



LEGEND

- CATCHMENT BOUNDARY
- EXISTING NATURAL CONTOUR
- PROPOSED DEVELOPMENT EXTENT
- STORMWATER CATCHMENT I.D.
- LPOD
- LEGAL POINT OF DISCHARGE

STORMWATER CATCHMENT TABLE	
STORMWATER CATCHMENT I.D.	AREA (ha)
A	2.405
B	4.427

			<div><div>Knobel Consulting Pty Ltd</div><div><b>KNOBEL CONSULTING PTY LTD</b></div><div>ENGINEERS - PROJECT MANAGERS</div></div> <div><div><div><div><div></div><div></div></div><div><div></div><div></div></div></div><div><div></div><div></div></div></div><div><div>Phone: 07 5576 4168</div><div>6/109 West Burleigh Road</div><div>Fax: 07 5576 6477</div><div>Burleigh Heads QLD 4220</div><div>Email: eng@knobelconsulting.com.au</div><div>ABN 33 071 435 202</div></div></div>	CLIENT PROPORTIONAL PROPERTY INVESTMENTS PTY LTD			DESIGN MG	DRAWN AA/EL	APPROVED	TITLE PRE DEVELOPMENT INTERNAL CATCHMENT PLAN		PROJECT NO. K1868		
B	12-07-13	CATCHMENT BOUNDARIES AMENDED		PROJECT TOURIST ACCOMMODATION KIRKWOOD ROAD, TWEED HEADS SOUTH, NSW					SCALE 1:1000 AT A1 1:2000 AT A3		DWG NO. P010		ISSUE B	
A	23-03-12	ISSUED FOR REPORT												
ISSUE No.	DATE	AMENDMENT												



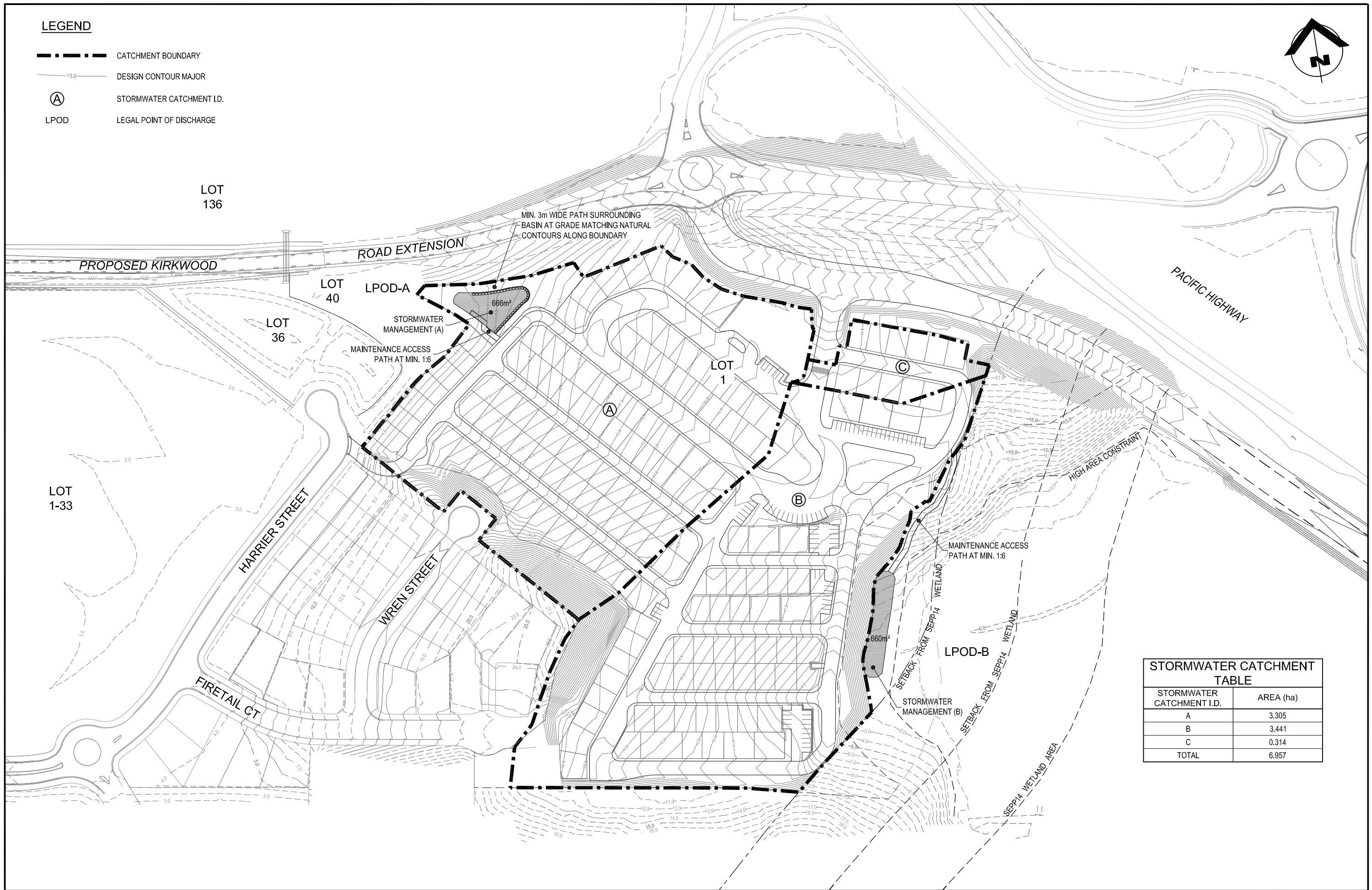
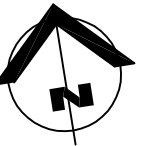
APPENDIX

