



10 March 2009

Dexus Property Group
C/-o Gallagher Jeffs Pty Ltd
Suite 2
Level 8, 171 Clarence Street
SYDNEY NSW 2000

Our ref: 21/18316/148330
Your ref:

Attention: Joanne Cunningham

Dear Joanne,

Greystanes Industrial Estate Review of Stormwater and Groundwater Site Servicing Strategy

GHD has been requested by Dexus to review and assess the impacts that the master plan layouts proposed by Dexus have on the stormwater and groundwater servicing strategies adopted for the eastern portion of the Greystanes Industrial Estate development under Boral's approved Part 3A Concept Plan. This assessment will form part of Dexus' application under Part 3A of the EP&A Act for the development of the eastern portion of the Greystanes Industrial Estate.

Dexus have provided GHD with a proposed master plan (Drawing No. DX_G_MP08.01 revC) and a number of master plan alternate options (Drawing No. MP-28). These drawings form the basis for our review and assessment.

1 Background

1.1 Stormwater

The proposed stormwater servicing strategy for the site includes elements designed for different storm return periods. Generally a "major/minor" design philosophy has been adopted at the site. The inground pipe system has been designed for a 10 year ARI storm event, while larger storms up to the 100-year ARI and beyond are conveyed via overland flow paths to the eastern and western perimeter channels. Refer to Appendix B for a typical section. The perimeter channels discharge through the southern cut to a detention basin in Widemere East.

Stormwater quality will be managed by the connection of a gross pollutant trap (GPT) at each lot boundary before discharging to the perimeter channels or street drainage system. Further water sensitive urban design strategies are provided at the stormwater retention basin at Widemere East. No onsite detention/water quality measures other than GPT units are required within the development sites.

1.2 Groundwater

The proposed groundwater servicing strategy for the site is based on a passive gravity drainage system draining to the Widemere East collection basin via a series of perimeter trench drains located below the perimeter stormwater channels. Refer to Appendix B for a typical section.



2 Stormwater Servicing Strategy

A review of Dexus' proposed master plans has confirmed that generally the layouts do not impact on the stormwater strategy developed as part of Boral's approved Concept Plan.

The following items are areas that the proposed Dexus master plan layouts appear to deviate from the original site strategies:

2.1 Fraction Impervious

The proposed master plan option drawing (Drawing No. MP-28) indicates that the proposed development would have the following site area breakdowns (including alternate layouts Options 1-3) and their equivalent fraction impervious areas:

Table 1 Proposed Development Breakdown Area

	Proposed Master Plan	Alternate Option 1	Alternate Option 2	Alternate Option 3
Total Site Area (m ²)	472,312	472,312	472,312	472,312
Warehouse (m ²)	220,865	223,263	220,722	226,969
Offices (m ²)	20,900	26,227	25,040	22,672
Awning Area (m ²)	12,875	12,474	12,288	12,482
Car Parking (m ²)	26,365	40,736	32,235	38,101
Hard-Stand (m ²)	97,730	88,211	93,838	84,809
Landscaping (m ²)	67,140	75,452	74,492	67,398
Impervious Area (%)	85.8	84.02	84.23	85.73

The stormwater strategy developed for the site (based on the approved Boral precinct plan) stipulated that approximately 15% of the lots would be landscaped, ie 85% of the lots will be impervious. Based on Table 1 the proposed master plan with a fraction impervious of 85.8%, whilst still generating (negligible) increases in stormwater runoff could be considered to be in accordance with the approved concept plan. The percentage impervious for the alternate options, are either less than 85% or the differences in the impervious areas are negligible.

2.2 Drainage Points of Connection

The approved concept plan strategy had assumed locations of stormwater discharge from the development into the eastern perimeter drain. Three main points of discharge were assumed and form the basis of hydraulic models for the design of the perimeter drains.

Refer to Appendix A for figure showing the location of discharge points based on Boral's Concept Plan.

Based on an assessment of Dexus' proposed master plans we believe that similar points of connections could be maintained. However, we note that the drainage system for buildings adjacent to the Spine



Road suits direct connections to the Spine Road. Controls must be in place to ensure that stormwater runoff from these building are directed towards the eastern perimeter drain.

3 Groundwater Servicing Strategy

A review of Dexus' proposed master plans have confirmed that generally the layouts do not impact on the groundwater strategy developed as part of Boral's approved Concept Plan.

The groundwater drainage system has been designed to maintain a water level within the development of a minimum of 2.5m below ground surface. Based on our assessment the proposed master plan has all structures above ground. Should, however, any below ground structures or landform cuttings be proposed deeper than 2.5m then any structures within these areas must cater for groundwater pressures and appropriate waterproofing measure be implemented.

If you have any queries regarding the above please do not hesitate to call myself.

Yours faithfully
GHD Pty Ltd

A handwritten signature in black ink, appearing to read 'Frank Carrozza', written in a cursive style.

