

3 QUARRY ROAD AND 4 VINEYS ROAD, DURAL

CIVIL ENGINEERING WORKS DEVELOPMENT APPLICATION



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DRAWING SCHEDULE	
DRG No.	DRAWING TITLE
DAC01.01	COVER SHEET, DRAWING SCHEDULE AND LOCALITY PLAN
DAC01.11	GENERAL ARRANGMENT PLAN
DAC02.01	SPECIFICATION NOTES
DAC03.01	CONCEPT SEDIMENT AND SOIL EROSION CONTROL PLAN
DAC03.11	CONCEPT SEDIMENT AND SOIL EROSION CONTROL DETAILS
DAC04.01	CONCEPT SITEWORKS AND STORMWATER MANAGEMENT PLAN - SHEET 01
DAC04.02	CONCEPT SITEWORKS AND STORMWATER MANAGEMENT PLAN - SHEET 02
DAC04.03	CONCEPT SITEWORKS AND STORMWATER MANAGEMENT PLAN - SHEET 03
DAC05.01	CONCEPT CULVERT DESIGN
DAC05.11	CULVERT LONGITUDINAL SECTION
DAC05.21	CULVERT CROSS SECTION - SHEET 01
DAC05.22	CULVERT CROSS SECTION - SHEET 02
DAC06.01	DETAIL - SHEET 01
DAC06.02	DETAIL - SHEET 02
DAC06.03	DETAIL - SHEET 03
DAC07.01	CATCHMENT PLAN

DRAWN: C. PASKE
DESIGNED: N. MAICKER
JOB MANAGER: J. GILLIGAN
VERIFIER:

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
0	REVISION IN PROGRESS	CP	-	NN	12.04.18
1	ISSUED FOR REVIEW	CP	-	NN	03.05.18
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PROJECT

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DRAWING TITLE

CIVIL ENGINEERING WORKS DEVELOPMENT APPLICATION

COVER SHEET, DRAWING SCHEDULE AND LOCALITY PLAN

JOB NUMBER

172490

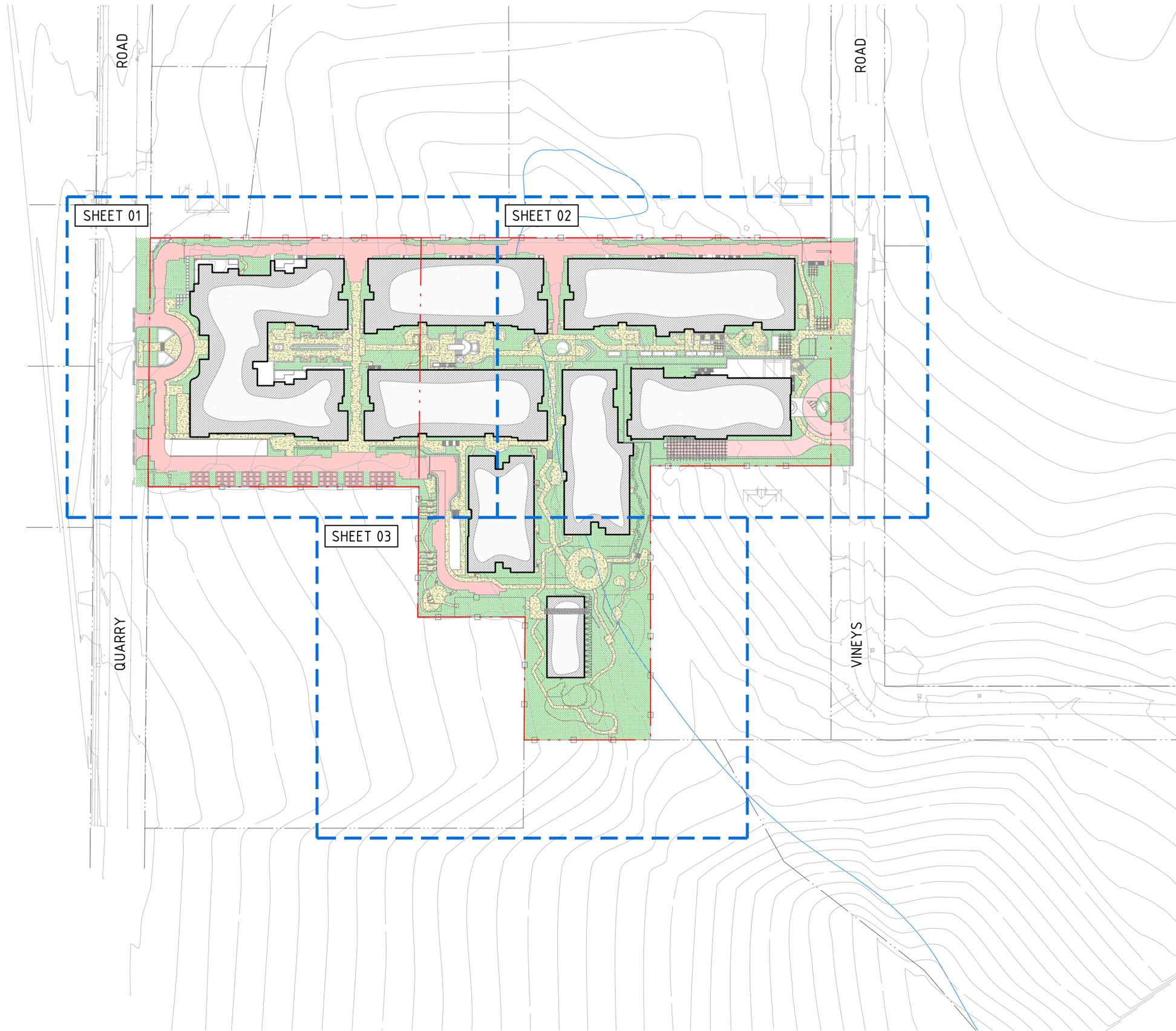
DRAWING NUMBER

DAC01.01

REVISION

2

DRAWING SHEET SIZE = A1



LEGEND	
	PROPOSED BOUNDARY LINE
	EXISTING BOUNDARY LINE
	EASEMENT LINE
	EXISTING CONTOURS
	SHEET EXTENTS

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DRAWING TITLE

CIVIL ENGINEERING WORKS DEVELOPMENT APPLICATION

GENERAL ARRANGMENT PLAN

JOB NUMBER	
172490	
DRAWING NUMBER	REVISION
DAC01.11	2
DRAWING SHEET SIZE = A1	

NOTE: ALL CIVIL ENGINEERING CONSTRUCTION WORKS TO BE CARRIED OUT IN ACCORDANCE WITH HORNSBY SHIRE COUNCIL DEVELOPMENT GUIDELINES .THE AFOREMENTIONED GUIDELINES INCLUSIVE OF ALL SPECIFICATIONS TAKE PRECEDENCE OVER NOTES PROVIDED BELOW.

STORMWATER DRAINAGE

- ALL DRAINAGE LINES SHALL BE UPVC (CLASS SN4) SEWER GRADE DRAINAGE PIPE, U.N.O.
- ALL DRAINAGE LINES SHALL BE LAID AT 1% MIN. FALL, UNO.
- ALL LEVELS ARE AUSTRALIAN HEIGHT DATUM (AHD).
- ALL DOWNPIPES GUTTERS TO BE DESIGNED IN ACCORDANCE WITH AS/NZS 3500.3.2 - 2003 'STORMWATER' DRAINAGE.
- THE STORMWATER DRAINAGE DESIGN HAS BEEN CARRIED OUT IN ACCORDANCE WITH AS/NZS 3500.3.2-2003 'STORMWATER' DRAINAGE.
- ANY VARIATIONS TO THE NOMINATED LEVELS SHALL BE REFERRED TO ENGINEER IMMEDIATELY.
- SUBSOIL DRAINAGE SHALL BE PROVIDED TO ALL RETAINING WALLS & EMBANKMENTS, WITH THE LINES FEEDING INTO THE STORMWATER DRAINAGE SYSTEM.
- ALL GRATES TO BE GALVANISED STEEL WITH HINGES AND CHILD PROOF LOCK.
- ALL GRATES TO BE HEEL SAFE WITHIN AGED CARE DEVELOPMENTS.
- THE STORMWATER DRAINAGE IS DESIGNED IN ACCORDANCE WITH HORNSBY SHIRE COUNCIL DEVELOPMENT DESIGN SPECIFICATION 0074 STORMWATER DRAINAGE DESIGN, JULY 2016.

RAINWATER RE-USE

- PROVIDE RAINWATER RE-USE SYSTEM TO SUPPLY WATER FOR TOILET FLUSHING
- GUTTER GUARD TO BE INSTALLED ON ALL EAVES GUTTERS.
- A PERMANENT SIGN IS TO BE LOCATED IN THE VICINITY OF THE TANK STATING THE WATER IS "NON POTABLE WATER" WITH APPROPRIATE HAZARD IDENTIFICATION.
- PIPEWORK USED FOR RAINWATER SERVICES SHALL BE COLOURED LILAC IN ACCORDANCE WITH AS1345.
- ALL VALVES AND APERTURES SHALL BE CLEARLY AND PERMANENTLY LABELLED WITH SAFETY SIGNS TO COMPLY WITH AS1319.
- RAINWATER TANK RETICULATION SYSTEM AND MAINS WATER BYPASS ARRANGEMENT TO BE INSTALLED IN ACCORDANCE WITH AS/NZS 3500.1.2-2003 AND THE NSW CODE OF PRACTICE : PLUMBING AND DRAINING.
- A FIRST FLUSH FILTRATION DEVICE IS TO BE PROVIDED AT RAINWATER TANK.

GENERAL NOTES

THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH OTHER CONSULTANTS' DRAWINGS AND SPECIFICATIONS AND WITH OTHER SUCH WRITTEN INSTRUCTIONS AS MAY BE ISSUED DURING THE COURSE OF THE CONTRACT. ANY DISCREPANCY SHALL BE REFERRED TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK.

ALL DIMENSIONS ARE IN MILLIMETRES & ALL LEVELS ARE IN METRES, UNO (UNLESS NOTED OTHERWISE).

NO DIMENSION SHALL BE OBTAINED BY SCALING THE DRAWINGS.

ALL LEVELS AND SETTING OUT DIMENSIONS SHOWN ON THE DRAWINGS SHALL BE CHECKED ON SITE PRIOR TO THE COMMENCEMENT OF THE WORK.

DETAIL SURVEY DATA WAS SUPPLIED BY HIGGINS SURVEYORS, DRAWING DATED 22/12/2016.

EXISTING SERVICES WHERE SHOWN HAVE BEEN PLOTTED FROM SUPPLIED DATA AND SUCH THEIR ACCURACY CAN NOT BE GUARANTEED. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ESTABLISH THE LEVEL OF ALL EXISTING SERVICES PRIOR TO THE COMMENCEMENT OF WORK.

ON COMPLETION OF STORMWATER INSTALLATION, ALL DISTURBED AREAS MUST BE RESTORED TO ORIGINAL CONDITION, INCLUDING KERBS, FOOTPATHS, CONCRETE AREAS, GRAVEL AND GRASSED AREAS AND ROAD PAVEMENTS, UNLESS DIRECTED OTHERWISE.

ALL STORMWATER MANAGEMENT MEASURES SHOWN ON THIS DRAWING HAVE BEEN PREPARED FOR DEVELOPMENT APPLICATION PURPOSES TO DEMONSTRATE FEASIBILITY. ALL MEASURES WILL BE SUBJECT TO DETAIL DESIGN AT THE CONSTRUCTION CERTIFICATE STAGE AND MAY BE SUBJECT TO VARIATION PROVIDED THAT THE DESIGN INTENT IS MAINTAINED.

DESIGN SUMMARY

CATCHMENT CALCULATIONS:

	PRE-DEVELOPMENT	POST-DEVELOPMENT
TOTAL AREA	29,695.90m ²	29,695.90m ²
IMPERVIOUS AREA	555.03m ² (1.9%)	20,399.79m ² (68.7%)
PERVIOUS AREA	2914.0.87m ² (98.1%)	9,296.11m ² (31.3%)

SITE DISCHARGE CALCULATIONS:

	5 YEAR ARI	100 YEAR ARI
PRE-DEVELOPMENT	790 L/s	1340 L/s
POST-DEVELOPMENT	530 L/s	790 L/s

ON-SITE DETENTION:

DESIGN BASIS:

- PRE TO POST DEVELOPMENT CONDITIONS USING 'DRAINS'.
- EMAIL 'NNAICKER@NORTHROP.COM.AU' FOR 'DRAINS' FILE.

PRE-DEVELOPED RUNOFF CALCULATED USING THE RATIONAL METHOD IN ACCORDANCE WITH HORNSBY SHIRE COUNCIL'S 'POLICY FOR STORMWATER MANAGEMENT'.

A= CATCHMENT AREA (m²)= 29695.90 m²

I_{avg}= 265 mm/hr

T_c= 6.6 MINUTES

PRE-DEVELOPED 5YR RUNOFF = 790 L/s

POST-DEVELOPED RUNOFF CALCULATED USING 'DRAINS'

POST-DEVELOPED 100YR RUNOFF = 790 L/s

STORMWATER DRAINAGE REQUIREMENTS HAVE BEEN CALCULATED IN ACCORDANCE WITH HORNSBY SHIRE COUNCIL.

