
From: Carman, Robert J <Robert.Carman@jacobs.com>
Sent: Thursday, 8 March 2018 9:36 AM
To: Neil Beck
Cc: McEwan, Daniel
Subject: Ocean Breeze Stage 6A (Your Ref: 44/2400/2017)
Attachments: IH132900-CI-SK-0013_A.pdf; _180222 Ocean Breeze Layout - 20m PS Offset.pdf; _IH132900-Stage 4C to 5 piped system.pdf; IH132900-CI-SK-0011_A.pdf; _180222 Ocean Breeze Layout - 20m PS Offset.pdf; IH094400-CI-DG-0119_D.pdf; CB24301-C-20-J.pdf; 180307-Overland Flood Extents-250.pdf

Hi Neil,

Further to our meeting in your office to discuss the Action Notice, I have attached the following information associated with the majority of the details contained within the Notice.

Lot 903 – the extent of construction within this lot has been significantly reduced by redirection of the sewer and stormwater lines.

Action Notice Items

1. See attached aerial image overlay (SK-0013) which shows the vegetation in relation to the proposed lots. No meetings with any Govt agencies have occurred.
2. We have completed sufficient masterplanning, including field survey of the existing drainage channel where the Julaji Close stormwater system will outlet to, to determine that a feasible drainage system through Stage 5 is achievable. Sketches and calculations that accompany the masterplanning are attached.
3. The stormwater outlet level will be raised to RL 1.4m. This is free draining as shown on the attached sketch (SK-0013) which is based on LIDAR information that RPS provided to us and which is similar to the DSC LIDAR contours. The level is similar to those in Stage 1 (RL 0.9 and 1.46) and Stage 5 (RL 1.62). The outlet level is above most tidal influence. The tailwater level used for stormwater calculations is RL 2.0m. This level is above the HAT (RL 1.78m). The need to assess hydraulic grade to the Mossman River is queried as the co-incidence of flood flows in that river and Q5 flooding of the subject site occurring simultaneously is a much less frequent occurrence than a Q5 recurrence interval.
4. The drain section that shows 407mm of depth is the maximum achievable depth – not the actual depth in a Q100 event. Nevertheless the flow path has been altered with changes to the sewer and stormwater systems. These changes have made the overland flowpath wider. A HECRAS analysis has been completed for the overland system and is attached which shows that the Q100 is contained in the flowpath. The VxD calculation for the flowpath is attached. There is more merit in placing the low point at the bend as the speed of any vehicle at the bend is more likely to be approximately 20 km/hr. The low point has always been indicated on the original masterplanning for the estate.
5. An alternative sewer masterplan is attached. Sewer depth has been reduced (max. depth is generally less than 3m except for the last lines contained within the lot that will be transferred to DSC) by inclusion of another lift station in Stage 5.
6. Please refer to the attached sewer masterplans. The pump station has been included on a lot that will be transferred to DSC. The sewer pump station is located a minimum of 20m from Lot 245. Given that the prevailing breezes are south-easterly and northerly then this location is considered adequate. The existing sewer pump station on Cooya Beach Road is within 20m of the nearest residence. Attached are the plans showing the last 2 pump stations that we have designed – neither of these have achieved a 30m separation from residential lots. The sewer pressure main has been removed from the park.

7. The footpath location can be shifted to the correct alignment – we were matching the previous stage drawings. The road grade at the intersection will be amended although it is not considered necessary at an intersection to do so. The temporary turnaround will be amended to be free draining.
8. The subsoil drain will be amended. Clearance to the water main will be reviewed. No additional pits are required as the flow does not cross the crown. An additional pit will be included to reduce the flow at Pit 2/6. A catchment plan is attached. Pipe types will be amended on the long sections. Q100 flow calculations are not required at each pit. A GPT has not been provided as the previous stage did not include one.
9. Pump station drawings will be supplied by the manufacturer. Pump station overflow will be independent of the stormwater system. The original masterplan allowed for this stage to be connected via Stage 5 and 1B to the pump station in Cooya Beach Road and hence the need to confirm downstream capacity is not considered necessary.
10. A revised Statement of Compliance will be submitted when the stormwater and sewer masterplans are agreed and revised drawings resubmitted.

We would like to convene another meeting to discuss these responses so that some agreement can be reached to allow us to revise the Op Works drawings. Please advise a suitable date and time.

Robert Carman

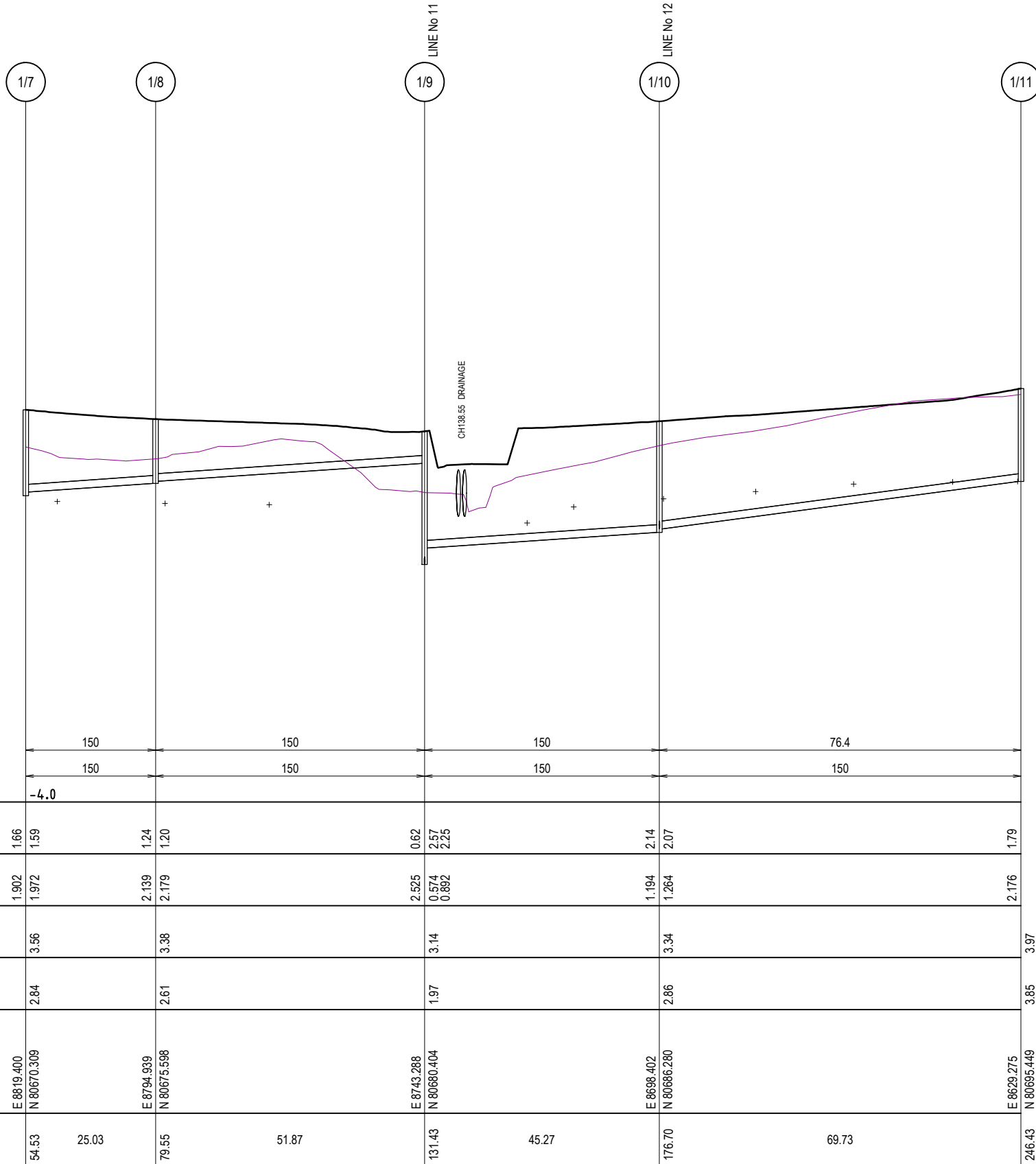
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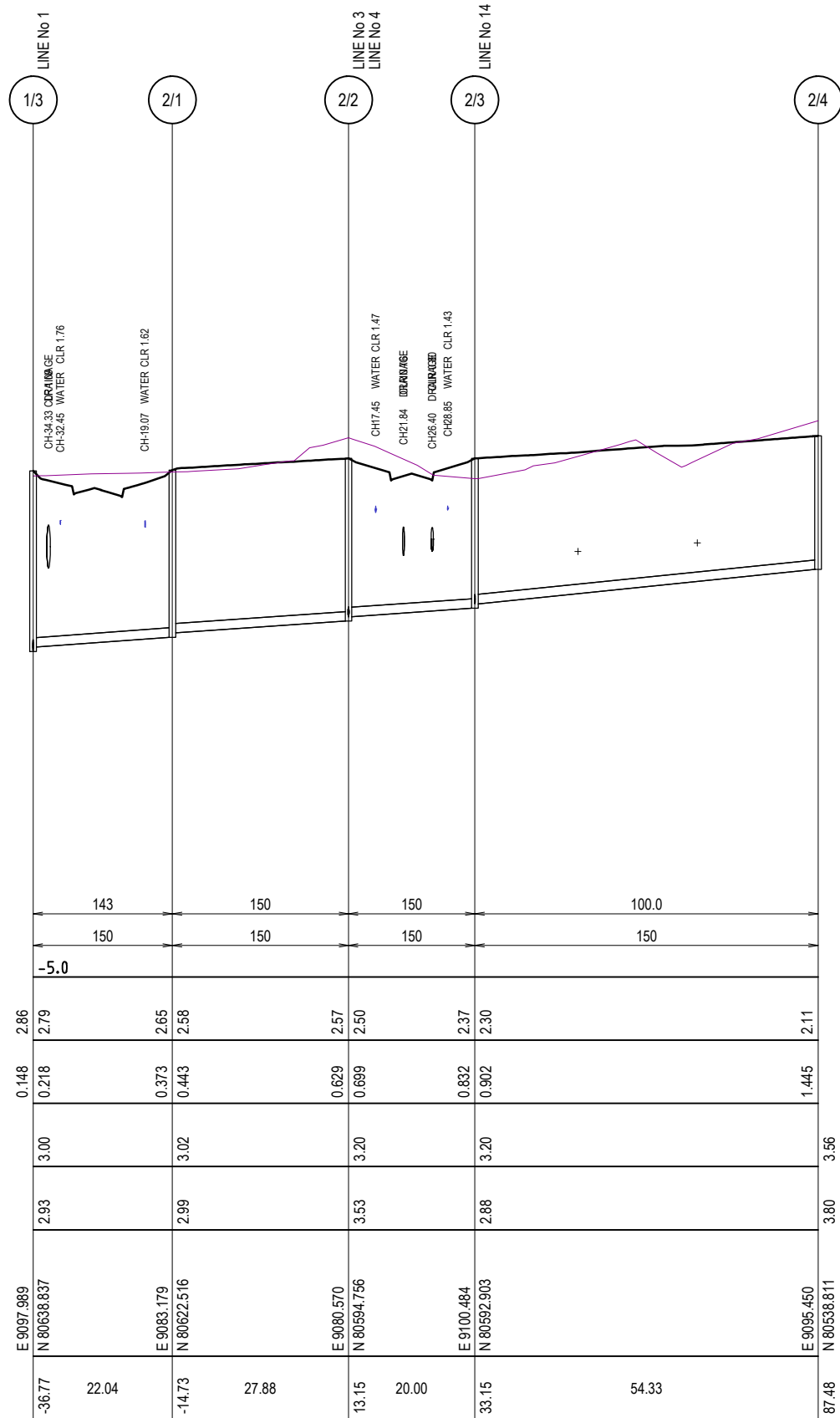
E: robert.carman@jacobs.com

