STORMWATER MANAGEMENT PLAN

INDUSTRIAL WAREHOUSE DEVELOPMENT

200 GOVERNOR MACQUARIE DRIVE WARWICK FARM

Prepared By:

MPN CONSULTING PTY LTD
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REVISION STATUS

Document:	Stormwater Management Plan
MPN Reference No:	6617
Client:	Stockland
Site Address:	200 Governor Macquarie Drive Warwick Farm, NSW

Document Control				
Version	**Date**	**Author**	**Reviewer**	**Approved**
Draft	19 February 2015	Lachlan Stephenson	Steven Byrne	Steven Byrne
A	26 February 2015	Lachlan Stephenson	Steven Byrne	Steven Byrne
B	25 March 2015	Lachlan Stephenson	Steven Byrne	Steven Byrne
C	16 June 2015	Lachlan Stephenson	Steven Byrne	Steven Byrne

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EXECUTIVE SUMMARY

This report has been commissioned by Stockland to support the Development Application for an Industrial Warehouse Facility on land located at Governor Macquarie Drive, Warwick Farm, NSW.

This report addresses the following Engineering aspects of the development at the conceptual level.

- Topography
- Flooding
- Stormwater Quantity Management
- Stormwater Quality Management
- Erosion and Sediment Control

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1 PURPOSE

This report has been commissioned by Stockland to support the Development Application for an Industrial Warehouse Facility on land located at 200 Governor Macquarie Drive, Warwick Farm, NSW.

2 PROJECT DETAILS

2.1 Project Description

The current proposal involves the construction of new warehouses, loading docks, car parking and office facilities. Access to the site will be from Governor Macquarie Drive.

The proposed layout is depicted on the Architectural Drawing by Nettleton Tribe in Appendix 1 and is reproduced below.

Figure 1 - Proposed Development

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3 SITE CHARACTERISTICS

3.1 Site Location

The site is located at 200 Governor Macquarie Drive, Warwick Farm and is formally described as Lot 42 on DP 1172051.

The site fronts Governor Macquarie Drive to the North, and is bounded by Georges River to the East, bushland and horse training facilities to the South and an open dam to the West.

Figure 2 - Site Location

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3.2 Topography and Existing Site Drainage

The area of the proposed development slopes away from a high RL of approximately 10m AHD towards the Southern Boundary to a low RL of approximately 8m AHD in the South Western corner, 7m on Southern Boundary, 8m on the Northern Boundary and 9m on the Eastern Boundary.

The existing site currently contains no underground stormwater drainage and sheet flow discharges to Georges River on the Eastern boundary, Governor Macquarie Drive on the Northern Boundary and the horse training facilities to the South.

There are no external catchments which flow through the proposed site. Areas external to the site all slope away from the site, or along the sites western boundary. The location of the high point on the western boundary has been maintained which will allow any stormwater to flow to the north and the south as per existing conditions.

There is currently a flow path through the South Western tip of the site as shown on the flood plan in Section 5.1. No development has been proposed through this area. As a result the proposed development will have no effect on the neighbouring properties flood levels.

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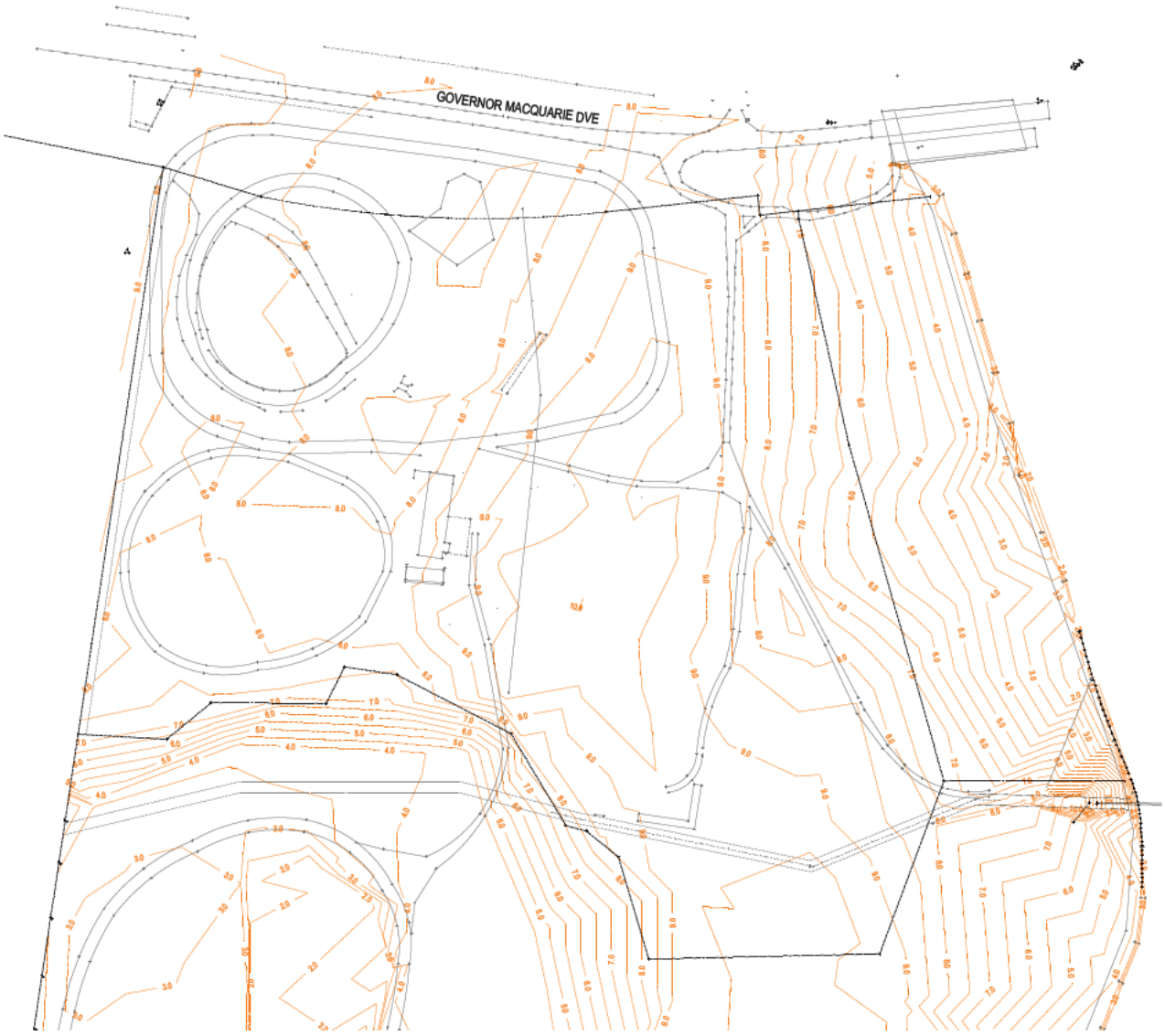

Figure 3 - Site Survey

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4 SITE DATA

Site data have been obtained from the following sources of information:

- Survey Data
- Liverpool City Council
- Satellite Imagery
- Relevant Reports
- Discussions with relevant authorities
- Dial Before You Dig (DBYD)

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5 STORMWATER

5.1 Flooding

The location of the proposed site works is currently affected by flooding from the Georges River. The Q100 flood level varies from RL8.4 at the South Western corner to RL7.0 in the North Eastern corner of the site. This information was provided to MPN Consulting Pty Ltd by Liverpool City Council from the 2004 Georges River Floodplain Risk Management Study. The proposed development protrudes into this floodplain marginally along the Southern and Eastern boundary. The flooding shown on the plan along the northern boundary of the site is due to trapped sags. These areas do not form part of the flood plain as they are separated from the Georges River floodplain by areas of higher ground according to the survey of the area. The highest flood level on site is denoted as RL 8.4m AHD. Both the flooded areas described above are separated from Georges River by ground levels higher than RL 8.4m AHD. As a result these areas will not be allowed for within compensatory excavation calculations.

The volume of fill that has been constructed into the existing floodplain along the Southern and Eastern boundary is 4549m^3.

It is proposed to utilise compensatory excavation on site to account for the loss of floodplain storage resulting from the construction of the warehouse building. As per the principles of compensatory excavation the volume of filling in the floodplain will be cut at the same RL's. Flood plain storage will be compensated for along the fire access on the Eastern boundary and within the car parking areas on the Southern boundary of the site, as depicted on MPN plan DA12 and DA13 attached in Appendix 2.

The bioretention basins that have been cut into the site also sit below the Q100 flood level. The bioretention basins will also provide further flood plain storage during the Q100 events.

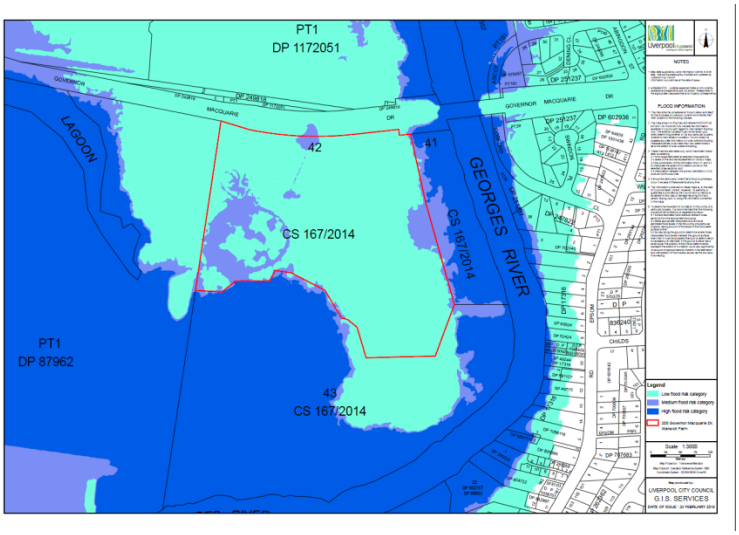

Figure 4 – Flood Mapping

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5.2 Water Conservation

All new water fittings within the proposed development will comply with the minimum standards defined by the Water Efficiency Labelling and Standards Scheme. Rainwater harvesting tanks will be installed in accordance with BASIX requirements. The tanks will be utilised for landscape watering and other purposes.

5.3 Site Based Stormwater Management Plan

The aim of the Stormwater Management Plan outlined below is to:

- Prevent or minimise adverse social and environmental impacts from stormwater runoff originating from the proposed development.
- Achieve acceptable levels of stormwater runoff quality and quantity.

The Stormwater Management Plan aims to identify Stormwater Quantity and Quality Best Management Practice for the site and demonstrate that water quantity and quality impacts will be minimised in receiving waters.

The Stormwater Management Plan examines the site in two sections, the operational phase and the construction phase. The operational phase addressed the treatment of contaminated runoff from the developed site by natural methods before discharging into receiving waters, whilst the construction phase of the Stormwater Management Plan addresses erosion and sediment control to prevent contamination of water sources by stormwater runoff during construction of the site.

5.4 Operational Phase

5.4.1 Proposed Site Drainage

Stormwater runoff from the roof of the proposed warehouses will be collected by rainwater harvesting tanks for reuse purposes. Overflow from these tanks will discharge into the proposed underground drainage system which will discharge into the new bioretention basins.

The proposed impervious ground level areas will sheet flow to bioretention or the new pit and pipe network for discharge to the bioretention basins.

The proposed underground pit and pipe network will discharge to Georges River, as per existing conditions, via treatment which will collect hydrocarbons, sediments and nutrients.

A new underground pipe system will be constructed through the parkland to the East of the site for discharge to Georges River.

The pipe network will convey the Q10 flows. Flows greater than this will overland sheet flow through the park area as per existing condition. At the outlets of the stormwater network to Georges Creek appropriate scour protection will be implemented to ensure no scour of the river bank occurs.

