REAL PROPERTY DESCRIPTION

Lot 6
SP 210592
Parish of Gracemere
County of Livingstone

SITE AREAS & STATISTICS

Zoning: Low Impact Industrial.
Proposed Use: Verterinary Services.

AREAS

Site Area:	1,489m²
Landscaped Area:	398.6m²
Hardstand Area:	561.7m²
Paths and Ramps:	33.5m²
Covered Outdoor Floor Area:	94.8m²
Uncovered Outdoor Floor Area:	19.5m²

PROPOSED BUILDING

New GFA:		380.5m²
Coverage	- Allowed:	1191m² (80%)
	- Provided:	494.8m² (33%)
Building Height	- Allowed:	10m
	- Provided:	5.95m
Setbacks:	- Alexander Court:	6.05m
	- Old Capricorn Highway:	12.9m

CARPARKS

Required:	9
Provided:	10 (9 +1 disabled)

ROCKHAMPTON REGIONAL COUNCIL
AMENDED PLANS APPROVED
29/09/2017
DATE
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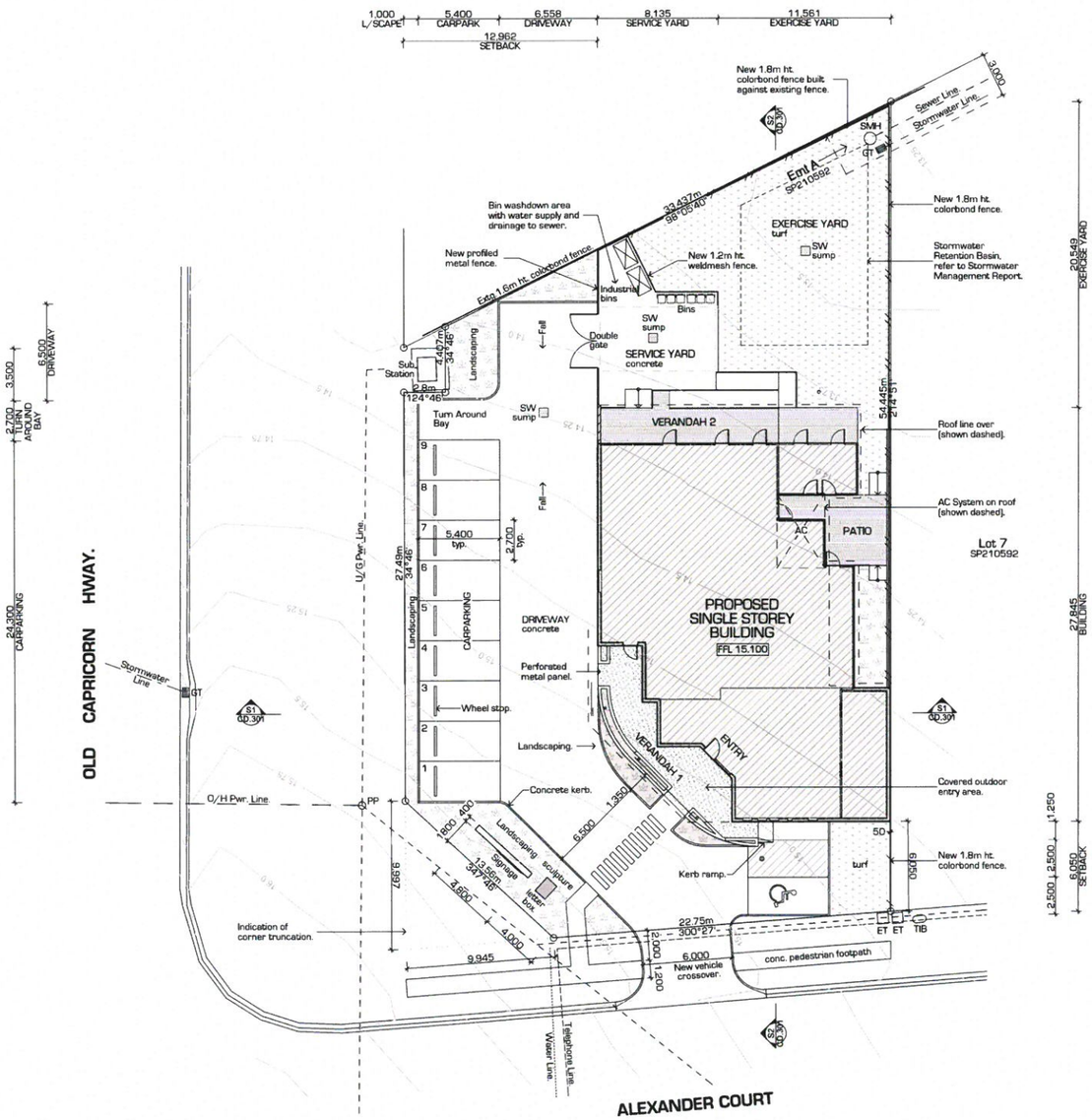
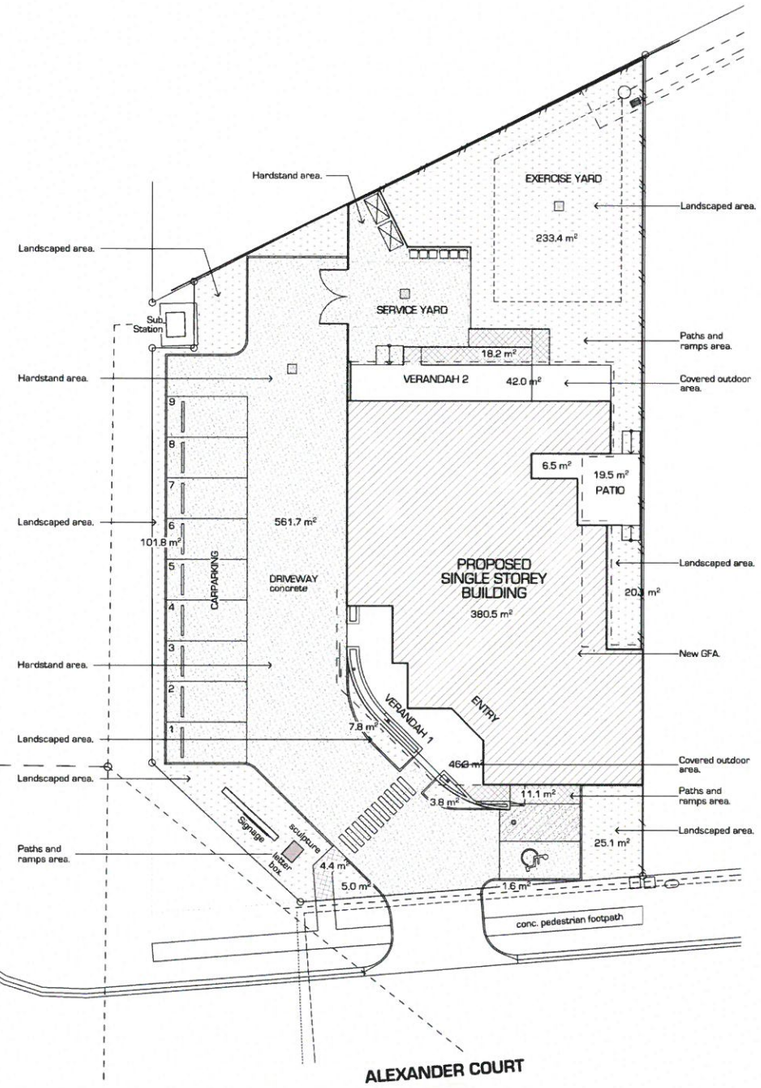
Development Permit No. D/51-2016 dated 14/09/2016



Site Plan
Scale 1:200 0 1 2 3 4 5



Area Plan
Scale 1:200

Revisions

rev	date	description	dwn
1	01.03.16	MCU Application	JS
2	06.04.17	Amended MCU Application	SB

If in doubt, ASK

Legend

Emt	Easement.
ET	Electrical turret.
GFA	Gross floor area.
GT	Gully trap.
PP	Power pole.
SMH	Sewer manhole.
SW	Stormwater
TIB	Telstra inspection box.

Legend

- New GFA.
- Outdoor Area.
- Hardstand Area.
- Paths and Ramps Area.
- Landscaped Area.

NORTH

Project Details

client
G. Muir

project
Gracemere Veterinary Hospital

address
1 Alexander Court, Gracemere

title
Site Plan

BEAT ARCHITECTS
BROWN EVANS + TROPICAL

29 (Little) Musgrave Street
North Rockhampton
QLD. 4701

ACN 074 133510

17 Flinders Parade
Gladstone
QLD. 4680

The Royal Australian Institute of Architects Membership 11782

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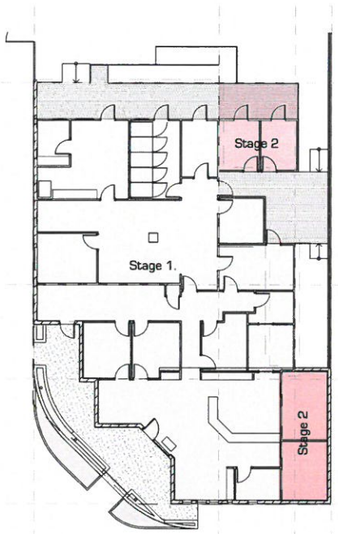
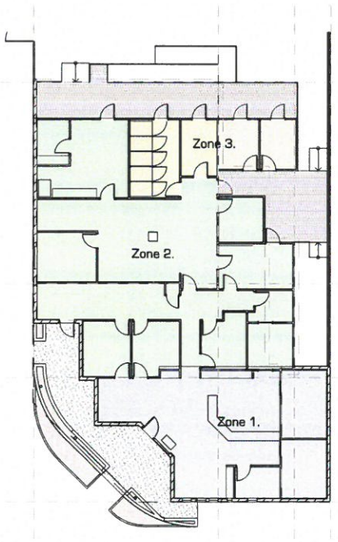
design	GC	drawn	SB
scale	as shown	job no.	BT150476
date	07-04-17	dwg no.	WD.201
orig size	A1	rev.	2



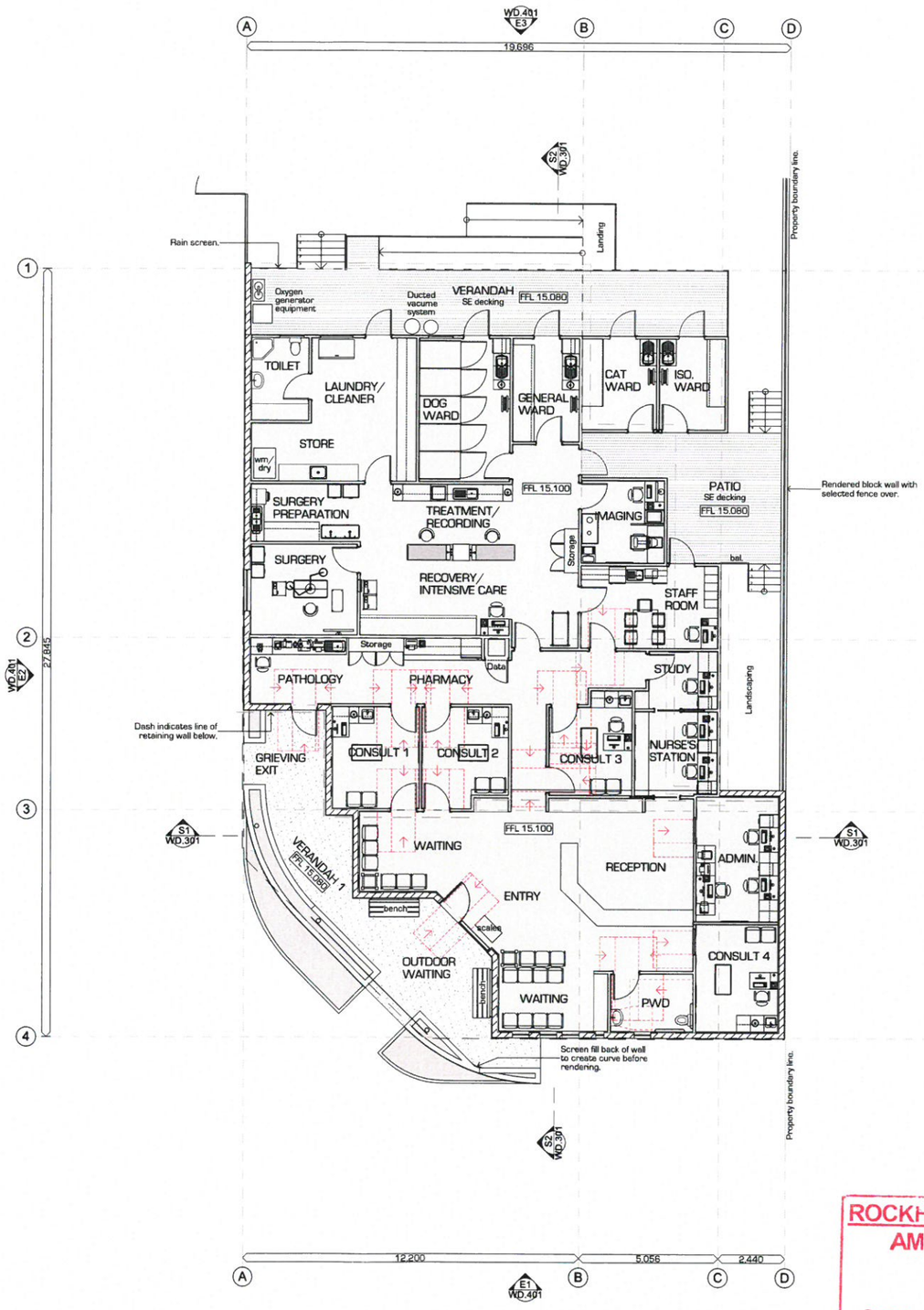
Staging Plan

Scale 1:200



Zoning Plan

Scale 1:200 0 1 2 3 4 5



Proposed Floor Plan

Scale 1:100 0 1 2 3 4 5

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1	01.03.16	MCU Application	JB
2	06.04.17	Amended MCU Application	SB

