

PROPOSED SUBDIVISION

CANAVAN DRIVE
BERESFIELD

FREEWAY NORTH BUSINESS PARK - STAGE 7

NEWCASTLE CITY COUNCIL

DRAWING SCHEDULE

DWG No.	SHEET TITLE	REV
C200	COVER SHEET	5
C201	GENERAL ARRANGEMENT PLAN	1
C202	PLAN SHEET (1 OF 4)	3
C203	PLAN SHEET (2 OF 4)	3
C204	PLAN SHEET (3 OF 4)	3
C205	PLAN SHEET (4 OF 4)	5
C206	ROAD 1 LONGITUDINAL SECTION	1
C207	ROAD 1 CROSS SECTIONS (1 OF 2)	1
C208	ROAD 1 CROSS SECTIONS (2 OF 2)	1
C209	ROAD 2 LONGITUDINAL SECTION	1
C210	ROAD 2 CROSS SECTIONS (1 OF 4)	1
C211	ROAD 2 CROSS SECTIONS (2 OF 4)	1
C212	ROAD 2 CROSS SECTIONS (3 OF 4)	1
C213	ROAD 2 CROSS SECTIONS (4 OF 4)	1
C214	KERB RETURN No 1 & 2	1
C215	KERB RETURN No 3 & 4	1
C216	KERB RETURN No 5	1
C217	KERB RETURN No 6	1
C218	TYPICAL SECTIONS, DETAILS AND NOTES	1
C219	CATCHMENT PLAN	5
C220	DRAINAGE LINE 1	5
C221	DRAINAGE LINES 1 (CONT.), 2, 3 & 4	5
C222	DRAINAGE LINES 5, 6, 7, 8, 9, 10, 11, 12, 13 & 22	5
C223	DRAINAGE LINES 14, 15 & 16	5
C224	DRAINAGE LINES 17, 18, 19, 20, 21, 22 & 30	5
C225	DRAINAGE LINES 30 (CONT.) & 40	5
C226	DRAINAGE LINES 50 & 51	3
C227	Q10 DRAINAGE CALCULATIONS	5
C228	Q100 DRAINAGE CALCULATIONS	5
C229	BASIN DETAIL PLAN	5
C230	DETENTION BASIN SECTIONS	4
C231	GPT ACCESSWAY PLAN	5
C232	SPLITTER PIT 1-16 DETAILS (1 OF 2)	5
C233	SPLITTER PIT 1-16 DETAILS (2 OF 2)	5
C234	EROSION AND SEDIMENTATION CONTROL PLAN	5
C235	EROSION AND SEDIMENTATION CONTROL DETAILS	1



A.B.N. 92 086 017 745
1 HARTLEY DRIVE, THORNTON NSW 2322
PO BOX 3337, THORNTON NSW 2322
PHONE: (02) 4964 1811

PRELIMINARY ISSUE
NOT FOR CONSTRUCTION

DWG C205

DWG C202

CANAVAN DRIVE

ROAD 2

ROAD 1

ELWELL CLOSE

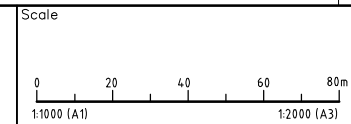
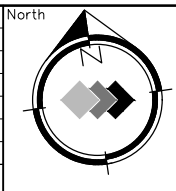
EXISTING DEVELOPMENT

DWG C204

DWG C203

PRELIMINARY ISSUE
NOT FOR CONSTRUCTION

1	ORIGINAL ISSUE	AM	IH	26.02.19
Amendment	Description	Drawn	App'd	Date



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Scale 1:1000	A1 SHEET
Project Approval IAN HILL (B.E) Consulting Civil Engineer	

Client

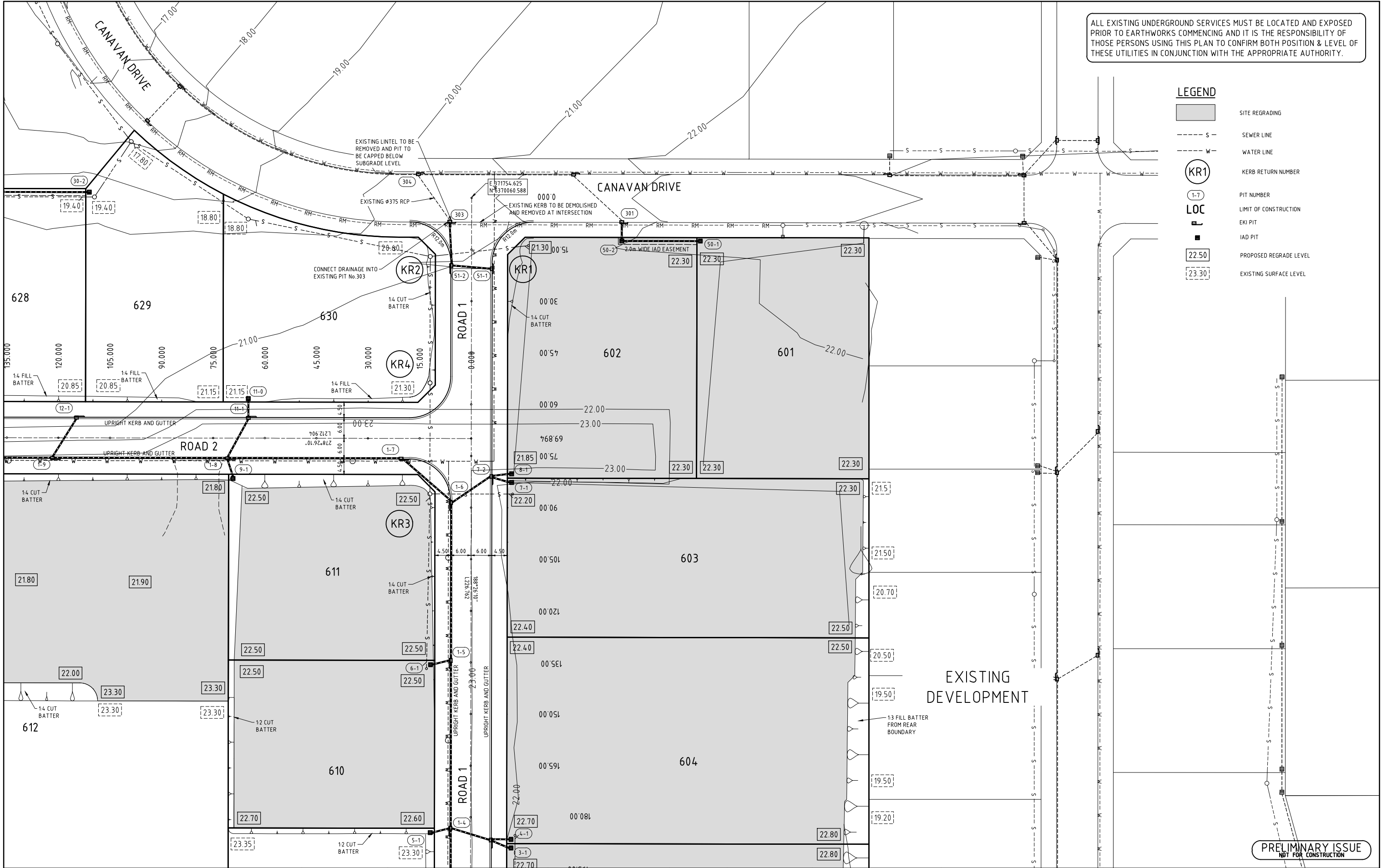


GCA
ENGINEERING SOLUTIONS

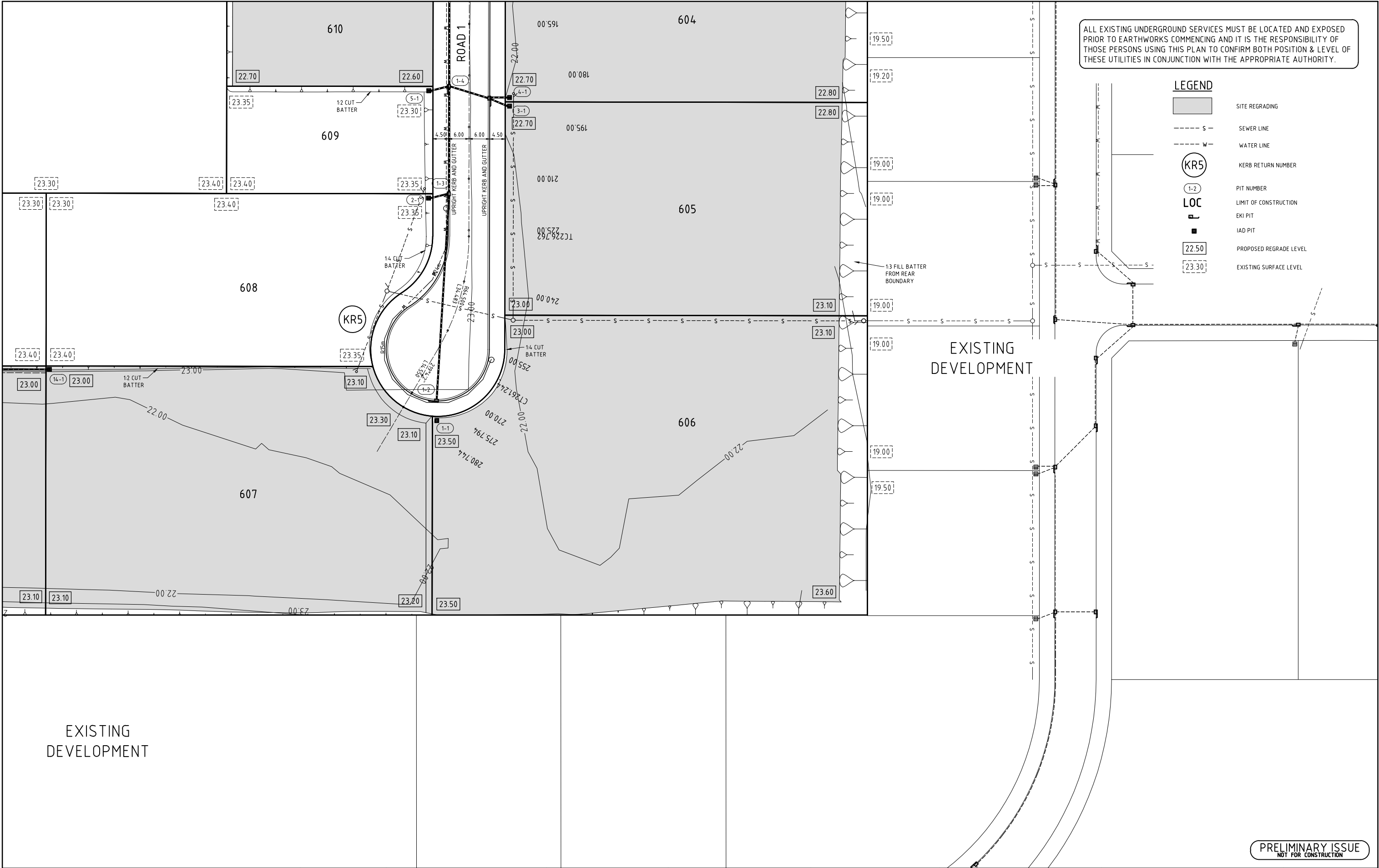
A.B.N. 92 086 017 745
1 HARTLEY DRIVE, THORNTON NSW 2322
PO BOX 3337, THORNTON NSW 2322
PHONE: (02) 4964 1811

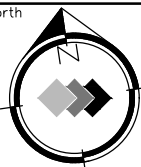
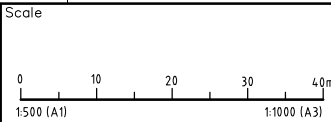
PROPOSED SUBDIVISION
FREEWAY NORTH BUSINESS PARK
STAGE 7
GENERAL ARRANGEMENT PLAN

Project No 18280C	
Drawing No C201	Revision 1



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								Drawing No C202	Revision 3					
								Scale 1:500	A1 SHEET					
							Project Approval IAN HILL (B.E) Consulting Civil Engineer							



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								Scale	A1 SHEET			Drawing No	Revision			
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1 ORIGINAL ISSUE								IAN HILL (B.E)				C203				
Description								Consulting Civil Engineer				Revision				
Drawn												3				
App'd																
Date																
25.03.19																
26.02.19																

LEGEND



SITE REGRADING

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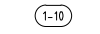
SEWER LINE

----- W -----

WATER LINE



KARB RETURN NUMBER



PIT NUMBER

LOC

LIMIT OF CONSTRUCTION



EKI PIT



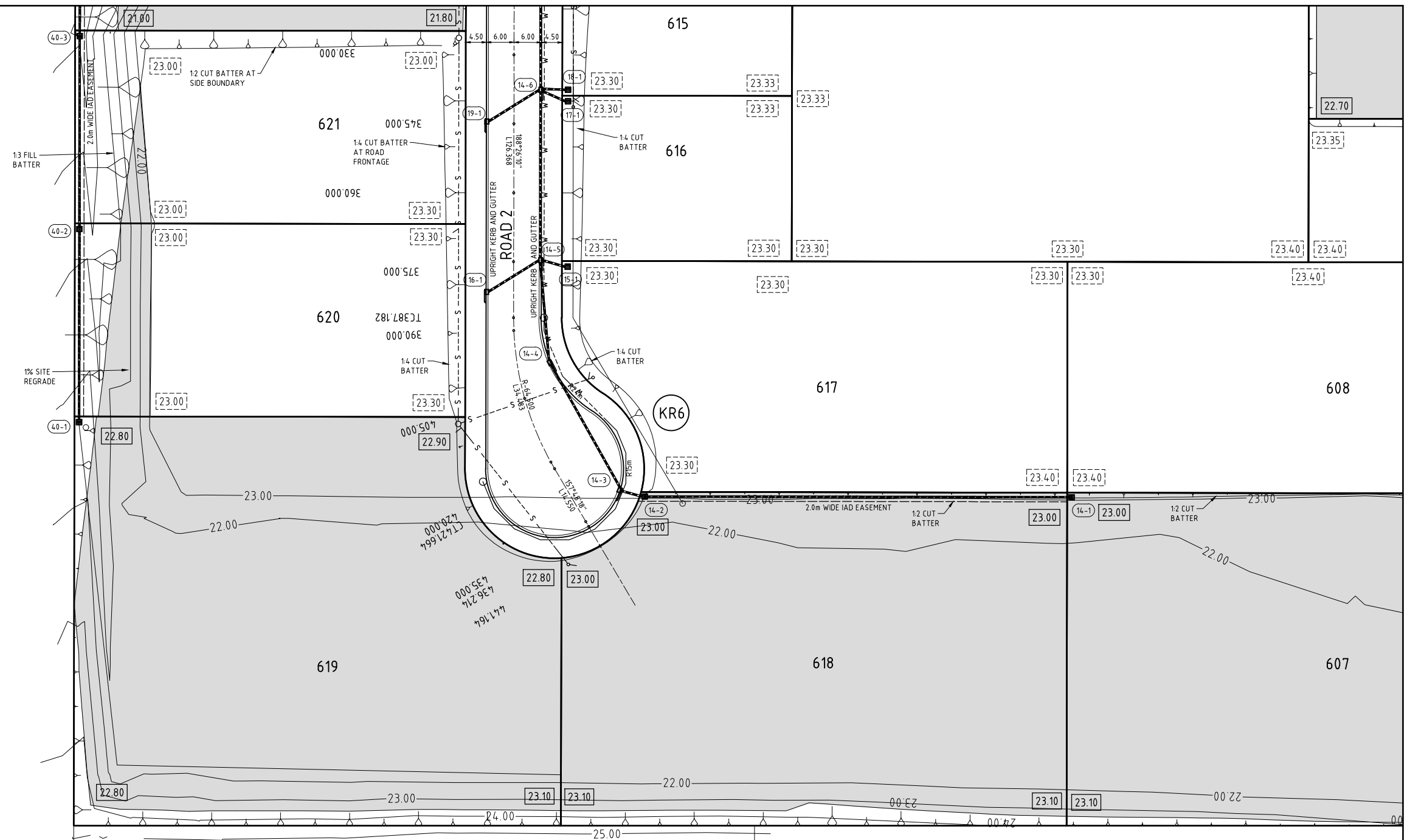
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22.50

PROPOSED REGRADE LEVEL

23.30

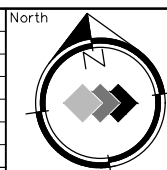
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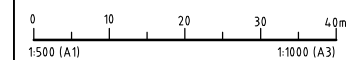
EXISTING
DEVELOPMENT

PRELIMINARY ISSUE
NOT FOR CONSTRUCTION

3	CLIENT COMMENTS	AM	IH	25.03.19
1	ORIGINAL ISSUE	AM	IH	26.02.19
Amendment	Description	Drawn	App'd	Date



	Scale



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Designed	
A.M	

Scale
1:500

Project Approval	
IAN HILL (B.E)	
Consulting Civil Engineer	

Cad Reference
18280C dC204 r3

	A1 SHEET
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Client

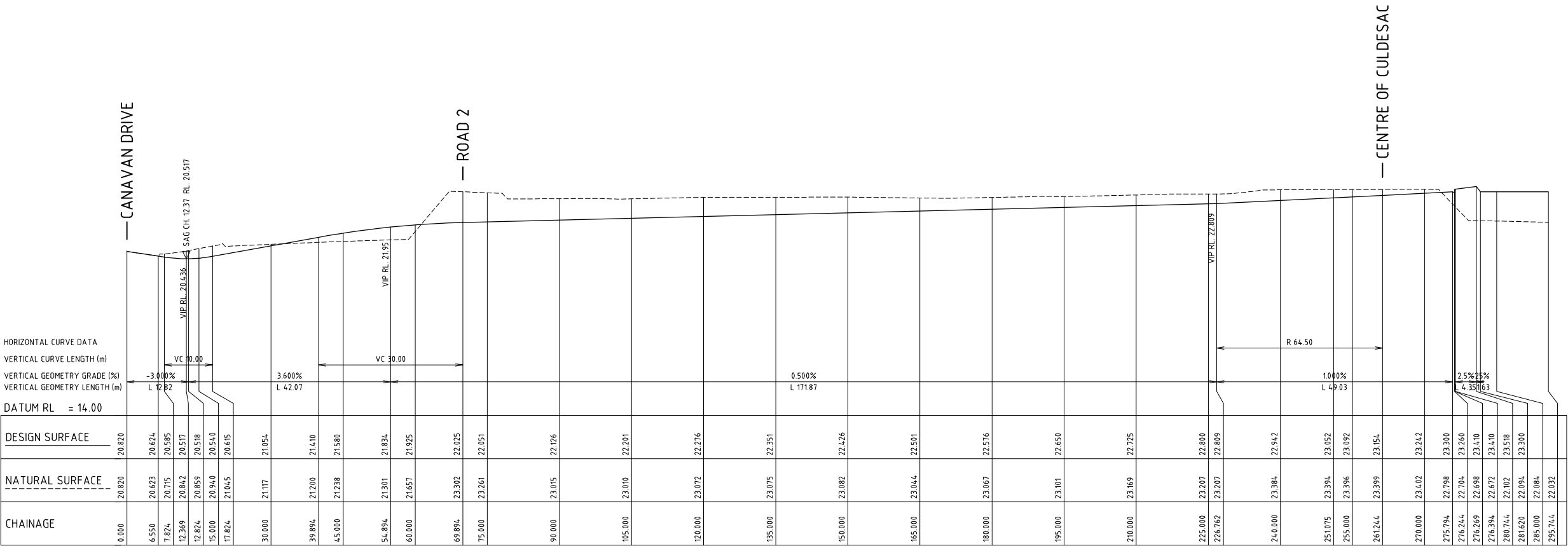


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PROPOSED SUBDIVISION
FREEWAY NORTH BUSINESS PARK
STAGE 7
PLAN SHEET (3 OF 4)

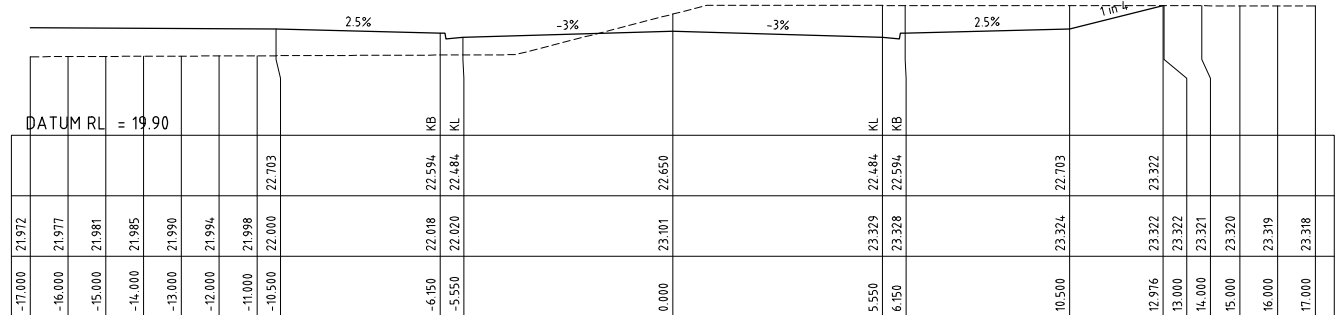
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Drawing No	Revision
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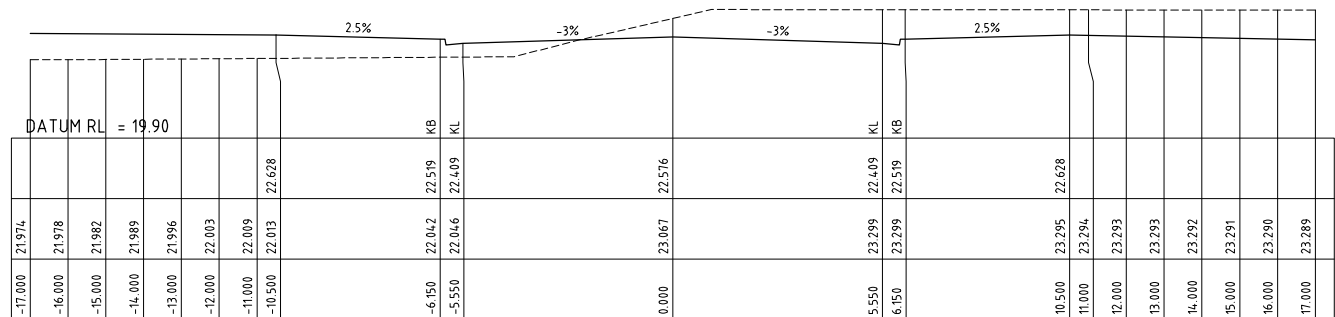


A1 SCALE: HORIZONTAL 1:500, VERTICAL 1:100
LONGITUDINAL SECTION ROAD 1

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1 ORIGINAL ISSUE					A.M	I.H	26.02.19	Project Approval IAN HILL (B.E) Consulting Civil Engineer		A1 SHEET				Drawing No C206	Revision 1	
Amendment	Description	Drawn	App'd	Date												

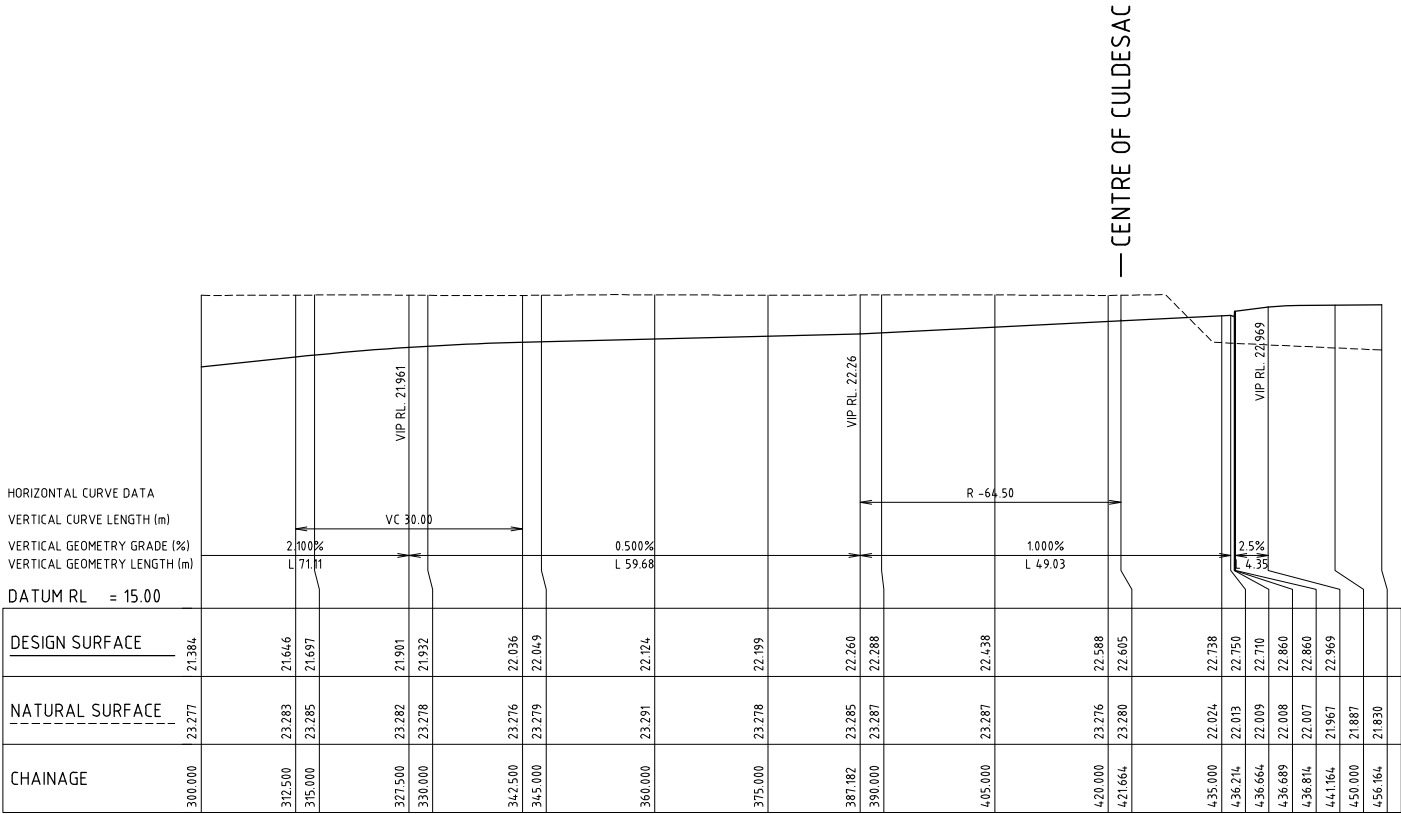


CH 261.244

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OFFSET	NATURAL SURFACE	DESIGN SURFACE
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-16 000	21 973	
-15 000	21 984	
-14 000	21 995	
-13 000	22 005	
-12 000	22 016	
-11 000	22 027	
-10 500	22 032	22 478
-6 150	22 078	22 369 KB
-5 550	22 085	22 259 KL
0 000	23 082	22 226
5 550	23 338	22 259 KL
6 150	23 338	22 369 KB
10 500	23 333	22 478
11 000	23 332	
12 000	23 331	
13 000	23 330	
14 000	23 329	
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16 000	23 326	
17 000	23 325	