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Pipe and treatment details are shown on MPN plans DA02, DA03, DA04, DA05 and DA06 in Appendix 2.

5.4.2 Stormwater Quantity Management Strategy

The site is located beside Georges Creek and hence requires no detention. It has been discussed with Liverpool City Council officers and confirmed that the proposed site does not require any on-site detention.

5.4.3 Stormwater Quality Management Strategy

5.4.3.1 Potential Pollutants Generated

The pollutants that could be potentially generated as a result of the development use are as follows:

- Litter
- Sediment
- Nutrients (Nitrogen and Phosphorous)
- Hydrocarbons (oil and grease)
- Surfactants
- Pathogens / faecal coliforms (bacteria and viruses)

The MUSIC computer modelling program developed by the Co-operative Research Centre for Catchment Hydrology was used to predict the performance of the proposed stormwater treatment train.

The pollutants modelled in MUSIC are Gross Pollutants, Total Suspended Solids (TSS), Total Phosphorous (TP) and Total Nitrogen (TN).

5.4.3.2 Rainfall

The rainfall data used in the model was based on the Bureau of Meteorology data from rainfall station 67035 Liverpool (Whitlam Centre). The model was run for a 10-year period from 1 January 1967 to 31 December 1976. The modelling time step was 6 minutes.

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5.4.3.3 Rainfall Runoff Properties

In accordance with the MUSIC information supplied by LCC, the following rainfall runoff properties have been used. These are listed in Table 1 below.

Parameter	Value
Rainfall Threshold (mm)	1.40
Soil Storage Capacity (mm)	170
Initial Storage (% Capacity)	30
Field Capacity (mm)	70
Infiltration Capacity Co-efficient a	210
Infiltration Capacity Co-efficient b	4.70
Initial Depth (mm)	10
Daily Recharge Rate (%)	50
Daily Base Flow Rate (%)	4.00
Daily Deep Seepage Rate (%)	0

Table 1 - MUSIC Rainfall Runoff Parameters (Liverpool City Council)

5.4.3.4 Pollutant Export Parameters

Specific Pollutant Export Parameters must be applied to each node type. The values listed in Table 2 below are used within various councils on the Georges River and Upper Parramatta River.

Runoff Pollutant Concentrations are generated stochastically from the defined mean and standard deviation.

Flow Type	Surface Type	TSS Log10 Values		TP Log_{10} Values		TN Log_{10} Values	
		Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.
Baseflow Parameters	**Roof**	1.20	0.17	-0.85	0.19	0.11	0.12
	Roads	1.20	0.17	-0.85	0.19	0.11	0.12
	Ground Level	1.20	0.17	-0.85	0.19	0.11	0.12
Stormflow Parameters	**Roof**	1.30	0.32	-0.89	0.25	0.30	0.19
	Roads	2.43	0.32	-0.30	0.25	0.34	0.19
	Ground Level	2.15	0.32	-0.60	0.25	0.30	0.19

Table 2 - Pollutant Export Parameters

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5.4.3.5 Water Quality Objectives

The Water Quality Objectives of the receiving waters for the proposed development have been obtained from the Liverpool City Council Development Control Plan. The DCP load reduction targets are summarised in Table 3 below.

Total Suspended Solids (TSS) % Reduction	Total Nitrogen (TN) % Reduction	Total Phosphorous (TP) % Reduction	Litter/ Gross Pollutants % Reduction	Total Hydrocarbons % Reduction
80	45	45	90	90

Table 3 - Water Quality Objectives

5.4.3.6 Treatment Plan

In order to achieve the pollutant load reduction targets for the proposed development, it is proposed to use natural treatment methods to treat the runoff prior to discharge into Georges River.

It is proposed to discharge stormwater from the site through a bioretention for the capture of pollutants in the runoff. The hardstand areas will flow into the gully pits prior to flowing through the bioretention.

Runoff from the roof of the proposed new warehouses will be captured in rainwater harvesting tanks for reuse purposes and then will be discharged into a bioretention basin for treatment prior to discharge from site.

Four bioretention basins are located across the site for adequate stormwater treatment. A small section of the fire access road will be untreated due to its location.

The treatment plan is depicted on MPN plan 6617 DA02 and DA03 in Appendix 2 with details shown on DA04, DA05, DA06 and DA07. A treatment catchment plan is attached as 6617 DA11 in Appendix 2. An excerpt from MUSIC is shown below.

Figure 5: Treatment Plan

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5.4.3.7 MUSIC Results

The resulting percentage based load reductions at the outlet of the site shown in Table 4 below together with the Water Quality Objectives for the receiving waters.

	Proposed Sources	Proposed Residual Load with Treatment	Proposed Treatment% Reduction	Target %
Total Suspended Solids (kg/yr)	11600	2280	80.3	80
Total Phosphorous (kg/yr)	23.5	8.32	64.6	45
Total Nitrogen (kg/yr)	157	78.8	49.6	45
Gross Pollutants (kg/yr)	1800	42.8	97.6	90

Table 4 - Percentage Based Load Reduction Results

5.4.3.8 Pollutants Reduction

5.4.3.8.1 Litter

Rubbish bins will be located within the proposed development for use by staff and visitors. The site will also be cleaned regularly. As a result of this, levels of litter exiting the site via stormwater are expected to be negligible.

5.4.3.8.2 Sediment

The TSS outflow achieves the above Water Quality Objective. The TSS level is therefore considered acceptable.

5.4.3.8.3 Nitrogen and Phosphorous

The TN and TP residual loads are identified in the above Table 4. The TN and TP loads leaving the site achieve the Water Quality Objectives, significant reductions of 50% and 65% in Nitrogen and Phosphorous, respectively, have been achieved. The Nitrogen and Phosphorous residual loads are therefore considered acceptable.

5.4.3.8.4 Hydrocarbons

Hydrocarbons will become trapped in the bio-retention filter media.

When there is a build-up of hydrocarbons within the bio-retention the top layer of the filter media can be removed and replaced ensuring that no hydrocarbons are discharged from the site. Studies have shown that micro-organisms in the organic mulch layer degrade and breakdown the petroleum base hydrocarbons will not be discharged from site.

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5.4.3.8.5 Surfactants

Washing of cars and trucks will only be permitted in certain areas of the development and will not discharge to the stormwater network.

5.4.3.8.6 Heavy Metals

Heavy metals in stormwater runoff generally become attached to the fine sediment. The bioretention basins will remove this fine sediment. The removal of the fine sediment should effectively remove most of the heavy metals in the runoff.

5.4.3.8.7 Pathogens / Faecal Coliforms

Animals are not expected on site. If domestic animals enter the site they will be under the control of their owners at all times within areas of the development, and the owners are required to clean up after them. The regular cleaning of the site would virtually eliminate these pollutants.

5.5 Proposed Stormwater Quality Improvement Devices

5.5.1 Location

The location of the proposed treatment units are shown on MPN Sketch 6617 DA02 and DA03 in Appendix 2.

5.5.2 Device and Size

The device type and size are depicted on MPN Sketch 6617 DA02 and DA03 in Appendix 2 with details on MPN plans DA04, DA05, DA06 and DA07.

5.5.3 Operation

The bioretention basin operates by filtering runoff through densely planted surface vegetation, then percolating the water through the soil, pollutants are captured by fine filtration, absorption and biological uptake. Details are shown on MPN plan DA04, DA05, DA06 and DA07 in Appendix 2.

5.5.4 Maintenance

For the maintenance of bioretention it is important to remove weeds and debris, regularly watering until plants are established and actively growing.

Watering requirements to sustain healthy vegetation should be determined during on-going maintenance visits.

Inspections are also recommended following large storm events to check for scour and damage.

A bioretention basin maintenance checklist is included in Appendix 3.

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5.5.5 Life Cycle Costs

A life cycle cost analysis is not within the scope of this report. All of the proposed SQIDs are located within the development site and shall be maintained and serviced by the owners of the site at no cost to Council.

5.5.6 Construction Period

Filter media for the bioretention is only to be installed once the 'Development Construction' stage is completed. 'Development Construction' stage involves the earthworks and civil works required to create the land forms associated with a development and the installation of the services. Once this has been completed the construction of the functional elements of the bioretention can be commenced as part of the early landscape works prior to the building phase of the development.

5.6 Construction Phase (Sediment and Erosion Control)

5.6.1 Intent of Erosion and Sediment Control Management Plan

To prevent stormwater contamination (of watercourses) and the release of contaminated stormwater and wastewater by ensuring compliance with the Environmental Protection Act 1994 and Environmental Protection (Water) Policy 1997.

5.6.2 Implementation Strategy

Establish control measures and best practice approaches to prevent stormwater contamination and minimise the risk and adverse effects of erosion and sedimentation. All Erosion and Sediment Control measures must be designed, constructed and maintained in a manner that is commensurate with the site's erosion risk.

5.6.3 Erosion and Sediment Control Measures

- Obtain a licence or approval to operate activities that are classed as environmental relevant activities (i.e. they have the potential to cause environmental harm).
- Implement and maintain appropriate control measures to prevent sediment leaden wastewater and other potential pollutants such as oil, paint and wet concrete from entering the stormwater system via stormwater drains and gullies. The control measures which must be considered to be adopted are:
    - Limit site access during construction to minimise disruption to traffic. Install a temporary construction entry/exit sediment trap at all site accesses to minimise mud and sediment from the site being tracked onto public road, particularly during wet weather or when the site is muddy.
    - Install and maintain appropriate sediment fences around construction areas
        - Divert clean stormwater runoff, using catch drains, around construction areas to existing or new stormwater drainage system.
        - Install sandbags and other pollution containment devices around stormwater drains and any other locations where required to prevent sediment entering the trunk stormwater system.

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- Cover open earth/soil areas progressively (with concrete slabs and pavements or mulch) to minimise areas of bare earth/soil.
- Any stockpiles of excavated soil and demolition / construction waste must be located where risk of erosion and sediment is minimal, and must be protected from wind and water erosion.

- Implement and maintain appropriate control measures such as catch drains and sediment fences to prevent ponding of stormwater or discharge of stormwater from the site to adjacent properties.
- Provision of spill / pollution control equipment that is readily accessible to clean up spills and leaks.
- Ensure spill/pollution control measures are available and maintained in working condition.
- Sediment contained by the sediment control devices such as sandbags, sediment fences and containment bunds must be frequently removed and placed in a controlled area.
- Implement an inspection schedule for any spill or leaks of any potential polluting areas or activities.

5.6.4 Erosion Sediment Control Management Goals

- Licences, approvals, permits and inspection reports in order.
- Sediment or pollution control devices such as sandbags, sediment fences and containment bunds are in place, maintained and effective.
- Spill/pollution control equipment is readily accessible at designated locations.
- No cumulated sediment contained by the sediment control devices such as hay bales, sediment fences and containment bunds.
- No sediment exceeding a depth of 300mm in the pollution control devices (e.g. Silt trap)

5.6.5 Erosion and Sediment Control Implementation Program

- Licences, permits or approvals for each environmentally relevant activity must be obtained prior to commencement of this activity.
- Appropriate control measures such as sediment fences, temporary construction entry/exit sediment traps, pollution containment device (e.g. sandbags), stormwater diversions and administrative controls must be installed and established prior to commencement of the earthwork and construction activities.
- Pollution control devices such as spill control equipment must be inspected on a regular basis (at least weekly).
- Other sediment and pollution control equipment such as containment bunds, hay bales and sediment fences must be inspected on a regular basis (at least daily).
- Inspection for any leaks, spills or potential contaminating activity must be performed on a regular basis (at least daily).

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- Remove cumulated sediment or other contaminants from sediment/ pollution control devices on a regular basis.
- All erosion and sediment control measures must be inspected within 24 hours of expected rain and within 18 hours of a rainfall event.