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NORTH

Project Details

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G. Muir

project
Gracemere Veterinary Hospital

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title
Proposed Floor Plan

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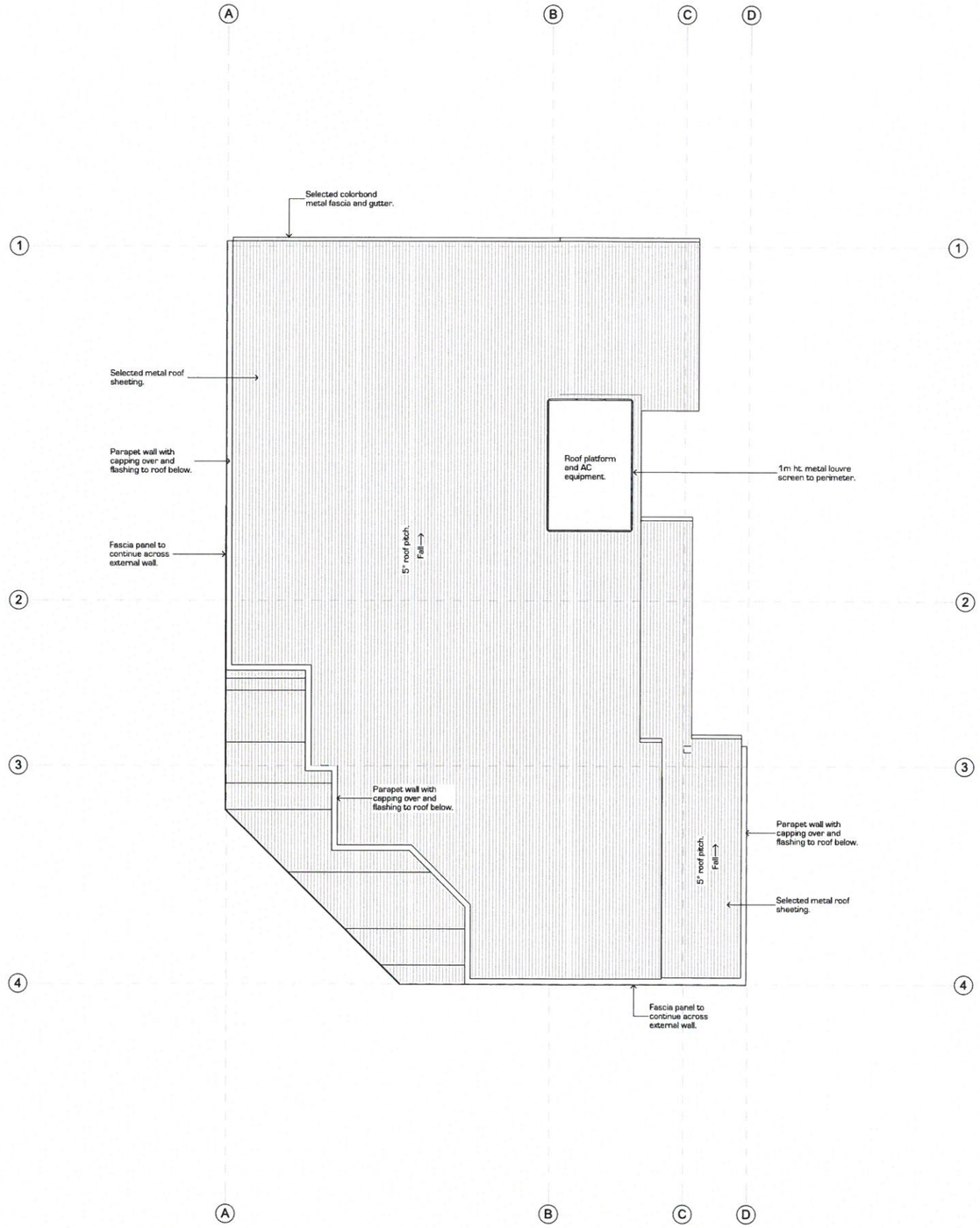
design	GC	drawn	SB
scale	as shown	job no.	BT150478
date	07-04-17	dwg no.	WD.202
orig size	A1	rev.	2



04 Roof Plan

Scale 1:100

0 1 2 3 4 5

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Revisions

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1	01.03.16	MCU Application	JB
2	06.04.17	Amended MCU Application	SB

If in doubt, ASK

Legend

AF Apron flashing.
BC Barge capping.
EG Eaves gutter.

NORTH

Project Details

client
G. Muir

project
Gracemere Veterinary Hospital

address
1 Alexander Court, Gracemere

title
Roof Plan

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BROWN EVANS + TROPICAL
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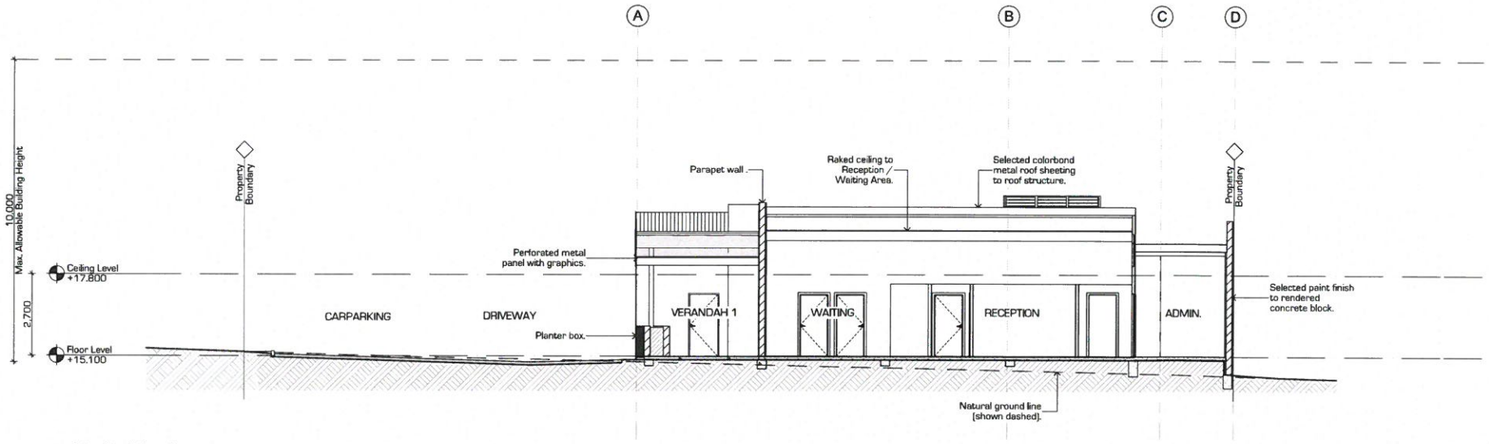
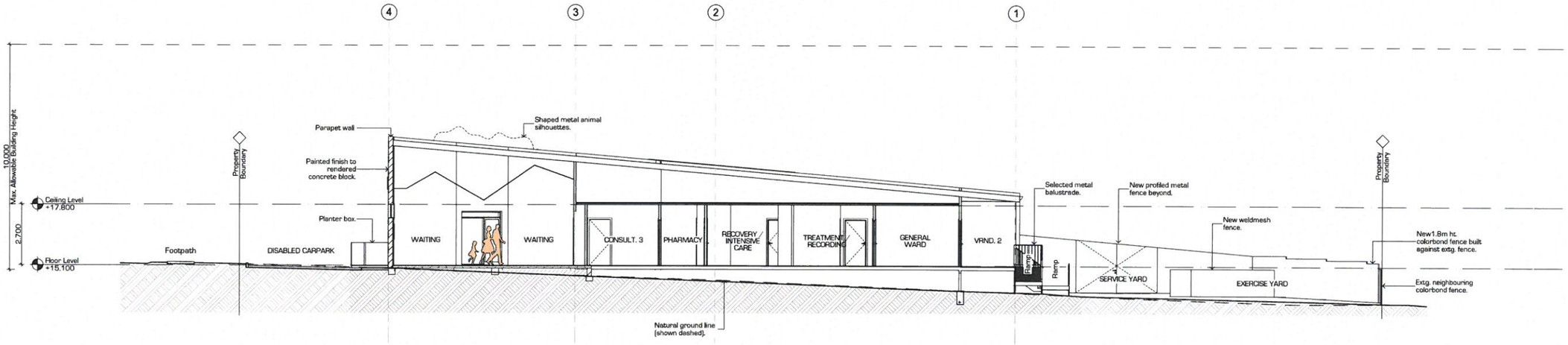
design	GC	drawn SB	chkd
scale	as shown	job no.	BT150478
date	07-04-17	dwg no.	WD.203
orig size	A1	rev.	2



S1 Vertical Section
WD.202 Scale 1:100



S2 Vertical Section
WD.202 Scale 1:100

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Revisions

rev	date	description	dwn
1	01.03.16	MCU Application	JB
2	06.04.17	Amended MCU Application	SB

If in doubt, ASK

Project Details

client
G. Muir

project
Gracemere Veterinary Hospital

address
1 Alexander Court, Gracemere

title
Sections

BEAT ARCHITECTS
BROWN EVANS + TROPICAL

29 (Little) Musgrave Street
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ACN
074 133510

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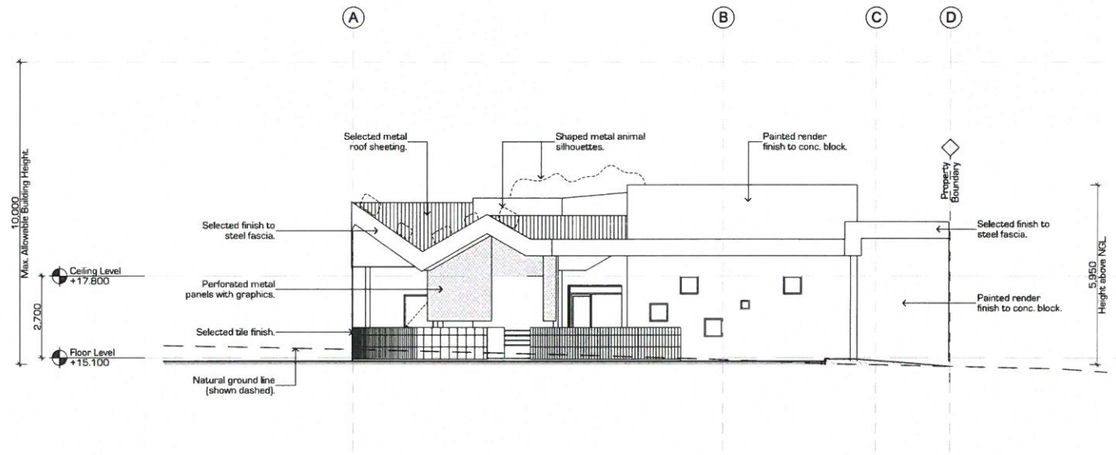
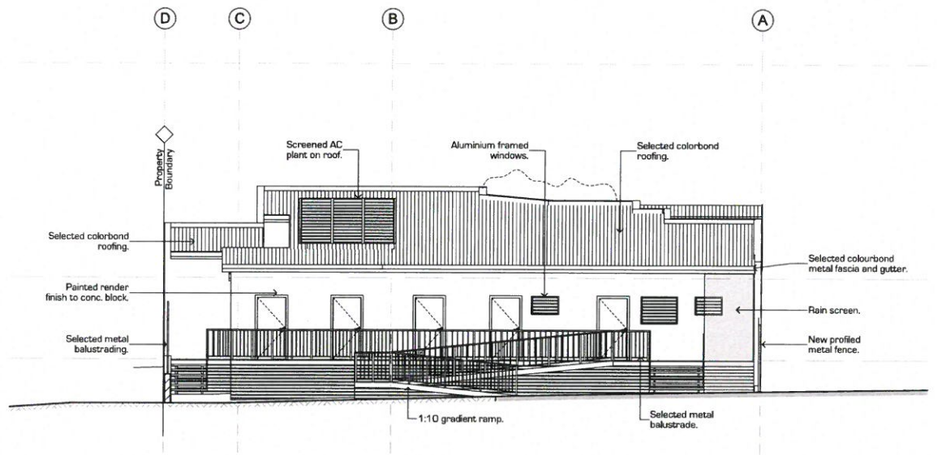
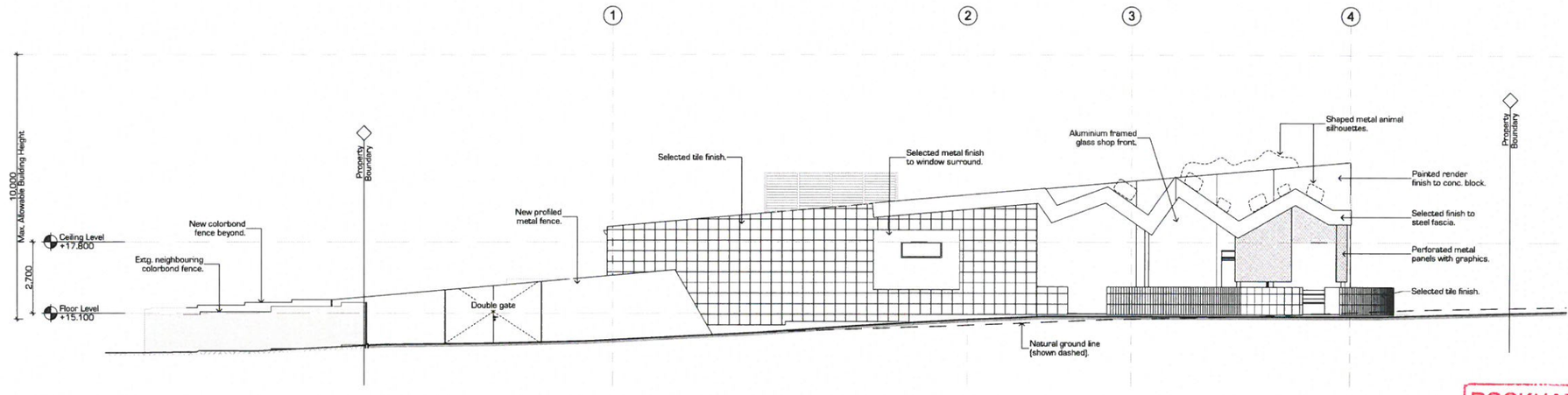
design	GC	drawn	SB
scale	as shown	job no.	BT150478
date	07-04-17	dwg no.	WD.301
orig size	A1	rev	2