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DATE: 12/02/2018 2:25:24 PM LOGIN NAME: BOUNDY, TROY A
LOCATION: C:\Users\boundy\appdata\local\project\sewer\jacobs_anz_16d181121180201 Sewer Pump Station - Option 2.dwg



LINE 1



LINE 2

PROJECT
OCEAN BREEZE COOYA BEACH

TITLE
OPTION 2
SEWER LONG SECTIONS

DATE
01.02.18

SCALE
1:500 H, 1:50 V (A1)

PROJ. No.
IH132900

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SCALE 1:50 (A1)

1:100 (A3)

SCALE 1:500 (A1)

1:1000 (A3)

0 1 2 3 4 5m

0.5

0 10 20 30 40 50m

5

PRELIMINARY ISSUE

DATE: 12/02/2018 2:26 PM LOGIN NAME: BOUNDY, TROY A
LOCATION: C:\Users\boundy\appdata\local\project\sewer\jacobs_anz_1610181121180201 Sewer Pump Station - Option 2.dwg

GRADE (1 in "X")	25.7	
PIPE SIZE (mm)	150	
DATUM RL	-4.0	
DEPTH TO INVERT	2.11	2.04
INVERT LEVEL	1.445	1.515
DESIGN SURFACE LEVEL	3.56	2.186
EXISTING SURFACE LEVEL	3.80	4.17
SETOUT COORDINATES	E 9095.450 N 80638.811	E 9092.652 N 80621.778
CHAINAGE	87.48	17.26

LINE 2

LINE 3

LINE No 2	2/2	2/5E	2/4
LINE No 5	3/1	3/2	3/3E
LINE No 6	3/2	3/2	3/3E
CH6248 WATER CLR 1.48			
CH8083 WATER CLR 1.25			
GRADE (1 in "X")	75.9		
PIPE SIZE (mm)	150		
DATUM RL	-4.0		
DEPTH TO INVERT	2.57	2.50	2.50
INVERT LEVEL	0.629	0.699	0.699
DESIGN SURFACE LEVEL	3.20	3.20	3.20
EXISTING SURFACE LEVEL	3.53	3.53	3.53
SETOUT COORDINATES	E 9080.570 N 80694.756	E 9023.902 N 80600.029	E 8983.999 N 80602.812
CHAINAGE	0.00	56.91	30.03

LINE 4

LINE No 2	2/2	2/2	2/2
LINE No 3	4/1	3/1	5/1
LINE No 5	5/2E	3/2	6/1E
GRADE (1 in "X")	61.8		
PIPE SIZE (mm)	150		
DATUM RL	-4.0		
DEPTH TO INVERT	2.57	2.50	2.50
INVERT LEVEL	0.629	0.699	0.699
DESIGN SURFACE LEVEL	3.20	3.20	3.20
EXISTING SURFACE LEVEL	3.53	3.53	3.53
SETOUT COORDINATES	E 9080.570 N 80694.756	E 9075.073 N 80636.279	E 9016.423 N 80580.159
CHAINAGE	0.00	58.74	10.55

LINE 5

LINE No 3	3/1	5/1	5/2E	3/2	6/1E
LINE No 5	5/2E	3/2	6/1E	3/2	6/1E
GRADE (1 in "X")	150				
PIPE SIZE (mm)	150				
DATUM RL	-3.0				
DEPTH TO INVERT	2.25	2.18	2.13	2.06	1.50
INVERT LEVEL	1.449	1.519	1.660	1.730	2.348
DESIGN SURFACE LEVEL	3.70	3.70	3.79	3.79	3.85
EXISTING SURFACE LEVEL	4.53	4.53	6.91	6.94	6.94
SETOUT COORDINATES	E 9023.902 N 80600.029	E 9016.423 N 80580.159	E 9006.466 N 80576.676	E 8983.999 N 80602.812	E 8991.150 N 80590.247
CHAINAGE	0.00	21.23	10.55	31.78	12.88

LINE 6

PROJECT
OCEAN BREEZE COOYA BEACH

TITLE
OPTION 2
SEWER LONG SECTIONS

DATE
01.02.18

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SCALE 1:500 (A1)

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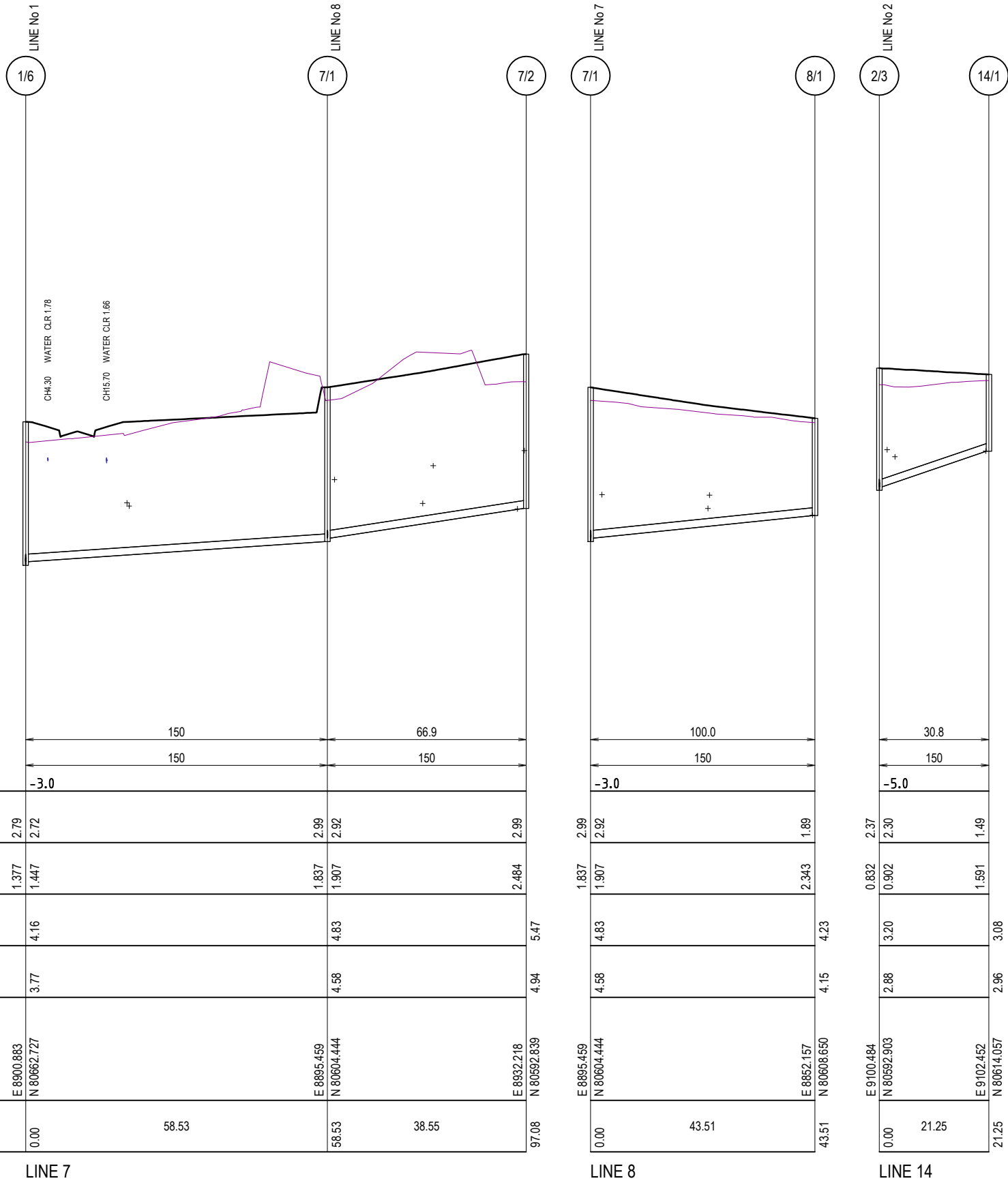
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0 10 20 30 40 50m

