

PROPOSED SUBDIVISION

CANAVAN DRIVE
BERESFIELD

FREEWAY NORTH BUSINESS PARK - STAGE 7

NEWCASTLE CITY COUNCIL

DRAWING SCHEDULE

DWG No.	SHEET TITLE	REV
C200	COVER SHEET	6
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)	6
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	6
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
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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	6
C235	EROSION AND SEDIMENTATION CONTROL DETAILS	1



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PRELIMINARY ISSUE
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DWG C205

DWG C202

CANAVAN DRIVE

ROAD 2

ROAD 1

ELWELL CLOSE

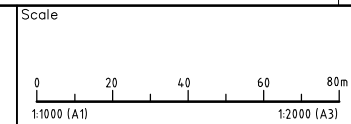
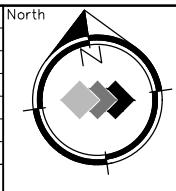
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DWG C204

DWG C203

PRELIMINARY ISSUE
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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

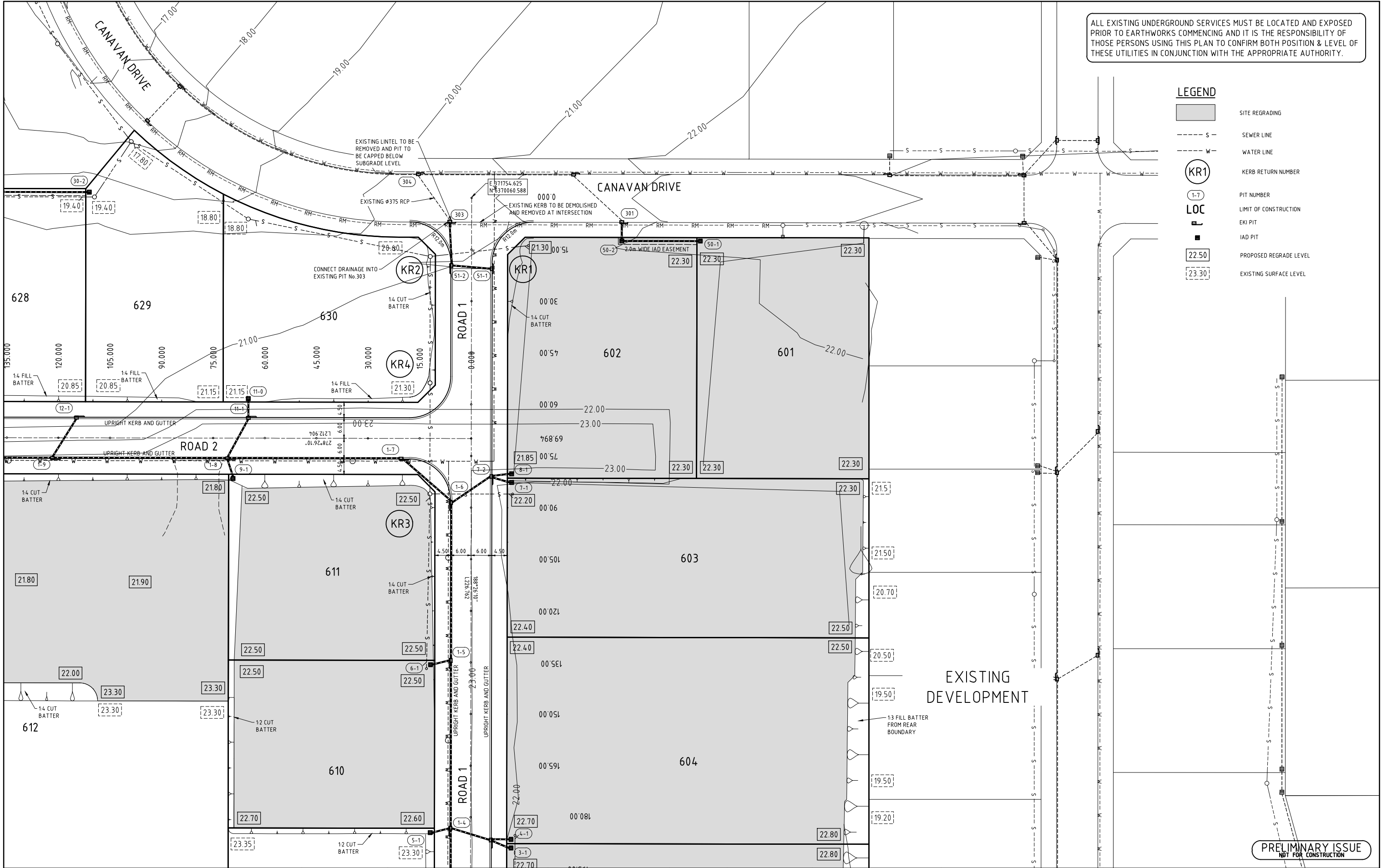


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PROPOSED SUBDIVISION
FREEWAY NORTH BUSINESS PARK
STAGE 7
GENERAL ARRANGEMENT PLAN

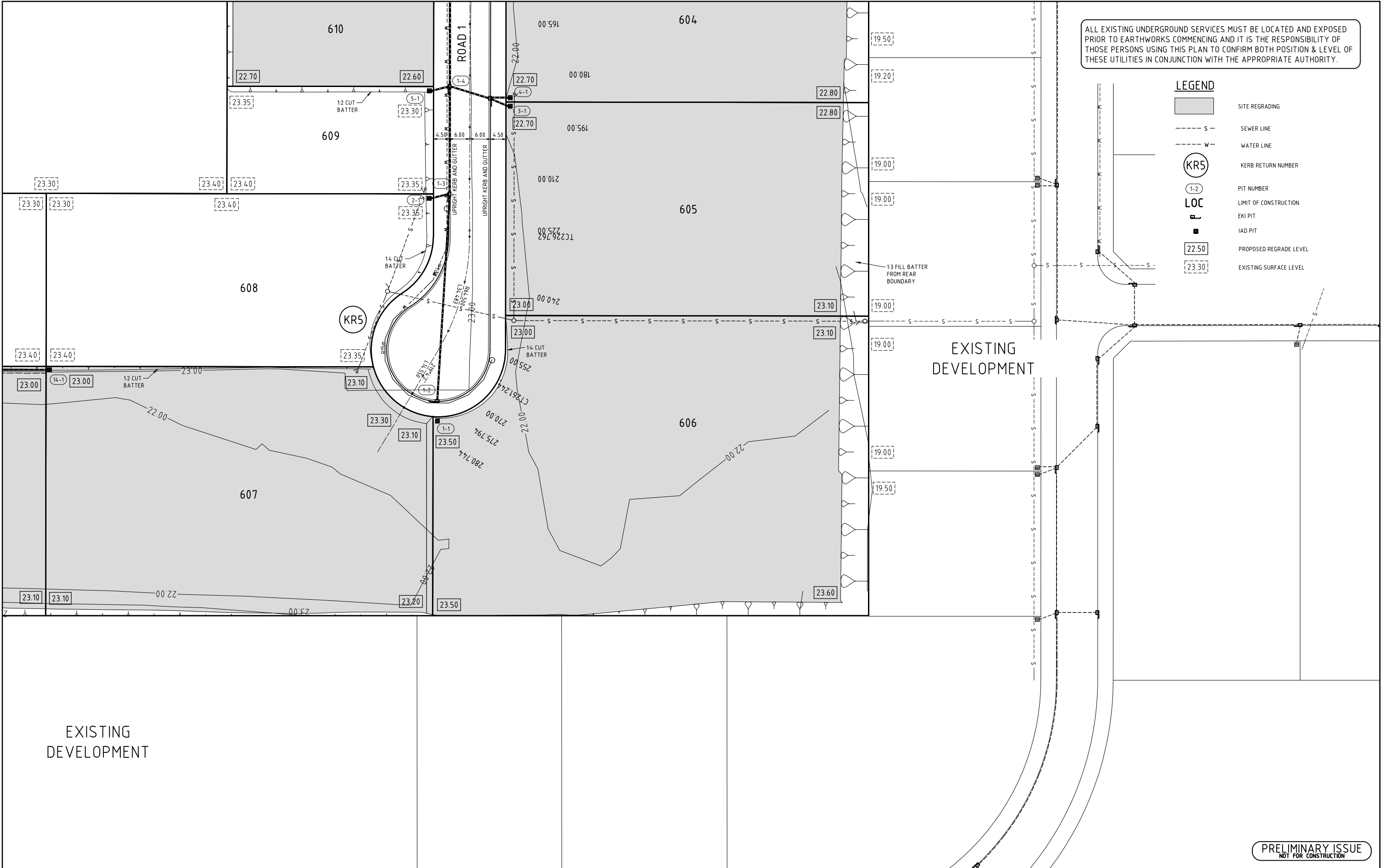
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Drawing No C201	Revision 1

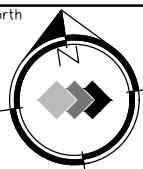
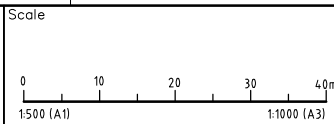


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								Drawing No C202	Revision 3																	
								A1 SHEET																		
							Project Approval IAN HILL (B.E.) Consulting Civil Engineer																			
<table><tr><td>3</td><td>CLIENT COMMENTS</td><td>A.M</td><td>I.H</td><td>25.03.19</td></tr><tr><td>2</td><td>CLIENT COMMENTS</td><td>A.M</td><td>I.H</td><td>19.03.19</td></tr><tr><td>1</td><td>ORIGINAL ISSUE</td><td>A.M</td><td>I.H</td><td>26.02.19</td></tr></table>					3	CLIENT COMMENTS	A.M	I.H	25.03.19	2	CLIENT COMMENTS	A.M	I.H	19.03.19	1	ORIGINAL ISSUE	A.M	I.H	26.02.19							
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2	CLIENT COMMENTS	A.M	I.H	19.03.19																						
1	ORIGINAL ISSUE	A.M	I.H	26.02.19																						
Amendment Description Drawn App'd Date																										

PLOT DATE: 20/09/2019 11:19:48 AM

CAD FILE: Q:\18\18280 FREEWAY NORTH BUSINESS PARK STAGE 7\02_CAD\AutoCAD\Civil\200 Series\18280C dC202 r3.dwg



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A.M								18280C dC203 r3				18280C				
Scale								A1 SHEET				Drawing No	Revision			
Project Approval												C203	3			
IAN HILL (B.E) Consulting Civil Engineer																

Amendment

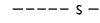
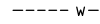
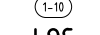
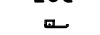
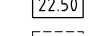
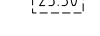
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1	A.M	I.H	26.02.19

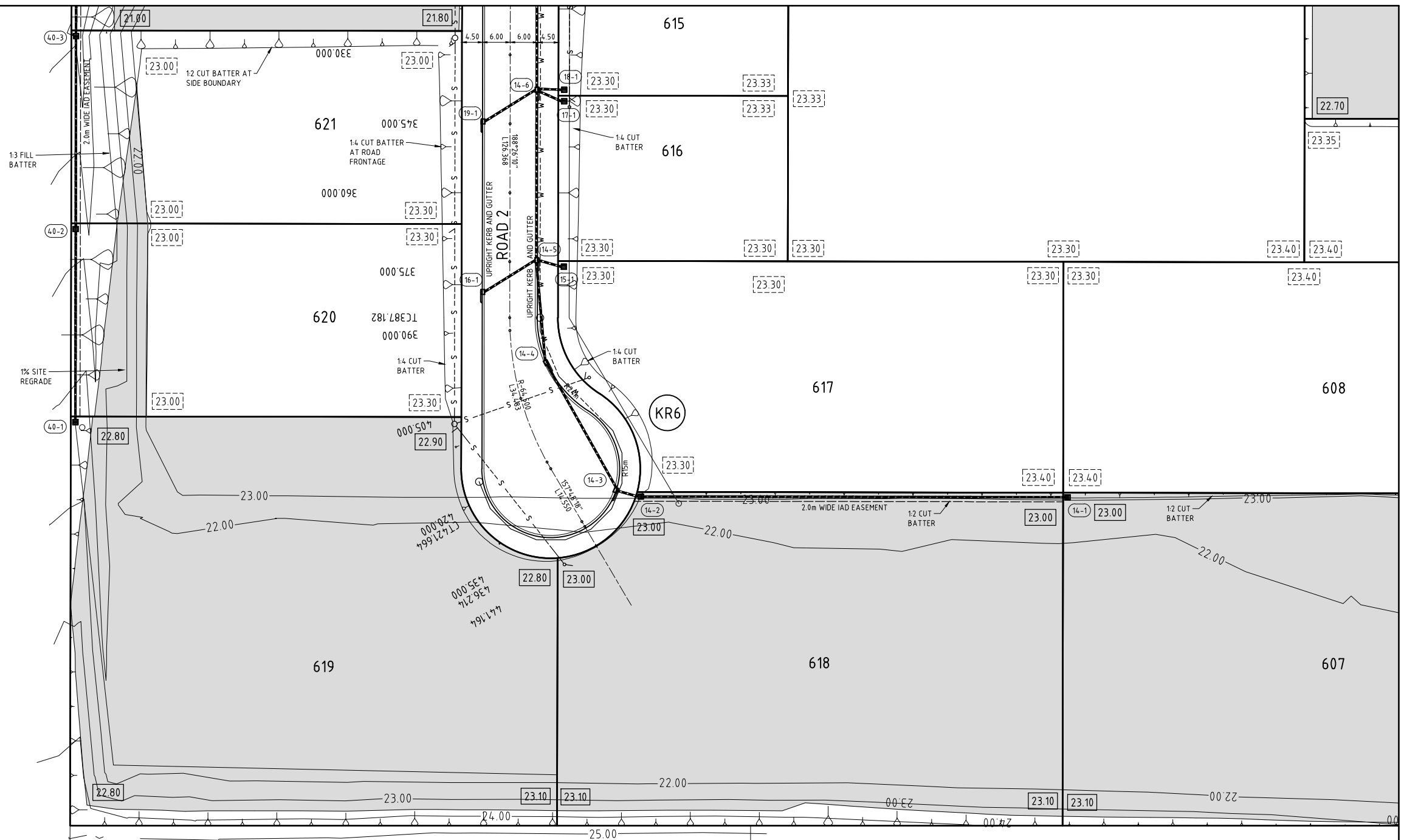
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ALL EXISTING UNDERGROUND SERVICES MUST BE LOCATED AND EXPOSED PRIOR TO EARTHWORKS COMMENCING AND IT IS THE RESPONSIBILITY OF THOSE PERSONS USING THIS PLAN TO CONFIRM BOTH POSITION & LEVEL OF THESE UTILITIES IN CONJUNCTION WITH THE APPROPRIATE AUTHORITY.

LEGEND

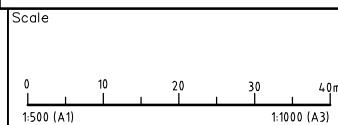
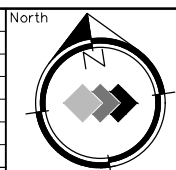
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	WATER LINE
	KERB RETURN NUMBER
	PIT NUMBER
	LIMIT OF CONSTRUCTION
	EKI PIT
	IAD PIT
	PROPOSED REGRADE LEVEL
	EXISTING SURFACE LEVEL



EXISTING
DEVELOPMENT

PRELIMINARY ISSUE
NOT FOR CONSTRUCTION

Amendment	Description	Drawn	App'd	Date
3	CLIENT COMMENTS	A.M	I.H	25.03.19
1	ORIGINAL ISSUE	A.M	I.H	26.02.19



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

Client

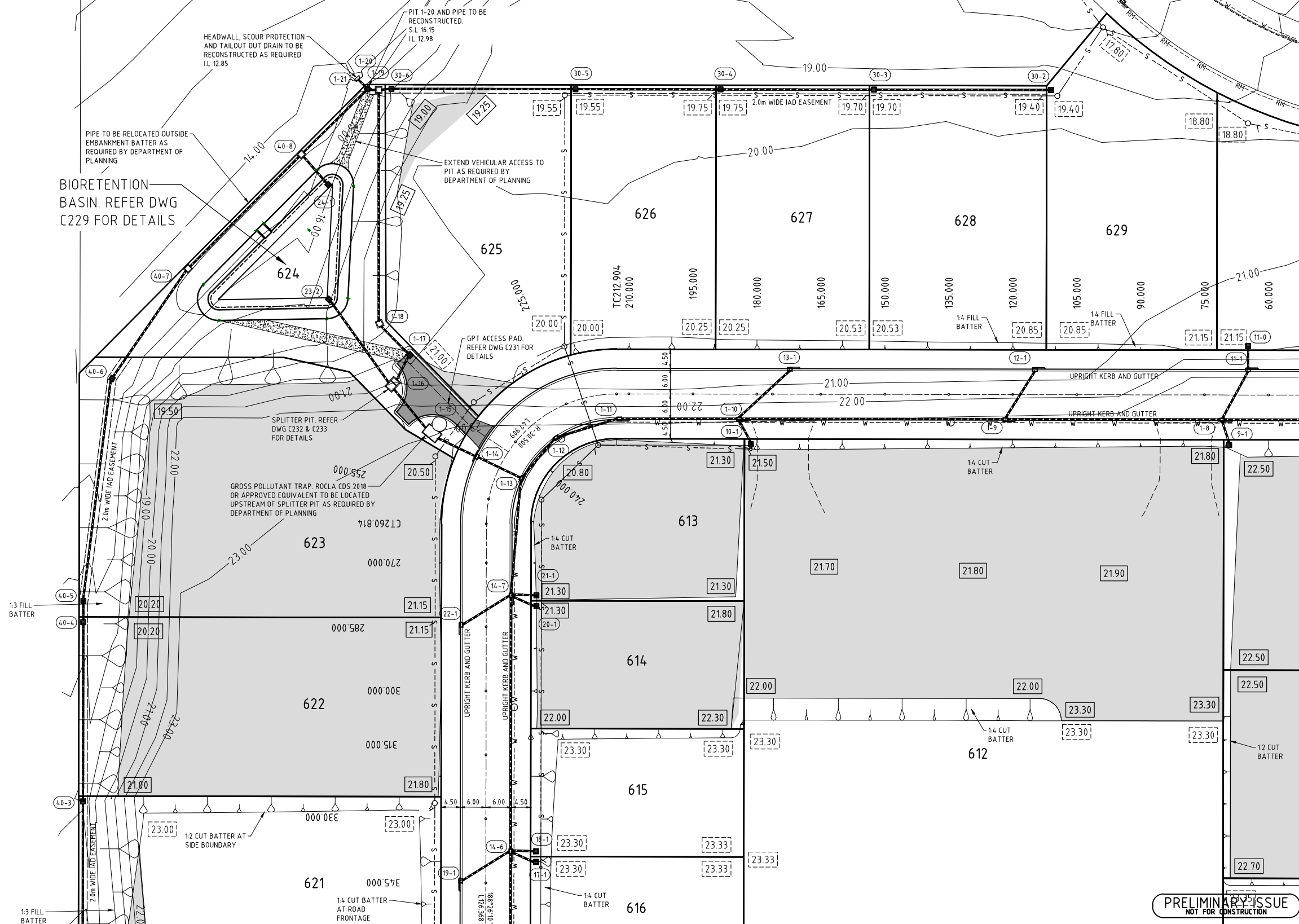
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PROPOSED SUBDIVISION FREEWAY NORTH BUSINESS PARK STAGE 7 PLAN SHEET (3 OF 4)		Project No 18280C
Drawing No C204	Revision 3	

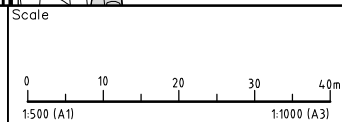
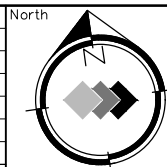
ALL EXISTING UNDERGROUND SERVICES MUST BE LOCATED AND EXPOSED PRIOR TO EARTHWORKS COMMENCING AND IT IS THE RESPONSIBILITY OF THOSE PERSONS USING THIS PLAN TO CONFIRM BOTH POSITION & LEVEL OF THESE UTILITIES IN CONJUNCTION WITH THE APPROPRIATE AUTHORITY.