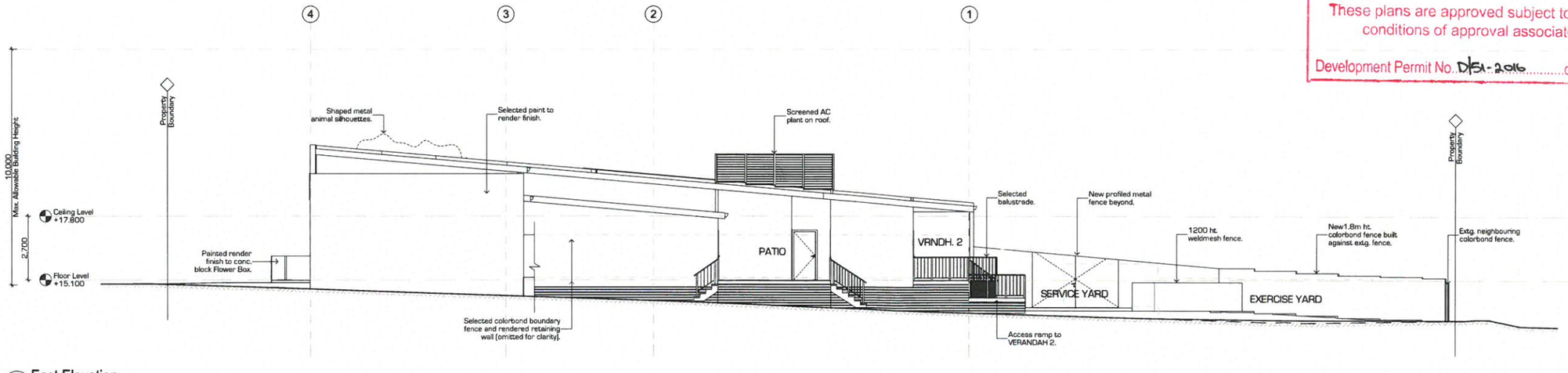
E1 South Elevation
WD.202 Scale 1:100



E3 North Elevation
WD.202 Scale 1:100



E2 West Elevation
WD.202 Scale 1:100



E4 East Elevation
WD.202 Scale 1:100

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29/09/2017
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Revisions

rev	date	description	dwn
1	01.03.16	MCU Application	JB
2	06.04.17	Amended MCU Application	SB

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Project Details

client
G. Muir

project
Gracemere Veterinary Hospital

address
1 Alexander Court, Gracemere

title
Elevations

BEAT ARCHITECTS
BROWN EVANS & TROPEA
29 (Little) Musgrave Street
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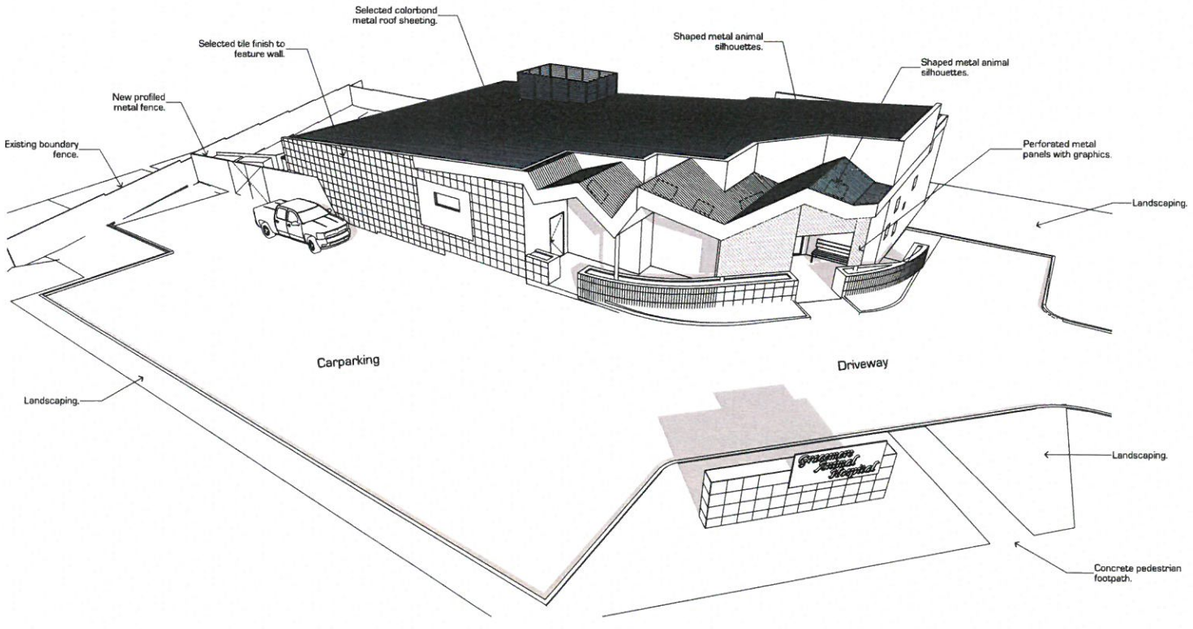
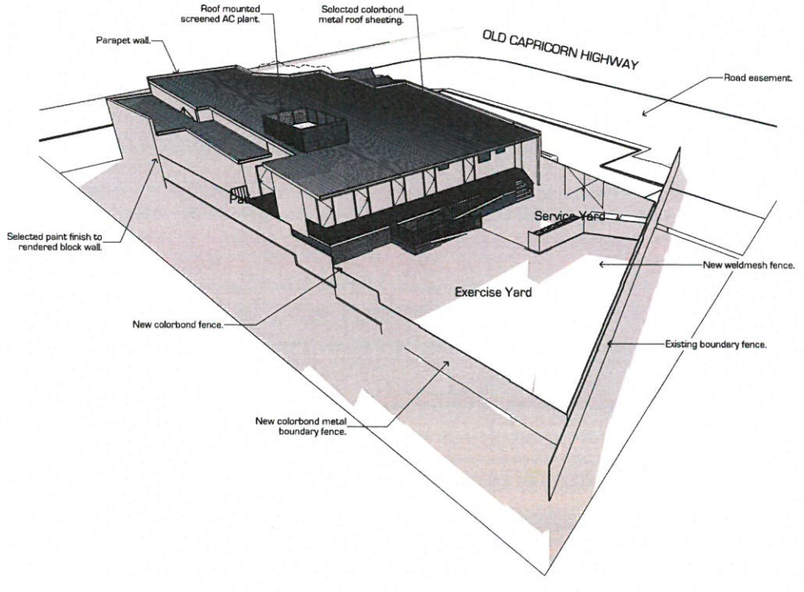
design	GC	drawn	SB
scale	as shown	job no.	BT150478
date	07-04-17	dwg no.	WD.401
orig size	A1	rev.	2

01 View from Highway
Perspective View

02 View from Alexander Court
Perspective View



03 Front Aerial View
Perspective View



04 Rear Aerial View
Perspective View

Revisions

rev	date	description	dwn
1	01.03.16	MCU Application	JB
2	06.04.17	Amended MCU Application	SB

If in doubt, ASK

Project Details

client
G. Muir

project
Gracemere Veterinary Hospital

address
1 Alexander Court, Gracemere

title
3D Views

BEAT ARCHITECTS
BROWN EVANS + TROPICAL

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ACN
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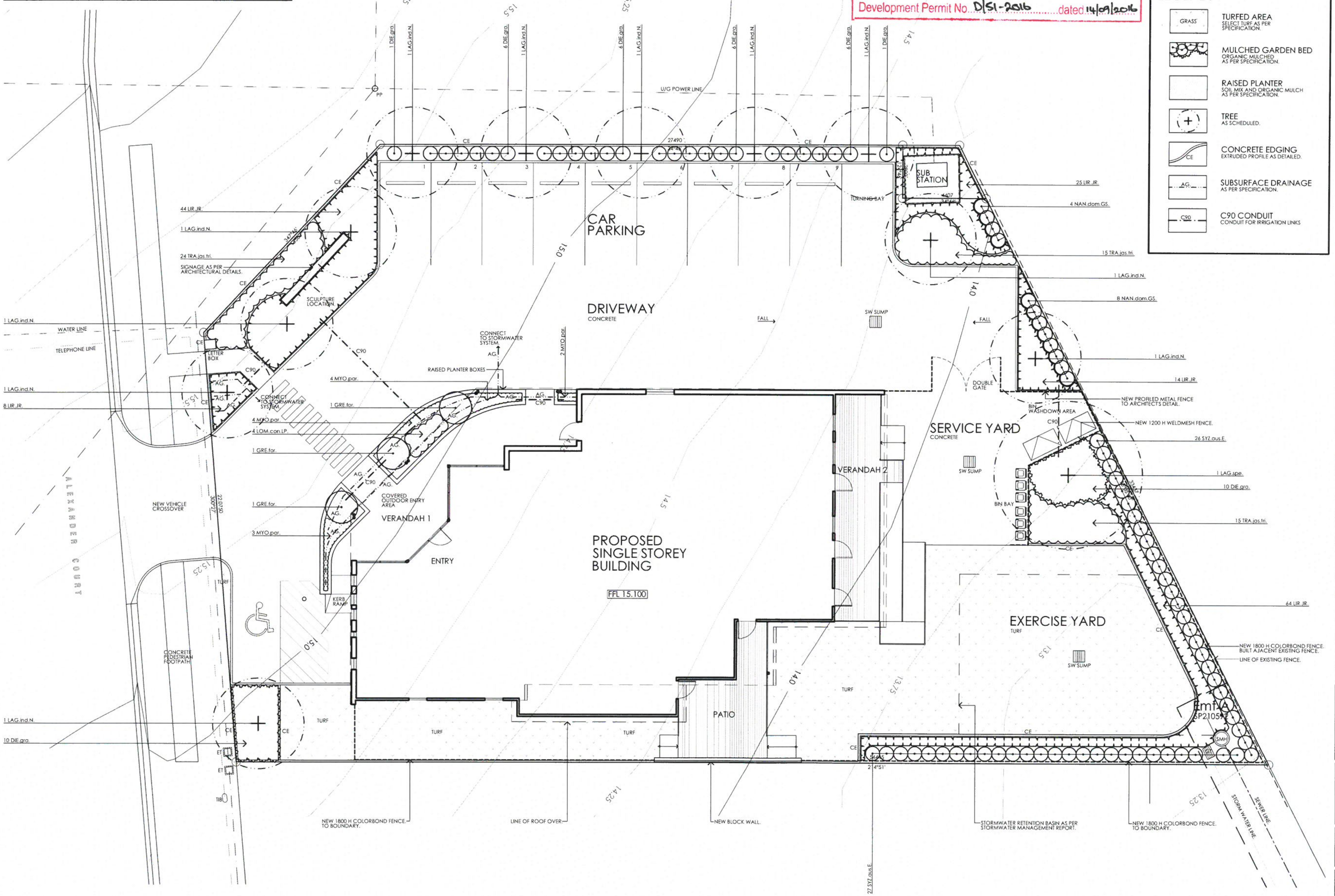
design	GC	drawn	SB
scale	as shown	job no.	BT150478
date	07-04-17	dwg no.	WD.901
orig size	A1	rev.	2

	PLANTING SCHEDULE: 874				
Abbr.	**Species**	**Common Name**	**No.**	**Size**	**Stake**
	Trees				
LAG.ind.N.	Lagerstroemia indica x L. fauriei 'Natchez' (Indian Summer vairety)	Crepe Myrtle Indian Summer variety (white)	11	45Lt	✓
LAG.spe.	Lagerstroemia speciosa	Pride of India	1	45Lt	✓
	Shrubs				
GRE.for.	Grevillea 'Formosa'	Grevillea	3	300mm	
NAN.dom.GS.	Nandina domestica 'Gulf Stream'	Dwarf Sacred Japanese Bamboo	12	200mm	
SYZ.aus.E.	Syzygium australe 'Elite'	Magenta Cherry	53	200mm	
	Groundcovers				
DIE.gra.	Dietes grandiflora	Spanish Iris	46	140mm	
LIR.JR.	Liriope Just Right	Turf Lilly	155	140mm	
LOM.con.LP.	Lomandra confertifolia 'Little Pal'	Mat Rush	4	140mm	
MYO.par.	Myoporum parvifolium	Creeping Boobialla	13	140mm	
TRA.jas.tri.	Trachelospermum jasminioides 'Tricolour'	Variegated Jasmine	54	140mm	



OLD CAPRICORN HWY.
O/H POWER LINE
U/G POWER LINE
CAR PARKING
DRIVEWAY
CONCRETE
SUB STATION
TURNING BAY
SIGNAGE AS PER ARCHITECTURAL DETAILS.
SCULPTURE LOCATION
LETTER BOX
WATER LINE
TELEPHONE LINE
RAISED PLANTER BOXES
CONNECT TO STORMWATER SYSTEM.
NEW VEHICLE CROSSOVER
ALEXANDER COURT
COVERED OUTDOOR ENTRY AREA
VERANDAH 1
ENTRY
KERB RAMP
CONCRETE PEDESTRIAN FOOTPATH
PROPOSED SINGLE STOREY BUILDING
FFL 15.100
VERANDAH 2
SERVICE YARD
CONCRETE
SW SUMP
DOUBLE GATE
BIN WASHDOWN AREA
BIN BAY
NEW PROFILED METAL FENCE TO ARCHITECTS DETAIL.
NEW 1200 H WELDMESH FENCE.
EXERCISE YARD
TURF
PATIO
NEW 1800 H COLORBOND FENCE. BUILT AJACENT EXISTING FENCE.
LINE OF EXISTING FENCE.
NEW 1800 H COLORBOND FENCE TO BOUNDARY.
LINE OF ROOF OVER
NEW BLOCK WALL.
STORMWATER RETENTION BASIN AS PER STORMWATER MANAGEMENT REPORT.
SEWER LINE
STORM WATER LINE

NOTES:

- REFER LANDSCAPE DRAWING LP02 FOR PLANTING DETAILS.
- REFER ARCHITECTURAL DRAWINGS FOR BUILDING PATH AND EXTERNAL WORKS SET OUT AND DETAILS UNLESS OTHERWISE NOTED.
- CONFIRM LOCATION OF ALL SERVICES ON SITE PRIOR TO COMMENCEMENT OF WORK.
- REFER ALL QUERIES TO THE LANDSCAPE ARCHITECT.
- TAKE-OFF POINTS FOR IRRIGATION AND LOCATION OF IRRIGATION CONTROLLER TO BE CONFIRMED ON SITE.
- PROTECT ALL EXISTING VEGETATION NOMINATED DURING CONSTRUCTION.
- ALL WORK TO BE CARRIED OUT IN ACCORDANCE WITH AUSTRALIAN STANDARDS, B.C.A. AND LOCAL AUTHORITY REQUIREMENTS.
- ALL WORK TO BE CARRIED OUT IN A WORKMAN LIKE MANNER TO INDUSTRY 'BEST PRACTICE'.