BYPASS AREA / (PERCENTAGE) = 2170.75m² (7.3%)

ON-SITE DETENTION STORAGE PROVIDED = 650m³

ON-SITE DETENTION SUMMARY:

- BELOW GROUND BLOCK WORK TANK

TOP WATER LEVEL = RL196.32

OVERFLOW LEVEL = RL197.00

ORIFICE CENTERLINE = RL194.65

ORIFICE DIAMETER = Ø572mm

RAINWATER RE-USE:

IN ACCORDANCE WITH BASIX/COUNCIL REQUIREMENTS.

RAINWATER RE-USE STORAGE REQUIRED = 20m³

RAINWATER RE-USE STORAGE PROVIDED = 20m³

RAINWATER RE-USE TO BE USED FOR THE FOLLOWING:

- IRRIGATION

STORMWATER MANAGEMENT REQUIREMENTS HAVE BEEN CALCULATED IN ACCORDANCE WITH HORNSBY SHIRE COUNCIL DEVELOPMENT DESIGN SPECIFICATION 0074 STORMWATER DRAINAGE (DESIGN, JULY 2016).

WATER QUALITY:

MUSIC MODEL SUMMARY (EMAIL 'NNAICKER@NORTHROP.COM.AU' FOR 'MUSIC' FILE)

MUSIC MODEL SUMMARY:

SOURCE NODE	CATCHMENT	AREA
URBAN	ROOF AREA (TOTAL)	9620m ²
URBAN	OPEN SPACE	2507.6m ²
URBAN	GROUND TO OSD	8274.4m ²
URBAN	DRIVEWAY	3285m ²
		TOTAL 23687m²

TREATMENT NODES:

- RAINWATER RE-USE TANK
- ON-SITE DETENTION TANK
- STORMWATER 360 'STORMFILTER' CARTRIDGE
- VEGETATIVE SWALE

TREATMENT STANDARDS:

POLLUTANT	REDUCTION STANDARDS	REDUCTION ACHIEVED
GROSS POLLUTANTS	90%	98.3%
TOTAL SUSPENDED SOLIDS	80%	81.5%
TOTAL PHOSPHORUS	65%	68.8%
TOTAL NITROGEN	45%	45.1%

MUSIC MODEL PARAMETERS IN ACCORDANCE WITH HORNSBY SHIRE COUNCIL'S MUSIC MODELLING VERSION 6.3.0

MUSIC MODEL PARAMETERS IN ACCORDANCE WITH THE DRAFT NSW MUSIC MODELLING GUIDELINES REF: R.B17048.001.01 DATED AUGUST 2010.

VERIFIER: J. GILLIGAN

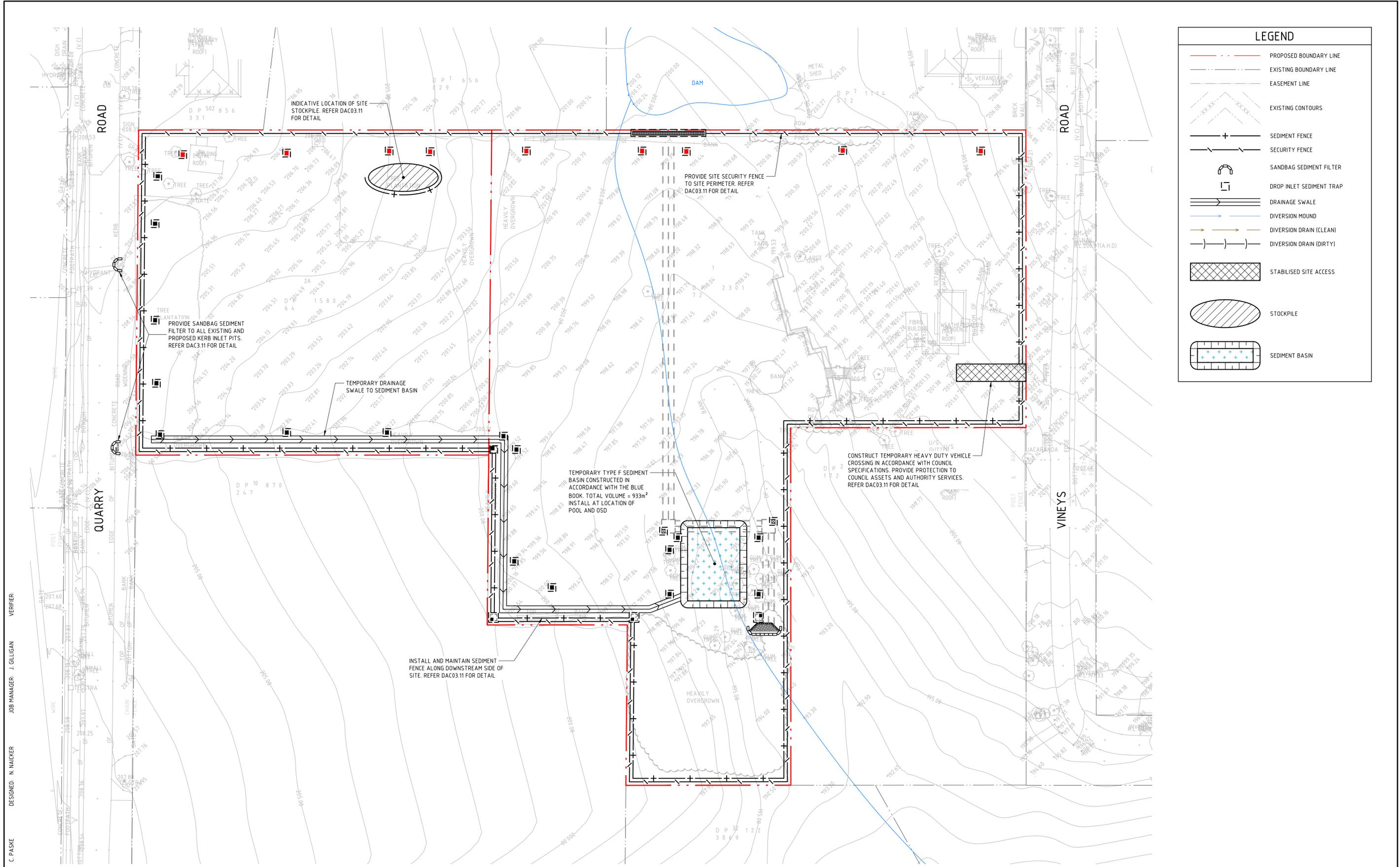
JOB MANAGER: N. NAICKER

DESIGNED: C. PASKE

DRAWN: C. PASKE

NOT FOR CONSTRUCTION

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										DRAWING SHEET SIZE = A1	



LEGEND	
	PROPOSED BOUNDARY LINE
	EXISTING BOUNDARY LINE
	EASEMENT LINE
	EXISTING CONTOURS
	SEDIMENT FENCE
	SECURITY FENCE
	SANDBAG SEDIMENT FILTER
	DROP INLET SEDIMENT TRAP
	DRAINAGE SWALE
	DIVERSION MOUND
	DIVERSION DRAIN (CLEAN)
	DIVERSION DRAIN (DIRTY)
	STABILISED SITE ACCESS
	STOCKPILE
	SEDIMENT BASIN

DRAWN: C. PASKE
 DESIGNED: N. WAICKER
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SCALE 1:500 @ A1

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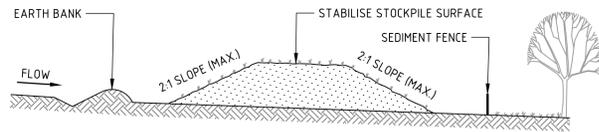
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DRAWING TITLE

CIVIL ENGINEERING WORKS DEVELOPMENT APPLICATION

CONCEPT SEDIMENT AND SOIL EROSION CONTROL PLAN

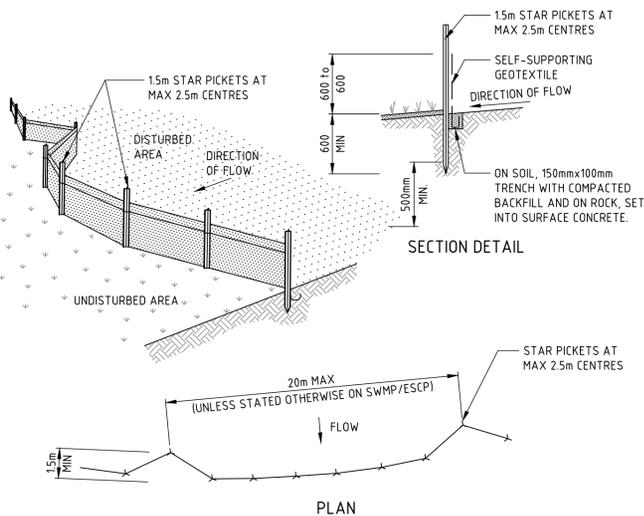
JOB NUMBER	172490
DRAWING NUMBER	DAC03.01
REVISION	2
DRAWING SHEET SIZE = A1	



CONSTRUCTION NOTES

1. PLACE STOCKPILES MORE THAN 2m (PREFERABLY 5m) FROM EXISTING VEGETATION, CONCENTRATED WATER FLOW, ROADS AND HAZARD AREAS.
2. CONSTRUCT ON THE CONTOUR AS LOW, FLAT, ELONGATED MOUNDS.
3. WHERE THERE IS SUFFICIENT AREA, TOPSOIL STOCKPILES SHALL BE LESS THAN 2m IN HEIGHT.
4. WHERE THEY ARE TO BE IN PLACE FOR MORE THAN 10 DAYS, STABILISE FOLLOWING THE APPROVED ESCP OR SWMP TO REDUCE THE C-FACTOR TO LESS THAN 0.10.
5. CONSTRUCT EARTH BANKS (STANDARD DRAWING 5-5) ON THE UPSLOPE SIDE TO DIVERT WATER AROUND STOCKPILES AND SEDIMENT FENCES (STANDARD DRAWING 6-8) 1 TO 2m DOWNSLOPE.

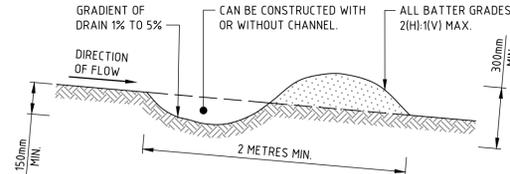
STOCKPILES (SD 4-1)



CONSTRUCTION NOTES

1. CONSTRUCT SEDIMENT FENCES AS CLOSE AS POSSIBLE TO BEING PARALLEL TO THE CONTOURS OF THE SITE, BUT WITH SMALL RETURNS AS SHOWN IN THE DRAWING TO LIMIT THE CATCHMENT AREA OF ANY ONE SECTION. THE CATCHMENT AREA SHOULD BE SMALL ENOUGH TO LIMIT WATER FLOW IF CONCENTRATED AT ONE POINT TO 50 LITRES PER SECOND IN THE DESIGN STORM EVENT, USUALLY THE 10-YEAR EVENT.
2. CUT A 150mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
3. DRIVE 15 METRE LONG STAR PICKETS INTO GROUND AT 2.5 METRE INTERVALS (MAX) AT THE DOWNSLOPE EDGE OF THE TRENCH. ENSURE ANY STAR PICKETS ARE FITTED WITH SAFETY CAPS.
4. FIX SELF-SUPPORTING GEOTEXTILE TO THE UPSLOPE SIDE OF THE POSTS ENSURING IT GOES TO THE BASE OF THE TRENCH. FIX THE GEOTEXTILE WITH WIRE TIES OR AS RECOMMENDED BY THE MANUFACTURER. ONLY USE GEOTEXTILE SPECIFICALLY PRODUCED FOR SEDIMENT FENCING. THE USE OF SHADE CLOTH FOR THIS PURPOSE IS NOT SATISFACTORY.
5. JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150mm OVERLAP.
6. BACKFILL THE TRENCH OVER THE BASE OF THE FABRIC AND COMPACT IT THOROUGHLY OVER THE GEOTEXTILE.

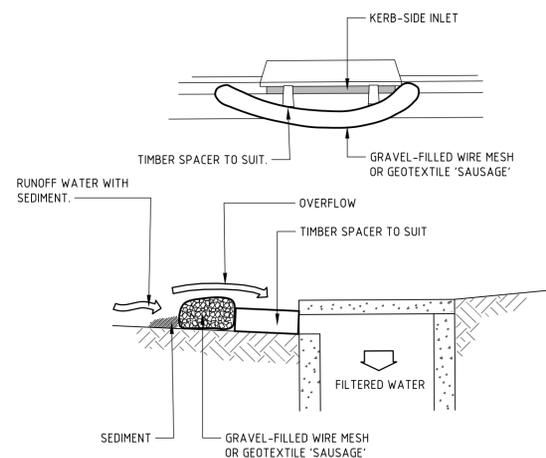
SEDIMENT FENCE (SD 6-8)



CONSTRUCTION NOTES

1. BUILD WITH GRADIENTS BETWEEN 1 AND 5 PERCENT.
2. AVOID REMOVING TREES AND SHRUBS IF POSSIBLE - WORK AROUND THEM.
3. ENSURE THE STRUCTURES ARE FREE OF PROJECTIONS OR OTHER IRREGULARITIES THAT COULD IMPEDE WATER FLOW.
4. BUILD THE DRAINS WITH CIRCULAR, PARABOLIC OR TRAPEZOIDAL CROSS SECTIONS, NOT V SHAPED.
5. ENSURE THE BANKS ARE PROPERLY COMPACTED TO PREVENT FAILURE.
6. COMPLETE PERMANENT OR TEMPORARY STABILISATION WITHIN 10 DAYS OF CONSTRUCTION.