**C**



Knobel Consulting Pty Ltd  
*Post Development Internal Catchment Plan*  
(Ref: K1868/P011/E)

LEGEND

- CATCHMENT BOUNDARY
- 13.0— DESIGN CONTOUR MAJOR
- Ⓐ STORMWATER CATCHMENT I.D.
- LPOD LEGAL POINT OF DISCHARGE



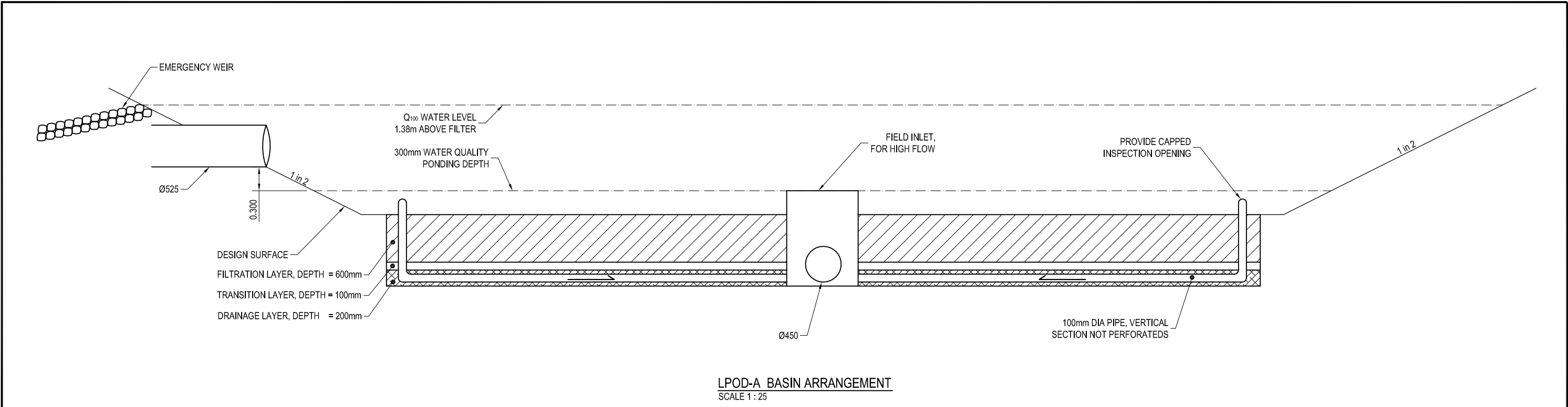
STORMWATER CATCHMENT TABLE	
STORMWATER CATCHMENT I.D.	AREA (ha)
A	3.305
B	3.441
C	0.314
TOTAL	6.957