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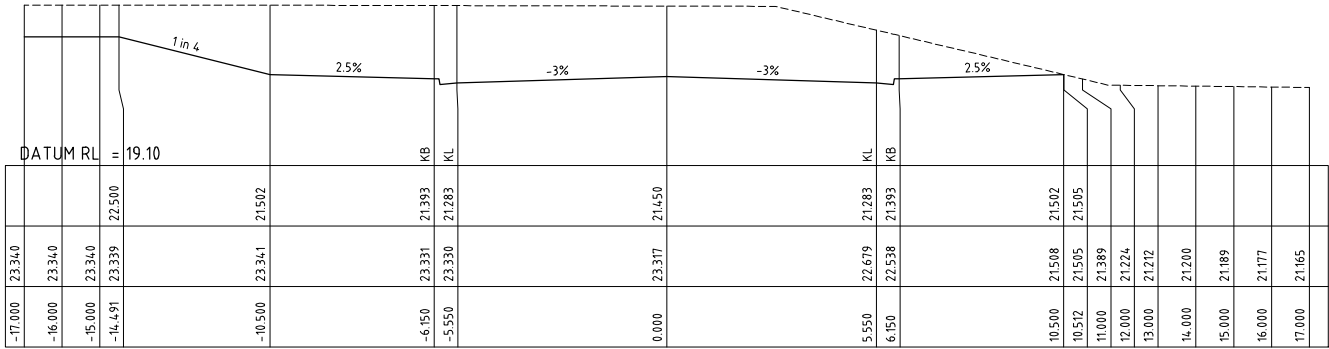
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LONGITUDINAL SECTION ROAD 2



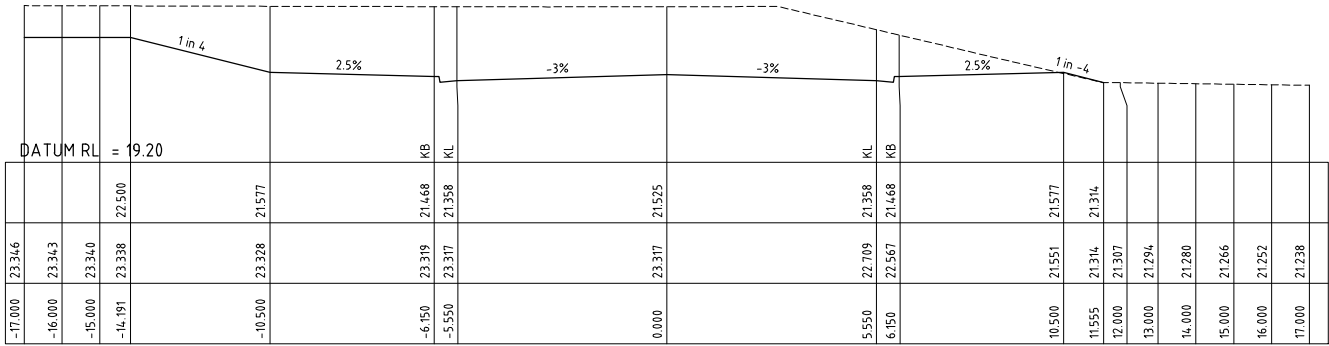
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LONGITUDINAL SECTION ROAD 2

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Amendment					Description	Drawn	App'd	Date														

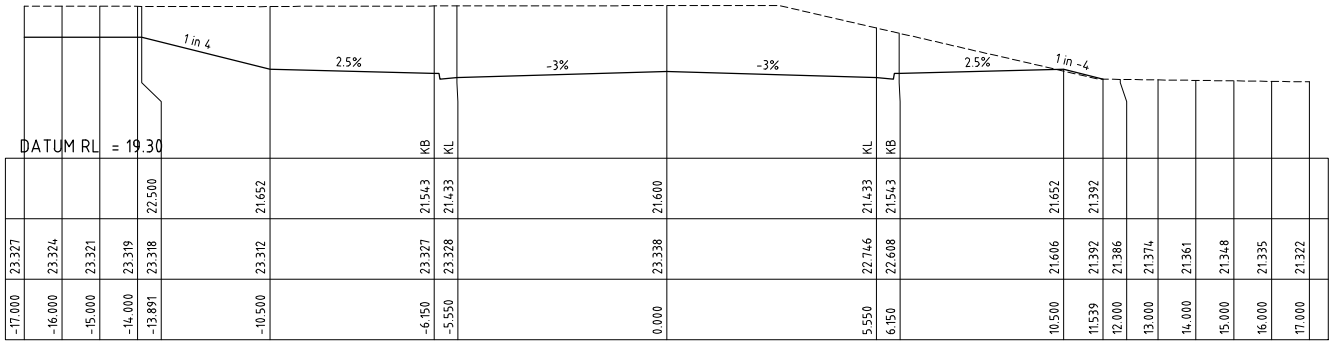
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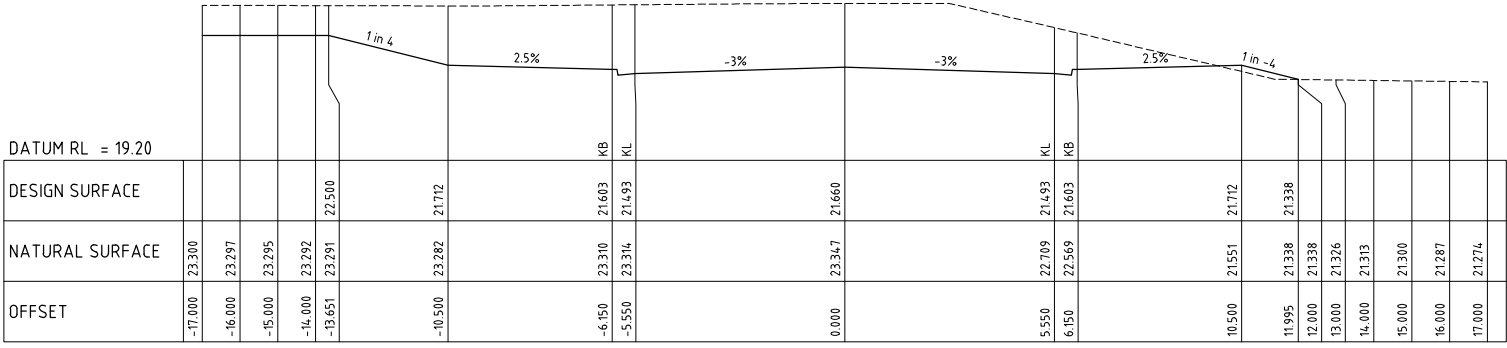
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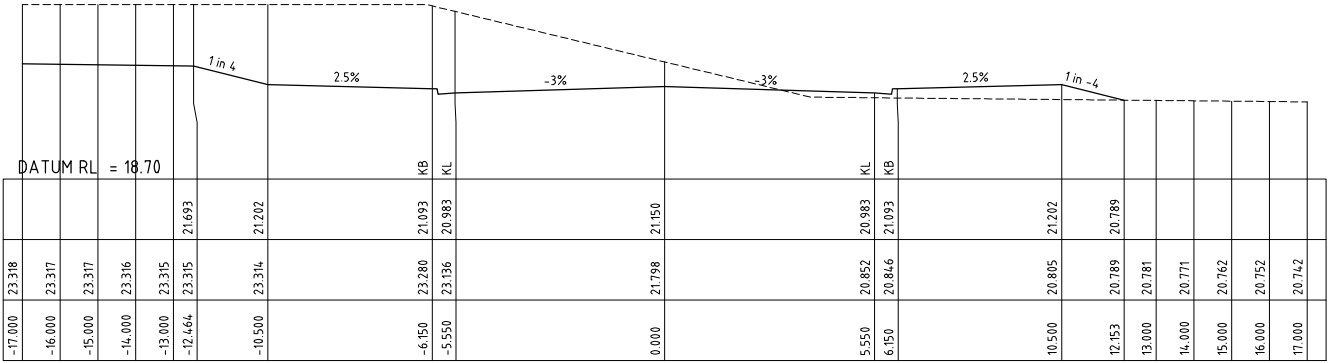
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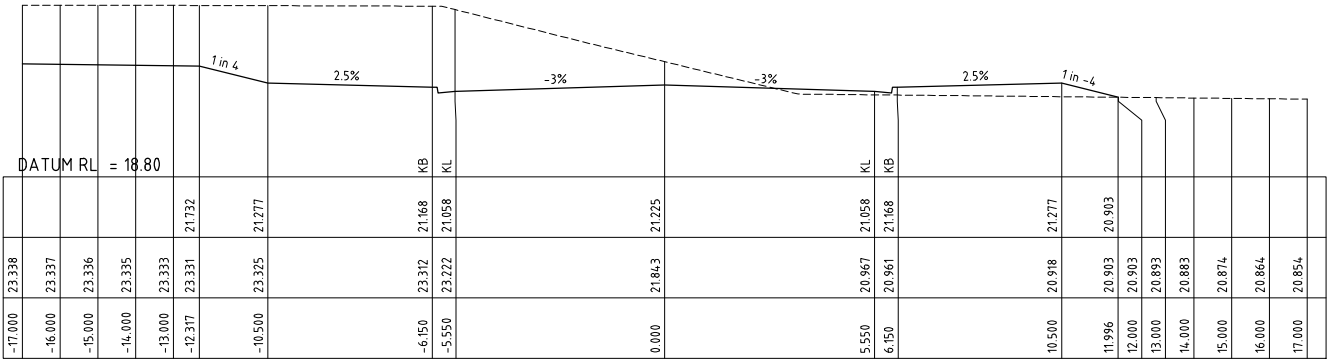
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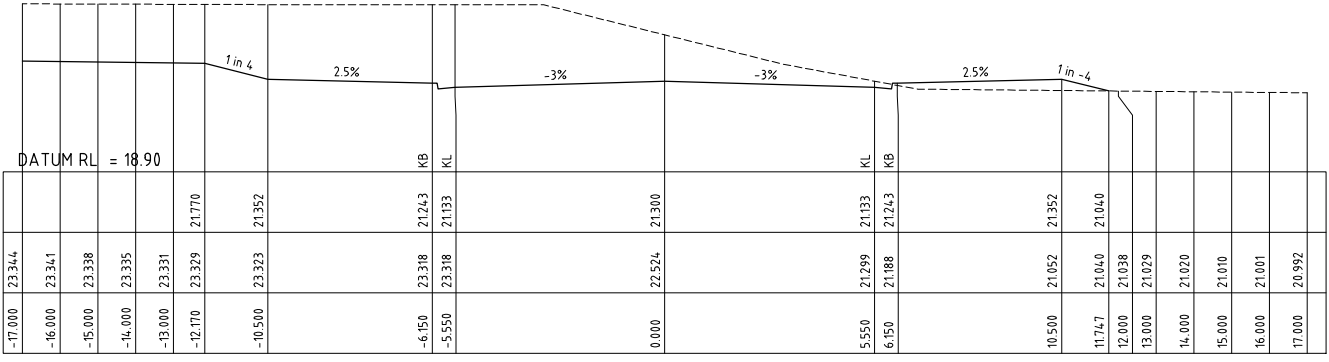
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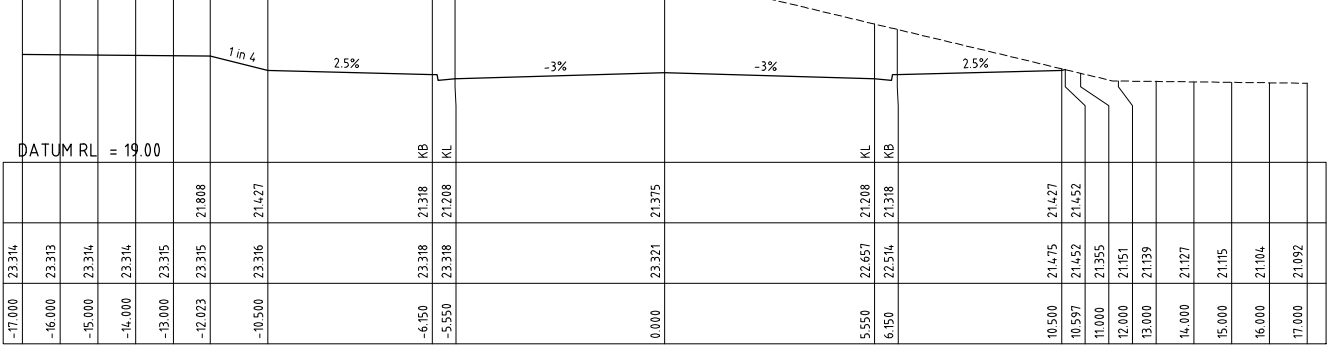
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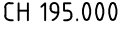
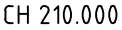
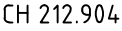
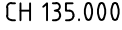
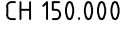
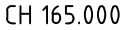
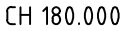
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CH 90.000



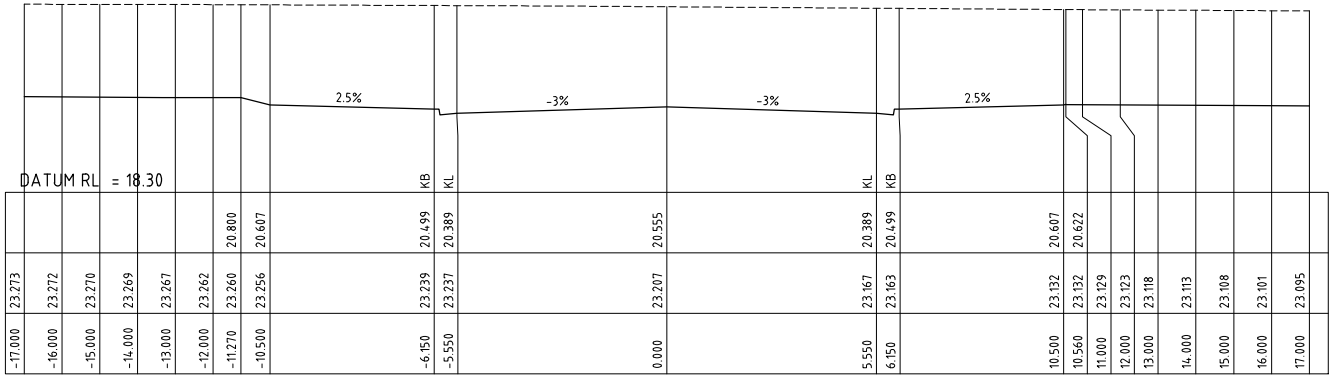
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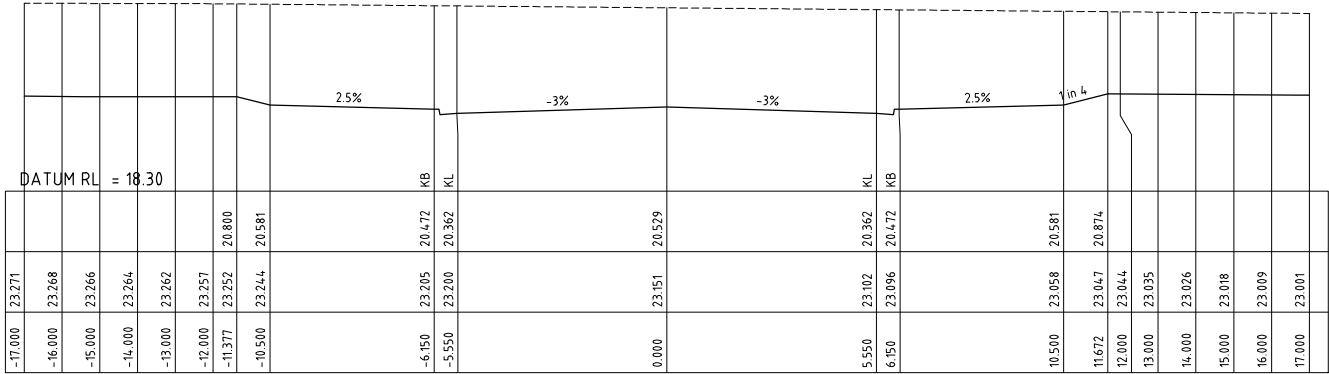
					North		COPYRIGHT Copyright in the drawings, information and data recorded hereon is the property of Geoff Craig & Associates Pty Ltd and may not be used, copied or reproduced in whole or part for any purpose other than that for which it is supplied without the prior consent of Geoff Craig & Associates Pty Ltd.	<table><tr><td>Designed A.M</td><td>Cad Reference 18280C dC211 r1</td></tr><tr><td>Scale 1:500H/1:100V</td><td>A1 SHEET</td></tr><tr><td colspan="2">Project Approval IAN HILL (B.E) Consulting Civil Engineer</td></tr></table>	Designed A.M	Cad Reference 18280C dC211 r1	Scale 1:500H/1:100V	A1 SHEET	Project Approval IAN HILL (B.E) Consulting Civil Engineer		Client	 PROPOSED SUBDIVISION FREEWAY NORTH BUSINESS PARK STAGE 7 ROAD 2 CROSS SECTIONS (2 OF 4)	<table><tr><td colspan="2">Project No 18280C</td></tr><tr><td>Drawing No C211</td><td>Revision 1</td></tr></table>	Project No 18280C		Drawing No C211	Revision 1
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Project Approval IAN HILL (B.E) Consulting Civil Engineer																					
Project No 18280C																					
Drawing No C211	Revision 1																				
1	ORIGINAL ISSUE	A.M	I.H	26.02.19																	
Amendment	Description	Drawn	App'd	Date																	