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PRELIMINARY ISSUE

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PROJECT
OCEAN BREEZE COOYA BEACH

TITLE
OPTION 2
SEWER LONG SECTIONS

DATE
01.02.18

SCALE
1:500 H, 1:50 V (A1)

PROJ. No.
IH132900

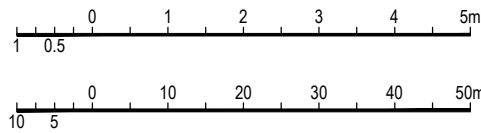
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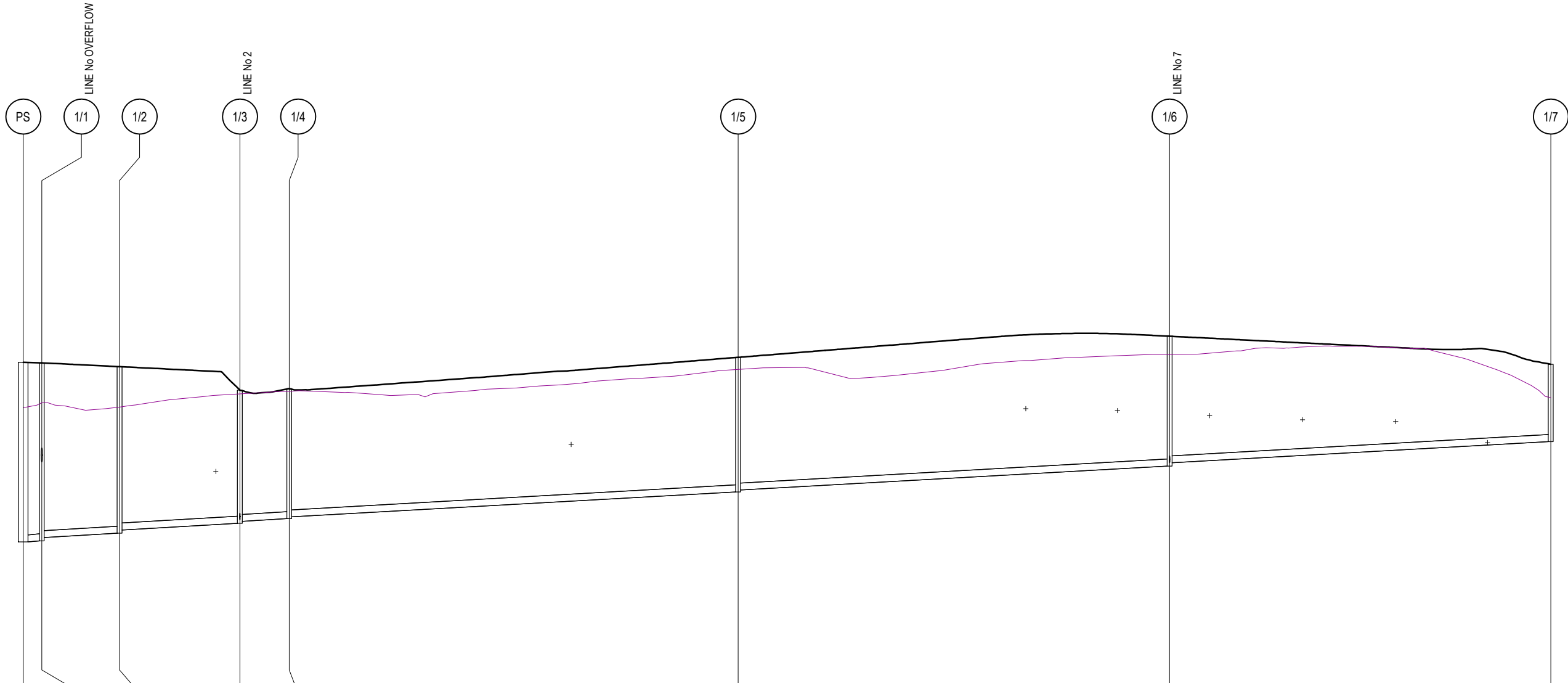
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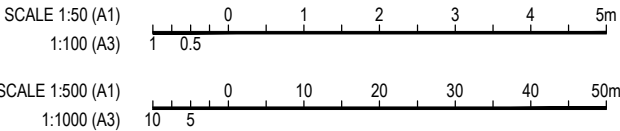
GRADE (1 in "X")	180		180		180		180		180				180				180						
PIPE SIZE (mm)	150		150		150		150		150				150				150						
DATUM RL	-5.0																						
DEPTH TO INVERT	3.85	3.85	3.82	3.75	3.57	3.50		2.86	2.82		2.79	2.75			2.89	2.85			2.79	2.72		1.66	
INVERT LEVEL	-0.250	-0.250	-0.228	-0.158	-0.065	0.005		0.148	0.188		0.247	0.287			0.822	0.862			1.377	1.447		1.902	
DESIGN SURFACE LEVEL		3.60		3.59		3.51			3.00		3.04				3.71				4.16			3.56	
EXISTING SURFACE LEVEL		2.63		2.73		2.64			2.93		2.98				3.45				3.77			2.84	
SETOUT COORDINATES	E 9132.306 N 80663.606		E 9128.779 N 80665.493		E 9120.905 N 80660.779			E 9097.989 N 80638.837		E 9089.019 N 80644.467				E 8993.062 N 80653.396				E 8900.883 N 80662.727			E 8819.400 N 80670.309		
CHAINAGE	-273.45	4.00	-269.45	16.69	-252.76	25.84		-226.92	10.59	-216.33			96.37		-119.96		92.65		-27.31		81.83		54.53

LINE 1

PROJECT
OCEAN BREEZE COOYA BEACH
TITLE
OPTION 2
SEWER LONG SECTIONS
DATE
01.02.18
SCALE
1:500 H, 1:50 V (A1)
PROJ. No.
IH132900

