintaining peak flow rates from the site at existing rates; and
- Increasing vegetative green areas across the site.

The development also does not impact on the existing vegetative buffer to the coastline.

# 6. FLOODING

## 6.1 Port Stephens Flood Levels

Flood levels for Port Stephens have been investigated in the three stage Port Stephens Flood Study (Manly Hydraulics Laboratory – for the NSW Department of Public Works and Services, 1993, 1997 and 1998). In these studies, design flood levels around the foreshores of Port Stephens were estimated including the effects of tide, storm surge, local wind waves, swell waves and freshwater flows. Wave run up levels were also estimated.

The flood study quotes RL 2.4 m AHD as the 100 year average recurrence interval (ARI) flood level for Kangaroo Point, which is the nearest point to the subject site that was investigated. This level includes wave run up with the 100 year ARI elevation still water level estimated as RL 1.7 m AHD.

The lowest level on the site is above RL 6.5 m AHD and therefore the flood risk to the development in the 100 year ARI event is negligible.

There are no other watercourses in the vicinity of the site.

## 6.2 Flood Impact

The only waterway in the vicinity of the site is Port Stephens (Salamander Bay). The hotel sits on the crest of a hill and there are no defined overland flowpaths which could be impacted upon.

The proposed development has provided a reduction in impervious percentage from 65% to 59%, as a direct result of moving car park spaces underground. With the increase in pervious area, peak flow rates and volumes generated across the site will decrease across the overall site. This is discussed in further detail in **Section 8**.

It is noted that there is no significant filling proposed as part of the redevelopment.

The flood assessment follows the guidelines set by the NSW Government Floodplain Development Manual – Management of Flood Liable Land (DIPNR 2005).

This approach conforms to the Director General's requirements of Issue 4.7.

## 6.3 Sea Level Rise and Climate Change

The developer is required to undertake a risk management assessment of climate change impacts to the year 2100. In New South Wales, climate change requirements are governed by DECCW's Practical Consideration of Climate Change – Floodplain Risk Management Guidelines (DECCW 2007) and now also by DECCW's NSW Sea Level Rise Policy Statement (2009) and the Department of Planning's Draft Sea Level Rise Policy Statement (DoP 2009).

In 2007, the NSW Department of Environment & Climate Change published a guideline entitled Floodplain Risk Management Guideline: *Practical Consideration of Climate Change,* which discusses the potential impact climate change would have on flood levels. The report recommends that flood studies incorporate a sensitivity analyses for an increase in rainfall intensity (of 10, 20, and 30%) and also an increase in sea level (where relevant of 0.18, 0.55 and 0.91 m).

In 2009, the NSW Department of Environment, Climate Change and Water (DECCW) published the *NSW Sea Level Rise Policy Statement,* which lists the sea level rise planning benchmarks as an increase above 1990 mean sea levels of 40 cm by 2050 and 90 cm by 2100. The document also states the government's commitments as:

1. promoting an adaptive risk-based approach to managing the impacts of sea level rise;
2. providing guidance to local councils to support their sea level rise adaptation planning;
3. encouraging appropriate development on land projected to be at risk from sea level rise;
4. continuing to provide emergency management support to coastal communities during times of floods and storms; and
5. continuing to provide up-to-date information to the public about sea level rise and its impacts.

The DECCW policy statement also states that "Department of Planning guidelines will describe how sea level rise should be considered in land use planning and development assessment".

The NSW Department of Planning released the *Draft NSW Coastal Planning Guideline: Adapting to Sea Level Rise* in 2009, which is centred on the following coastal planning principles:

1. Assess and evaluate coastal risks taking into account the NSW sea level rise planning benchmarks;
2. Advise the public of coastal risks and to ensure that informed land use planning and development decision-making can occur;
3. Avoid intensifying land use in coastal risk areas through appropriate strategic and land use planning;
4. Consider options to reduce land use intensity in coastal risk areas where feasible;
5. Minimise the exposure to costal risks from proposed development in coastal areas; and
6. Implement appropriate management responses and adaptation strategies, with consideration for the environmental, social and economic impacts of each option.

The draft guideline aims to provide direction to consent authorities regarding development assessment in coastal areas, which are affected by coastal erosion or coastal flooding. It recommends assessment against the following Planning Criteria for Proposed Development in Coastal Risk Areas:

1. Development avoids or minimises exposure to immediate coastal risks (seaward of the immediate hazard line);

2. Development provides for the safety of residents, workers or other occupants on-site from risks associated with coastal processes;

3. Development does not adversely affect the safety of the public off-site from a change in coastal risks as a result of the development;

4. Development does not increase coastal risks to properties adjoining or within the locality of the site;

5. Infrastructure, services and utilities on-site maintain their function and achieve their intended design performance;

6. Development accommodates natural coastal processes;

7. Coastal ecosystems are protected from development impacts; and

8. Existing public beach, foreshore or waterfront access and amenity is maintained.

Following the 2009 policy statements, and taking into consideration the flood levels near Salamander Bay (as discussed in **Section 6.1**), the 2100 year flood level would be predicted to be RL 3.3 m AHD. This level is taken from adding the expected sea level rise of 0.9 m to the existing flood level of RL 2.4 m AHD.

As the predicted 2100 year Port Stephens flood levels (considering the effects of climate change) sits well below the lowest point of the site (RL 6.5 m AHD), it is evident that the development will not be adversely affected by climate change.

This conforms to the Director General's Requirements in Issues 4.6 and 4.8.

# 7. COASTAL PLANNING AND ENGINEERING

The Director General's Requirements specify an assessment to be undertaken to address coastal hazard issues that may impact the development. The assessment is to be undertaken in accordance with the Coastline Management Manual, produced by the New South Wales Government in 1990.

The assessment would investigate the potential for risk and impacts associated with wave and wind action, coastal erosion and sea level rise. These issues are discussed below, while sea level rise and flooding were discussed in **Section 6**.

## 7.1 Coastline hazards

The subject property is situated on an elevated outcrop of high strength volcanic rock. Therefore, traditional coastline hazards such as erosion and recession are unlikely to apply at the subject property.

The geotechnical investigation (Coffey, 2010) indicates that the rock underlying the site and seaward of the subject property is inerodible. Further discussions with Coffey confirm that the rock is believed to be a solid mass, upon which lie relatively shallow soils.

The site survey indicates that the lowest land levels are around RL 6.5 m AHD, while the building floor levels have been nominated at RL 7.5 m AHD and above.

The Port Stephens Flood Study indicates that the current 100 year (ARI) flood level for the subject site is RL 2.4 m AHD, with sea level rise of 0.9 m to 2100, the 2100 flood level can be adopted as RL 3.3 m AHD.

Based the above information, coastline hazards (including erosion, recession and inundation) are of limited concern at the site, noting that all buildings and other significant structures should be founded on rock or as otherwise recommended by a geotechnical engineer.

This assessment has been undertaken in accordance to the Coastline Management Manual (NSW government 1990) and complies with the Director General's requirements per Issue 4.1.

## 7.2 Coastline Management Manual

The Coastline Management Manual was released by the NSW Government in 1990 and was introduced to assist with management of all coastline developments to ensure adequate consideration of hazards that may result from wind, waves and erosive coastal forces, as outlined in the NSW Coastline Hazard Policy (NSW government 1988).

The primary objectives of the Coastline Management Manual and NSW Coastline Hazard Policy are to protect the coastal environment, aesthetic and ecological qualities and ensure future developments do not adversely affect coastal communities and cause any disruptions to social and commercial interest groups who use the coast.

The NSW Coastline Hazard Policy requires that:

- the impact of coastal forces on existing developed areas shall be reduced by works and measures and by the purchase of property on a voluntary basis, where appropriate;
- the potential for coastal damage in respect of any proposed coastline development shall be contained by the application of effective planning and development controls by local councils; and
- a merit approach to all development and building decisions which takes account of social, economic and ecological as well as oceanic process considerations shall be followed by local councils and developers.

The coastline hazard and flooding assessments undertaken and discussed in **Section 6** and **7.1**, show that the development is unlikely to be affected by wind, waves and erosive coastal forces, as the proposed hotel would be founded on rhyodacite, nor would the development be affected by flooding, as the site sits well above the predicted sea level in Salamander Bay.

# 8. HYDROLOGY

A RAFTS rainfall/runoff model was formulated for the hydrological analysis of the Salamander Shores development. The model was used to estimate catchment runoff under existing and developed catchment conditions for the comparison of the 5, 20 and 100 year ARI storm events.

## 8.1 RAFTS

RAFTS is a program consisting of five discrete modules that simulate the rainfall/runoff routing process, namely:

- A library module;
- A hydrograph generation module;
- A loss module;
- A reservoir routing module; and
- A river/channel routing module.

Intensity Frequency Duration (*IFD*) data for the Salamander Shores site was obtained from *Australian Rainfall and Runoff*, *Institute of Engineers, 1987* and is shown in **Table 8-1** below.

**Table 8-1 – Adopted IFD values**

| Storm Event | Duration | Rainfall Intensity |
|---|---|---|
| 2 year ARI | 1 hour storm | 35.44 mm/hr |
| 2 year ARI | 12 hour storm | 7.08 mm/hr |
| 2 year ARI | 72 hour storm | 2.21 mm/hr |
| 50 year ARI | 1 hour storm | 70.01 mm/hr |
| 50 year ARI | 12 hour storm | 14.9 mm/hr |
| 50 year ARI | 72 hour storm | 4.56 mm/hr |

- Location skew (G) 0.02
- Geographical factor (F2) 4.32
- Geographical factor (F50) 16.04

Other input parameters adopted in the formation of the RAFTS model were as follows:

- Manning's 'n' was taken to be 0.02 for impervious areas and 0.035 for pervious areas;
- Initial and continuing losses for pervious areas were modelled as 30 mm and 5 mm/hr respectively; and

- Initial and continuing losses for impervious areas were modelled as 1 mm and 0 mm/hr respectively.

Two scenarios, as outlined below, were analysed to ascertain the hydrological impact of the proposed development to the nearby environment.

- Existing conditions; and
- Proposed conditions.

### 8.1.1 Existing Conditions

Two sub-catchments were identified within the Salamander Shores site under existing conditions. The major catchment falls to the west of the site and the other falls towards the east. The extents of the catchments were determined from supplied survey data. The areas included in each of the existing sub-catchments are shown in **Figure 3** and detailed in **Table 8-2**.

**Table 8-2 – Existing Catchment Details**

| Catchment | Area (ha) | Impervious (%) |
|---|---|---|
| **Sub-catchment West** | 0.919 | 73% |
| **Sub-catchment East** | 0.303 | 39% |
| **Total** | **1.222** | **65%** |

The estimated peak 5, 20, and 100 year ARI outflows from the Salamander Shores site are summarised in **Table 8-3**. The results below are reported to two decimal places for comparative purposes.

**Table 8-3 Estimated Peak Outflows under Existing Conditions**

| **West Catchment** | **Storm event** | | |
|---|---|---|---|
| **Storm Duration** | **5 year ARI** | **20 year ARI** | **100 year ARI** |
| 60 min | 0.25 $m^3/s$ | 0.34 $m^3/s$ | 0.49 $m^3/s$ |
| 90 min | 0.27 $m^3/s$ | 0.40 $m^3/s$ | 0.54 $m^3/s$ |
| 120 min | 0.25 $m^3/s$ | 0.34 $m^3/s$ | 0.49 $m^3/s$ |
| **East Catchment** | **Storm event** | | |
| **Storm Duration** | **5 year ARI** | **20 year ARI** | **100 year ARI** |
| 60 min | 0.04 $m^3/s$ | 0.08 $m^3/s$ | 0.15 $m^3/s$ |
| 90 min | 0.05 $m^3/s$ | 0.11 $m^3/s$ | 0.13 $m^3/s$ |
| 120 min | 0.05 $m^3/s$ | 0.10 $m^3/s$ | 0.15 $m^3/s$ |

### 8.1.2 Proposed Conditions

Two sub-catchments were identified within the Salamander Shores site under proposed conditions. The extents of the proposed catchments were determined from the proposed development layout, sections and elevations and were found to be very similar to existing conditions, with minimal changes to finished surface levels. The proposed catchments are defined in **Figure 4** and the data in **Table 8-4** was used to create a RAFTs model for the site.