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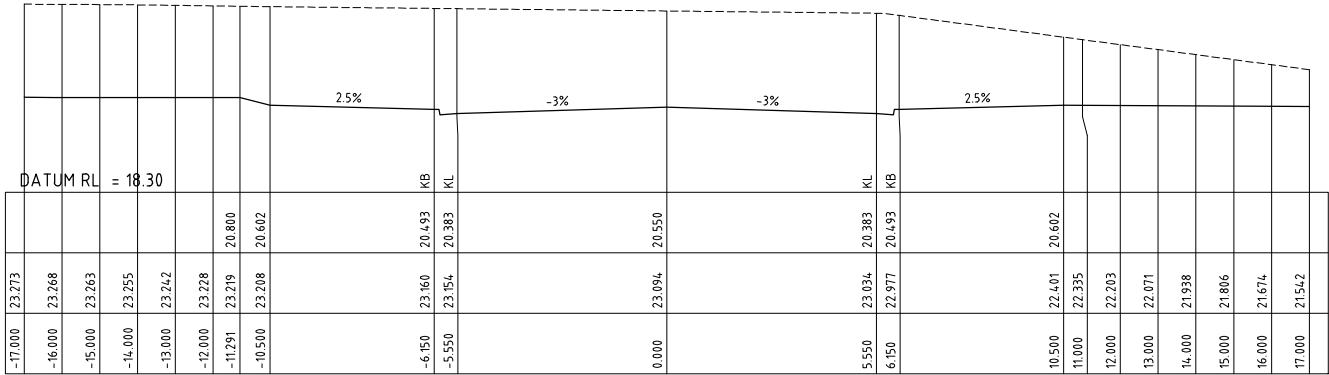
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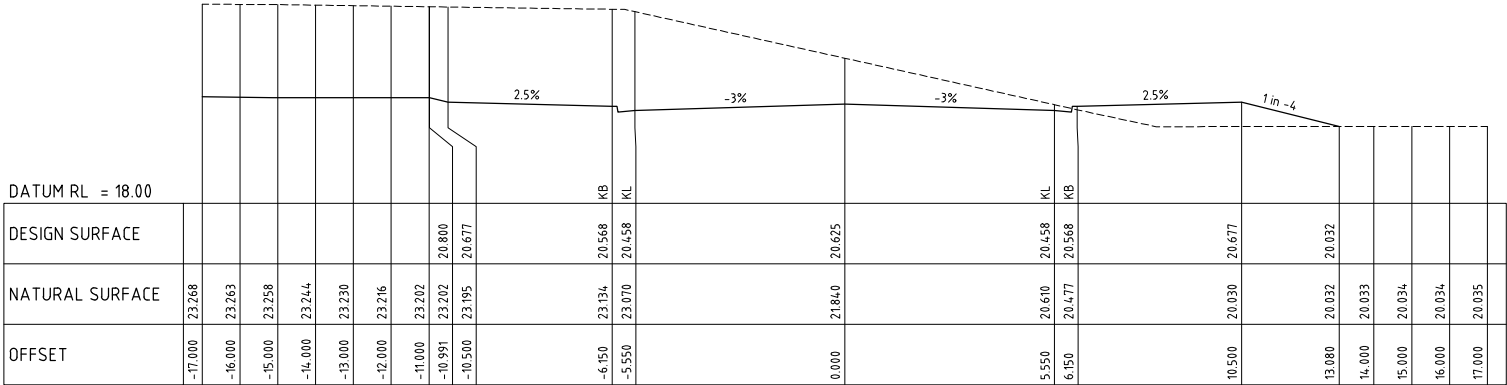
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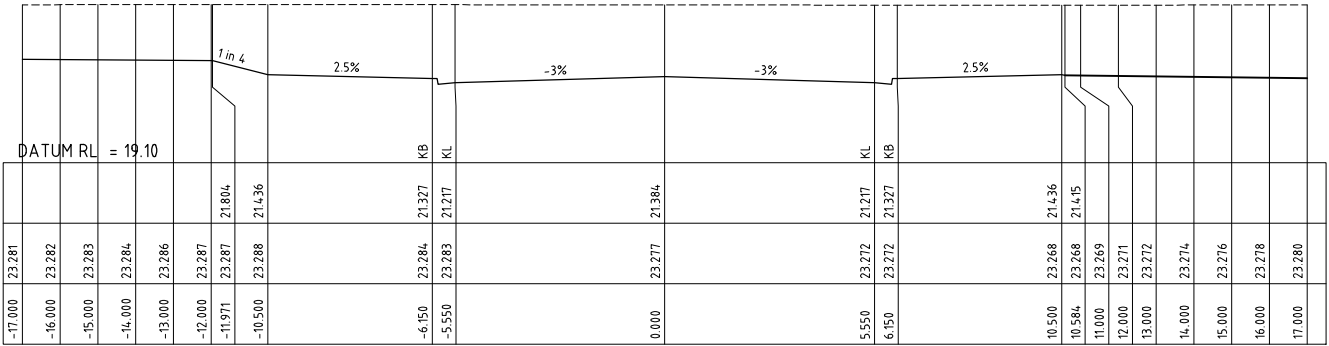
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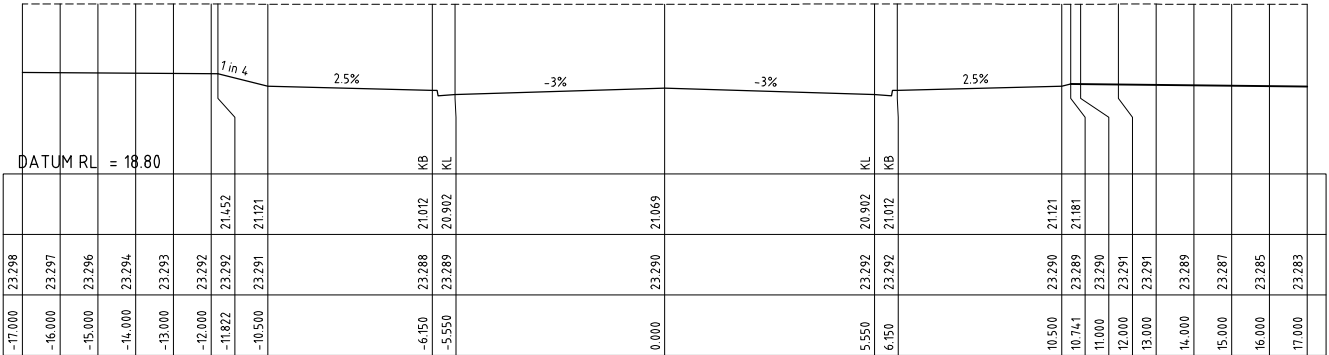
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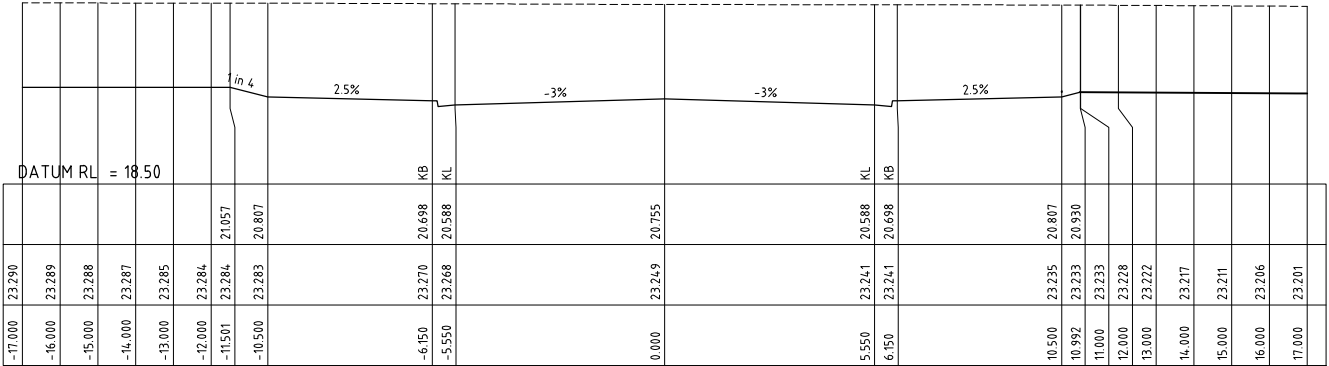
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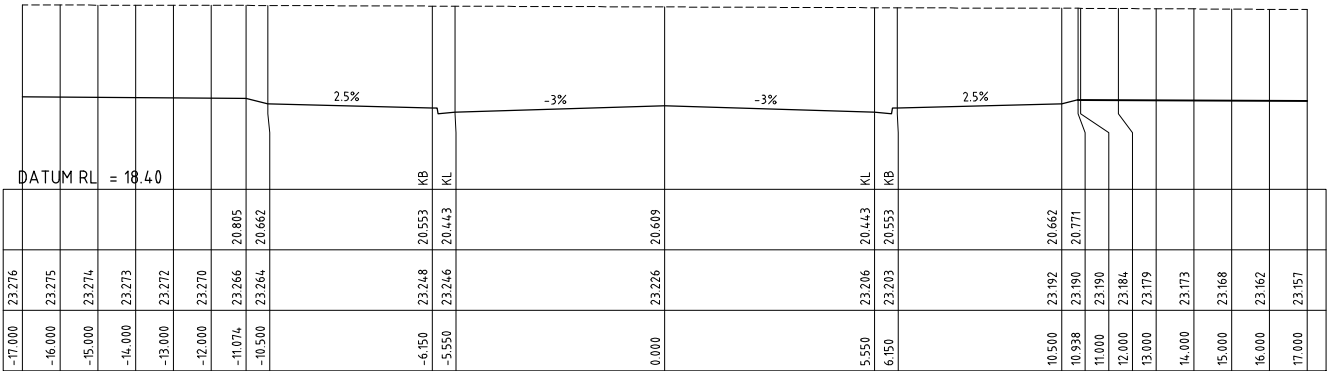
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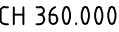
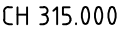
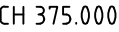
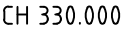
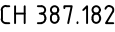
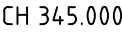
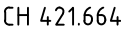
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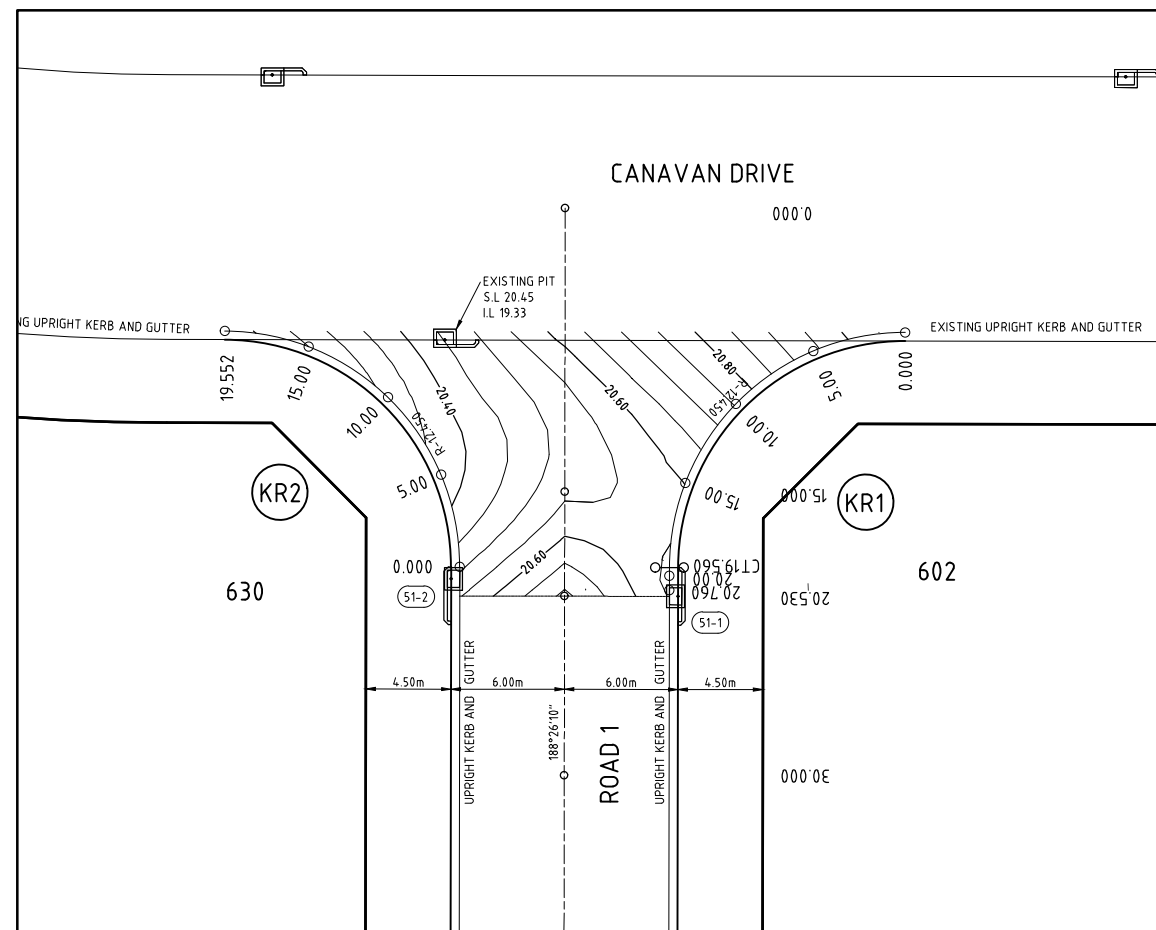
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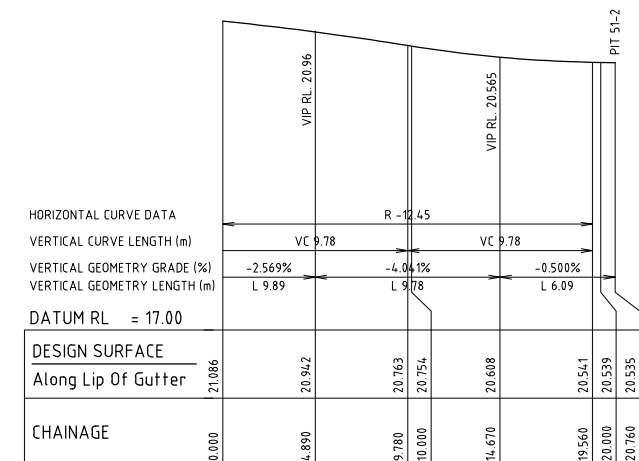
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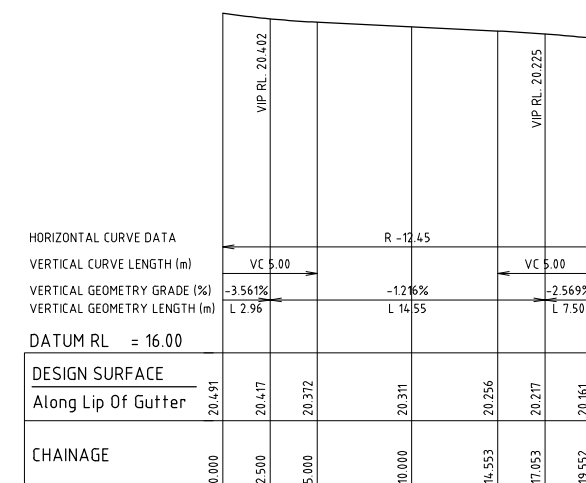
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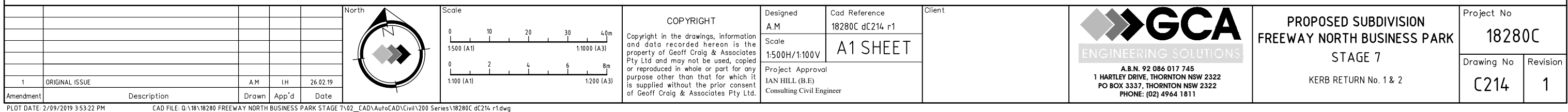
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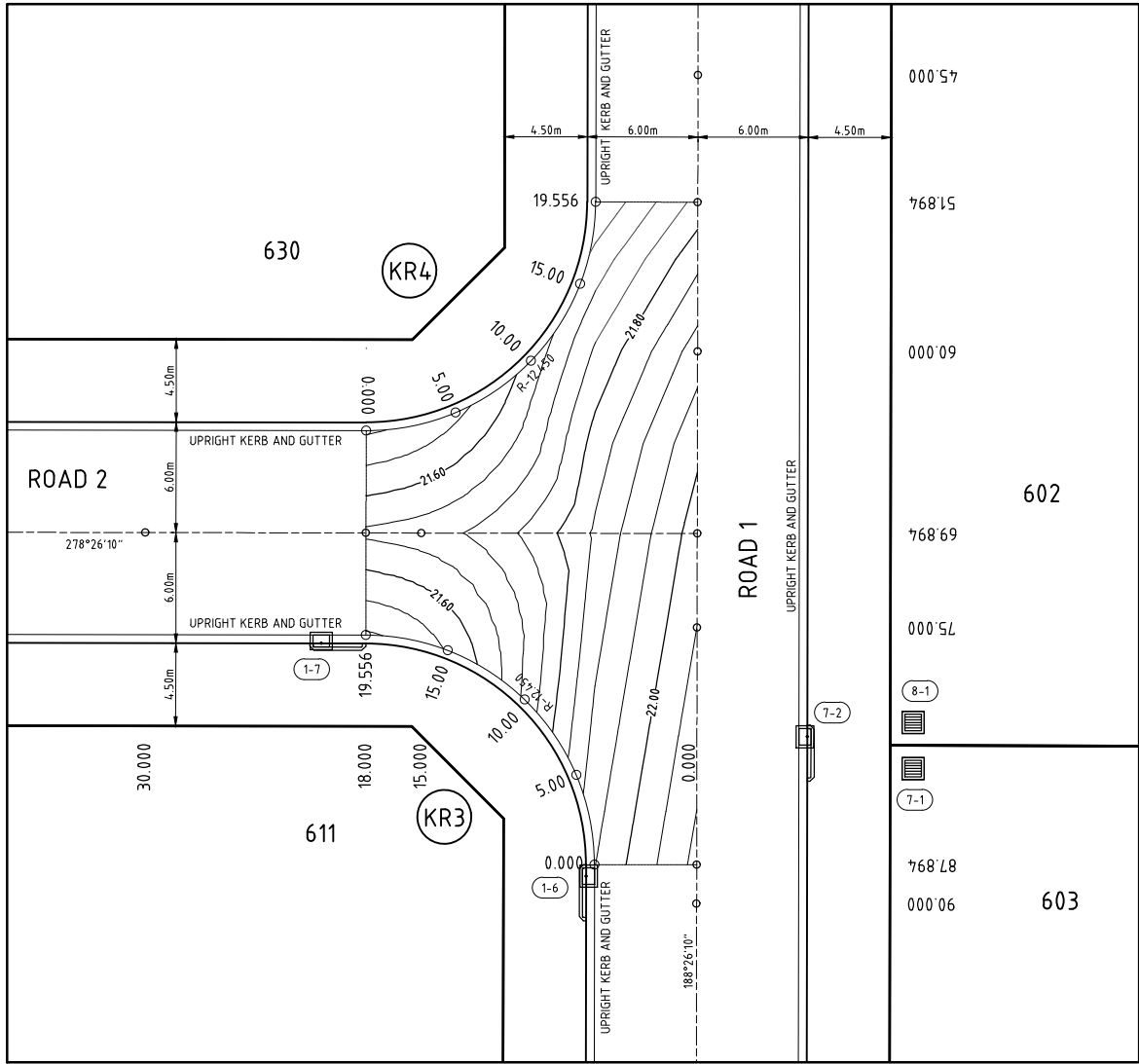


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LONGITUDINAL SECTION KR1

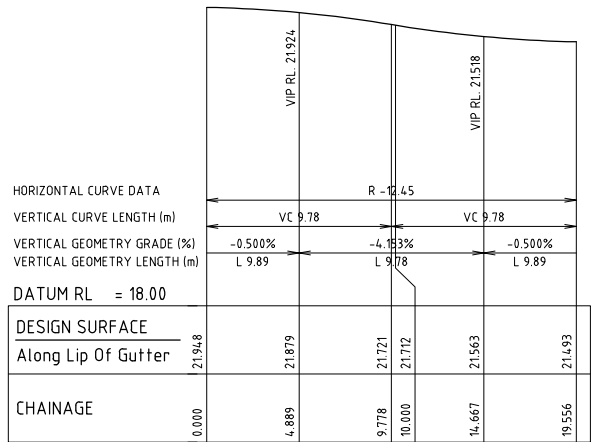


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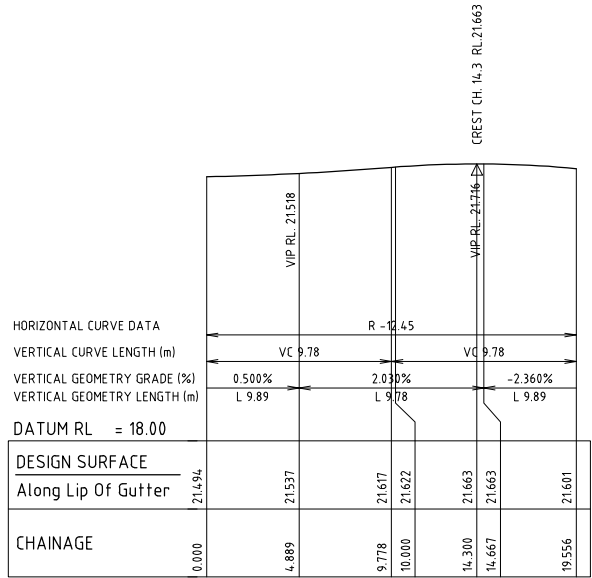




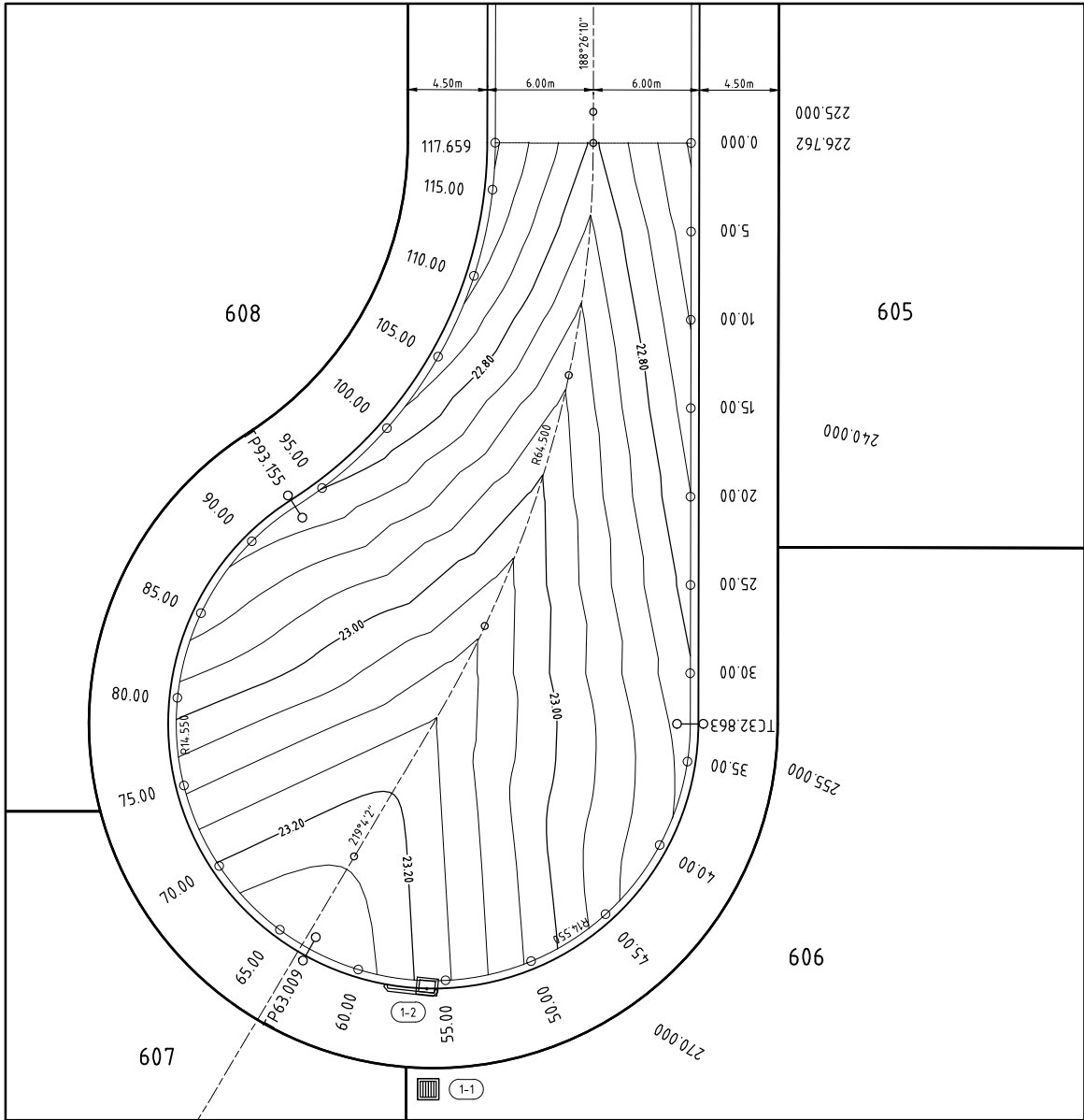
KERB RETURN No.3 & 4 DETAIL PLAN
SCALE 1:200



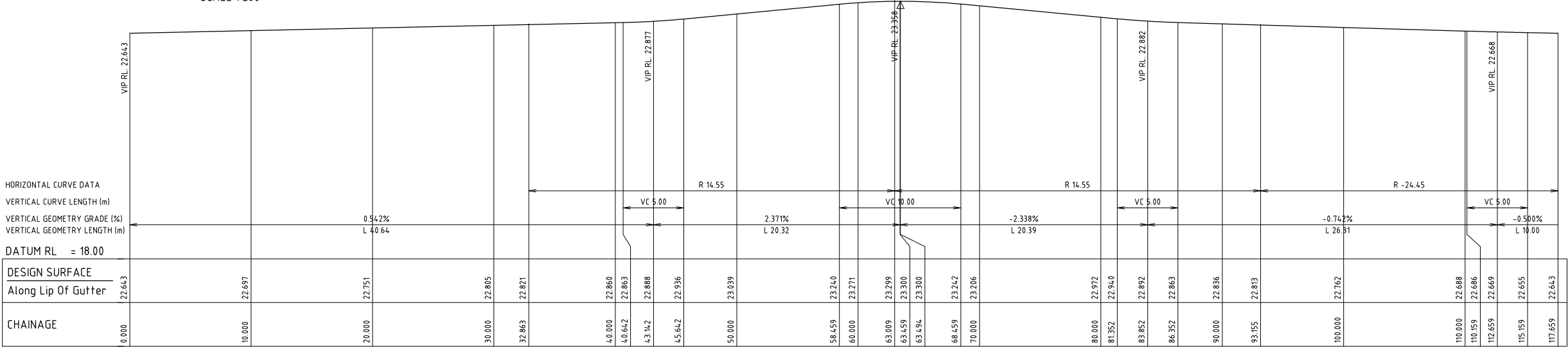
A1 SCALE: HORIZONTAL 1:200, VERTICAL 1:50
LONGITUDINAL SECTION KR3



A1 SCALE: HORIZONTAL 1:200, VERTICAL 1:50
LONGITUDINAL SECTION KR4

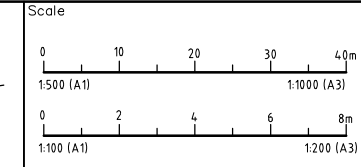
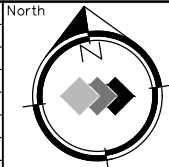


KERB RETURN No.5 DETAIL PLAN
SCALE 1:200



A1 SCALE: HORIZONTAL 1:200, VERTICAL 1:50
LONGITUDINAL SECTION KR5

1	ORIGINAL ISSUE	AM	IH	26.02.19	
Amendment	Description	Drawn	App'd	Date	



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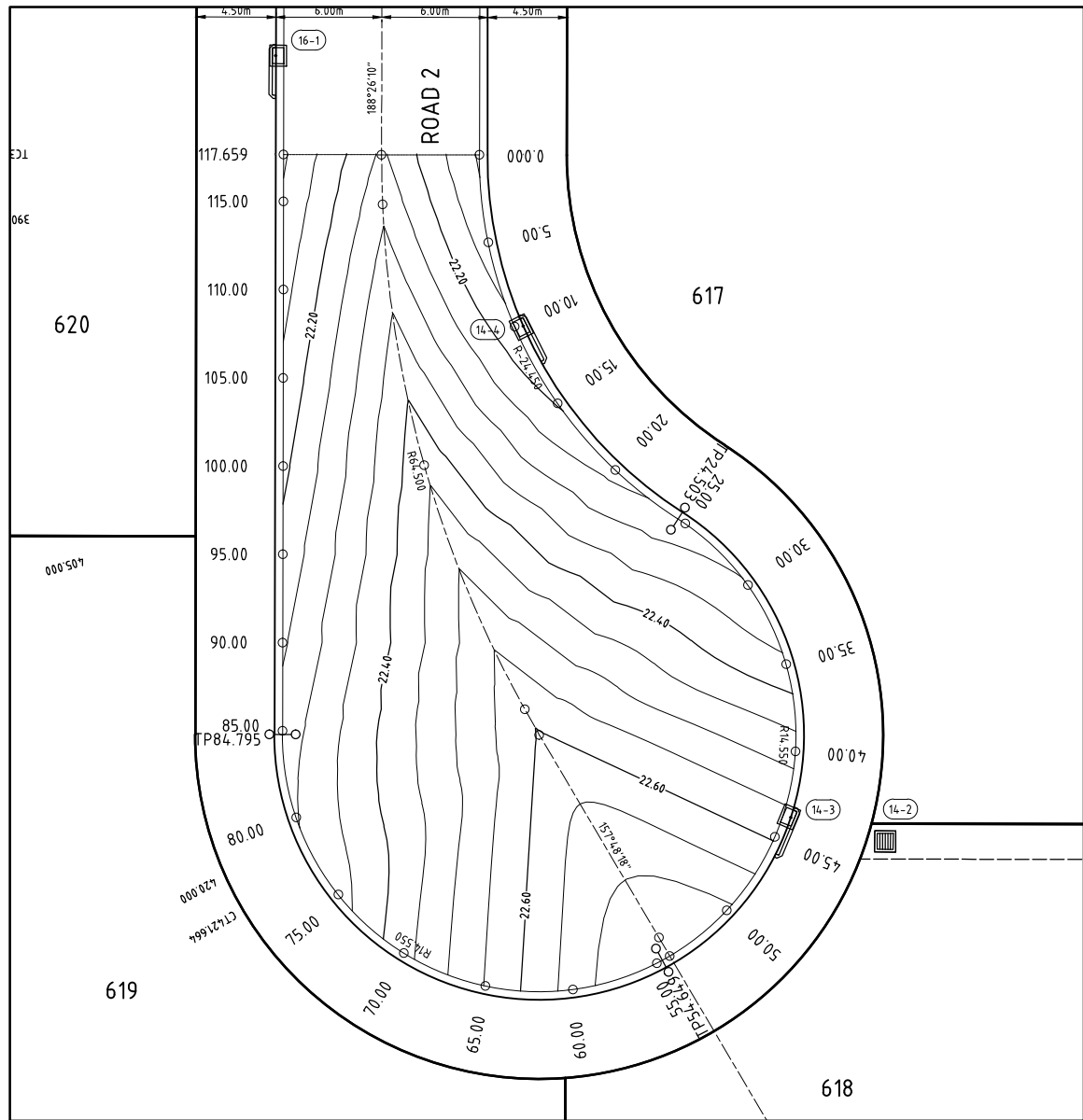
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Scale 1:500H/1:100V	A1 SHEET
Project Approval IAN HILL (B.E) Consulting Civil Engineer	