E	19-07-13	BIO RETENTION BASINS AMENDED	<div><div>Knobel Consulting Pty Ltd</div><div></div><div><b>KNOBEL CONSULTING PTY LTD</b></div><div>ENGINEERS - PROJECT MANAGERS</div><div><div>Phone: 07 5576 4168</div><div>Fax: 07 5576 6477</div><div>Email: eng@knobelconsulting.com.au</div></div><div><div>6/109 West Burleigh Road</div><div>Burleigh Heads QLD 4220</div><div>ABN 33 071 435 202</div></div></div>	CLIENT	PROPORTIONAL PROPERTY INVESTMENTS PTY LTD	DESIGN	TP	DRAWN	AA/NF	APPROVED	TITLE	PROJECT NO.		
D	12-07-13	CATCHMENT BOUNDARIES AMENDED		PROJECT	TOURIST ACCOMMODATION KIRKWOOD ROAD, TWEED HEADS SOUTH, NSW					POST DEVELOPMENT INTERNAL CATCHMENT PLAN		K1868		
C	20-07-12	LAYOUT AMENDED										DWG NO.	ISSUE	
B	30-05-12	MINOR AMENDMENTS												
A	23-03-12	ISSUED FOR REPORT												
ISSUE No.	DATE	AMENDMENT										P011	E	
SCALE 1:1000 AT A1 1:2000 AT A3														

APPENDIX

**D**

Knobel Consulting Pty Ltd  
*Detention and Bioretention Basin Plan*  
(Ref: K1868/P037/A)



**LPOD-A BASIN ARRANGEMENT**  
SCALE 1 : 25

**NOTES:**

- DO NOT SCALE THIS DRAWING TAKE FIGURED DIMENSIONS ONLY
- ALL DIMENSIONS IN METERS UNLESS NOTED OTHERWISE

**FILTRATION LAYER:**

1. MATERIAL TO CONSIST OF SANDY LOAM OR EQUIVALENT MATERIAL.
2. MATERIAL TO HAVE 5% - 10% ORGANIC CONTENT IN ACCORDANCE WITH AS12894.1.1
3. MATERIAL TO HAVE AN AVERAGE PARTICLE SIZE (D50) OF 0.45mm.
4. SATURATED HYDRAULIC CONDUCTIVITY BETWEEN 50 - 200mm/hr DETERMINED IN ACCORDANCE WITH AS 4419-1998 APPENDIX H SOIL PERMEABILITY.
5. pH BETWEEN 6 & 7.
6. DEPTH TO BE 800mm OR GREATER FOR TREE PLANTING.

**TRANSITION LAYER:**

1. MATERIAL TO CONSIST OF SAND/COURSE SAND MATERIAL.
2. TYPICAL PARTICLE SIZE DISTRIBUTION  
% PASSING: 1.4mm 100%  
1.0mm 80%  
0.7mm 44%  
0.5mm 08%

**DRAINAGE LAYER:**

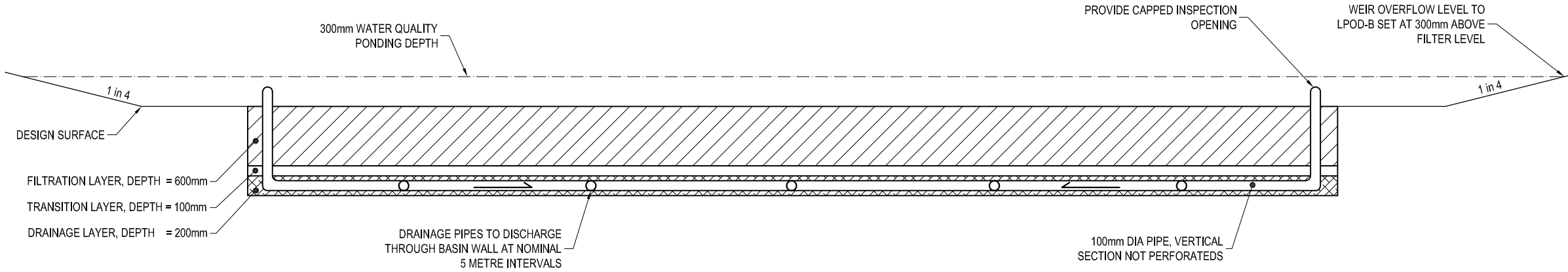
1. MATERIAL TO CONSIST OF 2 - 5mm GRAVEL.