**Table 8-4 -Proposed Catchment Details**

| Catchment | Area | Impervious (%) |
|---|---|---|
| **Sub-catchment West** | 0.936 | 56% |
| **Sub-catchment East** | 0.288 | 69% |
| **Total** | **1.222** | **59%** |

The catchment areas under the proposed development show a slight deviation in size from the existing site. This is largely due to minor changes in grades and drainage strategy, as a result of implementation of rainwater tanks within the development. Additional details regarding the rainwater tanks are discussed in **Section 8**.

The estimated peak 5, 20, and 100-year ARI outflows from the Salamander Shores site are summarised in **Table 8-5**. The results below are reported to two decimal places for comparative purposes.

**Table 8-5 Estimated Peak Outflows under Proposed Conditions**

| **West Catchment** | **Storm event** | | |
|---|---|---|---|
| **Storm Duration** | **5 year ARI** | **20 year ARI** | **100 year ARI** |
| 60 min | 0.19 $m^3/s$ | 0.27 $m^3/s$ | 0.40 $m^3/s$ |
| 90 min | 0.21 $m^3/s$ | 0.32 $m^3/s$ | 0.47 $m^3/s$ |
| 120 min | 0.20 $m^3/s$ | 0.27 $m^3/s$ | 0.40 $m^3/s$ |
| **East Catchment** | **Storm event** | | |
| **Storm Duration** | **5 year ARI** | **20 year ARI** | **100 year ARI** |
| 60 min | 0.07 $m^3/s$ | 0.10 $m^3/s$ | 0.14 $m^3/s$ |
| 90 min | 0.08 $m^3/s$ | 0.12 $m^3/s$ | 0.16 $m^3/s$ |
| 120 min | 0.07 $m^3/s$ | 0.10 $m^3/s$ | 0.14 $m^3/s$ |

## 8.2 Results

The results of the hydrologic assessment illustrate that the proposed development would generate similar peak flows to that generated at Salamander Shores under existing conditions. This is largely

credited to the minor changes to the catchments areas and grades. Minor increases in flows were observed up to the 20 year ARI storm event within the east catchment under proposed conditions (from 0.05 $m^3$/s to 0.08 $m^3$/s and 0.11 $m^3$/s to 0.12 $m^3$/s under 5 and 20 year ARI storm events respectively). This increase is believed to be insignificant and will have little to no impact on drainage or to downstream environments.

Overall, the peak flows from the total site, under proposed conditions, show a considerable decrease from those generated under existing conditions. This is mainly due to decreases in peak flows within the western catchment, resulting in the overall improvements across the site.

It is noted that the RAFTS modelling has not taken into account the proposed rainwater tanks. It is believed that an analysis into the detention capacities of the rainwater tanks in the hydrologic model would further assist in reducing peak flows. This would assist in achieving no impact on peak flows discharging from the site, particularly within the east catchment.

Further details in the proposed rainwater tanks are discussed in **Section 8**.

With minor improvements in peak flows from the proposed development, compared to those generated under existing conditions, there would be little impact on existing surrounding stormwater infrastructure, particularly within Soldiers Point Road where significant peak flow improvements have been found.

## 8.3 Stormwater Drainage

A Stormwater Concept Plan is illustrated in **Figure 7**.

Under proposed conditions it is envisaged that the redeveloped hotel would maintain both the west and east catchments, as no major changes have been proposed apart from grades within the site.

As per existing conditions, the west catchment will drain into Council's stormwater drainage line along Soldiers Point Road, while the east catchment would continue to discharge directly into Salamander Bay via the existing 525 mm stormwater drainage line located in the direction of the Jetty on the foreshore of hotel.

As discussed earlier in this section, the above arrangement is expected to reduce flows discharging to the Soldiers Point Road street drainage system by continuing to utilise the existing 525mm pipe draining directly to the bay.

# 9. INTERGRATED WATER CYCLE MANAGEMENT

As the proposal is for redevelopment of an existing hotel, the impacts on the surrounding water systems per Issue 5.1 in the DGRs are expected to be negligible. However, in accordance with the principles of Integrated Water Cycle Management and Water Sensitive Urban Design, rainwater tanks are proposed. The following sections demonstrate the positive impact of the proposal.

The proposed development includes the following water cycle management objectives:

- Reduction in potable water consumption through the use of water saving devices (i.e. dual flush toilets etc);
- Reduction in wastewater production;
- Utilisation of available rainwater;
- Minimisation of impacts on downstream receiving waters; and
- Safe conveyance of stormwater.

## 9.1 Water Resources

It is understood that potable water needs within the hotel are provided by the local water mains, while irrigation is currently provided by a groundwater bore. It is proposed to sustainably minimise reliance on mains water through the introduction of rainwater tanks.

### 9.1.1 Bore Water

The Salamander Shores Hotel currently provides irrigation to the gardens within the site as well as to the park along the foreshore for Council. Water for the irrigation is currently provided via an existing groundwater bore located at the north west corner of the development.

It is envisaged that the groundwater bore will remain as part of the redevelopment and be used for irrigation per existing conditions.

### 9.1.2 Rainwater

Rainwater tanks are proposed as part of the proposed redevelopment of the hotel. The rainwater tanks would source rainwater collected off the roof areas of each of the proposed hotel buildings. The collected rainwater would be reused for internal non-potable uses (i.e. toilet flushing) only, as existing groundwater bores will continue to be used for irrigation purposes (refer to **Section 9.1.1**). As the hotel outsources its laundry requirements, rainwater would not be used for this purpose.

For the small storms, the rainwater tanks have the potential to trap a significant portion of the runoff to either remove it or considerably slow down the runoff. In addition to the water re-use benefits evident with installation of a rainwater tank, there are also water quality benefits. Rainwater tanks contribute

to the retention of rainwater thus resulting in a reduction of the quantity of runoff from the development which in turn reduces the annual pollutant loads.

The possible locations of the proposed rainwater tanks are indicatively shown in the stormwater drainage plan on **Figure 7**. The configuration in **Figure 7** allows for individual tanks for each of the buildings, however it is noted that a single rainwater tank located centrally within the site could be configured, if preferred. Locating the tanks at each building would minimise energy associated with pumping, however would result in a more complicated pumping system with possibly greater capital costs.

A preliminary water balance investigation was undertaken to assess the effectiveness of the rainwater tank to provide non-potable water to the hotel. The water balance investigation was undertaken using daily rainfall data from the Salamander Bay rainfall station across a 17 year modelling period (1990 to 2007).

Daily demand and usages were generated from determining daily internal non-potable water use (toilet flushing for hotel/apartments) within the developed based on occupancy figures collected from management of the existing hotel. The daily demand for toilet flushing per person for single dwelling houses was extracted from water use studies undertaken by BASIX and the Australian Bureau of Statistics. Adopting demands for single dwellings in place for hotel apartment is believed to be a conservative approach, as internal water consumption of hotel would typically be lower. The daily demand for toilet flushing per person for hotels and apartments is approximately 19 litres per person per day. The demand also included an additional 5 litres per person per day to account for leakage.

The Salamander Shores Hotel has advised that the hotel has a room occupancy rate of approximately 50% for a majority of the year. This information is based on historical data collected from the hotel. Salamander Shores Hotel has also advised that each occupied room, on average, catered on average for 1.7 people.

Based on the information provided above average daily demand was found to be 3.2 kL/day. This is based on a total of 162 rooms proposed for the redevelopment.

The percentages of supply for the hotel for varying tank sizes are shown in **Table 9–2**.

**Table 9-1 – Percentage Supply of Internal Non-Potable Water for Varying Rainwater Tank Sizes**

| Tank Volume (kL) | Percentage Supplied of Internal Non-Potable Water (toilet flushing only) |
|---|---|
| **10** | 39% |
| **25** | 63% |
| **50** | 81% |
| **75** | 89% |
| **100** | 93% |

A cost-benefit analysis would need to be undertaken by the hotel operators during detailed design to assess the most cost effective volume of the rainwater tank. The optimal tank size would be in the range of 20 – 50 kL.

As discussed earlier, the rainwater tank volumes can be divided into separate tanks based on hotel/apartment rooms per building, or into a centrally located tank. A possible breakdown for individual rainwater tank for each building is shown in **Table 9–1**.

**Table 9-2 – Breakdown of Rainwater Tanks per Proposed Building**

| Building | Room Type | Rooms | Rainwater Tank Volume (kL) |
|---|---|---|---|
| A | Dual Key Serviced Apartments | 24 | 4 |
| B | Dual Key Serviced Apartments | 10 | 2 |
| D | Hotel Rooms | 24 | 4 |
| E | Hotel Rooms | 20 | 3 |
| F | Hotel Rooms | 20 | 3 |
| G | Hotel Rooms | 20 | 3 |
| H | Permanent Residential Apartments | 44 | 7 |
| **Total** | **-** | **162** | **26** |

Due to the seasonal occupancy of the hotel, the demand for water is highly variability. Therefore a preliminary sensitivity analysis was undertaken to assess the reliability of a 50 kL rainwater tank if the hotel was at 100% capacity. The assessment found the tank reliability would decrease from 81% to 55%.

## 9.2 Water Quality

### 9.2.1 Water Quality Treatment Targets

The NSW Department of Environment, Climate Change and Water (*DECCW formally DECC*) recommend reduction targets in annual runoff pollutant loads for developments of:

- 85% for total suspended solids (TSS);
- 60% for total phosphorous (TP); and
- 45% for total nitrogen (TN).

This guiding principle is generally adopted for new developments where significant changes to the landuse and impervious fraction are proposed, however since the proposed development is a redevelopment of an existing hotel, this assessment would concentrate on ensuring the proposed development does not have any adverse impact on existing pollutant volumes discharged from the site.

This target for zero impact or no adverse impact is echoed in Council's Stormwater Management Plan.

### 9.2.2 MUSIC Water Quality Model

MUSIC is a continual-run conceptual water quality assessment model developed by the Cooperative Research Centre for Catchment Hydrology (*CRCCH*). MUSIC can be used to estimate the long-term annual average stormwater volume generated by a catchment as well as the expected pollutant loads. MUSIC is able to conceptually simulate the performance of a group of stormwater treatment measures (*treatment train*) to assess whether a proposed water quality strategy is able to meet specified water quality objectives.

To undertake the water quality assessment component of the Stormwater Management Plan, a long-term MUSIC model was established for the proposed subdivision site. The model was used to estimate the annual pollutant load generated under existing state and developed conditions over a 5 year period of historically average rainfall.

MUSIC was chosen for this investigation because it has the following attributes:

- It can account for the temporal variation in storm rainfall throughout the year;
- Modelling steps can be as low as 6 minutes to allow accurate modelling of treatment devices;
- It can model a range of treatment devices;
- It can be used to estimate pollutant loads at any location within the catchment; and
- It is based on logical and accepted algorithms.

### 9.2.3 Input Data

#### RAINFALL

The nearest rainfall station to the site is located at Salamander Bay (Randall Drive – Station Number 061303), just over a kilometre south of the site. Daily rainfall data only was available for the Salamander Bay station and monthly average rainfalls were obtained from the Bureau of Meteorology for all available years. The mean annual rainfall at Hawks Nest was found to be of the order of 1273 mm.

In order to develop a model that could comprehensively assess the performance of water quality treatment, the use of pluviograph rainfall data (*captured at six minute intervals*) was considered necessary. The nearest station to the site with similar elevation for which pluvial data was available was the Williamtown station.