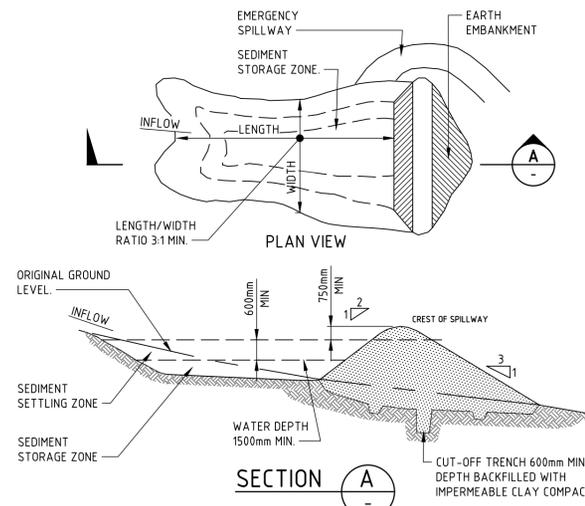
NOTE: ONLY TO BE USED AS TEMPORARY BANK WHERE MAXIMUM UPSLOPE LENGTH IS 80 METRES.
EARTH BANK - LOW FLOW (SD 5-5)



CONSTRUCTION NOTES

1. INSTALL FILTERS TO KERB INLETS ONLY AT SAG POINTS.
2. FABRICATE A SLEEVE MADE FROM GEOTEXTILE OR WIRE MESH LONGER THAN THE LENGTH OF THE INLET PIT AND FILL IT WITH 25mm TO 50mm GRAVEL.
3. FORM AN ELLIPTICAL CROSS-SECTION ABOUT 150mm HIGH x 400mm WIDE.
4. PLACE THE FILTER AT THE OPENING LEAVING AT LEAST A 100mm SPACE BETWEEN IT AND THE KERB INLET. MAINTAIN THE OPENING WITH SPACER BLOCKS.
5. FORM A SEAL WITH THE KERB TO PREVENT SEDIMENT BYPASSING THE FILTER.
6. SANDBAGS FILLED WITH GRAVEL CAN SUBSTITUTE FOR THE MESH OR GEOTEXTILE PROVIDING THEY ARE PLACED SO THAT THEY FIRMLY ABUT EACH OTHER AND SEDIMENT-LADEN WATERS CANNOT PASS BETWEEN.

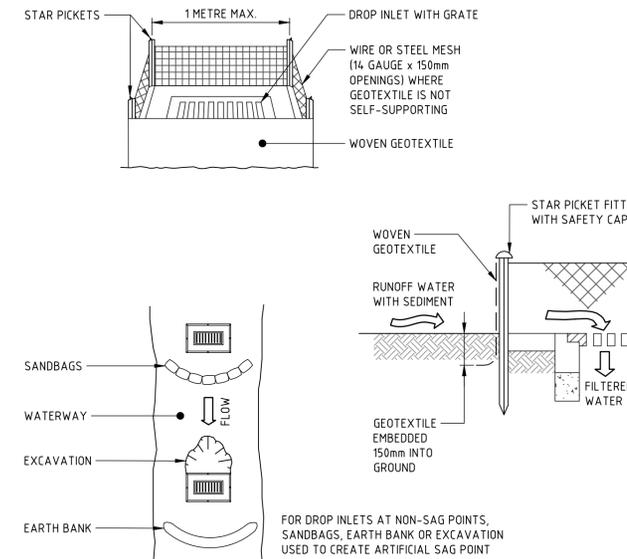
MESH AND GRAVEL INLET FILTER (SD 6-11)



CONSTRUCTION NOTES

1. REMOVE ALL VEGETATION AND TOPSOIL FROM UNDER THE DAM WALL AND FROM WITHIN THE STORAGE AREA.
2. CONSTRUCT A CUT-OFF TRENCH 500mm DEEP AND 1200mm WIDE ALONG THE CENTRELINE OF THE EMBANKMENT EXTENDING TO A POINT ON THE GULLY WALL LEVEL WITH THE RISER CREST.
3. MAINTAIN THE TRENCH FREE OF WATER AND RECOMPACT THE MATERIALS WITH EQUIPMENT AS SPECIFIED IN THE SWMP TO 95 PER CENT STANDARD PROCTOR DENSITY.
4. SELECT FILL FOLLOWING THE SWMP THAT IS FREE OF ROOTS, WOOD, ROCK, LARGE STONE OR FOREIGN MATERIAL.
5. PREPARE THE SITE UNDER THE EMBANKMENT BY RIPPING TO AT LEAST 100mm TO HELP BOND COMPACTED FILL TO THE EXISTING SUBSTRATE.
6. SPREAD THE FILL IN 100mm TO 150mm LAYERS AND COMPACT IT AT OPTIMUM MOISTURE CONTENT FOLLOWING THE SWMP.
7. CONSTRUCT THE EMERGENCY SPILLWAY.
8. REHABILITATE THE STRUCTURE FOLLOWING THE SWMP.

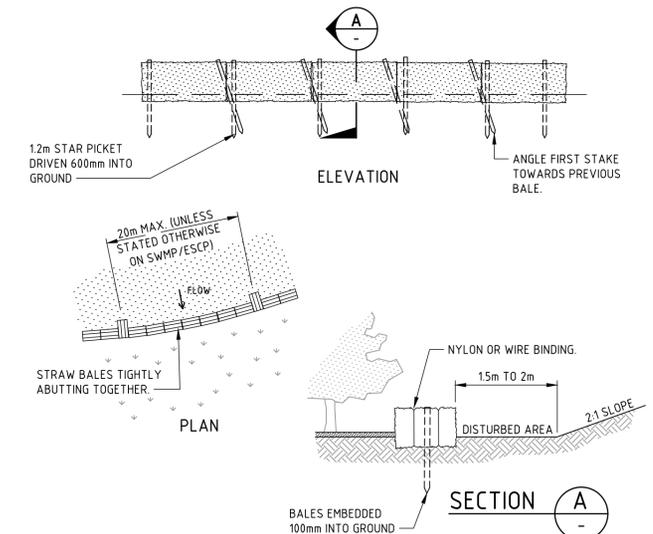
(APPLIES TO 'TYPE D' AND 'TYPE F' SOILS ONLY)
EARTH BASIN - WET (SD 6-4)



CONSTRUCTION NOTES

1. FABRICATE A SEDIMENT BARRIER MADE FROM GEOTEXTILE OR STRAW BALES.
2. FOLLOW STANDARD DRAWING 6-7 AND STANDARD DRAWING 6-8 FOR INSTALLATION PROCEDURES FOR THE STRAW BALES OR GEOTEXTILE. REDUCE THE PICKET SPACING TO 1 METRE CENTRES.
3. IN WATERWAYS, ARTIFICIAL SAG POINTS CAN BE CREATED WITH SANDBAGS OR EARTH BANKS AS SHOWN IN THE DRAWING.
4. DO NOT COVER THE INLET WITH GEOTEXTILE UNLESS THE DESIGN IS ADEQUATE TO ALLOW FOR ALL WATERS TO BYPASS IT.

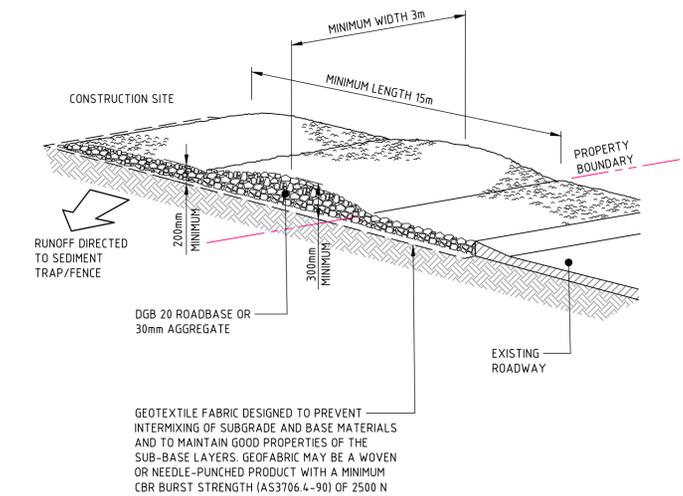
GEOTEXTILE INLET FILTER (SD 6-12)



CONSTRUCTION NOTES

1. CONSTRUCT THE STRAW BALE FILTER AS CLOSE AS POSSIBLE TO BEING PARALLEL TO THE CONTOURS OF THE SITE.
2. PLACE BALES LENGTHWISE IN A ROW WITH ENDS TIGHTLY ABUTTING. USE STRAW TO FILL ANY GAPS BETWEEN BALES. STRAWS ARE TO BE PLACED PARALLEL TO GROUND.
3. ENSURE THAT THE MAXIMUM HEIGHT OF THE FILTER IS ONE BALE.
4. EMBED EACH BALE IN THE GROUND 75mm TO 100mm AND ANCHOR WITH TWO 12 METRE STAR PICKETS OR STAKES. ANGLE THE FIRST STAR PICKET OR STAKE IN EACH BALE TOWARDS THE PREVIOUSLY LAID BALE. DRIVE THEM 600mm INTO THE GROUND AND, IF POSSIBLE, FLUSH WITH THE TOP OF THE BALES. WHERE STAR PICKETS ARE USED AND THEY PROTRUDE ABOVE THE BALES, ENSURE THEY ARE FITTED WITH SAFETY CAPS.
5. WHERE A STRAW BALE FILTER IS CONSTRUCTED DOWNSLOPE FROM A DISTURBED BATTER, ENSURE THE BALES ARE PLACED 1 TO 2 METRES DOWNSLOPE FROM THE TOE.
6. ESTABLISH A MAINTENANCE PROGRAM THAT ENSURES THE INTEGRITY OF THE BALES IS RETAINED - THEY COULD REQUIRE REPLACEMENT EACH TWO TO FOUR MONTHS.

STRAW BALE FILTER (SD 6-7)



CONSTRUCTION NOTES

1. STRIP THE TOPSOIL, LEVEL THE SITE AND COMPACT THE SUBGRADE.
2. COVER THE AREA WITH NEEDLE-PUNCHED GEOTEXTILE.
3. CONSTRUCT A 200mm THICK PAD OVER THE GEOTEXTILE USING ROAD BASE OR 30mm AGGREGATE.
4. ENSURE THE STRUCTURE IS AT LEAST 15 METRES LONG OR TO BUILDING ALIGNMENT AND AT LEAST 3 METRES WIDE.
5. WHERE A SEDIMENT FENCE JOINS ONTO THE STABILISED ACCESS, CONSTRUCT A HUMP IN THE STABILISED ACCESS TO DIVERT WATER TO THE SEDIMENT FENCE.

STABILISED SITE ACCESS (SD 6-14)

NOT FOR CONSTRUCTION

VERIFIER: J. GILLIGAN
JOB MANAGER: N. WACKER
DESIGNED: J. GILLIGAN
DRAWN: C. PASKE

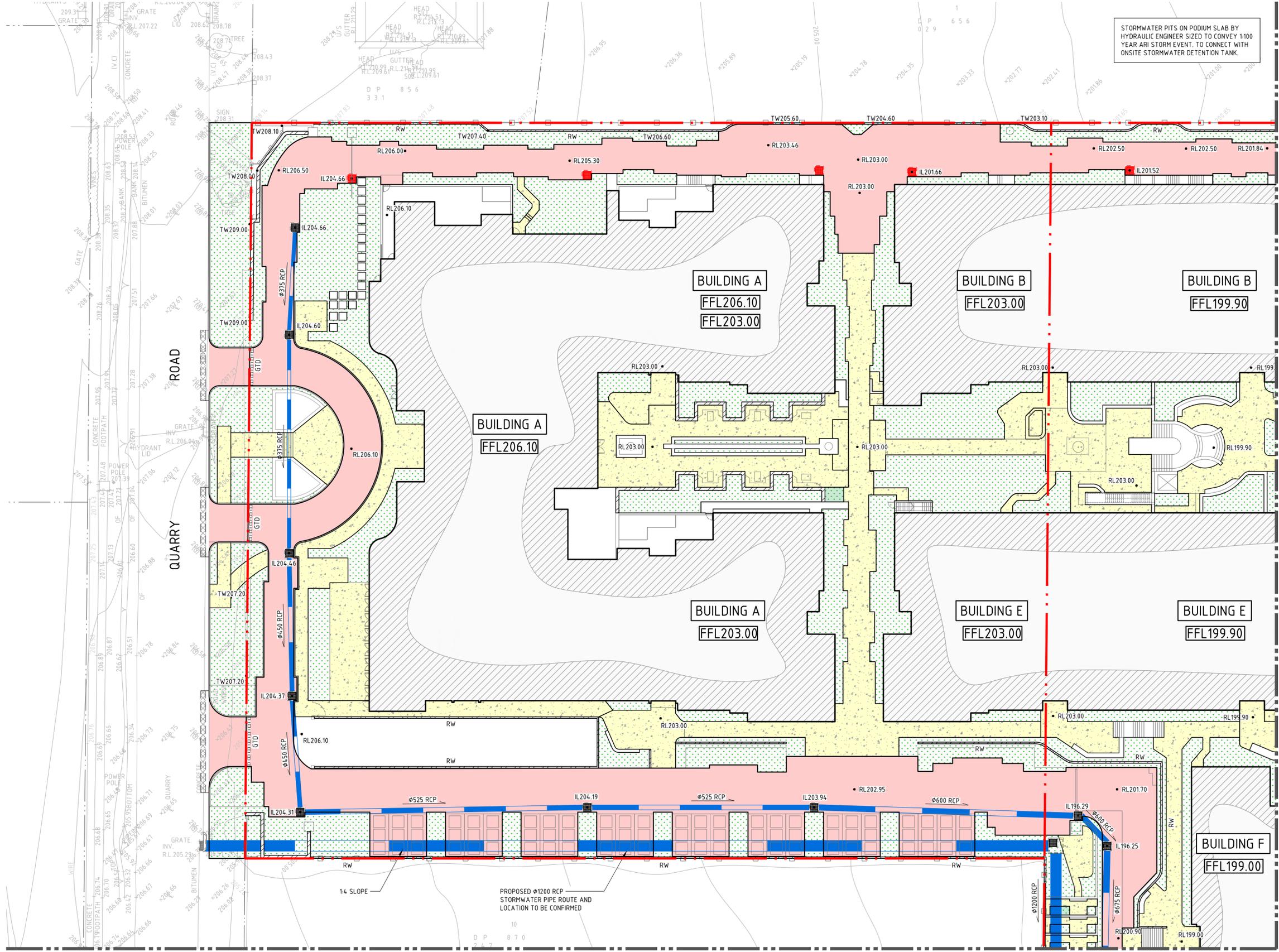
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Level 11 345 George Street, Sydney NSW 2000
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Email sydney@northrop.com.au ABN 81 094 433 100