Client

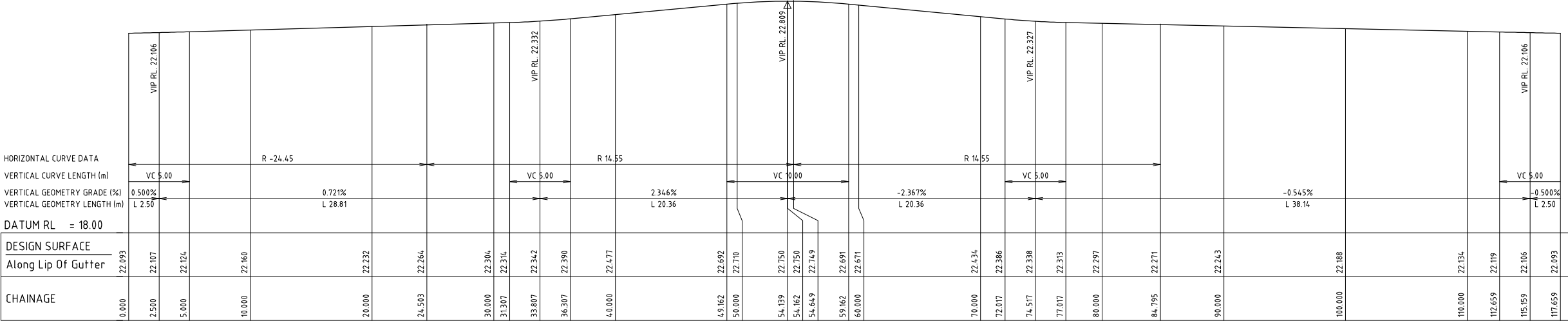
GCA
ENGINEERING SOLUTIONS
A.B.N. 92 086 017 745
1 HARTLEY DRIVE, THORNTON NSW 2322
PO BOX 3337, THORNTON NSW 2322
PHONE: (02) 4964 1811

**PROPOSED SUBDIVISION
FREEWAY NORTH BUSINESS PARK
STAGE 7
KERB RETURN No. 5**

Project No 18280C	
Drawing No C216	Revision 1

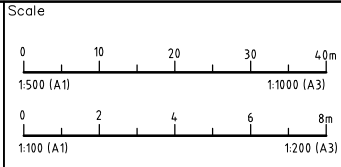
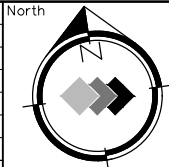


KERB RETURN No.6 DETAIL PLAN
SCALE 1:200



A1 SCALE: HORIZONTAL 1:200, VERTICAL 1:50
LONGITUDINAL SECTION KR6

1	ORIGINAL ISSUE	AM	IH	26.02.19	
Amendment	Description	Drawn	App'd	Date	



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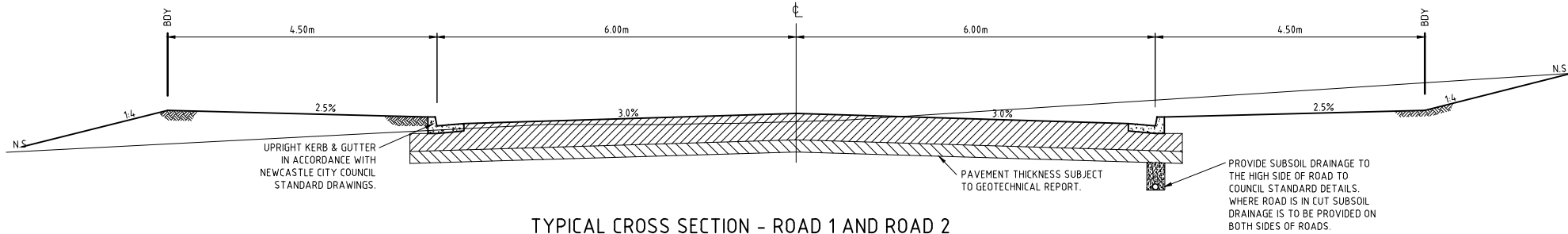
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Scale 1:500H/1:100V	A1 SHEET
Project Approval IAN HILL (B.E) Consulting Civil Engineer	

Client



PROPOSED SUBDIVISION
FREEWAY NORTH BUSINESS PARK
STAGE 7
KERB RETURN No. 6

Project No 18280C	Drawing No C217	Revision 1
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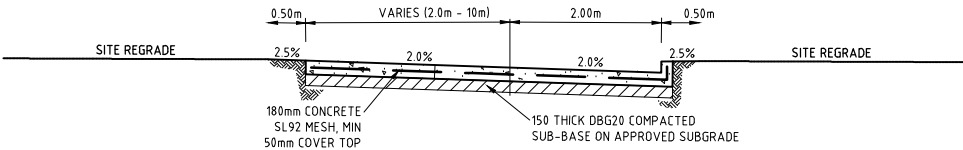
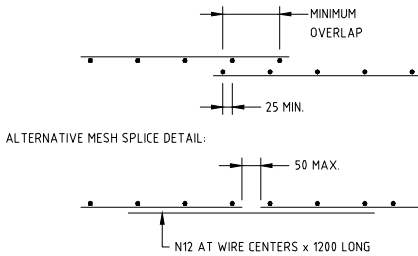


TYPICAL CROSS SECTION - ROAD 1 AND ROAD 2
SCALE 1:50

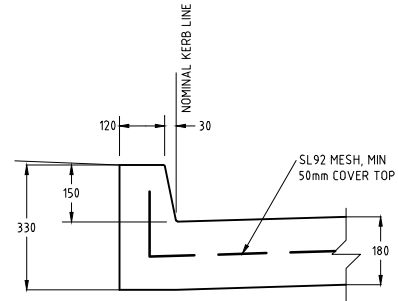
REINFORCED CONCRETE

- C1. ALL CONCRETE PAVEMENT TO BE IN ACCORDANCE WITH APPROVED GEOTECHNICAL REPORT.
- C2. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH AS3600 CURRENT EDITION WITH AMENDMENTS, EXCEPT WHERE VARIED BY THE CONTRACT DOCUMENTS.
- C3. CONCRETE COMPONENTS AND QUALITY SHALL BE AS FOLLOWS:
- | ELEMENT | SLUMP
mm | MAX. SIZE
AGG. mm | CEMENT
TYPE | f'c AT 28
DAYS - MPa | ADMIXTURE |
|----------|-------------|----------------------|----------------|-------------------------|-----------|
| ALL, UNO | 80 | 20 | GP | 32 | - |
- C4. MINIMUM CLEAR CONCRETE COVER TO REINFORCEMENT INCLUDING TIES AND STIRRUPS SHALL BE AS FOLLOWS UNO.
- | ELEMENT | CAST AGAINST FORMS
COMPLYING WITH CURRENT
SAA CODE | | NO.
FORM WORK
mm |
|----------------|--|--|------------------------|
| | IN
SHELTERED
LOCATION
mm | EXPOSED TO
GROUND OR
WEATHER
mm | |
| PAD FOOTINGS | - | 65 | 75 |
| STRIP FOOTINGS | - | 50 | 65 |
- C5. COVER TO REINFORCEMENT SHALL BE OBTAINED BY THE USE OF APPROVED BAR CHAIRS. ALL CHAIRS SHALL BE SPACED AT 1000 CTS MAXIMUM.
- C6. ALL CONCRETE SHALL BE MECHANICALLY VIBRATED. VIBRATORS SHALL NOT BE USED TO SPREAD CONCRETE.
- C7. SIZES OF CONCRETE ELEMENTS DO NOT INCLUDE THICKNESS OF APPLIED FINISHES.
- C8. NO HOLES OR CHASES OTHER THAN THOSE SHOWN ON THE STRUCTURAL DRAWINGS SHALL BE MADE IN CONCRETE MEMBERS WITHOUT THE PRIOR APPROVAL OF THE ENGINEER.
- C9. CONSTRUCTION JOINTS WHERE NOT SHOWN SHALL BE LOCATED TO APPROVAL OF THE ENGINEER. ALL CONSTRUCTION JOINTS SHALL BE SCABBLED OVER THE WHOLE FACE AND ANY UNSOUND MATERIAL REMOVED.
- C10. REINFORCEMENT IS REPRESENTED DIAGRAMMATICALLY; IT IS NOT NECESSARILY SHOWN IN TRUE PROJECTION.
- C11. SPLICES IN REINFORCEMENT SHALL BE MADE ONLY IN THE POSITIONS SHOWN OR AS APPROVED BY THE ENGINEER. WHERE THE LAP LENGTH IS NOT SHOWN IT SHALL BE SUFFICIENT TO DEVELOP THE FULL STRENGTH OF THE REINFORCEMENT AS SPECIFIED IN AS3600. COGS AND HOOKS SHALL BE STANDARD UNLESS SHOWN OTHERWISE.
- C12. WELDING OF REINFORCEMENT WILL NOT BE PERMITTED UNLESS SHOWN ON THE STRUCTURAL DRAWINGS OR APPROVED BY THE ENGINEER.
- C13. PIPES OR CONDUITS SHALL NOT BE PLACED WITHIN THE CONCRETE COVER TO REINFORCEMENT WITHOUT THE APPROVAL OF THE ENGINEER.

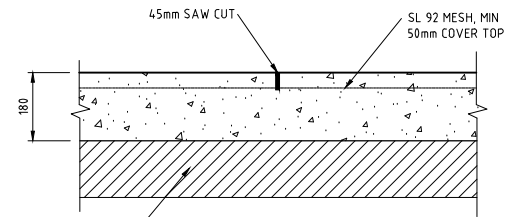
- C14. REINFORCEMENT SYMBOLS:
N - DENOTES GRADE 500N HIGH STRENGTH DEFORMED BARS TO AS4671.
R - DENOTES GRADE 250R HOT ROLLED PLAIN BARS TO AS4671.
SL - DENOTES HARD-DRAWN WIRE REINFORCING MESH TO AS4671.
LTM - DENOTES HARD-DRAWN WIRE TRENCH MESH TO AS 4671.
- C15. ALL REINFORCING MESH SHALL COMPLY WITH AS4671 AND SHALL BE SUPPLIED IN FLAT SHEETS.
- C16. SPLICES IN MESH: THE OUTERMOST TRANSVERSE WIRES SHALL BE OVERLAPPED BY AT LEAST THE SPACING OF THESE TRANSVERSE WIRES PLUS 25 mm
- C17. EXPOSED CORNERS SHALL BE 20 mm CHAMFERED UNO.
- C18. ALL REINFORCEMENT SHALL BE INSPECTED BY THE SUPERINTENDENT OR ENGINEER PRIOR TO PLACING CONCRETE.
- C19. ALL SLAB CONCRETE TO BE CURED IN AN APPROVED MANNER FOR A MINIMUM OF 7 DAYS
- C20. ALL ABBREVIATIONS ARE IN ACCORDANCE WITH AS1100.
- C21. ALL THE BARS AND DOWEL BARS TO BE HOT DIPPED GALVANISED.



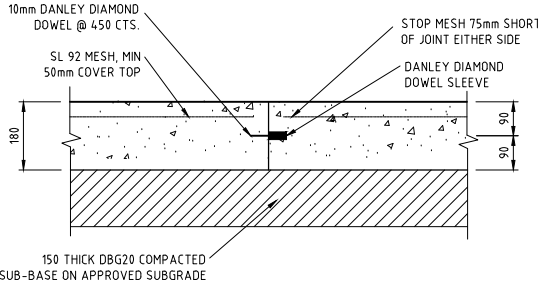
TYPICAL CROSS SECTION - GPT ACCESS
SCALE 1:50



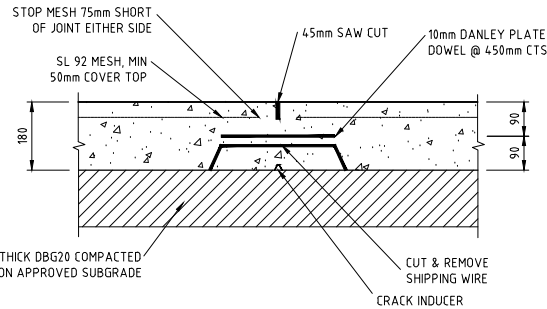
INTERGRAL KERB & GUTTER
SCALE 1:20



SAWN JOINT DETAIL - SJ
SCALE 1:10



CONSTRUCTION JOINT DETAIL - CJ1
SCALE 1:10

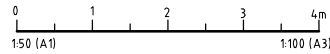
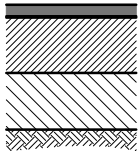


TYPICAL DANLEY PLATE CONTRACTION JOINT
SCALE 1:10

NOTE:
WHERE A CONTINUOUS POUR IS REQUIRED AT A CONSTRUCTION JOINT LOCATION USE DANLEY 10mm PLATE DOWEL CRADLES IN ACCORDANCE WITH MANUFACTURERS SPECIFICATIONS.

SAWCUT NOTE:
IT IS RECOMMENDED THAT SOFF-CUT CONCRETE SAW & SAWING METHODS BE USED. SAW CUT TO BE PLACED NORMALLY 0-2 HOURS FROM FINAL SLAB FINISHING TIME WHEN CONCRETE CAN SUPPORT THE WEIGHT OF THE SAW & OPERATOR WITHOUT DISTURBING THE FINAL FINISH.

CONCRETE SPECIFICATION - SLAB ON GROUND:	
SLAB THICKNESS	EXTERNAL 180mm
REINFORCEMENT	SL92 MESH
SUBBASE	AS SPECIFIED BY DOUGLAS PARTNERS
DESIGN SUBGRADE CBR	AS SPECIFIED BY DOUGLAS PARTNERS
MINIMUM COMPRESSIVE STRENGTH	32 MPa
MINIMUM FLEXURAL STRENGTH (f'cf AT 28 DAYS)	4.5 MPa
MAXIMUM AGGREGATE SIZE	20mm
ADMIXTURES	TO AS1478
NOMINAL SLUMP TO AS1012.3	80mm
CONCRETE TESTING	TO AS1379 & AS3600
SAWCUTS	SOFF CUT METHODS G2000 OR G3000 TO MANUFACTURERS SPECIFICATIONS
CURING	7 DAYS MINIMUM USING APPROVED METHODS
DESIGN WHEEL TYPE	PNEUMATIC
DESIGN WHEEL TRAFFIC	10 TONNE AXLE LOAD MAXIMUM
REPETITIONS	500x10 ³



NOTES:

- ALL DIMENSIONS OF EASEMENTS AND LOTS ARE SUBJECT TO REGISTRATION OF DEPOSITED PLAN.
- ALL WORK TO BE CARRIED OUT IN ACCORDANCE WITH COUNCIL'S CONSTRUCTION SPECIFICATION AND SUBDIVISION CODE.
- EROSION CONTROL DEVICES AND SILTATION TRAPS TO BE INSTALLED BEFORE SITE IS DISTURBED IN ACCORDANCE WITH THE ATTACHED SOIL AND WATER MANAGEMENT PLAN.
- DEMUDED AREAS WITHIN THE SUBDIVISION TO BE REGRASSED AND DISTURBED BUSHLAND AREAS TO BE REVEGETATED ON COMPLETION OF WORKS.
- ALL REINFORCED CONC. STORMWATER DRAINAGE PIPES ARE TO BE RUBBER RING JOINTED.
- ALL DRAINAGE INLET STRUCTURES WITHIN THE PUBLIC ROAD ARE TO BE CONSTRUCTED IN ACCORDANCE WITH COUNCIL'S STANDARD DRAWING No.'s A2200 AND A2203, DATED JUNE 2013.
- ALL IAD PITS TO CONFORM TO TABLE 3.1 OF COUNCIL'S DCP2012 TECHNICAL MANUAL - 'STORMWATER AND WATER EFFICIENCY FOR DEVELOPMENT'.
- SIDE WALLS OF ALL PITS GREATER THAN 1.5m DEEP SHALL BE REINFORCED WITH ONE LAYER OF SL82 MESH RETURNED 300mm INTO BASE.
- ALL INTERALLOTMENT DRAINAGE PIPES TO BE SEWER GRADE uPVC (UNLESS OTHERWISE SHOWN) OR AN APPROVED EQUIVALENT. THE MINIMUM SLOPE OF INTERALLOTMENT DRAINAGE LINES SHALL BE 1%, THE INTERALLOTMENT DRAINAGE LINE SHALL BE A MINIMUM OF 0.5m FROM THE BOUNDARY AND LOCATED IN AN EASEMENT 2.0m WIDE.
- JUNCTIONS SHALL BE PROVIDED WHERE AN INTERALLOTMENT PIT IS NOT CONSTRUCTED. THEY SHALL BE 1.0m FROM THE ADJOINING DOWNTOWN BOUNDARY.
- ALL EXISTING UNDERGROUND SERVICES MUST BE LOCATED AND EXPOSED PRIOR TO EARTHWORKS COMMENCING AND IT IS THE RESPONSIBILITY OF THOSE PERSONS USING THIS PLAN TO CONFIRM BOTH POSITION & LEVEL OF THESE UTILITIES IN CONJUNCTION WITH THE APPROPRIATE AUTHORITY.
- SUBSOIL DRAINS ARE TO BE PROVIDED IN ACCORDANCE WITH COUNCIL'S STD DWGS, AND WHERE NECESSARY, AS DIRECTED BY COUNCIL DURING WORKS.
- PAVEMENT THICKNESS TO BE IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE APPROVED GEOTECHNICAL REPORT.
- WORKING HOURS ON SITE SHALL BE IN ACCORDANCE WITH EPA & COUNCIL REQUIREMENTS.
- VEHICULAR ACCESS AND ALL SERVICES ARE TO BE MAINTAINED AT ALL TIMES TO ADJOINING PROPERTIES AFFECTED BY CONSTRUCTION WORKS.
- MAINTENANCE ON THE SEEDDED AND TURFED AREAS SHALL BE OVER A 6 MONTH PERIOD. TURF THE FULL WIDTH OF ALL EARTH DISH DRAINS. LAY 600mm WIDE TURF STRIPS TO EACH SIDE OF CONCRETE ACCESSWAYS, PATHWAYS, AT THE REAR OF ALL KERB AND GUTTERING AND AT THE TOP OF CUT BATTERS. MULCH (IF AVAILABLE FROM SITE CLEARING) AND SEED ALL OTHER DISTURBED AREAS, INCLUDING TRENCHES. NO PERMANENT MULCH/WOODCHIP IS PERMITTED WITHIN FLOWPATHS AND PUBLIC AREAS.
- ALL PERAMBULATOR RAMPS TO BE CONSTRUCTED AS SHOWN ON PLANS AND IN ACCORDANCE WITH NEWCASTLE CITY COUNCIL'S STANDARDS.
- TRAFFIC CONTROL MEASURES TO BE IN ACCORDANCE WITH AS 1742.3-1996.
- ALL LEVELS MUST BE OBTAINED FROM ESTABLISHED BENCH MARKS AS DIRECTED BY THE SUPERVISOR.
- THE CONTRACTOR IS TO ENSURE THAT ALL PROPOSED PIPE, CONDUIT AND SERVICE CROSSINGS CONSTRUCTED AFTER SUB GRADE PREPARATION AND PRIOR TO PLACEMENT OF THE PAVEMENT SUB BASE.
- PROVIDE STREET NAME SIGNS AT ALL INTERSECTIONS, DOUBLE BLADED WHERE NECESSARY.
- ALL SITE FILLING AND SITE REGRADING TO BE CONTROLLED FILL TO AS3798 WITH TESTING TO BE CARRIED OUT BY A NATA REGISTERED LABORATORY.
- PAVEMENT PROOF ROLLING AND LEVEL CHECKS, DENSITY AND BENKELMAN BEAM TESTING TO BE IN ACCORDANCE WITH COUNCIL'S ENGINEERING STANDARDS. BENKLEMAN BEAM RESULTS TO BE 0.8mm MAXIMUM FOR ALL PROPOSED ROADS.

LAYER	THICKNESS		COMPACTION
	CLAY SUBGRADE	ROCK SUBGRADE	
WEARING COURSE (WITH 10mm PRIMER SEAL)	50mm AC 14	50mm AC 14	
BASECOURSE - HEAVILY BOUND E = 5000 MPa (IN 2 LAYERS)	410	360	98% MODIFIED
SELECT SUBGRADE:	200	-	100% STANDARD
TOTAL THICKNESS	660	410	
DESIGN ESA's	5 x 10 ⁸	5 x 10 ⁸	
DESIGN CBR	4%	10%	

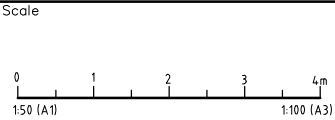
PAVEMENT DESIGN IN ACCORDANCE WITH DOUGLAS PARTNERS GEOTECHNICAL REPORT PROJECT No. 39976.11R.001 - Dated February 2017

PAVEMENT DESIGN
NTS

PRELIMINARY ISSUE
NOT FOR CONSTRUCTION

					North
1	ORIGINAL ISSUE	AM	1H	27.02.19	
Amendment	Description	Drawn	App'd	Date	

PLOT DATE: 2/09/2019 3:53:47 PM CAD FILE: Q:\10\18280 FREEWAY NORTH BUSINESS PARK STAGE 7\02_CAD\AutoCAD\Civil\200 Series\18280C dC218 r1.dwg



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		Scale	A1 SHEET	
		AS SHOWN		
		Project Approval		
		IAN HILL (B.E)		
		Consulting Civil Engineer		

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PO BOX 3337, THORNTON NSW 2322
PHONE: (02) 4964 1811

PROPOSED SUBDIVISION
FREEWAY NORTH BUSINESS PARK
STAGE 7
TYPICAL SECTIONS, DETAILS AND NOTES

Project No		18280C	
Drawing No	Revision	C218	1

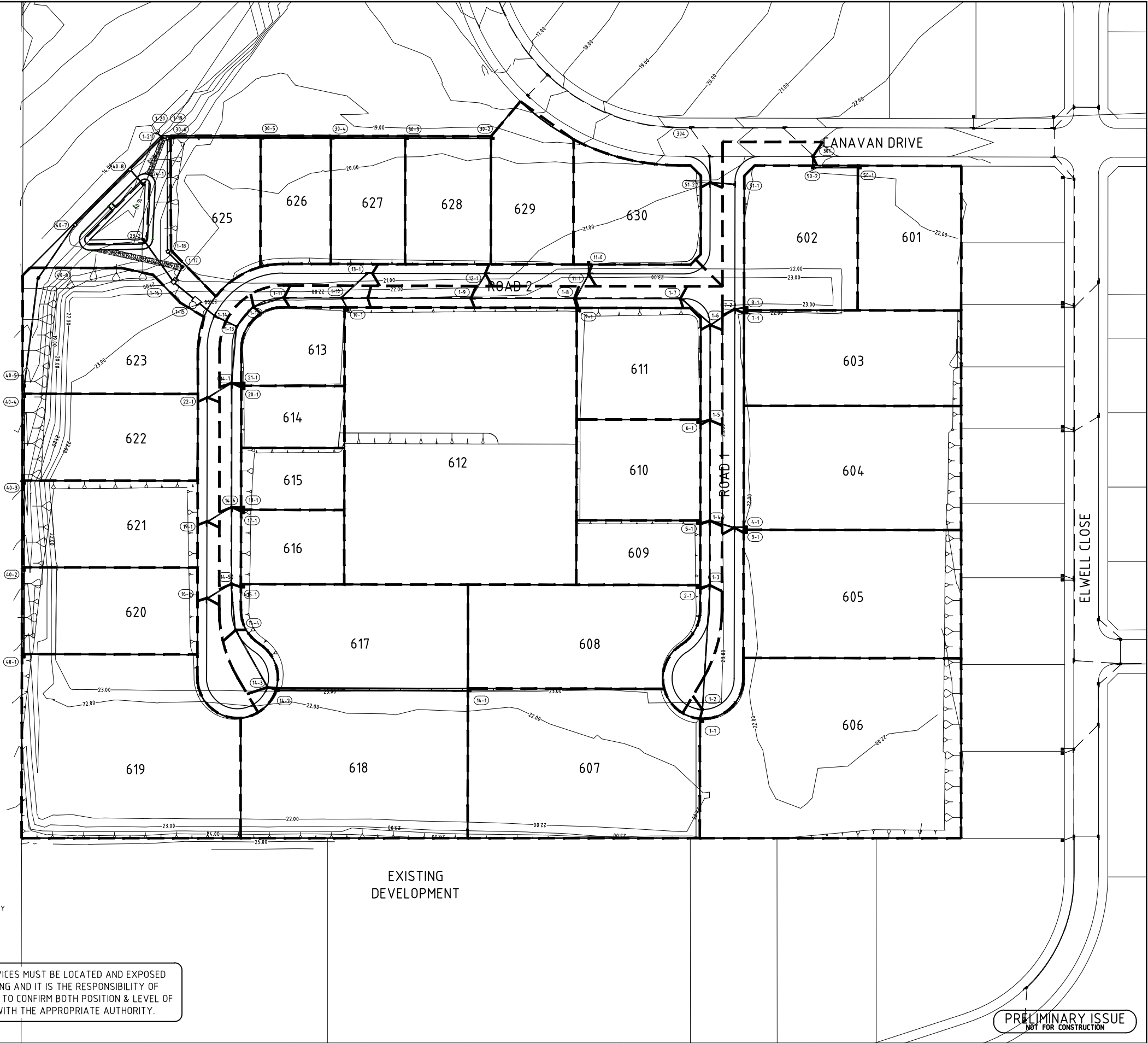
DRAINAGE PIT SCHEDULE

PIT No.	ROAD	CHAINAGE	PIT DETAILS
1-1	LOT 606	-	IAD PIT
1-2	ROAD 1	274.322	2400 EKI
1-3	ROAD 1	214.394	2400 EKI
1-4	ROAD 1	183.171	2400 EKI
1-5	ROAD 1	134.394	2400 EKI
1-6	ROAD 1	88.522	2400 EKI
1-7	ROAD 2	20.422	2400 EKI
1-8	ROAD 2	70.866	2400 EKI
1-9	ROAD 2	121.748	2400 EKI
1-10	ROAD 2	184.187	2400 EKI
1-11	ROAD 2	212.276	2400 EKI
1-12	ROAD 2	231.566	2400 EKI
1-13	ROAD 2	247.160	2400 SAG
1-14	ROAD 2	247.160	2400 SAG
1-15	DRAINAGE RESERVE	-	GPT - ROCLA CDS 2018
1-16	DRAINAGE RESERVE	-	SPLITTER PIT
1-17	DRAINAGE RESERVE	-	1500x1500 GSIP
1-18	DRAINAGE RESERVE	-	1500x1500 JUNCTION BOX
1-19	DRAINAGE RESERVE	-	1500x1500 JUNCTION BOX
1-20	DRAINAGE RESERVE	-	1500x1500 JUNCTION BOX
1-21	DRAINAGE RESERVE	-	EXISTING HEADWALL
2-1	LOT 608	-	IAD PIT
3-1	LOT 605	-	IAD PIT
4-1	LOT 604	-	IAD PIT
5-1	LOT 609	-	IAD PIT
6-1	LOT 610	-	IAD PIT
7-1	LOT 603	-	IAD PIT
7-2	ROAD 1	80.925	2400 EKI
8-1	LOT 602	-	IAD PIT
9-1	LOT 611	-	IAD PIT
10-1	LOT 612	-	IAD PIT
11-0	LOT 630	-	IAD PIT
11-1	ROAD 2	64.818	2400 EKI
12-1	ROAD 2	114.820	2400 EKI
13-1	ROAD 2	172.297	2400 EKI
14-1	LOT 607	-	IAD PIT
14-2	LOT 618	-	IAD PIT
14-3	ROAD 2	432.940	2400 EKI
14-4	ROAD 2	398.154	2400 EKI
14-5	ROAD 2	374.650	2400 EKI
14-6	ROAD 2	337.560	2400 EKI
14-7	ROAD 2	227.559	2400 EKI
15-1	LOT 617	-	IAD PIT
16-1	ROAD 2	381.578	2400 EKI
17-1	LOT 616	-	IAD PIT
18-1	LOT 615	-	IAD PIT
19-1	ROAD 2	344.487	2400 EKI
20-1	LOT 614	-	IAD PIT
21-1	LOT 613	-	IAD PIT
22-1	ROAD 2	284.488	2400 EKI
23-2	DRAINAGE RESERVE	-	BASIN INLET PIT
24-1	DRAINAGE RESERVE	-	BASIN OUTLET PIT
30-2	LOT 629	-	IAD PIT
30-3	LOT 628	-	IAD PIT
30-4	LOT 627	-	IAD PIT
30-5	LOT 626	-	IAD PIT
30-6	LOT 625	-	IAD PIT
40-1	LOT 619	-	IAD PIT
40-2	LOT 620	-	IAD PIT
40-3	LOT 621	-	IAD PIT
40-4	LOT 622	-	IAD PIT
40-5	LOT 623	-	IAD PIT
40-6	LOT 623	-	IAD PIT
40-7	DRAINAGE RESERVE	-	900x900 JUNCTION BOX
40-8	DRAINAGE RESERVE	-	900x900 JUNCTION BOX
50-1	LOT 601	-	IAD PIT
50-2	LOT 602	-	IAD PIT
51-1	ROAD 1	20.531	2400 SAG
51-2	ROAD 1	19.622	2400 EKI