LEGEND

	SITE REGRADING
	SEWER LINE
	WATER LINE
	PIT NUMBER
	LIMIT OF CONSTRUCTION
	EKI PIT
	IAD PIT
	PROPOSED REGRADE LEVEL
	EXISTING SURFACE LEVEL



Amendment	Description	Drawn	App'd	Date
6	NCC COMMENTS	A.M	I.H	20.09.19
5	DOP COMMENTS	A.M	I.H	02.09.19
4	GPT AMENDMENTS	A.M	I.H	17.04.18
3	CLIENT COMMENTS	A.M	I.H	25.03.19
2	CLIENT COMMENTS			
1	ORIGINAL ISSUE	A.M	I.H	26.02.19



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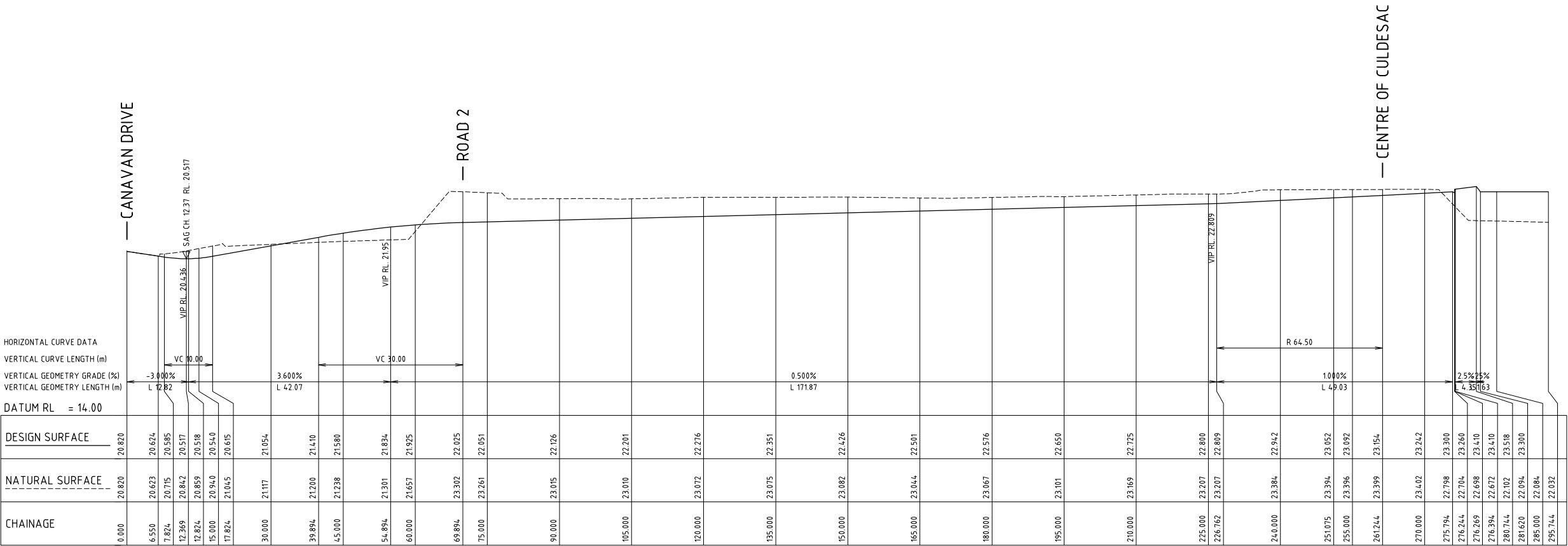
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A.M
Scale
1:500
Project Approval
IAN HILL (B.E)
Consulting Civil Engineer

Client

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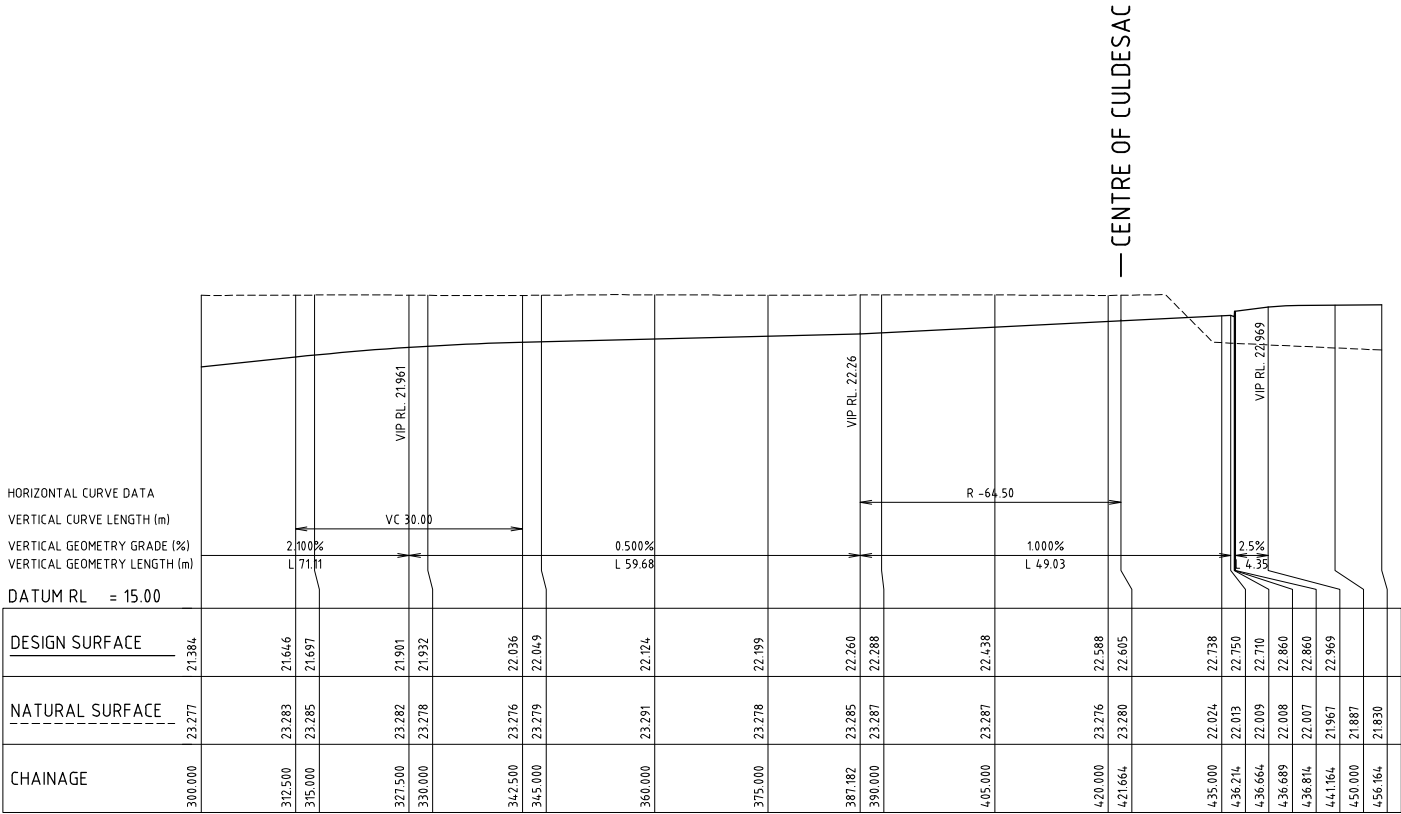
PROPOSED SUBDIVISION
FREEWAY NORTH BUSINESS PARK
STAGE 7
PLAN SHEET (4 OF 4)

Project No
18280C
Drawing No
C205
Revision
6



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

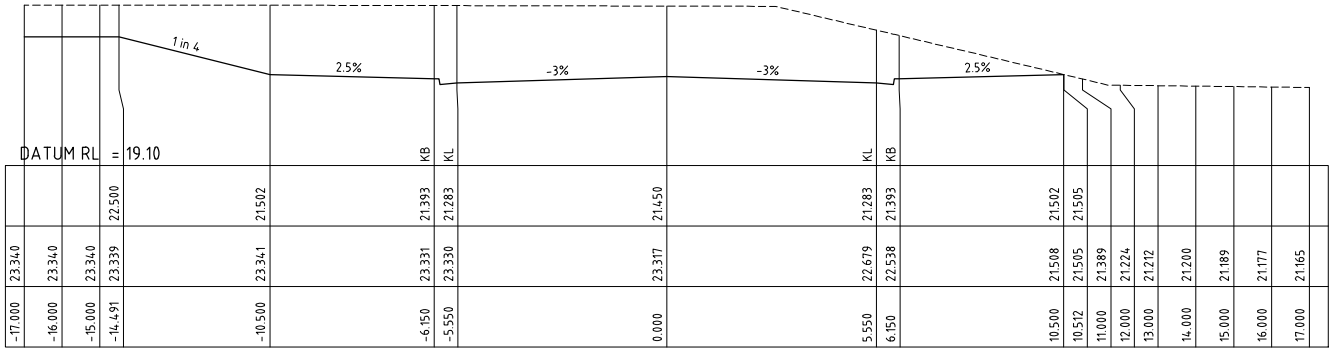
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1 ORIGINAL ISSUE					AM	IH	26.02.19	Project Approval IAN HILL (B.E) Consulting Civil Engineer					Drawing No C206		Revision 1			
Amendment	Description	Drawn	App'd	Date														



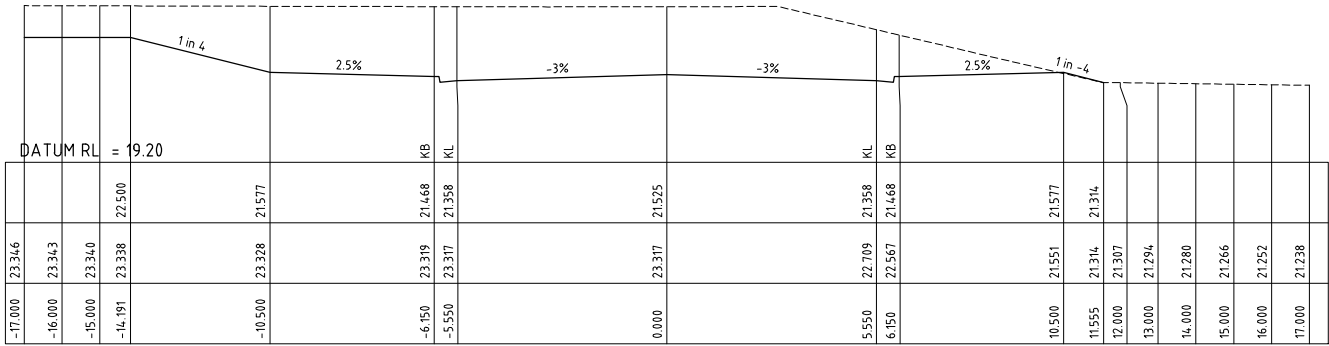
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LONGITUDINAL SECTION ROAD 2



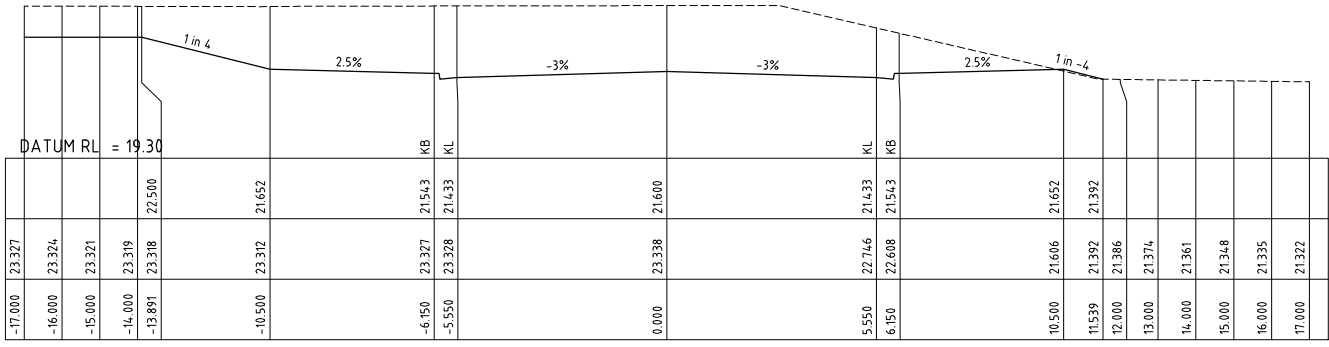
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LONGITUDINAL SECTION ROAD 2