**PERFORATED PIPE:**

1. MINIMUM GRADE OF 0.5%
2. MAXIMUM SPACING \* 1.5m CENTRE FOR BASINS < 100m²  
\* 2.5m CENTRE FOR BASINS > 100m²

**CONSTRUCTION PHASE:**

1. COVER FILTRATION LAYER WITH GEOTEXTILE, 50mm TOPSOIL & TURF STRIPS PERPENDICULAR TO FLOW.
2. GEOTEXTILE TO BE REMOVED ONLY WHEN UPSTREAM SEDIMENT LOADS ARE CONTROLLED.



**LPOD-B BASIN ARRANGEMENT**  
SCALE 1 : 25

			<div><div>Knobel Consulting Pty Ltd</div><div><div><div></div><div>KC</div></div></div><div><div><b>KNOBEL CONSULTING PTY LTD</b></div><div>ENGINEERS - PROJECT MANAGERS</div></div><div><div>Phone: 07 5576 4168</div><div>6/109 West Burleigh Road</div><div>Fax: 07 5576 6477</div><div>Burleigh Heads QLD 4220</div><div>Email: eng@knobelconsulting.com.au</div><div>ABN 33 071 435 202</div></div></div>	CLIENT PROPORTIONAL PROPERTY INVESTMENTS PTY LTD		DESIGN MG	DRAWN AA	APPROVED	TITLE DETENTION AND BIO-RETENTION BASIN PLAN			PROJECT NO. <b>K1868</b>		
				PROJECT TOURIST ACCOMMODATION KIRKWOOD ROAD, TWEED HEADS SOUTH, NSW								DWG NO.	ISSUE	
A	23-03-12	ISSUED FOR REPORT							SCALE 1:25 AT A1 1:50 AT A3			0	1	2m
ISSUE No.	DATE	AMENDMENT										P037	A	

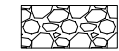
APPENDIX


**E**

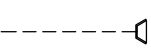
Knobel Consulting Pty Ltd  
*Bio Retention Basin Discharge Arrangement*  
(Ref: K1868/P044/A)



LEGEND

- 

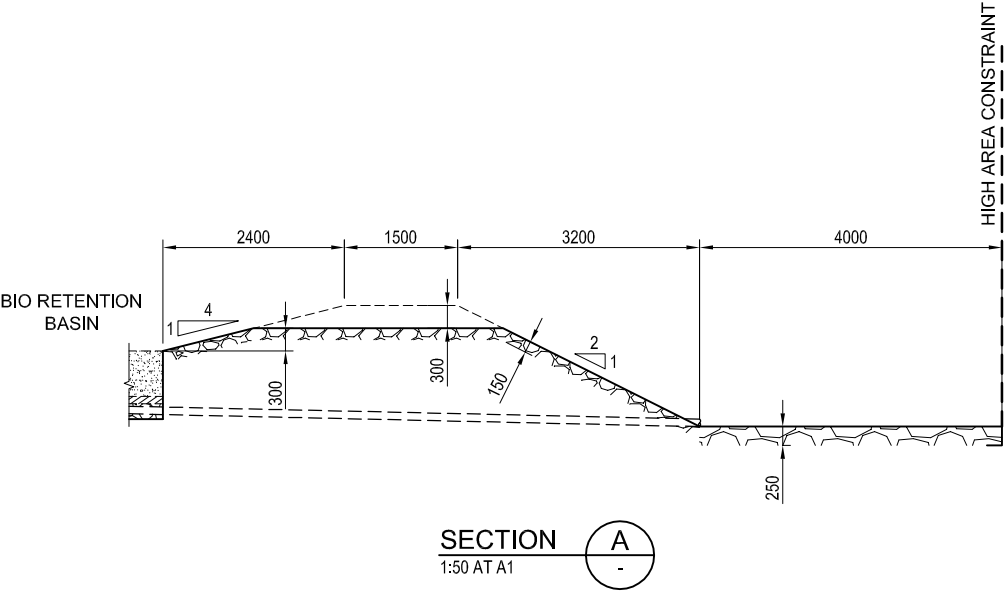
OVERFLOW WEIR SCOUR  
PROTECTION: ROCK  $D_{50} = 100\text{mm}$
- 