Frank Carrozza
Senior Civil Engineer
02 8898 8886



Appendix A

Drainage Points of Connection

Client: BORAL RECYCLING
Project: SOUTHERN EMPLOYMENT LANDS
Location: GREYSTANES



- OUTER CATCHMENT BOUNDARY
- SUB CATCHMENT BOUNDARY
- DIRECTION OF FLOW

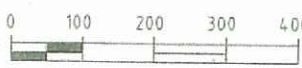
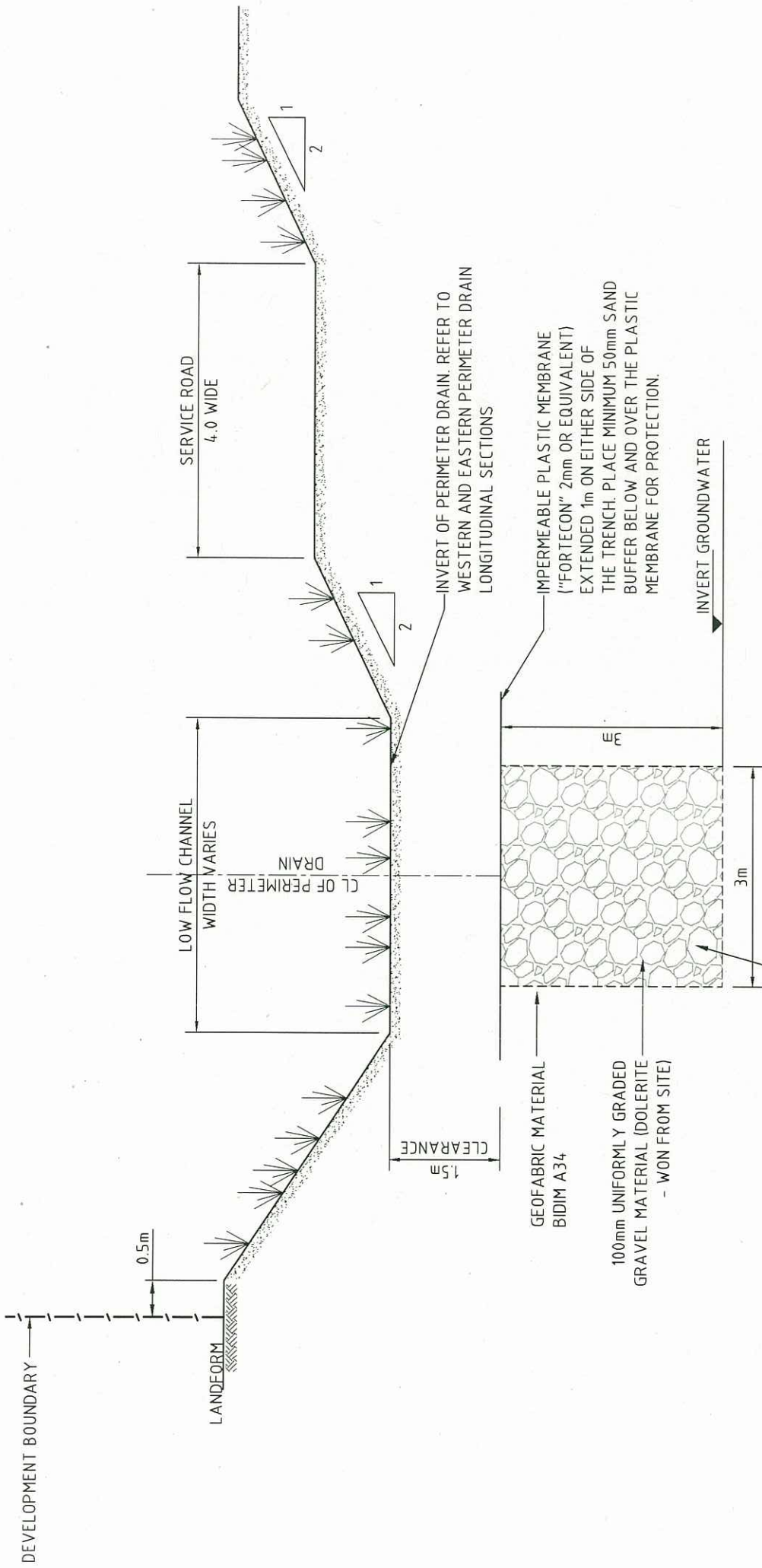
Scale :  A4
1:10000

FIGURE 2
STORMWATER CATCHMENT AREAS

Appendix B

Typical Stormwater and Groundwater Section



NOTE

FOR PERIMETER DRAIN DETAILS AND DIMENSIONS, REFER TO 21-15443-WB-385 FOR WESTERN DRAIN & 21-15443-EB-300 FOR EASTERN DRAIN.

TYPICAL CROSS SECTION AT PERIMETER CHANNEL

* WHEN GRAVEL MATERIAL IS CRUSHED ON SITE FOR USE IN TRENCH IT MUST HAVE A MIN K= 1000m/DAY. MATERIAL TO BE TESTED PRIOR TO PLACEMENT IN TRENCH IN ACCORDANCE WITH THE CIVIL SPECIFICATION.