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9 June 2010

Andrew Smith
NSW Government Department of Planning
GPO Box 39
Sydney, NSW 2001

Our ref: 21/19509/160196
Your ref:

Dear Sir

Lindfield Shopping Centre
Stormwater Management Plan

1 Background

This Stormwater Management Plan has been prepared to support the Project Application for the proposed retail and residential development at 23, 23a and 27-37 Lindfied Avenue and 11 Havilah Lane, Lindfield.

1.1 Existing Site

The existing site is fully developed with a number of small shops including a newsagent, liquor shop, travel agent, take-away shop and a chemist, as well as a Franklins supermarket. At present, the site stormwater discharges to Lindfield Avenue, Kochia Lane, and Havilah Lane.

1.2 Proposed Development

The proposed development includes under-ground car parking, retail space, and two residential towers. The development will contain on-site detention (OSD). There will be no increase peak stormwater discharge from the site.

2 Council Development Controls

Ku-ring-gai Council state the stormwater requirements in their *Development Control Plan 47: Water Management*. When referring to the document, the development is classed as 6A – mixed use development draining directly to the street. A summary of the key requirements relevant to this development are listed in Table 1.

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Table 1 Council DCP key requirements

Reference	Requirement
5.4.1	The total discharge from any development site to the street gutter or table drain shall not exceed 25 litres per second.
6.4	Rainwater tanks: 1000L per 100m^2 floor space or as determined by BASIX when in force plumbed to all toilets and for garden irrigation, or as determined by BASIX when in force.
6.7.2	Use the information in Appendix 2 and the calculation sheet at Appendix 3 to determine the permitted site discharge and minimum OSD storage volume required for the development.
Appendix 3	On-Site Detention Calculation Sheet: This sheet shows the calculations to determine the OSD and PSD requirements. A completed copy is included as an attachment to this document.

3 OSD/OSR

3.1 Storage

GHD's ESD report for this development states an on-site retention (OSR) volume for re-use of 100m^3 as one of a number of features to comply with BASIX. The required OSD volume as per the attached calculation sheet is 68m^3.

It is proposed to have a combined OSR/OSD tank between the upper and lower ground floors, in the northwest corner of the site. The minimum volume of this tank will be 168m^3.

3.2 Discharge

As per the attached calculation sheet, the Permissible Site Discharge (PSD) is 23.77 l/s. Stormwater will discharge from the site via a pipe to the kerb on Havilah Lane.

Emergency overflows from the OSD tank (in the event of blockage of the outlet pipe or extreme storm events) will be via a grated surcharge pit on Lindfield Avenue.

Detailed modelling of the OSD tank has not been undertaken at this stage of the project.

4 Flooding

Due the location of the site near the top of the ridge, no flooding is anticipated in the vicinity of the proposed development.

5 Construction Phase Soil and Water Management

Bulk earthworks will involve the excavation of the entire site below the surrounding area. As such, there will be little opportunity for stormwater to leave the site directly. Stormwater will be collected in a basin at the base of the excavation, and after the sediment has settled out, the water will be pumped out to the kerb on Havilah Lane.

Exits to the site will require shaker grids to remove sediment from vehicle tyres before they leave the site.

There should be adequate dust control measures put in place during the construction phase.

6 Water Sensitive Urban Design (WSUD)

WSUD encompasses all aspects of urban water cycle management including water supply, wastewater and stormwater management. WSUD is a multi-disciplinary approach that promotes opportunities for linking water infrastructure, landscape design and the urban built form to minimize the impacts of development upon the water cycle and achieve more sustainable forms of urban development.

The suitability of WSUD solutions to any proposed development depends upon a number of factors, including climate and rainfall, site topography, geology, available land and landuse.

WSUD on this project is achieved through the collection and re-use of rainwater. Rainwater is collected and stored in a 100 m^3 tank that is used to supply water for toilet flushing in the residential units. This reduces the volume of stormwater discharged from the fully developed site as well as reducing the demand for potable water, both positive WSUD outcomes.