PROJECT	DRAWING TITLE	JOB NUMBER
3 QUARRY ROAD AND 4 VINEYS ROAD, DURAL	CIVIL ENGINEERING WORKS DEVELOPMENT APPLICATION	172490
	CONCEPT SEDIMENT AND SOIL EROSION CONTROL DETAILS	DRAWING NUMBER
		DAC03.11
		REVISION
		2
		DRAWING SHEET SIZE = A1



LEGEND	
	PROPOSED BOUNDARY LINE
	EXISTING BOUNDARY LINE
	EASEMENT LINE
	REDUNDANT BOUNDARY LINE
	PROPOSED KERB
	EXISTING KERB
	FUTURE KERB
	SAWCUT AND PAVEMENT INFILL
	KO KERB ONLY
	KG KERB AND GUTTER
	VC VEHICULAR CROSSING
	KR KERB RAMP
	CE CONCRETE EDGING
	MTE MATCH TO EXISTING
	x eRLXX.XX PROPOSED SPOT HEIGHT
	• RLXX.XX EXISTING SPOT HEIGHT
	FFLXX.XX PROPOSED FINISHED FLOOR LEVEL
	x.x DIRECTION OF GRADE
	BATTERS
	XX.XX CONTOURS
	XX.XX EXISTING CONTOURS
	V-SHAPED CHANNEL
	STORMWATER PIPE
	PROPOSED GRATE INLET PIT CONNECTION OF STORMWATER PITS BY HYDRAULIC ENGINEER. TO CONNECT TO ON-SITE STORMWATER DETENTION TANK
	EXISTING DRAINAGE STRUCTURE
	NEW DRAINAGE STRUCTURE
	• B BOLLARD
	Rw RETAINING WALL - TYPE 1
	MC01 CONTROL LINE
	PAVEMENT
	FOOTPATH
	LANDSCAPING

NOTE:

PROPOSED LEVELS SHOWN ON PLAN HAVE BEEN OBTAINED FROM THE LANDSCAPE ARCHITECTS PLANS: DRAFT LANDSCAPE PACKAGE, DETAIL PLANS 1-3 (RECEIVED ON THE 04/04/18).

DRAWN: C. PASKE
DESIGNED: N. WAICKER
JOB MANAGER: J. GILLIGAN
VERIFIER:

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SYMBOLIC SCALE: 0 2 4 6 8 10 12m

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PROJECT: **3 QUARRY ROAD AND 4 VINEYS ROAD, DURAL**

DRAWING TITLE: **CIVIL ENGINEERING WORKS DEVELOPMENT APPLICATION**

CONCEPT SITEWORKS AND STORMWATER MANAGEMENT PLAN - SHEET 01

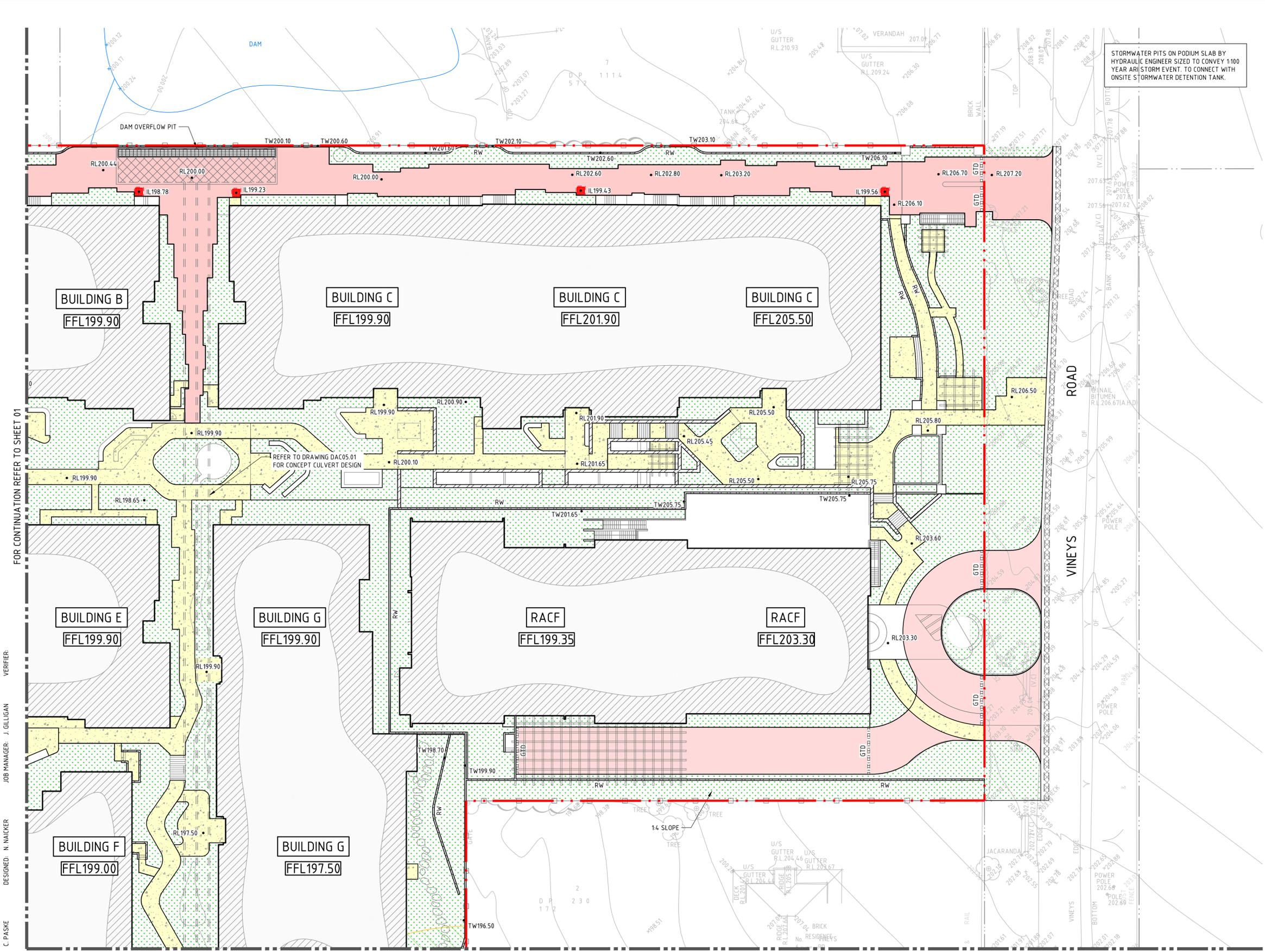
JOB NUMBER: **172490**

DRAWING NUMBER: **DAC04.01**

REVISION: **2**

DRAWING SHEET SIZE = A1

NOT FOR CONSTRUCTION



LEGEND

- PROPOSED BOUNDARY LINE
- EXISTING BOUNDARY LINE
- EASEMENT LINE
- REDUNDANT BOUNDARY LINE
- PROPOSED KERB
- EXISTING KERB
- FUTURE KERB
- SAWCUT AND PAVEMENT INFILL
- KO KERB ONLY
- KG KERB AND GUTTER
- VC VEHICULAR CROSSING
- KR KERB RAMP
- CE CONCRETE EDGING
- MTE MATCH TO EXISTING
- x eRLXX.XX PROPOSED SPOT HEIGHT
- RLXX.XX EXISTING SPOT HEIGHT
- FFLXX.XX PROPOSED FINISHED FLOOR LEVEL
- x.x DIRECTION OF GRADE
- BATTERS
- CONTOURS
- EXISTING CONTOURS
- V-SHAPED CHANNEL
- STORMWATER PIPE
- PROPOSED GRATED INLET PIT CONNECTION OF STORMWATER PITS BY HYDRAULIC ENGINEER TO CONNECT TO ON-SITE STORMWATER DETENTION TANK
- EXISTING DRAINAGE STRUCTURE
- NEW DRAINAGE STRUCTURE
- B BOLLARD
- RW RETAINING WALL - TYPE 1
- MC01 CONTROL LINE
- PAVEMENT
- FOOTPATH
- LANDSCAPING

NOTE:
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FOR CONTINUATION REFER TO SHEET 01

DRAWN: C. PASKE
 DESIGNED: N. NAICKER
 JOB MANAGER: J. GILLIGAN
 VERIFIER:

FOR CONTINUATION REFER TO SHEET 03

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PROJECT
3 QUARRY ROAD AND 4 VINEYS ROAD, DURAL

DRAWING TITLE
CIVIL ENGINEERING WORKS DEVELOPMENT APPLICATION
CONCEPT SITEWORKS AND STORMWATER MANAGEMENT PLAN - SHEET 02

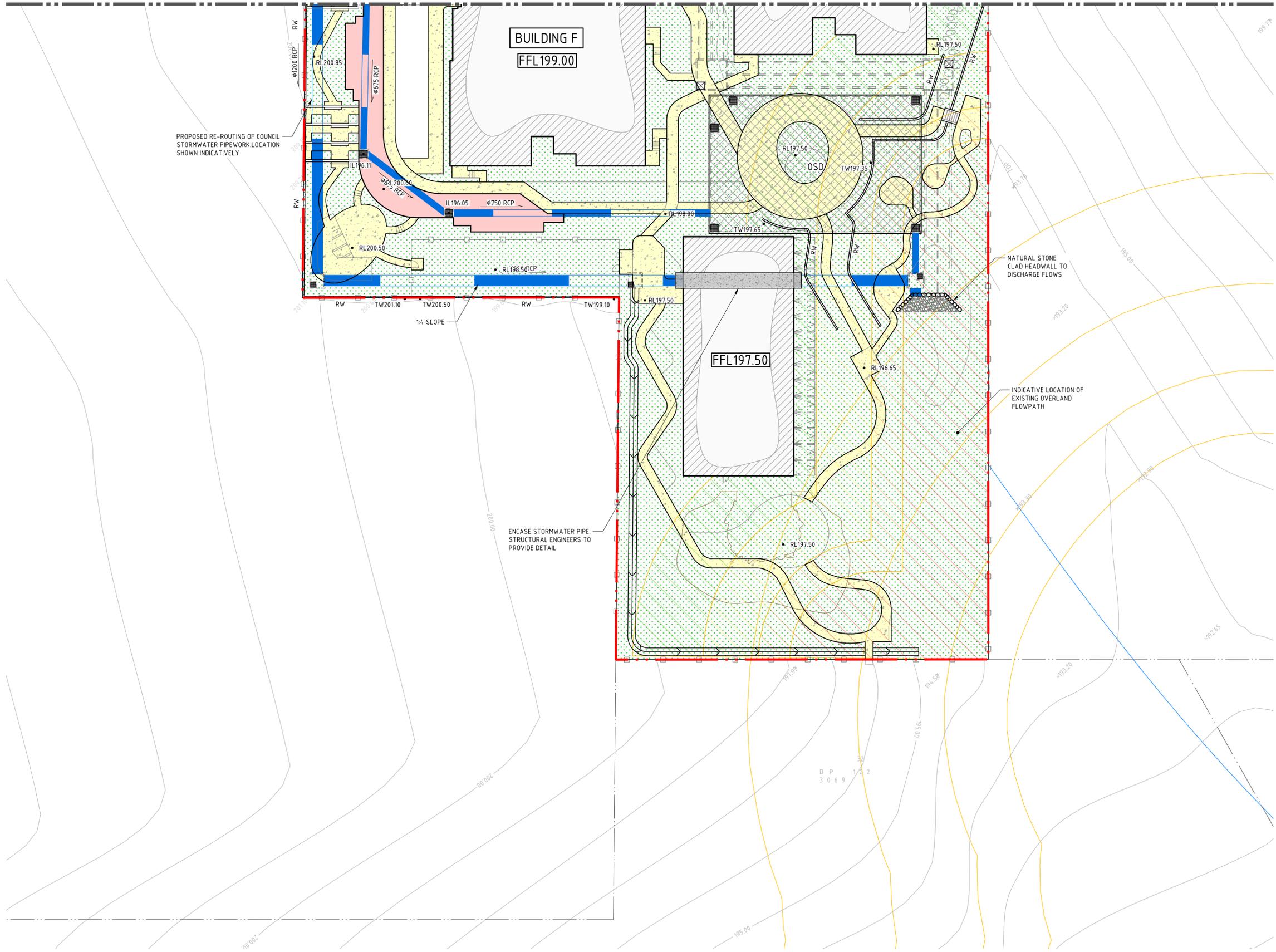
JOB NUMBER
172490

DRAWING NUMBER
DAC04.02

REVISION
2

DRAWING SHEET SIZE = A1

FOR CONTINUATION REFER TO SHEET 01 & 02



LEGEND	
	PROPOSED BOUNDARY LINE
	EXISTING BOUNDARY LINE
	EASEMENT LINE
	REDUNDANT BOUNDARY LINE
	PROPOSED KERB
	EXISTING KERB
	FUTURE KERB
	SAWCUT AND PAVEMENT INFILL
	KO KERB ONLY
	KG KERB AND GUTTER
	VC VEHICULAR CROSSING
	KR KERB RAMP
	CE CONCRETE EDGING
	MTE MATCH TO EXISTING
	× eRLXX.XX PROPOSED SPOT HEIGHT
	• RLXX.XX EXISTING SPOT HEIGHT
	FFLXX.XX PROPOSED FINISHED FLOOR LEVEL
	X.X DIRECTION OF GRADE
	BATTERS
	XX.XX CONTOURS
	XX.XX EXISTING CONTOURS
	V-SHAPED CHANNEL
	STORMWATER PIPE
	PROPOSED GRATED INLET PIT
	CONNECTION OF STORMWATER PITS
	BY HYDRAULIC ENGINEER. TO CONNECT TO ON-SITE STORMWATER DETENTION TANK
	EXISTING DRAINAGE STRUCTURE
	NEW DRAINAGE STRUCTURE
	• B BOLLARD
	Rw RETAINING WALL - TYPE 1
	MC01 CONTROL LINE
	PAVEMENT
	FOOTPATH
	LANDSCAPING