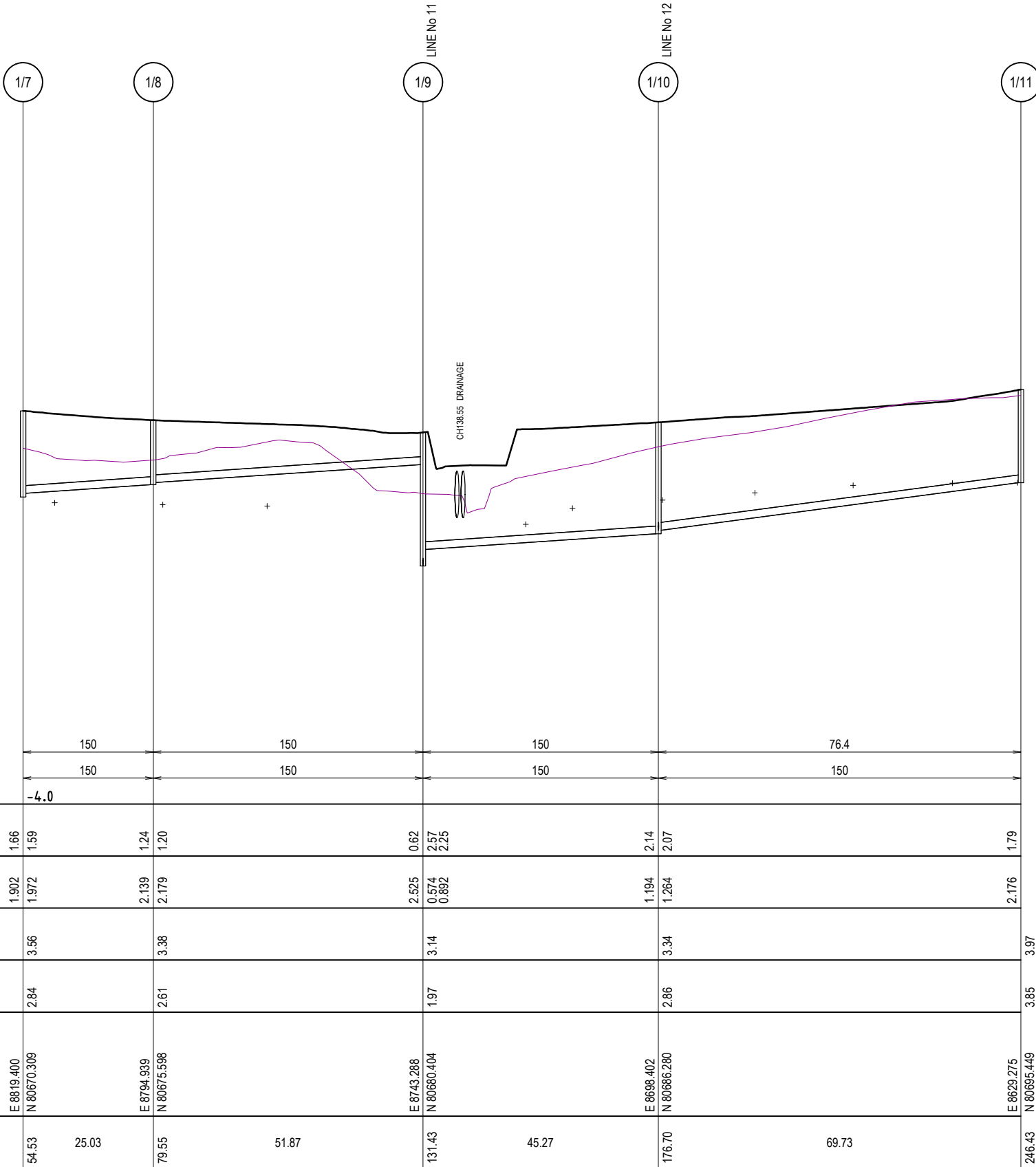
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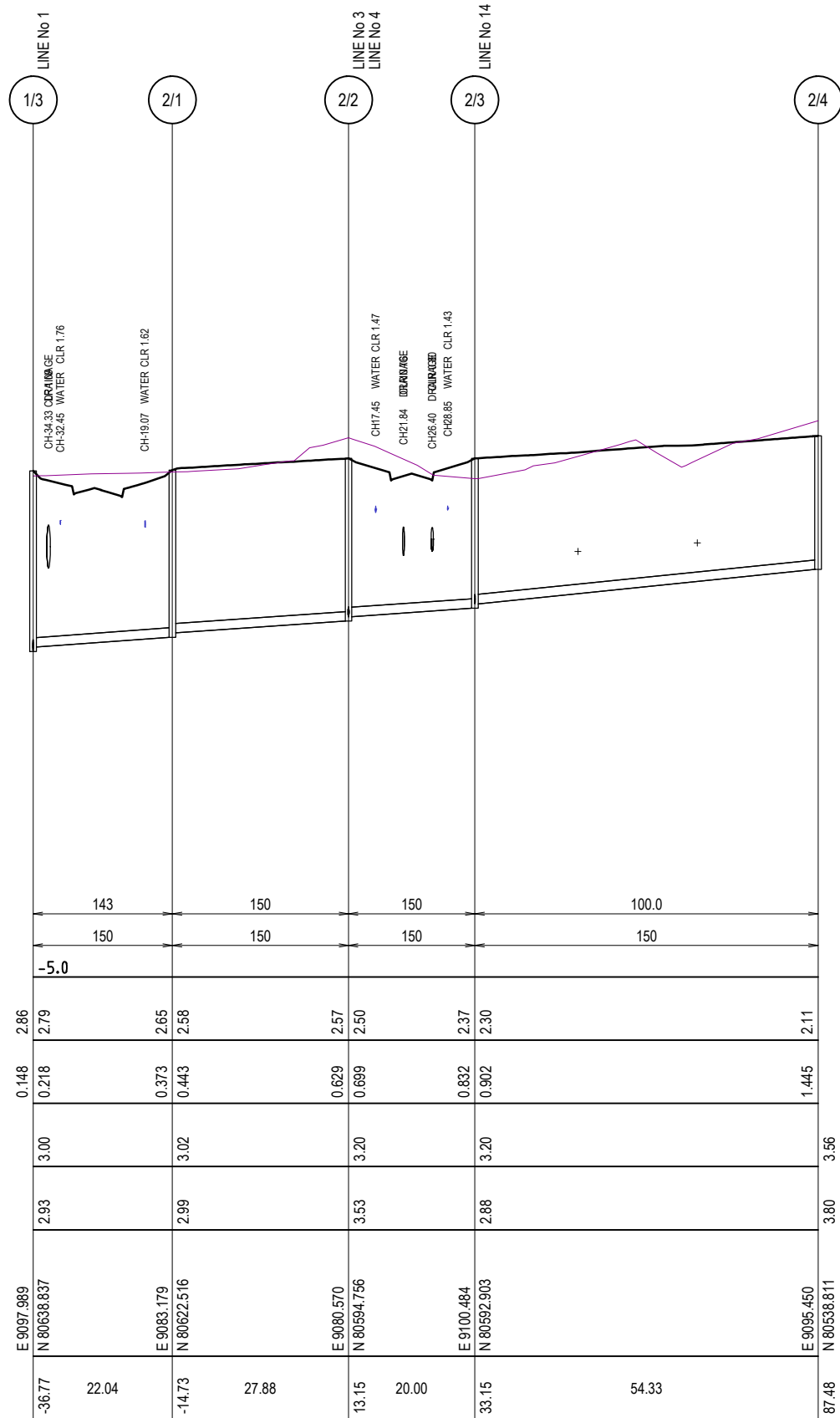


PRELIMINARY ISSUE

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LINE 1



LINE 2

PROJECT
OCEAN BREEZE COOYA BEACH

TITLE
OPTION 2
SEWER LONG SECTIONS

DATE
01.02.18

SCALE
1:500 H, 1:50 V (A1)

PROJ. No.
IH132900

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SCALE 1:50 (A1)

1:100 (A3)

SCALE 1:500 (A1)

1:1000 (A3)

0 1 2 3 4 5m

1 0.5

0 10 20 30 40 50m

10 5

PRELIMINARY ISSUE

DATE: 12/02/2018 2:26 PM LOGIN NAME: BOUNDY, TROY A
LOCATION: C:\Users\boundy\appdata\local\project\sewer\jacobs_anz_1610181121180201 Sewer Pump Station - Option 2.dwg

GRADE (1 in "X")	25.7	
PIPE SIZE (mm)	150	
DATUM RL	-4.0	
DEPTH TO INVERT	2.11	2.04
INVERT LEVEL	1.445	1.515
DESIGN SURFACE LEVEL	3.56	2.186
EXISTING SURFACE LEVEL	3.80	4.17
SETOUT COORDINATES	E 9095.450 N 80638.811	E 9092.652 N 80621.778
CHAINAGE	87.48	17.26

LINE 2

LINE 3

LINE No 2	2/2	2/5E	2/4
LINE No 5	3/1	3/2	3/3E
LINE No 6	3/2	3/2	3/3E
CH6248 WATER CLR 1.48			
CH8083 WATER CLR 1.25			
GRADE (1 in "X")	75.9		
PIPE SIZE (mm)	150		
DATUM RL	-4.0		
DEPTH TO INVERT	2.57	2.50	2.50
INVERT LEVEL	0.629	0.699	0.699
DESIGN SURFACE LEVEL	3.20	3.70	3.70
EXISTING SURFACE LEVEL	3.53	4.53	4.55
SETOUT COORDINATES	E 9080.570 N 80694.756	E 9023.902 N 80600.029	E 8983.999 N 80602.812
CHAINAGE	0.00	56.91	30.03

LINE 4

LINE No 2	2/2	2/2	2/2
LINE No 3	4/1	3/1	5/1
LINE No 5	5/2E	3/2	6/1E
GRADE (1 in "X")	61.8		
PIPE SIZE (mm)	150		
DATUM RL	-4.0		
DEPTH TO INVERT	2.57	2.50	2.50
INVERT LEVEL	0.629	0.699	0.699
DESIGN SURFACE LEVEL	3.20	3.70	3.70
EXISTING SURFACE LEVEL	3.53	4.53	4.55
SETOUT COORDINATES	E 9080.570 N 80694.756	E 9075.073 N 80636.279	E 9016.423 N 80580.159
CHAINAGE	0.00	58.74	10.55

LINE 5

LINE No 3	3/1	5/1	5/2E
LINE No 5	3/2	6/1E	6/1E
GRADE (1 in "X")	150		
PIPE SIZE (mm)	150		
DATUM RL	-3.0		
DEPTH TO INVERT	2.25	2.18	2.13
INVERT LEVEL	1.449	1.519	1.660
DESIGN SURFACE LEVEL	3.70	3.79	3.79
EXISTING SURFACE LEVEL	4.53	6.91	6.94
SETOUT COORDINATES	E 9023.902 N 80600.029	E 9016.423 N 80580.159	E 9006.466 N 80576.676
CHAINAGE	0.00	21.23	10.55

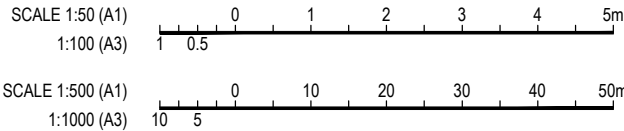
LINE 6

LINE No 3	3/2	6/1E	6/1E
GRADE (1 in "X")	28.8		
PIPE SIZE (mm)	150		
DATUM RL	-3.0		
DEPTH TO INVERT	1.96	1.89	1.49
INVERT LEVEL	1.805	1.875	2.322
DESIGN SURFACE LEVEL	3.77	3.77	3.81
EXISTING SURFACE LEVEL	4.49	5.22	5.22
SETOUT COORDINATES	E 8983.999 N 80602.812	E 8991.150 N 80590.247	E 8991.150 N 80590.247
CHAINAGE	0.00	12.88	12.88