5.6.6 Responsible Person Or Organisation

The contractor shall be responsible for the implementation and maintenance of the Erosion and Sediment Control Measures.

5.6.7 Reporting / Review

Records such as licences, approvals, permits and inspection reports must be reviewed on a regular basis (e.g. at least monthly) to ensure that legal compliance is met, complaints are reviewed and systems are working to prevent contamination.

5.6.8 Corrective Actions

- Perform clean-up of any spills immediately.
- Any mud or sediment which is tracked onto public roads is to be immediately removed using dry clean-up methods i.e. shovel and broom.
- Remove or relocate any stockpiles of waste where there is a reasonable risk of erosion and sedimentation.
- Replace or repair sediment or pollution control devices if they are not maintained in good working condition.

6 CONCLUSION

This Stormwater Management Plan demonstrates that under the proposed plan, Stormwater Quality and Quantity treatment is achievable to the levels required by the Liverpool City Council DCP.

All of the proposed SQIDs are located within the development site and shall be maintained and serviced by the owners of the site at no cost to Council.

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7 LIMITATIONS OF REPORT

MPN have prepared this report for the Industrial Warehouse Development at Governor Macquarie Drive, Warwick Farm in accordance with MPN's proposal to Stockland. This report is provided for the exclusive use of Stockland for this specific project and its requirements. It should not be used by or relied upon by a third party and MPN accept no responsibility for the use of this report by any party other than Stockland.

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Appendix 1
Nettleton Tribe Architectural Plan

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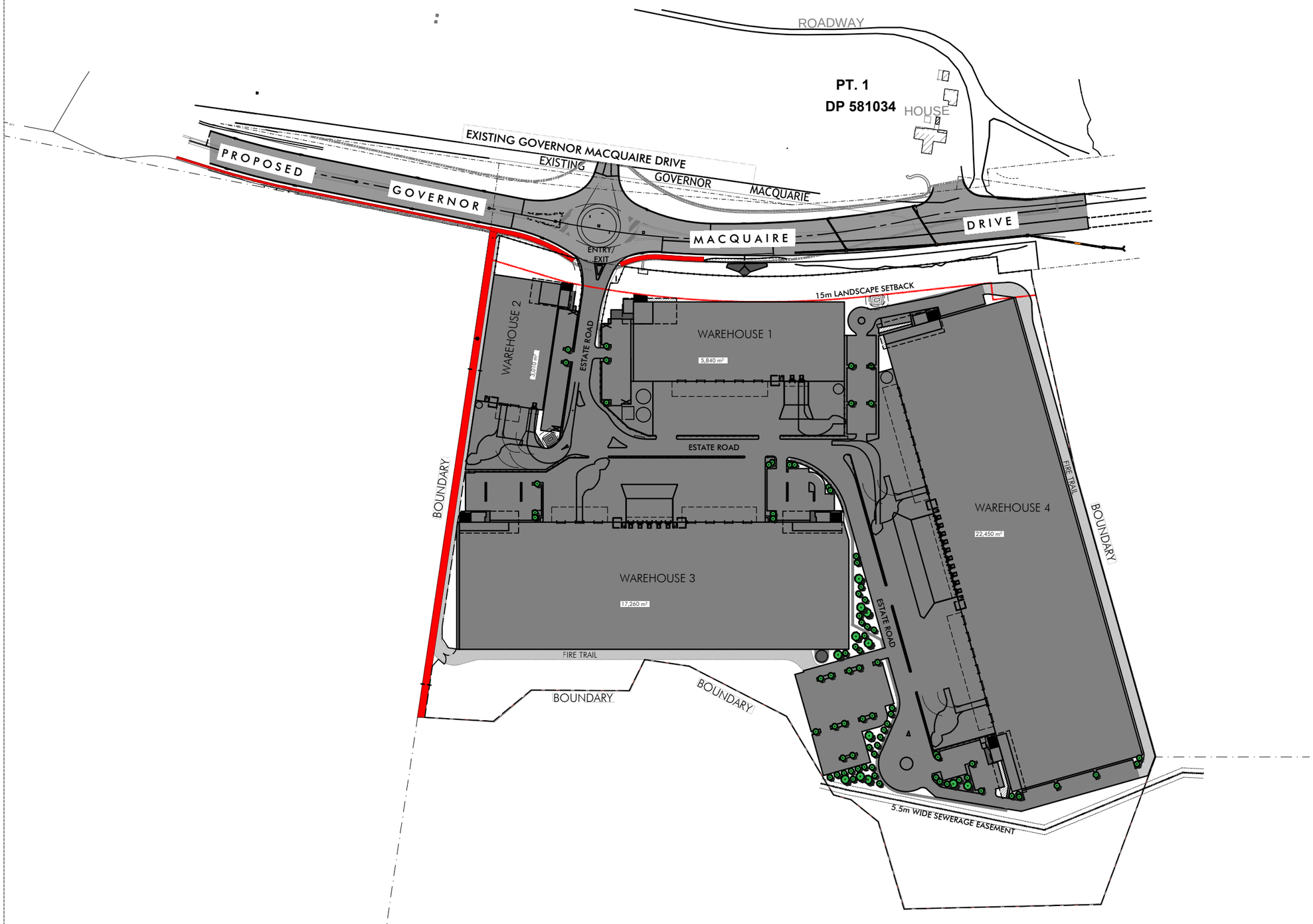

DEVELOPMENT SUMMARY	
WAREHOUSE 1	5,840
OFFICE 1	530
TOTAL	6,370
CAR PARKING REQUIRED (warehouse 1per300sqm=19.4 office 1per35sqm=15.1)	35
CAR PARKING PROVIDED	31
WAREHOUSE 2	3,010
OFFICE 2	405
TOTAL	3,415
CAR PARKING REQUIRED (warehouse 1per300sqm=10 office 1per35sqm=11.5)	22
CAR PARKING PROVIDED	22
WAREHOUSE 3	17,260
OFFICES 3A & 3B	984
TOTAL	18,244
CAR PARKING REQUIRED (warehouse 1per300sqm=57.4 office 1per35sqm=28.1)	86
CAR PARKING PROVIDED	74
WAREHOUSE 4	22,450
OFFICES 4A & 4B	1,224
TOTAL	23,674
CAR PARKING REQUIRED (warehouse 1per300sqm=74.6 office 1per35sqm=35.0)	110
CAR PARKING PROVIDED	115
TOTAL WAREHOUSE	48,560
TOTAL OFFICE	3,143
TOTAL FACILITY	51,703
TOTAL CAR PARKING REQUIRED (warehouse 1per300sqm=163 office 1per35sqm=88.5)	251
TOTAL CAR PARKING PROVIDED	334
TOTAL BICYCLE SPACES PARKING PROVIDED	48
Total Site Area	114,965
Total Facility	51,703
FSR	0.45:1
Total Landscape Area	23,490

Note: Lift and staircase areas are included in GFA calculations

PRELIMINARY

Client

LEVEL 25
133 CASTLEREAGH ST, SYDNEY NSW 2000
t 02 9035 2000

Project

COOPERS PADDOCK

GOVERNOR MACQUARIE DRIVE
WARWICK FARM, NSW, AUSTRALIA

Issue	Description	Date
P1	PRELIMINARY ISSUE	11.12.14
P2	ISSUED FOR PRE DA	16.12.14
P3	DRAFT DA ISSUE	23.01.15

Key Map / Notify

Title: MASTER PLAN- GROUND
Scale: 1:1000 @ B1
Date: February 2015
Number: 4429_DA-01

0 10 20 50 100m

nettletontribe
nettleton tribe partnership pty ltd ABN 58 761 693 122
117 willoughby road crows nest nsw 2065
t 02 9437 6401 f 02 9437 7474

Appendix 2
6617-DA02
6617-DA03
6617-DA04
6617-DA05
6617-DA06
6617-DA07
6617-DA08
6617-DA09
6617-DA10
6617-DA11
6617-DA12
6617-DA13

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LEGEND

EXISTING		PROPOSED
	PROPERTY BOUNDARY	
5.00	MAJOR CONTOUR	5.00
	MINOR CONTOUR	
	BUILDING	
	CONCRETE	
	EDGE OF BITUMEN	
	BARRIER KERB	
	KERB AND CHANNEL	
SW SW	STORM WATER MAIN	
SW	STORM WATER MANHOLE	
SW	STORM WATER GULLY PIT	
RW	ROOFWATER	
W	WATER MAIN	
S	SEWER MAIN	
S	SEWER MANHOLE	
T	TELSTRA CABLE	
O	OPTUS CABLE	
E	U/GROUND ELECTRICITY	
PP	OVERHEAD ELECTRICITY	
	ELECTRICITY POLE	
RET WALL	RETAINING WALL	RET WALL
	TOP OF BATTER	
	FACE OF BATTER	
	TOE OF BATTER	
	SWALE DRAIN	

CONSULTANT: MPN CONSULTING PTY LTD
CONTACT: STEVEN BYRNE (RPEQ 3858)
TELEPHONE: (07) 3335 4522

DATE 26.02.15

FFL 9.15

GOVERNOR MACQUARIE DVE

HW5 1 | HW2 14 | HW8 2 | HW7 16 | FI1 16 | FI1 15 | FI1 9 | FI1 17 | FI1 6 | FI2 9 | FI3 1 | FI4 16 | FI4 14 | FI5 16 | FI6 16 | FI6 2 | FI7 2 | MH2 16 | MH3 16 | MH5 2

9000 | 6000 | 5250 | 4500Ø | 1050Ø | 3750 | 3000Ø | 9000Ø | 3750Ø | 3000Ø | 600Ø | 750Ø | 750Ø | 750Ø

RET WALL

0 5 10 20 25

SCALE 1:500 (A1) 1:1000 (A3)

ISSUE	DATE	AMENDMENT	BY	APP
A	26.02.16	PRELIMINARY ISSUE FOR REVIEW	MS	SB

WAREHOUSE DEVELOPMENT

COOPERS PADDOCK
GOVERNOR MACQUARIE DRIVE
WARWICK FARM, NSW 2170

SCALES:	AS SHOWN
DESIGN:	MS
DRAWN:	MS
CHKD:	LS
APPRD:	SB
DATE:	26.02.15

CLIENT:
STOCKLAND

SCHEMATIC STORMWATER DRAINAGE PLAN SHEET 1

MPN Consulting Pty Ltd
ABN: 39 062 191 799
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mpn JOB 6617

DRAWING No. DA.02

REV A

PRELIMINARY

NOT FOR CONSTRUCTION

GOVERNOR MACQUARIE DVE

FFL 8.85

FFL 8.85

FFL 8.85

GOVERNOR MACQUARIE DVE

RET WALL

RET WALL

STORMWATER CUT-OFF DRAINS TO FALL TO EXISTING DRAINAGE CHANNEL

DIVERSION BUND TO BE INSTALLED TO PREVENT STORMWATER FLOWING INTO WESTERN DRAINAGE CHANNEL

LEGEND

EXISTING		PROPOSED
	PROPERTY BOUNDARY	
5.00	MAJOR CONTOUR	5.00
	MINOR CONTOUR	
	BUILDING	
	CONCRETE	
	EDGE OF BITUMEN	
	BARRIER KERB	
	KERB AND CHANNEL	
SW SW	STORM WATER MAIN	
SW	STORM WATER MANHOLE	
SW	STORM WATER GULLY PIT	
RW	ROOFWATER	
W	WATER MAIN	
S	SEWER MAIN	
S	SEWER MANHOLE	
T	TELSTRA CABLE	
O	OPTUS CABLE	
E	U/GROUND ELECTRICITY	
	OVERHEAD ELECTRICITY	
PP	ELECTRICITY POLE	
RET WALL	RETAINING WALL	RET WALL
	TOP OF BATTER	
	FACE OF BATTER	
	TOE OF BATTER	
	SWALE DRAIN	