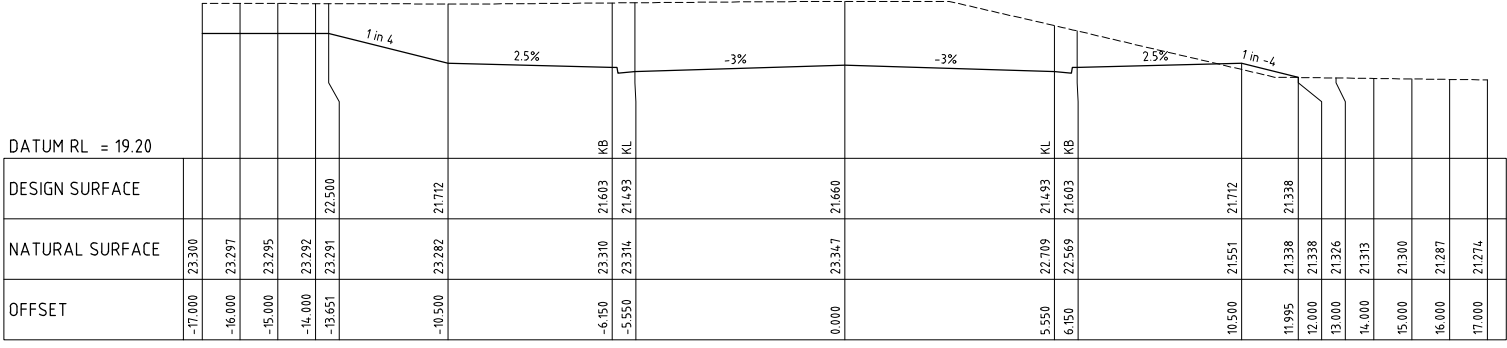
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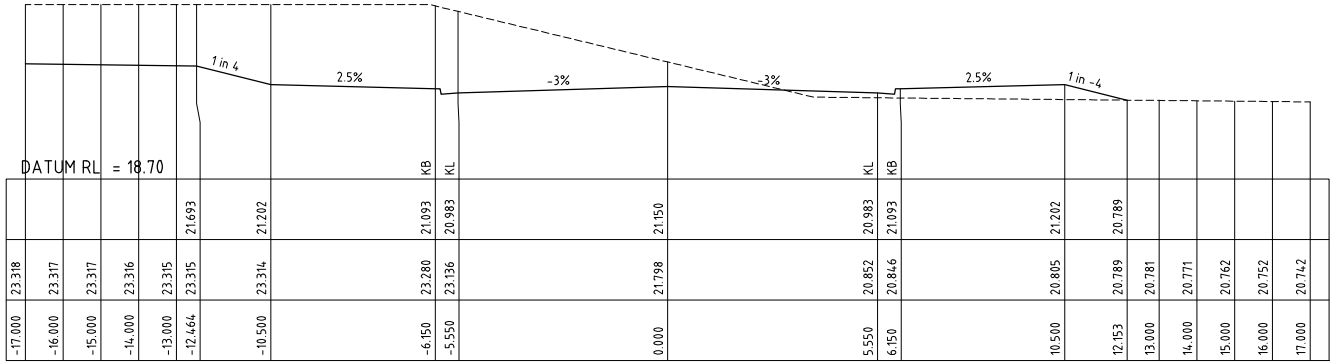
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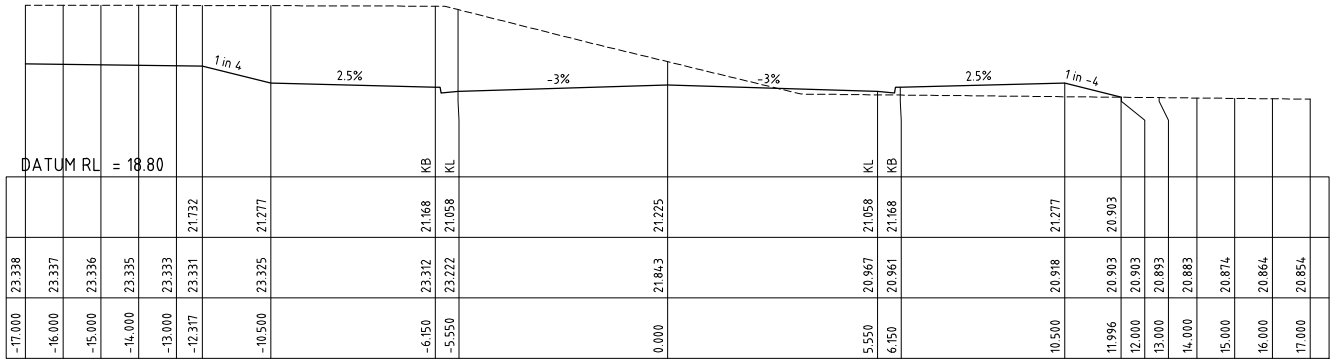
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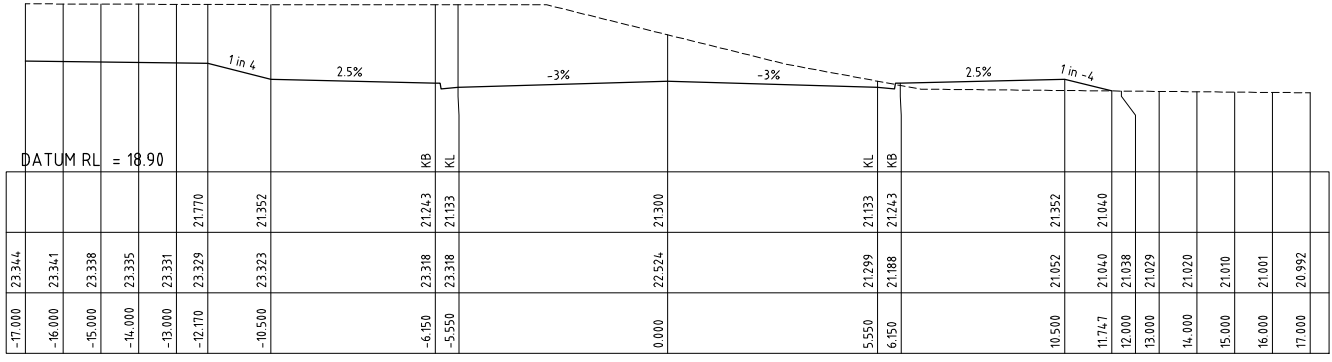
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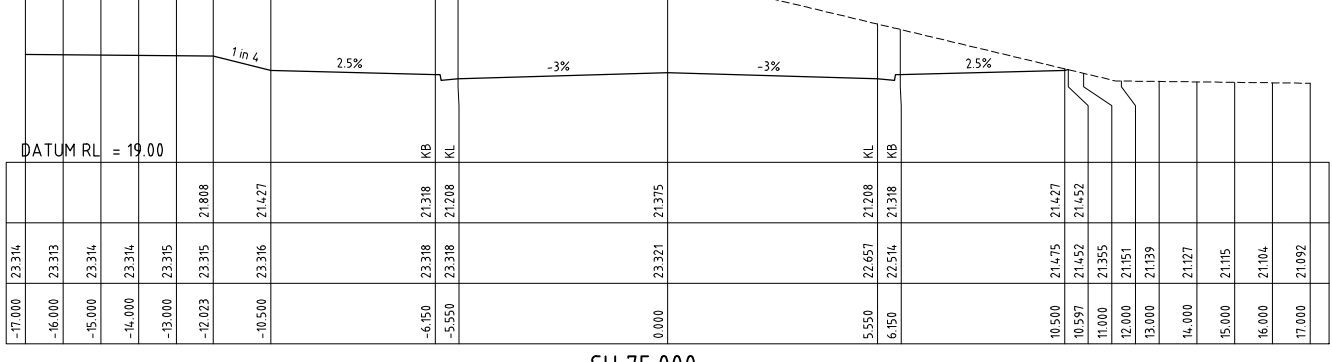
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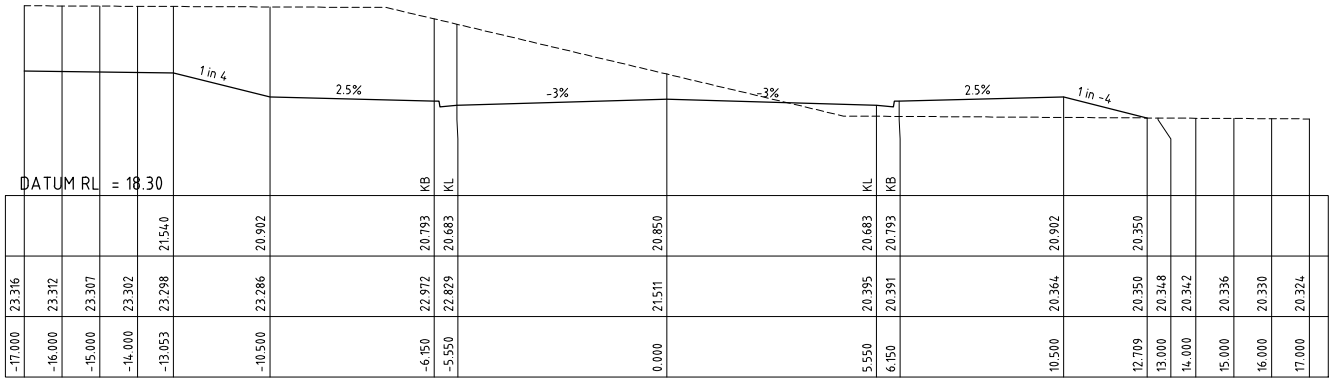
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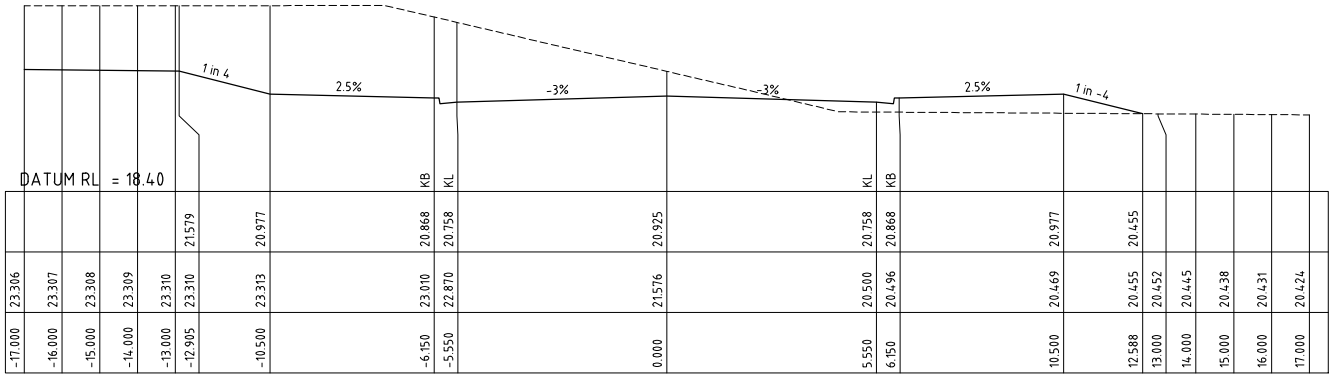
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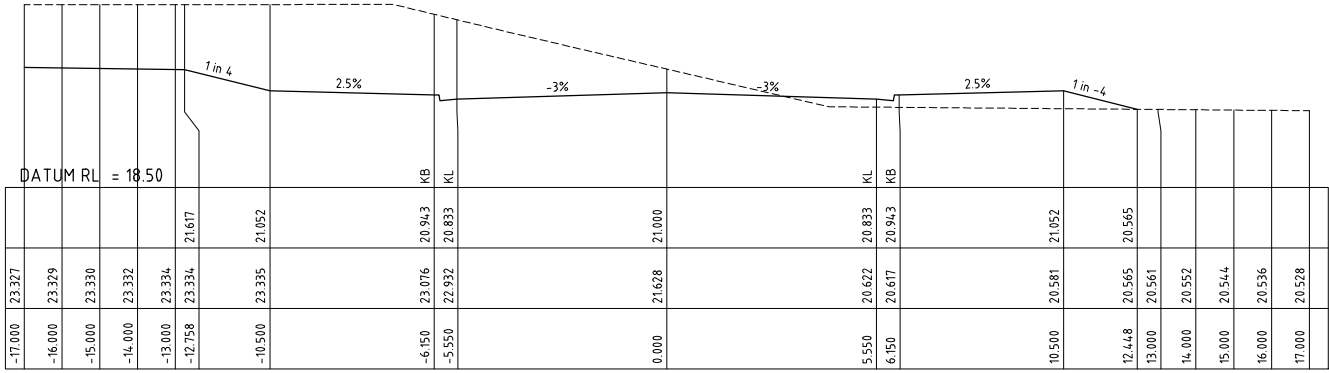
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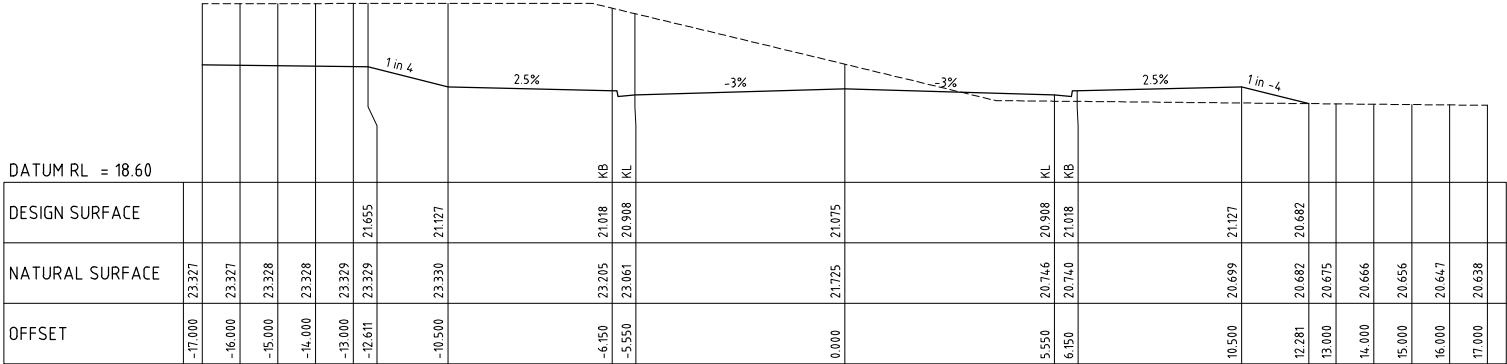
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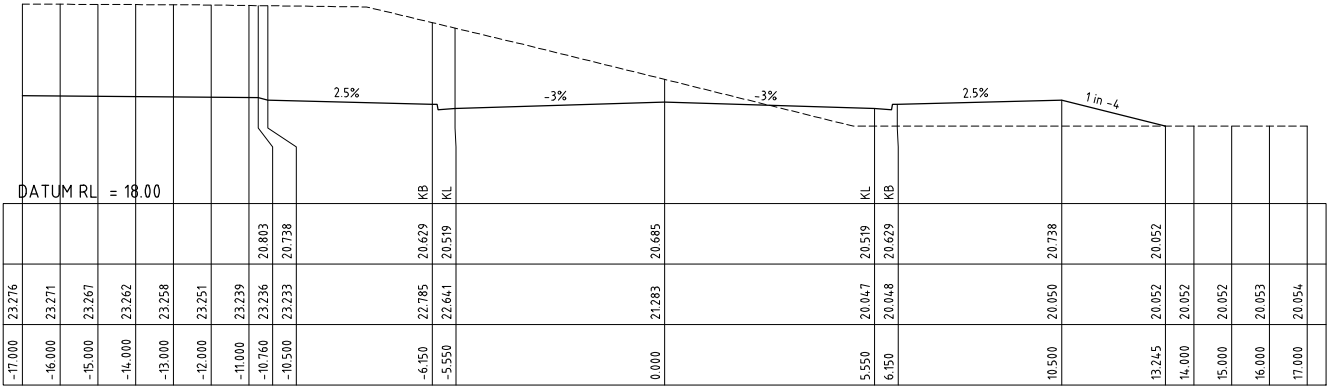
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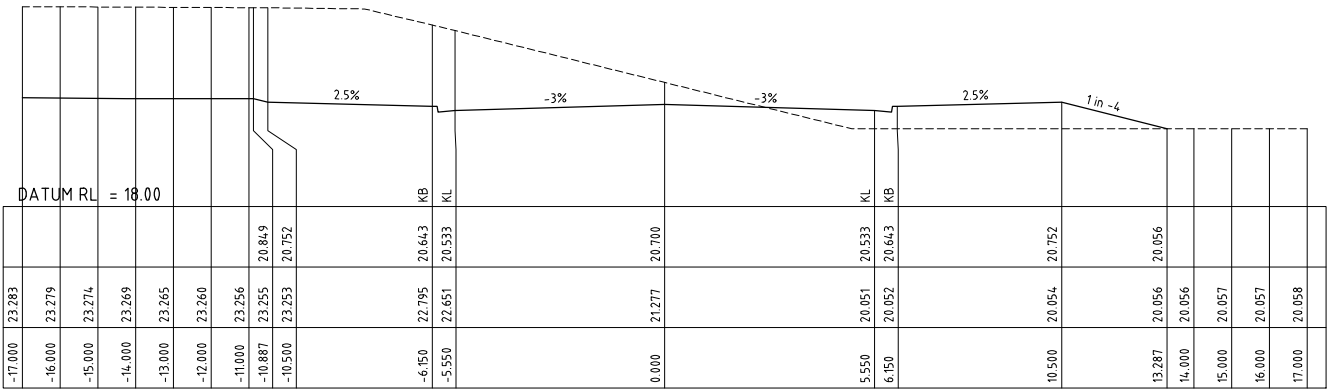
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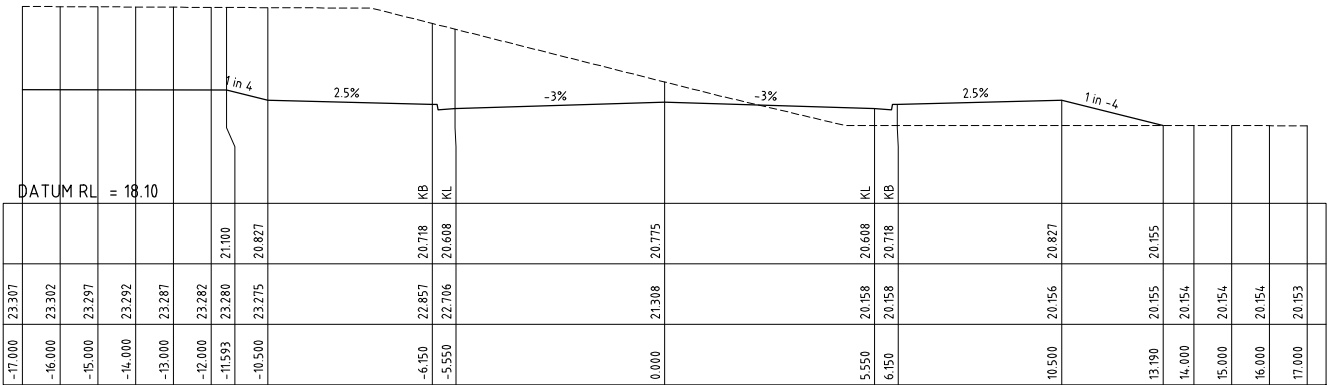
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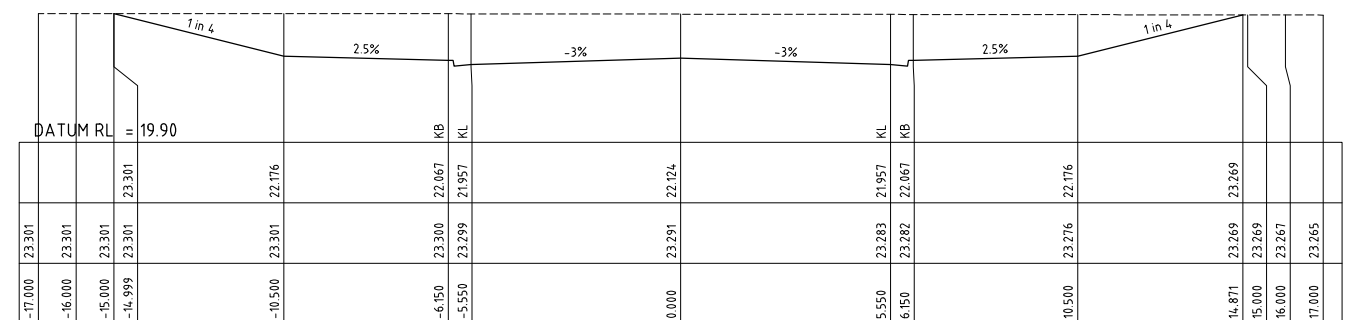
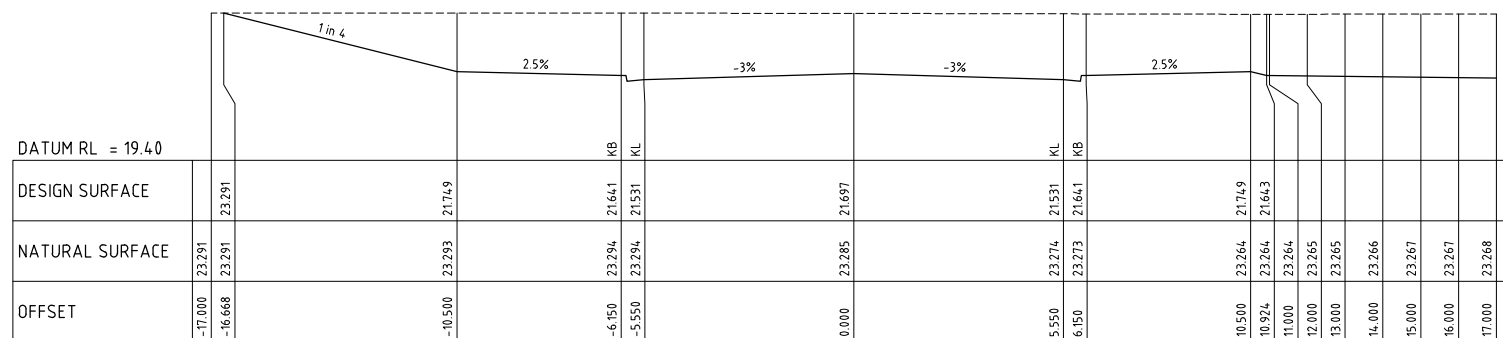
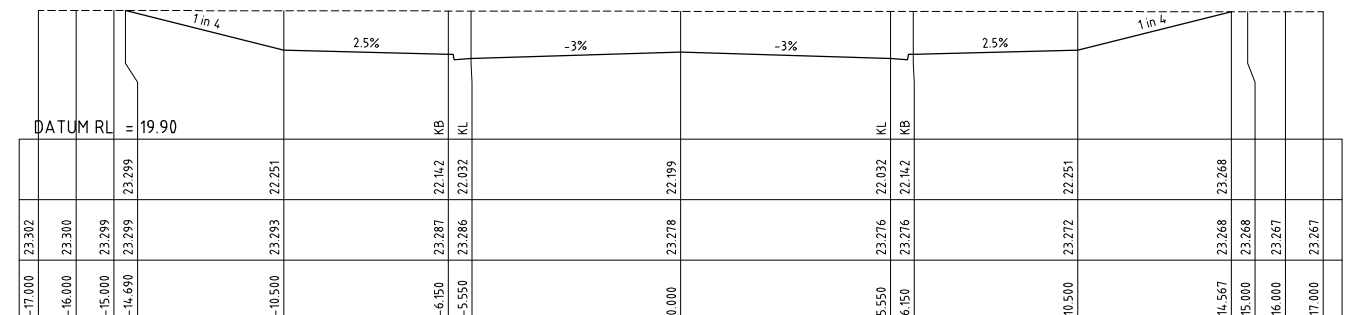
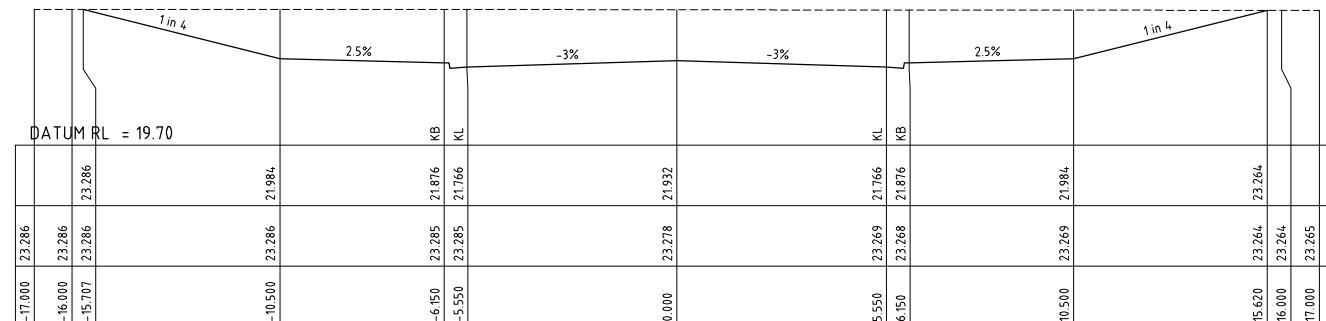
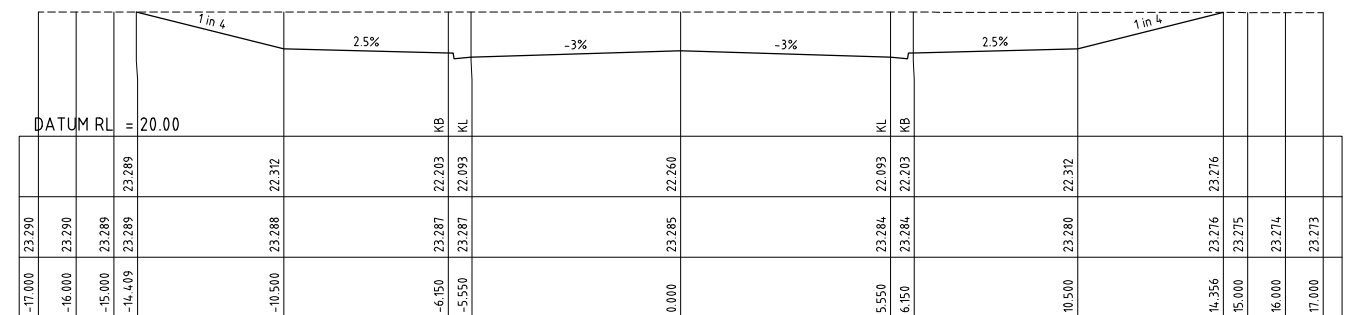
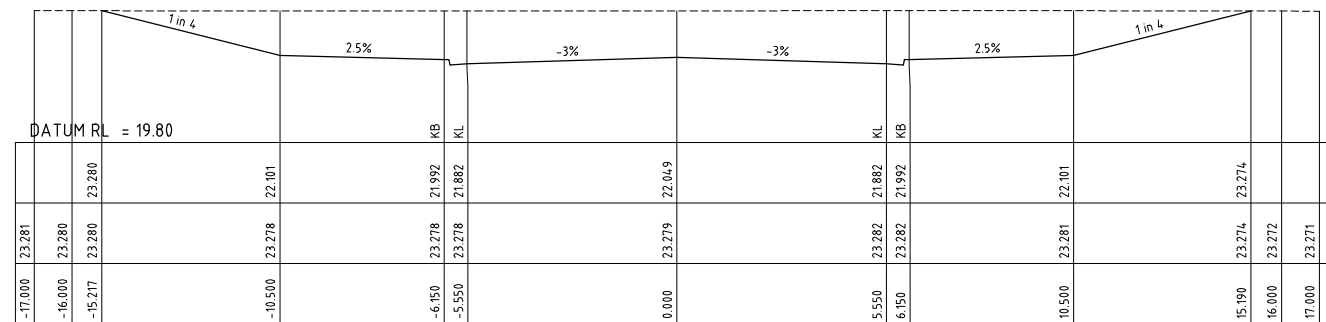
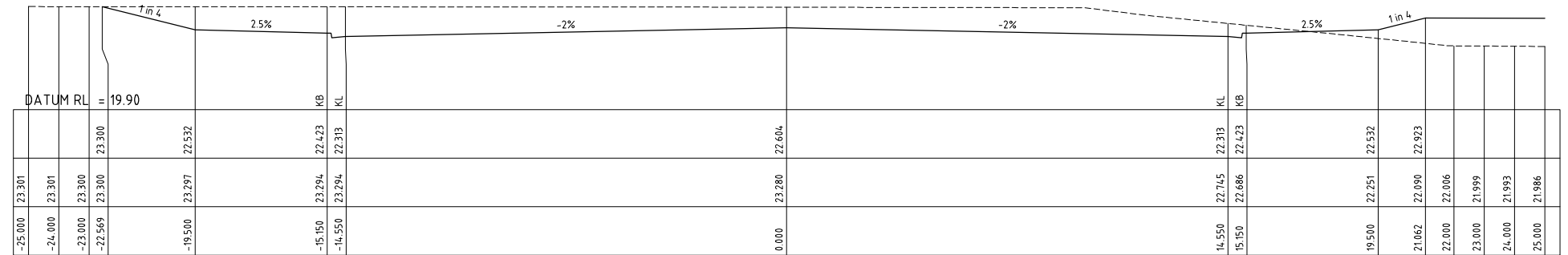