PROJECT
OCEAN BREEZE COOYA BEACH
TITLE
OPTION 2
SEWER LONG SECTIONS
DATE
01.02.18
SCALE
1:500 H, 1:50 V (A1)
PROJ. No.
IH132900

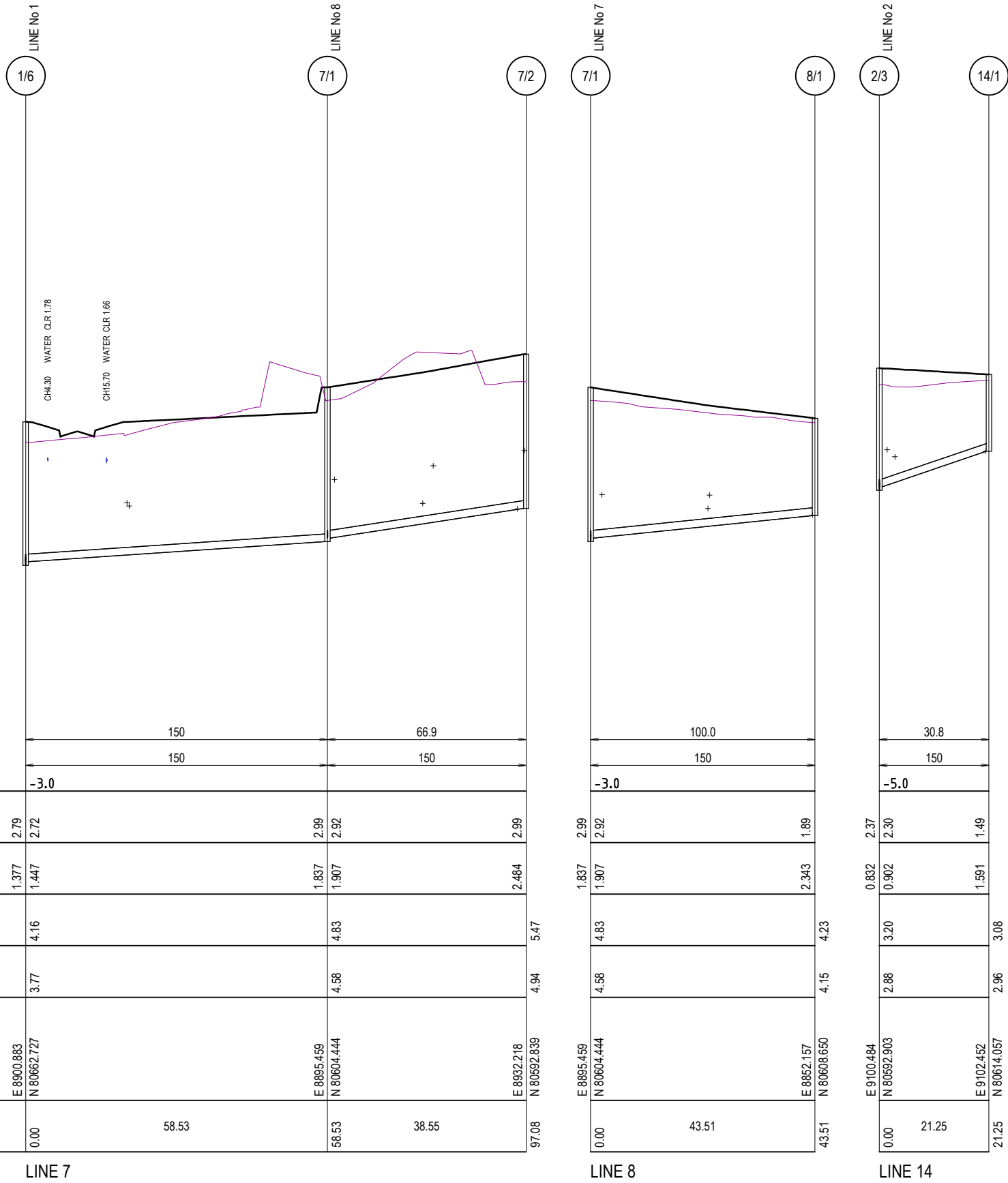
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PRELIMINARY ISSUE

DATE: 12/02/2018 2:25:28 PM LOGIN NAME: BOUNDY, TROY A
LOCATION: C:\Users\boundy\appdata\local\project\sewer\jacobs_anz_1\add18112118201 Sewer Pump Station - Option 2.dwg



PROJECT
OCEAN BREEZE COOYA BEACH

TITLE
OPTION 2
SEWER LONG SECTIONS

DATE
01.02.18

SCALE
1:500 H, 1:50 V (A1)

PROJ. No.
IH132900

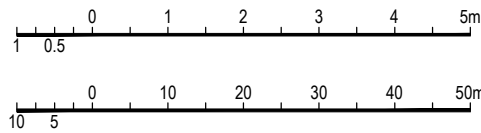
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1:100 (A3)

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1:1000 (A3)



PRELIMINARY ISSUE



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Subject	Drainage System Notes, Stage 4C to Outlet		
Project	Ocean Breeze Estate		
Project No.	IH132900	File	IH132900-Drainage 4C to Outlet.docx
Prepared by	Paul Mashford	Date	20 February 2018

A drainage system is proposed to convey stormwater flow from stage 4C and to ultimately outlet to the existing open drain passing through future stage 5 (refer attached sketch "Drainage from Stage 4C"). The system will comprise underground and overland components complying with QUDM guidelines.

The proposed system extends an existing system, which has previously been constructed from an inlet headwall at A1 to a temporary outlet at A11. From A11 there is a temporary headwall and open drain outletting to a legal point of discharge which is the existing open drain within future stage 5. It is intended to continue the piped system from A11 to 100/1.

Detailed field survey has been obtained covering the existing open drain which passes through stage 5 (refer attached sketch "Existing Stage 5 Open Drain"). Surveyed levels of the drain are approx. 1.8 at the southern end and 1.5 at the northern end. The detailed survey has been used as a basis to determine the outlet level of 1.58 at headwall 100/1. Lidar information has been interrogated to establish that the outlet level is free draining towards the north.

The existing 2/900 RCP at A11 has an as-constructed outlet level 2.60. It is proposed to extend the existing 2/900 RCP's to the outlet at a grade of 0.12% which complies with the requirements of QUDM. A 2100x750 RCBC is proposed as the last pipe in the system with an invert level of 1.58 and an obvert level of 2.33.

A tailwater level at the RCBC outlet has been set based on the Q100 flow depth within the stage 5 open drain. The drain will have a depth of 1200mm based on the existing levels of the drain and the ultimate stage 5 road levels. The drain will require 300mm freeboard which results in a 900mm flow depth. On this basis the 900mm open drain flow depth at 100/1 sets the tailwater level at 2.48. Modelling for the Q5 event has also adopted this tailwater level for simplicity. It is noted that the 15m drainage corridor for the open drain within stage 5 will need to be increased during detailed design to achieve the desired flow depth. Preliminary external catchment calculations indicate a drainage corridor width in the order of 20m will be required.

The following flow information has been obtained from the PDR drawings at existing pipe A9 => A10:

- The total Q5 event flow of 1.297m³/s has been designed to flow within the piped system.
- The total Q100 event flow is 2.485m³/s. This scenario pipes 1.841m³/s. It is noted on the PDR drawings that the overland system has capacity for 1.6m³/s (PDR Drg 15510-C25). Thus the overland flow for the Q100 event is interpreted to be 0.57m³/s and is less than the capacity of 1.6m³/s.
- The time of concentration at A10 is 18.09 mins.

- The design intent at A1 (first catchment) is to capture Q5 only with higher order events conveyed externally of the development via the open drain towards Melaleuca Drive.

Jacobs have undertaken calculations to assess the proposed drainage line extension from existing structure A10 to the proposed new outlet at 100/1. The calculated Jacobs Q100 flow at A9 => A10 is 2.46m³/s which is similar to the PDR calculated flow of 2.485m³/s. The calculated Jacobs Q5 flow at A9 => A10 is 1.40m³/s which is similar to the PDR calculated flow of 1.297m³/s. The Jacobs calculations have been adopted.

The ultimate downstream Q5 flow at 100/1 is calculated at 2.33m³/s.

To demonstrate that a piped system is capable of conveying the Q5 event, 2.33m³/s has been modelled in the piped system downstream from A9 => A10 to the outlet (refer attached Q5 drainage long section). A minimum freeboard of 160mm is calculated at 100/4.