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DRAWN: C. PASKE
DESIGNED: N. NAICKER
JOB MANAGER: J. GILLIGAN
VERIFIER:

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SCALE 1:250@A1

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PROJECT
3 QUARRY ROAD AND 4 VINEYS ROAD, DURAL

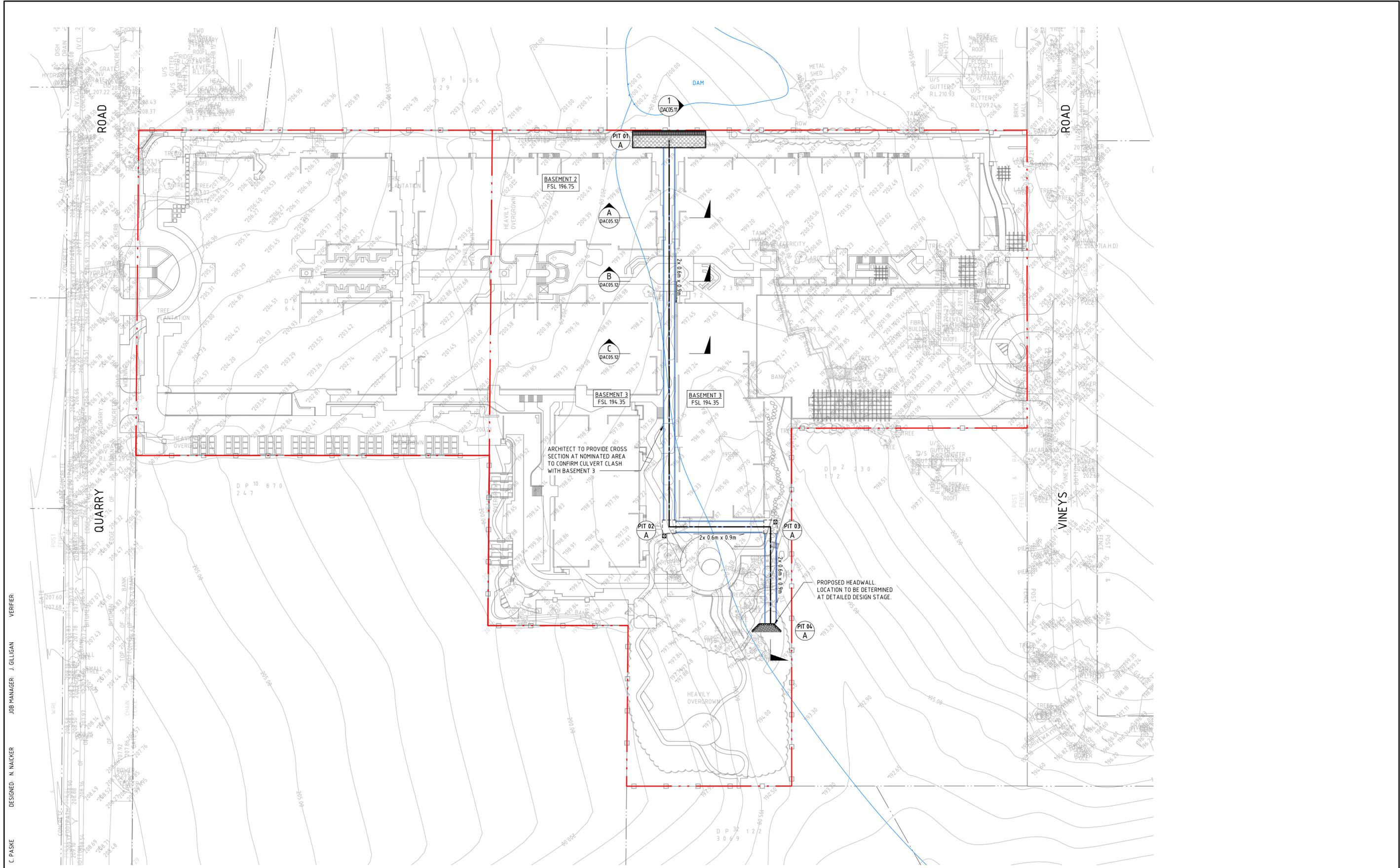
DRAWING TITLE
CIVIL ENGINEERING WORKS DEVELOPMENT APPLICATION
CONCEPT SITEWORKS AND STORMWATER MANAGEMENT PLAN - SHEET 03

JOB NUMBER
172490

DRAWING NUMBER
DAC04.03

REVISION
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DRAWING SHEET SIZE = A1



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 DESIGNED: N. WAICKER
 JOB MANAGER: J. GILLIGAN
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SCALE 1:500 @ A1

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PROJECT

3 QUARRY ROAD AND 4 VINEYS ROAD, DURAL

DRAWING TITLE

CIVIL ENGINEERING WORKS DEVELOPMENT APPLICATION

CONCEPT CULVERT DESIGN

JOB NUMBER

172490

DRAWING NUMBER

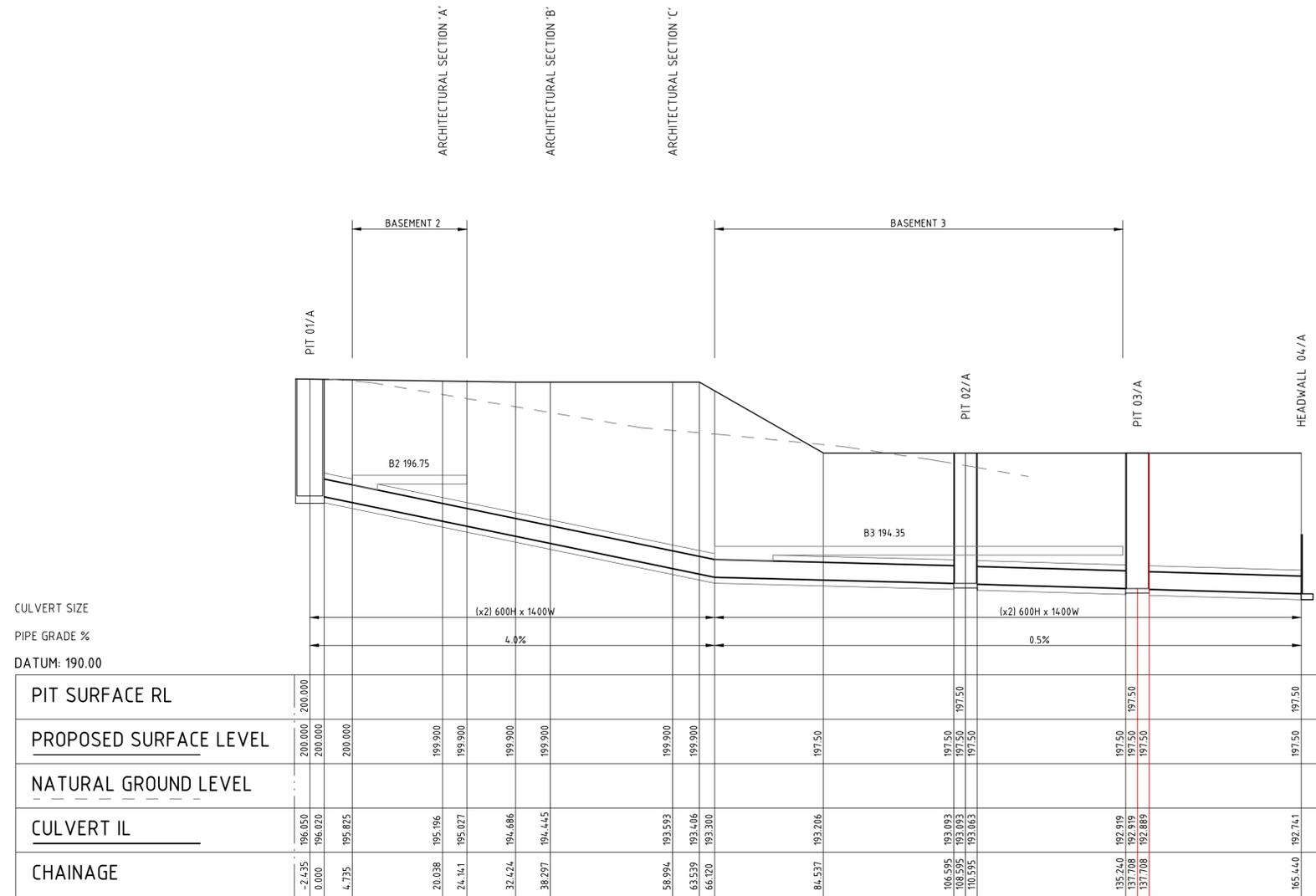
DAC05.01

REVISION

2

DRAWING SHEET SIZE = A1

DRAWN: C. PASKE
DESIGNED: N. MAICKER
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LONGITUDINAL SECTION
VERTICAL SCALE 1:10
HORIZONTAL SCALE 1:100

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PROJECT

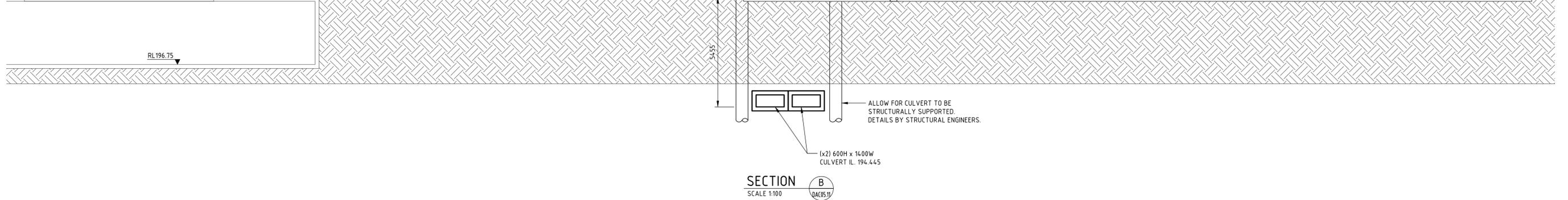
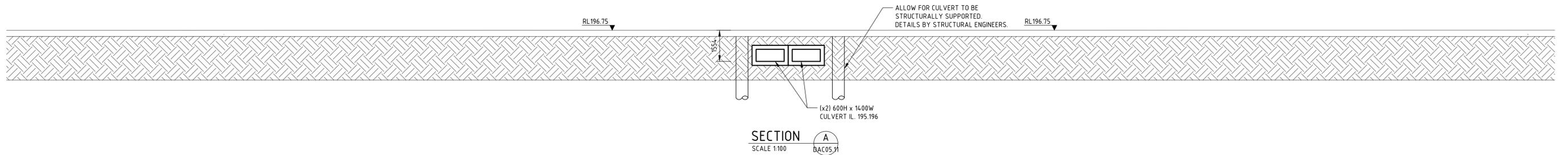
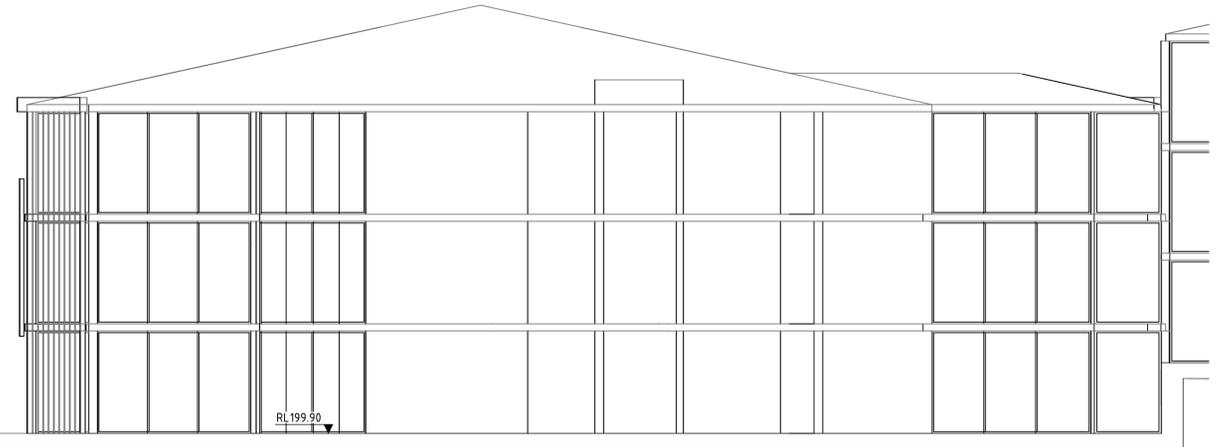
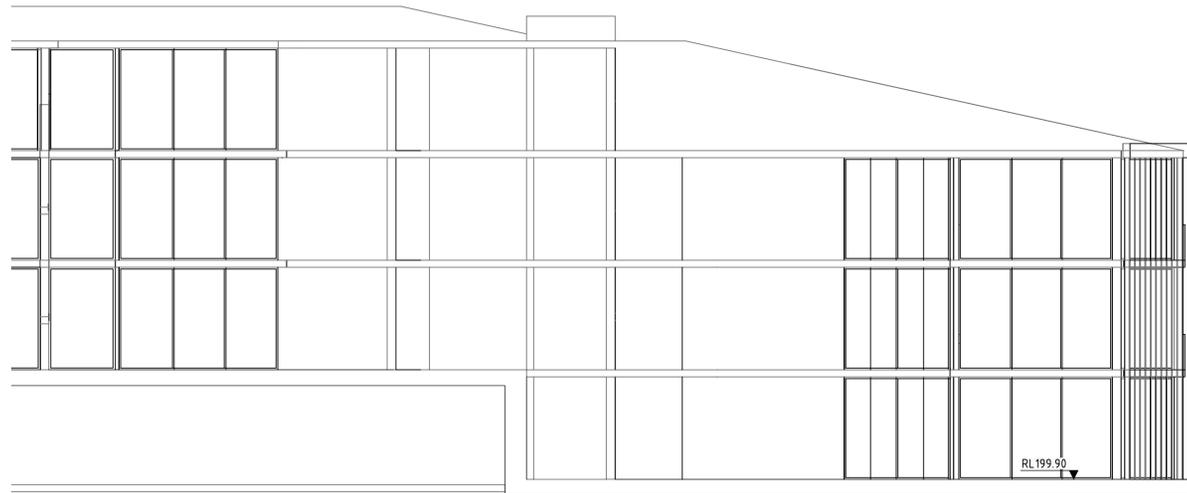
3 QUARRY ROAD AND 4 VINEYS ROAD, DURAL