LEGEND:

- GRASS — TURFED AREA: SELECT TURF AS PER SPECIFICATION.
- MULCHED GARDEN BED: ORGANIC MULCHED AS PER SPECIFICATION.
- RAISED PLANTER: SOIL MIX AND ORGANIC MULCH AS PER SPECIFICATION.
- TREE: AS SCHEDULED.
- CE — CONCRETE EDGING: EXTRUDED PROFILE AS DETAILED.
- AG. — SUBSURFACE DRAINAGE: AS PER SPECIFICATION.
- C90 — C90 CONDUIT: CONDUIT FOR IRRIGATION LINKS

REV.	DATE	DETAILS	INITIAL
A	11.7.2017	ISSUE FOR TENDER / CONSTRUCTION.	DB

ALDERSON + ASSOCIATES LANDSCAPE ARCHITECTS PTY LTD

A.B.N. 24 895 177 049
PH:040 991 5853 PH:07 4974 1184
LISMORE: P.O. BOX 6282 SOUTH LISMORE, NSW 2480
GLADSTONE: OLD MANY PEAKS SCHOOL BOYNE VALLEY, QLD 4680
EMAIL: design@landscapearchitects.com.au

CLIENT:
G. MUIR

PROJECT:
GRACEMERE VETERINARY HOSPITAL

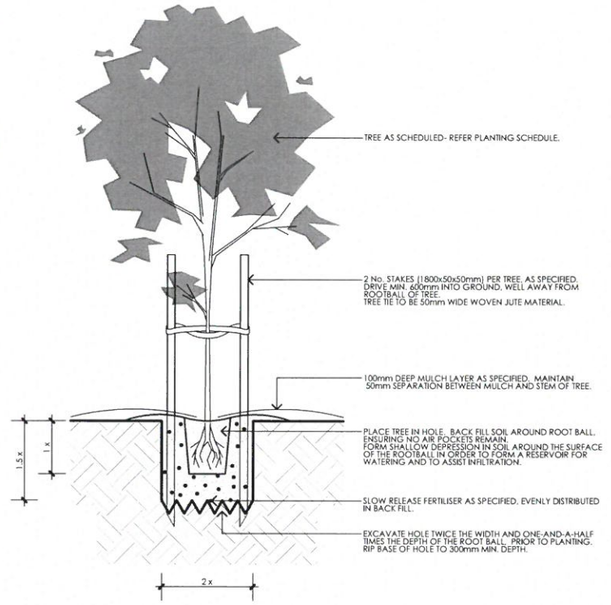
1 ALEXANDER COURT, GRACMERE.

DRAWING TITLE:
LANDSCAPE PLANTING PLAN

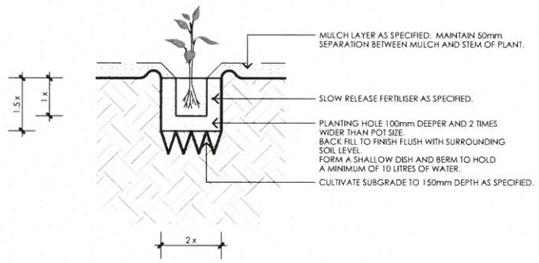
NORTH:

DATE:	DRAWN:	SCALE:
JUNE 2017	DB	1:100 AT A1

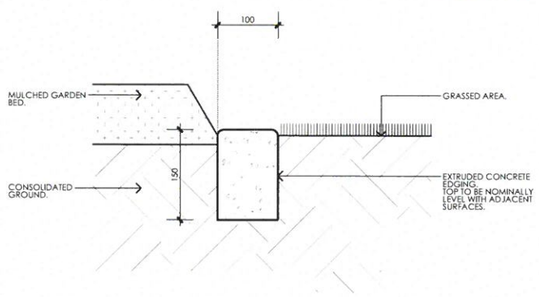
PROJECT NO.:	DWG NO.:	REVISION:
874	874-LP01	A



1 DETAIL SECTION
1:20
TYPICAL TREE PLANTING IN GARDEN BED



4 DETAIL SECTION
1:20
TYPICAL SHRUB/ GROUNDCOVER PLANTING (140-300mm CONTAINER)



3 DETAIL SECTION
1:5
TYPICAL EXTRUDED CONCRETE EDGE.

REFER LANDSCAPE SET OUT PLANS FOR LOCATIONS.

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GLADSTONE: OLD MANY PEAKS SCHOOL BOYNE VALLEY, QLD 4680
EMAIL: design@landscapearchitects.com.au

CLIENT:
G. MUIR

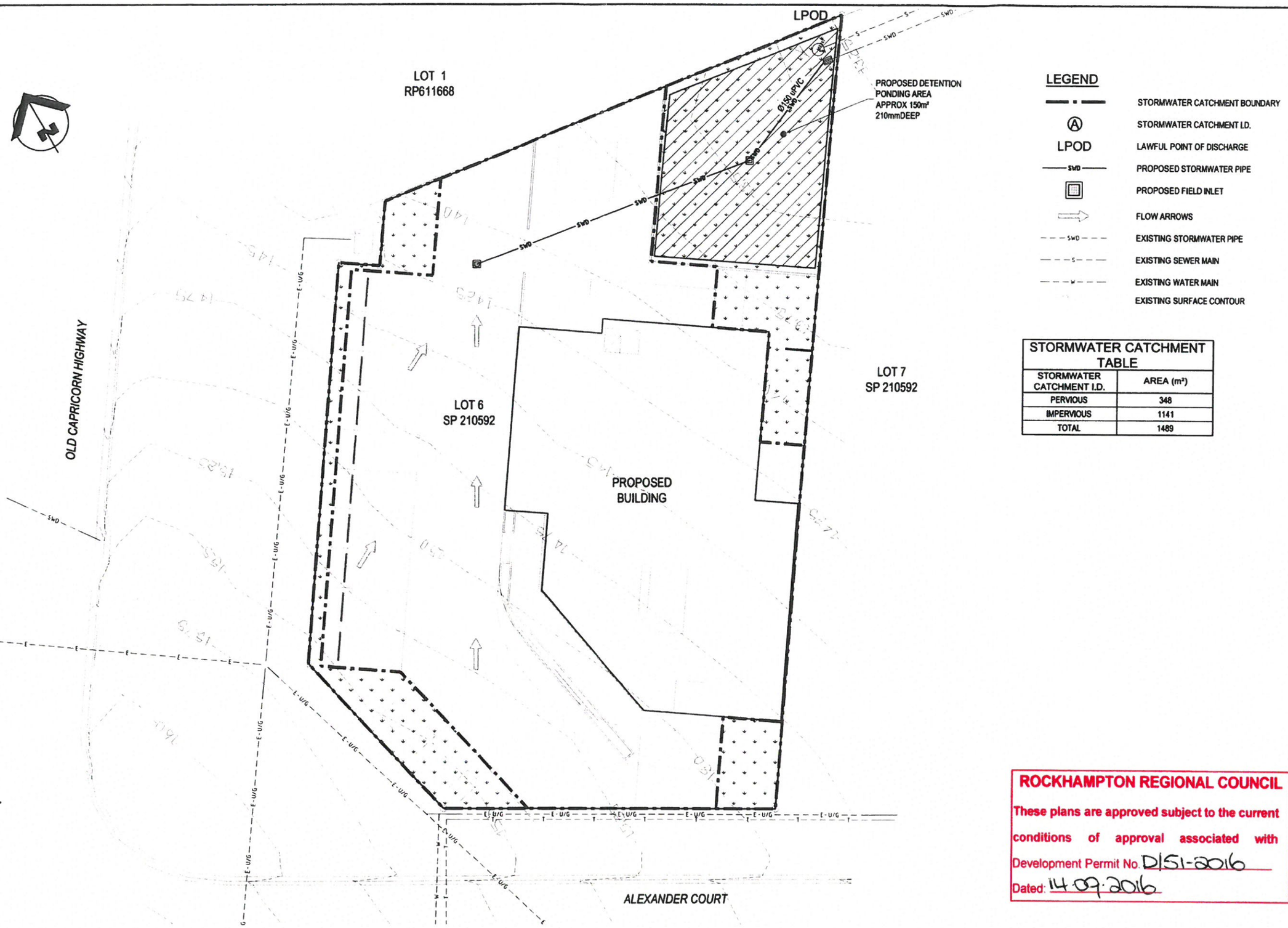
PROJECT:
GRACEMERE VETERINARY HOSPITAL
1 ALEXANDER COURT, GRACMERE.

DRAWING TITLE:
LANDSCAPE DETAILS

NORTH:

DATE:	DRAWN:	SCALE:
JUNE 2017	DB	1:20 AT A1

PROJECT NO.:	DWG NO.:	REVISION:
874	874-LP02	A



LEGEND

- STORMWATER CATCHMENT BOUNDARY
- Ⓐ STORMWATER CATCHMENT I.D.
- LPOD LAWFUL POINT OF DISCHARGE
- SWD PROPOSED STORMWATER PIPE
- PROPOSED FIELD INLET
- FLOW ARROWS
- SWD EXISTING STORMWATER PIPE
- S EXISTING SEWER MAIN
- W EXISTING WATER MAIN
- EXISTING SURFACE CONTOUR

STORMWATER CATCHMENT TABLE	
STORMWATER CATCHMENT I.D.	AREA (m²)
PERVIOUS	348
IMPERVIOUS	1141
TOTAL	1489

ROCKHAMPTON REGIONAL COUNCIL

These plans are approved subject to the current conditions of approval associated with Development Permit No. D/51-2016

Dated: 14.09.2016

ISSUE No.	DATE	AMENDMENT
A	23-03-16	ISSUED FOR REPORT

KNOBEL CONSULTING
CIVIL ENGINEERS + HYDRAULIC ENGINEERS + PROJECT MANAGERS
Level 6, 34 East Street
North Rockhampton Q 4701
Phone: 07 4922 5019
Fax: 07 5580 9133
Email: admincq@knobelconsulting.com.au
PO Box 5364 Red Hill,
Rockhampton Q 4701
ABN: 33 071 435 202
W: www.knobelconsulting.com.au

CLIENT	DESIGN	DRAWN	APPROVED
GRACEMERE VET CLINIC	JL	EW	

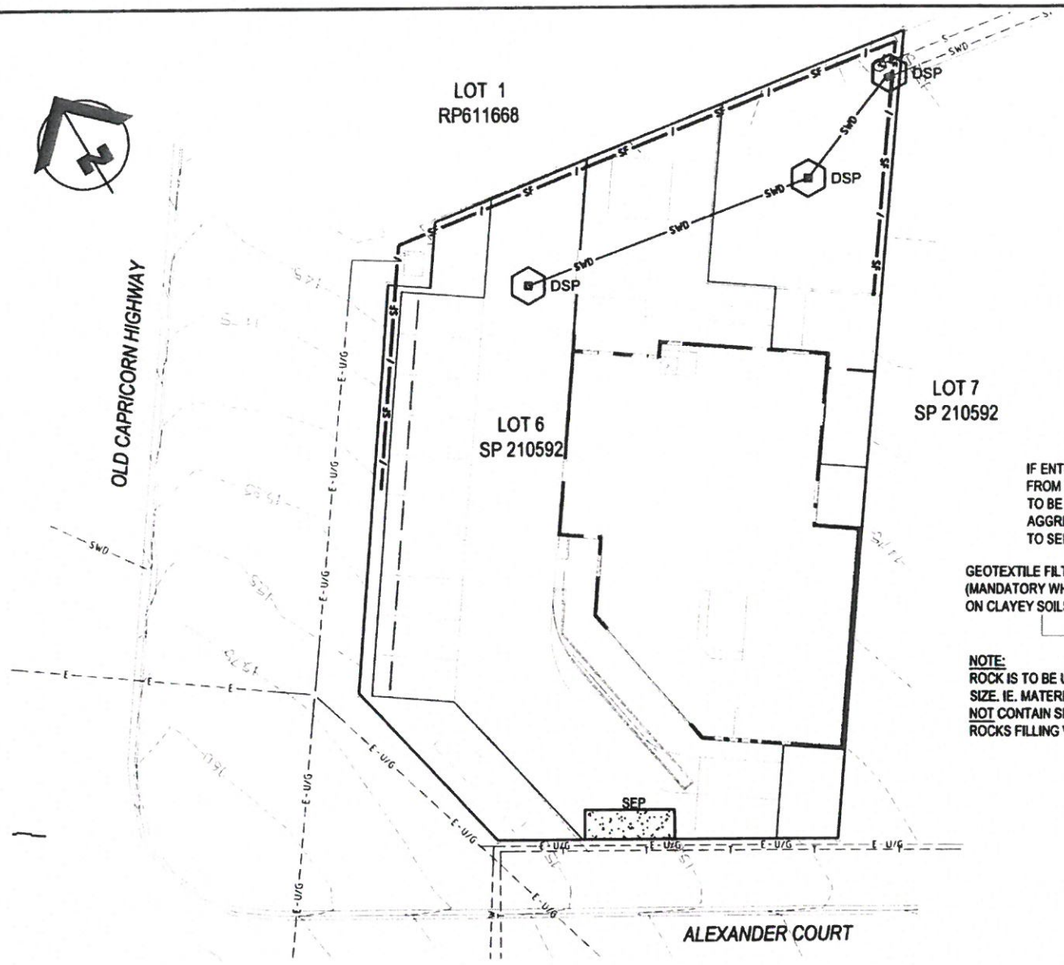
PROJECT
PROPOSED VETERINARY HOSPITAL
1 ALEXANDER COURT
GRACEMERE, QLD, 4702

TITLE
STORMWATER DRAINAGE PLAN

SCALE
1:125 AT A1
1:250 AT A3
0 5 10m

PROJECT NO. K3582
DWG NO. P002
ISSUE A

Z:\K3582\Preliminary\DWG\K3582-P002.dwg, 23/03/2016 10:01:02 AM, EnriW, PDF995



ROCKHAMPTON REGIONAL COUNCIL

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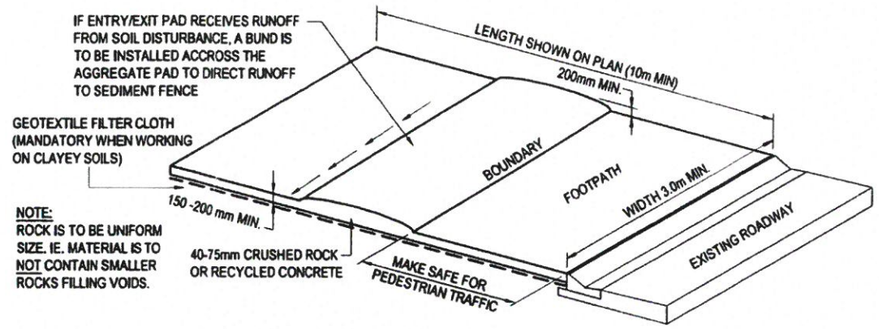
Dated: 14.09.2016