Six-minute pluviograph data was used for the five year period of rainfall data from 1/7/1959 to 31/6/1964 from the Williamtown station. The average rainfall for this period is 1,326 mm/yr, the dataset

contains the highest recorded rainfall over a five-year period for the Williamtown station. As such, this is the best available dataset to represent a 5-year period at Soldiers Point.

### EVAPORATION

Monthly areal potential evapotranspiration values were obtained for Port Stephens from the Bureau of Meteorology data and are shown in **Table 9-3**.

**Table 9-3 – Monthly Areal Potential Evapotranspiration**

| Month | Areal Potential Evapotranspiration (*mm*) |
|---|---|
| January | 185 |
| February | 140 |
| March | 140 |
| April | 95 |
| May | 65 |
| June | 50 |
| July | 50 |
| August | 68 |
| September | 95 |
| October | 140 |
| November | 155 |
| December | 175 |
| **Total** | **1,358** |

### SOIL PROPERTIES

Calibration of the runoff-rainfall parameters within the MUSIC model was completed to achieve an appropriate runoff co-efficient for the site. The MUSIC default and adopted rainfall run-off parameters along with the resulting run-off co-efficient are presented in **Table 9-4**. The Soil Storage Capacity and Field Capacity were changed to achieve a suitable volumetric runoff co-efficient of 0.30 for the site under natural undeveloped conditions. This is in the range of expected values based on available data for gauged catchments.

**Table 9-4 – Adopted MUSIC Soil Parameters**

| | Default Parameters | Adopted Parameters |
|---|---|---|
| ***Impervious Area Properties*** | | |
| Rainfall Threshold (mm/day) | 1 | 1 |
| | | |
| ***Pervious Area Properties*** | | |
| Soil Storage Capacity (mm) | 120 | 90 |
| Initial Storage (% of capacity) | 30 | 30 |
| Field Capacity (mm) | 80 | 50 |
| Infiltration Capacity Coefficient (a) | 200 | 200 |
| Infiltration Capacity Exponent (b) | 1 | 1 |
| | | |
| ***Groundwater Properties*** | | |
| Initial Depth (mm) | 10 | 10 |
| Daily Recharge Rate (%) | 25 | 25 |
| Daily Baseflow Rate (%) | 5 | 5 |
| Daily Deep Seepage Rate (%) | 0 | 0 |
| | | |
| ***Runoff Co-efficient*** | | |
| 100% Pervious | 0.25 | 0.34 |
| 65% Impervious | 0.67 | 0.70 |
| | | |

The adopted MUSIC soil parameters yielded a volumetric runoff coefficient ($C_v$) of 0.34 for the site.

## POLLUTANT CONCENTRATIONS

The event mean pollutant concentrations (*EMCs*) that were used in the modelling were derived from the Engineers Australia publication Australian Runoff Quality – A guide to Water Sensitive Urban Design (2006). The adopted pollutant concentrations are shown **Table 9-5**.

**Table 9-5 – Adopted Pollutant Concentrations**

| | Pollutant Concentration (mg/L) | | | | | |
|---|---|---|---|---|---|---|
| | Wet Weather Concentration (mg/L) | | | Dry Weather Concentration (mg/L) | | |
| | Suspended Solids | Total Phosphorous | Total Nitrogen | Suspended Solids | Total Phosphorous | Total Nitrogen |
| **Urban** | 180 | 0.35 | 2.8 | 16 | 0.14 | 1.3 |
| **Roofs** | 36 | 0.13 | 2.8 | - | - | 1.3 |
| **Roads/Car park** | 200 | 0.250 | 2.2 | - | - | - |

### 9.2.4 Existing Conditions

#### MODEL INPUTS

The primary objective is to achieve a no net increase in pollutant export relative to existing conditions. Therefore, the existing pollutant export from the site was estimated to establish the base case against which to measure the performance of the proposed development.

The existing catchment is defined in **Figure 3** and the data in **Table 9-6** was used to create a MUSIC model for the site.

**Diagram 9-1** shows the MUSIC model network that was used to represent existing conditions.

**Diagram 9-1 MUSIC Model Network (Existing Conditions)**

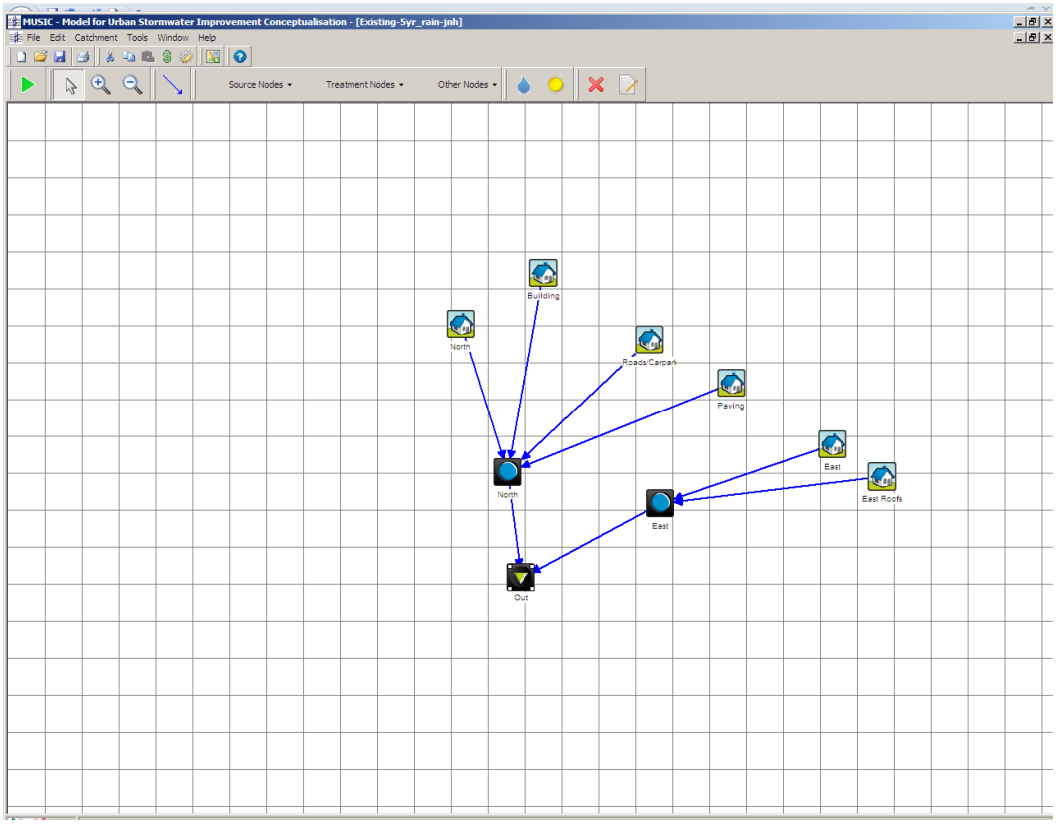



**Table 9-6 – Existing Catchment Data**

| Sub Catchment | Land Use | Area (*ha*) | Impervious (%) |
|---|---|---|---|
| **West Catchment** | | | |
| Car park/Roads | Roads | 0.449 | 100 |
| Roof area | Roofs | 0.154 | 100 |
| Paving/Pool | Urban | 0.058 | 100 |
| Open space | Urban | 0.258 | 5 |
| **East Catchment** | | | |
| Open Space | Urban | 0.195 | 5 |
| Roof area | Roofs | 0.108 | 100 |
| **Total** | | **1.222** | **65** |

### MODEL RESULTS

The calibrated MUSIC model was used to simulate pollutant export generated during the 5 year rainfall event, evaporation and using the typical pollutant concentrations contained in **Table 9-5**.

For the purposes of comparing the post-development case with the existing case, the estimated annual exports of pollutants generated by the site are shown in **Table 9-7**.

**Table 9-7 – Total Annual Pollutant Export Loads from Site – Existing State**

| Scenario | Pollutant Load (*kg/yr*) | | | |
|---|---|---|---|---|
| | Suspended Solids | Total Phosphorous | Total Nitrogen | Gross Pollutants |
| **Existing Site** | 1,950 | 2.92 | 29.1 | 265 |

Results from the MUSIC modelling show average volumetric flows from the existing site to be 11.9 ML/year, yielding a volumetric runoff coefficient ($C_v$) of 0.69. The high $C_v$ value is a result of the high percentage of impervious area within the site.

## 9.2.5 Post Development (*No Treatment*)

### MODEL INPUTS

The existing state model was modified to reflect the post development conditions. No treatment techniques were implemented in the re-developed (*no treatment*) model. The model was modified to reflect the impervious proportions of the catchment as defined in **Table 9-8** and illustrated in **Figure 4**.

**Table 9-8 – Re-developed Catchment Data**

| Sub Catchment | Land use | Area (ha) | Impervious (%) |
|---|---|---|---|
| **West Catchment** | | | |
| Car park/Roads | Roads | 0.058 | 100 |
| Roof Area | Roofs | 0.361 | 100 |
| Paving | Urban | 0.108 | 100 |
| Open Space | Urban | 0.409 | 5 |
| **East Catchment** | | | |
| Paving | Urban | 0.077 | 100 |
| Open Space | Urban | 0.120 | 25 |
| Roof Area | Roof | 0.091 | 100 |
| **Total** | | **1.222** | **59** |

### MODEL RESULTS

The estimated annual export of pollutants from the re-developed (*no treatment*) site are compared with existing conditions in **Table 9-9**.

**Table 9-9 – Annual Pollutant Export Loads – Re-developed State (No Treatment)**

| Scenario | Pollutant Load (*kg/yr*) | | | |
|---|---|---|---|---|
| | Suspended Solids | Total Phosphorous | Total Nitrogen | Gross Pollutants |
| **Existing Site** | 1,950 | 2.92 | 29.1 | 265 |
| **Redeveloped Site (no treatment)** | 1,220 | 2.65 | 30.7 | 250 |

By comparing the pollutants discharged from the proposed site without treatment measures, it is clear that the proposed development is generating lower volumes of pollutants, with the exception of total nitrogen, where there has been a slight increase. This minor increase is likely a result of an increase in open space area available within the proposed site.

The improvements across the redevelopment (without treatment) are due to the redistribution of roof, roads/car parking and open space areas and corresponding EMC associated with these land use areas.

Results from the MUSIC modelling show average volumetric runoff from the re-developed site (with no treatment) to be 10.8 ML/year, yielding $C_v$ of 0.67. The modelling demonstrates that the proposed development has decreased average volumetric flow from the site.