PRELIMINARY

NOT FOR CONSTRUCTION

CONSULTANT: MPN CONSULTING PTY LTD
CONTACT: STEVEN BYRNE (RPEQ 3858)
TELEPHONE: (07) 3335 4522

DATE 24.03.15

0 5 10 20 25

SCALE 1:500 (A1) 1:1000 (A3)

ISSUE	DATE	AMENDMENT	BY	APP
B	24.03.15	DIVERSION BUND & DRAINAGE CHANNELS ADDED	MS	SB
A	20.02.15	PRELIMINARY ISSUE FOR REVIEW	MS	SB

WAREHOUSE DEVELOPMENT

COOPERS PADDOCK
GOVERNOR MACQUARIE DRIVE
WARWICK FARM, NSW 2170

SCALES:	AS SHOWN
DESIGN:	MS
DRAWN:	MS
CHKD:	LS
APPRD:	SB
DATE:	24.03.15

CLIENT:
STOCKLAND

SCHEMATIC STORMWATER DRAINAGE PLAN SHEET 2

mpn consulting
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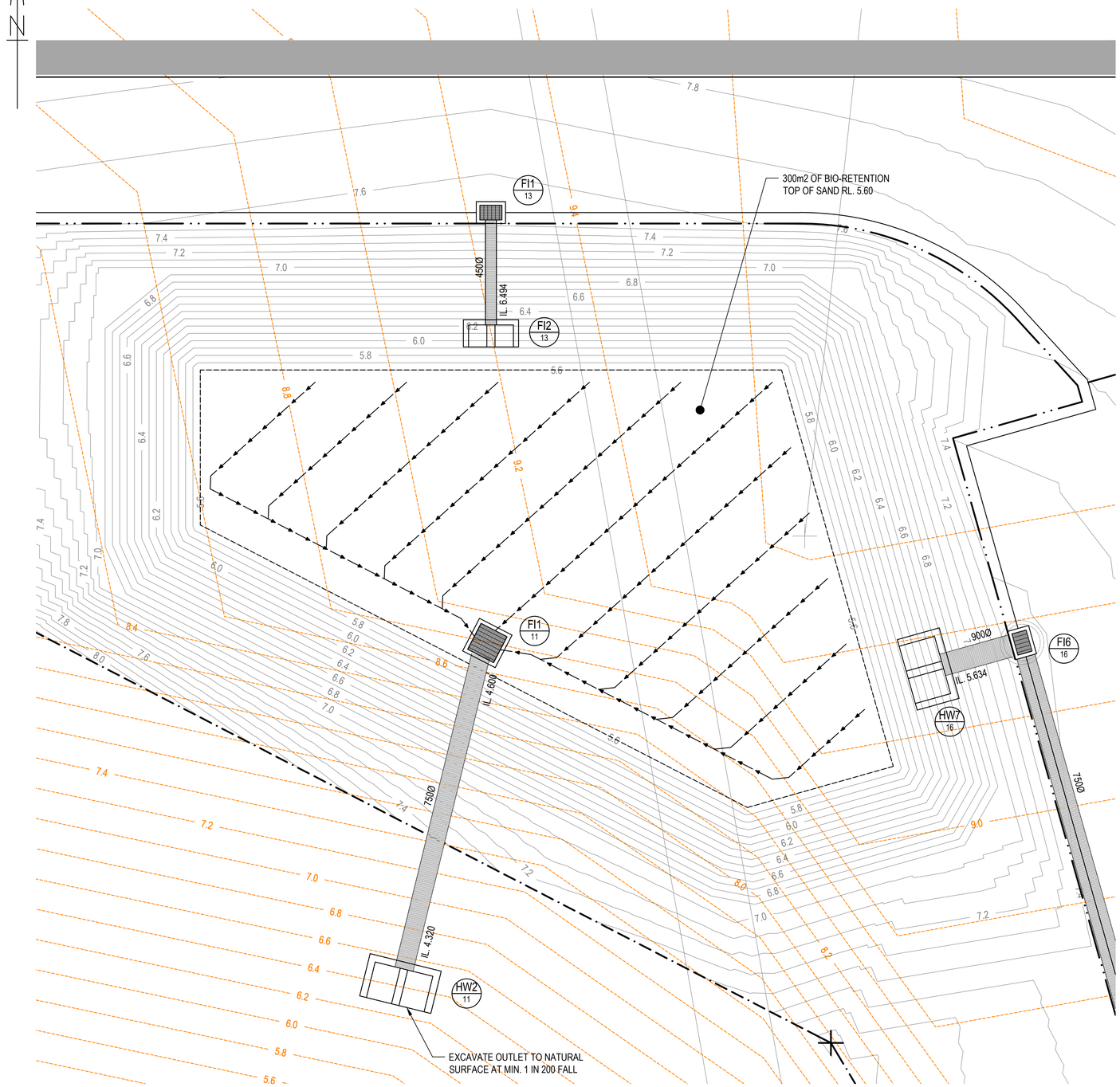
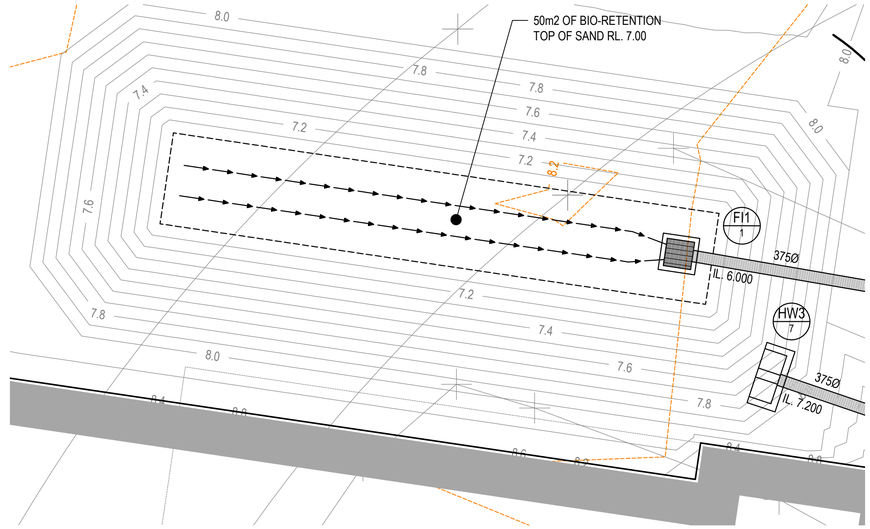
mpn JOB 6617

DRAWING No. DA.03

REV B



STORMWATER BIO-RETENTION BASIN No. 4 DETAIL PLAN



STORMWATER BIO-RETENTION BASIN No. 1 DETAIL PLAN

CONSULTANT: MPN CONSULTING PTY LTD
CONTACT: STEVEN BYRNE (RPEQ 3858)
TELEPHONE: (07) 3335 4522

DATE 26.02.15

0 1 2 3 4 5
SCALE 1:100 (A1) 1:200 (A3)

ISSUE	DATE	AMENDMENT	BY	APP
A	26.02.15	PRELIMINARY ISSUE FOR REVIEW	MS	SB

WAREHOUSE DEVELOPMENT

COOPERS PADDOCK
GOVERNOR MACQUARIE DRIVE
WARWICK FARM, NSW 2170

SCALES:	AS SHOWN
DESIGN:	MS
DRAWN:	MS
CHKD:	LS
APPRD:	SB
DATE:	26.02.15

CLIENT:
STOCKLAND

SCHEMATIC STORMWATER DRAINAGE DETAILS SHEET 1

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mpn JOB **6617**

DRAWING No. **DA.04**

REV **A**

PRELIMINARY

NOT FOR CONSTRUCTION

N

500m2 OF BIO-RETENTION
TOP OF SAND RL. 5.90

375Ø

375Ø

450Ø

MH3
8

HW4
8

IL 6.246

FI2
1

FI3
1

FOR CONTINUATION REFER BELOW

FOR CONTINUATION REFER ABOVE

600Ø

900Ø

FI4
1

HW2
14

525Ø

IL 6.350

FI1
14

1050Ø

IL 5.90

HW8
2

FI7
2

STORMWATER BIO-RETENTION BASIN No. 2 DETAIL PLAN

NOT FOR CONSTRUCTION

PRELIMINARY

CONSULTANT: MPN CONSULTING PTY LTD
CONTACT: STEVEN BYRNE (RPEQ 3858)
TELEPHONE: (07) 3335 4522

DATE 26.02.15

0 1 2 3 4 5

SCALE 1:100 (A1) 1:200 (A3)

ISSUE	DATE	AMENDMENT	BY	APP
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WAREHOUSE DEVELOPMENT

COOPERS PADDOCK
GOVERNOR MACQUARIE DRIVE
WARWICK FARM, NSW 2170

SCALES:	AS SHOWN
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SCHEMATIC STORMWATER DRAINAGE DETAILS SHEET 2

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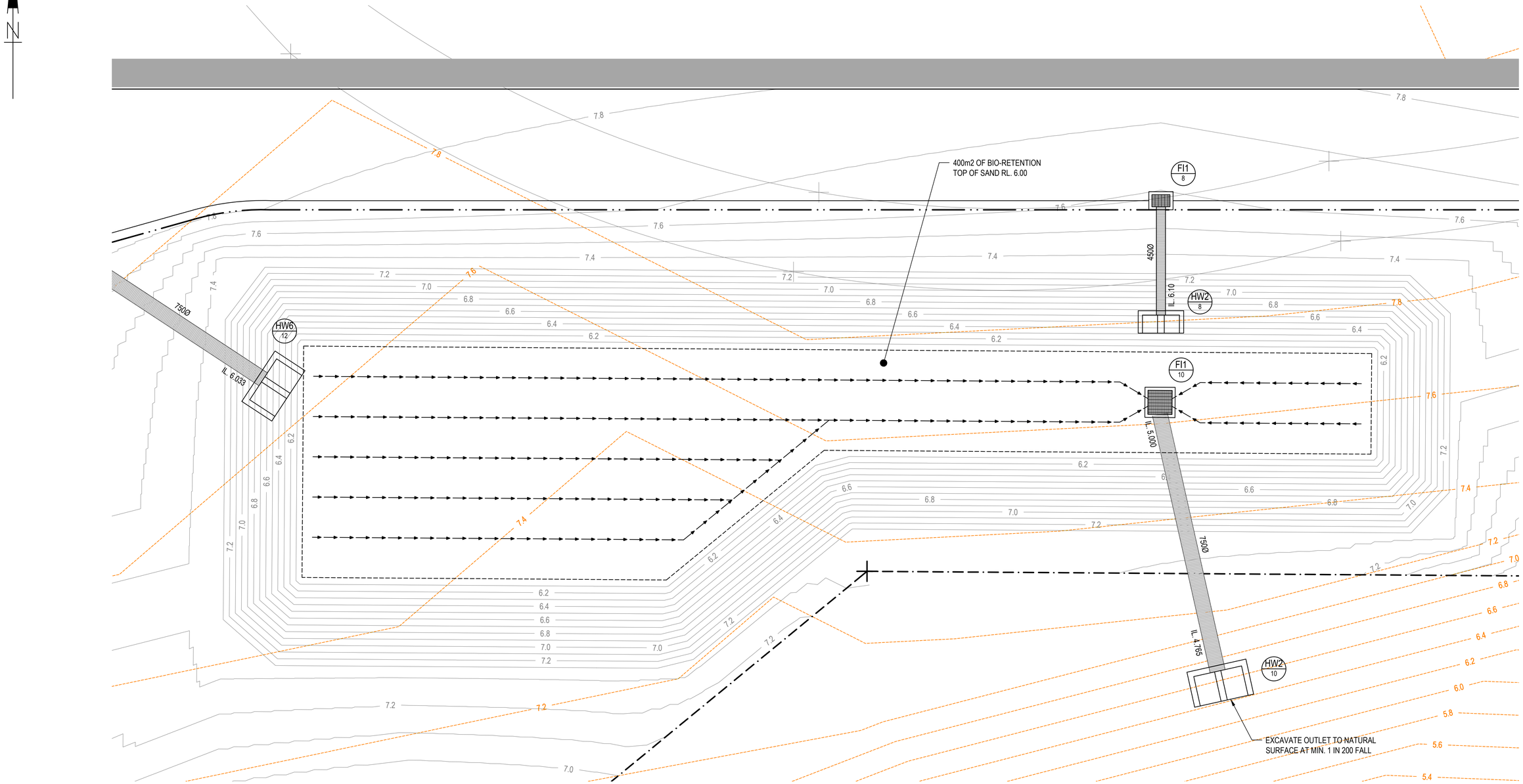
mpn JOB
6617