LEGEND

- SF — SEDIMENT FENCE
- SEP — STABILISED ENTRY/EXIT POINT
- DSP — DRAINAGE STRUCTURE PROTECTION

SEDIMENT AND EROSION CONTROL NOTES

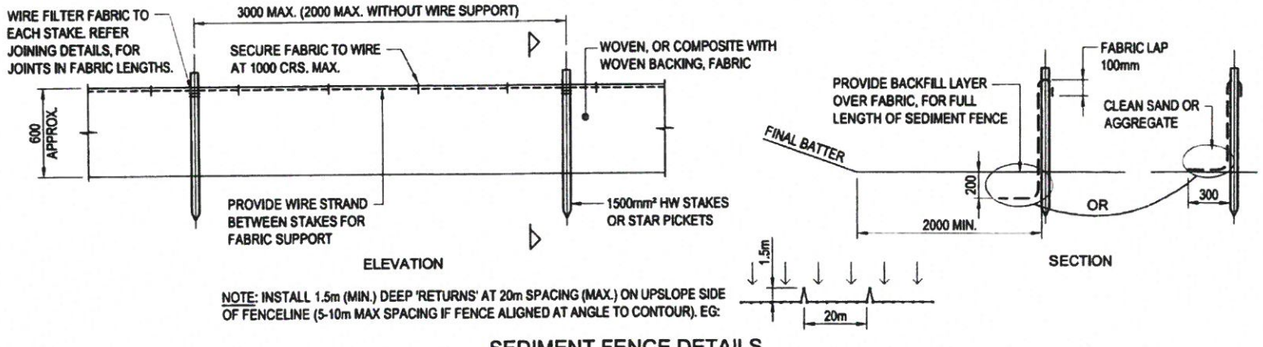
1. THE PROJECT SEDIMENT AND EROSION CONTROL DRAWINGS ARE TO BE READ IN CONJUNCTION WITH THE SITE'S APPROVED STORMWATER MANAGEMENT PLAN.
2. CONSTRUCTION IS TO BE PROGRAMMED TO PROVIDE INSTALLATION OF PERIMETER LANDSCAPING / SURFACE TREATMENTS AS EARLY AS PRACTICAL.
3. THE CONTRACTOR'S WORKS PROGRAM IS TO BE REVIEWED AT THE PRESTART MEETING. ALTERATIONS TO THE PROGRAM MAY BE REQUIRED TO ENSURE SATISFACTORY EROSION AND SEDIMENT CONTROL.
4. SAFETY ISSUES MUST BE CONSIDERED AND MONITORED FOR EACH DEVICE TO THE SATISFACTION OF THE SUPERINTENDENT.
5. SEDIMENT FENCE FILTER FABRIC IS TO BE APPROVED BY THE ENGINEER. FILTER CLOTH AND SHADE CLOTH IS NOT TO BE USED.
6. SEDIMENTATION MANAGEMENT DEVICES SHALL BE INSTALLED PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES AND MAINTAINED AT A SUITABLE LEVEL/ CONDITION THROUGHOUT CONSTRUCTION.
7. SEDIMENT FENCES ARE TO BE CLEANED OUT WHEN CAPACITY IS REDUCED BY 30%.
8. DRAINAGE STRUCTURE PROTECTION IS TO BE CLEANED FOLLOWING EACH SIGNIFICANT RUNOFF PRODUCING STORM.
9. ACCESS TO THE SITE IS TO BE PROVIDED BY THE CONTRACTOR. APPROVAL IS TO BE OBTAINED FROM COUNCIL FOR THE LOCATION OF THE SITE ACCESS POINT AND WASH DOWN AREA WHICH IS TO BE MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD. ACCESS TO AND FROM THE SITE IS TO BE VIA THE SHAKEDOWN FACILITY ONLY. ALL VEHICLES ARE TO BE WASHED DOWN PRIOR TO LEAVING THE SITE.
10. THE CONTRACTOR SHALL PROVIDE TEMPORARY DRAINAGE CONTROLS TO DIVERT FLOW FROM UNDISTURBED AREAS AROUND DISTURBED AREAS AND DIRECT FLOW FROM DISTURBED AREAS TOWARD CONTROL DEVICES.
11. PONDED RAINFALL SHALL BE PUMPED THROUGH A SEDIMENT FENCE LOCATED ON THE SITE BEFORE DISCHARGING INTO THE DOWNSTREAM STORMWATER SYSTEM.
12. STRAW BALES USED IN SEDIMENT DEVICES ARE TO BE REPLACED AFTER A MAXIMUM SERVICE PERIOD OF 6 WEEKS.



STABILISED ENTRY/EXIT POINT

N.T.S. OR APPROVED EQUIVALENT

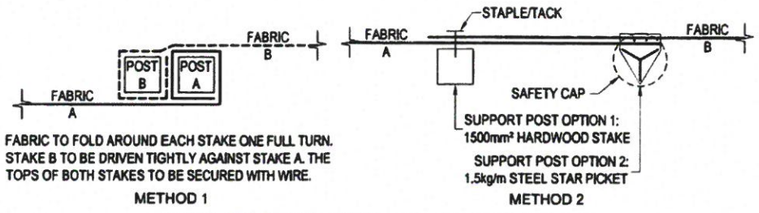
SEP — DENOTES STABILISED ENTRY/EXIT POINT, REFER PLAN FOR LOCATIONS.



NOTE: INSTALL 1.5m (MIN.) DEEP 'RETURNS' AT 20m SPACING (MAX.) ON UPSLOPE SIDE OF FENCELINE (5-10m MAX SPACING IF FENCE ALIGNED AT ANGLE TO CONTOUR). EG:

SEDIMENT FENCE DETAILS

N.T.S. —/—SF— DENOTES SEDIMENT FENCE. REFER PLAN FOR LOCATION AND EXTENTS.



SEDIMENT FENCE FABRIC JOINING DETAILS

N.T.S.

ISSUE No.	DATE	AMENDMENT
A	23-03-16	ISSUED FOR REPORT

KNOBEL CONSULTING
CIVIL ENGINEERS + HYDRAULIC ENGINEERS + PROJECT MANAGERS
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CLIENT: GRACEMERE VET CLINIC

PROJECT: PROPOSED VETERINARY HOSPITAL
1 ALEXANDER COURT
GRACEMERE, QLD, 4702

DESIGN	DRAWN	APPROVED
JL	EW	

TITLE: SEDIMENT AND EROSION CONTROL PLAN AND DETAILS

SCALE: 1:200 AT A1, 1:400 AT A3 (0, 5, 10, 15, 20m)

PROJECT NO. K3582

DWG NO. P003

ISSUE A

Z:\K3582\Preliminary\DWG\K3582-P003.dwg 23/03/2016 9:46:39 AM EdrWr PDF995

CONCEPTUAL STORMWATER MANAGEMENT PLAN

Proposed Veterinary Hospital
Lot 6 on SP210592
1 Alexander Court, Gracemere

For Gracemere Vet Clinic

ROCKHAMPTON REGIONAL COUNCIL
These plans are approved subject to the current conditions of approval associated with Development Permit No. D/51-2016
Dated: 14.09.2016

18 April 2016

File No: K3582-0002/A

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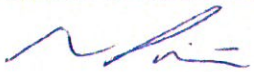
DOCUMENT CONTROL SHEET

Title:	CONCEPTUAL STORMWATER MANAGEMENT PLAN
Document No:	K3582-0002
Original Date of Issue:	23 March 2016
Project Manager:	Aaron Pianta
Author:	Jamie Lee
Client:	Gracemere Vet Clinic
Client Contact:	Jake Breedt – Beat Architects
Client Reference:	1 Alexander Court, Gracemere
Synopsis:	This *Conceptual Stormwater Management Plan* describes the existing site characteristics, proposed development of the site and corresponding site drainage infrastructure and stormwater management controls to be implemented during both the construction and operational phases of the development.

Reviewed by RPEQ	Reg. No.	Signed	Date
Aaron Pianta	10423		18 April 2016

Revision/Checking History			
Revision No	**Date**	**Checked By**	**Issued By**
Original	23 March 2016	Aaron Pianta	Jamie Lee
Revision A	18 April 2016	Aaron Pianta	Jamie Lee

Distribution		
Recipient	**No of Copies**	**Method**
Jake Breedt – Beat Architects	1	PDF

The information contained within this report is provided in good faith in the belief that no information, opinions or recommendations made are misleading. All comments and opinions given in this report are based on information supplied by the client, their agent and third parties.

CONTENTS

TABLES

FIGURES

APPENDICES

Appendix A - Schlencker Surveying, *Detail and level survey (*Ref: 6600-01)
Appendix B - BEAT Architects, Site Plan (Ref: BT 150478-CD.201)
Appendix C - Knobel Consulting Pty Ltd, *Pre Development Catchment Plan* (Ref: K3582/P001/A)
Appendix D - Knobel Consulting Pty Ltd, *Stormwater Drainage Plan* (Ref: K3582/P002/A)
Appendix E - Knobel Consulting Pty Ltd, *Sediment and Erosion Control Plan* & *Details* (Ref: K3582/P003/A)

1.0 INTRODUCTION/OBJECTIVES

1.1 Background

Knobel Consulting Pty Ltd has been commissioned by Gracemere Vet Clinic to prepare a *Conceptual Stormwater Management Plan* (CSWMP) and supporting engineering documentation for a proposed Veterinary Hospital development located at 1 Alexander Court, Gracemere (the subject site).

In preparing the CSWMP, Knobel Consulting Pty Ltd has considered the applicable requirements for the management of stormwater quality and quality appropriate for the subject site and proposed development.

1.2 Scope

This CSWMP details the planning, layout and design of the stormwater management infrastructure for both the construction and operational phase of this development.

This CSWMP aims to:

- Establish the required performance criteria for stormwater quantity and quality management systems for the proposed development;
- Provide a conceptual design of stormwater infrastructure including stormwater quality improvement devices and stormwater quantity management controls where required; and
- Ensure stormwater runoff is conveyed from/through the site to a lawful point of discharge in accordance with QUDM and Council guidelines.

This CSWMP has been prepared in accordance with Rockhampton Regional Council – *Development Guidelines,* Rockhampton Regional Council – *Rockhampton Region Planning Scheme 2015,* Queensland Urban Drainage Manual (QUDM) and State Planning Policy (SPP) July 2014.

2.0 SITE DESCRIPTION

2.1 Location

The subject site is located at 1 Alexander Court, Gracemere and has a total area of 1489m^2. Site details have been summarised within Table 1 and a Google Maps extract is presented as Figure 1.

Table 1: Site Details

Developer/Consultant	Property and Location	
Owner/Developer	Lot and Property Description	Address
Gracemere Vet Clinic	*Lot 6 on SP210592*	*1 Alexander Court, Gracemere QLD 4702*

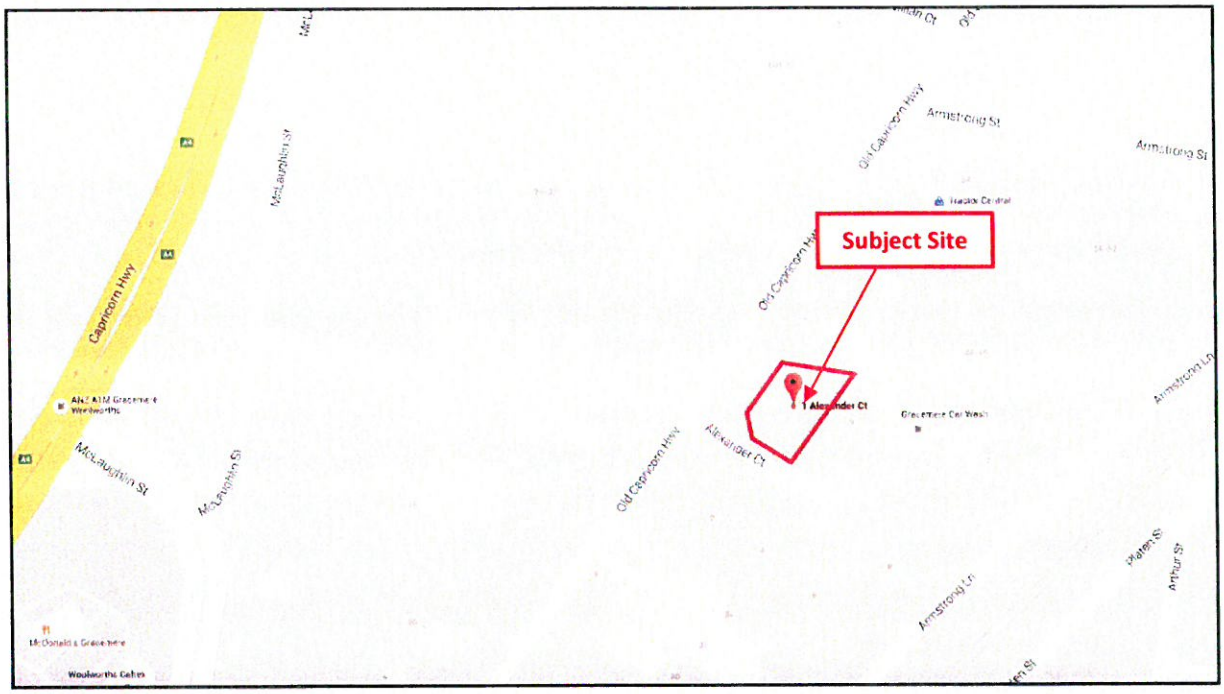


Figure 1: ***Google Maps Extract***

2.2 Site Topography

The subject site grades in an easterly direction toward the existing stormwater easement and adjoining properties. Site levels range from 15.6 m AHD to 13.25 m AHD. Refer to Schlencker Surveying, *Detail and level survey* (Ref: 6600-01) included as Appendix A.