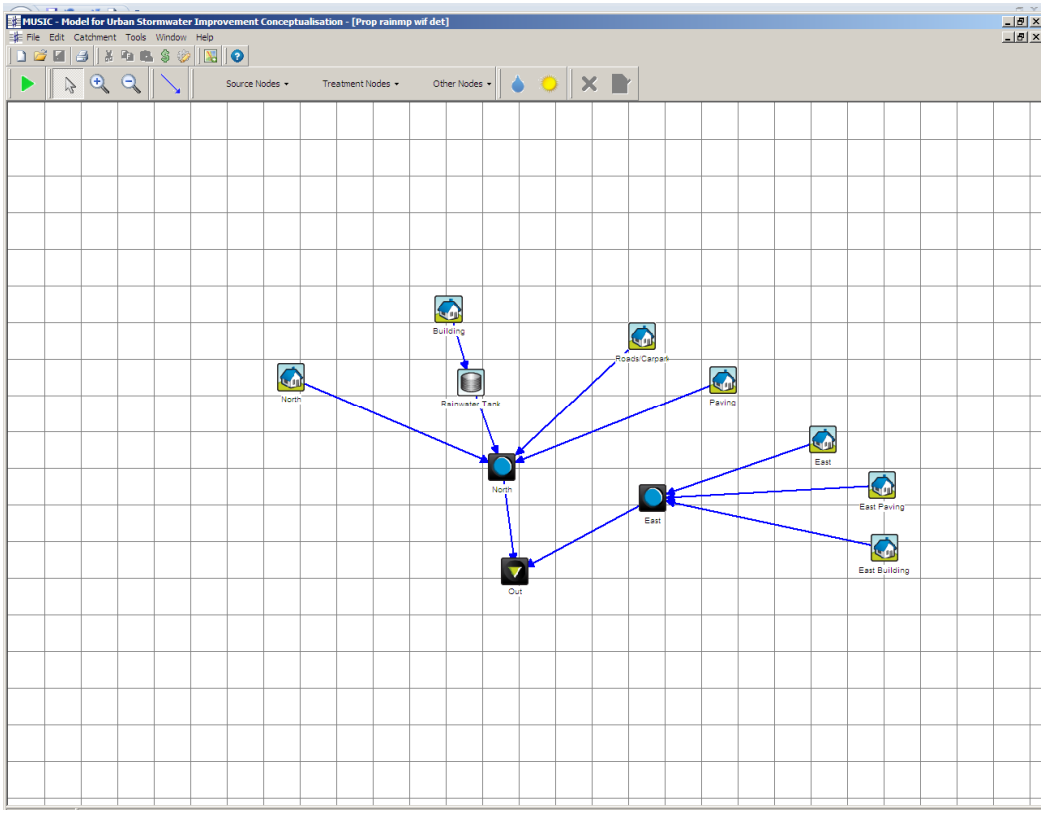
## 9.2.6 Post Development (*With Treatment*)

### MODEL INPUTS

The MUSIC model of the re-developed site (with treatment) takes into consideration of the use of the rainwater tank on site. Details of the rainwater tank are discussed further in **Sections 6.2**.

**Diagram 10-2** shows the MUSIC model network that was used to represent proposed conditions.

**Diagram 9-2 MUSIC Model Network (Proposed Conditions with treatment)**




## MODEL RESULTS

The estimated annual exports of pollutants from the re-developed (with treatment) site are compared with the existing and proposed (no treatment) conditions in **Table 9-10**.

**Table 9-10 – Annual Pollutant Export Loads – Re-developed State (With Treatment)**

| Scenario | Pollutant Load (*kg/yr*) | | | |
|---|---|---|---|---|
| | Suspended Solids | Total Phosphorous | Total Nitrogen | Gross Pollutants |
| **Existing Site** | 1,950 | 2.92 | 29.1 | 265 |
| **Redeveloped Site (no treatment)** | 1,220 | 2.65 | 30.7 | 250 |
| **Redeveloped Site (with treatment)** | 1,140 | 2.46 | 26.8 | 98.7 |

By comparing the volumes of pollutants discharged from the proposed site with treatment measures, it is clear that the proposed development with treatment generates even lower volumes of pollutant levels from the site than under existing conditions. Modelling results are discussed further in **Section 9.8**.

Results from the MUSIC modelling show average volumetric runoff from the re-developed site (with treatment) of 9.74 ML/year, yielding a $C_v$ of 0.60. The modelling demonstrates that the proposal has decreased average volumetric flow from the site.

The decrease in pollutant volumes is due to the slight decrease in impervious area across the site and the implementation of rainwater tanks.

### 9.2.7 Results and Conclusion

The results of the MUSIC modelling are summarised in **Table 9-11**.

**Table 9-11 – Summary of MUSIC Results**

| Scenario | Pollutant Load (*kg/yr*) | | | |
|---|---|---|---|---|
| | Suspended Solids | Total Phosphorous | Total Nitrogen | Gross Pollutants |
| **Existing** | 1,950 | 2.92 | 29.1 | 265 |
| **Developed State (no treatment)** | 1,220 | 2.65 | 30.7 | 250 |
| **Developed State (with treatment)** | 1,140 | 2.46 | 26.8 | 98.7 |
| **Percentage Reduction** | 42% | 16% | 8% | 63% |

As mentioned previously, the total volume of pollutants discharged from the site under re-developed conditions (with treatment) are below volumes generated under existing conditions. The MUSIC model suggests that the proposed development would improve water quality runoff and hence meets the water quality treatment targets discussed in **Section 9.1**.

This addressed to the Director General's Requirements Issue 5.1.

# 10. GROUNDWATER

## 10.1 Tomaree Groundwater Source

The site is located within the catchment area of the Tomaree groundwater system. The system is an important source of water for the region, so all water sharing within the Tomaree catchment must adhere to guidelines set by the Gazetted Water Sharing Plan for the Tomago Tomaree Stockton Groundwater Sources.

The plan describes the sharing arrangement for groundwater extraction for all users within the catchment. The hotel currently has a licence to extract water for irrigation of the hotel's gardens from a bore located within the north west corner of the site. This existing use will remain under proposed conditions for irrigation purposes, with no additional groundwater extraction bores. With no changes to the current groundwater use the proposed redevelopment would not be expected to affect groundwater water levels in the area.

This addresses Issue 5.2 raised by the Director General.

## 10.2 Local Groundwater

As discussed earlier, the site is sitting on a large rock mass of high strength rhyodacite, a form of volcanic rock. According to the Coffey Geotechnics, 2009 report, the groundwater behaviour in the rock mass is controlled by the defects within the rock mass which allow rainfall recharge from the overlying aeolian sandy soils to infiltrate to the water table which was found to be between 1 and 2.6 m below ground level (m bgl). The surface of the site is covered with aeolian soils to a maximum depth of 0.5 m followed by a layer of extremely weathered rhyodacite rock up to a maximum depth of approximately 0.8 m above fresh rhyodacite. The Coffey Geotechnics, 2009 report cited the probability of perched groundwater located at the contact between the relatively permeable aeolian sands and low permeability weathered rhyodacite after periods of heavy or prolonged rainfall. No groundwater quality data was recorded but is expected to be of low salinity.

Currently, the majority of the site surface is impervious, dominated by roof and sealed car park areas, which limits the amount of infiltration into the groundwater system. Under proposed conditions however, the pervious areas will increase (from 35% to 41%), which would marginally increase the amount of infiltration into the local groundwater system. This marginal increase is not a significant change to the existing situation.

As a result, it is assessed that the proposed redevelopment would have no adverse affect on groundwater levels or quality nor affect the Tomaree Groundwater source.

## 10.3 Local Groundwater Interception

### 10.3.1 Excavation

Perched and more seasonally permanent groundwater would potentially be intercepted by the basement car park. Due to the minor size of the development, in respect to the size of the groundwater catchment, it is assessed that the proposed development would not have an adverse impact on groundwater levels external to the site. Given the bulk hydraulic conductivity data for the rhyodacite fractured rock aquifer provided in the Coffey Geotechnics, 2009 report of approximately $1x10^{-3}$ m/d, it is assessed that inflows into any excavation are likely to be minor. If however, a significant fault zone were intersected during excavation, larger inflows may be experienced with possible associated slope instability. Faulting was not reported in the Coffey Geotechnical, 2009 report hence this risk is assessed to be of low probability. Groundwater inflow into an excavation either during its development or in the long term after completion is likely to be minimal and the area of influence restricted to within the site boundaries.

Any captured groundwater is proposed to be either pumped or drained back into the sewer network to minimise risk of contamination to downstream environments.

### 10.3.2 Groundwater dependent vegetation

There may be some groundwater dependence of more deeply rooted vegetation on the local water table occurring on the site and seasonal dependence of more shallow rooted vegetation on ephemeral perched groundwater located at the contact between the aeolian sand and the relatively low permeability weathered rhyodacite. The extent of this dependence has not been quantified but given the low bulk hydraulic conductivity and fracture density (opportunity for root penetration) of the rhyodacite it is likely to be restricted. In any event, groundwater dependence can be offset by irrigation from the licensed bore on the property which is the current situation.

This addresses Issue 5.3 raised by the Director General.

# 11. CONSTRUCTION PHASE WATER MANAGEMENT

In accordance with the best practice state government guideline "Managing Urban Stormwater – Soils and Construction" (*Landcom, 2004*), Erosion and Sediment Control Plans are required for sites of area less than 2,500 $m^2$ while Soil and Water Management Plans (SWMPs) are required for sites greater than 2,500$m^2$. The proposed development covers a total area of over 12,000 $m^2$, therefore a Soil and Water Management Plan would be required.

A concept Soil and Water Management Plan is illustrated in **Figure 6**.

Detailed SWMPs would be completed to accompany further applications for construction and other works.

The soil and water management plans would provide a control strategy for each sub catchment to ensure appropriate runoff quality. These controls would consist of filter fences, run off diversion mounds, a sediment basin and stabilised site access. The basin would be designed to trap all runoff for storms up to the design event. Runoff would not be released from the sediment basin until the quality becomes acceptable.

This addresses the Director General's requirements in Issue 5.1.

# 12. CONCLUSION

This report has been produced for Salamander Shores Hotel Pty Ltd in support of the redevelopment of the Salamander Shores Hotel, located at 147 Soldiers Point Road, Soldiers Point. Salamander Shores Hotel Pty Ltd, which is seeking concept plan approval from the Department of Planning, proposes to demolish the existing hotel and develop a new hotel resort to accommodate adventure and leisure tourist with conference, health, café, pub and recreational facilities.

Flooding at the site would not have any adverse effects on the proposed development. Peak 100 year ARI flood water levels taken from the Port Stephens Flood Study were found to have no impact on the development, as the entire site sits above RL 2.4 m AHD, the flood level at the subject site. Even taking into consideration the impacts of climate change, as per the NSW Sea Level Rise Policy Statement, (DECCW October 2009), It was found that the proposed development would still not be affected by flooding even in the event of a year 2100 sea water level rise of 0.9 m.

Coastal processes were too found to have no adverse effect on the proposed development. The subject property is situated on an elevated outcrop of high strength volcanic rock. Therefore, traditional coastline hazards such as erosion and recession would not have any impacts on the site.

Integrated Water Cycle Management (IWCM) principles have been adopted across the site to ensure no negative impact, in regards to stormwater runoff, water quality and quantity and wastewater. These principles include a reduction in potable water consumption, utilisation of rainwater, minimising impacts on downstream receiving waters and safe conveyance of stormwater.

The majority of these principles are achieved by minimising stormwater peak flows and volumes, encouraged by increasing the area of pervious space on the site. The objectives of IWCM are also met with the implementation of rainwater tanks. This is supported by hydrologic and water quality modelling of the site. A stormwater concept plan for the proposed redevelopment is illustrated in **Figure 7**.

The proposal is not believed to have any negative impact on groundwater water levels or supply of groundwater to the Tomaree Tomago Groundwater system. With a slight increase in pervious area within the site, stormwater infiltration into the groundwater system would marginally increase, however would not be considered significant. It is also noted that no additional groundwater extraction is proposed as part of the development. The likely interception of groundwater within the basement car park was discussed, however, it has been noted that due to the size and location of the site the proposed development is unlikely to adversely affect groundwater levels external to the site.

Finally, detailed Soil and Water Management Plans (SWMP's) for the site would be completed to accompany further applications for construction and other works. A preliminary SWMP is illustrated in **Figure 6**. The SWMPs for the development would be formulated in accordance with the Managing Urban Stormwater: Soil and Construction Guidelines.

Based on the masterplan, the proposed development is expected to have no adverse affect on receiving waterways and/or the environment in terms of water quantity and quality. Assessments have found no impact from coastal processes or detrimental effects on groundwater. As a result WorleyParsons believes the proposed development complies with the guiding policies and legislation, set and directed by the Department of Planning.