BASIN DISCHARGE SCOUR PROTECTION AND FLOW  
ENERGY DISSIPATION ROCK PAD: ROCK  $D_{50} = 200\text{mm}$
- 

BIO RETENTION BASIN FILTERED  
WATER DRAINAGE PIPE

NOTE:

THIS ARRANGEMENT TO BE INSTALLED AT TWO  
LOCATIONS WITH IDENTICAL DIMENSIONS, WEIR  
OVERFLOW & PIPE OUTLET LEVELS.



			<div><div>Knobel Consulting Pty Ltd</div><div></div><div><b>KNOBEL CONSULTING PTY LTD</b></div><div>ENGINEERS - PROJECT MANAGERS</div><div><div>Phone: 07 5576 41686/109 West Burleigh Road</div><div>Fax: 07 5576 6477Burleigh Heads QLD 4220</div><div>Email: eng@knobelconsulting.com.auABN 33 071 435 202</div></div></div>	CLIENT PROPORTIONAL PROPERTY INVESTMENTS PTY LTD			DESIGN MG	DRAWN EL	APPROVED	TITLE BIO RETENTION BASIN DISCHARGE ARRANGEMENT		PROJECT NO. <b>K1868</b>	
				PROJECT TOURIST ACCOMMODATION KIRKWOOD ROAD, TWEED HEADS SOUTH, NSW						DWG NO. <b>P044</b>		ISSUE <b>A</b>	
A	19-07-13	ISSUED FOR REPORT											
ISSUE No.	DATE	AMENDMENT											

APPENDIX

**F**

Knobel Consulting Pty Ltd

*Sediment and Erosion Control Layout Plan*

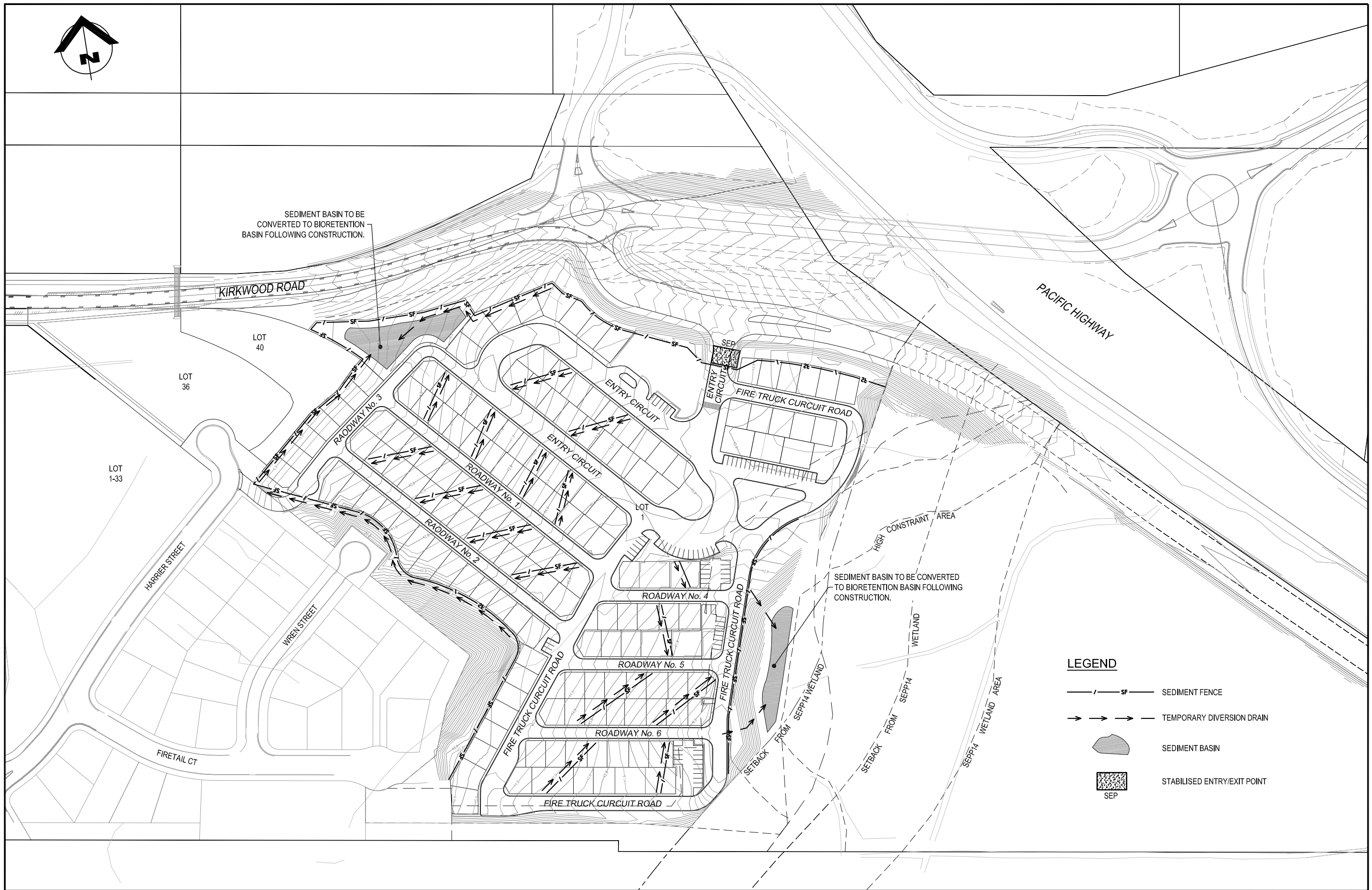
(Ref: K1868/P014/C)