2.3 Vegetation and Land Use

The subject site consists of a single lot. The ground coverage is poor grass. An aerial photograph is illustrated in Figure 2.

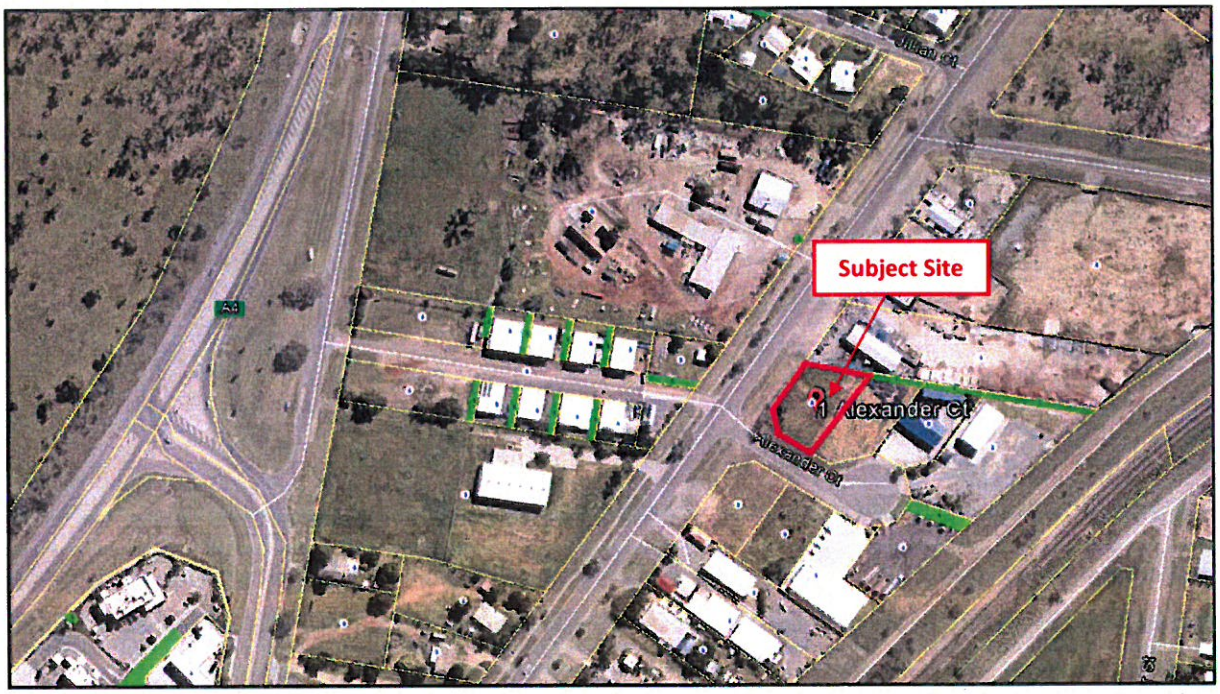


Figure 2: ***Aerial Photograph of the Site (Google Earth)***

2.4 Design Rainfall

Rainfall intensity data has been extracted from the Bureau of Meteorology (BOM) IFD program and calculated in accordance with the procedures outlined in IEAust, Australian Rainfall and Runoff. The extracted data is shown in Table 2:

Table 2: Rainfall Intensity Data

$^{2yr}I_{1hr}$: 43.5 mm/hr;
$^{2yr}I_{12hr}$: 8.70 mm/hr;
$^{2yr}I_{72hr}$: 2.47 mm/hr;
$^{50yr}I_{1hr}$: 87.50 mm/hr;
$^{50yr}I_{12hr}$: 18.60 mm/hr;
$^{50yr}I_{72hr}$: 6.33 mm/hr;
F_2: 4.22
F_{50}: 17.70
G: 0.21

2.5 Proposed Development

The site has frontage to Alexander Court and the proposed development is for a Veterinary Hospital. For development layout refer to Beat Architects – *Gracemere Veterinary Hospital* (Ref: BT150478-CD.201) included as Appendix B.

3.0 SITE HYDROLOGY AND HYDRAULICS

3.1 Background

For the Post development scenario all runoff will be directed toward existing stormwater easement SP210592 representing a Lawful Point of discharge (LPOD).

3.2 Pre Development

3.2.1 Coefficient of Runoff

A coefficient of runoff (Cyear) was calculated for the site using the fraction impervious method specified in QUDM. A fraction impervious factor of 0.00 is applied based on the existing site conditions. This equates to an approximate C_{10} value of 0.70, taken from Table 4.05.3(b) (QUDM). Refer to Knobel Consulting Pty Ltd, *Pre Development Stormwater Catchment Plan* (Ref: K3582/P001/A) included as Appendix C.

3.2.2 Time of Concentration

Friends Equation ($t_c = (107nL^{0.333})/S^{0.2}$) from QUDM has been applied for sheet flow for a length of 51 metres at 4.5% over poor grass (n=0.035), equating to a travel time of 10 minutes.

3.2.3 Design Flows

Design storm flow rates have been calculated for standard ARI storm events using rainfall intensity values from the BOM IFD programme. The Rational Method (Q = 2.78 x 10-3 CIA) has been used to calculate the design flow rates for the site.

Table 3: Pre Development Flow Rates

Average Recurrence Interval	ARI	2	10	100
Coefficient of Runoff	C	0.60	0.70	0.84
Area of Catchment (ha)	A	0.1489	0.1489	0.1489
Average Rainfall Intensity (mm/h)	I	104	154	242
Peak Flow Rate (L/s)	Q	26	45	84

3.3 Post Development

3.3.1 Coefficient of Runoff

A coefficient of runoff (Cyear) was calculated for the site using the fraction impervious method specified in QUDM. A fraction impervious factor of 0.76 is applied in accordance with the proposed layout.
This equates to an approximate C_{10} value of 0.84, taken from Table 4.05.3(a) (QUDM). Refer to Knobel Consulting Pty Ltd, *Stormwater Drainage Plan* (Ref: K3582/P002/A) included as Appendix D.

3.3.2 Time of Concentration

Friends Equation ($t_c = (107nL^{0.333})/S^{0.2}$) from QUDM has been applied for sheet flow for a length of 45 metres at 2.0% over a paved surface (n=0.015), equating to a travel time of 5 minutes.
plus 1 minute of pipe flow. This equates to a total travel time of 6 minutes to LPOD.

3.3.3 Design Flows

Design storm flow rates have been calculated for standard ARI storm events using rainfall intensity values from the BOM IFD programme. The Rational Method (Q = 2.78 x 10-3 CIA) has been used to calculate the design flow rates for the site.

Table 4: Post Development Flow Rates

Average Recurrence Interval	ARI	2	10	100
Coefficient of Runoff	C	0.71	0.84	1.00
Area of Catchment (ha)	A	0.1489	0.1489	0.1489
Average Rainfall Intensity (mm/h)	I	126	187	296
Peak Flow Rate (L/s)	Q	37	65	122

3.4 External Catchments

There are no external catchments impacting on the proposed development site.

4.0 STORMWATER QUANTITY ASSESSMENT

4.1 Background

The development of land will potentially increase peak flow rates from the subject site due to increased impervious areas and a reduced critical time of concentration. The following section provides details of an onsite detention system ensuring there will be no adverse impacts associated with the increased runoff rate on downstream properties and infrastructure.

4.2 Objective

The following objective has been set for stormwater discharge from the site and proposed development:

- *No net increase in peak flows from the subject site for all events up to the Q_{100} storm event during the post developed condition.*

This objective shall be achieved by detaining site runoff within the development.

4.3 Hydraulic Model

A calculation of the required detention volume to mitigate any increase in total site discharge rates has been made using the DRAINS software programme. DRAINS modelling has been adopted to ensure that the detention volume is designed with a higher degree of confidence.

The model was developed comprising of a single catchment discharging to LPOD-A. The 2, 10 and 100 year ARI storm events were analysed for all standard durations ranging from 5 minutes to 120 minutes. As the DRAINS model has been run using the Rational Method rainfall generation method, the peak flow rate targets have been calibrated to the peak flow rates calculated using the Rational Method. It was determined that the 20 minute storm is the critical duration for the combined peak site discharge for both the pre development and post development scenarios.

4.4 Detention Volume

Detention volume will be provided within a ground level ponding area. The sizes and outlet pipe configuration were adjusted to ensure the developed site as a whole does not discharge stormwater at levels exceeding the existing site's discharge rates.

The following detention storage parameters were found to achieve the target mitigated pre development flow rates:

Table 5: Detention Tank Parameters

Detention Surface Area	***150 m^2***
Detention Outlet Level	***13.25 m AHD***
Detention Depth	***0.21 m***
Detention Volume	***32.0 m^3***
Base Outlet Pipe Diameter	***150 mm***
Orifice on Base Outlet Pipe	***none***

The 20 minute design storm was the critical storm event for determining the required volume. A comparison of the DRAINS pre development, post development and mitigated flow rates based on the above arrangement is shown in Table 6 followed by the hydrograph for the critical duration of the Q_{100} storm event.

Table 6: Comparison of DRAINS Pre Development, Post Development and Mitigated Flow Rates

Average Recurrence Interval	2	10	100
Pre Development Flow Rate (m^3/sec) (DRAINS)	0.034	0.055	0.089
Post Development Flow Rate (m^3/sec) (DRAINS)	0.046	0.075	0.112
Mitigated Flow Rate (m^3/sec)	0.033	0.036	0.088

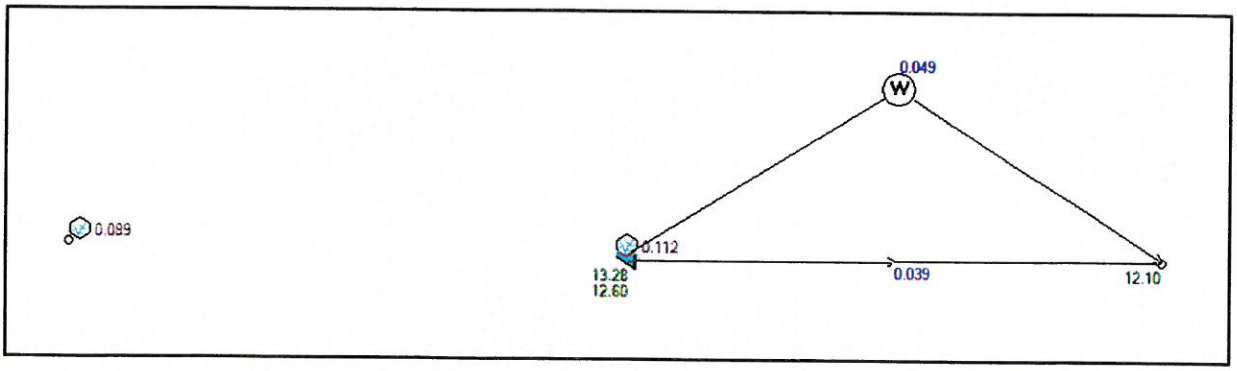


Figure 3: Drains Q100 Model Extract

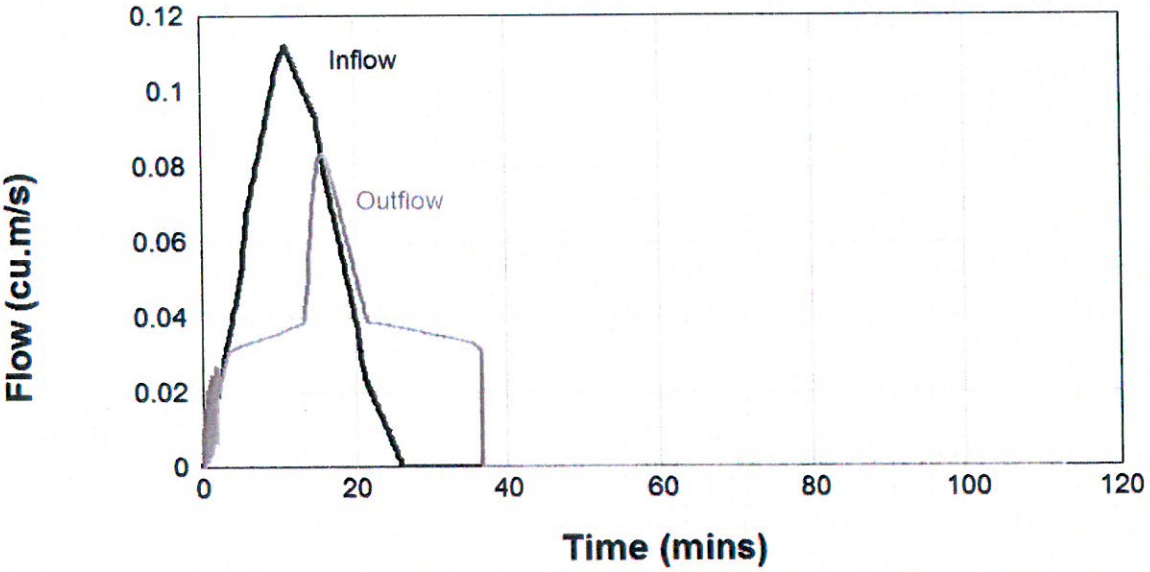


Figure 4: Mitigated Post Development Flow Rates for 100 year ARI 20 minute duration storm event

The detention arrangement can be seen to effectively mitigate the post development flows in all storms.
The hydraulic analysis using the DRAINS model has determined that a minimum of 32 m^3 of storage is required for site runoff attenuation. The detention arrangement must be fitted with an outlet pipe configuration detailed in Table 5 to satisfy the requirements. For location and details, Refer to Knobel Consulting Pty Ltd, *Stormwater Drainage Plan* (Ref: K3582/P002/A)

A copy of the DRAINS model used in this report can be made available to Council upon request.