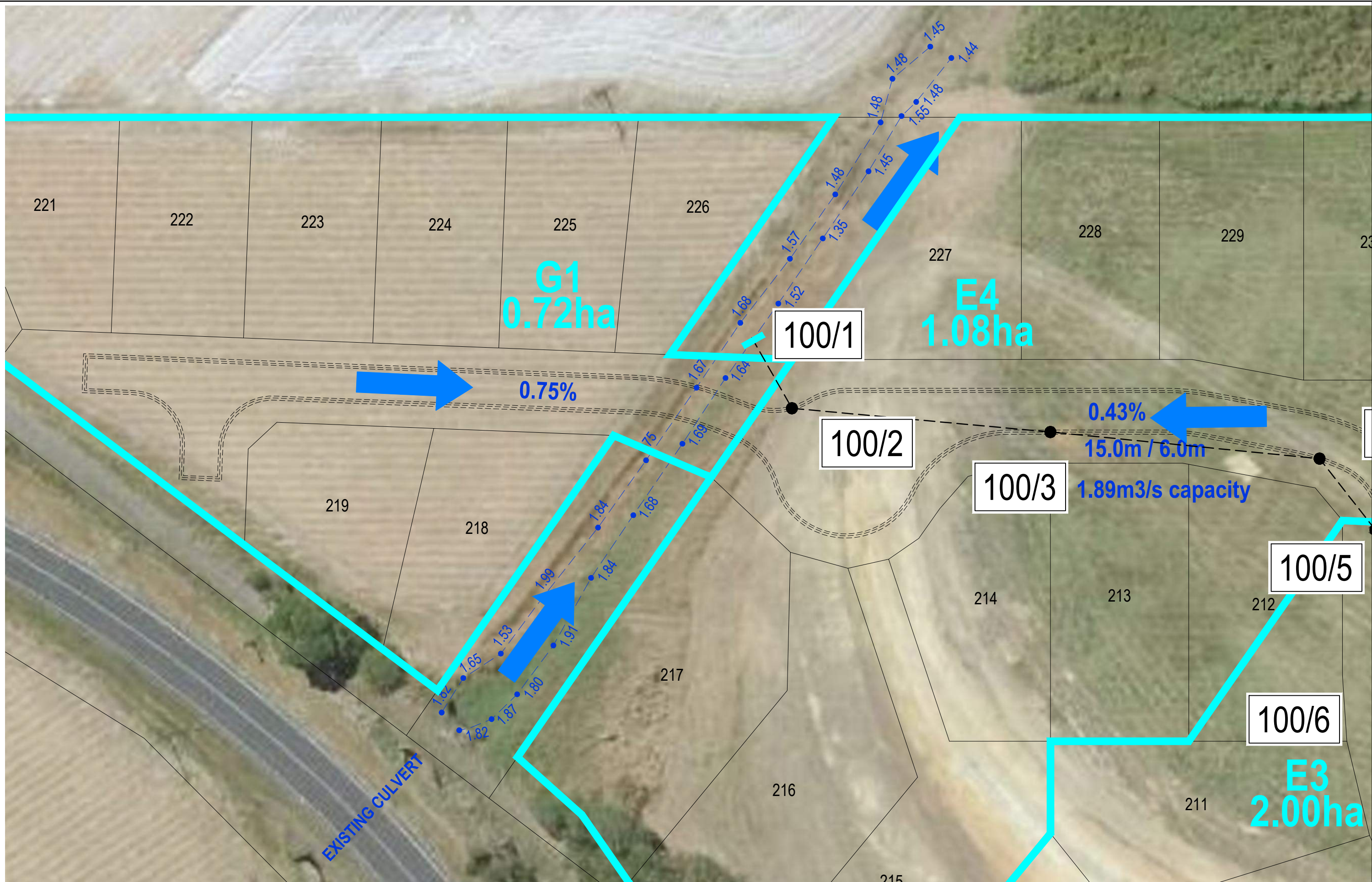
The overland capacity has been calculated at 2 critical locations downstream of A10 to confirm that the Q100 event can be designed through stage 5.

- Adjacent lot 211: The overland capacity at this point is 1.89m³/s. This point aligns with catchment E3. For catchment E3 the Q100 flow is 3.42m³/s with a Q5 flow of 1.89m³/s. Overland flow (Q100-Q5) is 1.54m³/s. Since 1.54m³/s is less than the 1.89m³/s capacity it is demonstrable that there is overland capacity between Stage 4C and Stage 5. It is also noted that the PDR calculations demonstrate that 1.841m³/s can be captured and piped upstream at A9=>A10.
- Adjacent lot 213: The overland capacity at this point is 1.89m³/s. This point aligns with catchment E4. For catchment E4 the Q100 flow is 4.29m³/s with a Q5 flow of 2.33m³/s. Overland flow (Q100-Q5) is 1.97m³/s. For the Q100 scenario the piped system will be required to capture and convey an additional 0.08m³/s compared to the Q5 piped scenario. It is anticipated this minor additional flow can be readily captured and demonstrated to comply during detailed design of stage 5.

To demonstrate that there is latent capacity within the piped system a scenario has been looked at where 2.5m³/s is piped from A10 downstream to the outlet (refer attached Q100 drainage long section).

Paul Mashford
Senior Civil Designer

Paul.Mashford@jacobs.com



PROJECT
OCEAN BREEZE ESTATE - STAGE 5
TITLE
EXISTING STAGE 5 OPEN DRAIN

DATE
20.02.18
SCALE
AS SHOWN
PROJ. No.
IH132900

JACOBS

ABN 37 001 024 095 and ACN 001 024 095
Jacobs Group (Australia) Pty Ltd
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Web: www.jacobs.com

SCALE 1:250 (A1)
1:500 (A3)
0 5 10 15 20 25m
5 2.5

PRELIMINARY ISSUE

DATE: 5/03/2018 11:39:43 AM LOGIN NAME: MASHFORD, PAUL
LOCATION: C:\Users\pmashford\appdata\local\projectwise\jacobs_art_eud0181121180220\Drainage Stage 5.dwg

STRUCTURE NAME	A9		A10	A11		100/9		100/8		100/7		100/6		100/5		100/4		100/3		100/2	100/1
STRUCTURE DESCRIPTION	MANHOLE		MANHOLE	MANHOLE		MANHOLE		MANHOLE		MANHOLE		MANHOLE		MANHOLE		MANHOLE		MANHOLE		MANHOLE	HEADWALL
PIPE SIZE (mm)			(2x)900	(2x)900		(2x)900		(2x)900		(2x)900		(2x)900		(2x)900		(2x)900		(2x)900		(2x)900	2100x750
PIPE CLASS			RCP (2)	RCP (2)		RCP (2)		RCP (2)		RCP (2)		RCP (2)		RCP (2)		RCP (2)		RCP (2)		RCP (2)	RCP (2)
PIPE GRADE (%)			0.39%	0.70%		0.70%		0.12%		0.12%		0.12%		0.12%		0.12%		0.12%		0.12%	0.12%
PIPE SLOPE (1 in X)			255.78	143.46		143.47		833.33		833.33		833.33		833.33		833.33		833.33		833.33	833.32
FULL PIPE VELOCITY (m/s)			0.00	1.83		1.83		1.83		1.83		1.83		1.83		1.83		1.83		1.83	1.48
PART FULL VELOCITY (m/s)			0.00	2.62		2.62		1.83		1.83		1.83		1.83		1.83		1.83		1.83	1.48
DATUM RL	-2.0																				
H.G.L IN PIPE & W.S.E IN STRUCTURE	4.482 4.482 4.482		4.482 4.482	4.482 4.441 4.441 4.407		4.255 4.273 3.958		3.672 3.672 3.613		3.500 3.500 3.453		3.358 3.358 3.315		3.189 3.189 3.104		3.048 3.048 2.948		2.786 2.786 2.751		2.596 2.612 2.504	2.480 2.480 2.480
PIPE FLOW (Cumeecs)			0.000	2.330		2.330		2.330		2.330		2.330		2.330		2.330		2.330		2.330	2.330
PIPE CAPACITY AT GRADE (Cumeecs)			2.265	3.024		3.024		1.255		1.255		1.255		1.255		1.255		1.255		1.255	1.780
DEPTH TO INVERT	2.530 2.520		2.590 2.580	2.636 2.636		2.540 2.864		1.989 2.009		1.911 1.931		1.848 1.868		1.756 1.776		1.462 1.482		1.354 1.374		1.152 1.172	0.255 0.255
INVERT LEVEL OF DRAIN	2.820 2.830		2.660 2.670	2.600 2.600		2.345 2.022		1.939 1.919		1.886 1.866		1.839 1.819		1.782 1.762		1.746 1.726		1.679 1.659		1.614 1.594	1.580 1.580
DESIGN SURFACE LEVEL	5.350		5.250	5.236		4.886		3.928		3.797		3.687		3.538		3.208		3.033		2.766	1.835
SETOUT COORDINATES	E 8868.135 N 80458.400		E 8885.792 N 80498.137	E 8889.795 N 80507.347		E 8904.354 N 80540.841		E 8842.565 N 80571.627		E 8826.459 N 80593.932		E 8821.153 N 80616.310		E 8823.356 N 80646.605		E 8815.708 N 80657.751		E 8777.307 N 80665.187		E 8740.402 N 80672.072	E 8735.571 N 80682.770
CHAINAGE	21.788 43.483		65.271 10.042	75.313		111.834 36.521		180.868 69.033		208.380 27.512		231.378 22.999		261.753 30.375		275.271 39.114		314.385 37.542		351.928 11.737	363.665

LINE 100

PROJECT

OCEAN BREEZE ESTATE - STAGE 5

TITLE

Q5 DRAINAGE LONG SECTION

DATE

20.02.18

SCALE

AS SHOWN

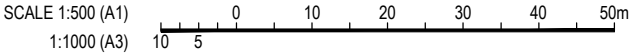
PROJ. No.