NOTE:
ALL NOMINATED EKI LINTEL
LENGTHS ARE NOMINAL
LENGTHS AS SPECIFIED IN
THE ROCLA PRODUCT GUIDE

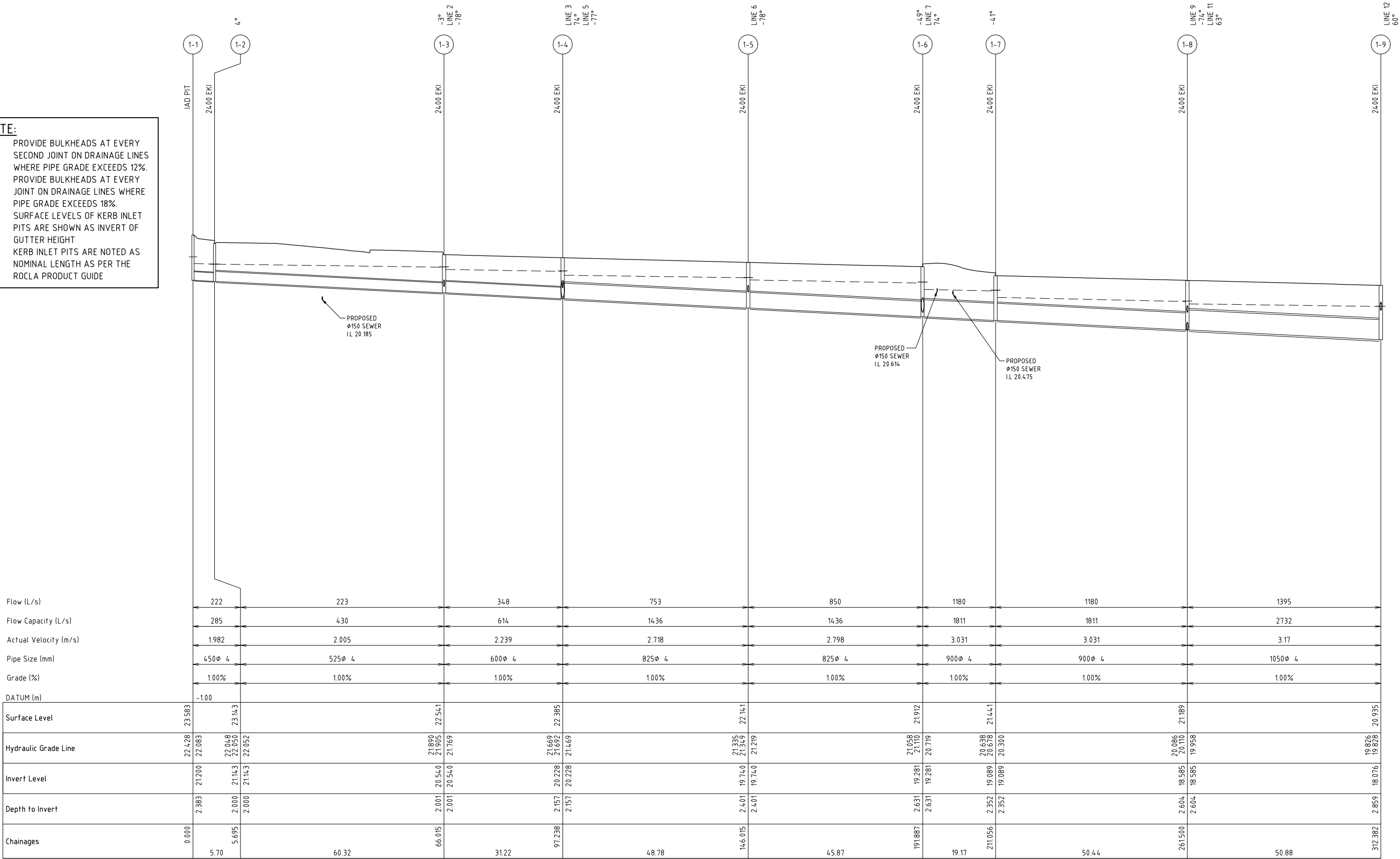
LEGEND:
SUB CATCHMENT BOUNDARY
PIT NUMBER

ALL EXISTING UNDERGROUND SERVICES MUST BE LOCATED AND EXPOSED
PRIOR TO EARTHWORKS COMMENCING AND IT IS THE RESPONSIBILITY OF
THOSE PERSONS USING THIS PLAN TO CONFIRM BOTH POSITION & LEVEL OF
THESE UTILITIES IN CONJUNCTION WITH THE APPROPRIATE AUTHORITY.



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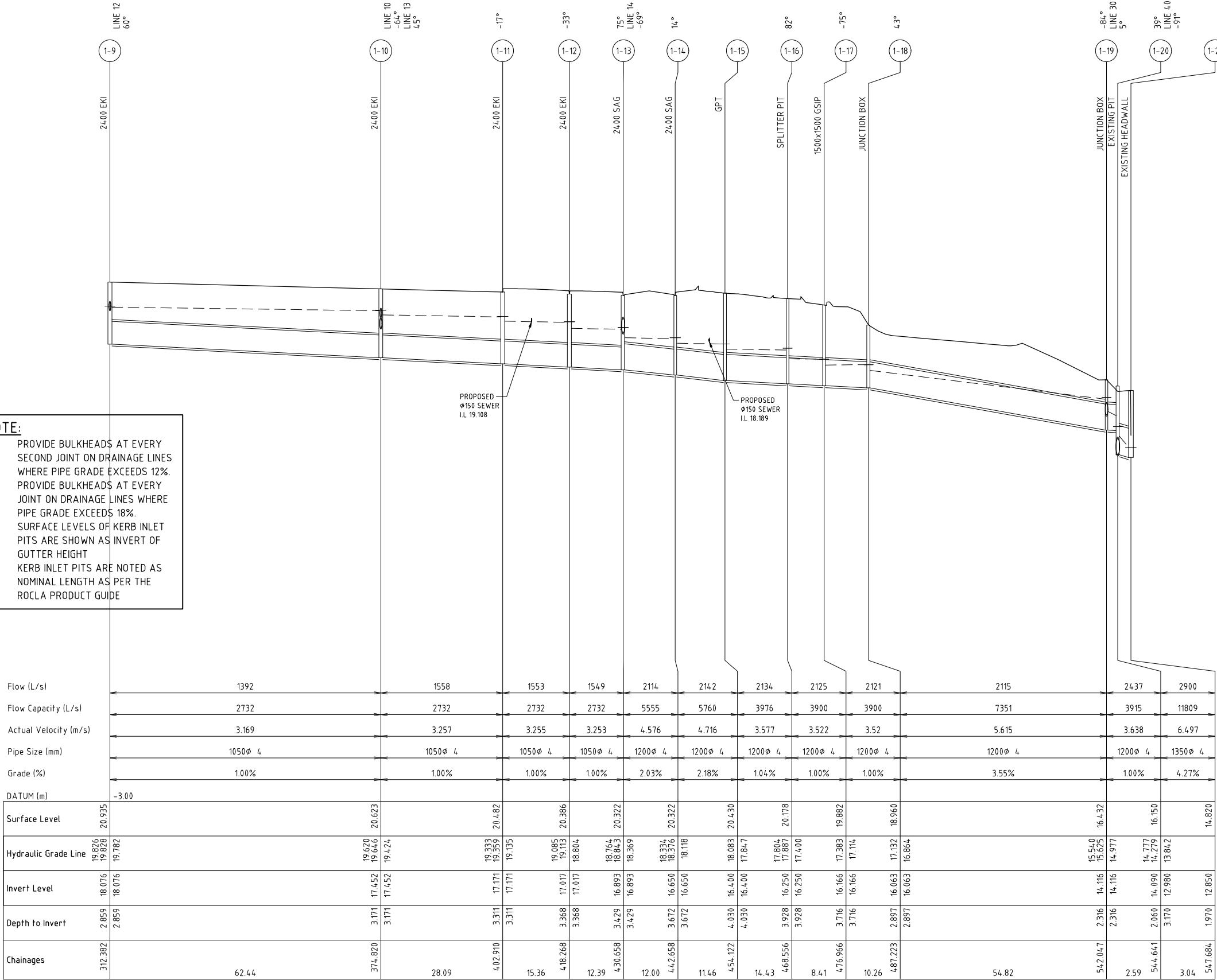
- NOTE:
1. PROVIDE BULKHEADS AT EVERY SECOND JOINT ON DRAINAGE LINES WHERE PIPE GRADE EXCEEDS 12%.
 2. PROVIDE BULKHEADS AT EVERY JOINT ON DRAINAGE LINES WHERE PIPE GRADE EXCEEDS 18%.
 3. SURFACE LEVELS OF KERB INLET PITS ARE SHOWN AS INVERT OF GUTTER HEIGHT
 4. KERB INLET PITS ARE NOTED AS NOMINAL LENGTH AS PER THE ROCLA PRODUCT GUIDE



LINE 1

					North			COPYRIGHT Copyright in the drawings, information and data recorded hereon is the property of Geoff Craig & Associates Pty Ltd and may not be used, copied or reproduced in whole or part for any purpose other than that for which it is supplied without the prior consent of Geoff Craig & Associates Pty Ltd.		Designed A.M	Cad Reference 18280C dC220 r5	Client		 A.B.N. 92 086 017 745 1 HARTLEY DRIVE, THORNTON NSW 2322 PO BOX 3337, THORNTON NSW 2322 PHONE: (02) 4964 1811		PROPOSED SUBDIVISION FREEWAY NORTH BUSINESS PARK STAGE 7 DRAINAGE LINE 1		Project No 18280C Drawing No C220 Revision 5	
								Scale 1:500H/1:100V	Project Approval IAN HILL (B.E) Consulting Civil Engineer										
5	DOP COMMENTS		A.M	I.H	30.08.19														
3	CLIENT AMENDMENTS		A.M	I.H	25.03.19														
1	ORIGINAL ISSUE		A.M	I.H	27.02.19														
Amendment	Description		Drawn	App'd	Date														

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Flow (L/s)	1392	1558	1553	1549	2114	2142	2134	2125	2121	2115	2437	2900
Flow Capacity (L/s)	2732	2732	2732	2732	5555	5760	3976	3900	3900	7351	3915	11809
Actual Velocity (m/s)	3.169	3.257	3.255	3.253	4.576	4.716	3.577	3.522	3.52	5.615	3.638	6.497
Pipe Size (mm)	1050ø 4	1050ø 4	1050ø 4	1050ø 4	1200ø 4	1200ø 4	1200ø 4	1200ø 4	1200ø 4	1200ø 4	1200ø 4	1350ø 4
Grade (%)	1.00%	1.00%	1.00%	1.00%	2.03%	2.18%	1.04%	1.00%	1.00%	3.55%	1.00%	4.27%
DATUM (m)	-3.00											
Surface Level	19.826 19.828 20.935	19.620 19.646 20.623	19.333 19.359 20.482	19.085 19.113 20.386	18.764 18.843 20.322	18.334 18.376 20.322	18.083 18.376 20.430	17.804 17.887 20.178	17.400 17.383 19.882	17.114 17.114 18.960	16.432 16.625 14.977	14.777 14.279 16.150
Hydraulic Grade Line	19.826 19.828 19.782	19.620 19.646 19.424	19.333 19.359 19.135	19.085 19.113 18.804	18.764 18.843 18.369	18.334 18.376 18.118	18.083 18.376 17.847	17.804 17.887 17.400	17.383 17.383 17.114	17.114 17.114 16.166	16.432 16.625 14.977	14.777 14.279 13.842
Invert Level	18.076 18.076 18.076	17.452 17.452 17.452	17.171 17.171 17.171	17.017 17.017 17.017	16.893 16.893 16.893	16.650 16.650 16.650	16.400 16.400 16.400	16.250 16.250 16.250	16.166 16.166 16.166	16.063 16.063 16.063	14.116 14.116 14.116	14.090 14.090 12.980
Depth to Invert	2.859 2.859 2.859	3.171 3.171 3.171	3.311 3.311 3.311	3.368 3.368 3.368	3.429 3.429 3.429	3.672 3.672 3.672	4.030 4.030 4.030	3.928 3.928 3.928	3.716 3.716 3.716	2.897 2.897 2.897	2.316 2.316 2.316	2.060 2.060 3.170
Chainages	312.382	62.44	4.02.910	15.36	12.39	4.42.658	11.46	4.54.122	14.43	8.41	4.76.966	10.26

LINE 1

LINE 2

LINE 3

LINE 4

					North
5	DOP COMMENTS	A.M	I.H	30.08.19	
3	CLIENT AMENDMENTS	A.M	I.H	25.03.19	
1	ORIGINAL ISSUE	A.M	I.H	27.02.19	
Amendment	Description	Drawn	App'd	Date	

Scale

0 10 20 30 40m

1:500 (A1)

1:1000 (A3)

0 2 4 6 8m

1:100 (A1)

1:200 (A3)

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Designed	Cad Reference
A.M	18280C dC221 r5
Scale	A1 SHEET
1:500H/1:100V	
Project Approval	
IAN HILL (B.E)	
Consulting Civil Engineer	

Client

GCA

ENGINEERING SOLUTIONS

A.B.N. 92 086 017 745

1 HARTLEY DRIVE, THORNTON NSW 2322

PO BOX 3337, THORNTON NSW 2322

PHONE: (02) 4964 1811

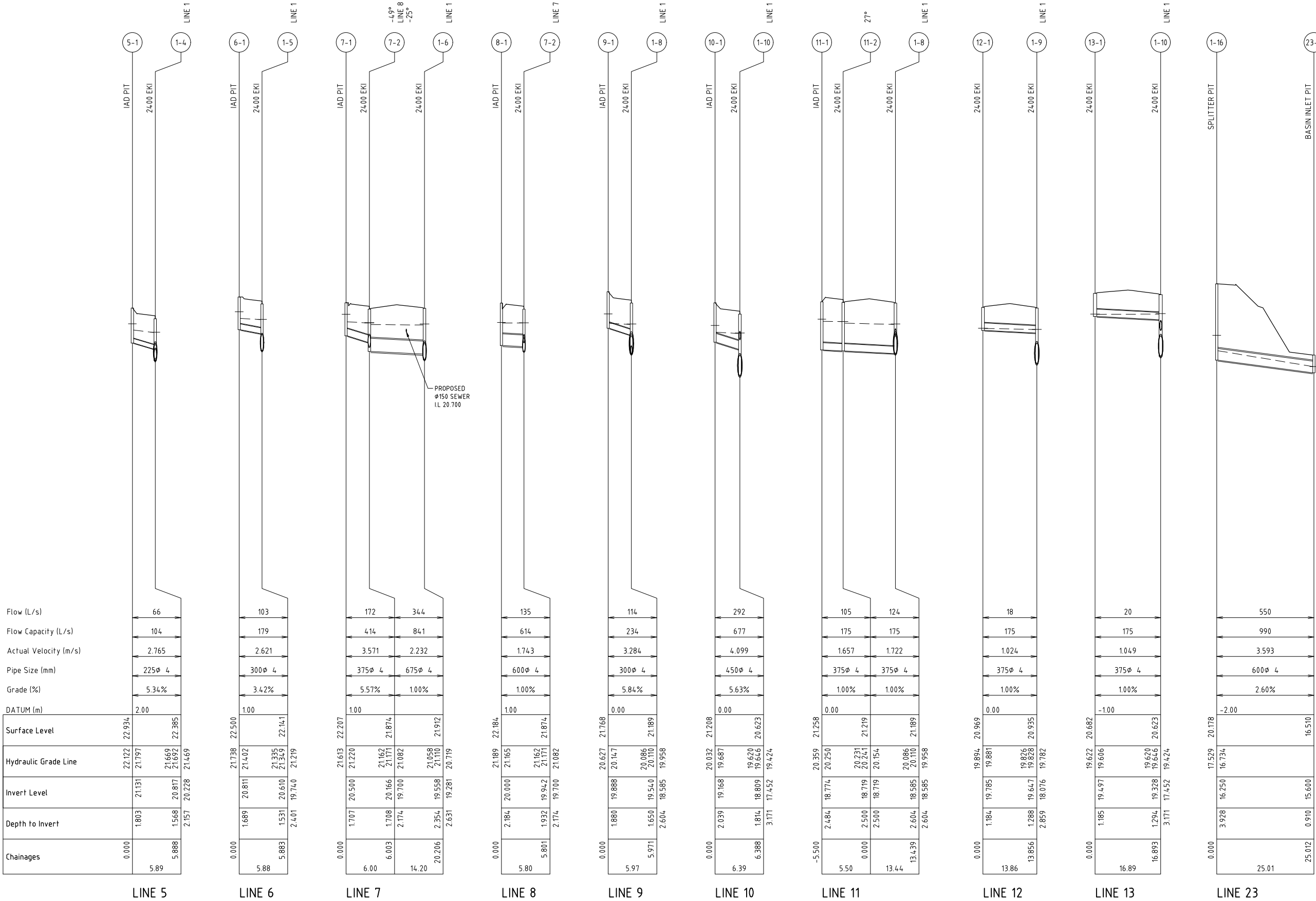
PROPOSED SUBDIVISION

FREEWAY NORTH BUSINESS PARK

STAGE 7

DRAINAGE LINES 1 (CONT.), 2, 3 & 4

Project No	18280C
Drawing No	C221
Revision	5



					North
5	DOP COMMENTS	A.M	I.H	30.08.19	
4	GPT AMENDMENTS	A.M	I.H	17.04.19	
3	CLIENT COMMENTS	A.M	I.H	25.03.19	
1	ORIGINAL ISSUE	A.M	I.H	27.02.19	
Amendment	Description	Drawn	App'd	Date	

Scale

0 10 20 30 40m

1:500 (A1)

1:1000 (A3)

0 2 4 6 8m

1:100 (A1)

1:200 (A3)

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Designed	Cad Reference
A.M	18280C dC222 r5
Scale	A1 SHEET
1:500H/1:100V	
Project Approval	
IAN HILL (B.E)	
Consulting Civil Engineer	

Client

GCA

ENGINEERING SOLUTIONS

A.B.N. 92 086 017 745

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PO BOX 3337, THORNTON NSW 2322

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PROPOSED SUBDIVISION

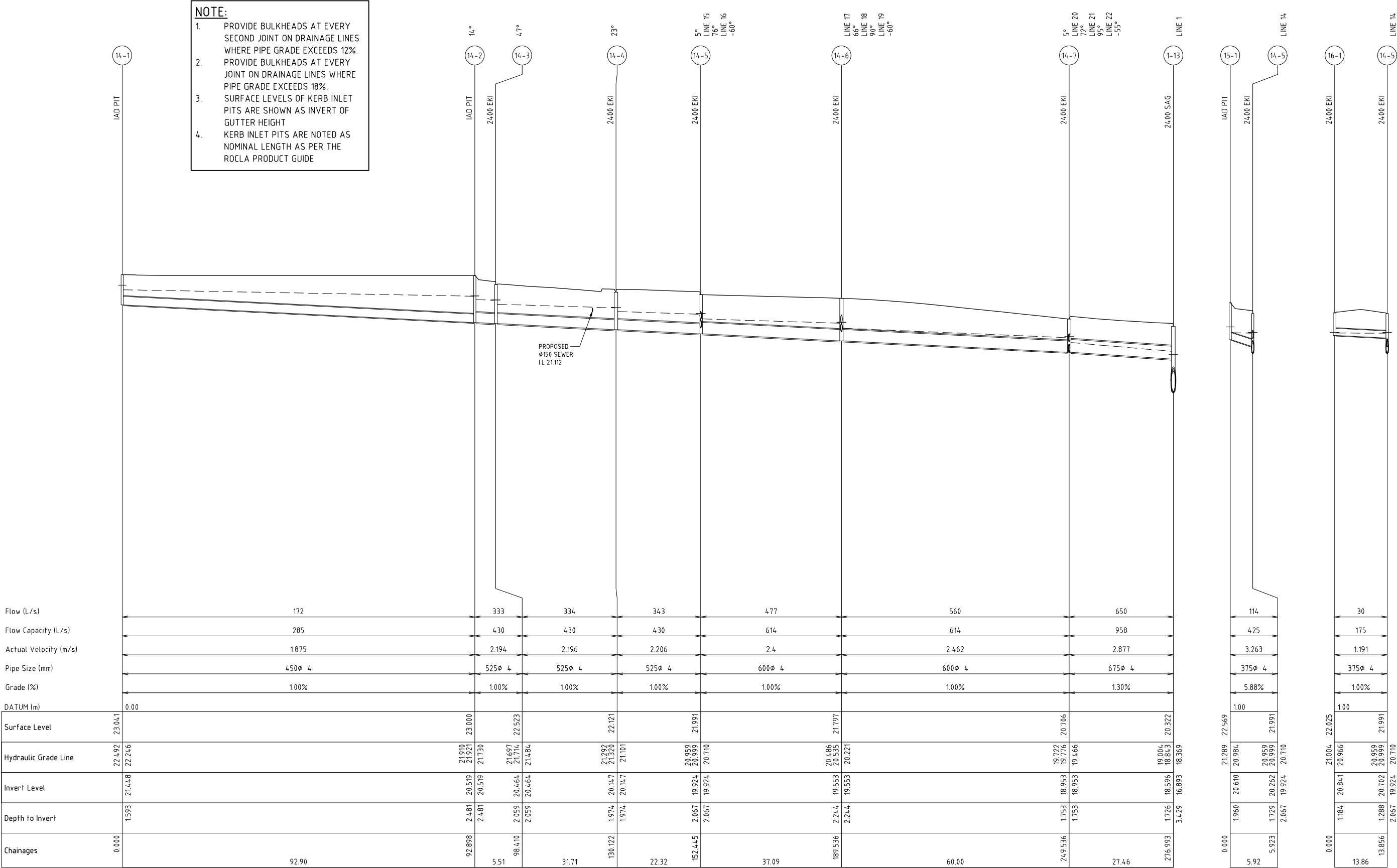
FREEWAY NORTH BUSINESS PARK

STAGE 7

DRAINAGE LINES 5, 6, 7, 8, 9, 10, 11, 12, 13 & 23

Project No	18280C
Drawing No	C222
Revision	5

- NOTE:
1. PROVIDE BULKHEADS AT EVERY SECOND JOINT ON DRAINAGE LINES WHERE PIPE GRADE EXCEEDS 12%.
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 3. SURFACE LEVELS OF KERB INLET PITS ARE SHOWN AS INVERT OF GUTTER HEIGHT
 4. KERB INLET PITS ARE NOTED AS NOMINAL LENGTH AS PER THE ROCLA PRODUCT GUIDE