## 13. REFERENCES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# Figures


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| Issue | Date | Issue Description |
|---|---|---|
| 0 | 7/7/10 | Final Issue |

**Source:**

**File Identity:** 02132_FIG1_SiteSurvey.jpg

**Date Modified:** 27/5/2010

NORTH

**Salamander Shores Hotel, Salamander Shores**
**147 Soldiers Point**
**Site Survey of Existing Development**
**FIGURE 1**

SERVICED APARTMENTS
BUILDING A
5 LEVELS

10M BUSHFIRE APZ

POOL

PERMANENT APARTMENTS/
CARPARK
BUILDING H
5 LEVELS/
3 LEVELS UNDER

RL 20.00

SERVICED
APARTMENTS/
GYM / SPA / GAMES
BUILDING B
4 LEVELS

LOUNGE BAR
CONFERENCE
RESTAURANT / BOH
BUILDING C
3 LEVELS

HOTEL ROOMS
BUILDING D
3 LEVELS

HOTEL ROOMS
RECEPTION
BUILDING E
4 LEVELS

HOTEL ROOMS
BUILDING F
5 LEVELS

BUILDING G
5 LEVELS

RL 15.00

10M BUSHFIRE APZ

RL 10.00

SOLDIERS POINT ROAD

Location Plan

0 5 10 15 20 25m
A3 is 1:500

WorleyParsons
resources & energy

OneWay™
to zero harm

| Issue | Date | Issue Description |
|---|---|---|
| 0 | 7/7/10 | Final Issue |

Source:

File Identity: FIG2_ConceptPlan.jpg

Date Modified: 20/5/2010

NORTH

**Salamander Shores Hotel, Salamander Shores**
**147 Soldiers Point**
**Concept Plan**
**FIGURE 2**


WorleyParsons
resources & energy

OneWay™ to zero harm

| Issue | Date | Issue Description |
|---|---|---|
| 0 | 7/7/10 | Final Issue |

**Source:**

**File Identity:** 02132_FIG3_ExistSiteSubCatchment.jpg

**Date Modified:** 28/6/2010

NORTH

**Salamander Shores Hotel, Salamander Shores**
**147 Soldiers Point**
**Existing Site Sub-Catchment Plan**
**FIGURE 3**

East Catchment

West Catchment

10M BUSHFIRE APZ

SERVICED APARTMENTS
BUILDING A
5 LEVELS

POOL

PERMANENT APARTMENTS/ CARPARK
BUILDING H
5 LEVELS/
3 LEVELS UNDER

SERVICED APARTMENTS/ GYM / SPA / GAMES
BUILDING B
4 LEVELS

LOUNGE BAR CONFERENCE RESTAURANT / BOH
BUILDING C
3 LEVELS

HOTEL ROOMS
BUILDING D
3 LEVELS

HOTEL ROOMS RECEPTION
BUILDING E
4 LEVELS

HOTEL ROOMS
BUILDING F
LEVELS
BUILDING G
5 LEVELS

RL 20.00
RL 15.00
RL 10.00
10M BUSHFIRE APZ

SOLDIERS POINT ROAD

**LEGEND:**

Sub-catchment

Direction of overland flow

0 5 10 15 20 25m
A3 is 1:500

WorleyParsons
resources & energy

OneWay™ to zero harm

| Issue | Date | Issue Description |
|---|---|---|
| 0 | 7/7/10 | Final Issue |

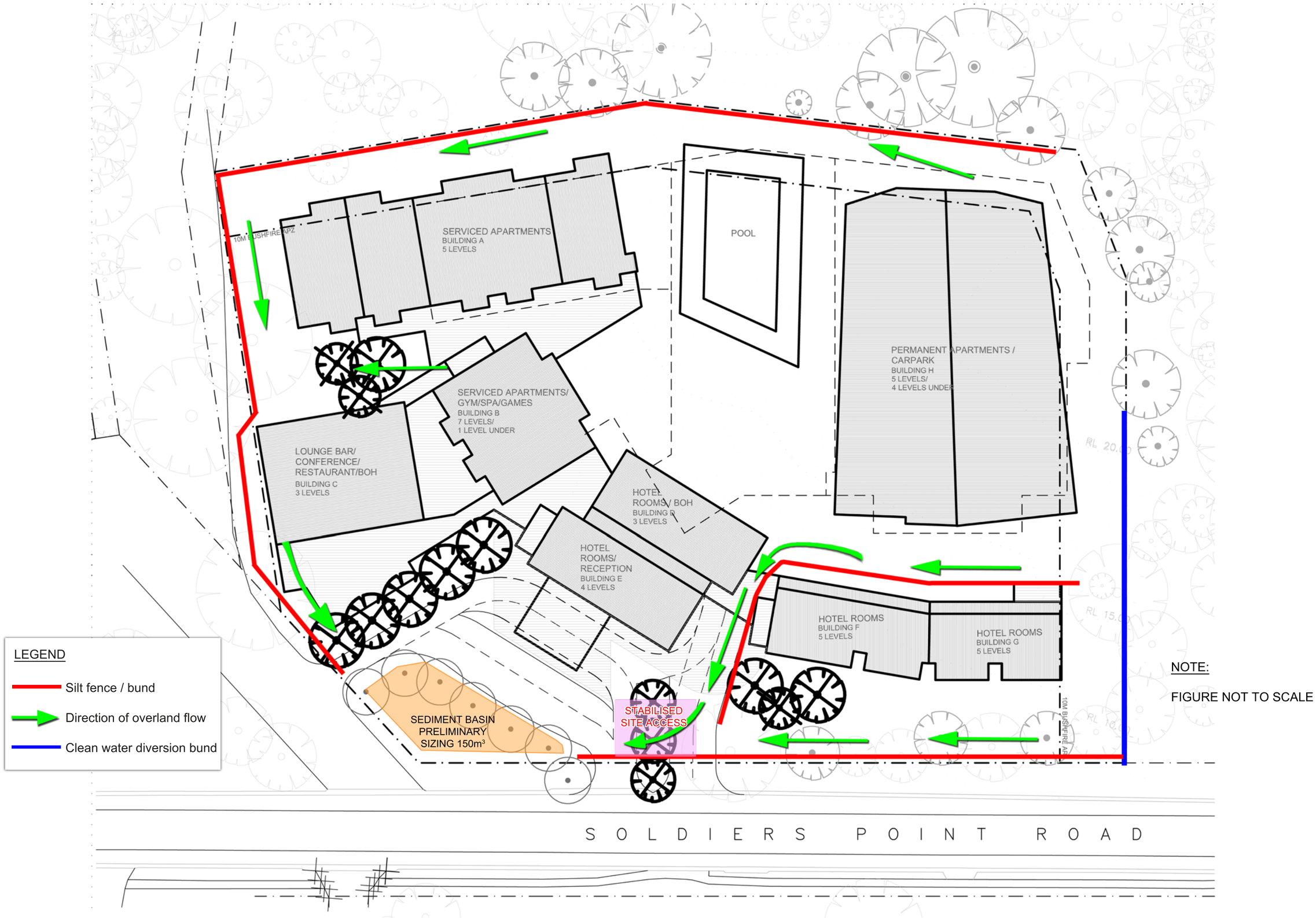
**Source:**

**File Identity:** 02132_FIG4_DevSiteSub_CatchmentPlan.jpg

**Date Modified:** 28/6/2010

NORTH

**Salamander Shores Hotel, Salamander Shores**
**147 Soldiers Point**
**Developed Site Sub-Catchment Plan**
**FIGURE 4**




LEGEND

- Silt fence / bund
- Direction of overland flow
- Clean water diversion bund

NOTE:

FIGURE NOT TO SCALE

WorleyParsons
resources & energy

OneWay™ to zero harm

| Issue | Date | Issue Description |
|---|---|---|

**Source:**

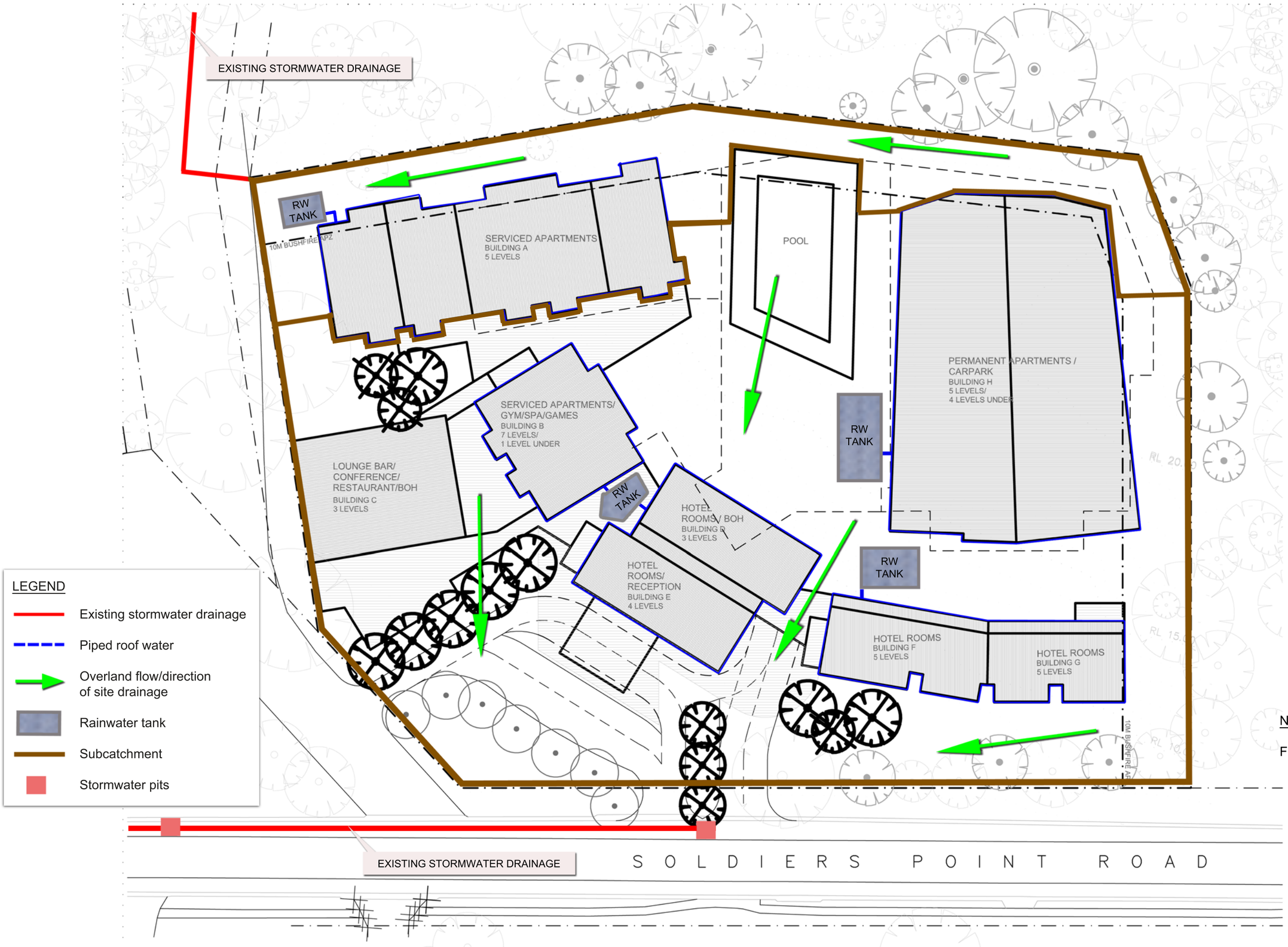
**File Identity:** 02132_FIG6_Soil&WaterMPlan.jpg

**Date Modified:** 8/07/2010

NORTH

**Salamander Shores Hotel**
**147 Soldiers Point Road, Soldiers Point**
**Soil and Water Management Plan**

**FIGURE 6**




LEGEND

- Existing stormwater drainage
- Piped roof water
- Overland flow/direction of site drainage
- Rainwater tank
- Subcatchment
- Stormwater pits

NOTE:

FIGURE NOT TO SCALE

WorleyParsons
resources & energy

OneWay™ to zero harm

| Issue | Date | Issue Description |
|---|---|---|

Source:

File Identity: 02132_FIG7_StormwaterCPlan.jpg

Date Modified: 8/07/2010

NORTH

**Salamander Shores Hotel**
**147 Soldiers Point Road, Soldiers Point**
**Stormwater Concept Plan**

**FIGURE 7**

# Appendix 1 - Director General's Requirements

NSW GOVERNMENT | Planning

Contact: Lisa Pemberton
Phone:(02) 9228 6294
Fax: (02) 9228 6540
Email: Lisa.Pemberton@planning.nsw.gov.au

Objective Ref:10/05264
MP: 06_0183

Sarah Kelly
SAKE Development
Suite 11, 340 Darling Street
BALMAIN NSW 2041

Dear Ms Kelly,

**RE: MP 06_0183 – 147 Soldiers Point Road, Soldiers Point – Proposed Mixed Use Development**

I write to provide you with feedback on your above mentioned project.