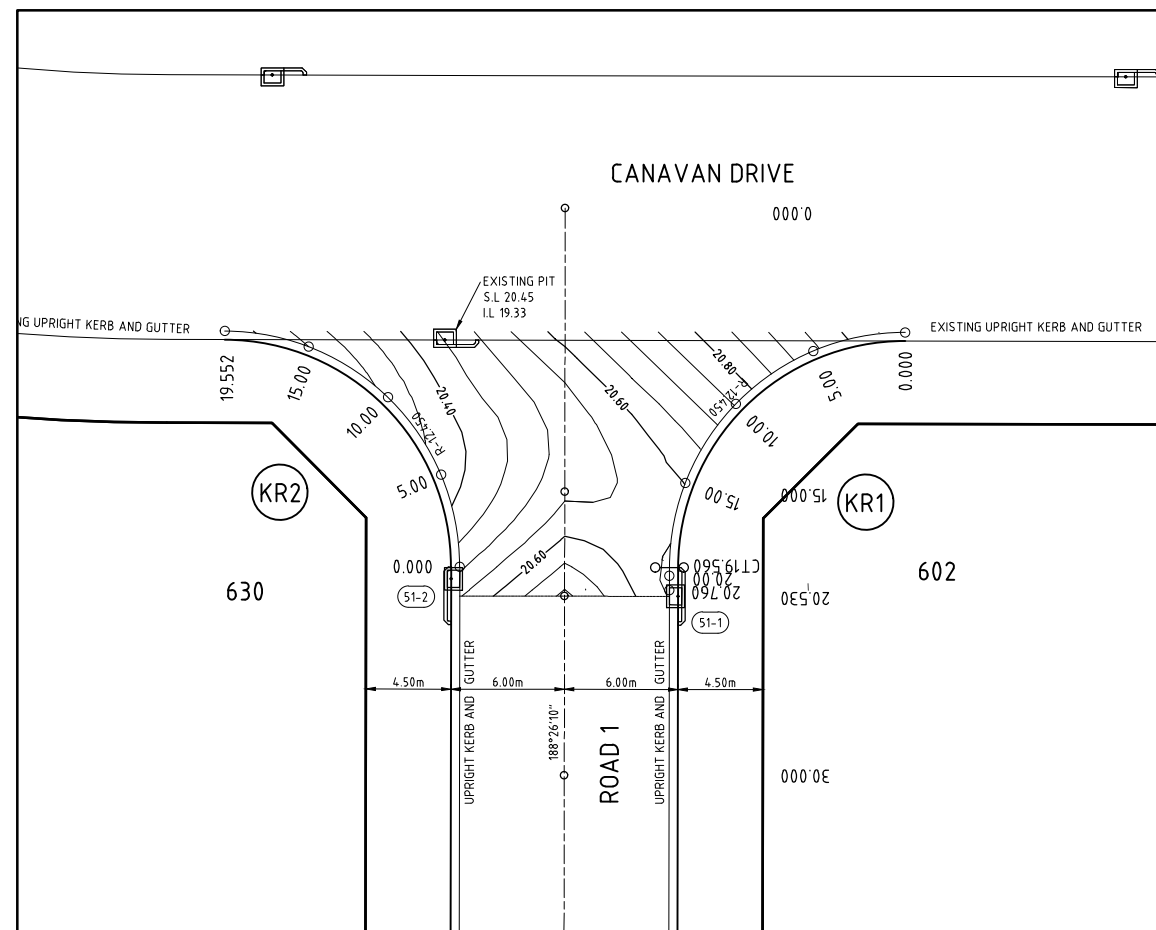
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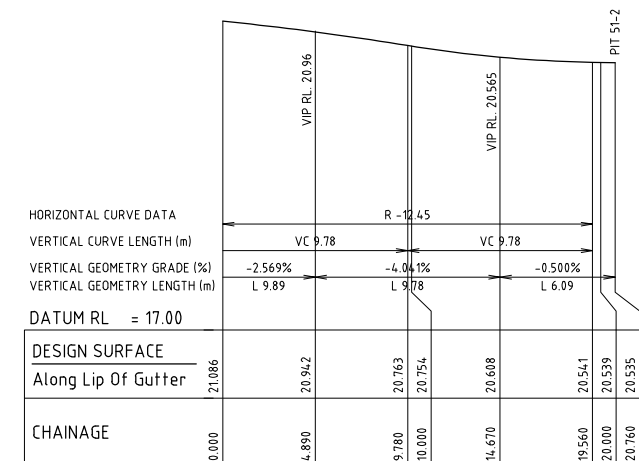
CH 195.000

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										1:500H/1:100V		Project Approval		Revision				
										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		C211		1		
1 ORIGINAL ISSUE					AM	IH	26.02.19											
Amendment					Description	Drawn	App'd	Date										

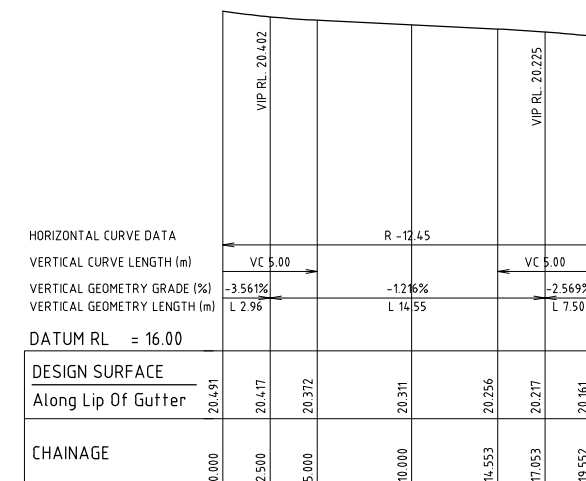
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KERB RETURN No.1 & 2 DETAIL PLAN
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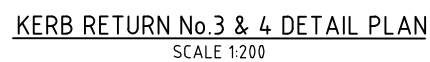
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LONGITUDINAL SECTION KR2

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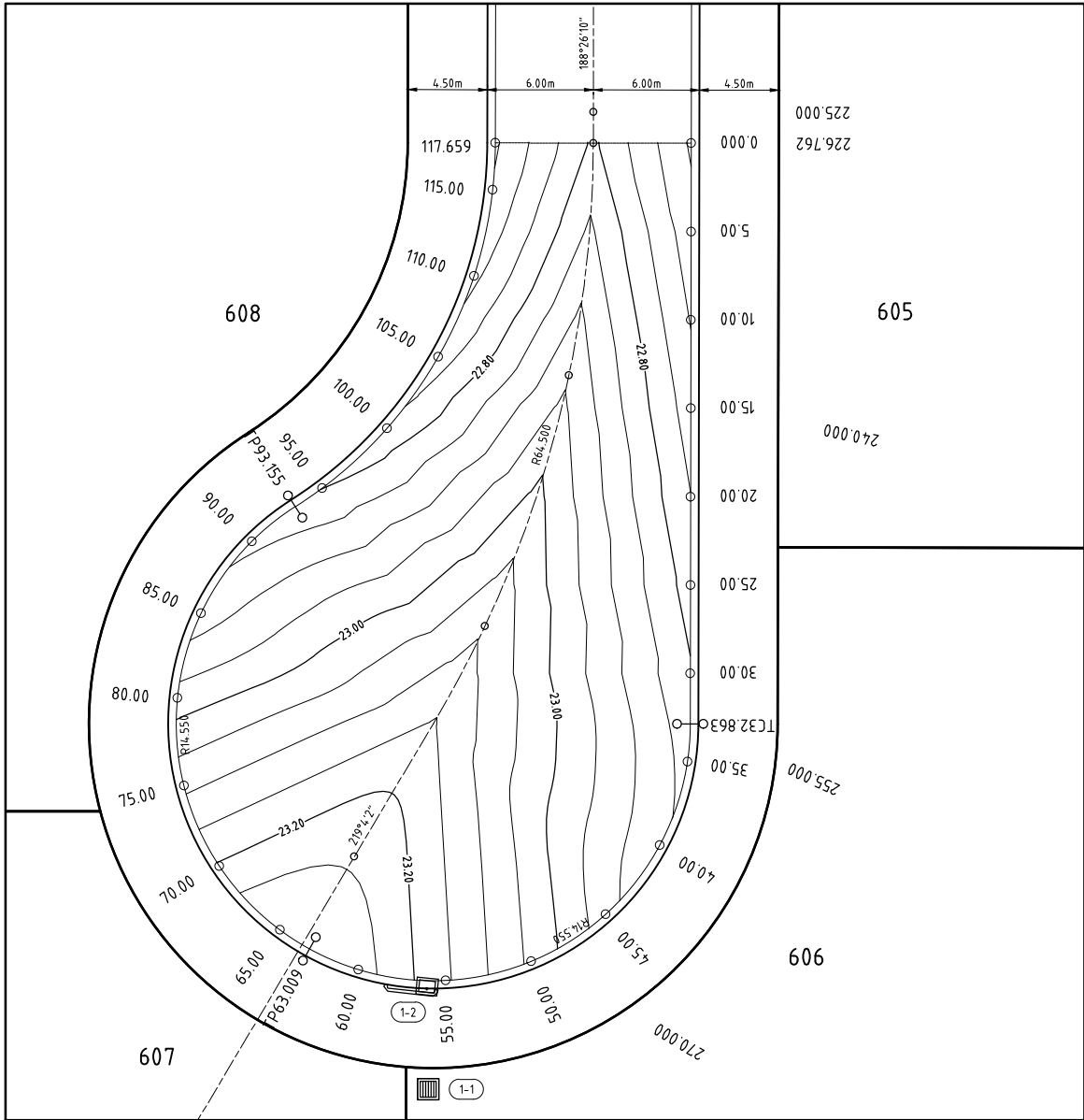
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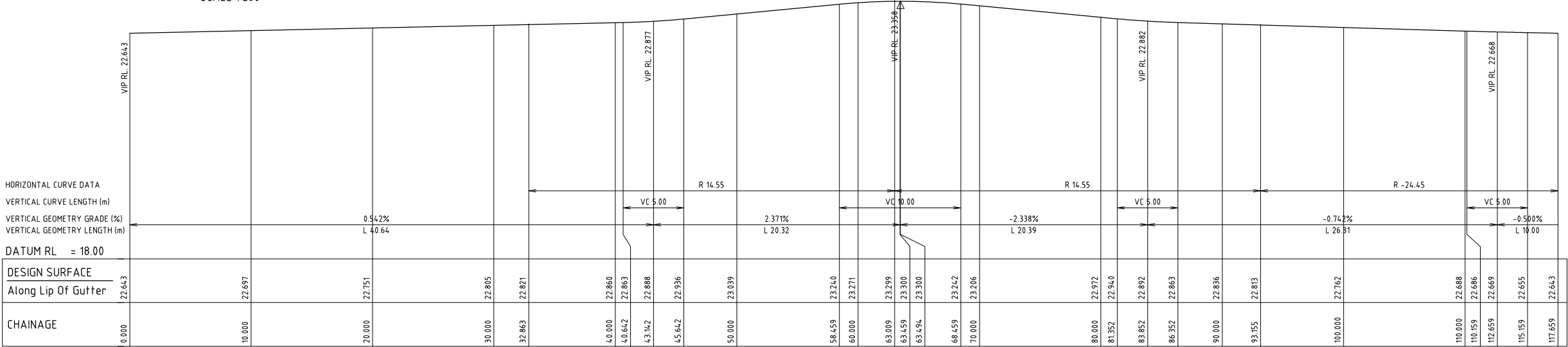
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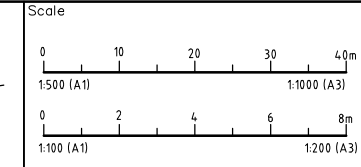
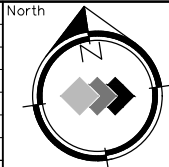


KERB RETURN No.5 DETAIL PLAN
SCALE 1:200



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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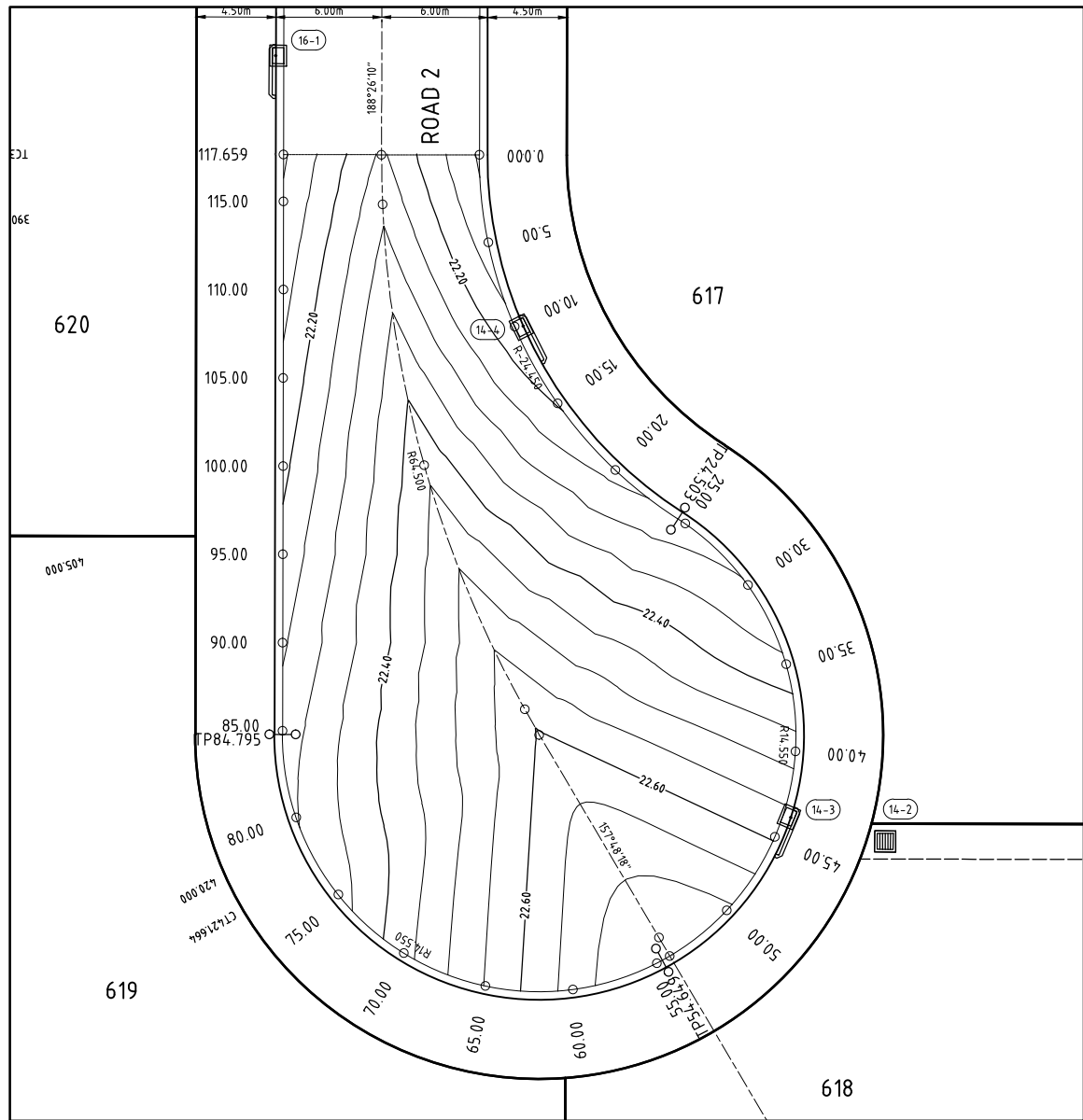
Designed A.M	Cad Reference 18280C dC216 r1
Scale 1:500H/1:100V	A1 SHEET
Project Approval IAN HILL (B.E) Consulting Civil Engineer	