LINE 14

LINE 15

LINE 16

5	DOP COMMENTS	A.M	I.H	30.08.19
3	CLIENT COMMENTS	A.M	I.H	25.03.19
1	ORIGINAL ISSUE	A.M	I.H	27.02.19

Amendment	Description	Drawn	App'd	Date
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North

0 10 20 30 40m
1:500 (A1) 1:1000 (A3)

0 2 4 6 8m
1:100 (A1) 1:200 (A3)

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Designed A.M	Cad Reference 18280C dC223 r5
Scale 1:500H/1:100V	A1 SHEET
Project Approval IAN HILL (B.E) Consulting Civil Engineer	

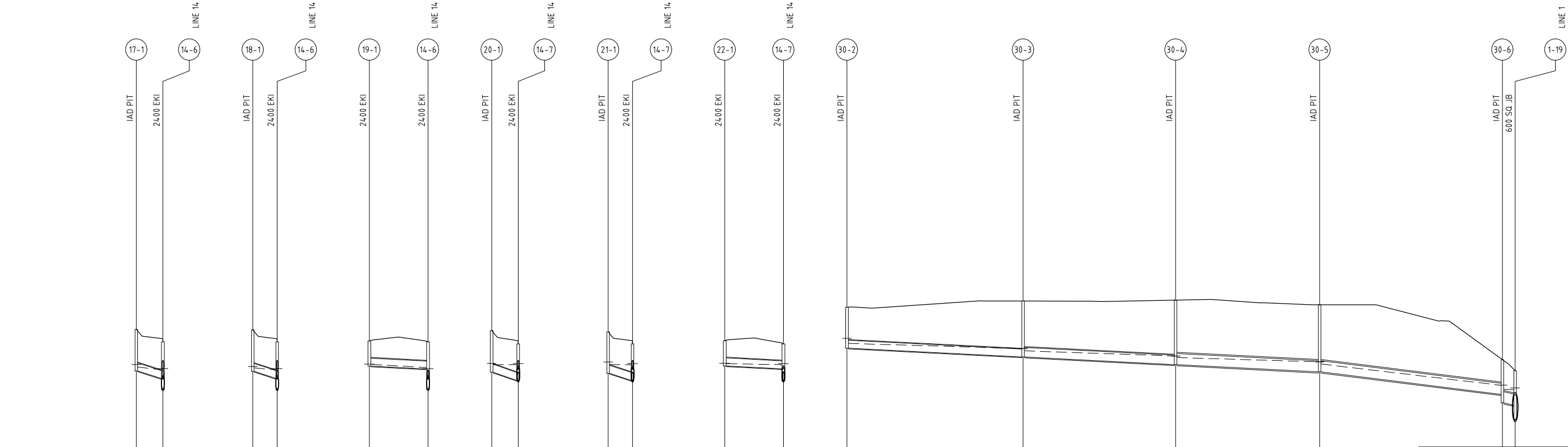
Client

GCA
ENGINEERING SOLUTIONS

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1 HARTLEY DRIVE, THORNTON NSW 2322
PO BOX 3337, THORNTON NSW 2322
PHONE: (02) 4964 1811

PROPOSED SUBDIVISION
FREEWAY NORTH BUSINESS PARK
STAGE 7
DRAINAGE LINE 14, 15 & 16

Project No 18280C
Drawing No C223
Revision 5



NOTE:

1. PROVIDE BULKHEADS AT EVERY SECOND JOINT ON DRAINAGE LINES WHERE PIPE GRADE EXCEEDS 12%.
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Flow (L/s)	64	49	13	44	64	22	95	174	244	295	372
Flow Capacity (L/s)	422	426	175	439	426	175	175	285	430	676	814
Actual Velocity (m/s)	2.751	2.563	0.938	2.548	2.773	1.079	1.619	1.882	2.049	3.016	3.673
Pipe Size (mm)	375ø 4	375ø 4	375ø 4	375ø 4	375ø 4	375ø 4	375ø 4	450ø 4	525ø 4	525ø 4	525ø 4
Grade (%)	5.79%	5.89%	1.00%	6.26%	5.89%	1.00%	1.00%	1.00%	1.00%	2.47%	3.58%
DATUM (m)	1.00	1.00	1.00	0.00	0.00	0.00	-3.00				
Surface Level	20.731 22.388	20.637 22.368	20.745 21.840	19.783 21.330	19.850 21.269	19.788 20.852	17.967 19.429		17.130 19.773	16.858 19.553	15.747 16.957
Hydraulic Grade Line	20.731 20.613	20.637 20.568	20.745 20.737	19.783 19.725	19.850 19.730	19.788 19.769	17.967 17.726		17.130 17.059	16.858 16.859	15.747 15.754
Invert Level	20.429 20.486	20.408 20.555	20.656 20.555	19.370 20.517	19.317 20.979	19.665 19.526	17.500 17.085		16.725 16.725	16.385 16.385	15.319 14.919
Depth to Invert	1.959 1.731	2.042 2.066	1.184 1.280	1.960 1.729	1.951 1.727	1.187 1.180	1.929 2.642		3.048 3.048	3.169 3.169	1.639 2.039
Chainages	0.000 6.27	0.000 5.75	0.000 13.86	0.000 6.27	0.000 5.75	0.000 13.86	41.53 36.00		77.534 34.00	111.534 43.14	154.671 3.00

LINE 17

LINE 18

LINE 19

LINE 20

LINE 21

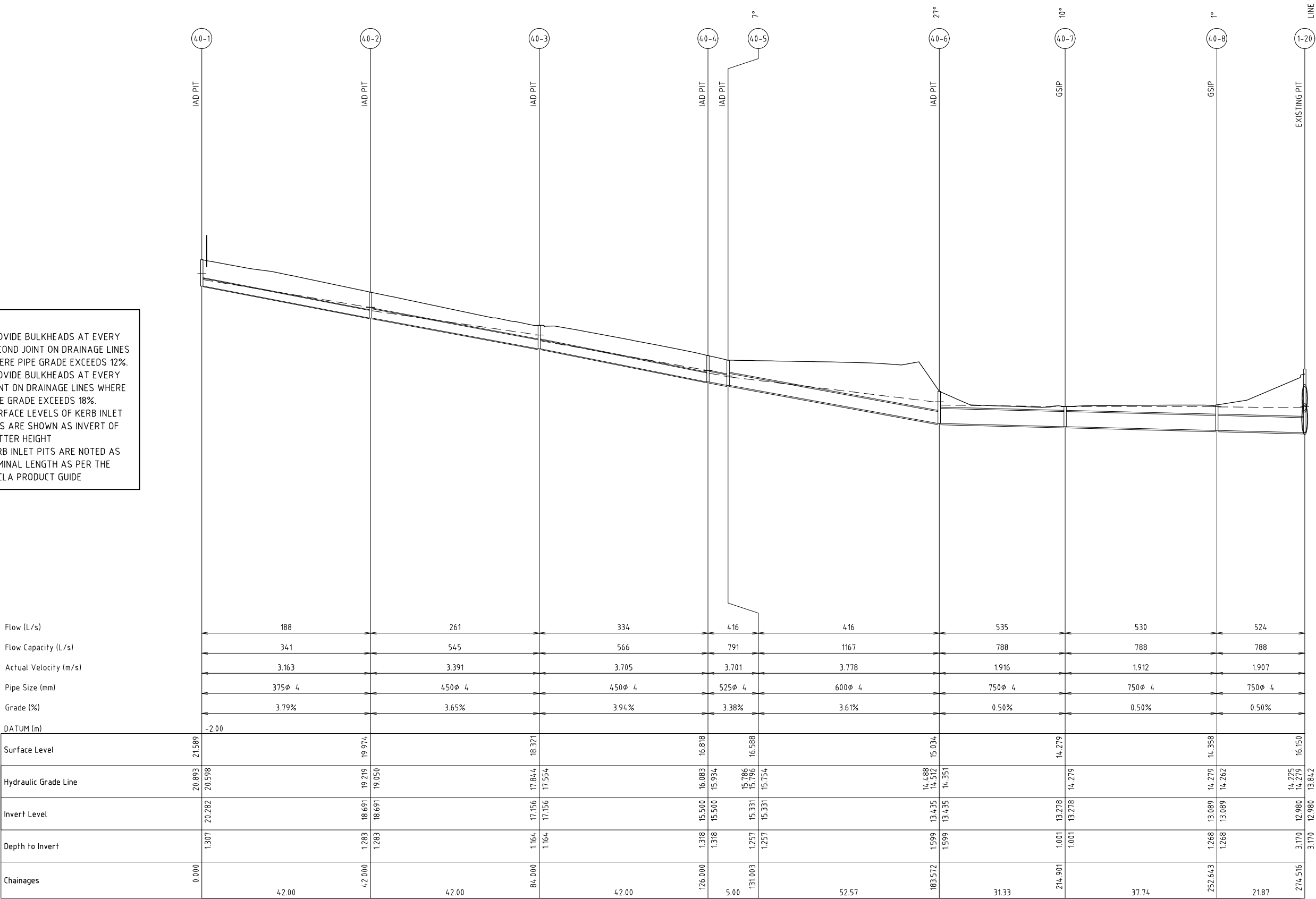
LINE 22

LINE 30

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										Scale 1:500H/1:100V	A1 SHEET	Project Approval IAN HILL (B.E) Consulting Civil Engineer				Drawing No C224	Revision 5
Amendment					Description	Drawn	App'd	Date									

PLOT DATE: 2/09/2019 3:54:25 PM CAD FILE: Q:\18\18280 FREEWAY NORTH BUSINESS PARK STAGE 7\02_CAD\AutoCAD\Civil\200 Series\18280C dC224 r5.dwg

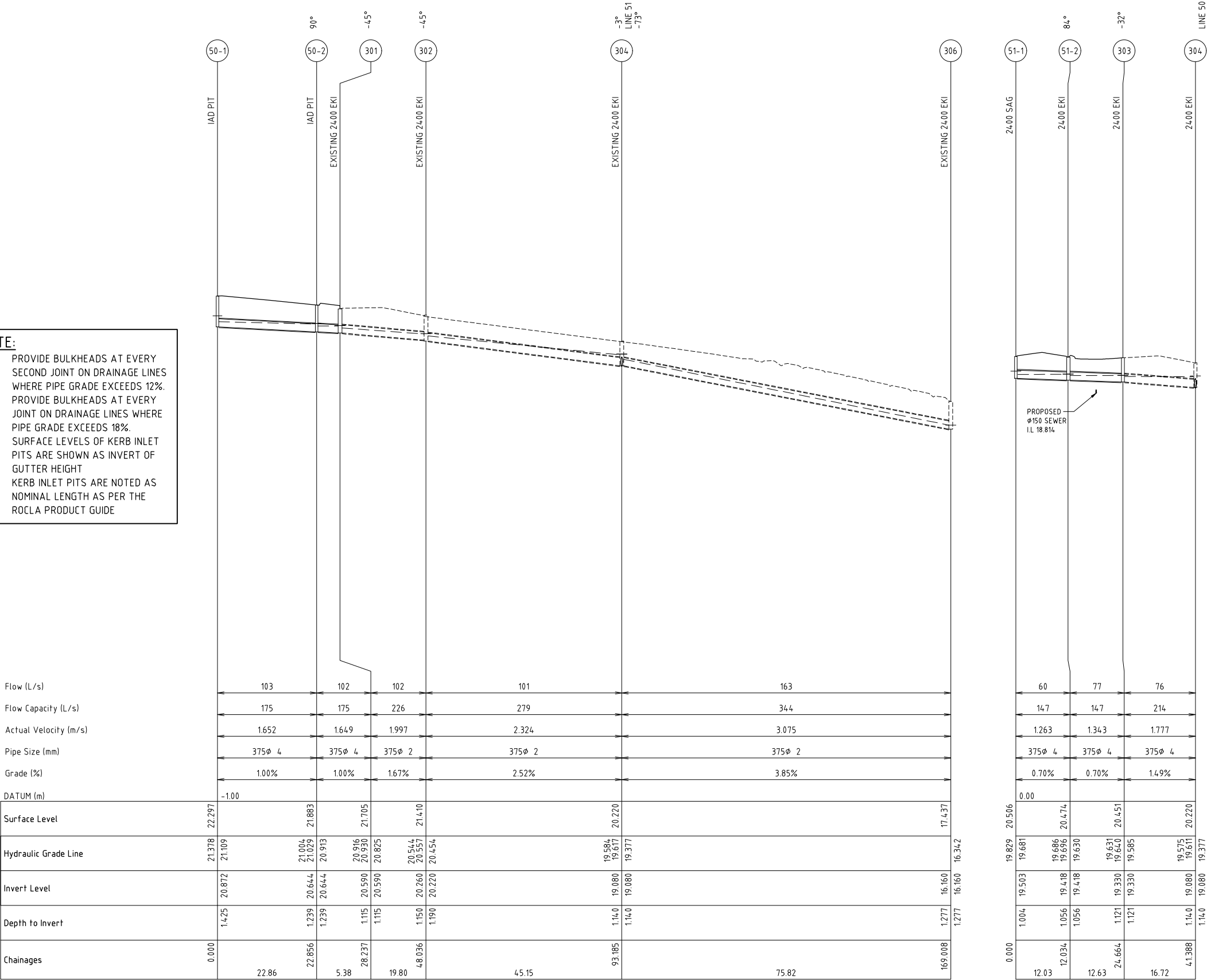
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 4. KERB INLET PITS ARE NOTED AS NOMINAL LENGTH AS PER THE ROCLA PRODUCT GUIDE



LINE 40

Amendment <table><tr><th>Description</th><th>Drawn</th><th>App'd</th><th>Date</th></tr><tr><td>5 DOP COMMENTS</td><td>A.M</td><td>I.H</td><td>30.08.19</td></tr><tr><td>3 CLIENT COMMENTS</td><td>A.M</td><td>I.H</td><td>25.03.19</td></tr><tr><td>1 ORIGINAL ISSUE</td><td>A.M</td><td>I.H</td><td>27.02.19</td></tr></table>					Description	Drawn	App'd	Date	5 DOP COMMENTS	A.M	I.H	30.08.19	3 CLIENT COMMENTS	A.M	I.H	25.03.19	1 ORIGINAL ISSUE	A.M	I.H	27.02.19	North		Scale		COPYRIGHT Copyright in the drawings, information and data recorded hereon is the property of Geoff Craig & Associates Pty Ltd and may not be used, copied or reproduced in whole or part for any purpose other than that for which it is supplied without the prior consent of Geoff Craig & Associates Pty Ltd.		Designed A.M Scale 1:500H/1:100V Project Approval IAN HILL (B.E) Consulting Civil Engineer		Cad Reference 18280C dC225 r5 A1 SHEET		Client		A.B.N. 92 086 017 745 1 HARTLEY DRIVE, THORNTON NSW 2322 PO BOX 3337, THORNTON NSW 2322 PHONE: (02) 4964 1811		PROPOSED SUBDIVISION FREEWAY NORTH BUSINESS PARK STAGE 7 DRAINAGE LINE 40		Project No 18280C Drawing No C225 Revision 5	
Description	Drawn	App'd	Date																																			
5 DOP COMMENTS	A.M	I.H	30.08.19																																			
3 CLIENT COMMENTS	A.M	I.H	25.03.19																																			
1 ORIGINAL ISSUE	A.M	I.H	27.02.19																																			

- NOTE:**
1. PROVIDE BULKHEADS AT EVERY SECOND JOINT ON DRAINAGE LINES WHERE PIPE GRADE EXCEEDS 12%.
 2. PROVIDE BULKHEADS AT EVERY JOINT ON DRAINAGE LINES WHERE PIPE GRADE EXCEEDS 18%.
 3. SURFACE LEVELS OF KERB INLET PITS ARE SHOWN AS INVERT OF GUTTER HEIGHT
 4. KERB INLET PITS ARE NOTED AS NOMINAL LENGTH AS PER THE ROCLA PRODUCT GUIDE



					North			COPYRIGHT Copyright in the drawings, information and data recorded hereon is the property of Geoff Craig & Associates Pty Ltd and may not be used, copied or reproduced in whole or part for any purpose other than that for which it is supplied without the prior consent of Geoff Craig & Associates Pty Ltd.		Designed A.M	Cad Reference 18280C dC226 r3	Client	 A.B.N. 92 086 017 745 1 HARTLEY DRIVE, THORNTON NSW 2322 PO BOX 3337, THORNTON NSW 2322 PHONE: (02) 4964 1811	PROPOSED SUBDIVISION FREEWAY NORTH BUSINESS PARK STAGE 7 DRAINAGE LINES 50 & 51		Project No 18280C	
									Scale 1:500H/1:100V	A1 SHEET				Drawing No C226	Revision 3		
									Project Approval IAN HILL (B.E) Consulting Civil Engineer								

Amendment

Description

Drawn

App'd

Date

3	CLIENT COMMENTS	A.M	I.H	25.03.19
1	ORIGINAL ISSUE	A.M	I.H	27.02.19

PLOT DATE: 2/09/2019 3:54:37 PM CAD FILE: Q:\18\18280 FREEWAY NORTH BUSINESS PARK STAGE 7\02_CAD\AutoCAD\Civil\200 Series\18280C dC226 r3.dwg

NETWORK 1 - HYDROLOGY

Minor 10 Year Storm Event																													
Pit Name	Catch ID	Tc Method	Catch Length	Catch Slope	Catch Retardanc	Time Tc	Intensity I	Runoff C	Area A	Full CA	Full Sum CA	Full Qc-CA	Partial Sum CA	Partial Qc-CA	Partial Sum CA	Catchment Flow Qc	Approach Flow Qc	Road Capacity	Flooded Depth	Flooded Width	Flooded Vel Dep	Road Grade	Road Xfall	Max Pond Depth	Inlet Curve Vel	Inlet Flow Qc	Bypass Pit		
(-)	(-)	(-)	(m)	(%)	(-)	(min)	(mm/hr)	(-)	(ha)	(ha)	(ha)	(L/s)	(ha)	(ha)	(L/s)	(L/s)	(L/s)	(L/s)	(m)	(m)	(sq.m/s)	(%)	(%)	(m)	(-)	(L/s)	(L/s)	(-)	
1-1	2P	Genietatic	135.00	0.5	0.060	19.78	89.45	0.43	0.1048	0.0447	0.8957	222.1	0.0447	0.8957	222.1	222.1	222.1									222.1	-		
1-2	1P	Direct	Genietatic	135.00	0.5	0.060	19.78	89.45	0.90	0.9333	0.8400												2.3	5.7		-1.2% Grade	1.9	1-3	
1-3	1P	Direct	Genietatic	60.00	0.5	0.011	6.00	149.00	0.43	0.0129	0.0055	0.0712	29.5	0.0055	0.0712	29.5	29.5	29.5	693.8	0.077	1.71	0.05	0.5	3.0		0.5% Grade	29.5	1-4	
1-4	1P	Genietatic	60.00	0.5	0.011	6.00	149.00	0.90	0.0730	0.0657																			
1-5	1P	Genietatic	30.00	0.5	0.011	6.00	149.00	0.43	0.0206	0.0021	0.0273	11.3	0.0021	0.0273	11.3	11.3	11.3	693.8	0.059	1.08	0.03	0.5	3.0			0.5% Grade	11.3	1-5	
1-6	1P	Genietatic	48.00	0.5	0.011	6.00	149.00	0.43	0.0280	0.0253																			
1-7	1P	Genietatic	30.00	0.5	0.011	6.00	149.00	0.43	0.0077	0.0033	0.0403	17.5	0.0033	0.0403	17.5	17.5	17.5	693.8	0.067	1.35	0.04	0.5	3.0			0.5% Grade	17.5	1-6	
1-8	1P	Genietatic	48.00	0.5	0.011	6.00	149.00	0.90	0.0434	0.0391																			
1-9	1P	Genietatic	30.00	0.5	0.011	6.00	149.00	0.43	0.0077	0.0031	0.0400	16.5	0.0031	0.0400	16.5	16.5	16.5	693.8	0.066	1.31	0.03	0.5	3.0			0.5% Grade	16.5	1-7	
1-10	1P	Direct	Genietatic	45.00	0.5	0.011	6.00	149.00	0.90	0.0410	0.0369																		
1-11	1P	Direct	Genietatic	45.00	0.5	0.011	6.00	149.00	0.43	0.0047	0.0020	0.0259	10.7	0.0020	0.0259	10.7	10.7	10.7	693.8	0.058	1.05	0.03	0.5	3.0			0.5% Grade	10.7	1-8
1-12	1P	Genietatic	51.00	0.5	0.011	6.00	149.00	0.43	0.0081	0.0035	0.0450	18.6	0.0035	0.0450	18.6	18.6	18.6	693.8	0.068	1.39	0.04	0.5	3.0			0.5% Grade	18.6	1-9	
1-13	1P	Genietatic	51.00	0.5	0.011	6.00	149.00	0.43	0.0078	0.0033	0.0433	17.9	0.0033	0.0433	17.9	17.9	17.9	693.8	0.067	1.36	0.04	0.5	3.0			0.5% Grade	17.9	10% LOST	
1-14	1P	Genietatic	50.00	0.5	0.011	6.00	149.00	0.90	0.0444	0.0400																			
1-15	1P	Genietatic	50.00	0.5	0.011	6.00	149.00	0.43	0.0079	0.0034	0.0437	18.1	0.0034	0.0437	18.1	18.1	18.1	693.8	0.067	1.37	0.04	0.5	3.0			0.5% Grade	18.1	1-11	
1-16	1P	Genietatic	50.00	0.5	0.011	6.00	149.00	0.90	0.0446	0.0400																			
1-17	1P	Genietatic	40.00	0.5	0.011	6.00	149.00	0.43	0.0063	0.0027	0.0347	14.4	0.0027	0.0347	14.4	14.4	14.4	693.8	0.063	1.22	0.03	0.5	3.0			0.5% Grade	14.4	1-12	
1-18	1P	Direct	Genietatic	40.00	0.5	0.011	6.00	149.00	0.90	0.0356	0.0320																		
1-19	1P	Direct	Genietatic	30.00	0.7	0.011	6.00	149.00	0.43	0.0026	0.0011	0.0144	6.0	0.0011	0.0144	6.0	6.0	6.0	772.7	0.046	0.64	0.02	0.6	3.0			0.5% Grade	6.0	1-13
1-20	1P	Direct	Genietatic	30.00	0.7	0.011	6.00	149.00	0.90	0.0149	0.0133																		
1-21	1P	Genietatic	30.00	0.7	0.011	6.00	149.00	0.43	0.0067	0.0029	0.0372	15.4	0.0029	0.0372	15.4	15.4	15.4	279.6	0.027						0.150	Inlet Cap.	15.4	1-14	
1-22	1P	Genietatic	80.00	0.5	0.011	6.00	149.00	0.43	0.0381	0.0343																			
1-23	1P	Genietatic	80.00	0.5	0.011	6.00	149.00	0.90	0.0198	0.0085	0.1097	45.4	0.0085	0.1097	45.4	45.4	45.4	279.6	0.052						0.150	Inlet Cap.	45.4	1-17	
1-24	1P	Genietatic	80.00	0.5	0.011	6.00	149.00	0.90	0.1124	0.1012																			
1-25																													
1-26																													
1-27																													
1-28																													
1-29																													
1-30																													
1-31	2P	Genietatic	120.00	0.5	0.060	18.08	93.75	0.43	0.0526	0.0224	0.4486	116.8	0.0224	0.4486	116.8	116.8	116.8										116.8	-	
1-32	2P	Genietatic	120.00	0.5	0.060	18.08	93.75	0.90	0.4735	0.4262																			
1-33	2P	Genietatic	120.00	0.5	0.011	6.00	149.00	0.43	0.0653	0.0279	0.5570	230.5	0.0279	0.5570	230.5	230.5	230.5										230.5	-	
1-34	2P	Genietatic	120.00	0.5	0.011	6.00	149.00	0.90	0.3079	0.5291																			
1-35	2P	Genietatic	90.00	0.5	0.011	6.00	149.00	0.43	0.0178	0.0095	0.0985	40.8	0.0095	0.0985	40.8	40.8	40.8	693.8	0.085	1.97	0.05	0.5	3.0			0.5% Grade	39.7	7-2	
1-36	4-1	2P	Genietatic	120.00	0.5	0.011	6.00	149.00	0.43	0.0632	0.0269	0.5385	222.9	0.0269	0.5385	222.9	222.9	222.9										222.9	-
1-37	5-1	2P	Genietatic	65.00	0.5	0.011	6.00	149.00	0.43	0.0187	0.0080																		
1-38	6-1	2P	Genietatic	75.00	0.5	0.011	6.00	149.00	0.43	0.0281	0.0125	0.2497	103.3	0.0125	0.2497	103.3	103.3	103.3											
1-39	7-1	2P	Genietatic	75.00	0.5	0.011	6.00	149.00	0.90	0.2635	0.2372																		
1-40	7-1	2P	Genietatic	85.00	0.5	0.011	6.00	149.00	0.43	0.0486	0.0207	0.4145	171.6	0.0207	0.4145	171.6	171.6	171.6										171.6	-
1-41	7-2	1P	Genietatic	105.00	0.5	0.011	6.00	149.00	0.43	0.0167	0.0071	0.0921	38.1	0.0071	0.0921	38.1	38.1	39.2	693.8	0.084	1.94	0.05	0.5	3.0			0.5% Grade	38.3	10% LOST
1-42	8-1	2P	Genietatic	105.00	0.5	0.011	6.00	149.00	0.90	0.0945	0.0850																		
1-43	8-1	2P	Genietatic	85.00	0.5	0.011	6.00	149.00	0.43	0.0384	0.0164	0.3272	135.4	0.0164	0.3272	135.4	135.4	135.4										135.4	-
1-44	9-1	2P	Genietatic	85.00	0.5	0.011	6.00	149.00	0.90	0.3454	0.3108																		
1-45	9-1	2P	Genietatic	80.00	0.5	0.011	6.00	149.00	0.43	0.0331	0.0138	0.2751	113.9	0.0138	0.2751	113.9	113.9	113.9										113.9	-
1-46	10-1	2P	Genietatic	170.00	0.5	0.060	23.52	81.97	0.43	0.1506	0.0643	1.2843	292.4	0.0643	1.2843	292.4	292.4	292.4										292.4	-
1-47	10-1	2P	Genietatic	170.00	0.5	0.060	23.52	81.97	0.90	1.5556	1.2200																		
1-48	11-1	1P	Genietatic	80.00	3.0	0.060	7.04	146.66	0.43	0.0314	0.0134	0.2678	104.6	0.0134	0.2678	104.6	104.6	104.6										104.6	-
1-49	11-1	1P	Genietatic	80.00	3.0	0.060	7.04	146.66	0.90	0.3827	0.2544																		
1-50	11-2	1P	Genietatic	60.00	0.5	0.011	6.00	149.00	0.43	0.0099																			