*and*

*Sediment and Erosion Control Details Sheet*

(Ref: K1868/P015/A)

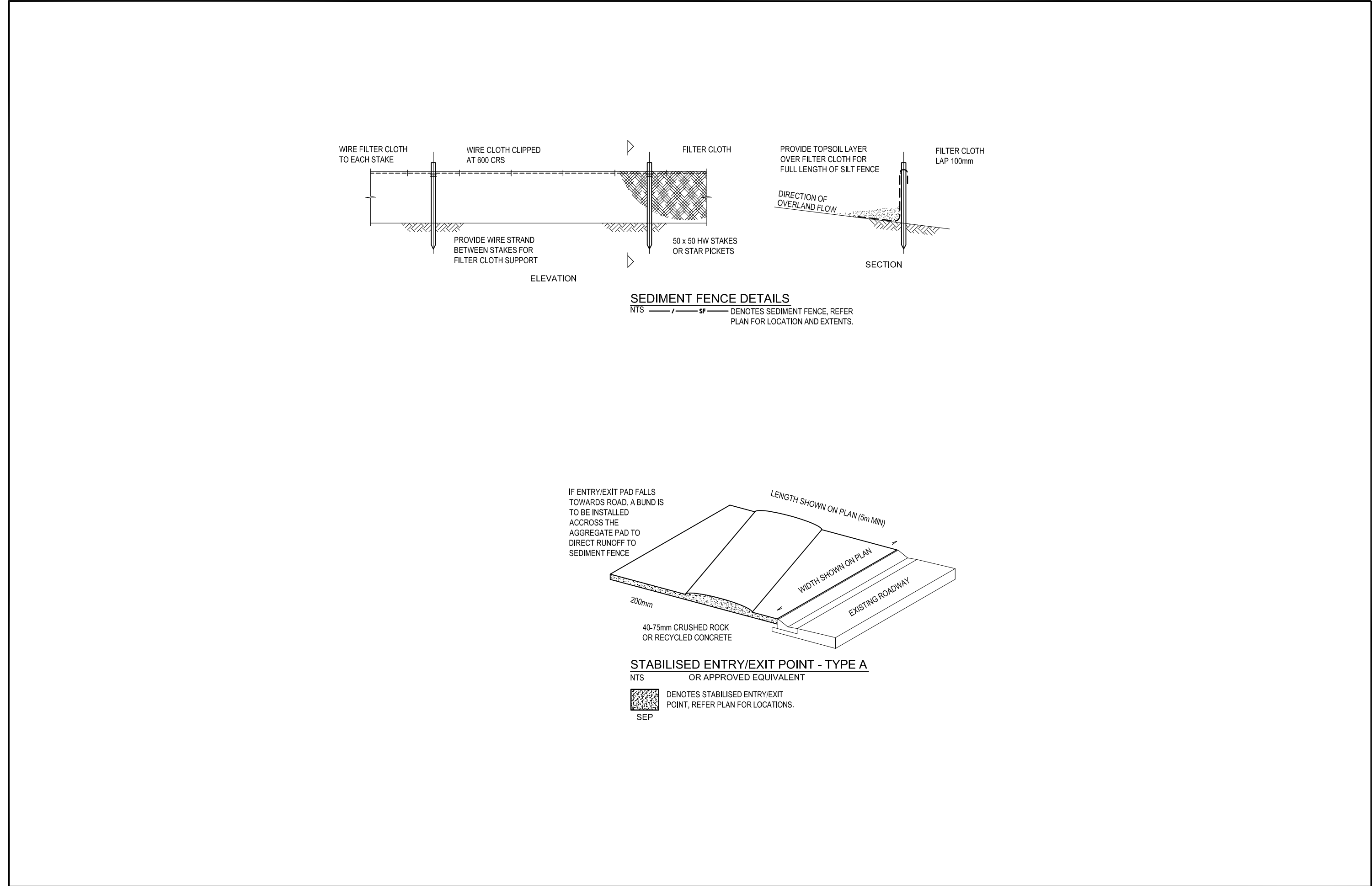




**LEGEND**

- SEDIMENT FENCE
- TEMPORARY DIVERSION DRAIN
- SEDIMENT BASIN
- STABILISED ENTRY/EXIT POINT

			<div><div>Knobel Consulting Pty Ltd</div><div></div><div><b>KNOBEL CONSULTING PTY LTD</b></div><div>ENGINEERS - PROJECT MANAGERS</div><div>Phone: 07 5576 4168 Fax: 07 5576 6477 Email: eng@knobelconsulting.com.au</div><div>6/109 West Burleigh Road Burleigh Heads QLD 4220 ABN 33 071 435 202</div></div>	CLIENT PROPORTIONAL PROPERTY INVESTMENTS PTY LTD		DESIGN TP	DRAWN AA	APPROVED	TITLE SEDIMENT AND EROSION CONTROL LAYOUT PLAN		PROJECT NO. K1868	
C	20-07-12	LAYOUT AMENDED		PROJECT TOURIST ACCOMMODATION KIRKWOOD ROAD, TWEED HEADS SOUTH, NSW					DWG NO.		ISSUE	
B	30-05-12	MINOR AMENDMENTS							P014		C	
A	23-03-12	ISSUED FOR REPORT										
ISSUE No.	DATE	AMENDMENT										