An initial scheme was presented in the Preliminary Environmental Assessment report. The Department had a number of concerns with the scheme, which were expressed in our letter of the 30 June 2006, which accompanied the Director General's Environmental Assessment Requirements (DGR's).

An amended scheme was presented at an on-site meeting held on the 3 September 2008. The amendments made included breaking down the mass of the buildings and a review of the heights. The outcomes of this meeting included:

- Further site analysis to occur to inform the urban design of the development. This would also generate site specific development controls for the site to inform the future Concept Plan;
- The maximum height of the buildings should be consistent with that of the height to the trees in the foreshore reserve;
- That the design of the development should activate both street frontages and retail space should be kept to a minimum, as occupancy rates are low in other retail areas in the vicinity of the site;
- That landscaping should be provided to soften the appearance of the development from the street, the depth this may vary between 15- 25m; and,
- Design to also include basement car parking to be provided, and asset protection zones.

A further amended scheme was presented at a meeting held on 8 February 2010. The amendments made included the relocation of the entrance to the northwest corner, with the introduction of a porte-cochere and landscaping to this corner. It is noted that in this latest scheme the FSR has been reduced to 1.6:1 and the total floor area by 5000m$^2$ and 24 apartments, again responding to concerns regarding bulk and scale.

The design of the project has evolved positively in response to feedback from the Department and Council. You are encouraged to continue refining your design with these issues in mind.

At the meeting of 8 February 2010, you sought clarification on several aspects of the DGRs, including BASIX requirements, SEPP 65, expiration dates, climate change/ sea level rise and the extent of consultation with agencies and community groups. Our advice on these matters is as follows:

- BASIX
  The Environmental Assessment should address how the scheme will facilitate future applications being able to comply with BASIX requirements.

- SEPP 65
  The Environmental Assessment should include an assessment against *SEPP 65 – Design Quality of Residential Flat Development.* The assessment should demonstrate that future developments will be able to achieve design quality in accordance with the design quality principles and have regard to the publication *Residential Flat Design Code* (a publication of the Department of Planning, September 2002).

- Expiration of DGR's and Climate Change/ Sea Level rise
  Pursuant to Section 75F(3) of the *Environmental Planning and Assessment Act 1979,* you are required to undertake an assessment of address climate change/ sea level rise in your Environmental Assessment. This assessment should also address the *Draft NSW Coastal Planning Guideline: Adapting to Sea Level Rise*. A copy of which can be found on the Department's website – www.planning.nsw.gov.au.

  As a result of this additional requirement, the DGR's have been reissued to reflect the above; they will now expire two years from the new issue date. A copy of the amended DGR's are attached

- Consultation
  The DGR's issued on 30 June 2008, contains a list of groups/ agencies to consult. It is understood that you are seeking clarification on whether you need to consult with all those listed. The consultation list has been updated in the amended DGR's (attached).

  Please be advised that you should consult with all groups on the list. With respect to the RTA, you should consult only provided if:
  - the development is NOT subject to the SEPP (Infrastructure) 2007, and
  - Soldiers Point Road is not classified as an RTA road.

If you wish to discuss this letter, please contact Lisa Pemberton using the details provided above.

Yours Sincerely

16/03/10

Alan Bright
**A/Director**
**Regional Projects**
(as delegate for the Director - General)

Cc: Amanda Gale, Port Stephens Council

# Attachment 1
# Director-General's Environmental Assessment Requirements

## Section 75F of the *Environmental Planning and Assessment Act 1979*

| **Application number** |
|---|
| MP06_0183 |
| **Project** |
| **Concept Plan Application**: A concept plan approval is sought for the entire "Salamander Shores" redevelopment comprising a new hotel, commercial, residential flat buildings and associated parking. The application will involve approval of the following conceptual key design parameters: land use, indicative building envelopes and footprints, Floor Space Ratio, vehicular access and parking.<br><br>**Project Application:** A part project application is sought for the demolition of the existing buildings on site |
| **Location** |
| 147 Soldiers Point Road, Soldiers Point (Lot 31 DP529002) |
| **Proponent** |
| Salamander Shores Hotel P/L |
| **Date issued** |
| 16 March 2010 |
| **Expiry date** |
| 2 years from date of issue |
| **General requirements** |

The Environmental Assessment (EA) must include:

**Part A: Concept Plan Application**

1. An executive summary;
2. An outline of the scope of the project including:
   - any development options;
   - justification for the project taking into consideration any environmental impacts of the project, the suitability of the site and whether the project is in the public interest;
   - outline of the staged implementation of the project if applicable;
3. A thorough site analysis including constraints mapping and description of the existing environment;
4. Consideration of any relevant statutory and non-statutory provisions and identification of any non-compliances with such provisions, in particular relevant provisions arising from environmental planning instruments, Regional Strategies (including draft Regional Strategies) and Development Control Plans.
5. Consideration of the consistency of the project with the objects of the *Environmental Planning and Assessment Act 1979*.
6. Consideration of impacts, if any, on matters of National Environmental Significance under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*;
7. An assessment of the potential impacts of the project and a draft Statement of Commitments, outlining environmental management, mitigation and monitoring measures to be implemented to minimise any potential impacts of the project;

8. The plans and documents outlined in **Attachment 2**;
9. A signed statement from the author of the Environmental Assessment certifying that the information contained in the report is neither false nor misleading;
10. A Quantity Surveyor's Certificate of Cost to verify the capital investment value of the project; and
11. An assessment of the key issues specified below and a table outlining how these key issues have been addressed.

**Part B: Project Application**

1. The matters listed above in Part A; and
2. A detailed description, including plan details of the project component

**Key Issues: Part A for the Concept Plan**

The EA must address the following key issues:

**1. Strategic Planning**

1.1 Justify the proposal with reference to relevant local, regional and State planning strategies. Provide justification for any inconsistencies with these planning strategies, including justification of any non compliance with the LEP and any relevant DCP's.

**2. Urban Design, Visual Impact and Sustainability**

2.1 Address the design quality with specific consideration of the façade, massing, setbacks, proportions to openings, building articulation, and amenity. In particular, address impacts on the amenity of the foreshore, overshadowing of public reserves, loss of views from public places, cumulative impacts, amenity impacts for adjoining and surrounding development.

2.2 Address impacts in relation to privacy, views and overshadowing and relevant mitigation measures, including overshadowing of adjoining and surrounding development and of adjacent open space/coastal reserve.

2.3 Use visual aids such as scale model and photomontage to demonstrate visual impacts. Amelioration of visual impacts through design, use of appropriate colours and building materials, landscaping and buffer areas must be addressed.

2.4 Demonstrate the suitability of the proposal with the surrounding area in relation to bulk, scale, amenity (including noise) and visual amenity having regard to the *Coastal Design Guidelines of NSW* (2003) and the *NSW Coastal Policy 1997*.

2.5 Demonstrate in concept, compliance with SEPP 65 and BASIX.

2.6 An indicative external materials and finishes schedule is to be submitted.

**3. Traffic and Access**

3.1 Prepare a traffic impact study in accordance with Table 2.1 of the RTA's Guide to Traffic Generating Developments which addresses, but is not limited to the following matters:

- The capacity of the road network to safely and efficiently cater for the additional traffic generated;
- Access to and within the site;
- Servicing and parking arrangements;
- Intersection site distances;
- Connectivity to existing developments;
- Impact on public transport (including school bus routes);
- Provision of access for pedestrians and cyclists to, through and within the site; and
- Identify suitable mitigation measures, if required to ensure the efficient functioning of the road network.

3.2 Protect existing public access to and along the beach and coastal foreshore and provide, where appropriate, new opportunities for controlled public access. Consider access for the disabled, where appropriate.

| | |
|---|---|
| **4. Hazard Management and Mitigation** | |
| *Coastal Processes* | |
| 4.1 | Address coastal hazards and the provisions of the Coastline Management Manual. In particular consider impacts associated with wave and wind action, coastal erosion, sea level rise and more frequent and intense storms. |
| *Contamination* | |
| 4.2 | Identify any contamination on site and appropriate mitigation measures in accordance with the provisions of SEPP 55 – Remediation of Land. |
| *Acid Sulfate Soils* | |
| 4.3 | Identify the presence and extent of acid sulfate soils on the site and, where relevant, appropriate mitigation measures. Identify the need for an Acid Sulfate Management Plan (prepared in accordance with ASSMAC Guidelines). |
| *Bushfire* | |
| 4.4 | Address the requirements of Planning for Bush Fire Protection 2006 (RFS). |
| *Geotechnical* | |
| 4.5 | Provide an assessment of any geotechnical limitations that may occur on the site and if necessary, appropriate design considerations that address these limitations. |
| *Flooding* | |
| 4.6 | Provide an assessment of any flood risk on site in consideration of any relevant provisions of the NSW Floodplain Development Manual (2005) including the potential effects of sea level rise and an increase in rainfall intensity. |
| 4.7 | Consider the potential impacts of any filling on the flood regime of the site and adjacent lands. |
| 4.8 | A risk management assessment of climate change impacts to the year 2100, is to be undertaken using the latest available information from the International Panel on Climate change (IPCC), Department of Environment and Climate Change (DECC) and the CSIRO. This should include sensitivity analyses for low level, mid range and high level ocean impacts as set out in relevant DECC Guideline (*Floodplain Risk Management Guideline: Practical Consideration of Climate Change*, 2007), and the Draft NSW Coastal Planning Guideline: Adapting to Sea Level Rise (DOP 2009) |
| **5. Water Cycle Management** | |
| 5.1 | Address and outline measures for Integrated Water Cycle Management (including stormwater) based on Water Sensitive Urban Design principles which addresses impacts on the surrounding environment, drainage and water quality controls for the catchment, and erosion and sedimentation controls at construction and operational stages. |
| 5.2 | Assess the impacts of the proposal on surface and groundwater hydrology and quality during both construction and occupation of the site; including consistency with the rules of the Gazetted Water Sharing Plan for the Tomago Tomaree Stockton Groundwater Sources, where relevant. |
| 5.3 | Provide details of works likely to intercept, infiltrate or connect with the groundwater sources; details of any proposed groundwater extraction, details on prevention of groundwater pollution, and on protective measures for any groundwater dependent ecosystems. |
| **6. Heritage and Archaeology** | |
| 6.1 | Identify whether the site has significance to Aboriginal cultural heritage and identify appropriate measures to preserve any significance. The assessment must address the information and consultation requirements of the draft *Guidelines for Aboriginal Cultural Heritage Assessment and Community Consultation* (DEC 2005) and *Interim Community Consultation Requirements for Applicants* (DEC 2004) |
| 6.2 | Identify any items of European heritage significance and, where relevant, provide measures for |