NETWORK 1 - HYDROLOGY

Major 100 Year Storm Event

Name	Arch	Tc Method	Catch Length	Catch Slope	Catch Reluctant/C	Time (min)	Intensity (mm/hr)	Runoff C	Area (ha)	Full C (ha)	Full Sum C (ha)	Full Qc (L/s)	Partial C (ha)	Partial Sum C (ha)	Partial Qc (L/s)	Curbside Flow Qc (L/s)	Approach Flow Qc (L/s)	Road Capacity (L/s)	Flooded Depth (m)	Flooded Width (m)	Flooded Vel Dep (sq.m/s)	Road Grade (%)	Road Xfall (%)	Max Pond Depth (m)	Check Gate Factor	Inlet Curve Flow Qc (L/s)	Inlet Flow Qc (L/s)	Bypass Flow Qc (L/s)	Bypass Flow Qc (L/s)	
(-)	(-)	(-)	(m)		(-)	(min)	(mm/hr)	(-)	(ha)	(ha)	(ha)	(L/s)	(ha)	(ha)	(L/s)	(L/s)	(L/s)	(L/s)	(m)	(m)	(sq.m/s)	(%)	(%)	(m)	(-)	(-)	(L/s)	(L/s)	(L/s)	(-)
1-1	2P	Kinematic	135.00	0.5	0.060	16.37	143.53	0.51	0.1048	0.0537	0.9970	397.5	0.0537	0.9970	397.5	397.5	397.5									397.5	-			
2P		Kinematic	135.00	0.5	0.060	16.37	143.53	0.51	0.9433	0.9433																				
1-2	1P	Direct		0.0		6.00	218.00	0.51	0.0008	0.0004	0.0052	3.1	0.0004	0.0052	3.1	3.1	3.1					2.3	5.7	0.00	-2% Grade	2.5	0.6	1-3		
2P		Direct		0.0		6.00	218.00	0.51	0.0048	0.0048																				
1-3	1P	Kinematic	60.00	0.5	0.011	6.00	218.00	0.51	0.0219	0.0066	0.0796	48.2	0.0066	0.0796	48.2	48.2	698.8	0.090	2.12	0.06	0.5	3.0	0.00	5% Grade	-270.0	319.1	1-4			
2P		Kinematic	60.00	0.5	0.011	6.00	218.00	0.51	0.0730	0.0730																				
1-4	1P	Kinematic	30.00	0.5	0.011	6.00	218.00	0.51	0.0049	0.0025	0.0305	18.5	0.0025	0.0305	18.5	18.5	337.6	698.8	0.166	5.43	0.17	0.5	3.0	0.00	5% Grade	-36.7	374.3	1-5		
2P		Kinematic	30.00	0.5	0.011	6.00	218.00	0.51	0.0280	0.0280																				
1-5	1P	Kinematic	48.00	0.5	0.011	6.00	218.00	0.51	0.0077	0.0039	0.0473	28.7	0.0039	0.0473	28.7	28.7	403.0	698.8	0.176	6.15	0.18	0.5	3.0	0.47	5% Grade	111.2	291.8	1-6		
2P		Kinematic	48.00	0.5	0.011	6.00	218.00	0.51	0.0434	0.0434																				
1-6	1P	Kinematic	45.00	0.5	0.011	6.00	218.00	0.51	0.0072	0.0037	0.0447	27.1	0.0037	0.0447	27.1	27.1	318.9	698.8	0.163	5.20	0.16	0.5	3.0	0.80	5% Grade	160.7	198.1	1-7		
2P		Kinematic	45.00	0.5	0.011	6.00	218.00	0.51	0.0410	0.0410																				
1-7	1P	Direct		0.0		6.00	218.00	0.51	0.0647	0.0244	0.0289	17.5	0.0289	17.5	17.5	175.7	698.8	0.132	3.55	0.12	0.5	3.0	0.00	5% Grade	-244.9	400.6	1-8			
2P		Direct		0.0		6.00	218.00	0.51	0.0265	0.0265																				
1-8	1P	Kinematic	51.00	0.5	0.011	6.00	218.00	0.51	0.0081	0.0042	0.0503	30.4	0.0042	0.0503	30.4	30.4	451.0	698.8	0.182	6.61	0.19	0.5	3.0	0.00	5% Grade	-207.7	248.4	1-9		
2P		Kinematic	51.00	0.5	0.011	6.00	218.00	0.51	0.0461	0.0461																				
1-9	1P	Kinematic	50.00	0.5	0.011	6.00	218.00	0.51	0.0081	0.0042	0.0484	29.3	0.0042	0.0484	29.3	29.3	777.7	698.8	0.155	4.61	0.15	0.5	3.0	0.00	5% Grade	145.8	131.9	1-10		
2P		Kinematic	50.00	0.5	0.011	6.00	218.00	0.51	0.0444	0.0444																				
1-10	1P	Kinematic	50.00	0.5	0.011	6.00	218.00	0.51	0.0079	0.0041	0.0489	29.6	0.0041	0.0489	29.6	29.6	29.6	698.8	0.078	1.72	0.05	0.5	3.0	0.00	5% Grade	-401.3	430.9	1-11		
2P		Kinematic	50.00	0.5	0.011	6.00	218.00	0.51	0.0448	0.0448																				
1-11	1P	Kinematic	40.00	0.5	0.011	6.00	218.00	0.51	0.0077	0.0039	0.0388	23.5	0.0039	0.0388	23.5	23.5	454.4	698.8	0.182	6.64	0.19	0.5	3.0	0.00	5% Grade	203.6	290.2	1-12		
2P		Kinematic	40.00	0.5	0.011	6.00	218.00	0.51	0.0356	0.0356																				
1-12	1P	Direct		0.0		6.00	218.00	0.51	0.0026	0.0013	0.0161	9.8	0.0013	0.0161	9.8	9.8	260.6	772.7	0.145	3.96	0.16	0.6	3.0	0.80	5% Grade	139.3	121.3	1-13		
2P		Direct		0.0		6.00	218.00	0.51	0.0148	0.0148																				
1-13	1P	Kinematic	30.00	0.7	0.011	6.00	218.00	0.51	0.0067	0.0034	0.0416	25.2	0.0034	0.0416	25.2	25.2	390.6	139.8	0.150				0.150	0.50	Inlet Caps	139.8	230.8	1-14		
2P		Kinematic	30.00	0.7	0.011	6.00	218.00	0.51	0.0381	0.0381																				
1-14	1P	Kinematic	80.00	0.5	0.011	6.00	218.00	0.51	0.0188	0.0102	0.1226	74.2	0.0102	0.1226	74.2	74.2	341.2	139.8	0.150				0.150	0.50	Inlet Caps	139.8	201.4	1-17		
2P		Kinematic	80.00	0.5	0.011	6.00	218.00	0.51	0.1124	0.1124																				
1-15																										0.0	-			
1-16																										0.0	-			
1-17																										201.4	-			
1-18																										0.0	-			
1-19																										0.0	-			
1-20																										0.0	-			
1-21																										0.0	-			
2-1	2P	Kinematic	120.00	0.5	0.060	15.03	148.88	0.51	0.0536	0.0269	0.5005	207.0	0.0269	0.5005	207.0	207.0	207.0									207.0	-			
2P		Kinematic	120.00	0.5	0.060	15.03	148.88	0.51	0.4735	0.4735																				
3-1	2P	Kinematic	120.00	0.5	0.011	6.00	218.00	0.51	0.0453	0.0247	0.6213	376.3	0.0247	0.6213	376.3	376.3	376.3									376.3	-			
2P		Kinematic	120.00	0.5	0.011	6.00	218.00	0.51	0.5879	0.5879																				
3-2	1P	Kinematic	90.00	0.5	0.011	6.00	218.00	0.51	0.0178	0.0091	0.1101	66.7	0.0091	0.1101	66.7	66.7	66.7	698.8	0.098	2.42	0.07	0.5	3.0	0.00	5% Grade	-294.1	380.8	7-2		
2P		Kinematic	90.00	0.5	0.011	6.00	218.00	0.51	0.1010	0.1010																				
4-1	2P	Kinematic	75.00	0.5	0.011	6.00	218.00	0.51	0.0452	0.0247	0.6007	363.8	0.0247	0.6007	363.8	363.8	363.8									363.8	-			
2P		Kinematic	75.00	0.5	0.011	6.00	218.00	0.51	0.5684	0.5684																				
5-1	2P	Kinematic	65.00	0.5	0.011	6.00	218.00	0.51	0.0187	0.0096	0.1781	107.8	0.0096	0.1781	107.8	107.8	107.8									107.8	-			
2P		Kinematic	65.00	0.5	0.011	6.00	218.00	0.51	0.1685	0.1685																				
6-1	2P	Kinematic	75.00	0.5	0.011	6.00	218.00	0.51	0.0393	0.0217	0.2785	168.7	0.0217	0.2785	168.7	168.7	168.7									168.7	-			
2P		Kinematic	75.00	0.5	0.011	6.00	218.00	0.51	0.2635	0.2635																				
7-1	2P	Kinematic	110.00	0.5	0.011	6.00	218.00	0.51	0.0486	0.0249	0.4624	280.0	0.0249	0.4624	280.0	280.0	280.0									280.0	-			
2P		Kinematic	110.00	0.5	0.011	6.00	218.00	0.51	0.4376	0.4376																				
7-2	1P	Kinematic	105.00	0.5	0.011	6.00	218.00	0.51	0.0147	0.0074	0.1030	62.4	0.0074	0.1030	62.4	62.4	423.1	698.8	0.178	6.35	0.18	0.5	3.0	0.00	5% Grade	-234.4	637.6	10ST		
2P		Kinematic	105.00	0.5	0.011	6.00	218.00	0.51	0.0945	0.0945																				
8-1	2P	Kinematic	85.00	0.5	0.011	6.00	218.00	0.51	0.0384	0.0196	0.3650	221.0	0.0196	0.3650	221.0	221.0	221.0									221.0	-			
2P		Kinematic	85.00	0.5	0.011	6.00	218.00	0.51	0.3454	0.3454																				
9-1	2P	Kinematic	80.00	0.5	0.011	6.00	218.00	0.51	0.0365	0.0185	0.3069	185.9	0.0185	0.3069	185.9	185.9	185.9									185.9	-			
2P		Kinematic	80.00	0.5	0.011	6.00	218.00	0.51	0.2904	0.2904																				
10-1	2P	Kinematic	170.00	0.5	0.060	19.42	132.34	0.51	0.1506	0.0771	1.4327	526.7	0.0771	1.4327	526.7	526.7	526.7									526.7	-			
2P		Kinematic	170.00	0.5	0.060	19.42	132.34	0.51	1.3556	1.3556																				
11-1	1P	Kinematic	90.00	3.0	0.060	6.00	218.00	0.51	0.0114	0.0161	0.2988	180.9	0.0161	0.2988	180.9															

NETWORK 2 - HYDROLOGY

Major 100 Year Storm Event

[illegible]

NETWORK 2 - HYDRAULICS

Abstract

Pipe Length	Pipe Size	Full Pipe Area (m ²)	Pipe Grade	Pipe Grade	Full-area Tect	Full-area Tect	Full-area Sum	Full-area Q-Cia	Full-area Tect	Part-area Sum	Part-area Sum	Part-area Q-Cia	Catchment Flow	Direct Flow	Peak Flow	Pipe Flow	Capacity Flow	Q/Capac	Full Pipe	No
(m)	(mm)	(sq.m)	(%)	(1:10)	(mm/h)	(mm/h)	(ha)	(mm)	(mm)	(ha)	(ha)	(mm)	(l/s)	(l/s)	(l/s)	(l/s)	(l/s)	(%)	(m/s)	(V=V2/V1)
22.86	375	0.11	1	100	8.7	189	0.3101	162.8	8.7	189	0.3101	162.8	162.8	162.8	162.8	162.8	175.4	0.93	1.47	
5.38	300	0.11	1	100	8.89	182	0.3101	161.2	8.89	182	0.3101	161.2	161.2	161.2	161.2	161.2	174.4	0.92	1.46	
19.8	375	0.11	1.67	60	8.94	186.65	0.3101	160.8	8.94	186.65	0.3101	160.8	160.8	160.8	20	180.8	160.8	226.5	0.71	1.46
45.15	375	0.11	2.52	39.6	9.1	185.2	0.3101	159.5	9.1	185.2	0.3101	159.5	159.5	159.5	48	159.5	159.5	278.7	0.57	1.44
75.92	375	0.11	3.85	26	9.48	182.19	0.4269	234.3	6.34	231.3	0.3599	207.9	234.3	75	309.3	234.3	344.2	0.74	2.3	
17.02	375	0.11	1.67	60	9.18	186.18	0.3101	161.8	9.18	186.18	0.3101	161.8	161.8	161.8	161.8	161.8	174.4	0.92	1.46	
28.27	375	0.11	1.18	84.5	6.1	218.6	0.1629	91.6	6	218	0.1599	91.4	91.6	91.9	91.9	111.9	180.9	0.59	1.01	

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	Scale	A1 SHEET	
	Project Approval IAN HILL (B.E) Consulting Civil Engineer		

 A.B.N. 92 086 017 745 1 HARTLEY DRIVE, THORNTON NSW 2322 PO BOX 3337, THORNTON NSW 2322 PHONE: (02) 4964 1811	PROPOSED SUBDIVISION FREEWAY NORTH BUSINESS PARK STAGE 7 Q100 DRAINAGE CALCULATIONS	Project No 18280C	
		Drawing No C228	Revision 5

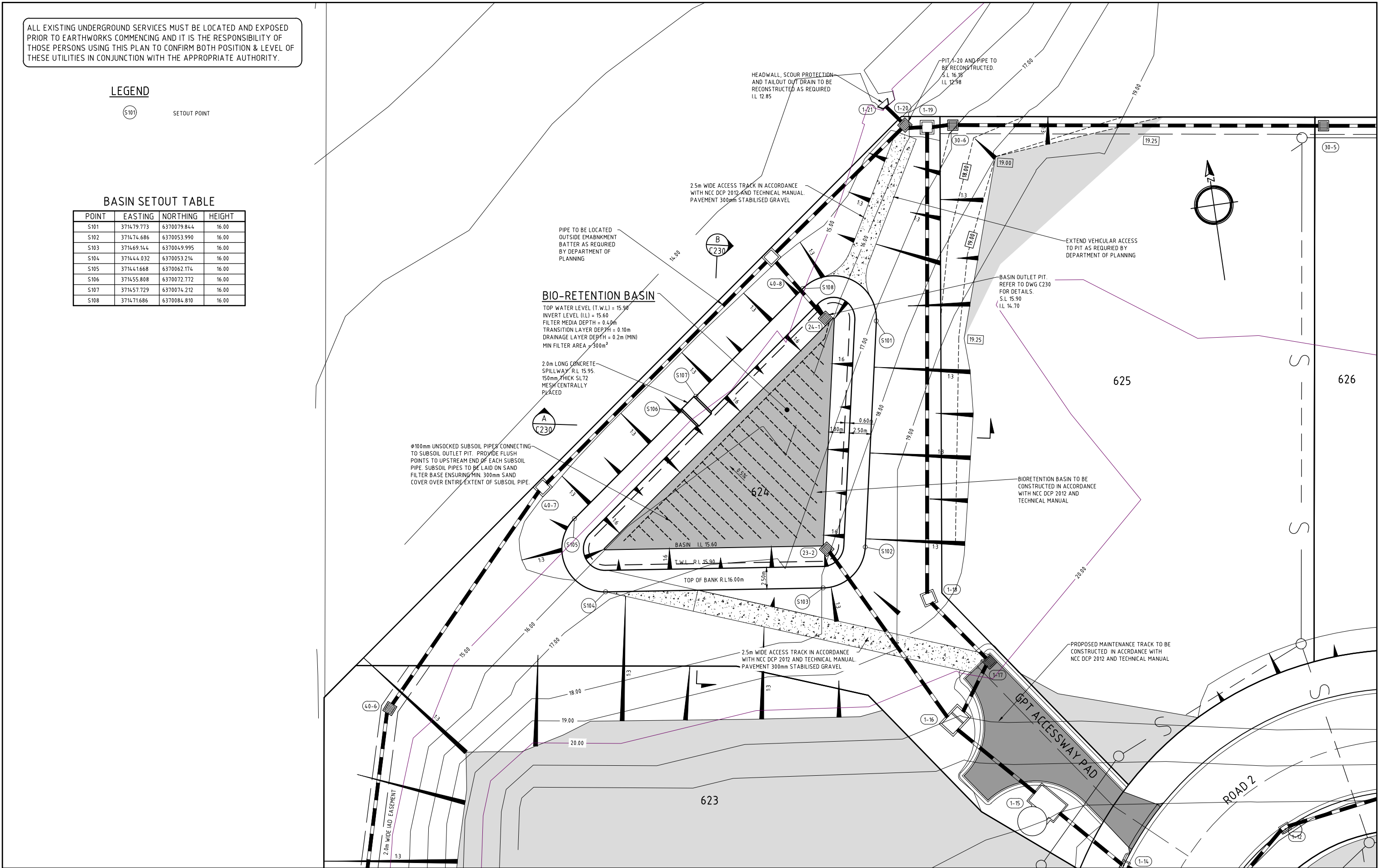
ALL EXISTING UNDERGROUND SERVICES MUST BE LOCATED AND EXPOSED PRIOR TO EARTHWORKS COMMENCING AND IT IS THE RESPONSIBILITY OF THOSE PERSONS USING THIS PLAN TO CONFIRM BOTH POSITION & LEVEL OF THESE UTILITIES IN CONJUNCTION WITH THE APPROPRIATE AUTHORITY.

LEGEND

(S101) SETOUT POINT

BASIN SETOUT TABLE

POINT	EASTING	NORTHING	HEIGHT
S101	3714.79.773	6370079.844	16.00
S102	3714.74.686	6370053.990	16.00
S103	3714.69.144	6370049.995	16.00
S104	3714.44.032	6370053.214	16.00
S105	3714.41.668	6370062.174	16.00
S106	3714.55.808	6370072.772	16.00
S107	3714.57.729	6370074.212	16.00
S108	3714.71.686	6370084.810	16.00



					North
					Scale
					0 4 8 12 16m
					1:200 (A1) 1:400 (A3)
5	DOP COMMENTS	A.M	I.H	30.08.19	
4	GPT AMENDMENTS	A.M	I.H	17.04.19	
1	ORIGINAL ISSUE	A.M	I.H	27.02.19	
Amendment	Description	Drawn	App'd	Date	

PLOT DATE: 2/09/2019 3:54:58 PM CAD FILE: Q:\18\18280 FREEWAY NORTH BUSINESS PARK STAGE 7\02_CAD\AutoCAD\Civil\200 Series\18280C dC229 r5.dwg

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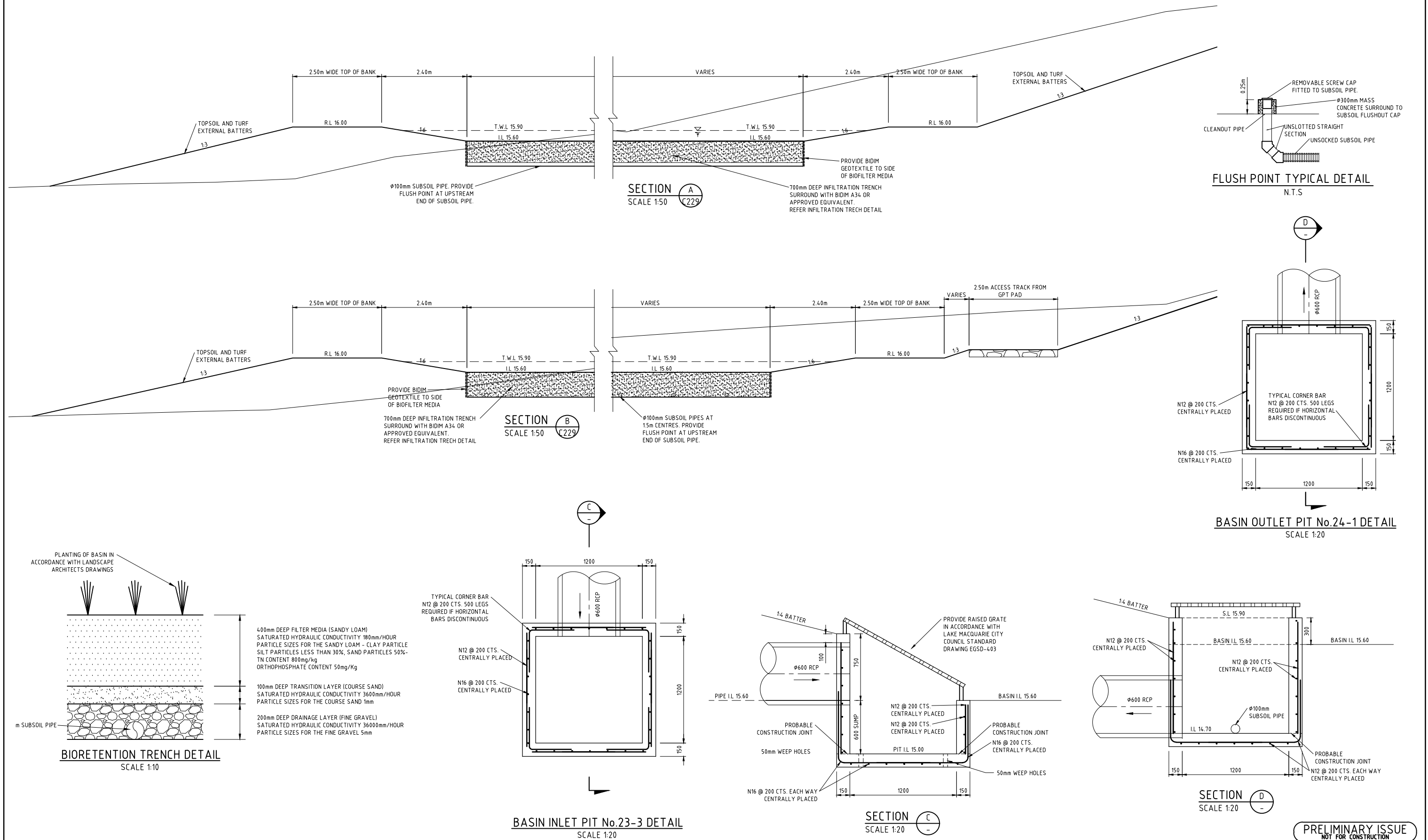
Designed A.M	Cad Reference 18280C dC229 r5
Scale 1:200	A1 SHEET
Project Approval IAN HILL (B.E) Consulting Civil Engineer	

Client

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PHONE: (02) 4964 1811

PROPOSED SUBDIVISION
FREEWAY NORTH BUSINESS PARK
STAGE 7
BASIN DETAIL PLAN

Project No 18280C	Drawing No C229	Revision 5
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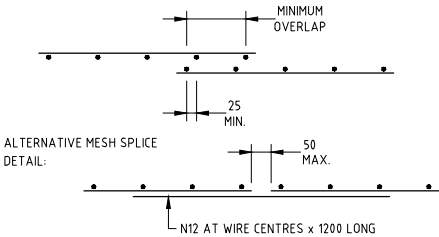
							COPYRIGHT Copyright in the drawings, information and data recorded hereon is the property of Geoff Craig & Associates Pty Ltd and may not be used, copied or reproduced in whole or part for any purpose other than that for which it is supplied without the prior consent of Geoff Craig & Associates Pty Ltd.	Designed	Cad Reference	Client	 A.B.N. 92 086 017 745 1 HARTLEY DRIVE, THORNTON NSW 2322 PO BOX 3337, THORNTON NSW 2322 PHONE: (02) 4964 1811	PROPOSED SUBDIVISION FREEWAY NORTH BUSINESS PARK		Project No			
												A.M	18280C dC230 r4		18280C		
												Scale	A1 SHEET				
												Project Approval IAN HILL (B.E) Consulting Civil Engineer					
4	GPT AMENDMENTS				A.M	L.H	17.04.19							Drawing No		Revision	
1	ORIGINAL ISSUE				A.M	L.H	27.02.19							C230		4	
Amendment	Description				Drawn	App'd	Date										

REINFORCED CONCRETE

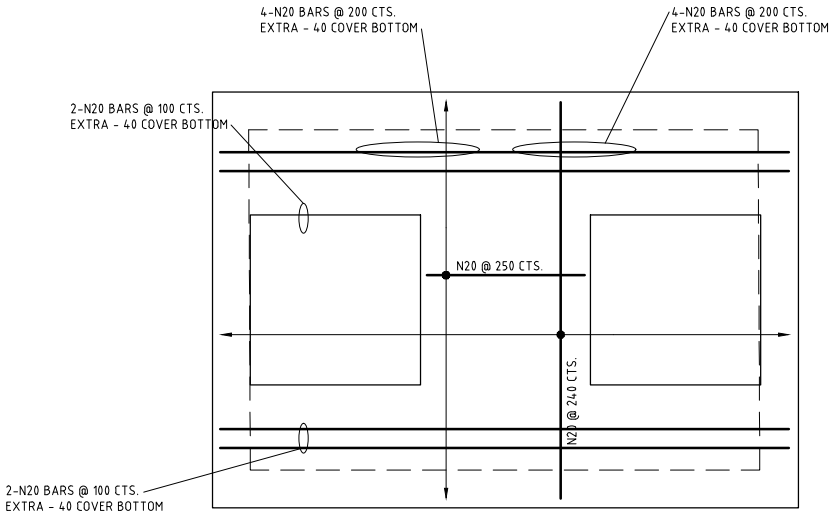
- C1. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH AS3600 CURRENT EDITION WITH AMENDMENTS, EXCEPT WHERE VARIED BY THE CONTRACT DOCUMENTS.
- C2. CONCRETE COMPONENTS AND QUALITY SHALL BE AS FOLLOWS:
- | ELEMENT | SLUMP
mm | MAX. SIZE
AGG. mm | CEMENT
TYPE | F'c AT 28
DAYS - MPa | ADMIXTURE |
|----------|-------------|----------------------|----------------|-------------------------|-----------|
| ALL, UNO | 80 | 20 | GP | 32 | - |
| PIT LID | 80 | 20 | GP | 40 | - |
- C3. MINIMUM CLEAR CONCRETE COVER TO REINFORCEMENT INCLUDING TIES AND STIRRUPS SHALL BE AS FOLLOWS UNO.