DRAWING No. **DA.05**

REV **A**



STORMWATER BIO-RETENTION BASIN No. 3 DETAIL PLAN

NOT FOR CONSTRUCTION

PRELIMINARY

CONSULTANT: MPN CONSULTING PTY LTD
CONTACT: STEVEN BYRNE (RPEQ 3858)
TELEPHONE: (07) 3335 4522

DATE 26.02.15

0 1 2 3 4 5
SCALE 1:100 (A1) 1:200 (A3)

ISSUE	DATE	AMENDMENT	BY	APP
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WAREHOUSE DEVELOPMENT

COOPERS PADDOCK
GOVERNOR MACQUARIE DRIVE
WARWICK FARM, NSW 2170

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CLIENT:
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SCHEMATIC STORMWATER DRAINAGE DETAILS SHEET 3

MPN Consulting Pty Ltd
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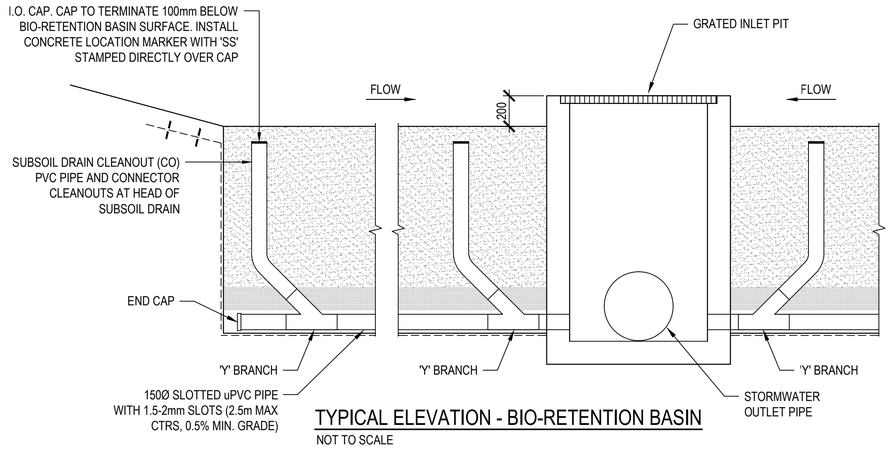
mpn JOB **6617**

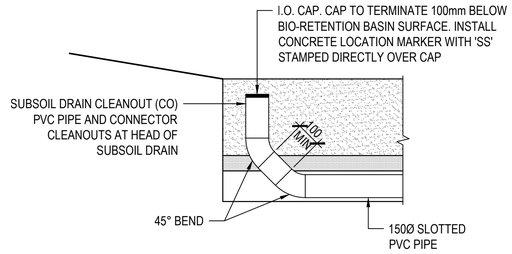
DRAWING No. **DA.06**

REV **A**



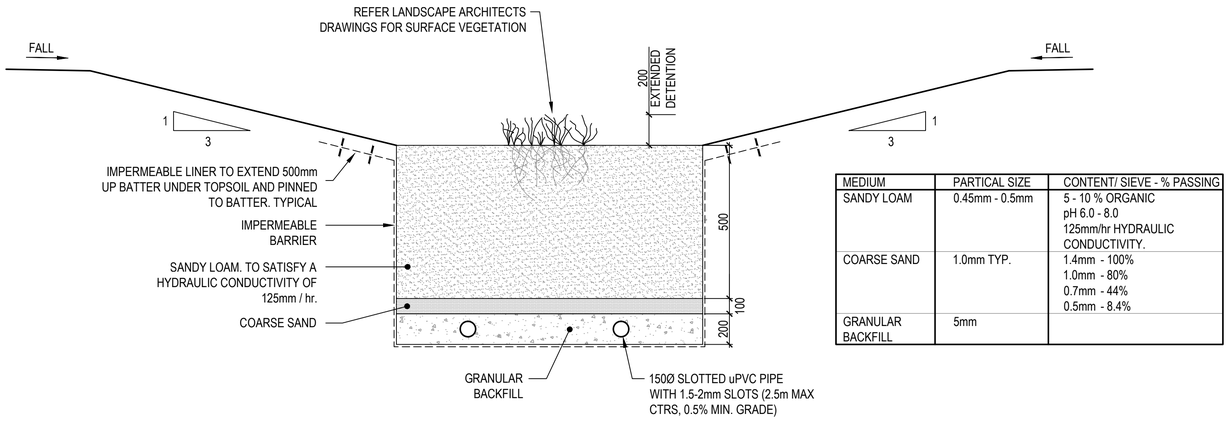
TYPICAL ELEVATION - BIO-RETENTION BASIN

NOT TO SCALE



ELEVATION OF CLEANOUT

NOT TO SCALE



MEDIUM	PARTICAL SIZE	CONTENT/ SIEVE - % PASSING
SANDY LOAM	0.45mm - 0.5mm	5 - 10 % ORGANIC pH 6.0 - 8.0 125mm/hr HYDRAULIC CONDUCTIVITY.
COARSE SAND	1.0mm TYP.	1.4mm - 100% 1.0mm - 80% 0.7mm - 44% 0.5mm - 8.4%
GRANULAR BACKFILL	5mm	

TYPICAL SECTION - BIO-RETENTION BASIN

NOT TO SCALE

CONSULTANT: MPN CONSULTING PTY LTD
CONTACT: STEVEN BYRNE (RPEQ 3858)
TELEPHONE: (07) 3335 4522
DATE 26.02.15

0 0.2 0.4 0.6 0.8 1.0
SCALE 1:20 (A1) 1:40 (A3)

ISSUE	DATE	AMENDMENT	BY	APP
A	26.02.15	PRELIMINARY ISSUE FOR REVIEW	MS	SB

WAREHOUSE DEVELOPMENT

COOPERS PADDOCK
GOVERNOR MACQUARIE DRIVE
WARWICK FARM, NSW 2170

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APPRD:	SB
DATE:	26.02.15

CLIENT:
STOCKLAND

SCHEMATIC STORMWATER DRAINAGE DETAILS SHEET 4

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mpn JOB **6617**

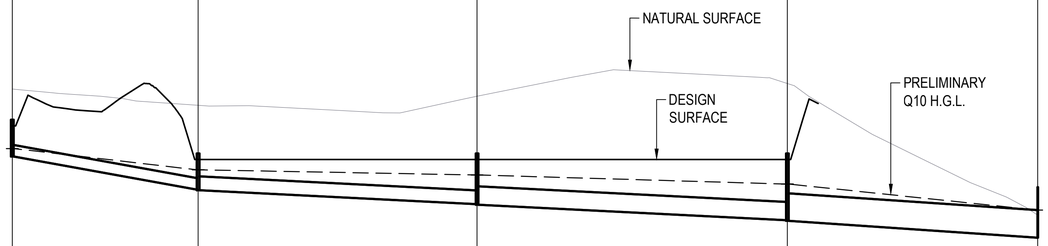
DRAWING No. **DA.07**

REV **A**

PRELIMINARY

NOT FOR CONSTRUCTION

STRUCTURE NAME	FI 1/1	FI 2/1	FI 3/1	FI 4/1	HW 5/1
STRUCTURE DESCRIPTION	900 X 900 FIELD INLET	900 X 900 FIELD INLET	900 X 900 FIELD INLET	1200 X 900 FIELD INLET	CONCRETE HEADWALL
PIPE SIZE (mm)	375Ø	450Ø	600Ø	900Ø	
PIPE CLASS	2	2	2	2	
PIPE GRADE (%)	1.78%	0.50%	0.50%	0.67%	
PIPE SLOPE (1 in X)	1 in 56	1 in 200	1 in 200	1 in 149	
FULL PIPE VELOCITY (m/s)	1.11	0.77	1.17	2.90	
PART FULL VELOCITY (m/s)	2.14	1.33	1.69	2.90	
DATUM RL	-8.0				
H.G.L IN PIPE & W.S.E IN STRUCTURE	6.259 / 6.259	5.565 / 5.565	5.396 / 5.396	5.100 / 5.100	4.250 / 4.250
PIPE FLOW (Cumecs)	0.123	0.123	0.332	1.847	
PIPE CAPACITY AT GRADE (Cumecs)	0.234	0.202	0.434	1.483	
DEPTH TO INVERT	1.200	1.180	1.200	1.655	1.675	2.182	2.202	1.650	1.650
INVERT LEVEL OF DRAIN	6.000	4.920	4.900	4.445	4.425	3.918	3.898	3.350	3.350
DESIGN SURFACE LEVEL	7.200	6.100		6.100		6.100		5.000	
SETOUT COORDINATES	E 310223.287 N 6245262.765	E 310283.088 N 6245252.546	E 310374.150 N 6245252.546	E 310474.845 N 6245263.522	E 310556.115 N 6245272.303
CHAINAGE	0.000	60.668	60.668	91.062	151.730	101.292	253.022	81.742	334.764



STRUCTURE NAME	FI 1/2	MH 2/2	FI 3/2	FI 4/2	MH 5/2	FI 6/2	FI 7/2	HW 8/2
STRUCTURE DESCRIPTION	900 X 600 FIELD INLET	STD 1050 DIA. MANHOLE	1800 X 900 FIELD INLET	1800 X 900 FIELD INLET	STD 1200 DIA. MANHOLE	900 X 600 FIELD INLET STD 1500 DIA. MANHOLE	900 X 600 FIELD INLET STD 1500 DIA. MANHOLE	CONCRETE HEADWALL
PIPE SIZE (mm)	375Ø	375Ø	(2x) 600Ø	900Ø	900Ø	1050Ø	1050Ø	
PIPE CLASS	2	2	2	2	2	2	2	
PIPE GRADE (%)	1.00%	1.00%	0.50%	0.50%	0.40%	0.40%	0.40%	
PIPE SLOPE (1 in X)	1 in 100	1 in 100	1 in 200	1 in 200	1 in 250	1 in 250	1 in 250	
FULL PIPE VELOCITY (m/s)	0.16	0.16	0.82	1.40	1.58	1.46	1.53	
PART FULL VELOCITY (m/s)	1.03	1.02	1.56	2.17	2.03	2.18	2.20	
DATUM RL	-6.0							
H.G.L IN PIPE & W.S.E IN STRUCTURE	7.529 / 7.515	7.453 / 7.453	7.451 / 7.461	7.375 / 7.292	7.292 / 7.102	7.077 / 7.077	7.024 / 6.904	6.907 / 6.802	6.652 / 6.652	6.625 / 6.553	6.553
PIPE FLOW (Cumecs)	0.018	0.018	0.462	0.891	1.006	1.260	1.322	
PIPE CAPACITY AT GRADE (Cumecs)	0.175	0.175	0.869	1.281	1.145	1.728	1.728	
DEPTH TO INVERT	0.936	0.864	0.884	0.929	0.949	1.253	1.273	1.728	1.748	2.423	2.443	2.825	2.845	1.450	1.450
INVERT LEVEL OF DRAIN	7.420	7.135	7.115	6.821	6.801	6.497	6.477	6.358	6.338	6.157	6.137	5.962	5.942	5.900	5.900
DESIGN SURFACE LEVEL	8.356	7.998		7.750		7.750		8.086		8.579		8.786		7.350	
SETOUT COORDINATES	E 310248.244 N 6245187.946	E 310256.621 N 6245160.739	E 310285.944 N 6245159.046	E 310346.748 N 6245159.046	E 310369.822 N 6245165.146	E 310401.194 N 6245197.796	E 310401.194 N 6245241.498	E 310401.194 N 6245251.960
CHAINAGE	0.000	28.468	28.468	29.371	57.839	60.805	118.643	23.867	142.510	45.279	187.789	43.702	231.491	10.462	241.953