| | |
|---|---|
| | the conservation of such items. |
| **7. Flora and Fauna** | |
| 7.1 | Assess the potential direct and indirect impacts of the development on flora and fauna taking into consideration impacts on any threatened species, populations, ecological communities and/or critical habitat and any relevant recovery plan in accordance with DECC's *Guidelines for Threatened Species Assessment* (2005) Describe the actions that will be taken to avoid or mitigate impacts or compensate unavoidable impacts, where relevant. |
| 7.2 | Outline measures for the conservation of existing wildlife corridor values and/or connective importance of any vegetation on the subject land. |
| 7.3 | Address measures to protect and manage the riparian corridor and adjacent aquatic habitats. |
| 7.4 | Assessment of flora and fauna should be done in accordance with the *Draft Guideline for assessment of impacts on Threatened Species under Part 3A (Department of Planning 2005)* |
| **8. Noise** | |
| 8.1 | Address potential noise impacts, in particular road traffic noise, for future residents and appropriate mitigation measures. |
| **Key Issues: Part B for the Project Application** | |
| The EA must address the following key issues: | |
| **9. Demolition** | |
| 9.1 A demolition & waste management plan should be prepared, which addresses demolition and construction wastes that may be generated including likely quantities, proposed disposal destinations and best practices for safe handling and disposal in accordance with WorkCover's Occupational Health and Safety requirements must be provided; | |
| **10. Compliance with requirements for the Concept Plan** | |
| 10.1 The EA must demonstrate consistency with all DGRs detailed in *Key Issues: Part A Concept Plan* | |
| **Consultation** | |
| You should undertake an appropriate and justified level of consultation with the following agencies during the preparation of the environmental assessment:<br>(a) *Agencies or other authorities:*<br>• Port Stephens Council;<br>• Department of Environment and Climate Change;<br>• Department of Primary Industries;<br>• Department of Defence;<br>• NSW Rural Fire Service;<br>• Department of Water and Energy;<br>• Roads and Traffic Authority;<br>• Department of Lands;<br>• NSW Police Service;<br>• Port Stephens – Great Lakes Marine Park Authority;<br>• The relevant Local Aboriginal Land Council/s and other Aboriginal community groups; and<br>(b) *Public:*<br>Document all community consultation undertaken to date or discuss the proposed strategy for undertaking community consultation. This should include any contingencies for addressing any issues arising from the community consultation and an effective communications strategy.<br><br>The consultation process and the issues raised should be described in the Environmental Assessment. | |
| **Deemed Refusal Period** | |
| 60 days | |

# Attachment 2
# Plans and Documents to accompany the Application

| | |
|---|---|
| *Plans and Documents of the development* | The following plans, architectural drawings and diagrams of your proposal as well as the relevant documents will be required to be submitted for your **Concept Plan** application:<br><br>1. The **existing site survey plan** is to be drawn to 1:500 scale (or other appropriate scale) and show:<br>• the location of the land, the measurements of the boundaries of the land, the size of the land and north point;<br>• the existing levels of the land in relation to buildings and roads;<br>• location and height of existing structures on the site; and<br>• location and height of adjacent buildings and private open space.<br><br>2. An **aerial photograph** of the subject site with the site boundary superimposed.<br><br>3. A **Site Analysis Plan** must be provided which identifies existing natural elements of the site (including all hazards and constraints), existing vegetation, property dimensions, footpath crossing levels and alignments, existing pedestrian and vehicular access points and other facilities, slope and topography, natural features such as watercourses, rock outcrops, utility services, boundaries, orientation, view corridors and all structures on neighbouring properties where relevant to the application (including windows, driveways etc.).<br><br>4. A **locality/context plan** drawn to 1:500 scale (or other appropriate scale) should be submitted indicating:<br>• significant local features such as parks, community facilities and open space, water courses and heritage items;<br>• the location and uses of existing buildings, shopping and employment areas;<br>• traffic and road patterns, pedestrian routes and public transport nodes; and<br>• The existing site plan and locality plan should be supported by a written explanation of the local and site constraints and opportunities revealed through the above documentation.<br><br>5. **Subdivision plans,** if relevant, are to show the following:-<br>• The location, boundary dimensions, site area and north point of the land, and names of roads fronting the land;<br>• Title showing the description of the land with lot and DP numbers etc;<br>• Existing and proposed subdivision pattern including all measurements and sites areas of existing and proposed allotments;<br>• Location and details of all proposed roads and footpaths;<br>• Location of all structures proposed and retained on site;<br>• Cross sections of roads, including gradients, widths, road names, footpaths etc.<br>• Existing and proposed finished levels in relation to roads, footpaths and structures;<br>• Location and details of access points to the subdivision;<br>• Existing vegetation on the land and vegetation to be retained;<br>• Location of services and infrastructure, and proposed methods of draining the land; |

- Any easements, covenants or other restrictions either existing or proposed on the site;
- Type of subdivision proposed (Torrens, strata and/or community title).

6. The **Architectural drawings** are to be drawn to scale and illustrate the following general features, where relevant:
   - the location of any existing building envelopes or structures on the land;
   - the floor plans;
   - the location of lifts, stairs and corridors;
   - adaptable housing requirements;
   - section plans;
   - fenestrations, balconies and other features;
   - communal facilities and servicing points;
   - the height of the proposed development in relation to the land;
   - significant level changes;
   - parking and vehicular access arrangements; and
   - pedestrian access to, through and within the site.

7. **Elevations** – of the proposed buildings drawn to the same scale as the architectural drawings. The elevations are to indicate height and key datum lines, building length and articulation, the composition of the façade and roof design, existing buildings on the site, building entries (pedestrian, vehicular and service), and profile of buildings on adjacent properties.

8. **Stormwater Concept Plan** - illustrating the concept for stormwater management from the site and must include details of any major overland flow paths through the site and any discharge points to the street drainage system. Where an on-site detention system is required, the type and location must be shown and must be integrated with the proposed landscape design. Site discharge calculations should be provided;

9. **Erosion and Sediment Control Plan** – plan or drawing that shows the nature and location of all erosion and sedimentation control measures to be utilised on the site;

10. **Landscape Concept Plan** – plan or drawing that shows the basic detail of planting design and plant species to be used, listing botanical and common names, mature height and spread, number of plants to be utilised and surface treatments (i.e. pavers, lawn etc);

11. **BASIX** – compliance details and relevant certificates;

12. **View analysis** – artist's impression, photomontages, etc of the proposed development in the context of the surrounding development; and

13. **Shadow Diagrams** – diagrams showing solar access to the site and adjacent properties, including the public reserve, at summer solstice (Dec 21), winter solstice (Jun 21) and the equinox (Mar 21 and Sept 21) at 9am, 12 midday, 3pm and 6.30pm.

The following plans, architectural drawings and diagrams of your proposal as well as the relevant documents will be required to be submitted for your **Project Application**:

1. The **existing site survey plan** is to be drawn to 1:500 scale (or other

| | |
|---|---|
| | appropriate scale) and show:<br>• the location of the land, the measurements of the boundaries of the land, the size of the land and north point;<br>• the existing levels of the land in relation to buildings and roads;<br>• location and height of existing structures on the site; and<br>• location and height of adjacent buildings and private open space.<br><br>2. **A plan of demolition identifying**:<br>• the location of the land, the measurements of the boundaries of the land, the size of the land and north point;<br>• the existing levels of the land in relation to buildings and roads; and<br>• all structures to be demolished.<br><br>3. **Erosion and Sediment Control Plan** – plan or drawing that shows the nature and location of all erosion and sedimentation control measures to be utilised on the site. |
| *Specialist advice* | Specialist advice, where required to support your Environmental Assessment, must be prepared by suitably qualified and practising consultants in relation to issues including, but not limited to, the following:<br><br>• Planning<br>• Flora and Fauna;<br>• Bushfire;<br>• Landscaping;<br>• Geotechnical and/or hydro geological (groundwater);<br>• Stormwater/drainage;<br>• Urban Design/Architectural;<br>• Contamination in accordance with the requirements of SEPP 55; and<br>• Acid Sulphate Soil Management Plan. |
| *Documents to be submitted* | • Consult with the Department of Planning for the number of hard copies of the Environmental Assessment, architectural and landscape plans to scale (including one (1) set at A3 size (to scale)), copies copy of the Environmental Assessment and plans on CD-ROM (PDF format), not exceeding 5Mb in size (see below) ; and<br>• If the Environmental Assessment is bulky and lengthy in volume, you will be required to package up each Environmental Assessment ready for distribution by the Department to key agencies. |
| **Electronic Documents** | Electronic documents presented to the Department for publication via the Internet must satisfy the following criteria:-<br><br>▪ All files should be approximately 5 Mb.<br>• Large files of more than 5 Mb will need to be broken down and supplied as different files. can publish them in the correct order. |

# Attachment 3
# State Government technical and policy guidelines

The following list provides relevant technical and Policy Guidelines which may assist in the preparation of the Environmental Assessment. It should be noted, however, that this list is not exhaustive as other documents and policies may need to be reviewed. It is also important to note that not of all of these guidelines may be relevant to your proposal.

The majority of these documents can be found on the relevant Departmental Websites, on the NSW Government's on-line bookshop at http://www.bookshop.nsw.gov.au or on the Commonwealth Government's publications website at http://www.publications.gov.au.

| Aspect | Policy /Methodology |
|---|---|
| **Biodiversity** | |
| | Draft Guidelines for Threatened Species Assessment (DEC & DPI, 2005) |
| | Threatened Species Assessment Guidelines: The Assessment of significance - DECC 2007 |
| | Guidelines for Development Adjoining DECC Land (DECC, 2008) |
| | Guidelines for Development Adjoining DECC Land (DECC, 2008) |
| | Why do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings (NSW Fisheries, 2003) |
| | Policy and Guidelines: Aquatic Habitat Management and Fish Conservation (NSW Fisheries, 1999) |
| | Threatened Species Management Manual (NPWS, 1998) |
| **Coastal Planning** | |
| | NSW Coastal Policy 1997 - A sustainable Future for the New South Wales Coast, NSW Government, 1997 |
| | Coastal Design Guidelines for NSW, PlanningNSW, February 2003 |
| | NSW Wetlands Management Policy (DLWC, March 1996) |
| | Coastline Management Manual (NSW Government 1990) |
| | Practical Consideration of Climate Change – Floodplain Risk Management Guideline (DECC, October 2007) |
| | Draft Coastal Risk Management Guide: Incorporating sea level rise benchmarks in flood risk assessments (DECCW, 2009) |
| | Draft Coastal Risk Management Guide: Incorporating the sea level rise benchmarks in coastal hazard assessments (DECCW, 2009) |
| | Draft NSW Coastal Planning Guideline: Adapting To Sea Level Rise (DoP, 2009) |
| **Community Consultation** | |
| | Guidelines For Major Project Community Consultation, (NSW Department of Planning, 2007) |
| **Bushfire** | |
| | Planning for Bushfire Protection 2006 (NSW Rural Fire Service) |
| **Contamination and Soils** | |
| | Managing Land Contamination: Planning Guidelines SEPP 55 – Remediation of Land (DUAP & EPA, 1998) |
| | Best Practice in Contaminated Sites (Commonwealth DEH, 1999, ISBN 0 642 546460) |