DRAWING TITLE

CIVIL ENGINEERING WORKS DEVELOPMENT APPLICATION

CULVERT LONGITUDINAL SECTION

JOB NUMBER		172490
DRAWING NUMBER	REVISION	
DAC05.11	2	
DRAWING SHEET SIZE = A1		



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 DESIGNED: N. MAICKER
 JOB MANAGER: J. GILLIGAN
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PROJECT

3 QUARRY ROAD AND 4 VINEYS ROAD, DURAL

DRAWING TITLE

CIVIL ENGINEERING WORKS DEVELOPMENT APPLICATION

CULVERT CROSS SECTION - SHEET 01

JOB NUMBER

172490

DRAWING NUMBER

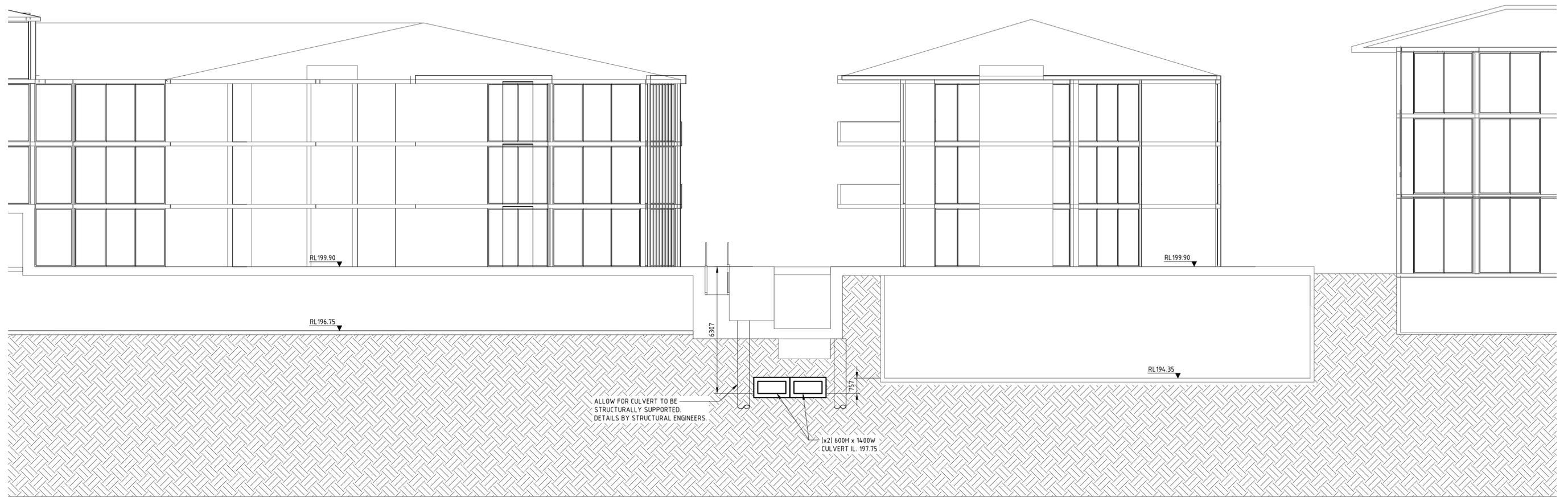
DAC05.21

REVISION

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DRAWING SHEET SIZE = A1

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DESIGNED: N. MAICKER
JOB MANAGER: J. GILLIGAN
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SECTION C
SCALE 1:100

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PROJECT

3 QUARRY ROAD AND 4 VINEYS ROAD, DURAL

DRAWING TITLE

CIVIL ENGINEERING WORKS DEVELOPMENT APPLICATION

CULVERT CROSS SECTION - SHEET 02

JOB NUMBER

172490

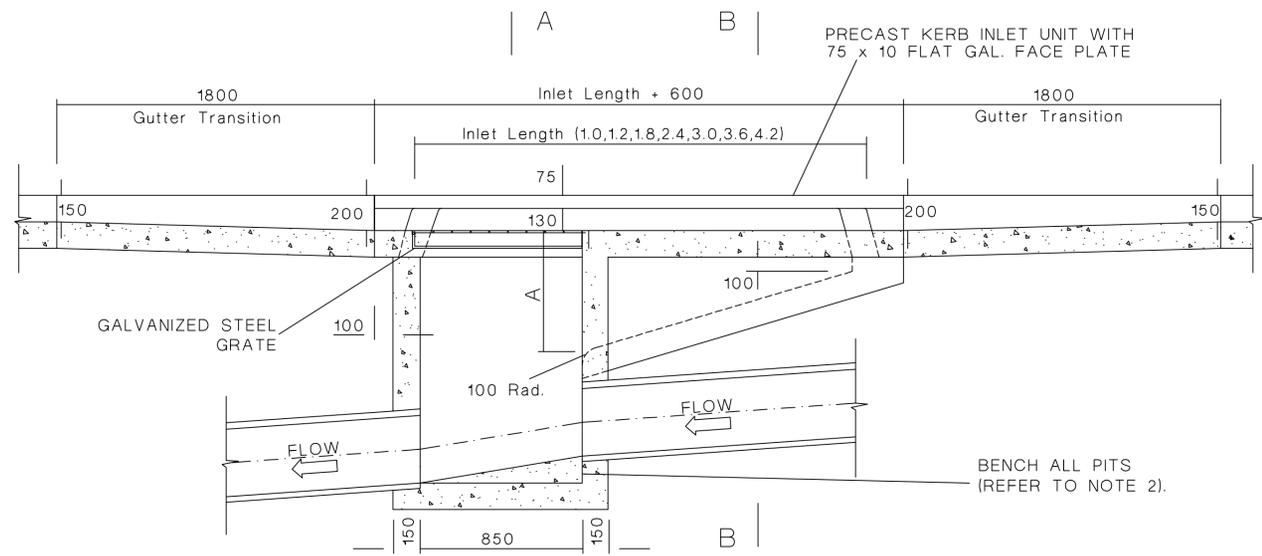
DRAWING NUMBER

DAC05.22

REVISION

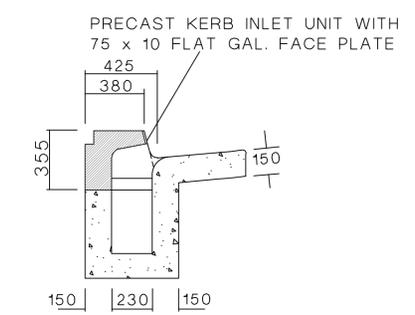
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DRAWING SHEET SIZE = A1

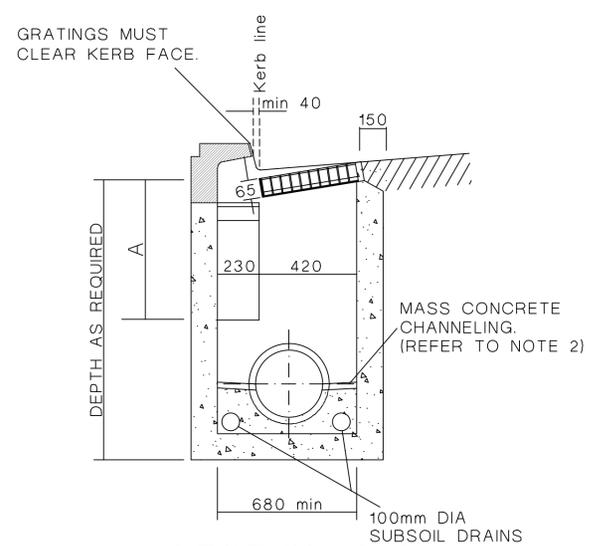


SECTION C-C

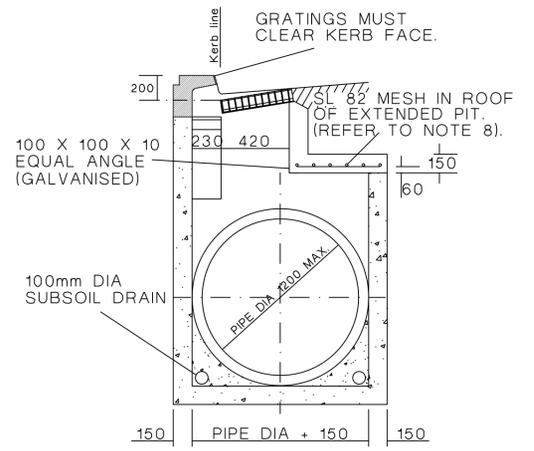
DIMENSION A (mm)	INLET LENGTH (m)
250	UP TO 1.8
300	2.4
350	3.0
400	3.6
450	4.2



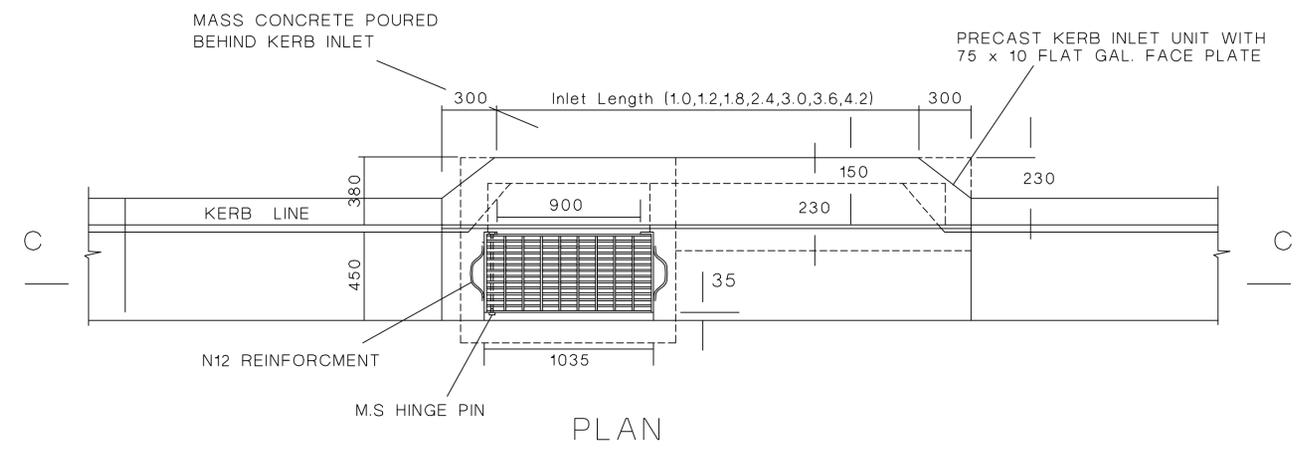
SECTION B-B



SECTION A-A (PIPES UP TO 525)



SECTION A-A (PIPES > 525)



PLAN

NOTES:

1. COMPRESSIVE STRENGTH OF CONCRETE AT 28 DAYS TO BE 20MPa.
2. TOP OF BENCHING TO BE 1/2 OF OUTLET PIPE DIAMETER.
3. 100 DIA. SUBSOIL DRAINAGE PIPE 3m LONG WRAPPED IN FABRIC SOCK TO BE PROVIDED AT INVERT LEVEL EITHER SIDE OF INLET PIPES.
4. PROVIDE STEP IRONS WHERE PIT IS DEEPER THAN 1.0m AT 450 CENTRES.
5. FOR PIT DEPTHS GREATER THAN 3.0m SEPARATE DESIGN IS REQUIRED.
6. PROVIDE HOT DIPPED GALVANIZED FABRICATED STEEL GULLY GRATE AND FRAME OF CLASS D. GRATE AND FRAME MUST COMPLY WITH AS3996-2006. OUTSIDE EDGE OF THE FRAME TO BE FLUSH WITH THE LIP OF THE GUTTER.
7. ALL GRATINGS TO HAVE LOCKING CLIP.
8. WHERE CHAMBER WIDTH EXCEEDS 1.2m, ROOF REINFORCEMENT TO BE DESIGNED BY A CHARTERED PROFESSIONAL.