STRUCTURE NAME	FI 1/3	FI 2/12
STRUCTURE DESCRIPTION	900 X 600 FIELD INLET	900 X 600 FIELD INLET STD 1200 DIA. MANHOLE
PIPE SIZE (mm)	375Ø	
PIPE CLASS	2	
PIPE GRADE (%)	0.94%	
PIPE SLOPE (1 in X)	1 in 106	
FULL PIPE VELOCITY (m/s)	0.44	
PART FULL VELOCITY (m/s)	1.33	
DATUM RL	-6.0	
H.G.L IN PIPE & W.S.E IN STRUCTURE	7.571 / 7.473	7.456 / 7.456	7.336
PIPE FLOW (Cumecs)	0.049	
PIPE CAPACITY AT GRADE (Cumecs)	0.170	
DEPTH TO INVERT	1.189	1.136	1.156
INVERT LEVEL OF DRAIN	7.146	6.914	6.894
DESIGN SURFACE LEVEL	8.335	8.050	
SETOUT COORDINATES	E 310223.013 N 6245169.304	E 310204.117 N 6245153.582
CHAINAGE	-39.998	24.581	-15.416

LINE 1 2 3

PRELIMINARY

NOT FOR CONSTRUCTION

CONSULTANT: MPN CONSULTING PTY LTD
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DATE 26.02.15

VERT: 0 1 2 3 4 5 SCALE 1:100 (A1) 1:200 (A3)

HORIZ: 0 10 20 30 40 50 SCALE 1:1000 (A1) 1:2000 (A3)

ISSUE	DATE	AMENDMENT	BY	APP
A	26.02.15	PRELIMINARY ISSUE FOR REVIEW	MS	SB

WAREHOUSE DEVELOPMENT

COOPERS PADDOCK
GOVERNOR MACQUARIE DRIVE
WARWICK FARM, NSW 2170

SCALES:	AS SHOWN
DESIGN:	MS
DRAWN:	MS
CHKD:	LS
APPRD:	SB
DATE:	26.02.15

CLIENT: STOCKLAND

SCHEMATIC STORMWATER LONGITUDINAL SECTIONS SHEET 1

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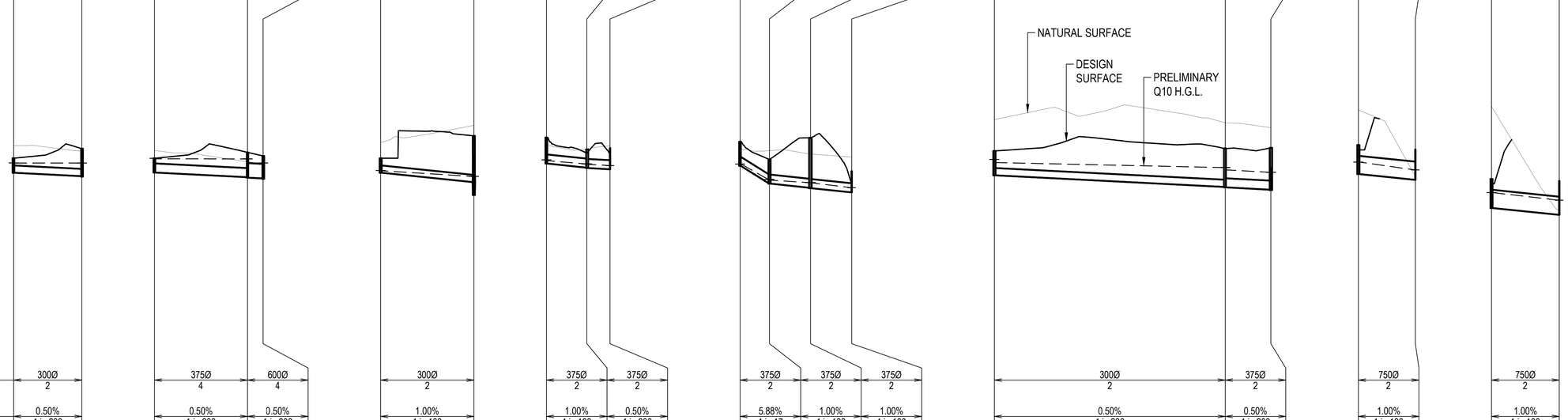
mpn JOB **6617**

DRAWING No. **DA.08** REV **A**

STRUCTURE NAME	FI 1/4	FI 2/12	FI 1/5	FI 2/5	FI 3/2	FI 1/6	FI 6/2	FI 1/7	MH 2/7	HW 3/7	FI 1/8	G 2/8	MH 3/8	HW 4/8	FI 1/9	FI 2/9	MH 5/2	FI 1/10	HW 2/10	FI 1/11	HW 2/11
STRUCTURE DESCRIPTION	900 X 600 FIELD INLET	900 X 600 FIELD INLET STD 1200 DIA. MANHOLE	900 X 600 FIELD INLET	900 X 600 FIELD INLET	1800 X 900 FIELD INLET	900 X 600 FIELD INLET	900 X 600 FIELD INLET STD 1500 DIA. MANHOLE	900 X 600 FIELD INLET	STD 1050 DIA. MANHOLE	CONCRETE HEADWALL	900 X 600 FIELD INLET	GULLY PIT L.I.L; 2.4m Lintel: K&C STD. MANHOLE	STD 1050 DIA. MANHOLE	CONCRETE HEADWALL	900 X 600 FIELD INLET	900 X 600 FIELD INLET	STD 1200 DIA. MANHOLE	12000 X 1200 FIELD INLET	CONCRETE HEADWALL	12000 X 1200 FIELD INLET	CONCRETE HEADWALL
PIPE SIZE (mm)		300Ø		375Ø	600Ø		300Ø		375Ø	375Ø		375Ø	375Ø	375Ø		300Ø	375Ø		750Ø		750Ø
PIPE CLASS		2		4	4		2		2	2		2	2	2		2	2		2		2
PIPE GRADE (%)		0.50%		0.50%	0.50%		1.00%		1.00%	0.50%		5.88%	1.00%	1.00%		0.50%	0.50%		1.00%		1.00%
PIPE SLOPE (1 in X)		1 in 200		1 in 200	1 in 200		1 in 100		1 in 100	1 in 200		1 in 17	1 in 100	1 in 100		1 in 200	1 in 200		1 in 100		1 in 100
FULL PIPE VELOCITY (m/s)		0.08		0.20	0.76		0.17		0.26	0.40		0.10	0.36	0.83		0.64	1.12		1.45		2.46
PART FULL VELOCITY (m/s)		0.59		0.85	1.53		0.93		1.17	1.03		1.64	1.29	1.60		1.03	1.12		2.61		2.87
DATUM RL		-6.0		-6.0			-6.0		-6.0			-6.0				-6.0			-8.0		-7.0
H.G.L IN PIPE & W.S.E IN STRUCTURE	7.460	7.457 7.456	7.651	7.632 7.626	7.457 7.449	7.147	7.137 6.904	7.590	7.556 7.418	7.403 7.352	7.416	7.411 6.779	6.749 6.648	6.638 6.438	7.606	7.477 7.269	7.172 7.077	5.496	5.496 5.173	5.239	5.239 4.921
PIPE FLOW (Cumecs)		0.006		0.022	0.215		0.012		0.029	0.045		0.011	0.040	0.092		0.045	0.124		0.641		1.089
PIPE CAPACITY AT GRADE (Cumecs)		0.068		0.124	0.434		0.097		0.175	0.124		0.425	0.175	0.175		0.068	0.124		1.114		1.114
DEPTH TO INVERT	0.600	1.136	0.589	1.025	1.045 0.929	0.600	1.910	1.076	0.750	0.770 0.875	1.000	0.980	1.000	2.064 2.084 0.875	1.005	1.591	1.611 1.728	1.200	1.250	1.200	1.400
INVERT LEVEL OF DRAIN	7.054	6.914	7.065	6.873	6.853 6.821	7.054	6.669	7.435	7.268	7.248 7.200	7.338	6.626	6.606	6.436 6.416 6.246	6.949	6.472	6.452 6.358	5.000	4.765	4.600	4.320
DESIGN SURFACE LEVEL	7.654	8.050	7.654	7.899	7.750	7.654	8.579	8.510	8.018	8.075	8.338	7.606	8.500	7.121	7.954	8.063	8.086	6.200	6.015	5.800	5.720
SETOUT COORDINATES	E 310207.709 N 6245181.519	E 310204.117 N 6245153.582	E 310275.933 N 6245115.496	E 310285.944 N 6245152.596	E 310285.944 N 6245159.046	E 310362.694 N 6245197.796	E 310401.194 N 6245197.796	E 310233.305 N 6245239.049	E 310235.592 N 6245255.573	E 310226.548 N 6245258.658	E 310248.244 N 6245231.746	E 310247.559 N 6245243.823	E 310262.984 N 6245250.901	E 310279.988 N 6245250.901	E 310450.284 N 6245095.525	E 310369.539 N 6245146.296	E 310369.822 N 6245165.146	E 310220.691 N 6245024.472	E 310225.622 N 6245001.462	E 310342.813 N 6245016.866	E 310335.891 N 6244989.753
CHAINAGE	0.000	28.167 28.167	0.000	38.427 38.427	6.450 44.877	0.000	38.500 38.500	0.000	16.682 16.682	9.556 26.238	0.000	12.096 12.096	16.972 29.068	17.004 46.072	-95.380	95.380 0.000	18.852 18.852	0.000	23.532 23.532	0.000	27.983 27.983



LINE 4 5 6 7 8 9 10 11

PRELIMINARY

NOT FOR CONSTRUCTION

CONSULTANT: MPN CONSULTING PTY LTD
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DATE 26.02.15

VERT: 0 1 2 3 4 5 SCALE 1:100 (A1) 1:200 (A3)

HORIZ: 0 10 20 30 40 50 SCALE 1:1000 (A1) 1:2000 (A3)

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WAREHOUSE DEVELOPMENT

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SCHEMATIC STORMWATER LONGITUDINAL SECTIONS SHEET 2

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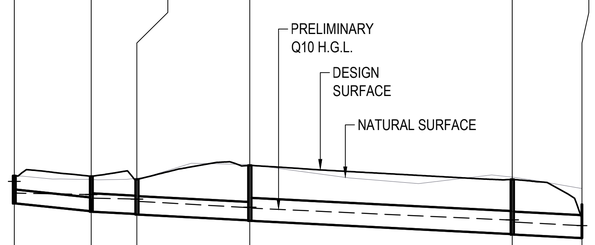
mpn JOB **6617**