5.0 STORMWATER QUALITY ASSESSMENT

5.1 Background

The development of land has the potential to increase the pollutant loads within stormwater runoff and downstream watercourse and environment. During the construction phase of the development, disturbance to the existing ground has the potential to significantly increase sediment loads entering downstream drainage systems and watercourses. The operational phase of the development will potentially increase the amount of sediments and nutrients washing from the site.

5.2 Construction Phase

5.2.1 Key Pollutants

During the construction phase a number of key pollutants have been identified for this development.
Table 7 illustrates the key pollutants that have been identified.

Table 7: Key Pollutants, Construction Phase

Pollutant	Sources
Litter	Paper, construction packaging, food packaging, cement bags, material off cuts.
Sediment	Exposed soils and stockpiles during earthworks and building works.
Hydrocarbons	Fuel and oil spills, leaks from construction equipment and temporary car park areas.
Toxic Materials	Cement slurry, asphalt primer, solvents, cleaning agents, and wash waters (eg, from tile works).
Acids or Alkaline substances	Acid sulphate soil, cement slurry and wash waters.

5.2.2 Sediment and Erosion Controls

Sediment and erosion control devices (S&EC) employed on the site shall be designed and constructed in accordance with IECA Australasia *Best Practice Erosion & Sediment Control Guidelines* (2008).
Details of the proposed controls are shown on Knobel Consulting Pty Ltd, *Sediment and Erosion Control Plan & Details* (Ref: K3582/P003/A) included as Appendix E.

PRE CONSTRUCTION

- Stabilised site access/exit on Alexander Court;
- Sediment fences to be located along the contour lines downstream of disturbed areas;
- Diversion drains to divert clean runoff around the construction site; and
- Educate site personnel to the requirements of the Sediment and Erosion Control Plan.

CONSTRUCTION

- Maintain construction access/exit, sediment fencing, catch drains and all other existing controls as required; and
- Progressively surface and revegetate finished areas as appropriate.

During construction, all areas of exposed soils allowing dust generation are to be suitably treated. Treatments will include mulching the soil and watering. Road access is to be regularly cleaned to prevent the transmission of soil on vehicle wheels and eliminate any build-up of typical road dirt and tyre dusts from delivery vehicles.

Adequate waste disposal facilities are to be provided and maintained on the site to cater for all waste materials such as litter hydrocarbons, toxic materials, acids or alkaline substances.

5.3 Operational Phase

The proposed development involves land less than 2500m^2 and will result in less than 6 lots. Therefore it is not assessable under State Planning Policy (SPP), July 2014 and shall not require water quality devices.

6.0 CONCLUSIONS

Knobel Consulting Pty Ltd has been commissioned by Gracemere Vet Clinic to prepare a *Conceptual Stormwater Management Plan* (CSWMP) and supporting engineering documentation for a Proposed Veterinary Hospital situated at 1 Alexander Court, Gracemere. The report details the planning, layout and conceptual design of the stormwater management infrastructure for both the construction and operational phases of this development.

The proposed development will result in an increase in runoff compared to the pre developed site. The report outlines a successful mitigation strategy for the post development flow rates, demonstrating that there will be no adverse impacts to the downstream properties.

The subject site is less than 2500m^2 and therefore does not need to satisfy the performance outcomes and water quality objectives outlined in Department of Environment and Resource Management, *State Planning Policy July 2014.*

APPENDIX

A

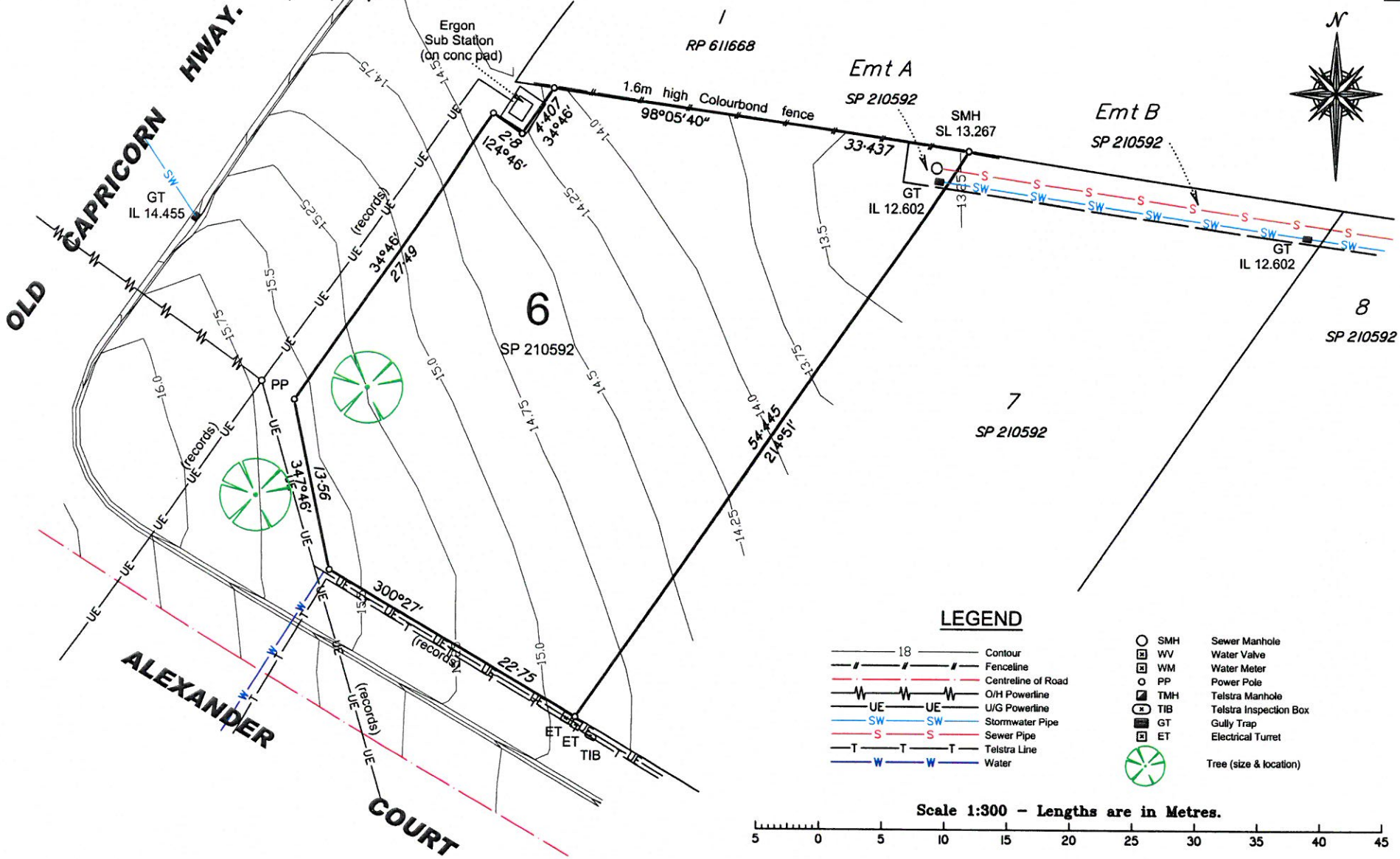
Schlencker Surveying,

Detail and level survey

(Ref: 6600-01)

Rev No	Revision note	Date	Signature	Checked

Sheet 1 of 1



LEGEND

18	Contour
Fenceline	
Centreline of Road	
O/H Powerline	
UE UE	U/G Powerline
SW SW	Stormwater Pipe
S S	Sewer Pipe
T T T	Telstra Line
W W	Water
SMH	Sewer Manhole
WV	Water Valve
WM	Water Meter
PP	Power Pole
TMH	Telstra Manhole
TIB	Telstra Inspection Box
GT	Gully Trap
ET	Electrical Turret
	Tree (size & location)

Scale 1:300 – Lengths are in Metres.

5 0 5 10 15 20 25 30 35 40 45

Notes:

This plan was prepared from a combination of field survey and existing records for the purpose of designing new constructions on the land and should not be used for any other purpose.
The title boundaries shown hereon were not marked by the author at the time of survey. See SP210592.
Services shown hereon have been located where possible by field survey. If not able to be so located known, services have been plotted from the records of the relevant authorities where available and have been noted accordingly on this plan. Where such records either do not exist or are considered inadequate, a notation has been made hereon. Prior to any demolition, excavation or construction on the site, the relevant authority should be contacted for possible location of further underground services and detailed locations of all services.
Level Datum is AHD derived from PSM98943. RL 13.733. Contour Interval 0.25m.

This note is an integral part of this plan.

0 50mm 100mm 150mm

Horizontal Datum:	G.D.A.
Meridian:	MGA94 by GPS
Vertical Datum:	A.H.D.
Derived from:	PSM 98943

Plan of:

Detail & Level Survey of Lot 7 on SP210592

SCHLENCKER SURVEYING
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SURVEYING, MAPPING & DEVELOPMENT CONSULTANTS
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Also at BRISBANE & GOLD COAST

Drawn:	DCE
Scale	1:300@A3
Date:	19-5-2014
Parish	GRACEMERE
AutoCAD Scale:	1:1000
County:	Livingstone
Keays Run:	6600-dtm(1)
Ref:	6600-01
Rev:	-

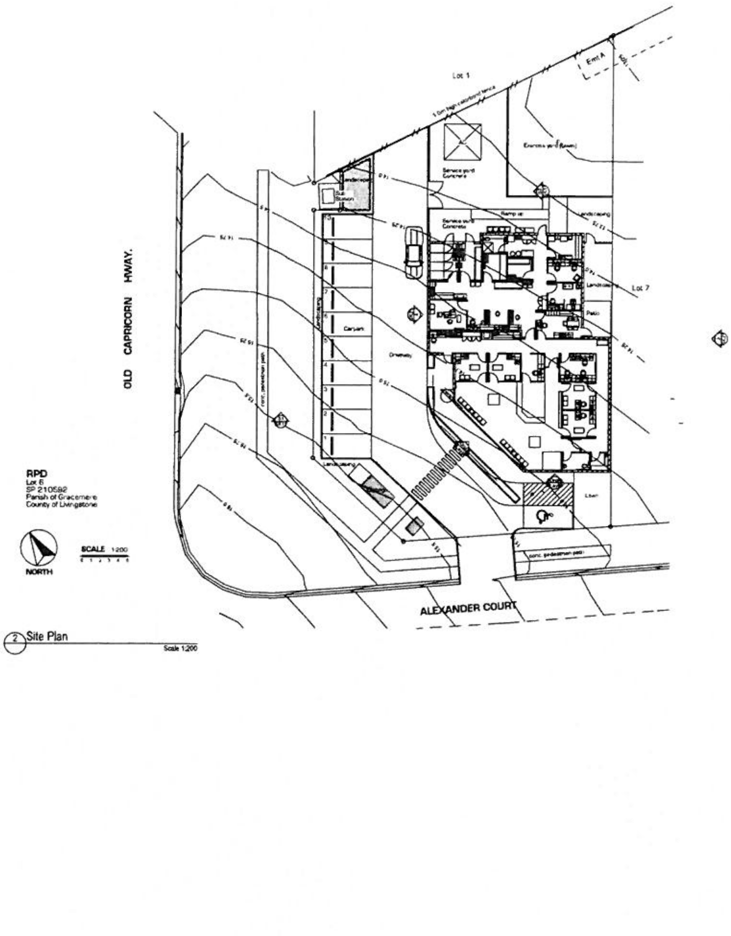
APPENDIX

B

BEAT Architects

Site Plan

(Ref: BT 150478-CD.201)



2 Site Plan
Scale 1:200

Revisions

Building Application Notice

These Architectural drawings are for Building Application purposes only. There is insufficient detail to construct every element shown and further detail is available by commission from the Architect for the Construction Phase. Where not appointed by the Architect to do so the Builder and/or Project Manager shall be responsible for the coordination of documents between Architects and Sub-Consultants (eg Structural Engineer, Hydraulics Engineer, Electrical engineer etc.)

If in doubt, ASK

Project Details

client
Client Name

project
Gracemere Veterinary Hospital

address
Cnr. Alexander & Old Capricorn Highway

title
Site Plan

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design JB	drawn SB		
scale as shown		job no.	BT150478
date 16/02/2016		drawing no.	CD.201
A1		rev.	