Yours faithfully
GHD Pty Ltd

Tim Henderson
Civil Engineer
02 9239 7135

Attachments: OSD Calculation Sheet
Erosion and Sediment Control Plan

Appendix 3
On-Site Detention Calculation Sheet

Address 23, 27-37 Lindfield Avenue + 11 Havilah Lane

Catchment Detail				
1.	Catchment Name GC1 – Gordon Creek			
2.	Catchment Discharge Rate	0.0128	l/sec/m^2	**A**
3.	Catchment Storage Rate	0.0336	m^3/m^2	**B**
Site Details				
4.	Site Area 3095 m^2 ^ 60% of site area	1857	m^2	**C**
5.	Area(s) not draining to the detention system	0	m^2	
6.	Total impervious area (roofs, driveways, paving, etc.)	3095	m^2	**D**
7.	Impervious area bypassing detention system	0	m^2	**E**
Permitted Site Discharge				
8.	**C** [1857 m^2] x **A** [0.0128 l/sec/m^2] =	23.77	l/sec	**Flow 1**
9.	Adjustment for any uncontrolled impervious flow **E / D** =	0	(<0.25)	**F**
10.	**Flow 1** [23.77 l/sec] x **F** [0] =	0	l/sec	**Flow 2**
11.	**Flow 1** [23.77] – **Flow 2** [0] =	23.77	**l/sec**	**PSD**
Site Storage Requirement				
12.	**C** [1857 m^2] x **B** [0.0336 m^3/m^2] =	68	**m^3**	**SSR1**
13.	If the storage is in a landscaped basin, **SSR1** x 1.2 =	—	**m^3**	**SSR2**
Outlet Control				
14.	Height difference between top water surface level and the centre of the orifice	0.5	m	**G**
15.	Orifice Diameter $21.8 \times \sqrt{\frac{PSD}{\sqrt{G}}}$	127	**mm**	**OD**

PSD = Permitted Site Discharge
SSR1 = Site Storage Requirement (except for landscaped basins)
SSR2 = Site Storage Requirement (landscaped basins) **(Note: Use only SSR1 or SSR2)**
OD = Orifice Diameter

Signature T Hll **Name** Tim Henderson

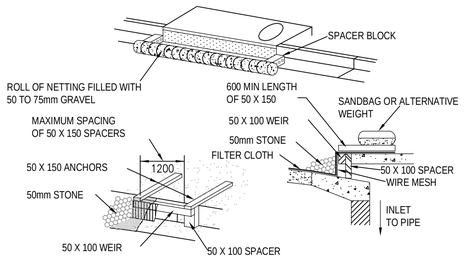
Qualifications B.E (civil) **Date** 20-05-2010