Client

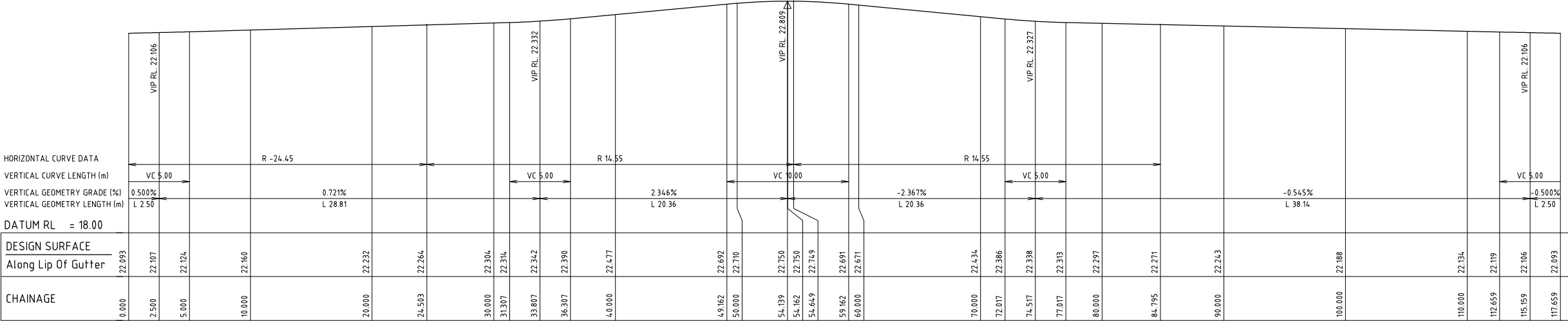
GCA
ENGINEERING SOLUTIONS
A.B.N. 92 086 017 745
1 HARTLEY DRIVE, THORNTON NSW 2322
PO BOX 3337, THORNTON NSW 2322
PHONE: (02) 4964 1811

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

Project No 18280C
Drawing No C216
Revision 1



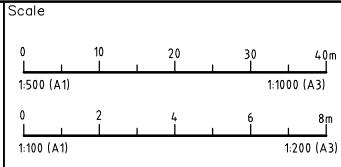
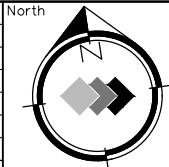
KERB RETURN No. 6 DETAIL PLAN
SCALE 1:200



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

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

PLOT DATE: 20/09/2019 11:20:27 AM CAD FILE: Q:\18\18280 FREEWAY NORTH BUSINESS PARK STAGE 7\02_CAD\AutoCAD\Civil\200 Series\18280C dC217 r1.dwg



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Designed A.M	Cad Reference 18280C dC217 r1
Scale 1:500H/1:100V	A1 SHEET
Project Approval IAN HILL (B.E) Consulting Civil Engineer	

Client

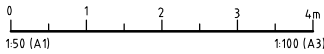


PROPOSED SUBDIVISION
FREEWAY NORTH BUSINESS PARK
STAGE 7
KERB RETURN No. 6

Project No 18280C	Drawing No C217	Revision 1
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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 ALLOTMENT 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

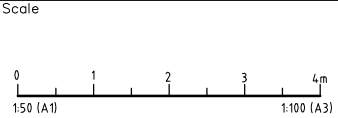
PROPOSED SUBDIVISION
FREEWAY NORTH BUSINESS PARK
STAGE 7
TYPICAL SECTIONS, DETAILS AND NOTES

Project No
18280C
Drawing No
C218
Revision
1



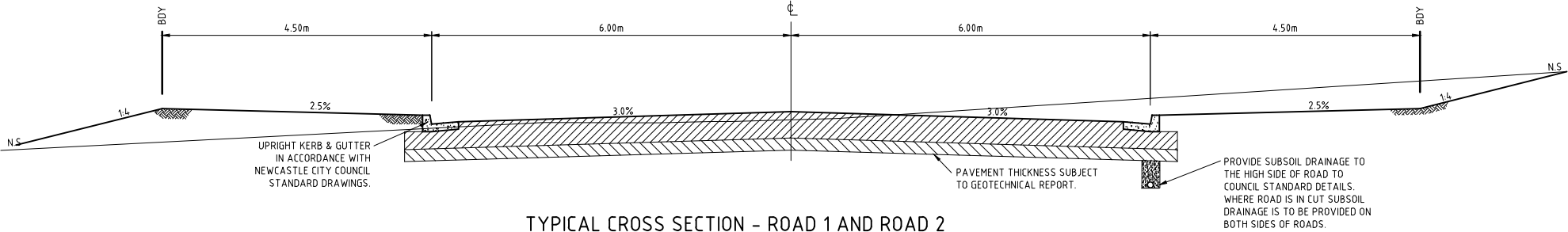
Designed
A.M
Scale
AS SHOWN
Project Approval
IAN HILL (B.E)
Consulting Civil Engineer

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North
Scale

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



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

REINFORCED CONCRETE

- ALL CONCRETE PAVEMENT TO BE IN ACCORDANCE WITH APPROVED GEOTECHNICAL REPORT.
- ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH AS3600 CURRENT EDITION WITH AMENDMENTS, EXCEPT WHERE VARIED BY THE CONTRACT DOCUMENTS.
- CONCRETE COMPONENTS AND QUALITY SHALL BE AS FOLLOWS:

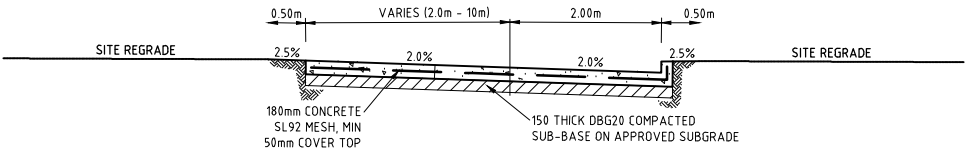
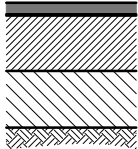
ELEMENT	SLUMP mm	MAX. SIZE AGG. mm	CEMENT TYPE	f'c AT 28 DAYS - MPa	ADMIXTURE
ALL, UNO	80	20	GP	32	-

- MINIMUM CLEAR CONCRETE COVER TO REINFORCEMENT INCLUDING TIES AND STIRRUPS SHALL BE AS FOLLOWS UNO.

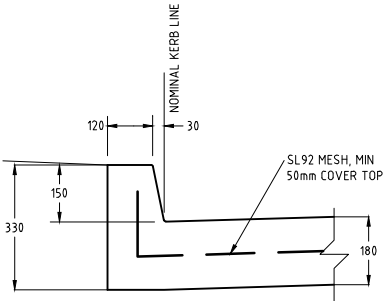
ELEMENT	CAST AGAINST FORMS COMPLYING WITH CURRENT SAA CODE		NO. FORM WORK mm
	IN SHELTERED LOCATION mm	EXPOSED TO GROUND OR WEATHER mm	
PAD FOOTINGS	-	65	75
STRIP FOOTINGS	-	50	65

- COVER TO REINFORCEMENT SHALL BE OBTAINED BY THE USE OF APPROVED BAR CHAIRS. ALL CHAIRS SHALL BE SPACED AT 1000 CTS MAXIMUM.
- ALL CONCRETE SHALL BE MECHANICALLY VIBRATED. VIBRATORS SHALL NOT BE USED TO SPREAD CONCRETE.
- SIZES OF CONCRETE ELEMENTS DO NOT INCLUDE THICKNESS OF APPLIED FINISHES.
- 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.
- 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.
- REINFORCEMENT IS REPRESENTED DIAGRAMMATICALLY; IT IS NOT NECESSARILY SHOWN IN TRUE PROJECTION.
- SPICES 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.
- WELDING OF REINFORCEMENT WILL NOT BE PERMITTED UNLESS SHOWN ON THE STRUCTURAL DRAWINGS OR APPROVED BY THE ENGINEER.
- PIPES OR CONDUITS SHALL NOT BE PLACED WITHIN THE CONCRETE COVER TO REINFORCEMENT WITHOUT THE APPROVAL OF THE ENGINEER.

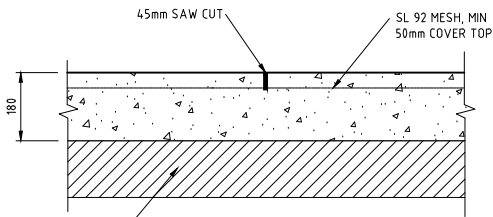
CONCRETE SPECIFICATION - SLAB ON GROUND:	
SLAB THICKNESS	EXTERNAL 180mm
REINFORCEMENT	SL92 MESH
SUBBASE	AS SPECIFIED BY DOUGLAS PARTNERS
DESIGN SUBGRADE CBR	AS SPECIFIED BY DOUGLAS PARTNERS
MINIMUM COMPRESSIVE STRENGTH	32 MPa
MINIMUM FLEXURAL STRENGTH (f'cf AT 28 DAYS)	4.5 MPa
MAXIMUM AGGREGATE SIZE	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



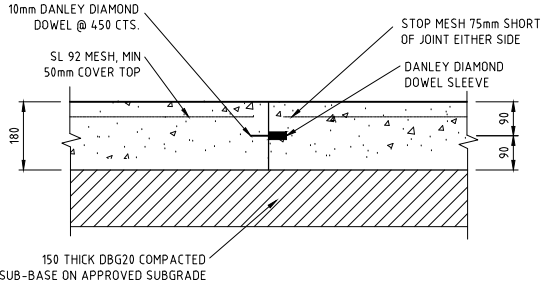
TYPICAL CROSS SECTION - GPT ACCESS
SCALE 1:50



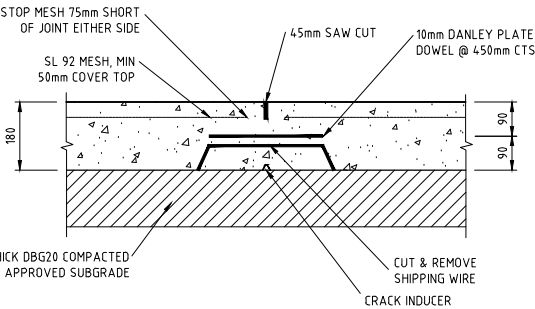
INTERGRAL KERB & GUTTER
SCALE 1:20



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.

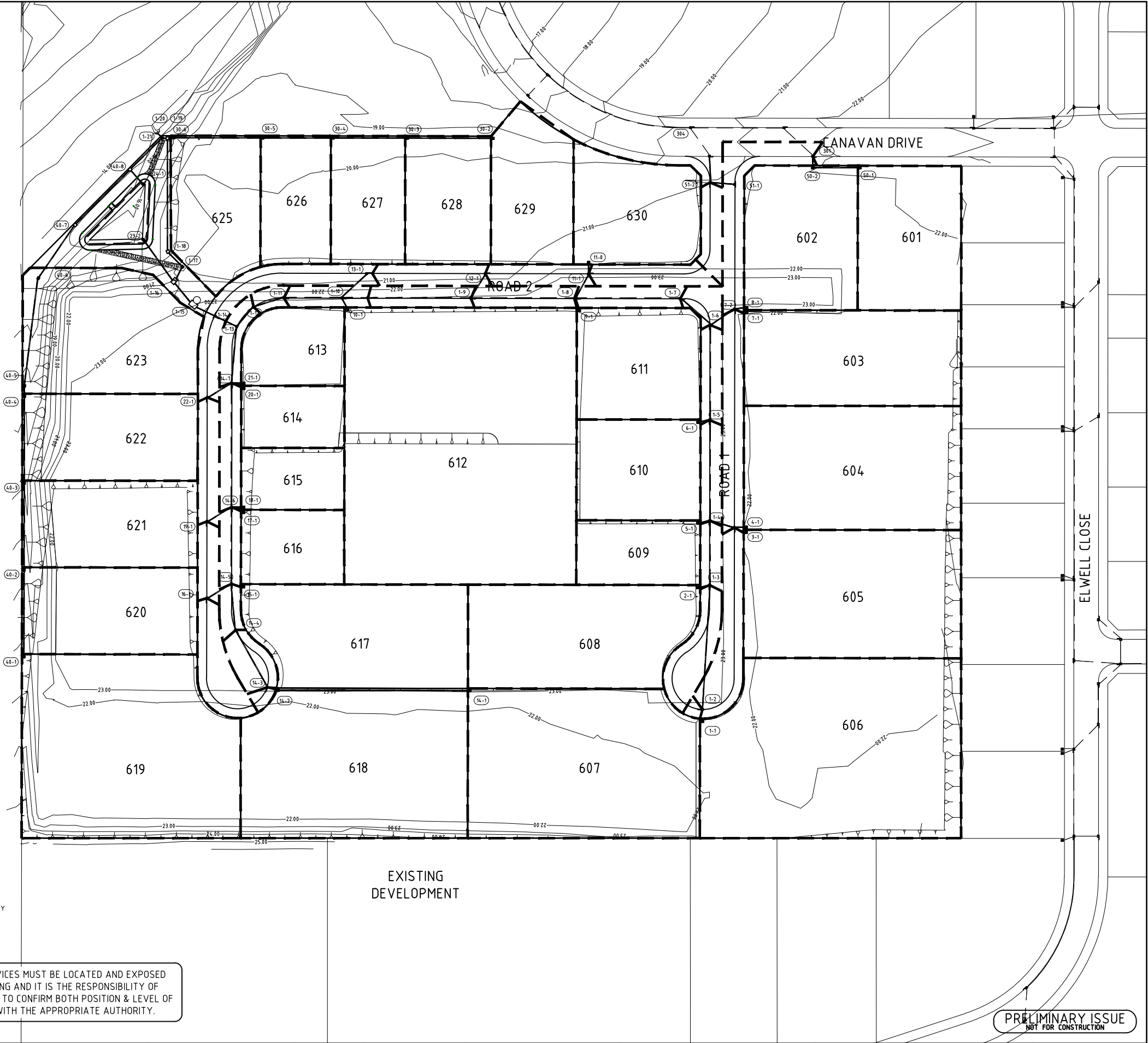
DRAINAGE PIT SCHEDULE

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

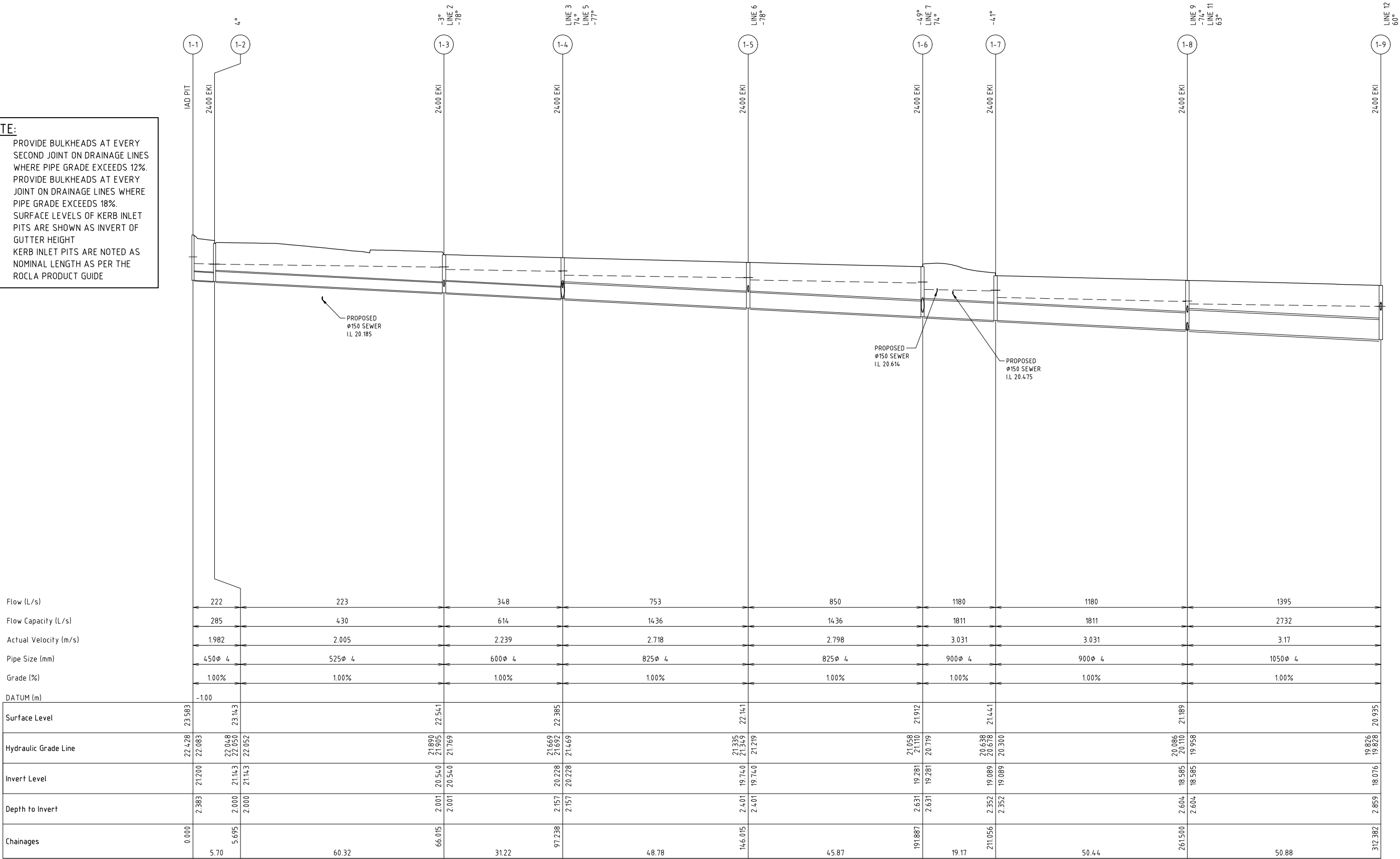
LEGEND:
SUB CATCHMENT BOUNDARY
PIT NUMBER