IH132900

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PRELIMINARY ISSUE

DATE: 5/03/2018 11:39:00 AM LOGIN NAME: MASHFORD, PAUL
LOCATION: C:\users\pmashford\appdata\local\projectwise\jacobs_int_\eud0181121180220\Drainage Stage 5.dwg

STRUCTURE NAME	A9		A10	A11		100/9		100/8		100/7		100/6		100/5		100/4		100/3		100/2	100/1
STRUCTURE DESCRIPTION	MANHOLE		MANHOLE	MANHOLE		MANHOLE		MANHOLE		MANHOLE		MANHOLE		MANHOLE		MANHOLE		MANHOLE		MANHOLE	HEADWALL
PIPE SIZE (mm)		(2x)900	(2x)900	(2x)900		(2x)900		(2x)900		(2x)900		(2x)900		(2x)900		(2x)900		(2x)900		(2x)900	2100x750
PIPE CLASS		RCP (2)	RCP (2)	RCP (2)		RCP (2)		RCP (2)		RCP (2)		RCP (2)		RCP (2)		RCP (2)		RCP (2)		RCP (2)	RCP (2)
PIPE GRADE (%)		0.39%	0.70%	0.70%		0.12%		0.12%		0.12%		0.12%		0.12%		0.12%		0.12%		0.12%	0.12%
PIPE SLOPE (1 in X)		255.78	143.46	143.47		833.33		833.33		833.33		833.33		833.33		833.33		833.33		833.33	833.32
FULL PIPE VELOCITY (m/s)		0.00	1.96	1.96		1.96		1.96		1.96		1.96		1.96		1.96		1.96		1.96	1.59
PART FULL VELOCITY (m/s)		0.00	2.65	2.65		1.96		1.96		1.96		1.96		1.96		1.96		1.96		1.96	1.59
DATUM RL	-2.0																				
H.G.L IN PIPE & W.S.E IN STRUCTURE	4.774 4.774		4.774 4.774	4.726 4.726	4.687	4.513 4.555	4.181	3.853 3.853	3.785	3.654 3.654	3.601	3.491 3.491	3.441	3.296 3.296	3.198	3.133 3.133	3.018	2.832 2.832	2.792	2.614 2.632	2.508 2.480
PIPE FLOW (Cumeecs)		0.000	2.500	2.500		2.500		2.500		2.500		2.500		2.500		2.500		2.500		2.500	2.500
PIPE CAPACITY AT GRADE (Cumeecs)		2.265	3.024	3.024		1.255		1.255		1.255		1.255		1.255		1.255		1.255		1.255	1.780
DEPTH TO INVERT	2.530 2.520		2.590 2.580	2.636 2.636		2.540 2.864		1.989 2.009		1.911 1.931		1.848 1.868		1.756 1.776		1.462 1.482		1.354 1.374		1.152 1.172	0.255 0.255
INVERT LEVEL OF DRAIN	2.820 2.830		2.660 2.670	2.600 2.600		2.345 2.022		1.939 1.919		1.886 1.866		1.839 1.819		1.782 1.762		1.746 1.726		1.679 1.659		1.614 1.594	1.580 1.580
DESIGN SURFACE LEVEL	5.350		5.250	5.236		4.886		3.928		3.797		3.687		3.538		3.208		3.033		2.766	1.835
SETOUT COORDINATES	E 8868.135 N 80458.400		E 8885.792 N 80498.137	E 8889.795 N 80507.347		E 8904.354 N 80540.841		E 8842.565 N 80571.627		E 8826.459 N 80593.932		E 8821.153 N 80616.310		E 8823.356 N 80646.605		E 8815.708 N 80657.751		E 8777.307 N 80665.187		E 8740.402 N 80672.072	E 8735.571 N 80682.770
CHAINAGE	21.788	43.483	65.271	10.042	36.521	111.834	69.033	180.868	27.512	208.380	22.999	231.378	30.375	261.753	13.518	275.271	39.114	314.385	37.542	351.928	11.737

LINE 100

PROJECT

OCEAN BREEZE ESTATE - STAGE 5

TITLE

Q100 DRAINAGE LONG SECTION

DATE

20.02.18

SCALE

AS SHOWN

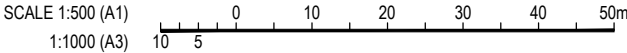
PROJ. No.

IH132900

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PRELIMINARY ISSUE

Secondary Overland Flow Catchment Calculations									
Ocean Breeze Estate - Stage 5									

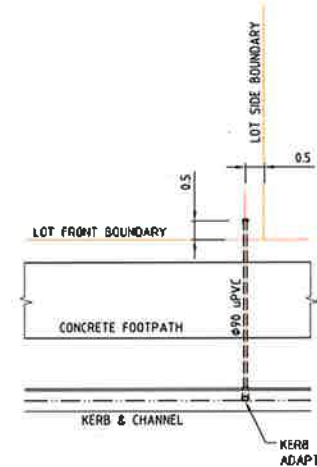
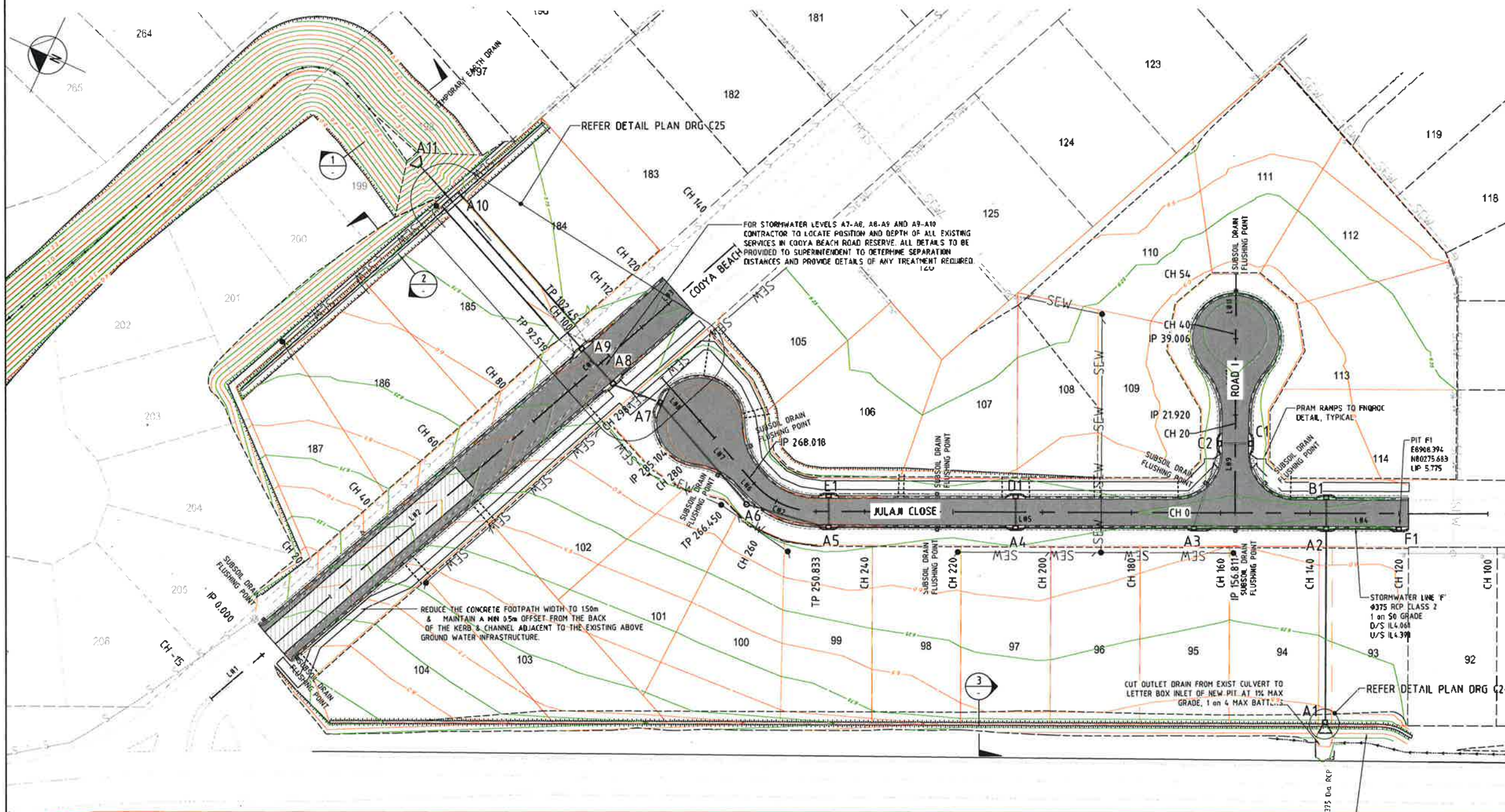
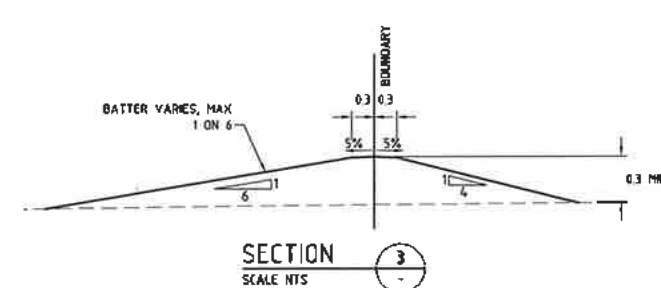
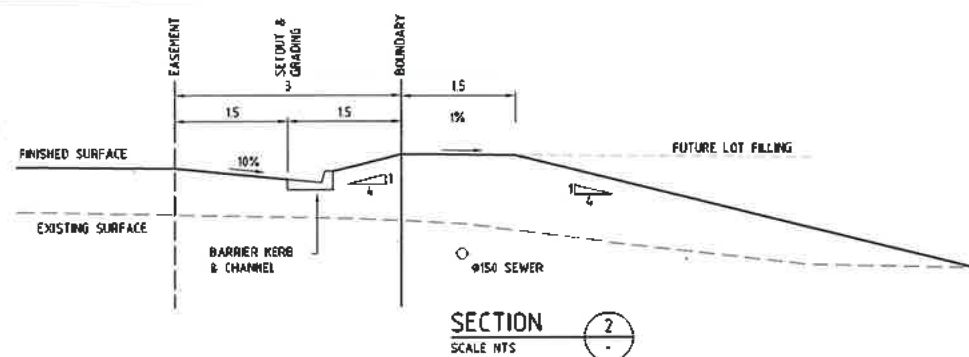
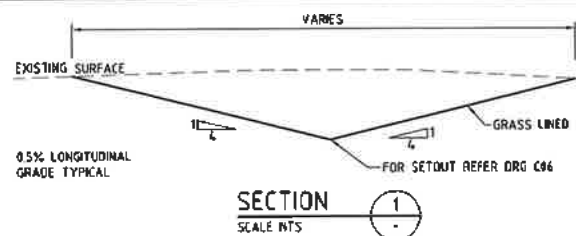
Overland Minor Q100-Q5	Comment	Capacity
---------------------------	---------	----------