GENERAL NOTES

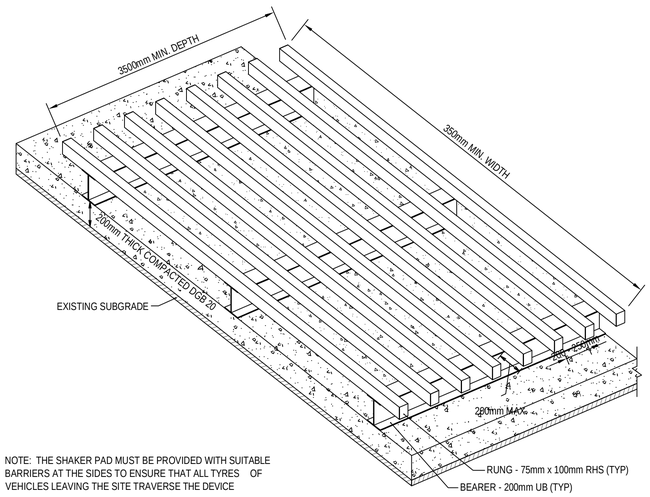
1. CONSTRUCT SHAKER PAD FOR CONSTRUCTION TRAFFIC AT ALL POINTS OF EXIT FROM THE SITE PRIOR TO COMMENCING EARTHWORKS OPERATIONS. SHAKER PAD CONSTRUCTION MUST COMPLY WITH THE KU-RING-GAI COUNCIL STANDARD. CLEAN OUT AND MAINTAIN THE SHAKE DOWN DEVICE REGULARLY TO ENSURE EFFICIENT OPERATION.
2. SPOIL TO BE DISPOSED OF AS DIRECTED BY THE SUPERINTENDENT.
3. STOCKPILED SPOIL ON SITE TO BE LOCATED AS DIRECTED BY THE SUPERINTENDENT.
4. CONSTRUCT SILT FENCE ON DOWNSTREAM SIDE OF ALL AREAS OF EARTHWORKS AS DIRECTED BY THE SUPERINTENDENT TO PREVENT THE TRANSPORT OF SEDIMENT.
5. THE CONTRACTOR SHALL PROVIDE ADEQUATE DUST CONTROL TO ALL AREAS.
6. PROVIDE SEDIMENT INLET TRAPS TO ALL EXISTING SURFACE INLET PITS PRIOR TO COMMENCEMENT OF CONSTRUCTION.
7. OUTLET FROM SEDIMENT BASIN DISCHARGE TO BE PUMPED OUT TO THE NEAREST EXISTING STORMWATER MANHOLE/PIT. THE CONTRACTOR SHALL COMPLY TO KU-RING-GAI COUNCIL REQUIREMENTS PRIOR TO DISCHARGE INTO COUNCIL STORMWATER SYSTEM.
8. THE EXTRA SANDBAG SEDIMENT TRAPS ARE TO PLACED DOWNSTREAM OF THE CONCENTRATED CIVIL WORKS

LEGEND

SEDIMENT FENCE

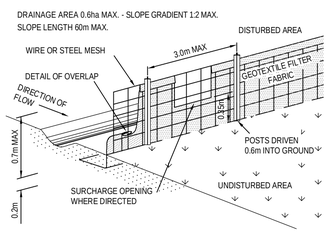


GULLY INLET PROTECTION OPTIONS



NOTE: THE SHAKER PAD MUST BE PROVIDED WITH SUITABLE BARRIERS AT THE SIDES TO ENSURE THAT ALL TYRES OF VEHICLES LEAVING THE SITE TRAVERSE THE DEVICE