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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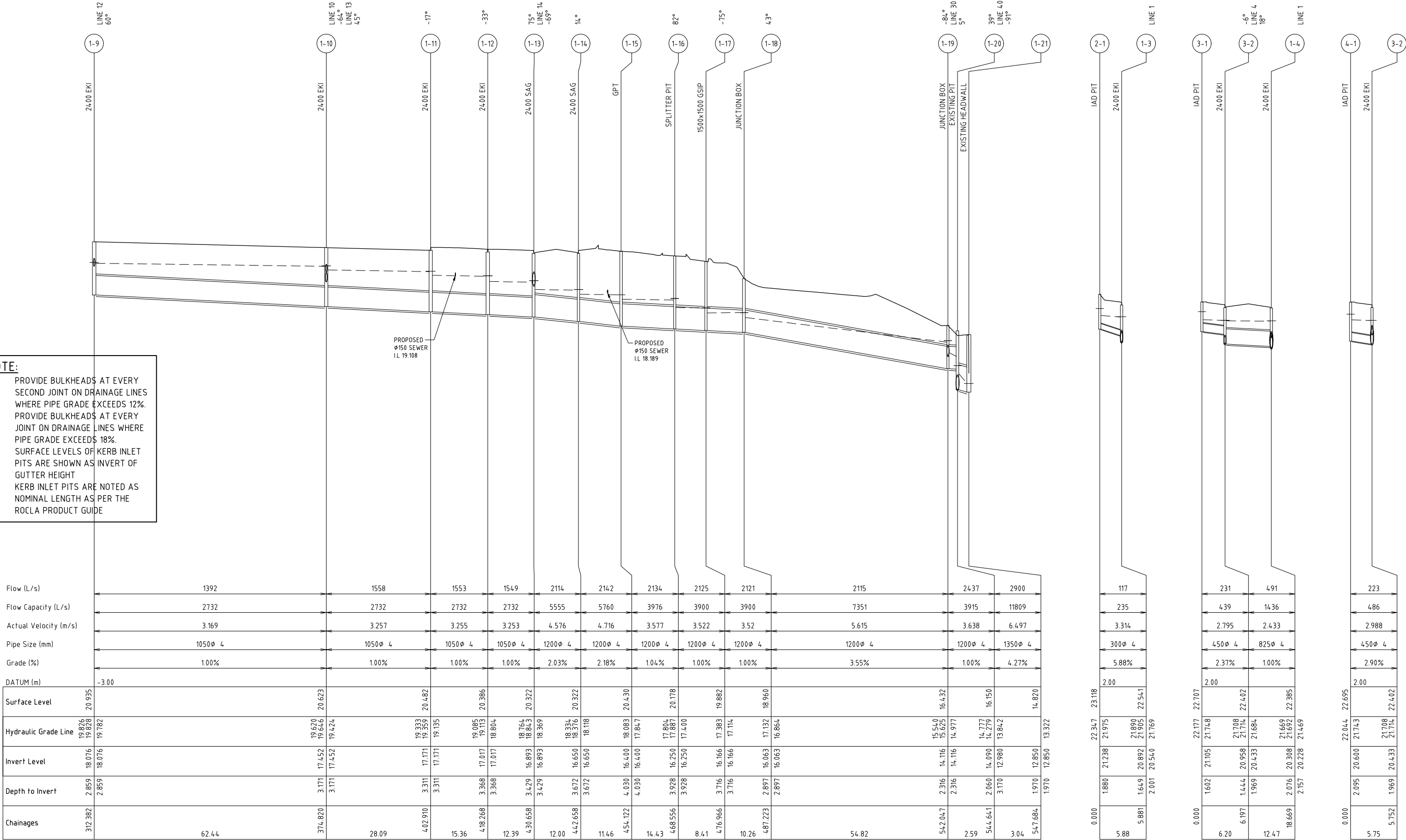
- NOTE:
1. PROVIDE BULKHEADS AT EVERY SECOND JOINT ON DRAINAGE LINES WHERE PIPE GRADE EXCEEDS 12%.
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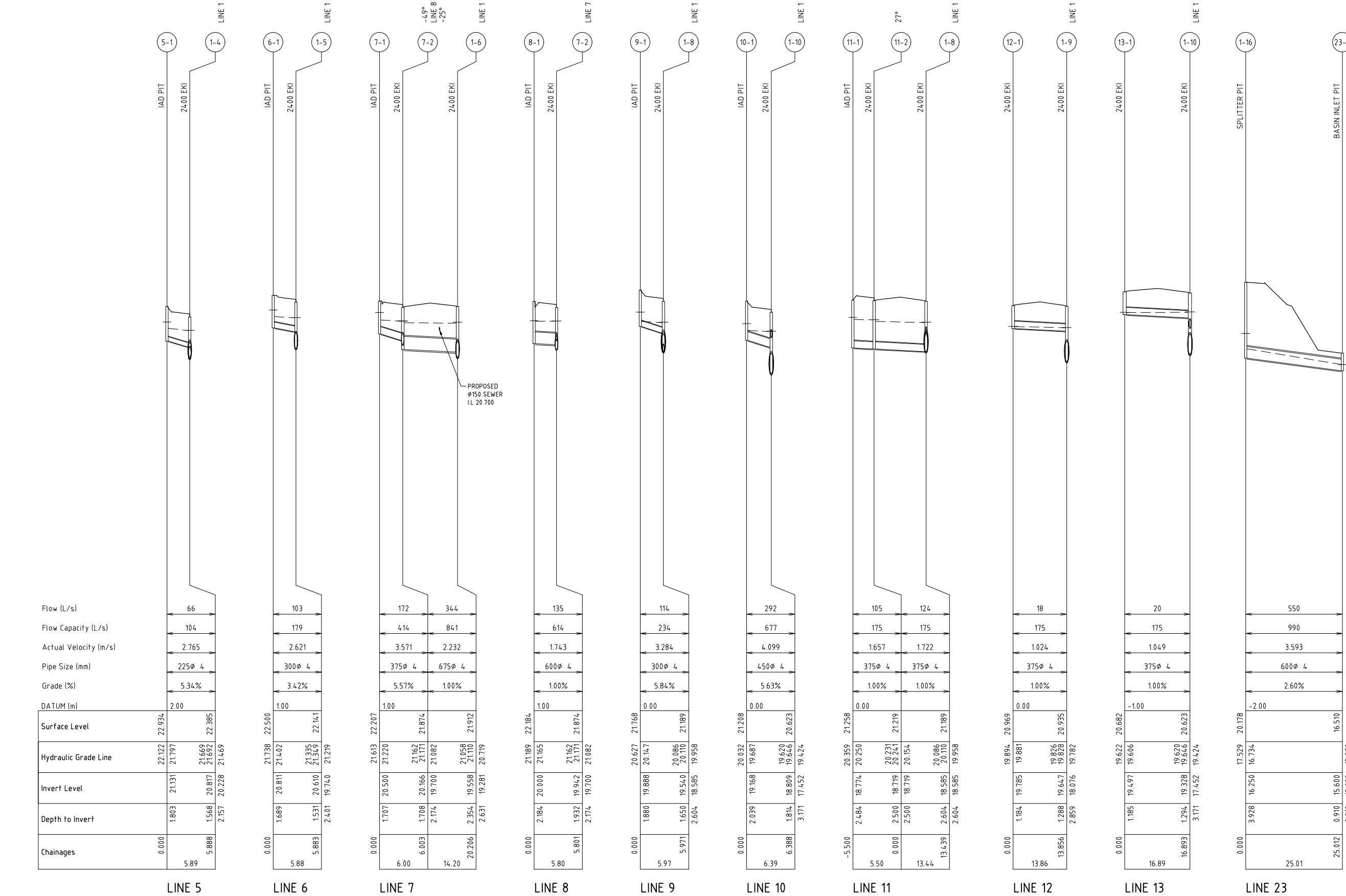
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					North	Scale		COPYRIGHT		Designed		Cad Reference		Client		 GCA ENGINEERING SOLUTIONS A.B.N. 92 086 017 745 1 HARTLEY DRIVE, THORNTON NSW 2322 PO BOX 3337, THORNTON NSW 2322 PHONE: (02) 4964 1811		PROPOSED SUBDIVISION FREEWAY NORTH BUSINESS PARK STAGE 7 DRAINAGE LINES 1 (CONT.), 2, 3 & 4		Project No 18280C Drawing No C221 Revision 5	
					0 10 20 30 40m 1:500 (A1) 1:1000 (A3)		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.		A.M		18280C dC221 r5										
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Amendment					Description	Drawn	App'd	Date													
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													



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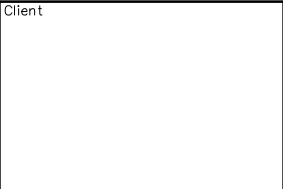
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5	DOP COMMENTS	AM	IH	30.08.19	
4	GPT AMENDMENTS	AM	IH	17.04.19	
3	CLIENT COMMENTS	AM	IH	25.03.19	
1	ORIGINAL ISSUE	AM	IH	27.02.19	
Amendment	Description	Drawn	App'd	Date	



COPYRIGHT

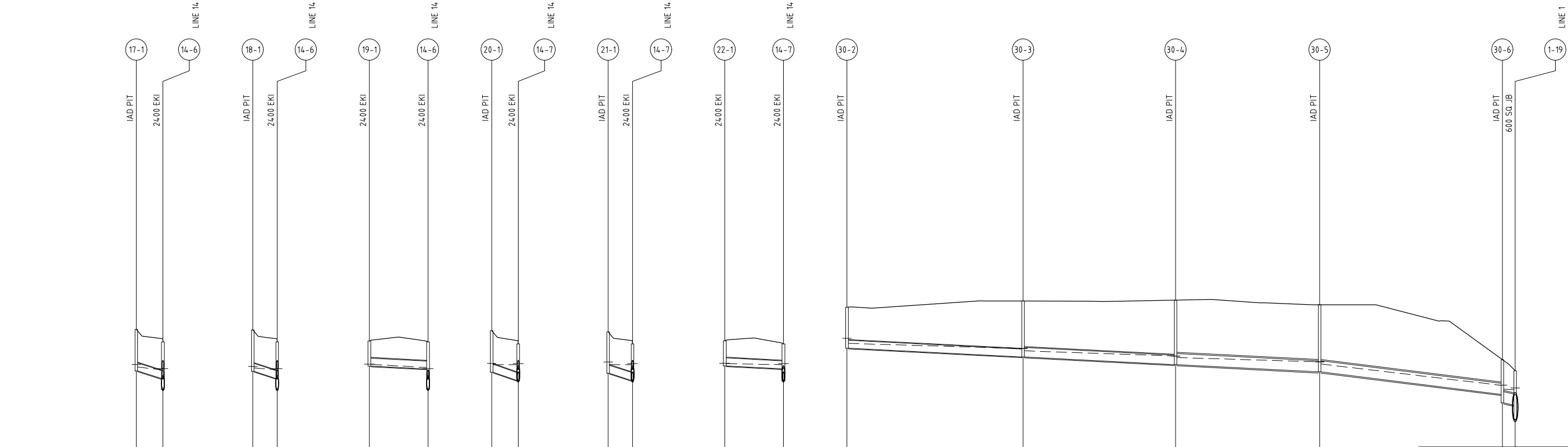
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Designed A.M	Cad Reference 18280C dC222 r5	Client
Scale 1:500H/1:100V	A1 SHEET	
Project Approval IAN HILL (B.E) Consulting Civil Engineer		



**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
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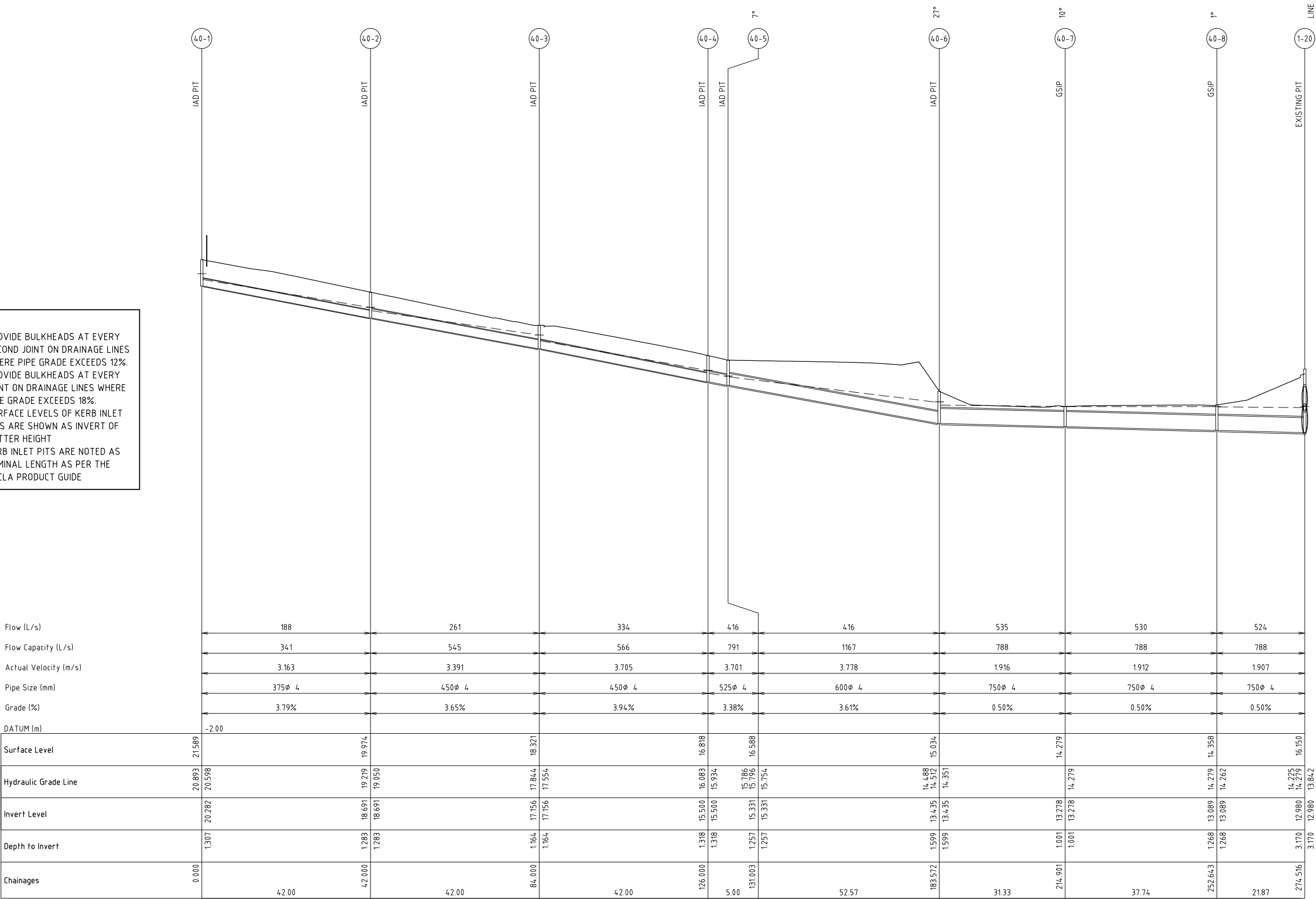
Flow (L/s)	64	49	13	44	64	22	95	174	244	295	372
Flow Capacity (L/s)	422	426	175	439	426	175	175	285	430	676	814
Actual Velocity (m/s)	2.751	2.563	0.938	2.548	2.773	1.079	1.619	1.882	2.049	3.016	3.673
Pipe Size (mm)	375ø 4	375ø 4	375ø 4	375ø 4	375ø 4	375ø 4	375ø 4	450ø 4	525ø 4	525ø 4	525ø 4
Grade (%)	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 20.066	20.408 20.070	20.656 20.517	19.370 18.977	19.317 18.979	19.665 19.526	17.085 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	4.153 36.00		77.534 34.00	111.534 43.14	154.671 3.00

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					North	Scale		COPYRIGHT		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 STAGE 7 DRAINAGE LINES 17, 18, 19, 20, 21, 22 & 30		Project No	
						0 10 20 30 40m 1:500 (A1) 1:1000 (A3)		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.		A.M	18280C dC224 r5					18280C	
						0 2 4 6 8m 1:100 (A1) 1:200 (A3)		Project Approval IAN HILL (B.E) Consulting Civil Engineer		Scale 1:500H/1:100V	A1 SHEET					Drawing No	
Amendment					Description	Drawn	App'd	Date							Revision		
5					DOP COMMENTS	A.M	I.H	30.08.19							C224		
3					CLIENT COMMENTS	A.M	I.H	25.03.19							5		
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



LINE 40

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

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Designed A.M	Cad Reference 18280C dC225 r5
Scale 1:500H/1:100V	A1 SHEET
Project Approval IAN HILL (B.E) Consulting Civil Engineer	

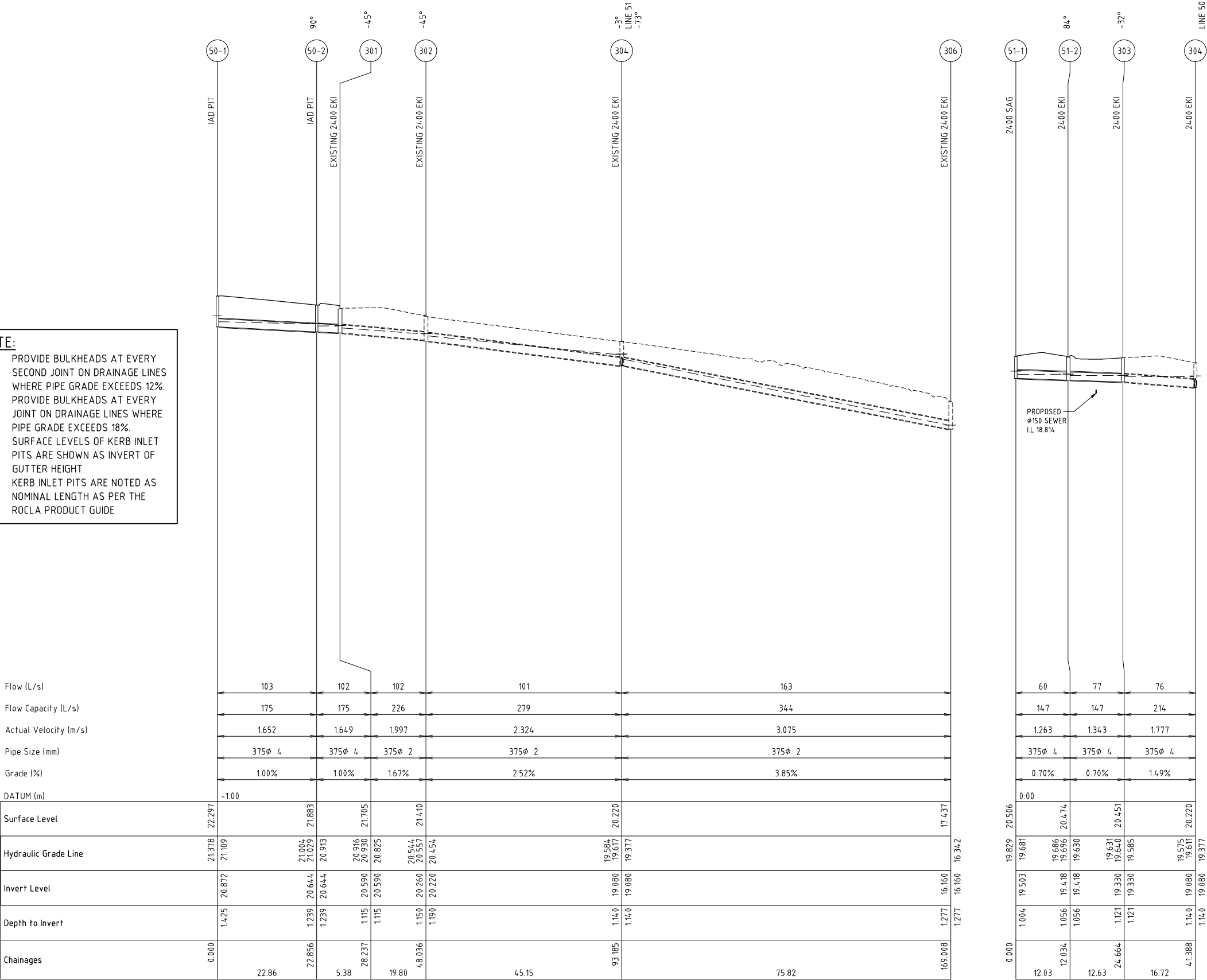
Client

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

- 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 50

LINE 51

					North	Scale 010203040m 1:500 (A1) 02468m 1:100 (A1)		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		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 50 & 51		Project No 18280C	
3 CLIENT COMMENTS					A.M	L.H	25.03.19	Scale 1:500H/1:100V		Project Approval IAN HILL (B.E) Consulting Civil Engineer		Drawing No C226			Revision 3			
1 ORIGINAL ISSUE					A.M	L.H	27.02.19	A1 SHEET										
Amendment					Description	Drawn	App'd	Date										