DRAWING No. **DA.09** REV **A**

STRUCTURE NAME	FI 1/12	FI 2/12	FI 3/12	MH 4/12	MH 5/12	HW 6/12	FI 1/13	HW 2/13	FI 1/14	HW 2/14	FI 1/15	MH 3/16	FI 1/16	MH 2/16	MH 3/16	FI 4/16	FI 5/16	FI 6/16	HW 7/16	FI 1/17	FI 6/2	FI 1/18	HW 2/18
STRUCTURE DESCRIPTION	900 X 600 FIELD INLET	900 X 600 FIELD INLET STD 1200 DIA. MANHOLE	900 X 600 FIELD INLET STD 1050 DIA. MANHOLE	STD 1050 DIA. MANHOLE	STD 1050 DIA. MANHOLE	CONCRETE HEADWALL	900 X 600 FIELD INLET	CONCRETE HEADWALL	900 X 600 FIELD INLET	CONCRETE HEADWALL	900 X 600 FIELD INLET	STD 1200 DIA. MANHOLE	900 X 900 FIELD INLET	STD 1050 DIA. MANHOLE	STD 1200 DIA. MANHOLE	900 X 600 FIELD INLET STD 1050 DIA. MANHOLE	900 X 600 FIELD INLET STD 1050 DIA. MANHOLE	900 X 600 FIELD INLET STD 1500 DIA. MANHOLE	CONCRETE HEADWALL	900 X 600 FIELD INLET	900 X 600 FIELD INLET STD 1500 DIA. MANHOLE	900 X 600 FIELD INLET	CONCRETE HEADWALL
PIPE SIZE (mm)	450Ø	600Ø	600Ø	750Ø	750Ø		450Ø		525Ø		375Ø		600Ø	600Ø	750Ø	750Ø	750Ø	900Ø		450Ø		450Ø	
PIPE CLASS	2	2	2	2	2		2		2		2		2	2	2	2	2	2		2		2	
PIPE GRADE (%)	1.00%	0.50%	0.50%	0.50%	0.50%		1.00%		5.00%		2.50%		0.50%	0.50%	0.50%	0.50%	0.50%	0.50%		2.50%		1.00%	
PIPE SLOPE (1 in X)	1 in 100	1 in 200	1 in 200	1 in 200	1 in 200		1 in 100		1 in 20		1 in 40		1 in 200	1 in 200	1 in 200	1 in 200	1 in 200	1 in 200		1 in 40		1 in 100	
FULL PIPE VELOCITY (m/s)	0.98	1.17	1.34	1.03	1.01		1.18		1.45		0.06		0.93	1.81	1.17	1.58	1.68	1.42		1.30		1.56	
PART FULL VELOCITY (m/s)	1.83	1.69	1.73	1.85	1.84		1.91		3.97		1.04		1.61	1.81	1.90	2.01	2.03	2.18		2.77		2.02	
DATUM RL	-7.0						-6.0		-6.0		-6.0		-6.0							-6.0		-7.0	
H.G.L IN PIPE & W.S.E IN STRUCTURE	7.885	7.502 7.456	7.336 7.307	7.233 7.029	7.011 6.621	6.558 6.438	6.438	7.327 6.846 6.761	6.761	7.854 7.209 6.796	6.796	7.572 7.571 7.150	7.150	7.840 7.595 7.521	7.521	7.477 7.150	7.150	7.143 7.055	7.055	6.884 6.717	6.723	6.560 6.435	6.488
PIPE FLOW (Cumecs)	0.156	0.332	0.378	0.457	0.448		0.188		0.313		0.007		0.263	0.513	0.518	0.699	0.740	0.901		0.206		0.248	
PIPE CAPACITY AT GRADE (Cumecs)	0.285	0.434	0.434	0.788	0.788		0.285		0.962		0.277		0.434	0.434	0.788	0.788	0.788	1.281		0.451		0.285	
DEPTH TO INVERT	0.905	1.136	1.156	1.132	1.152	1.792	1.812	1.783	1.803	1.100	1.100	1.000	1.025	1.025	1.588	1.025	1.025	1.000	1.224	1.961	1.126	2.085	2.105
INVERT LEVEL OF DRAIN	7.165	6.914	6.894	6.820	6.800	6.615	6.595	6.167	6.147	6.033	6.033	6.540	6.494	6.494	6.829	6.590	6.590	7.514	7.007	6.270	6.743	6.544	6.524
DESIGN SURFACE LEVEL	8.070	8.050	7.952	8.407	7.949	7.133	7.540	7.519	8.418	7.615	8.514	8.231	7.869	8.629	8.231	7.879	7.510	7.372	6.884	8.577	8.579	7.585	7.050
SETOUT COORDINATES	E 310229.212 N 6245152.596	E 310204.117 N 6245153.582	E 310192.567 N 6245144.196	E 310161.922 N 6245123.661	E 310157.120 N 6245038.120	E 310176.128 N 6245025.619	E 310342.960 N 6245034.496	E 310342.960 N 6245029.892	E 310471.311 N 6245254.804	E 310470.743 N 6245259.553	E 310468.610 N 6244957.522	E 310448.401 N 6244955.546	E 310533.659 N 6244955.701	E 310494.663 N 6244947.763	E 310448.401 N 6244955.546	E 310411.684 N 6244972.696	E 310372.516 N 6244989.185	E 310364.709 N 6245016.884	E 310361.454 N 6245015.966	E 310411.744 N 6245194.274	E 310401.194 N 6245197.796	E 310220.737 N 6245034.496	E 310220.737 N 6245028.814
CHAINAGE	-226.283	25.114 -201.168	14.883 -186.285	36.889 -149.396	85.675 -63.720	22.751 -40.970	0.000	4.604 4.604	0.000	4.783 4.783	0.000	20.306 20.306	-126.522	39.795 -86.727	46.913 -39.814	40.525 0.710	42.497 43.207	28.778 71.985	3.382 75.367	0.000	11.122 11.122	0.000	5.682 5.682



LINE 12 13 14 15 16 17 18

CONSULTANT: MPN CONSULTING PTY LTD
CONTACT: STEVEN BYRNE (RPEQ 3858)
TELEPHONE: (07) 3335 4522
DATE 26.02.15

VERT: 0 1 2 3 4 5 SCALE 1:100 (A1) 1:200 (A3)

HORIZ: 0 10 20 30 40 50 SCALE 1:1000 (A1) 1:2000 (A3)

ISSUE	DATE	AMENDMENT	BY	APP
A	26.02.15	PRELIMINARY ISSUE FOR REVIEW	MS	SB

WAREHOUSE DEVELOPMENT
COOPERS PADDOCK
GOVERNOR MACQUARIE DRIVE
WARWICK FARM, NSW 2170

SCALES:	AS SHOWN
DESIGN:	MS
DRAWN:	MS
CHKD:	LS
APPRD:	SB
DATE:	26.02.15

CLIENT: STOCKLAND

SCHEMATIC STORMWATER LONGITUDINAL SECTIONS SHEET 3

MPN Consulting Pty Ltd
ABN: 39 062 191 799
39 Sherwood Road, Toowong, Qld, 4066
P: 61 7 3335 4555
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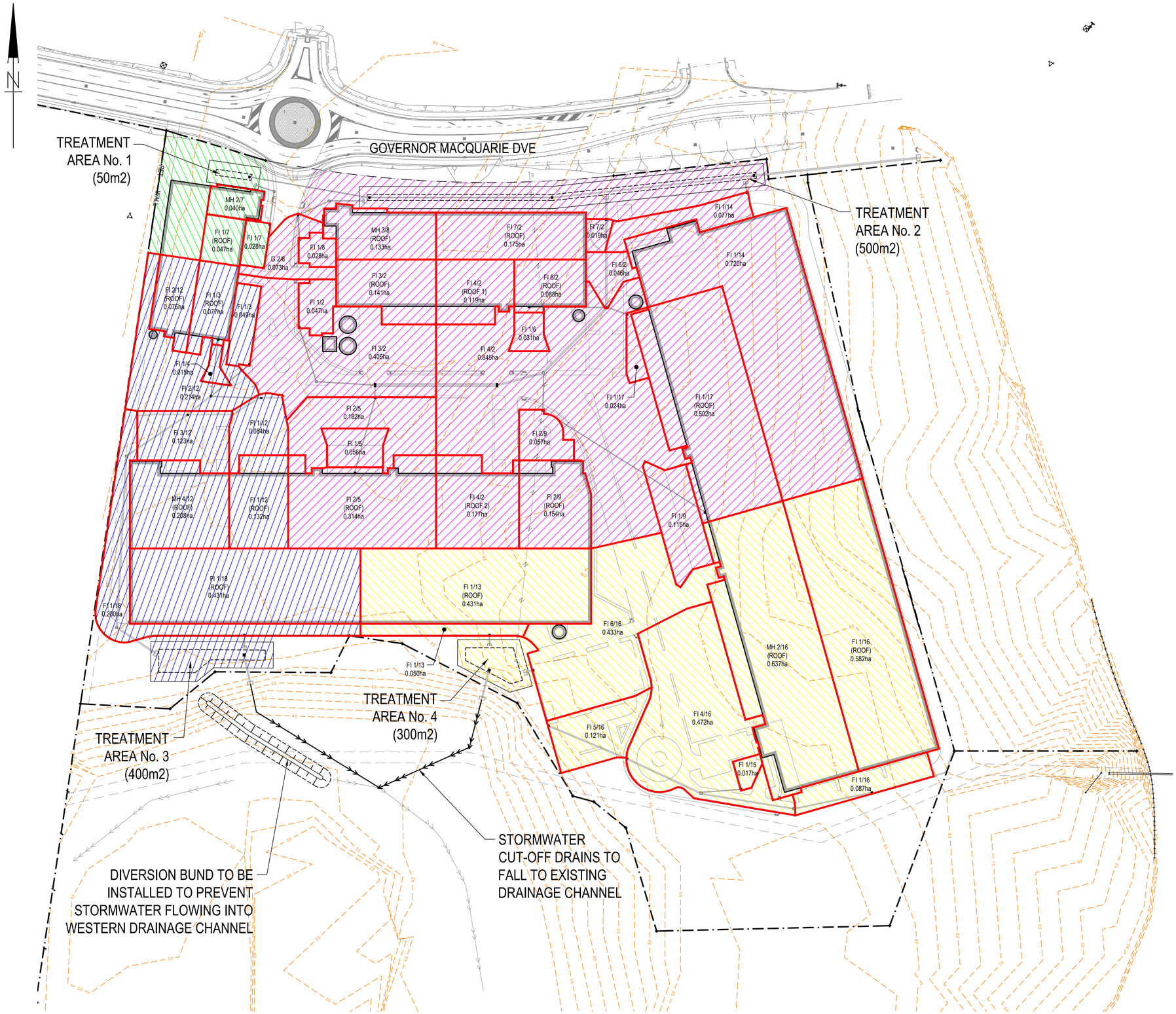
E: solutions@mpnc.net.au

mpn JOB 6617

DRAWING No. DA.10 REV A

PRELIMINARY

NOT FOR CONSTRUCTION



LEGEND

EXISTING		PROPOSED
	PROPERTY BOUNDARY	
5.00	MAJOR CONTOUR	5.00
	MINOR CONTOUR	
	BUILDING	
	CONCRETE	
	EDGE OF BITUMEN	
	BARRIER KERB	
	KERB AND CHANNEL	
	FLUSH KERB	
	KERB RAMP	
SW SW	STORM WATER MAIN	
SW	STORM WATER MANHOLE	
SW	STORM WATER GULLY PIT	
	CATCHMENT BOUNDARY	

CATCHMENT TO TREATMENT AREA No. 1
3,147m2

CATCHMENT TO TREATMENT AREA No. 2
49,373m2

CATCHMENT TO TREATMENT AREA No. 3
17,268m2

CATCHMENT TO TREATMENT AREA No. 4
29,143m2

CONSULTANT: MPN CONSULTING PTY LTD
CONTACT: STEVEN BYRNE (RPEQ 3858)
TELEPHONE: (07) 3335 4522

DATE 24.03.15

0 10 20 30 40 50
SCALE 1:1000 (A1) 1:2000 (A3)