SHAKER PAD DETAIL

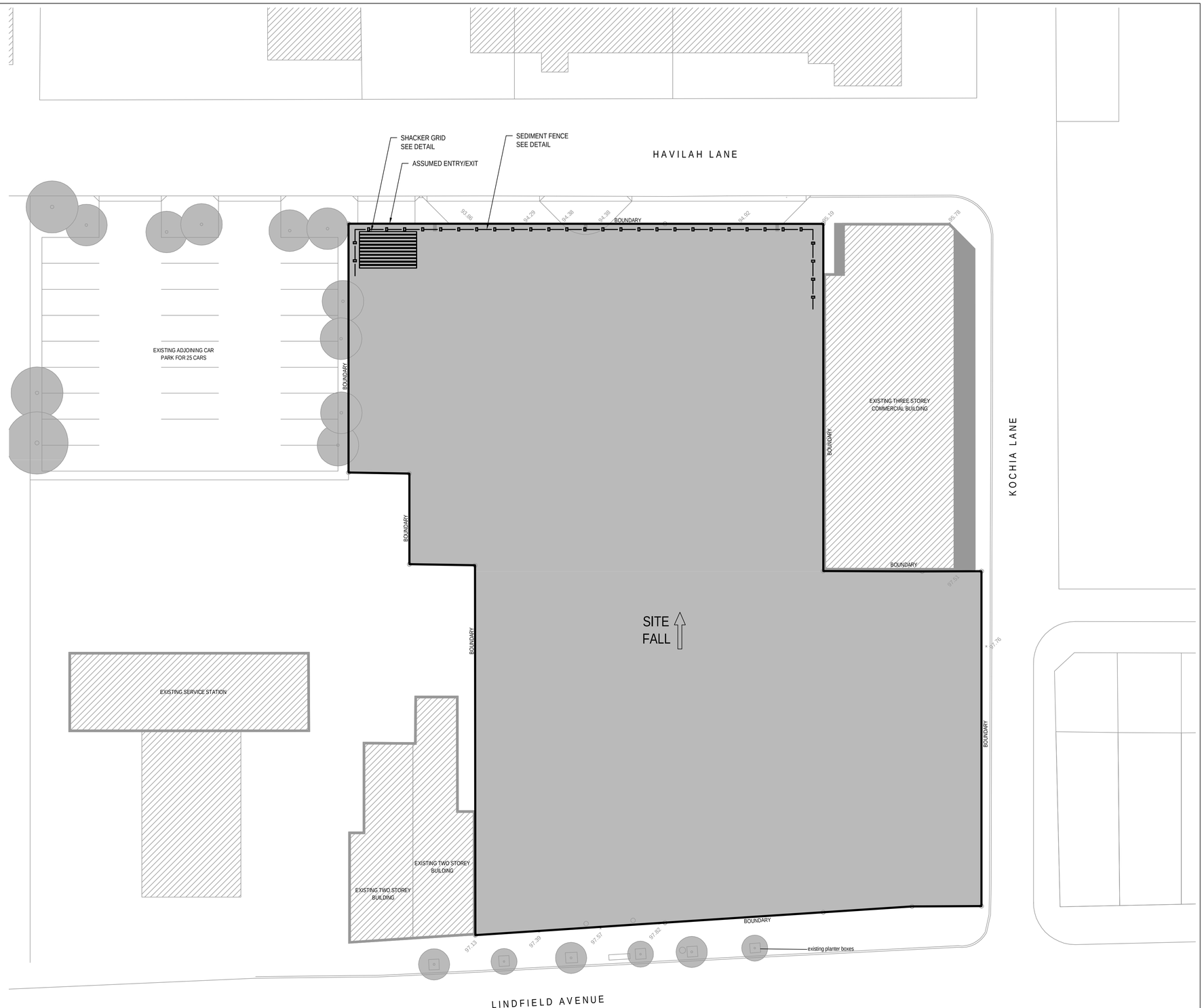


SEDIMENT FENCE DETAIL

SEDIMENT FENCE INSTALLATION

1. EXCAVATE A TRENCH 200mm DEEP.
2. DRIVE POSTS 500-700mm INTO GROUND AT A MAXIMUM SPACING OF 3.0m
3. PLACE AND FIX SUPPORT MESH (F52) TO POST.
4. LAY BIDIM GEOFABRIC (SF 2000) AGAINST THE SUPPORT MESH AND FIX BY TIE WIRE, STAPLES OR HOG RINGS.
5. PLACE BIDIM IN TRENCH AND BACKFILL WITH SOIL.

NOTE: POSITION OF SEDIMENT FENCE AS DIRECTED BY SUPERINTENDENT.



PRELIMINARY

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Checked	Approved	Date
B	PRELIMINARY ISSUE		RD	TH	TH	09.06.10
A	FOR PROJECT APPLICATION		RD			

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Drawn RD		Designed TH	
Drafting Check		Design Check	
Approved			
Date			
Scale AS SHOWN	This Drawing must not be used for Construction unless signed as Approved		

Client **COOGEE BAY VILLAGE**
Project **LINDFIELD SHOPPING CENTRE**
Title **SEDIMENT & EROSION CONTROL PLAN**

Original Size **A1** Drawing No: **21-19509-C001** Rev: **B**

Plot Date: 9 June 2010 - 2:26 PM Plotted by: Robert Dam/Sydney/GHD/AU Cad File No: G:\21\19509\CADD\Drawings\21-19509-C001.dwg