DRAWN: C. PASKE
DESIGNED: N. NAICKER
JOB MANAGER: J. GILLIGAN
VERIFIER:

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SCALE VARIES

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PROJECT
3 QUARRY ROAD AND 4 VINEYS ROAD, DURAL

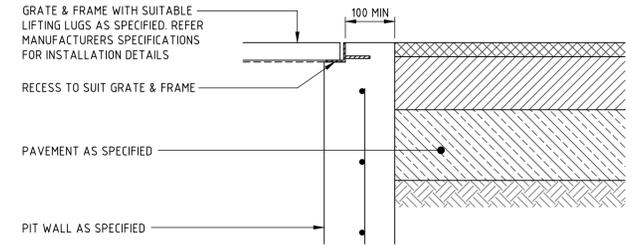
DRAWING TITLE
CIVIL ENGINEERING WORKS DEVELOPMENT APPLICATION
DETAIL - SHEET 01

JOB NUMBER
172490

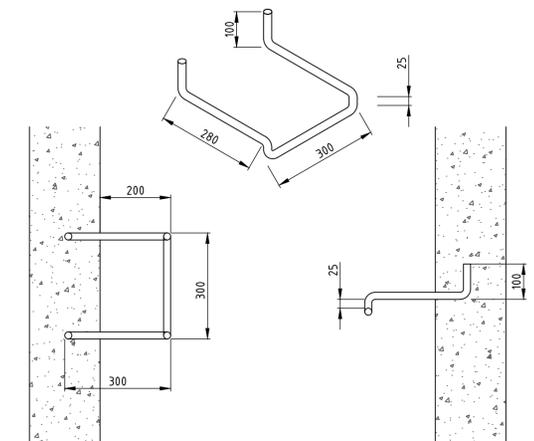
DRAWING NUMBER
DAC06.01

REVISION
2

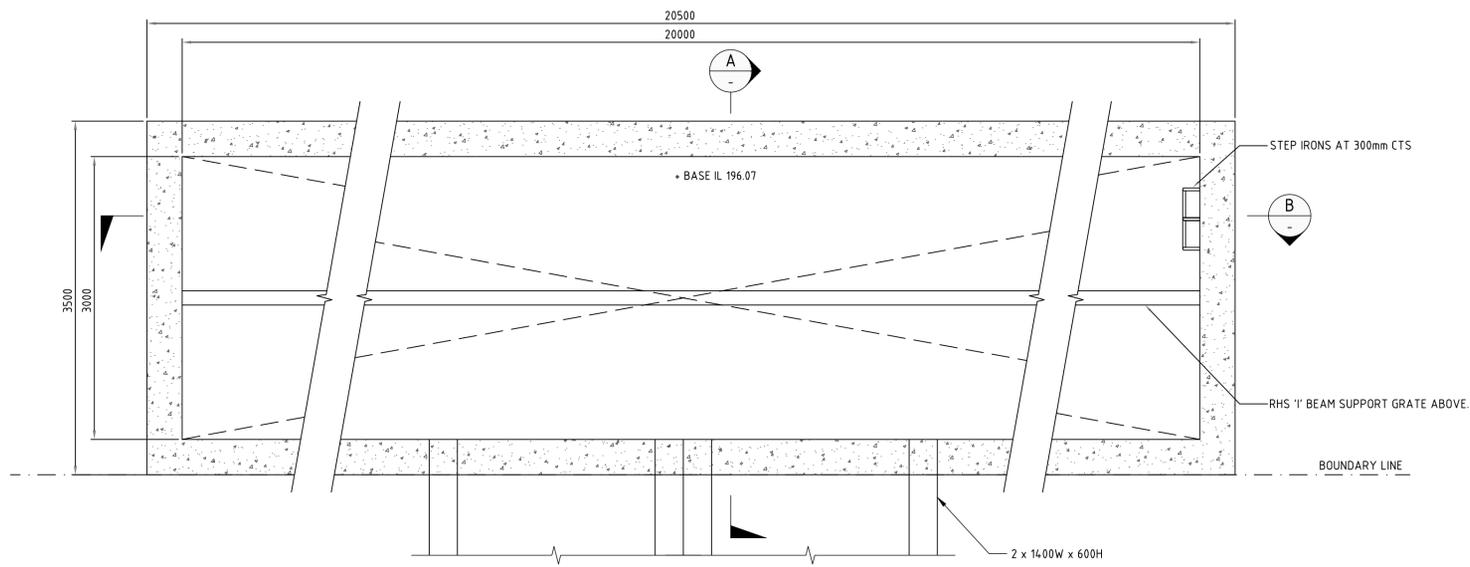
DRAWING SHEET SIZE = A1



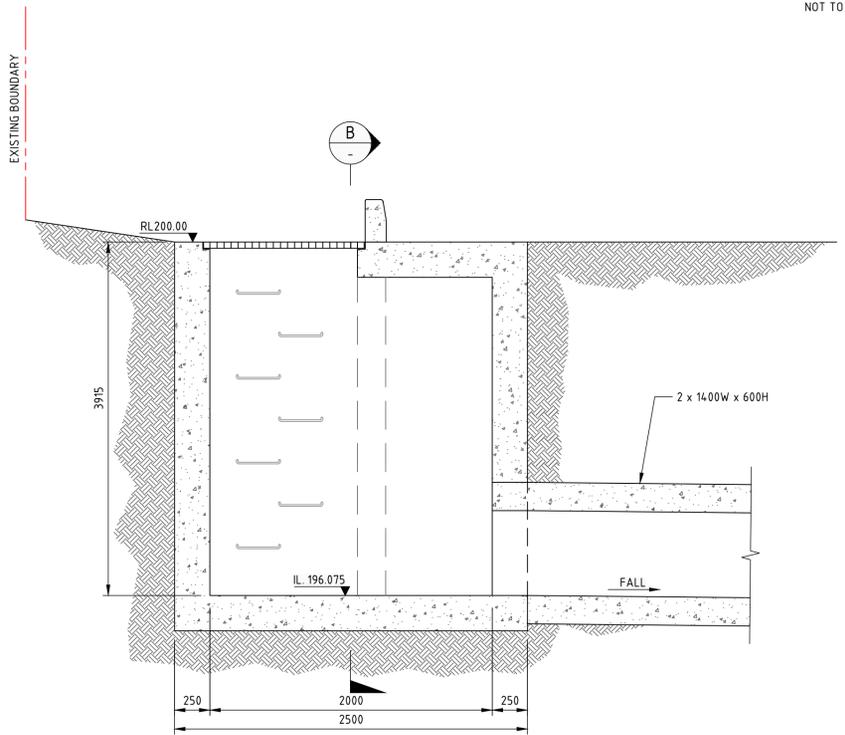
PIT INTERFACE - DETAIL 'A'



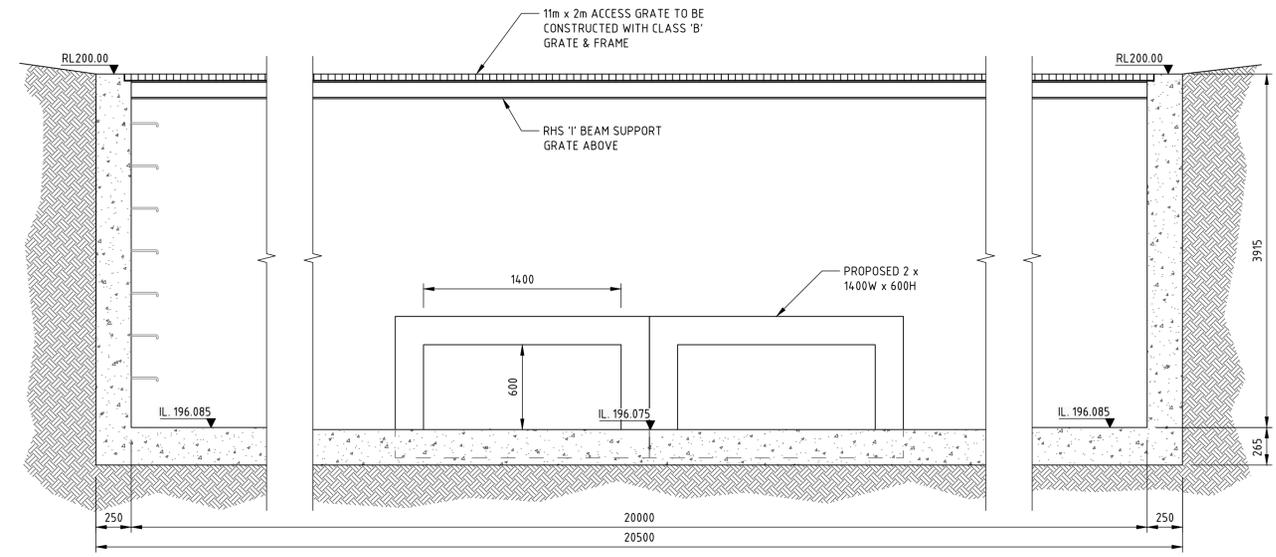
STEP IRON DETAIL



INLET ACCESS CHAMBER DETAIL 1
NOT TO SCALE FIG 6



SECTION A
NOT TO SCALE



SECTION B
NOT TO SCALE

DRAWN: C. PASKE
DESIGNED: N. NAICKER
JOB MANAGER: J. GILLIGAN
VERIFIER:

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SCALE VARIES

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PROJECT

3 QUARRY ROAD AND 4 VINEYS ROAD, DURAL

DRAWING TITLE

CIVIL ENGINEERING WORKS DEVELOPMENT APPLICATION

DETAIL - SHEET 02

JOB NUMBER

172490

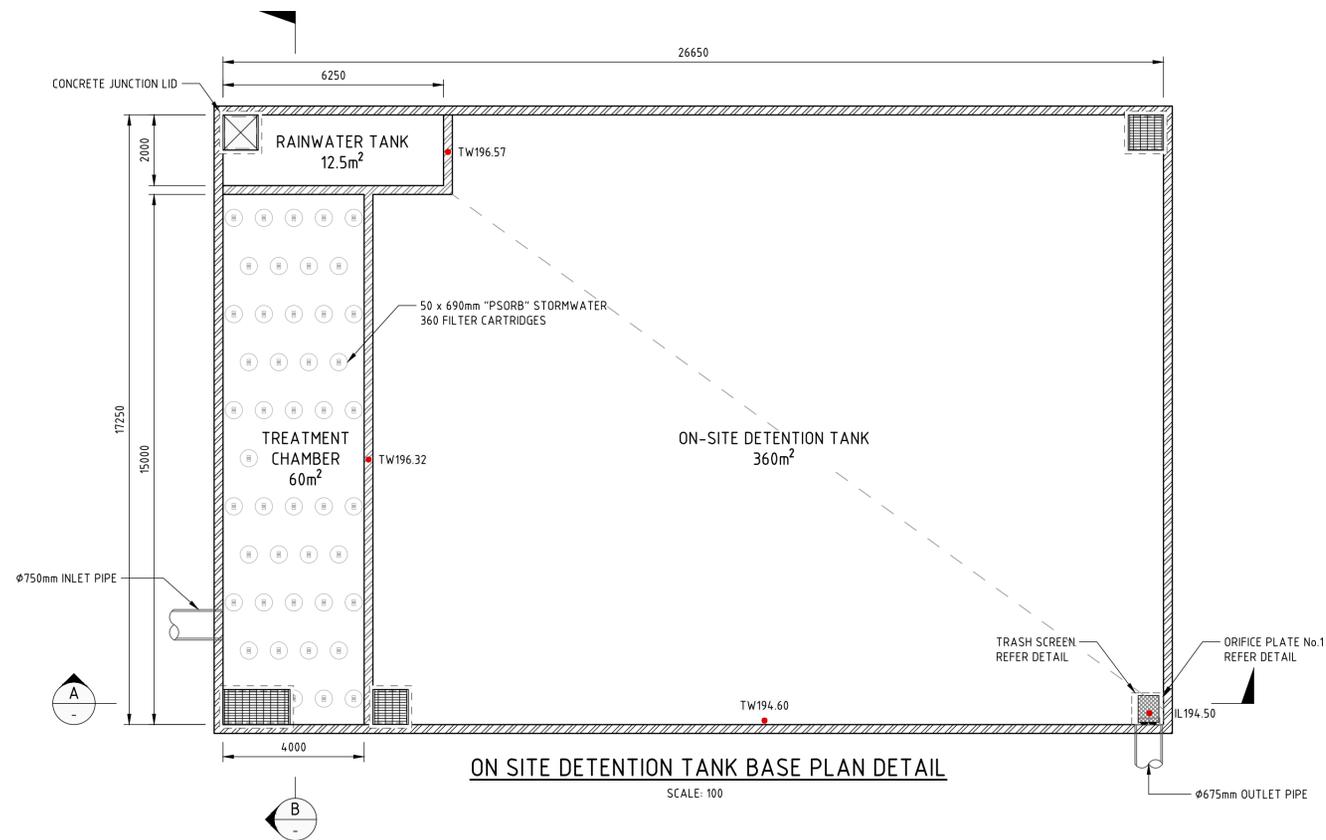
DRAWING NUMBER

DAC06.02

REVISION

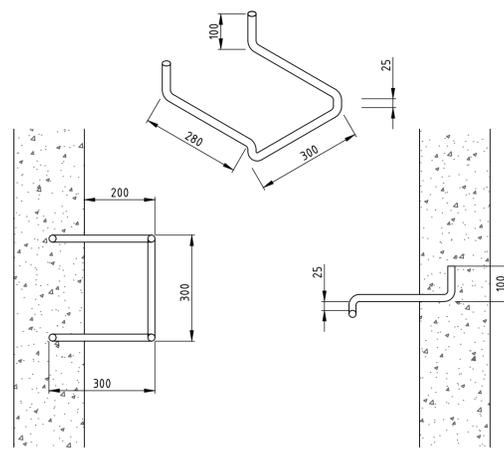
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DRAWING SHEET SIZE = A1