			<div><div>Knobel Consulting Pty Ltd</div><div><div><div><div><div></div><div></div><div></div></div><div><div><div><div></div><div></div><div></div></div></div><div><div><div><div></div><div></div><div></div></div></div></div><div><b>KNOBEL CONSULTING PTY LTD</b></div><div>ENGINEERS - PROJECT MANAGERS</div><div><div>Phone: 07 5576 41686/109 West Burleigh Road</div><div>Fax: 07 5576 6477Burleigh Heads QLD 4220</div><div>Email: eng@knobelconsulting.com.auABN 33 071 435 202</div></div></div></div></div></div></div>	CLIENT PROPORTIONAL PROPERTY INVESTMENTS PTY LTD			DESIGN TP	DRAWN AA	APPROVED	TITLE SEDIMENT AND EROSION CONTROL DETAILS SHEET			PROJECT NO. <b>K1868</b>	
				PROJECT TOURIST ACCOMMODATION KIRKWOOD ROAD, TWEED HEADS SOUTH, NSW									DWG NO.	ISSUE
A	23-03-12	ISSUED FOR INFORMATION											P015	A
ISSUE No.	DATE	AMENDMENT								SCALE 1:1000 AT A1 1:2000 AT A3				
										<div><div></div><div>020406080100m</div></div>				