PLOT DATE: 20/09/2019 11:20:44 AM

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	Partial Qc-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)	(ha)	(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	0.048	0.047	222.1	222.1															222.1	-	
1-2	1P	Direct																						2.3	5.7		-7% Grade	1.9	1-3
1-3	1P	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	30.00	0.5	0.011	6.00	149.00	0.90	0.0730	0.0657																			
1-5	1P	Genietatic	48.00	0.5	0.011	6.00	149.00	0.43	0.0049	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	30.00	0.5	0.011	6.00	149.00	0.90	0.0205	0.0152																			
1-7	1P	Genietatic	48.00	0.5	0.011	6.00	149.00	0.43	0.0077	0.0033	0.0423	17.5	0.0033	0.0423	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	45.00	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	Genietatic	45.00	0.5	0.011	6.00	149.00	0.90	0.0410	0.0369																			
1-11	1P	Direct																											
1-12	1P	Direct																											
1-13	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	0.067	1.39	0.04	0.5	3.0		0.5% Grade	18.6	1-9		
1-14	1P	Genietatic	50.00	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	10ST		
1-15	1P	Genietatic	50.00	0.5	0.011	6.00	149.00	0.90	0.0444	0.0400																			
1-16	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		
1-17	1P	Genietatic	50.00	0.5	0.011	6.00	149.00	0.90	0.0446	0.0400																			
1-18	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		
1-19	1P	Genietatic	40.00	0.5	0.011	6.00	149.00	0.90	0.0356	0.0320																			
1-20	1P	Direct																											
1-21	1P	Direct																											
1-22	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 Caps	15.4	1-14		
1-23	1P	Genietatic	30.00	0.7	0.011	6.00	149.00	0.90	0.0381	0.0343																			
1-24	1P	Genietatic	80.00	0.5	0.011	6.00	149.00	0.43	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 Caps	45.4	1-17	
1-25	1P	Genietatic	80.00	0.5	0.011	6.00	149.00	0.90	0.1124	0.1012																			
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	0.3879	0.3291																			
1-35	1P	Direct																											
1-36	1P	Genietatic	90.00	0.5	0.011	6.00	149.00	0.43	0.0149	0.0076	0.0885	40.8	0.0076	0.0885	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		
1-37	1P	Genietatic	90.00	0.5	0.011	6.00	149.00	0.90	0.1031	0.0909																			
1-38	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	-	
1-39	2P	Genietatic	120.00	0.5	0.011	6.00	149.00	0.90	0.5684	0.5115																			
1-40	1P	Genietatic	65.00	0.5	0.011	6.00	149.00	0.43	0.0107	0.0050	0.1596	66.1	0.0050	0.1596	66.1	66.1	66.1										66.1	-	
1-41	2P	Genietatic	65.00	0.5	0.011	6.00	149.00	0.90	0.1685	0.1516																			
1-42	1P	Genietatic	75.00	0.5	0.011	6.00	149.00	0.43	0.0293	0.0125	0.2497	103.3	0.0125	0.2497	103.3	103.3	103.3										103.3	-	
1-43	2P	Genietatic	75.00	0.5	0.011	6.00	149.00	0.90	0.2635	0.2372																			
1-44	1P	Genietatic	110.00	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	-	
1-45	1P	Genietatic	110.00	0.5	0.011	6.00	149.00	0.90	0.4376	0.3938																			
1-46	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	10ST		
1-47	1P	Genietatic	105.00	0.5	0.011	6.00	149.00	0.90	0.0945	0.0850																			
1-48	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	-	
1-49	2P	Genietatic	85.00	0.5	0.011	6.00	149.00	0.90	0.3454	0.3108																			
1-50	1P	Genietatic	80.00	0.5	0.011	6.00	149.00	0.43	0.0323	0.0138	0.2751	113.9	0.0138	0.2751	113.9	113.9	113.9										113.9	-	
1-51	1P	Genietatic	80.00	0.5	0.011	6.00	149.00	0.90	0.2904	0.2614																			
1-52	1P	Genietatic	70.00	0.5	0.060	23.52	81.87	0.43	0.1556	0.0643	1.2843	292.4	0.0643	1.2843	292.4	292.4	292.4										292.4	-	
1-53	1P	Genietatic	70.00	0.5	0.060	23.52	81.87	0.90	1.3556	1.2200																			

NETWORK 1 - HYDROLOGY

Major 100 Year Storm Event																																	
Pit Name	Catch ID	Tc Method	Catch Length	Catch Slope	Catch Retardant	Time Tc	Intensity I	Runoff C	Area A	Full Catch Sum CA	Full Qc-CA	Full CA	Partial Catch Sum CA	Partial Qc-CA	Partial CA	Catchment Flow Qc	Approach Flow Qc	Road Capacity	Flooded Depth	Flooded Width	Flooded Vel Dep	Road Grade	Road Xfall	Max Pond Depth	Choke Factor	Inlet Curve Nat	Inlet Flow Qc	Bypass 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)	(m)	(-)	(-)	(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																
2P	Kinematic	135.00	0.5	0.060	16.37	143.53	1.00	0.9433	0.9433																								
1-2	1P	Direct	6.00	218.00	0.51	0.0008	0.0004	0.0052	3.1	0.0004	0.0052	3.1	0.0004	0.0052	3.1	3.1	3.1																
1-3	1P	Kinematic	60.00	0.5	0.011	6.00	218.00	0.51	0.0129	0.0066	0.0796	48.2	0.0066	0.0796	48.2	48.2	48.8	693.8	0.090	2.12	0.06	0.5	3.0	0.00	0.5% Grade	-270.3	319.1	1-4					
1P	Kinematic	60.00	0.5	0.011	6.00	218.00	1.00	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	693.8	0.166	5.43	0.17	0.5	3.0	0.00	0.5% Grade	-36.7	374.3	1-5					
1P	Kinematic	30.00	0.5	0.011	6.00	218.00	1.00	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	693.8	0.176	6.15	0.18	0.5	3.0	0.00	0.5% Grade	-11.2	291.8	1-6					
1P	Kinematic	48.00	0.5	0.011	6.00	218.00	1.00	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	693.8	0.163	5.20	0.16	0.5	3.0	0.00	0.5% Grade	-160.7	158.1	1-7					
1P	Kinematic	45.00	0.5	0.011	6.00	218.00	1.00	0.0410	0.0410																								
1-7	1P	Direct	6.00	218.00	0.51	0.0007	0.0004	0.0028	17.5	0.0004	0.0028	17.5	0.0004	0.0028	17.5	17.5	175.7	693.8	0.132	3.55	0.12	0.5	3.0	0.00	0.5% Grade	-244.9	420.6	1-8					
1P	Direct	6.00	218.00	0.51	0.0007	0.0004	0.0028	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	693.8	0.182	6.61	0.19	0.5	3.0	0.00	0.5% Grade	-202.7	248.4	1-9					
1P	Kinematic	51.00	0.5	0.011	6.00	218.00	1.00	0.0461	0.0461																								
1-9	1P	Kinematic	50.00	0.5	0.011	6.00	218.00	0.51	0.0078	0.0040	0.0484	29.3	0.0040	0.0484	29.3	29.3	277.7	693.8	0.155	4.61	0.15	0.5	3.0	0.00	0.5% Grade	-145.8	131.9	1-10					
1P	Kinematic	50.00	0.5	0.011	6.00	218.00	1.00	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	296.6	693.8	0.078	1.72	0.05	0.5	3.0	0.00	0.5% Grade	-401.3	430.9	1-11					
1P	Kinematic	50.00	0.5	0.011	6.00	218.00	1.00	0.0448	0.0448																								
1-11	1P	Kinematic	40.00	0.5	0.011	6.00	218.00	0.51	0.0063	0.0032	0.0388	23.5	0.0032	0.0388	23.5	23.5	454.4	693.8	0.182	6.64	0.19	0.5	3.0	0.00	0.5% Grade	-203.6	250.8	1-12					
1P	Kinematic	40.00	0.5	0.011	6.00	218.00	1.00	0.0356	0.0356																								
1-12	1P	Direct	6.00	218.00	0.51	0.0006	0.0013	0.0161	9.8	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	0.00	0.5% Grade	-139.3	121.3	1-13					
1P	Direct	6.00	218.00	0.51	0.0006	0.0013	0.0161	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	250.8	1-14				
1P	Kinematic	30.00	0.7	0.011	6.00	218.00	1.00	0.0381	0.0381																								
1-14	1P	Kinematic	80.00	0.5	0.011	6.00	218.00	0.51	0.0198	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				
1P	Kinematic	80.00	0.5	0.011	6.00	218.00	1.00	0.1124	0.1124																								
1-15																																	
1-16																																	
1-17																																	
1-18																																	
1-19																																	
1-20																																	
1-21																																	
2-1	2P	Kinematic	120.00	0.5	0.060	15.03	148.88	0.51	0.0526	0.0269	0.5005	207.0	0.0269	0.5005	207.0	207.0	207.0																
2P	Kinematic	120.00	0.5	0.060	15.03	148.88	1.00	0.4735	0.4735																								
1-2	1P	Kinematic	120.00	0.5	0.011	6.00	218.00	0.51	0.0653	0.0334	0.6213	376.3	0.0334	0.6213	376.3	376.3	376.3																
1P	Kinematic	120.00	0.5	0.011	6.00	218.00	1.00	0.5879	0.5879																								
3-2	3P	Kinematic	60.00	0.5	0.011	6.00	218.00	0.51	0.0178	0.0091	0.0591	0.1101	0.0091	0.1101	66.7	66.7	66.7	693.8	0.088	2.42	0.07	0.5	3.0	0.00	0.5% Grade	-294.1	360.8	7-2					
3P	Kinematic	60.00	0.5	0.011	6.00	218.00	1.00	0.1010	0.1010																								
4-1	2P	Kinematic	120.00	0.5	0.011	6.00	218.00	0.51	0.0632	0.0323	0.6007	363.8	0.0323	0.6007	363.8	363.8	363.8																
2P	Kinematic	120.00	0.5	0.011	6.00	218.00	1.00	0.5684	0.5684																								
5-1	5P	Kinematic	120.00	0.5	0.011	6.00	218.00	0.51	0.0196	0.0106	0.1781	107.8	0.0106	0.1781	107.8	107.8	107.8																
5P	Kinematic	120.00	0.5	0.011	6.00	218.00	1.00	0.1685	0.1685																								
6-1	2P	Kinematic	75.00	0.5	0.011	6.00	218.00	0.51	0.0293	0.0150	0.2785	168.7	0.0150	0.2785	168.7	168.7	168.7																
2P	Kinematic	75.00	0.5	0.011	6.00	218.00	1.00	0.2635	0.2635																								
7-1	7P	Kinematic	120.00	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																
7P	Kinematic	120.00	0.5	0.011	6.00	218.00	1.00	0.4376	0.4376																								
7-2	1P	Kinematic	105.00	0.5	0.011	6.00	218.00	0.51	0.0167	0.0085	0.1030	62.4	0.0085	0.1030	62.4	62.4	433.1	693.8	0.178	6.35	0.18	0.5	3.0	0.00	0.5% Grade	-234.4	657.6	1-05T					
1P	Kinematic	105.00	0.5	0.011	6.00	218.00	1.00	0.0945	0.0945																								

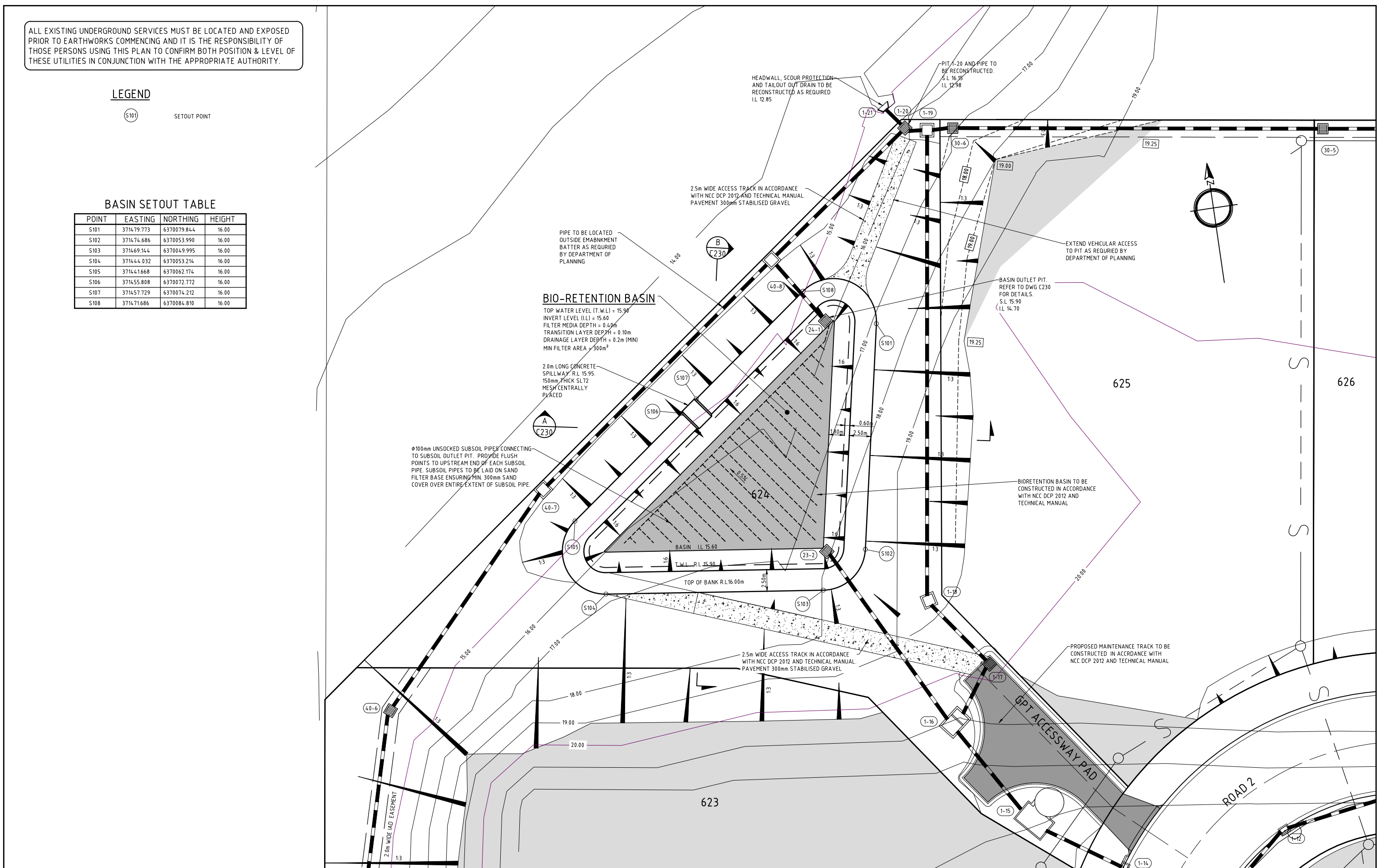
LEGEND

(S101)

SETOUT POINT

BASIN SETOUT TABLE

POINT	EASTING	NORTHING	HEIGHT
S101	3714.79.773	6370079.84	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



6	NCC COMMENTS	AM	I/H	20.09.19
5	DDP COMMENTS	AM	I/H	30.08.19
4	GPT AMENDMENTS	AM	I/H	17.04.19
1	ORIGINAL ISSUE	AM	I/H	27.02.19
Amendment	Description	Drawn	App'd	Date

North

Scale



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Designed	
A.M	

Scale
1:200

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

Cad Reference
18280C dC229 r6

	A1 SHEET
--	----------

Client	
--------	--



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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