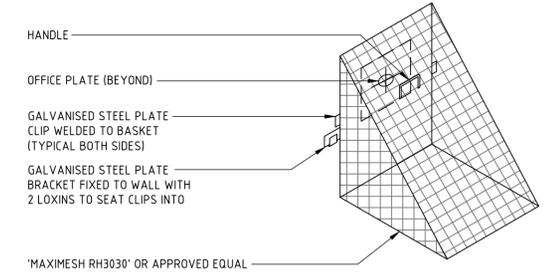
ON SITE DETENTION TANK BASE PLAN DETAIL

SCALE: 100

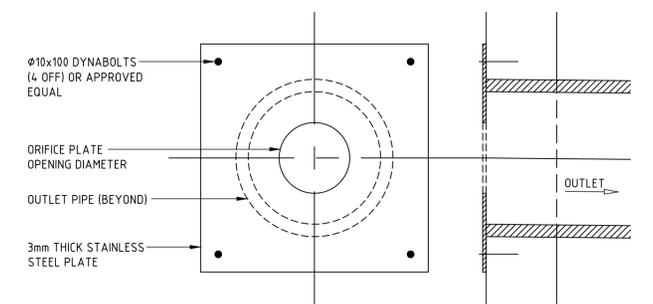


STEP IRON DETAIL

STEP IRON OF 20mm GALVANISED STEEL MADE TO SHAPE AND DIMENSIONS AS SHOWN, PLACED AT 300 CENTRES AND STAGGERED HORIZONTALLY FOR ALL PITS DEEPER THAN 1.0m. THE USE OF PROPRIETARY STEP IRONS ARE ACCEPTABLE PROVIDED THE PRODUCT IS IN ACCORDANCE WITH AUSTRALIAN STANDARDS



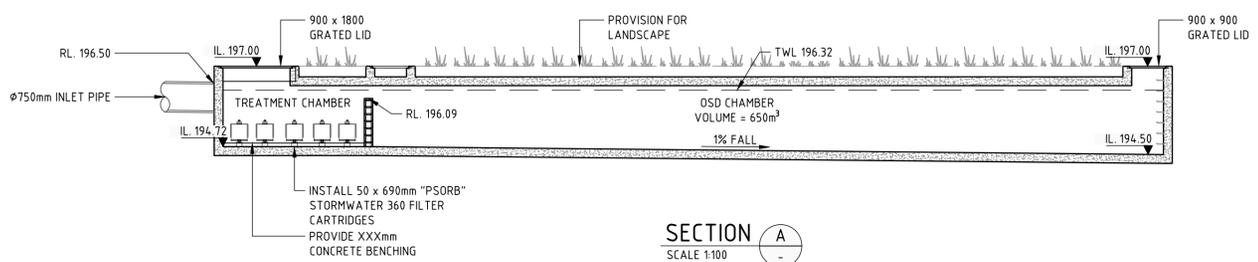
TRASH SCREEN DETAIL



ORIFICE PLATE DETAIL

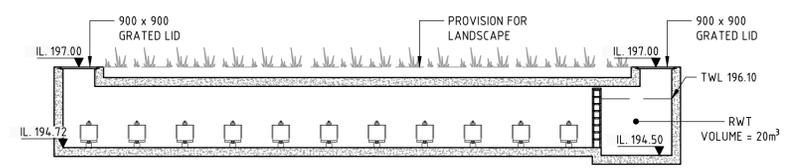
ORIFICE PLATE No 1 - Ø572

VERIFIER: J. GILLIGAN
JOB MANAGER: N. NAICKER
DESIGNED: N. NAICKER
DRAWN: C. PASKE



SECTION A

SCALE 1:100



SECTION B

SCALE 1:100

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
0	REVISION IN PROGRESS	CP	-	NN	12.04.18
1	ISSUED FOR REVIEW	CP	-	NN	03.05.18
2	ISSUED FOR INFORMATION	CP	-	JG	19.06.18

CLIENT

ARCHITECT

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SCALE VARIES

Level 11 345 George Street, Sydney NSW 2000
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Email sydney@northrop.com.au ABN 81 094 433 100

PROJECT

3 QUARRY ROAD AND 4 VINEYS ROAD, DURAL

DRAWING TITLE

CIVIL ENGINEERING WORKS DEVELOPMENT APPLICATION

DETAIL - SHEET 03

JOB NUMBER

172490

DRAWING NUMBER

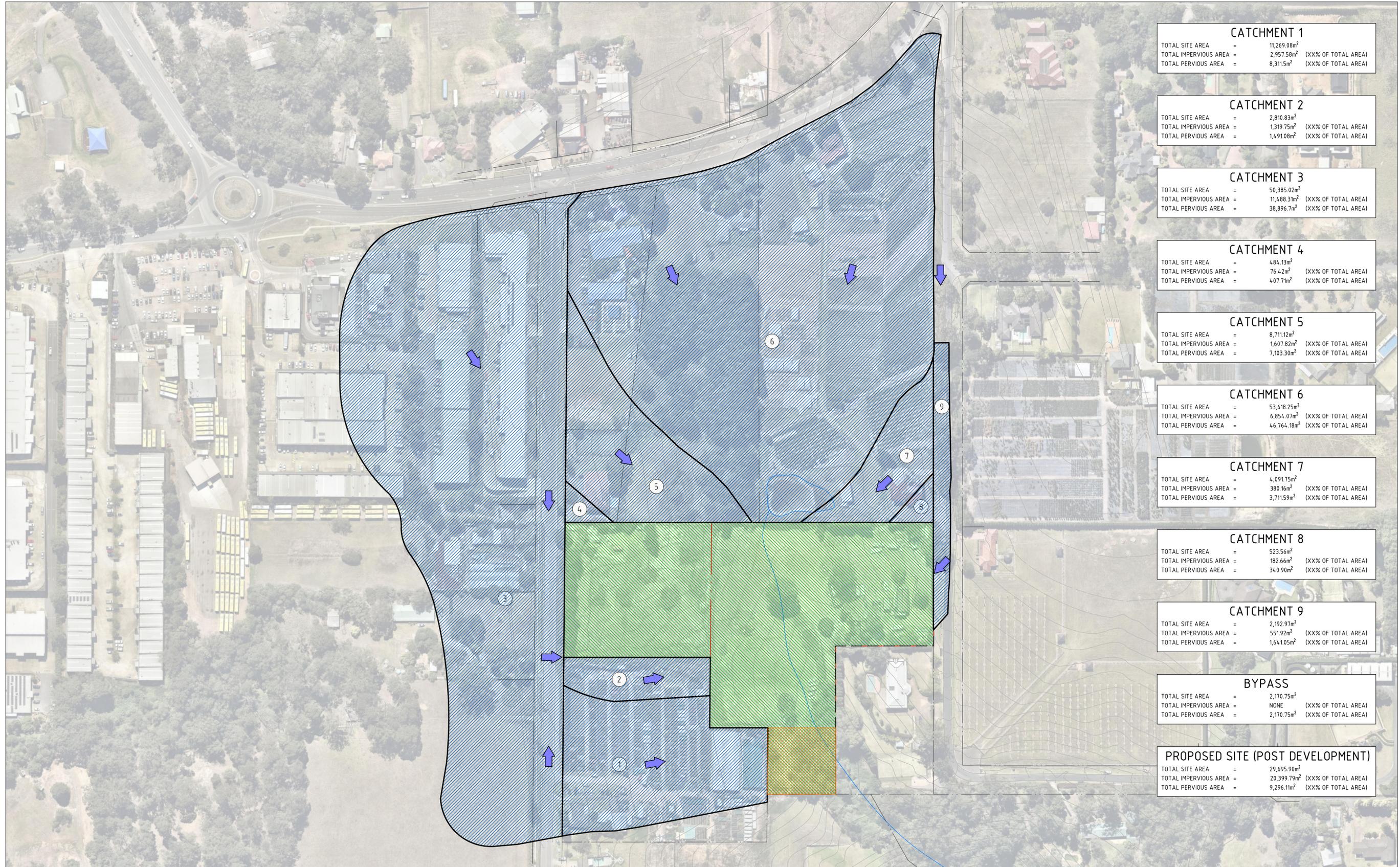
DAC06.03

REVISION

2

DRAWING SHEET SIZE = A1

DRAWN: C. PASKE
DESIGNED: N. MAICKER
JOB MANAGER: J. GILLIGAN
VERIFIER:



CATCHMENT 1	
TOTAL SITE AREA	= 11,269.08m ²
TOTAL IMPERVIOUS AREA	= 2,957.58m ² (XX% OF TOTAL AREA)
TOTAL PERVIOUS AREA	= 8,311.5m ² (XXX% OF TOTAL AREA)

CATCHMENT 2	
TOTAL SITE AREA	= 2,810.83m ²
TOTAL IMPERVIOUS AREA	= 1,319.75m ² (XX% OF TOTAL AREA)
TOTAL PERVIOUS AREA	= 1,491.08m ² (XXX% OF TOTAL AREA)

CATCHMENT 3	
TOTAL SITE AREA	= 50,385.02m ²
TOTAL IMPERVIOUS AREA	= 11,488.31m ² (XX% OF TOTAL AREA)
TOTAL PERVIOUS AREA	= 38,896.7m ² (XXX% OF TOTAL AREA)

CATCHMENT 4	
TOTAL SITE AREA	= 484.13m ²
TOTAL IMPERVIOUS AREA	= 76.42m ² (XX% OF TOTAL AREA)
TOTAL PERVIOUS AREA	= 407.71m ² (XXX% OF TOTAL AREA)

CATCHMENT 5	
TOTAL SITE AREA	= 8,711.12m ²
TOTAL IMPERVIOUS AREA	= 1,607.82m ² (XX% OF TOTAL AREA)
TOTAL PERVIOUS AREA	= 7,103.30m ² (XXX% OF TOTAL AREA)

CATCHMENT 6	
TOTAL SITE AREA	= 53,618.25m ²
TOTAL IMPERVIOUS AREA	= 6,854.07m ² (XX% OF TOTAL AREA)
TOTAL PERVIOUS AREA	= 46,764.18m ² (XXX% OF TOTAL AREA)

CATCHMENT 7	
TOTAL SITE AREA	= 4,091.75m ²
TOTAL IMPERVIOUS AREA	= 380.16m ² (XX% OF TOTAL AREA)
TOTAL PERVIOUS AREA	= 3,711.59m ² (XXX% OF TOTAL AREA)

CATCHMENT 8	
TOTAL SITE AREA	= 523.56m ²
TOTAL IMPERVIOUS AREA	= 182.66m ² (XX% OF TOTAL AREA)
TOTAL PERVIOUS AREA	= 340.90m ² (XXX% OF TOTAL AREA)

CATCHMENT 9	
TOTAL SITE AREA	= 2,192.97m ²
TOTAL IMPERVIOUS AREA	= 551.92m ² (XX% OF TOTAL AREA)
TOTAL PERVIOUS AREA	= 1,641.05m ² (XXX% OF TOTAL AREA)

BYPASS	
TOTAL SITE AREA	= 2,170.75m ²
TOTAL IMPERVIOUS AREA	= NONE (XX% OF TOTAL AREA)
TOTAL PERVIOUS AREA	= 2,170.75m ² (XXX% OF TOTAL AREA)

PROPOSED SITE (POST DEVELOPMENT)	
TOTAL SITE AREA	= 29,695.90m ²
TOTAL IMPERVIOUS AREA	= 20,399.79m ² (XX% OF TOTAL AREA)
TOTAL PERVIOUS AREA	= 9,296.11m ² (XXX% OF TOTAL AREA)

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PROJECT

3 QUARRY ROAD AND 4 VINEYS ROAD, DURAL

DRAWING TITLE

CIVIL ENGINEERING WORKS DEVELOPMENT APPLICATION

CATCHMENT PLAN

JOB NUMBER

172490

DRAWING NUMBER

DAC07.01

REVISION

2

DRAWING SHEET SIZE = A1