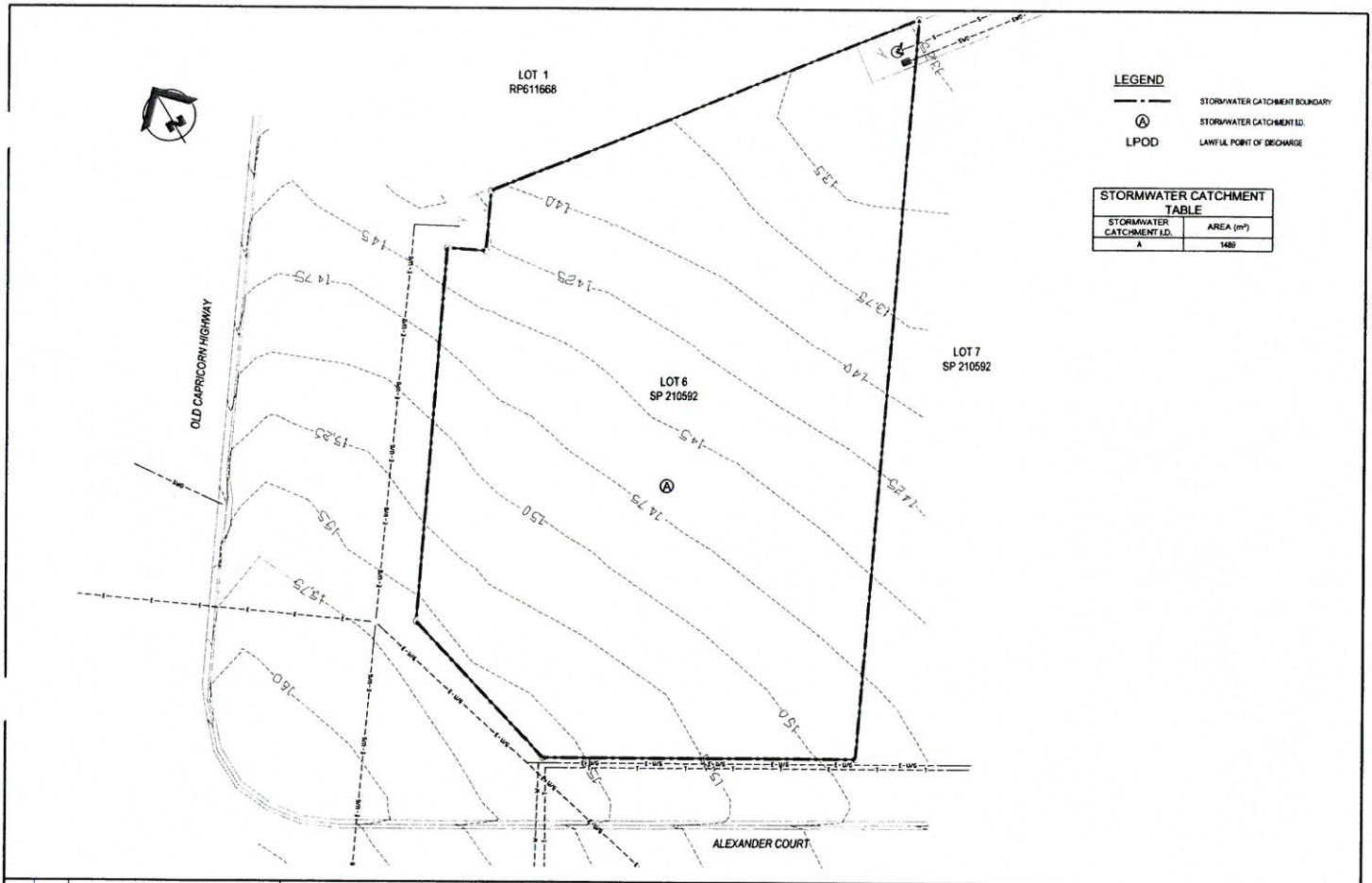
APPENDIX

C

Knobel Consulting Pty Ltd

Pre Development Catchment Plan

(Ref: K3582/P001/A)



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CLIENT: GRACEMERE VET CLINIC

PROJECT: PROPOSED VETERINARY HOSPITAL
1 ALEXANDER COURT
GRACEMERE, QLD, 4702

DESIGN	DRAWN	APPROVED
JL	EW	

TITLE: PRE DEVELOPMENT STORMWATER CATCHMENT PLAN

SCALE: 1:125 AT A1
1:250 AT A3
0 5 10m

PROJECT NO.: K3582
DWG NO.: P001
ISSUE: A

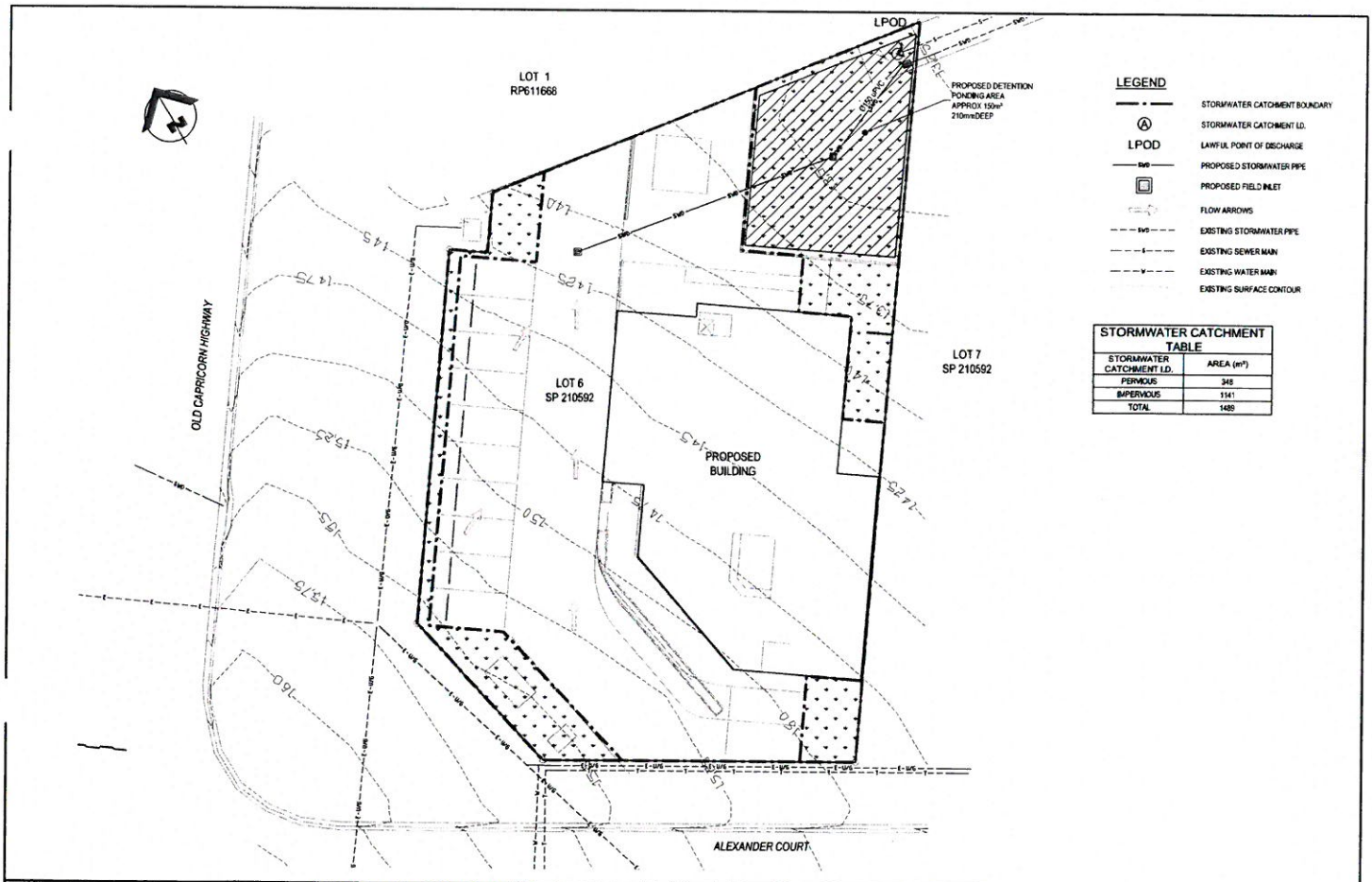
APPENDIX

D

Knobel Consulting Pty Ltd

Stormwater Drainage Plan

(Ref: K3582/P002/A)



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CLIENT	GRACEMERE VET CLINIC
PROJECT	PROPOSED VETERINARY HOSPITAL 1 ALEXANDER COURT GRACEMERE, QLD, 4702
DESIGN	JL
DRAWN	EW
APPROVED	
TITLE	STORMWATER DRAINAGE PLAN
SCALE	1:125 AT A1 1:250 AT A3
PROJECT NO.	K3582
DWG NO.	P002
ISSUE	A

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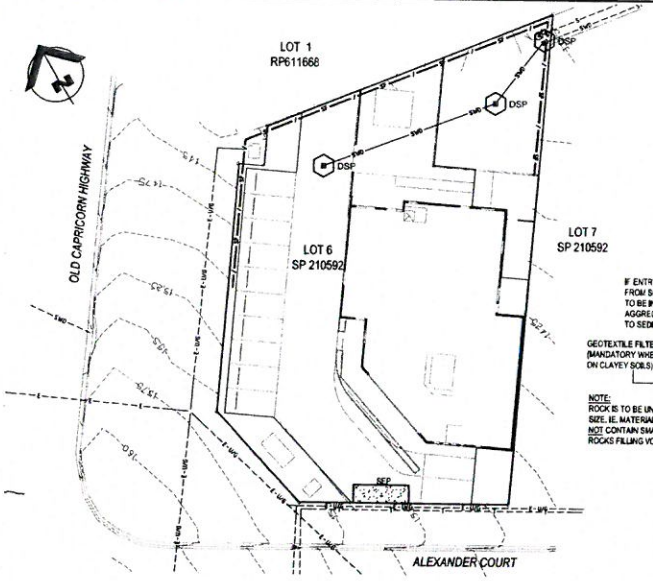
APPENDIX

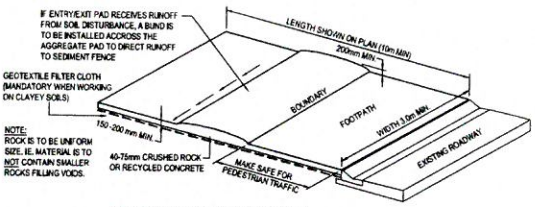
E

Knobel Consulting Pty Ltd

Sediment and Erosion Control Plan & Details

(Ref: K3582/P003/A)





STABILISED ENTRY/EXIT POINT

N.T.S. OR APPROVED EQUIVALENT

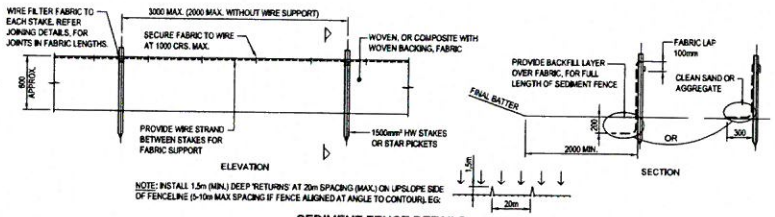
SEP — DENOTES STABILISED ENTRY/EXIT POINT, REFER PLAN FOR LOCATIONS.

LEGEND

- SEDIMENT FENCE
- SEP — STABILISED ENTRY/EXIT POINT
- DSP — DRAINAGE STRUCTURE PROTECTION

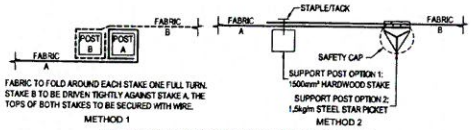
SEDIMENT AND EROSION CONTROL NOTES

1. THE PROJECT SEDIMENT AND EROSION CONTROL DRAWINGS ARE TO BE READ IN CONJUNCTION WITH THE SITES APPROVED STORMWATER MANAGEMENT PLAN.
2. CONSTRUCTION IS TO BE PROGRAMMED TO PROVIDE INSTALLATION OF PERIMETER LANDSCAPING / SURFACE TREATMENTS AS EARLY AS PRACTICAL.
3. THE CONTRACTOR'S WORKS PROGRAM IS TO BE REVIEWED AT THE PRESTART MEETING. ALTERATIONS TO THE PROGRAM MAY BE REQUIRED TO ENSURE SATISFACTORY EROSION AND SEDIMENT CONTROL.
4. SAFETY ISSUES MUST BE CONSIDERED AND MONITORED FOR EACH DEVICE TO THE SATISFACTION OF THE SUPERINTENDENT.
5. SEDIMENT FENCE FILTER FABRIC IS TO BE APPROVED BY THE ENGINEER. FILTER CLOTH AND SHADE CLOTHS NOT TO BE USED.
6. SEDIMENTATION MANAGEMENT DEVICES SHALL BE INSTALLED PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES AND MAINTAINED AT A SUITABLE LEVEL/ CONDITION THROUGHOUT CONSTRUCTION.
7. SEDIMENT FENCES ARE TO BE CLEANED OUT WHEN CAPACITY IS REDUCED BY 30%.
8. DRAINAGE STRUCTURE PROTECTION IS TO BE CLEANED FOLLOWING EACH SIGNIFICANT RUNOFF PRODUCING STORM.
9. ACCESS TO THE SITE IS TO BE PROVIDED BY THE CONTRACTOR. APPROVAL IS TO BE OBTAINED FROM COUNCIL FOR THE LOCATION OF THE SITE ACCESS POINT AND WASH DOWN AREA WHICH IS TO BE MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD. ACCESS TO AND FROM THE SITE IS TO BE VIA THE SHAKEDOWN FACILITY ONLY. ALL VEHICLES ARE TO BE WASHED DOWN PRIOR TO LEAVING THE SITE.
10. THE CONTRACTOR SHALL PROVIDE TEMPORARY DRAINAGE CONTROLS TO DIVERT FLOW FROM UNDISTURBED AREAS AROUND DISTURBED AREAS AND DIRECT FLOW FROM DISTURBED AREAS TOWARD CONTROL DEVICES.
11. PONDED RAINFALL SHALL BE PUMPED THROUGH A SEDIMENT FENCE LOCATED ON THE SITE BEFORE DISCHARGING INTO THE DOWNSTREAM STORMWATER SYSTEM.
12. STRAW BALES USED IN SEDIMENT DEVICES ARE TO BE REPLACED AFTER A MAXIMUM SERVICE PERIOD OF 6 WEEKS.



SEDIMENT FENCE DETAILS

N.T.S. — DENOTES SEDIMENT FENCE, REFER PLAN FOR LOCATION AND EXTENTS.



SEDIMENT FENCE FABRIC JOINING DETAILS

N.T.S.

ISSUE No.	DATE	AMENDMENT
A	23-03-18	ISSUED FOR REPORT

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PROJECT	PROPOSED VETERINARY HOSPITAL 1 ALEXANDER COURT GRACEMERE, QLD, 4702
DESIGN	JL
DRAWN	EW
APPROVED	
TITLE	SEDIMENT AND EROSION CONTROL PLAN AND DETAILS
SCALE	1:200 AT A1 1:400 AT A3
PROJECT NO.	K3582
DWG NO.	P003
ISSUE	A