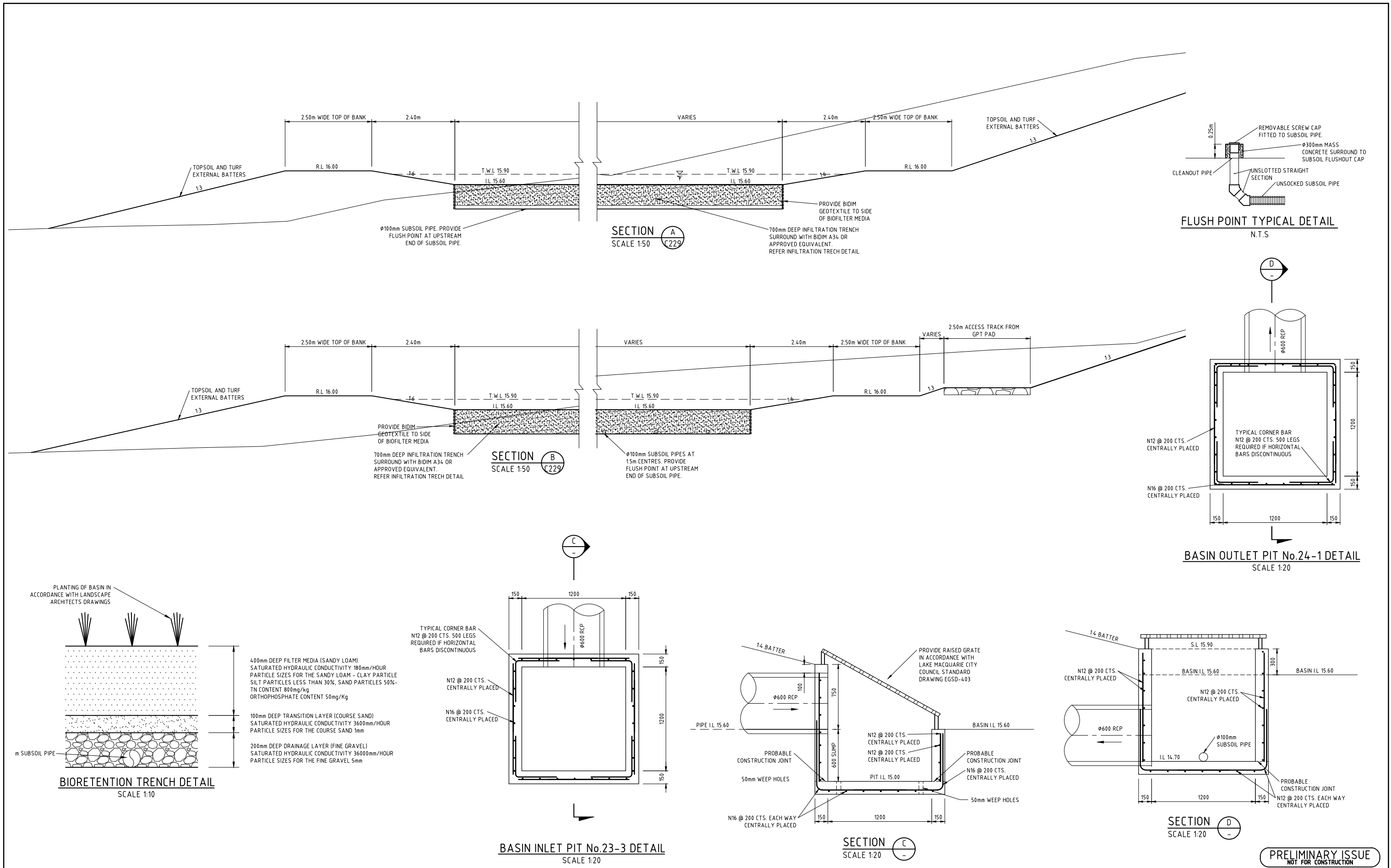
BASIN DETAIL PLAN

Project No	
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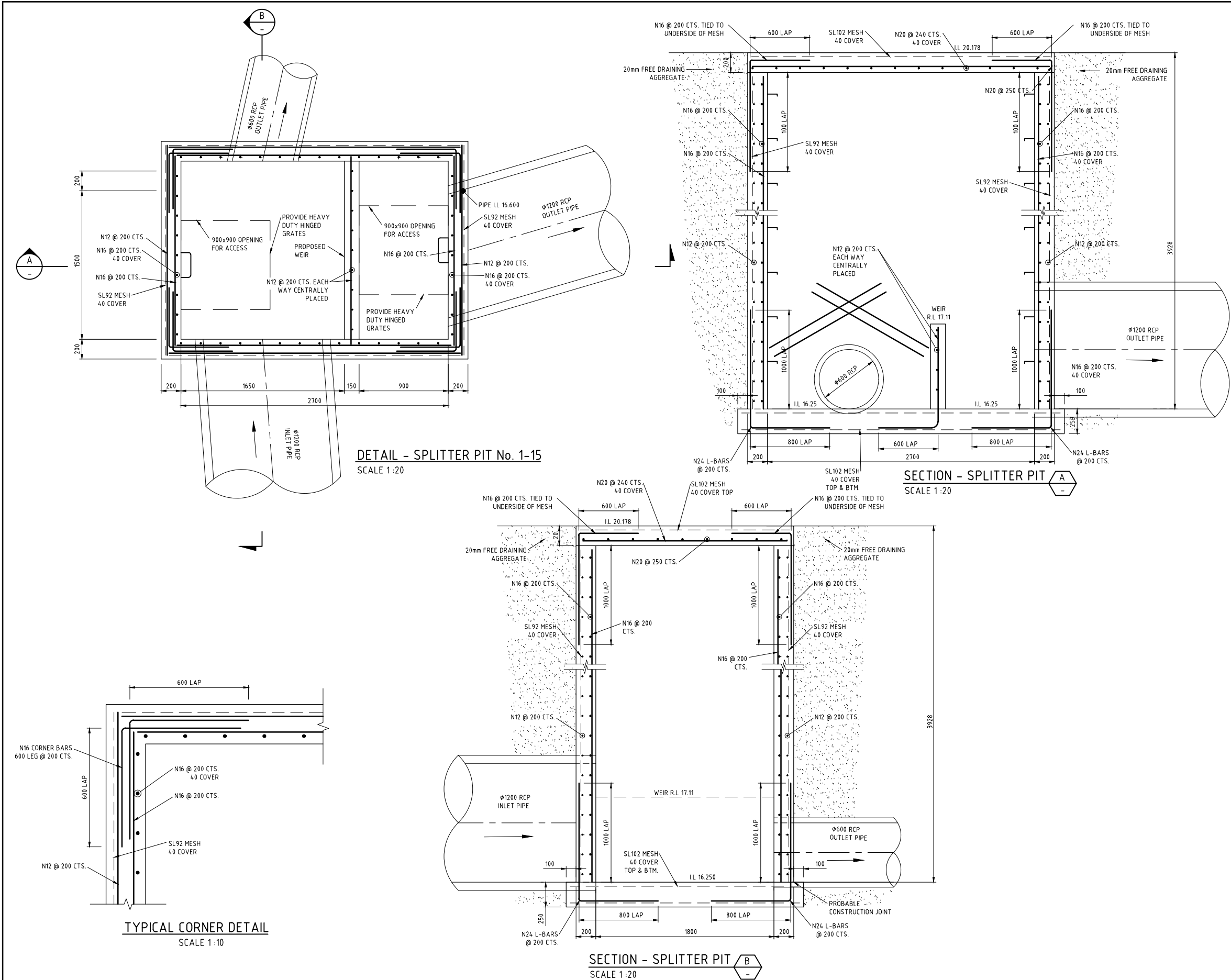
18280C

Drawing No

revision



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								Scale A1 SHEET	Project Approval IAN HILL (B.E) Consulting Civil Engineer			STAGE 7		Drawing No C230	Revision 4	
												DETENTION BASIN SECTIONS				
4	GPT AMENDMENTS				A.M	L.H	17.04.19									
1	ORIGINAL ISSUE				A.M	L.H	27.02.19									
Amendment	Description				Drawn	App'd	Date									



REINFORCED CONCRETE

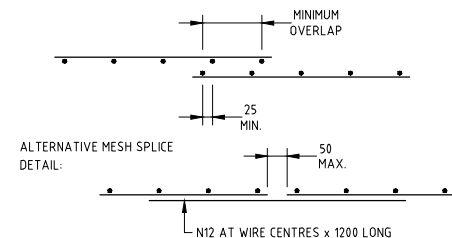
- C1. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH AS3600 CURRENT EDITION WITH AMENDMENTS, EXCEPT WHERE VARIED BY THE CONTRACT DOCUMENTS.
- C2. CONCRETE COMPONENTS AND QUALITY SHALL BE AS FOLLOWS:

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 DIAGMATIC 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.

Amendment	Description	Drawn	App'd	Date
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

North
Scale

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Designed S.M
Scale
Project Approval
IAN HILL (B.E)
Consulting Civil Engineer

Cad Reference
18280C dC232 r5
A1 SHEET

Client

GCA
ENGINEERING SOLUTIONS
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1 HARTLEY DRIVE, THORNTON NSW 2322
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PHONE: (02) 4964 1811

PROPOSED SUBDIVISION
FREEWAY NORTH BUSINESS PARK
STAGE 7
SPLITTER PIT 1-16 DETAILS (1 OF 2)

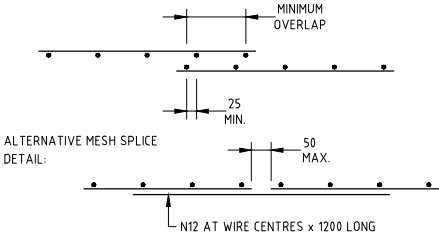
Project No
18280C
Drawing No
C232
Revision
5

REINFORCED CONCRETE

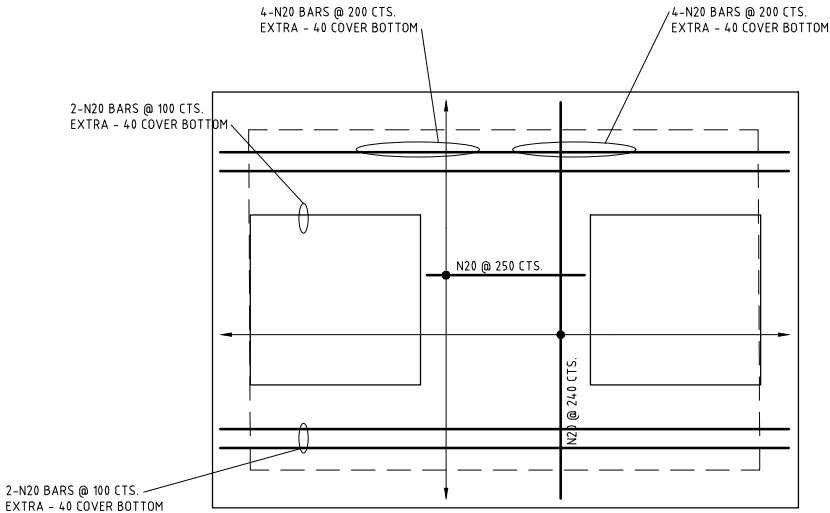
- C1. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH AS3600 CURRENT EDITION WITH AMENDMENTS, EXCEPT WHERE VARIED BY THE CONTRACT DOCUMENTS.
- C2. CONCRETE COMPONENTS AND QUALITY SHALL BE AS FOLLOWS:
- | ELEMENT | SLUMP
mm | MAX. SIZE
AGG. mm | CEMENT
TYPE | F'c AT 28
DAYS - MPa | ADMIXTURE |
|----------|-------------|----------------------|----------------|-------------------------|-----------|
| 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	
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STRIP FOOTINGS	-	50	65
COLUMNS	40	50	75
WALLS	20	40	65
BEAMS	25	40	65
SLABS	20	40	65

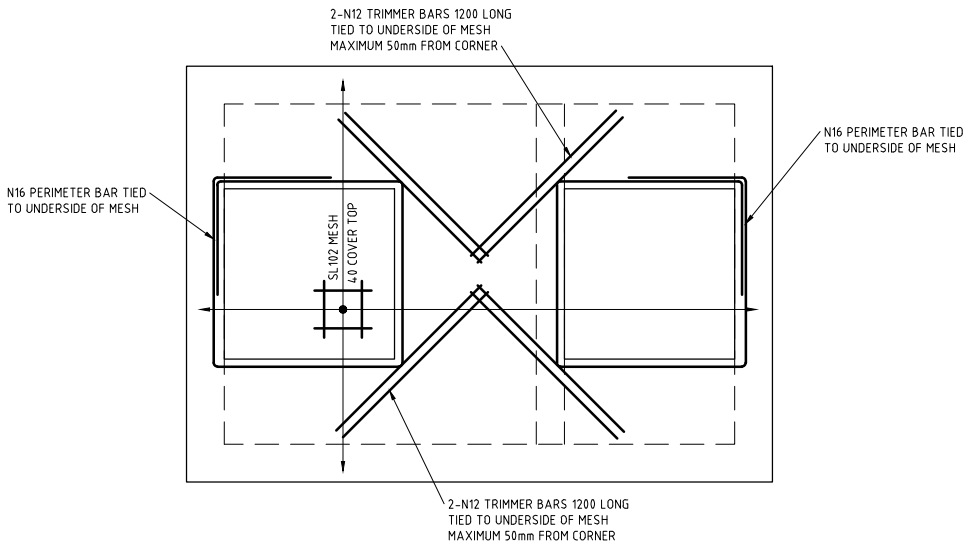
- C4. COVER TO REINFORCEMENT SHALL BE OBTAINED BY THE USE OF APPROVED BAR CHAIRS. ALL CHAIRS SHALL BE SPACED AT 1000 CTS MAXIMUM.
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- C6. SIZES OF CONCRETE ELEMENTS DO NOT INCLUDE THICKNESS OF APPLIED FINISHES.
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- C16. EXPOSED CORNERS SHALL BE 20 mm CHAMFERED UNO.
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- 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

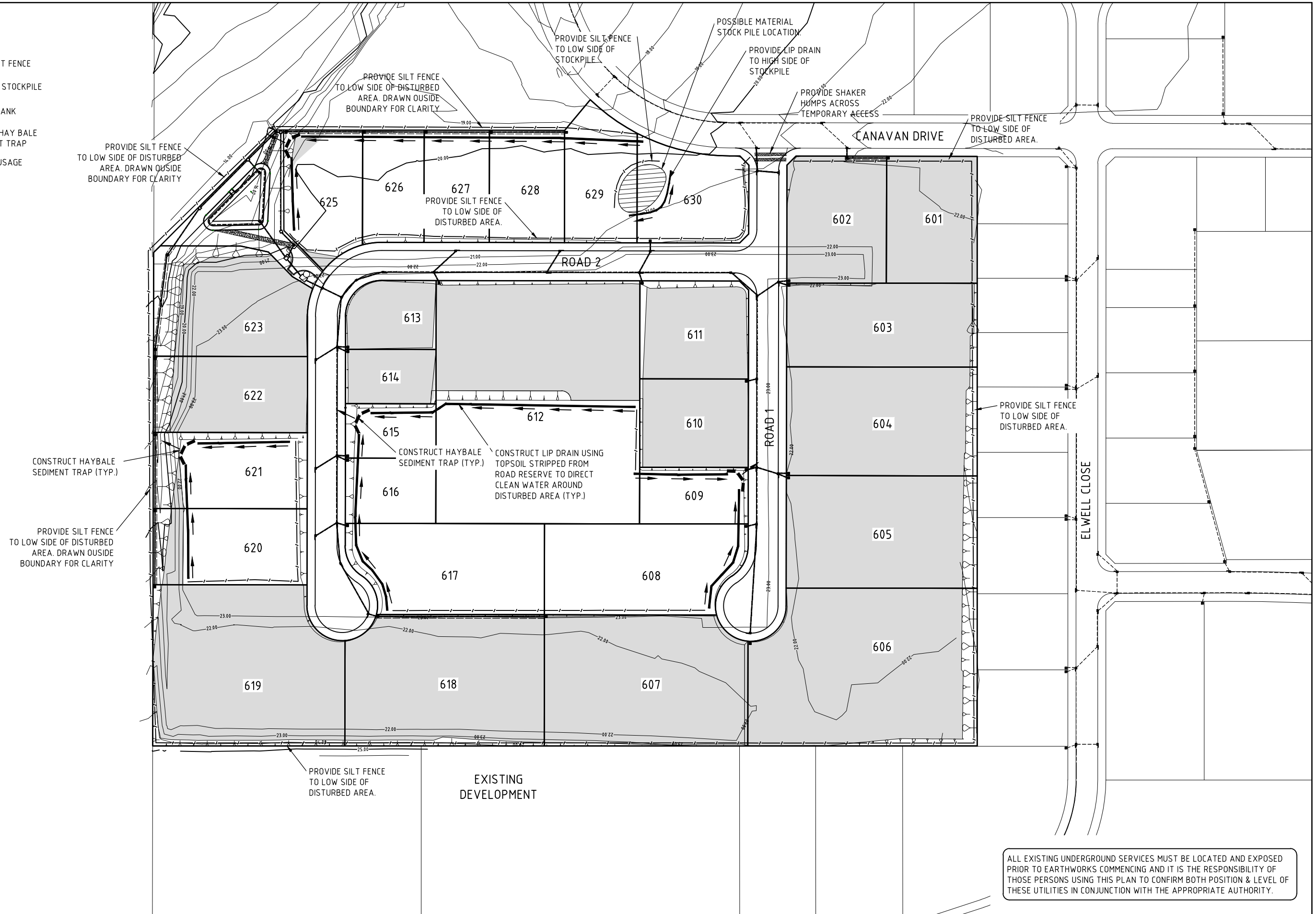


SPLITTER PIT LID - TOP REINFORCEMENT LAYOUT
SCALE 1:20

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									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											

LEGEND:

- SEDIMENT FENCE
TOPSOIL STOCKPILE
EARTH BANK
5m x 5m HAY BALE SEDIMENT TRAP
SILT SAUSAGE



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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6	NCC COMMENTS	A.M	I.H	20.09.19				Scale 1:1000	A1 SHEET			Project Approval IAN HILL (B.E) Consulting Civil Engineer	Drawing No C234	Revision 6	
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											

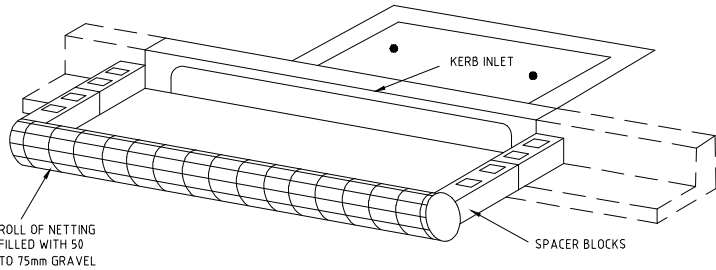
SOIL & WATER MANGEMENT NOTES

- 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.

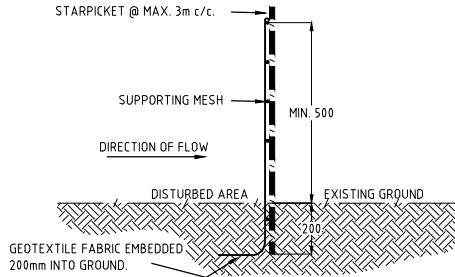
HYDROMULCH SEED MIXES

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

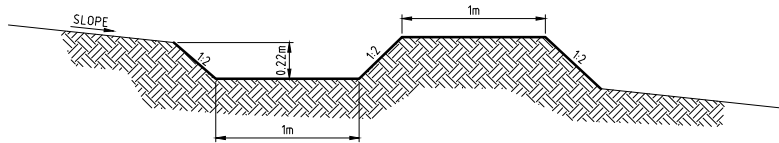
- THE AREA OVER ALL STORMWATER AND SEWER LINES NOT WITHIN ROAD RESERVES IS TO BE MULCHED AND SEEDED WITHIN 14 DAYS AFTER BACKFILL.
- ALL DISTURBED AREAS ARE TO BE GRASSED/RE-VEGETATED WITHIN 14 DAYS OF DISTURBANCE IF NO WORK IS TO OCCUR IN THAT ARE WITHIN THE NEXT 14 DAYS.
- AREAS OVER ELECTRICITY, TELEPHONE 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

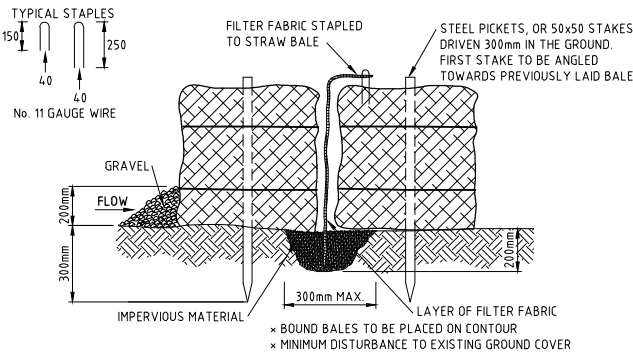


SEDIMENT FENCE.



EARTH BANK
N.T.S

	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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