PRELIMINARY

NOT FOR CONSTRUCTION

ISSUE	DATE	AMENDMENT	BY	APP
B	24.03.15	DIVERSION BUND & DRAINAGE CHANNELS ADDED	MS	SB
A	26.02.15	PRELIMINARY ISSUE FOR REVIEW	MS	SB

WAREHOUSE DEVELOPMENT

COOPERS PADDOCK
GOVERNOR MACQUARIE DRIVE
WARWICK FARM, NSW 2170

SCALES:	AS SHOWN
DESIGN:	MS
DRAWN:	MS
CHKD:	LS
APPRD:	SB
DATE:	24.03.15

CLIENT:
STOCKLAND

SCHEMATIC STORMWATER DRAINAGE CATCHMENT PLAN

MPN Consulting Pty Ltd
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39 Sherwood Road, Toowong, Qld, 4066
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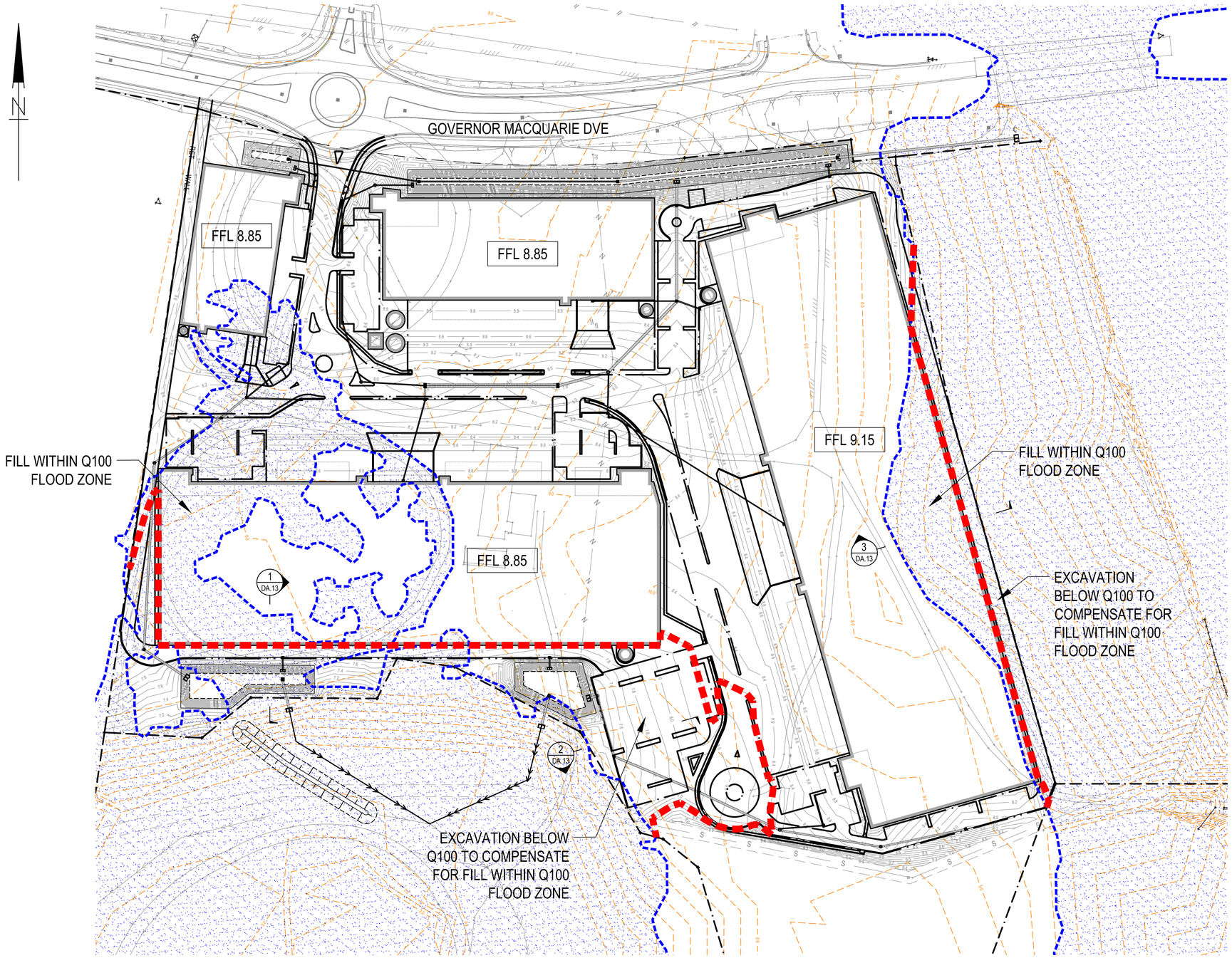
mpn JOB **6617**

DRAWING No. **DA.11**

REV **B**



LEGEND

EXISTING		PROPOSED
	PROPERTY BOUNDARY	
5.00	MAJOR CONTOUR	5.00
	MINOR CONTOUR	
	BUILDING	
	CONCRETE	
	EDGE OF BITUMEN	
	BARRIER KERB	
	KERB AND CHANNEL	
SW SW	STORM WATER MAIN	
SW	STORM WATER MANHOLE	
SW	STORM WATER GULLY PIT	
	Q100 FLOOD ZONE	

Q100 FLOOD STORAGE TABLE

	FILL WITHIN Q100 FLOOD ZONE	EXCAVATION WITHIN Q100 FLOOD ZONE
EASTERN SIDE	1,917 m3	213 m3
SOUTHERN SIDE	2,632 m3	6,162 m3
TOTAL	4,549 m3	6,375 m3

0 10 20 30 40 50

SCALE 1:1000 (A1) 1:2000 (A3)

ISSUE	DATE	AMENDMENT	BY	APP
A	16.06.15	PRELIMINARY ISSUE FOR REVIEW	MS	SB

WAREHOUSE DEVELOPMENT

COOPERS PADDOCK
GOVERNOR MACQUARIE DRIVE
WARWICK FARM, NSW 2170

SCALES:	AS SHOWN
DESIGN:	MS
DRAWN:	MS
CHKD:	LS
APPRD:	SB
DATE:	

CLIENT:
STOCKLAND

EARTHWORKS IN Q100 FLOOD ZONE

MPN Consulting Pty Ltd
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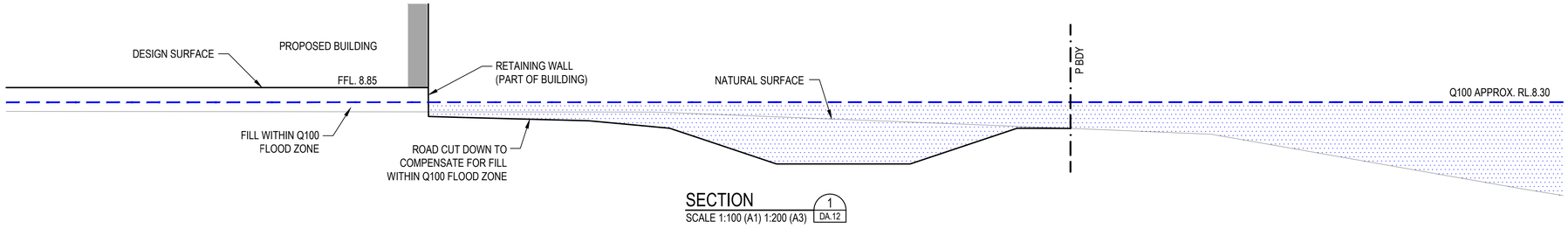
mpn JOB 6617

DRAWING No. DA.12

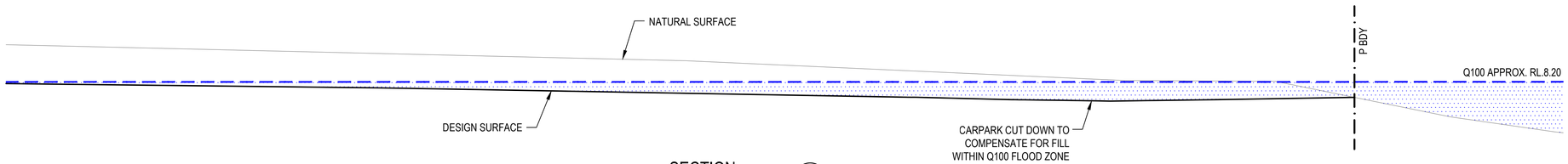
REV A

PRELIMINARY

NOT FOR CONSTRUCTION



SECTION 1 DA.12
SCALE 1:100 (A1) 1:200 (A3)



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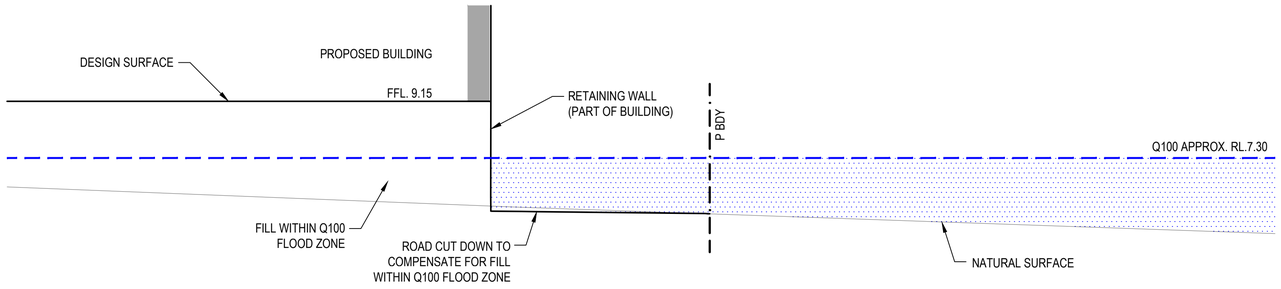
SCALE 1:100 (A1) 1:200 (A3)



SECTION 3 DA.12
SCALE 1:100 (A1) 1:200 (A3)

NOT FOR CONSTRUCTION

PRELIMINARY

0 1 2 3 4 5
SCALE 1:100 (A1) 1:200 (A3)

ISSUE	DATE	AMENDMENT	BY	APP
A	16.06.15	PRELIMINARY ISSUE FOR REVIEW	MS	SB

WAREHOUSE DEVELOPMENT

COOPERS PADDOCK
GOVERNOR MACQUARIE DRIVE
WARWICK FARM, NSW 2170

SCALES:	AS SHOWN
DESIGN:	MS
DRAWN:	MS
CHKD:	LS
APPRD:	SB
DATE:	

CLIENT:
STOCKLAND

EARTHWORKS IN Q100 FLOOD ZONE

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mpn JOB **6617**

DRAWING No. **DA.13**

REV **A**

Appendix 3
Bioretention Maintenance Checklist

MPN CONSULTING PTY LTD 39 Sherwood Road Toowong Queensland 4066 Australia **Phone • 61 7 3335 4555** Fax • 61 7 3371 3196

BIORETENTION BASIN MAINTENANCE CHECKLIST

Inspection Frequency 1 to 6 Monthly Date of Inspection
Location
Description
Asset ID
Site Visit by

Inspection Items	Y	N	Actions Required (Details)
Sediment accumulation at inflow points?			
Litter within basin?			
Erosion at inlet or other key structures?			
Traffic damage present?			
Evidence of water dumping?			
Vegetation condition satisfactory (health, weeds etc)?			
Watering of vegetation required?			
Replanting required?			
Mowing required?			
Clogging of drainage points (sediment or debris)?			
Evidence of ponding?			
Damage/Vandalism to structures present?			
Surface clogging visible?			
Reprofilling/filling of surface required?			
Drainage System inspected?			
Resetting of system required?			

MPN CONSULTING PTY LTD 39 Sherwood Road Toowong Queensland 4066 Australia **Phone • 61 7 3335 4555** Fax • 61 7 3371 3196