| Aspect | Policy /Methodology |
|---|---|
| | Contaminated Sites: Sampling Design Guidelines (EPA, 1999) |
| | NSW Acid Sulfate Soil Management Advisory Committee - Acid Sulfate Soil Manual (ASSMAC,1998). |
| | National Environment Protection (Assessment of Site Contamination) Measure (NEPC 1999) |
| **Environmental Management Systems** | |
| | NSW Government Interim Water Quality and River Flow Environmental Objectives (DEC) |
| | Guidelines for the preparation of Environmental Management Plans (DIPNR, 2004) |
| **Heritage** | |
| **Aboriginal** | Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation (DEC, 2005) |
| | Interim Community Consultation Requirements for Applicants (DEC, 2004) |
| **Non-Indigenous** | Assessing Heritage Significance Update for Heritage Manual, NSW Heritage Office, 2000 |
| | Statements of Heritage Impact, NSW Heritage Office 2002 |
| | NSW Heritage Manual, NSW Heritage Office 1996 |
| **Noise** | |
| | Environmental Criteria for Road Traffic Noise (EPA, 1999) |
| | Acoustics - Road traffic noise intrusion - Building siting and construction (Standards Australia, 1989, AS 3671-1989) |
| | Interim Construction Noise Guideline (DECC, 2009) |
| **Safety and Hazards** | |
| | Electrical Safety Guidelines (Integral Energy) |
| | Crime prevention and assessment of development applications 2001 |
| **Traffic & Transport** | |
| | Guide to Traffic Engineering and Guide to Geometric Design of Rural Roads (Austroads, 2003, AP-G1/03) |
| | Guide to Traffic Generating Developments (RTA, 2002) |
| **Urban Design: Cycleway/Pathway Design** | |
| | Guidelines for the Design and Construction of Paths and Cycleways along Watercourses and Riparian Areas (Version 2) (DIPNR/DNR) |
| **Vibration** | |
| | Assessing Vibration: A Technical Guideline (DEC, 2006) |
| **Water** | |
| **Water Quality** | Water quality guidelines for the protection of aquatic ecosystems for upland rivers. (ANZECC, 2000) |
| | Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC 2000) |
| **Effluent Reuse** | Environmental Guidelines for the Utilisation of Treated Effluent by Irrigation (NSW DEC 2004) |
| **Floodplain** | NSW Government Floodplain Development Manual - the Management of Flood Liable Land (DIPNR, 2005) |
| | Practical Consideration of Climate Change – Floodplain Risk Management Guideline (DECC, October 2007) |

| Aspect | Policy /Methodology |
|---|---|
| **Groundwater** | NSW State Groundwater Quality Protection Policy (DLWC, 1998, 0 7313 0379 2) |
| | NSW State Groundwater Quality Protection Policy (DLWC 1998) |
| | NSW Groundwater Dependent Ecosystem Policy (DLWC 2000) |
| **Stormwater** | Managing Urban Stormwater: Soils & Construction – Volume 1 (NSW Landcom, March 2004) - "The Blue Book" |
| | Managing Urban Stormwater: Soils & Construction – Volume 2 (DECC, January 2008) |
| | Managing Urban Stormwater: Harvesting and Reuse (DEC, May 2006) |
| | Constructed Wetlands Manual (NSW DLWC 1998) |
| **Waterways** | Waterways Crossing Design & Construction (Version 4 – DIPNR/DNR Draft Guidelines) |
| **Wetlands** | NSW Wetlands Management Policy (DLWC 2000) |

# Appendix 2 - Correspondence

## Koudounis, Daisy (Sydney)

**From:** Paul Wood [Paul.Wood@portstephens.nsw.gov.au]
**Sent:** Wednesday, 10 March 2010 11:32 AM
**To:** Hoang, James (Sydney)
**Subject:** RE: Salamander Shores
**Attachments:** rbdyr0rvmn2fni2wwnb20s45_1.pdf

James,
This is the drainage plan for the area you are asking for also pasted pit and pipe data along Soldiers Point rd,
The blue data is the pipes and pits along Soldiers pt rd pipe sizes are 375 and 450mm no invert levels available on this system

Regards
*Paul Wood*
Civil Assets Rater
Port Stephens Council
PH: 02 4980 0132
Mob PH: 0427 437150
email: paul.wood@portstephens.nsw.gov.au

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 17606 | 20spbas001 | 20 | Soldiers Point | 20sp | 20SPBAS001 | SOLDIERS POINT ROAD SOLDIERS POINT | HOUSING & COM AMENITIES | URBAN STORMWATER DRAINAGE | | | | | | |
| 17610 | 20spbas002 | 20 | Soldiers Point | 20sp | 20SPBAS002 | SOLDIERS POINT ROAD SOLDIERS POINT | HOUSING & COM AMENITIES | URBAN STORMWATER DRAINAGE | | | | | | |
| 17613 | 20spbas003 | 20 | Soldiers Point | 20sp | 20SPBAS003 | SOLDIERS POINT ROAD SOLDIERS POINT | HOUSING & COM AMENITIES | URBAN STORMWATER DRAINAGE | | | | | | |
| 17616 | 20spbas004 | 20 | Soldiers Point | 20sp | 20SPBAS004 | SOLDIERS POINT ROAD SOLDIERS POINT | HOUSING & COM AMENITIES | URBAN STORMWATER DRAINAGE | | | | | | |
| 17621 | 20spbas005 | 20 | Soldiers Point | 20sp | 20SPBAS005 | SOLDIERS POINT ROAD SOLDIERS POINT | HOUSING & COM AMENITIES | URBAN STORMWATER DRAINAGE | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|
| 17605 | 20spbap001 | 20 | Soldiers Point | 20sp | 20SPBAP001 | SOLDIERS POINT ROAD SOLDIERS POINT | HOUSING & COM AMENITIES | URBAN STORMWATER DRAINAGE | DRAINAGE PIPE | 1 |
| 17608 | 20spbap002 | 20 | Soldiers Point | 20sp | 20SPBAP002 | SOLDIERS POINT ROAD SOLDIERS POINT | HOUSING & COM AMENITIES | URBAN STORMWATER DRAINAGE | DRAINAGE PIPE | 2 |
| 17612 | 20spbap003 | 20 | Soldiers Point | 20sp | 20SPBAP003 | SOLDIERS POINT ROAD | HOUSING & COM AMENITIES | URBAN STORMWATER DRAINAGE | DRAINAGE PIPE | 2 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | SOLDIERS POINT | | | | |
| 17614 | 20spbap004 | 20 | Soldiers Point | 20sp | 20SPBAP004 | SOLDIERS POINT ROAD SOLDIERS POINT | HOUSING & COM AMENITIES | URBAN STORMWATER DRAINAGE | DRAINAGE PIPE | 2 |
| 17618 | 20spbap005 | 20 | Soldiers Point | 20sp | 20SPBAP005 | SOLDIERS POINT ROAD SOLDIERS POINT | HOUSING & COM AMENITIES | URBAN STORMWATER DRAINAGE | DRAINAGE PIPE | 2 |
| 17623 | 20spbap006 | 20 | Soldiers Point | 20sp | 20SPBAP006 | SOLDIERS POINT ROAD SOLDIERS POINT | HOUSING & COM AMENITIES | URBAN STORMWATER DRAINAGE | DRAINAGE PIPE | 2 |

**From:** Hoang, James (Sydney) [mailto:James.Hoang@WorleyParsons.com]
**Sent:** Tuesday, 9 March 2010 4:03 PM
**To:** Paul Wood
**Subject:** Salamander Shores

Hi Paul,

Further to our discussion earlier, I have attached a copy of a plan illustrating the study area that I am interested in. If I could get any stormwater plans with pit and pipe locations and diameters within the catchment area than that would help me a lot with our stormwater management report.

Cheers,

**James Hoang**
*BEng (Civil) IEAust*
**Civil Engineer, Urban Infrastructure Group**
**WorleyParsons**
Tel: +61 2 8456 7218
Fax: +61 2 8923 6877
**Level 10**
**141 Walker St.**
**Nth Sydney NSW 2060**

Email: james.hoang@worleyparsons.com
Web: www.worleyparsons.com

legally entitled to do so.

## Koudounis, Daisy (Sydney)

**From:** max.haste@industry.nsw.gov.au
**Sent:** Monday, 12 April 2010 3:10 PM
**To:** Hoang, James (Sydney)
**Cc:** richard.mcevilly@industry.nsw.gov.au
**Subject:** Re: Salamander Shore - 147 Soldiers Point Road, Soldiers Point

James

Our concerns will relate primarily to run-off, and the potential of the development to allow pollutants to enter the marine park. You should seek to incorporate and utilise green strips and infiltration beds such that water is managed on-site insofar as is practicable, and that overland flow is minimised. Also avoid concentrating the runoff from roof areas into discharge pipes directly into the marine park.

We are not too concerned with the actual development, just the impact it may have on water quality and/or adjacent habitat of the marine park. we have little to comment on int he pic you forwarded, but would be happy to review more detailed designs pertaining to water and silt management.

Regards

Max Haste
Manager
Port Stephens - Great Lakes Marine Park
ph. 02 4916 3970
fax. 02 4916 3960
mb. 0428 432 863

Locked Bag 800
Nelson Bay 2315

From: "Hoang, James (Sydney)" <James.Hoang@WorleyParsons.com>
To: "max.haste@industry.nsw.gov.au" <max.haste@industry.nsw.gov.au>
Date: 12/04/2010 02:15 PM
Subject: Salamander Shore - 147 Soldiers Point Road, Soldiers Point

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Max,

Further to our discussion earlier this afternoon, I have attached a plan of our proposed developed of the Salamander Shores Hotel.
We are currently providing a report covering stormwater, flooding and coastal process for our client for a Part3A submission.

As discussed earlier, we've proposed nothing outside of the property boundary and we have decreased the percentage of impervious area.

Would you be able to provide me some preliminary advice and information in regards to the design that would steer us towards compliance with the Great Lakes Marine Park Authority.

Thanks,

**James Hoang**
*BEng (Civil) GradIEAust*
**Civil Engineer, Urban Infrastructure Group**

**WorleyParsons**
Tel: +61 2 8456 7218
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**Level 10**
**141 Walker St.**
**Nth Sydney NSW 2060**

Email: james.hoang@worleyparsons.com
Web: www.worleyparsons.com

## Koudounis, Daisy (Sydney)

**From:** carla.ganassin@industry.nsw.gov.au
**Sent:** Friday, 16 April 2010 3:03 PM
**To:** Hoang, James (Sydney)
**Cc:** scott.carter@industry.nsw.gov.au
**Subject:** Re: Salamander Shores Hotel - 147 Soldiers Point Road, Soldiers Point
**Attachments:** illustrative 032010.jpg

Hi James,

Industry and Investment NSW is supportive of the reduction of impervious surfaces in this proposal.

The Department recommends that:

- erosion and sediment measures are used to mitigate potential sedimentation impacts on the nearby waterway.
- there is no encroachment into the vegetated riparian buffer zone.
- impacts to the adjacent waterway and aquatic habitats from stormwater discharge are not increased and water sensitive urban design measures are used to minimise any such impacts.

Regards,
Carla Ganassin | Conservation Manager | Aquatic Habitat Protection Unit
Industry & Investment NSW | PO Box 21 | Cronulla NSW 2230 | 202 Nicholson Parade | Cronulla NSW 2230
T: 02 9527 8552 | F: 02 9527 8576 | E: carla.ganassin@industry.nsw.gov.au
W: www.industry.nsw.gov.au | www.dpi.nsw.gov.au

From: "Hoang, James (Sydney)" <James.Hoang@WorleyParsons.com>
To: "carla.ganassin@industry.nsw.gov.au" <carla.ganassin@industry.nsw.gov.au>
Date: 12/04/2010 04:43 PM
Subject: Salamander Shores Hotel - 147 Soldiers Point Road, Soldiers Point

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Carla,

Further to our discussion earlier this afternoon, I have attached a plan of our proposed developed of the Salamander Shores Hotel (147 Soldiers Point Road, Soldiers Point). We are currently in the process of providing a report covering stormwater, flooding and coastal process for our client for a Part3A submission. We are at the early stages of the development at the moment.

As discussed earlier, we dont believe that we are going to have too much of a significant impact on the environment. We've proposed nothing outside of the property boundary and we have decreased the percentage of impervious area. There are also no defined water courses within our site nor downstream of it.

Would you be able to provide me some preliminary advice and information in regards to the design that would steer us towards compliance with the Department of Primary Industries – Fisheries and Aquaculture.

Feel free to call me or send me an email if you require any additional information.

Kind Regards,

**James Hoang**
*BEng (Civil) GradIEAust*
**Civil Engineer, Urban Infrastructure Group**
**WorleyParsons**
Tel: +61 2 8456 7218
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**SALAMANDER SHORES HOTEL PTY LTD**
**SALAMANDER SHORES HOTEL**
**WATER MANAGEMENT, FLOODING AND COASTAL PROCESSES REPORT**