ELEMENT	CAST AGAINST FORMS COMPLYING WITH CURRENT SAA CODE		NO FORM WORK mm
	IN SHELTERED LOCATION mm	EXPOSED TO GROUND OR WEATHER mm	
PAD FOOTINGS	-	65	75
STRIP FOOTINGS	-	50	65
COLUMNS	40	50	75
WALLS	20	40	65
BEAMS	25	40	65
SLABS	20	40	65

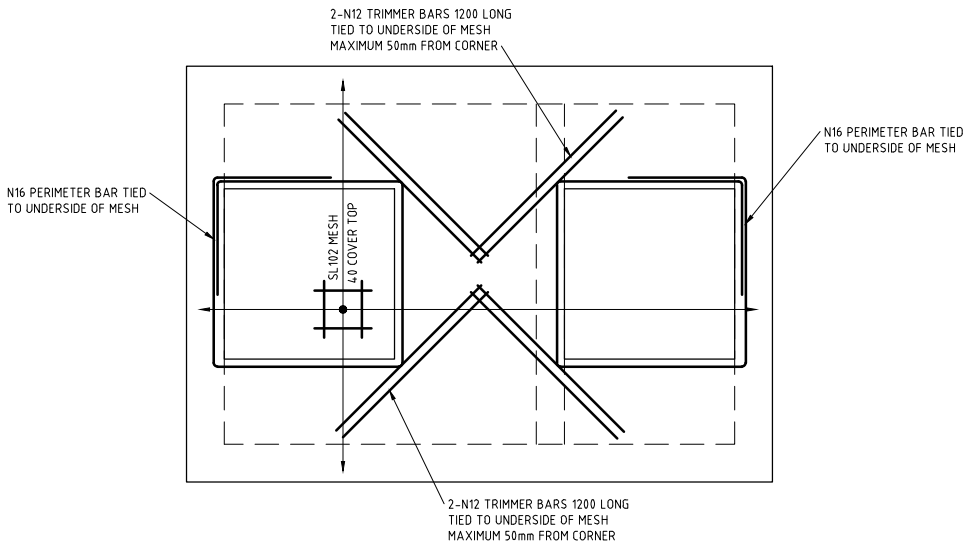
- C4. COVER TO REINFORCEMENT SHALL BE OBTAINED BY THE USE OF APPROVED BAR CHAIRS. ALL CHAIRS SHALL BE SPACED AT 1000 CTS MAXIMUM.
- C5. ALL CONCRETE SHALL BE MECHANICALLY VIBRATED. VIBRATORS SHALL NOT BE USED TO SPREAD CONCRETE.
- C6. SIZES OF CONCRETE ELEMENTS DO NOT INCLUDE THICKNESS OF APPLIED FINISHES.
- C7. NO HOLES OR CHASES OTHER THAN THOSE SHOWN ON THE STRUCTURAL DRAWINGS SHALL BE MADE IN CONCRETE MEMBERS WITHOUT THE PRIOR APPROVAL OF THE ENGINEER.
- C8. CONSTRUCTION JOINTS WHERE NOT SHOWN SHALL BE LOCATED TO APPROVAL OF THE ENGINEER. ALL CONSTRUCTION JOINTS SHALL BE SCABBLED OVER THE WHOLE FACE AND ANY UNSOUND MATERIAL REMOVED.
- C9. REINFORCEMENT IS REPRESENTED DIAGMAMATIC ALLY; IT IS NOT NECESSARILY SHOWN IN TRUE PROJECTION.
- C10. SPLICES IN REINFORCEMENT SHALL BE MADE ONLY IN THE POSITIONS SHOWN OR AS APPROVED BY THE ENGINEER. WHERE THE LAP LENGTH IS NOT SHOWN IT SHALL BE SUFFICIENT TO DEVELOP THE FULL STRENGTH OF THE REINFORCEMENT AS SPECIFIED IN AS3600. COGS AND HOOKS SHALL BE STANDARD UNLESS SHOWN OTHERWISE.
- C11. WELDING OF REINFORCEMENT WILL NOT BE PERMITTED UNLESS SHOWN ON THE STRUCTURAL DRAWINGS OR APPROVED BY THE ENGINEER.
- C12. PIPES OR CONDUITS SHALL NOT BE PLACED WITHIN THE CONCRETE COVER TO REINFORCEMENT WITHOUT THE APPROVAL OF THE ENGINEER.
- C13. REINFORCEMENT SYMBOLS:
N - DENOTES GRADE 500N HIGH STRENGTH DEFORMED BARS TO AS4671.
R - DENOTES GRADE 250R HOT ROLLED PLAIN BARS TO AS4671.
SL - DENOTES HARD-DRAWN WIRE REINFORCING MESH TO AS4671.
LTM - DENOTES HARD-DRAWN WIRE TRENCH MESH TO AS 4671.
- C14. ALL REINFORCING MESH SHALL COMPLY WITH AS4671 AND SHALL BE SUPPLIED IN FLAT SHEETS.
- C15. SPLICES IN MESH: THE OUTERMOST TRANSVERSE WIRES SHALL BE OVERLAPPED BY AT LEAST THE SPACING OF THESE TRANSVERSE WIRES PLUS 25 mm



- C16. EXPOSED CORNERS SHALL BE 20 mm CHAMFERED UNO.
- C17. ALL REINFORCEMENT SHALL BE INSPECTED BY THE SUPERINTENDENT OR ENGINEER PRIOR TO PLACING CONCRETE.
- C18. ALL SLAB CONCRETE TO BE CURED IN AN APPROVED MANNER FOR A MINIMUM OF 7 DAYS
- C19. ALL FORM WORK AND PROPS FOR SLABS AND BEAMS SHALL BE REMOVED BEFORE CONSTRUCTION OF ANY MASONRY WALLS OR PARTITIONS ON THE FLOOR
- C20. SLAB AND FOUNDATIONS TO BE CAST ON A NATURAL COMPACTED SUB GRADE OR APPROVED COMPACTED FILL, (COMPACTION TO BE TO A MINIMUM OF 98% STANDARD DRY DENSITY TO A.S. 1289 5.1.1, HAVING:
- A CBR NOT LESS THAN 10.
- A SAFE BEARING CAPACITY OF NOT LESS THAN 250 kPa.
SITE TO BE CONFIRMED AS MEETING THESE DESIGN REQUIREMENTS UNO.
- C21. ALL ABBREVIATIONS ARE IN ACCORDANCE WITH AS1100.

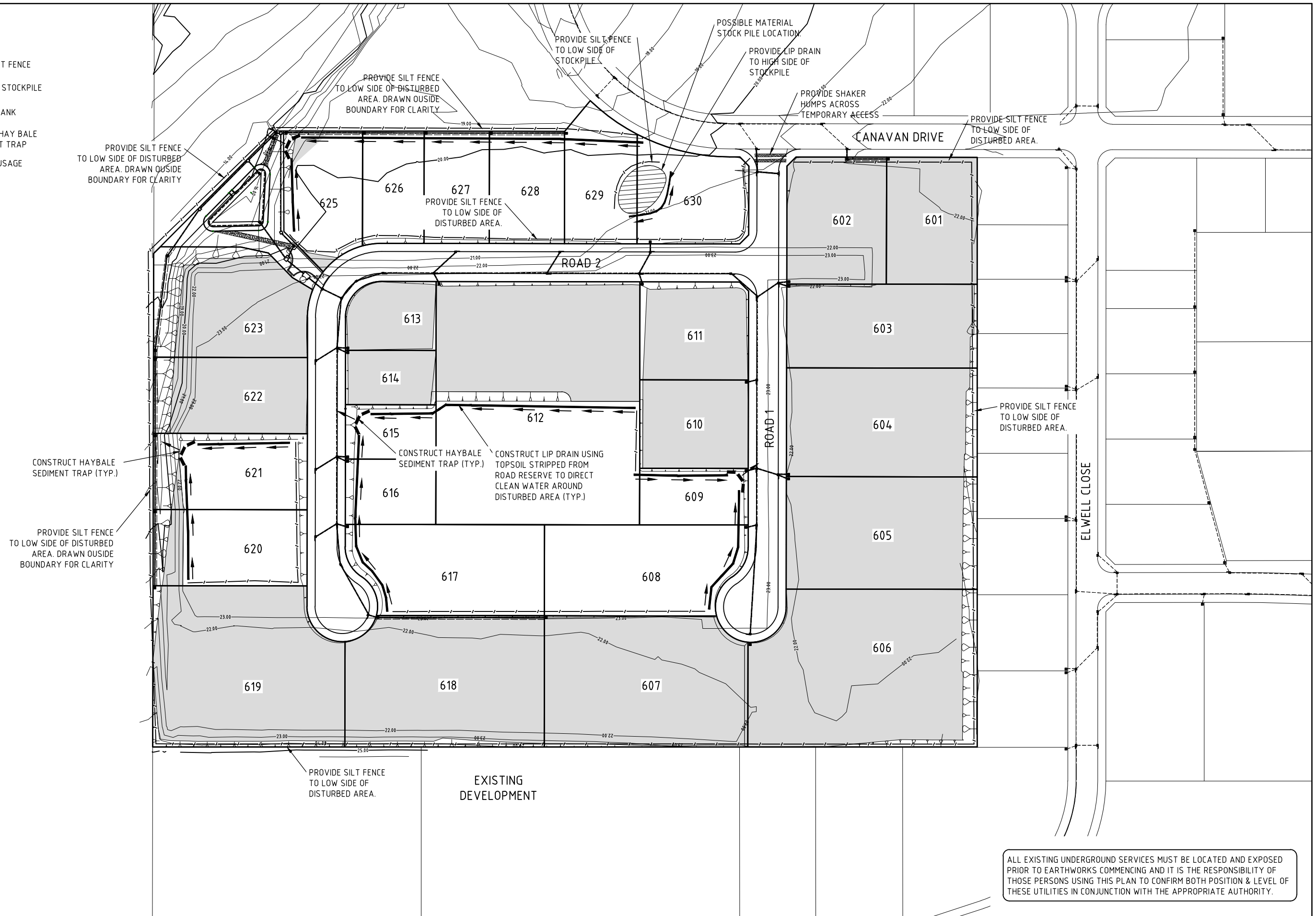


SPLITTER PIT LID - BOTTOM REINFORCEMENT LAYOUT
SCALE 1:20

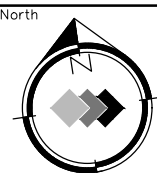


SPLITTER PIT LID - TOP REINFORCEMENT LAYOUT
SCALE 1:20

						North	Scale	COPYRIGHT Copyright in the drawings, information and data recorded hereon is the property of Geoff Craig & Associates Pty Ltd and may not be used, copied or reproduced in whole or part for any purpose other than that for which it is supplied without the prior consent of Geoff Craig & Associates Pty Ltd.	Designed S.M	Cad Reference 18280C dC233 r5	Client	 A.B.N. 92 086 017 745 1 HARTLEY DRIVE, THORNTON NSW 2322 PO BOX 3337, THORNTON NSW 2322 PHONE: (02) 4964 1811	PROPOSED SUBDIVISION FREEWAY NORTH BUSINESS PARK STAGE 7 SPLITTER PIT 1-15 DETAILS (2 OF 2)		Project No 18280C	
									Scale	A1 SHEET				Drawing No C233	Revision 5	
5	DOP COMMENTS		A.M	I.H	30.08.19				Project Approval IAN HILL (B.E) Consulting Civil Engineer							
3	CLIENT COMMENTS		A.M	I.H	25.03.19											
1	ORIGINAL ISSUE		A.M	I.H	27.02.19											
Amendment	Description	Drawn	App'd	Date												



5	DOP COMMENTS	A.M	I.H	30.08.19
4	GPT AMENDMENT	A.M	I.H	17.04.19
1	ORIGINAL ISSUE	A.M	I.H	27.02.19
Amendment	Description	Drawn	App'd	Date



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Project No	
18280C	
Drawing No	Revision
C231	E

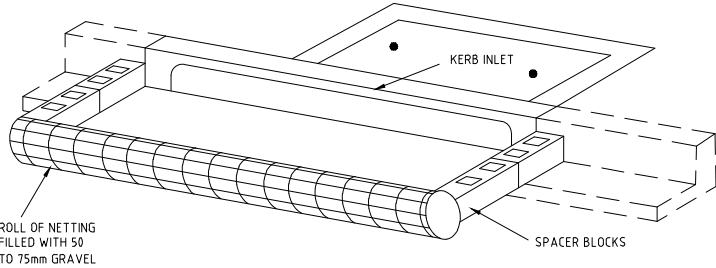
SOIL & WATER MANGEMENT NOTES

- EROSION CONTROL DEVICES AND SILTATION TRAPS TO BE INSTALLED BEFORE SITE IS DISTURBED IN ACCORDANCE WITH N.S.W. DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT GUIDELINES AND APPROVED BY COUNCIL INSPECTOR.
- THE SOIL AND WATER MANAGEMENT PLAN DRAWING SHALL BE READ IN CONJUNCTION WITH THESE NOTES AND ANY OTHER PLANS OR NOTES ISSUED BY GCA OR THE PRINCIPAL CERTIFYING AUTHORITY.
- CONTRACTORS WILL ENSURE THAT ALL SOIL AND WATER MANAGEMENT WORKS ARE UNDERTAKEN IN ACCORDANCE WITH:
 - THESE NOTES
 - SOIL AND WATER MANAGEMENT PLAN DRAWING
 - THE GUIDELINES OUTLINED IN MANAGING URBAN STORMWATER: SOILS AND CONSTRUCTION (LANDCOM, 2004, OTHERWISE KNOWN AS 'THE BLUE BOOK')
 - NEWCASTLE CITY COUNCIL REQUIREMENTS FOR EROSION AND SEDIMENT CONTROL
 - OTHER NOTES, PLANS AND INSTRUCTIONS THAT MAY BE ISSUED BY THE PRINCIPAL CERTIFYING AUTHORITY.
- ALL SUBCONTRACTORS SHALL BE INFORMED OF THEIR RESPONSIBILITIES TO MINIMISE THE POTENTIAL FOR SOIL EROSION AND POLLUTION OF SURFACE WATER AND GROUNDWATER DURING CONSTRUCTION.
- ALL PERIMETER AND CONTROL MEASURES ARE TO BE PLACED PRIOR TO OR AS THE FIRST STEP IN EARTHWORKS AND/OR CLEARING.
- VEHICULAR ACCESS TO THE SITE SHALL ONLY BE OBTAINED THROUGH CONSTRUCTED STABILISED SITE ACCESS POINT AS IDENTIFIED ON THE EROSION AND SEDIMENT CONTROL PLAN DRAWING.
- ADDITIONAL STABILISED ACCESS POINTS MAY BE CONSTRUCTED WITH APPROVAL SOUGHT FROM THE PRINCIPAL CERTIFYING AUTHORITY IF NECESSARY.
- SILT TO BE REMOVED FROM TEMPORARY SEDIMENT CONTROL BASINS AS DIRECTED BY COUNCIL INSPECTOR OR DEPARTMENT OF LAND AND WATER CONSERVATION REPRESENTATIVE TO MAINTAIN SILTATION STORAGE CAPACITY IN TEMPORARY BASINS.
- FILTRATION BUFFER ZONES ARE TO BE FENCED OFF AND ACCESS PROHIBITED TO ALL PLANT AND MACHINERY.
- HAY BALE BARRIERS AND GEOFABRIC FENCES ARE TO BE CONSTRUCTED TO THE OF BATTER PRIOR TO COMMENCEMENT OF EARTHWORKS IMMEDIATELY AFTER CLEARING OF VEGETATION BEFORE REMOVAL OF TOPSOIL.
- SANDBAGS TO BE USED DURING ROAD CONSTRUCTION TO DIVERT STORMWATER INTO PITS WHEN SUBGRADE IS UP TO KERB LEVEL.
- ALL TEMPORARY EARTH BERMS, DIVERSION AND SILT DAM EMBANKMENTS ARE TO BE MACHINE COMPACTED, SEEDED & MULCHED FOR TEMPORARY VEGETATION COVER AS SOON AS THEY HAVE BEEN FORMED.
- CLEAN WATER IS TO BE DIVERTED AWAY FROM DISTURBED GROUND AND INTO DRAINAGE SYSTEM.
- ALL SEDIMENT TRAPPING STRUCTURES AND DEVICES ARE TO BE INSPECTED AFTER STORMS FOR STRUCTURAL DAMAGE OR CLOGGING. TRAPPED MATERIAL IS TO BE REMOVED TO A SAFE APPROVED LOCATION.
- ALL TOPSOIL IS TO BE STOCKPILED ON SITE FOR RE-USE (AWAY FROM TREES AND DRAINAGE LINES). MEASURES SHALL BE APPLIED TO PREVENT EROSION OF THE STOCKPILES.
- ALL FILLS ARE TO BE LEFT WITH A LIP AT THE TOP OF THE SLOPE AT THE END OF EACH DAYS EARTHWORKS. THE HEIGHT OF THE LIP SHALL BE A MINIMUM OF 200mm.
- ALL CUT AND FILL SLOPES ARE TO BE SEEDED AND MULCHED WITHIN 10 DAYS OF COMPLETION OF FORMATION.
- UNDERSCRUBBING OF VEGETATION TO BE RESTRICTED TO SLASHING TO MINIMISE SOIL DISTURBANCE.
- UPON COMPLETION OF ALL EARTHWORKS OR AS DIRECTED BY COUNCIL, SOIL CONSERVATION TREATMENTS SHALL BE APPLIED TO RENDER AREAS THAT HAVE BEEN DISTURBED, EROSION PROOF WITHIN 14 DAYS.
- DENUDED AREAS TO BE STRIP TURFED OR HYDROMULCH SEEDED WITH THE SEED MIX BELOW OR APPROVED BY DEPARTMENT OF LAND AND WATER CONSERVATION REPRESENTATIVE, WITHIN 14 DAYS OF PRACTICAL COMPLETION OF EARTHWORKS. STRIPS ARE TO BE PLACED ACROSS THE CONTOUR AT RIGHT ANGLES TO THE DIRECTION OF SLOPE.

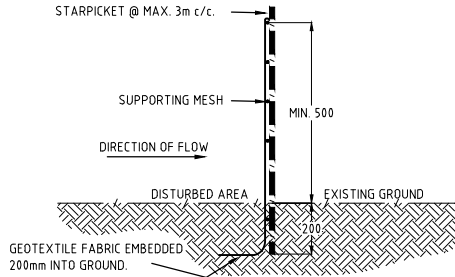
HYDROMULCH SEEDMIXES

SUMMER MIX		AUTUMN MIX	
MATERIAL	APPLICATION RATE	MATERIAL	APPLICATION RATE
JAPANESE MILLET	30 Kg/Ha	OATS	20 Kg/Ha
COUCH	10 Kg/Ha	RYE GRASS	10 Kg/Ha
CARPET GRASS	10 Kg/Ha	RED CLOVER	5 Kg/Ha
HAIFA WHITE CLOVER	5 Kg/Ha	WHITE CLOVER	5 Kg/Ha
BINDER	200 l/Ha	COUCH	10 Kg/Ha
PULP	1000 Kg/Ha	FERTILISER ENRICHER	300 Kg/Ha
FERTILISER	300 Kg/Ha	OR	
		DYNAMIC LIFTER	1000Kg/Ha

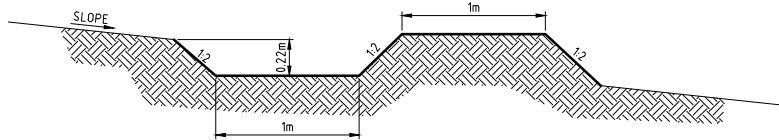
- THE AREA OVER ALL STORMWATER AND SEWER LINES NOT WITHIN ROAD RESERVES IS TO BE MULCHED AND SEEDED WITHIN 14 DAYS AFTER BACKFILL.
- ALL DISTURBED AREAS ARE TO BE GRASSED/RE-VEGETATED WITHIN 14 DAYS OF DISTURBANCE IF NO WORK IS TO OCCUR IN THAT ARE WITHIN THE NEXT 14 DAYS.
- AREAS OVER ELECTRICITY, TELEPHONE AND GAS SUPPLY TRENCHES ARE TO BE SEEDED AND MULCHED BY THE RELEVANT AUTHORITY WITHIN 14 DAYS AFTER BACKFILL.
- ALL FOOTPATHS, BERMS AND BATTERS AND SITE REGRADING AREAS ARE TO BE TOPSOILED WITH MINIMUM 75mm OF SELECTED SITE TOPSOIL AND GRASSED.
- STRIPS OF TURF ARE TO BE PLACED IMMEDIATELY BEHIND THE KERB AND GUTTER ON ALL NEW ROADS AND AT LOCATIONS AS DETERMINED BY COUNCIL'S SUPERVISING OFFICER.
- ALL FINAL EROSION PREVENTION MEASURES INCLUDING THE ESTABLISHMENT OF GRASSING ARE TO BE COMPLETED PRIOR TO THE SUBDIVISION FINAL INSPECTION. ALL EROSION DEVICES ARE TO BE MAINTAINED UNTIL THE END OF THE MAINTENANCE PERIOD.
- PROVIDE RETURNS TO SILT FENCE AT 20m INTERVALS.



SEDIMENT BARRIER OF STORMWATER PITS
N.T.S.



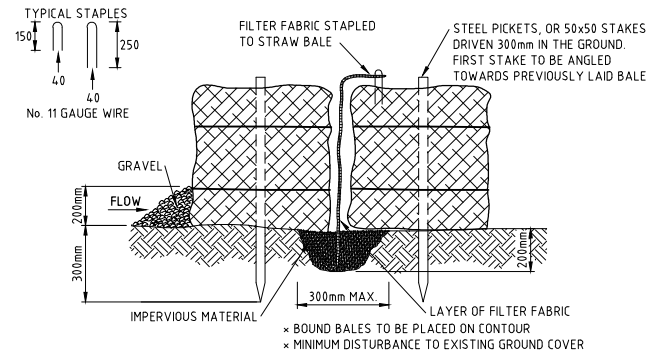
SEDIMENT FENCE
N.T.S.



EARTH BANK
N.T.S.

TYPICAL CONSTRUCTION SCHEDULE

	WEEK							
	1	2	3	4	5	6	7	8
CONSTRUCT ALL TEMPORARY SEDIMENT BASINS								
PLACE SILT FENCE ALONG ROAD BOUNDARIES AS SHOWN								
PLACE SILT FENCE BELOW AREAS TO BE REGRADED								
CONSTRUCT ALL DIVERSION BANKS CATCHING CLEAN WATER								
ROAD CONSTRUCTION AND REGRADING								
PLACE SILT FENCE AROUND TOPSOIL STOCKPILES								
PLACE SEDIMENT BARRIERS AROUND STORMWATER PITS AT COMPLETION OF DRAINAGE								
PLACE STRIP TURF PARALLEL TO DESIGN CONTOURS ALONG ROAD AS SHOWN								



HAY BALE DETAIL
N.T.S.

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																Drawing No C235	Revision 1	
1	ORIGINAL ISSUE																	
Amendment	Description																	