0.21		
0.21		
	Internal Catchment 4B/4C	
	External catchment Stage 4B/4C	
1.06	Totals considering E1 taking Q5 only	
	External catchment Stage 4B/4C	
1.54	Totals considering E1 taking Q5 only	
	External catchment Stage 4B/4C	
1.97	Totals considering E1 taking Q5 only	

Q100-Q2		
Overland Minor		

- LEGEND:**
- DESIGN SURFACE CONTOURS (0.25m INTERVAL)
 - DESIGN KERB AND CHANNEL
 - DESIGN STORMWATER PIPES, PITS AND PIT DESIGNATION
 - DESIGN SUBSOIL DRAIN WITH FLUSHING POINT
 - DESIGN SEWER PIPES, MANHOLES AND MANHOLE DESIGNATION
 - DESIGN ROAD CENTRELINES
 - DESIGN BATTER TOP
 - DESIGN BATTER TOE
 - DESIGN CUT OPEN DRAIN INVERT
 - Ø90 UPVC ROOF DRAINAGE PIPES
 - EXISTING EDGE OF BITUMEN
 - EXISTING RAISED MEDIAN
 - EXISTING KERB & CHANNEL
 - EXISTING SEWER RISING MAIN
 - EXISTING SEWER

NOTES:
FOR ROADWORKS AND STORMWATER
NOTES REFER TO DRG 15510-C02.
FOR SETOUT TABLES REFER TO DRG
15510-C06



ALLOW 2 PIPES FOR EACH LOT AS SHOWN.

TYPICAL DETAIL
ROOF DRAINAGE CROSSING TO
CONCRETE FOOTPATH
LOTS 102-109, & 114
NOT TO SCALE

ROADWORKS & STORMWATER PLAN
SCALE: 1:500

ISSUE	DESCRIPTION	DATE
1	ALAA/COOYA D/FLOW AMENDED FOR CONSTRUCTION	27/07/16
2	0100 OVERLAND FLOW PATH AMENDED	04/05/16
3	FOR COUNCIL APPROVAL	08/03/16
4	FOR COUNCIL APPROVAL	17/01/16

Drawing Status

FOR CONSTRUCTION

SCALE 1:500

Orig. Sheet A1

DO NOT SCALE DRAWINGS

Scales Before Reduction

0 5 10 15 20 25 m

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A.B.N. 55 126 211 461
A.C.N. 126 211 461

Client

JONPA PTY LTD

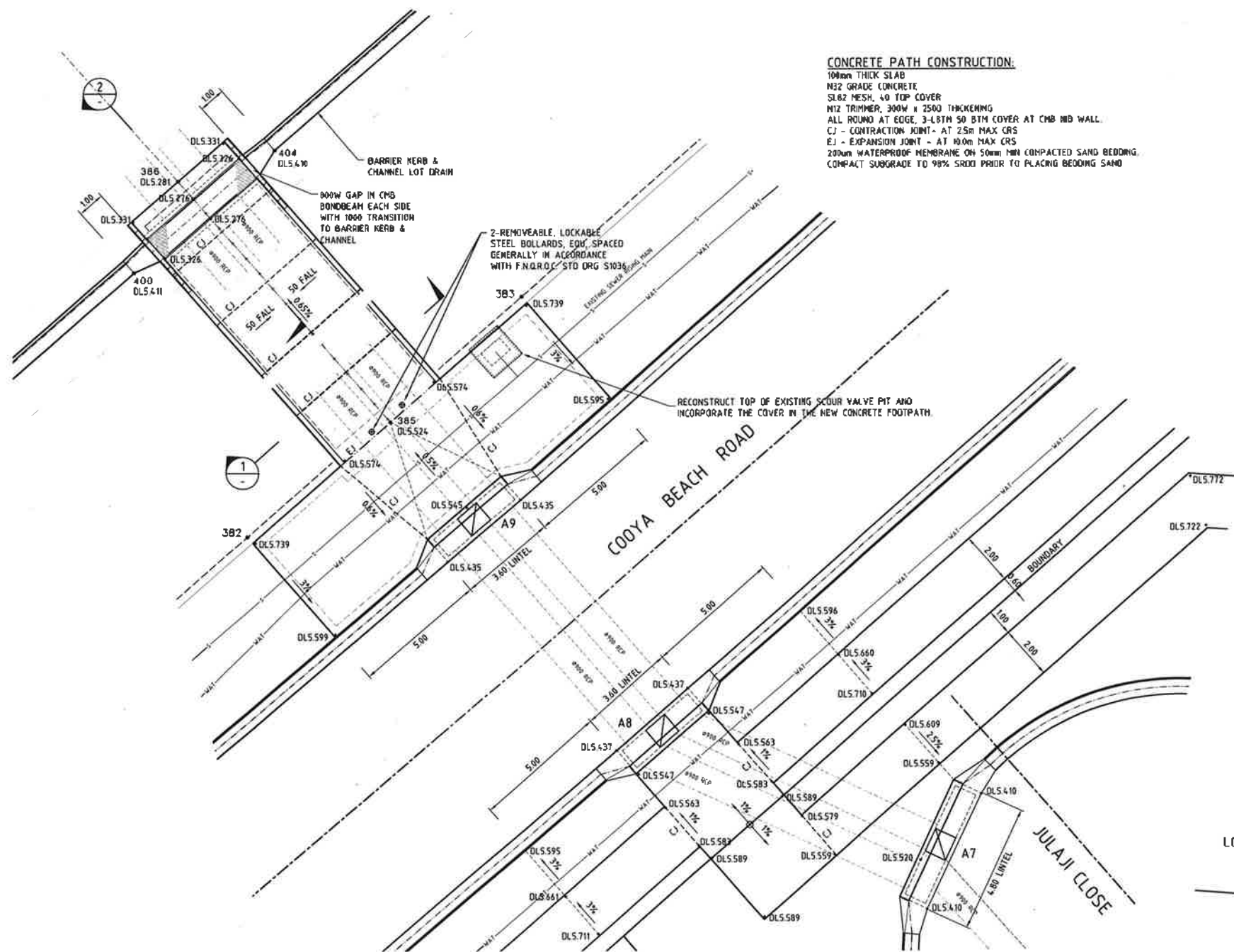
Project

STAGES 4B & 4C
OCEAN BREEZE ESTATE
COOYA BEACH, 4873

Drawing Title

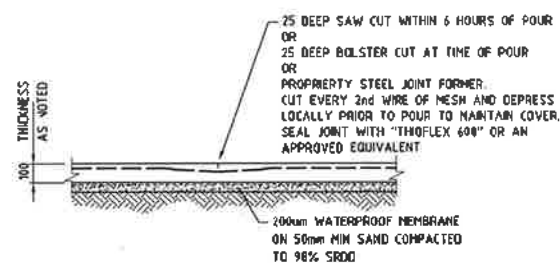
ROADWORKS & STORMWATER
DRAINAGE PLAN

Drawn MP	Designed GCH	Verified AMCP
Approved		Date JAN 2016
Drawing Number 15510 - C05		Revision 1

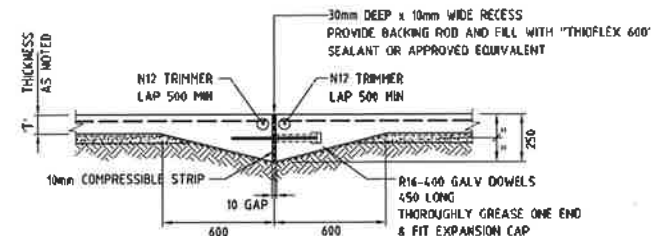


DETAIL PLAN
STORMWATER OVERFLOW PATH
JULAJI CLOSE/COOYA BEACH ROAD

SCALE 1000 0 1000 2000 3000 4000 5000mm

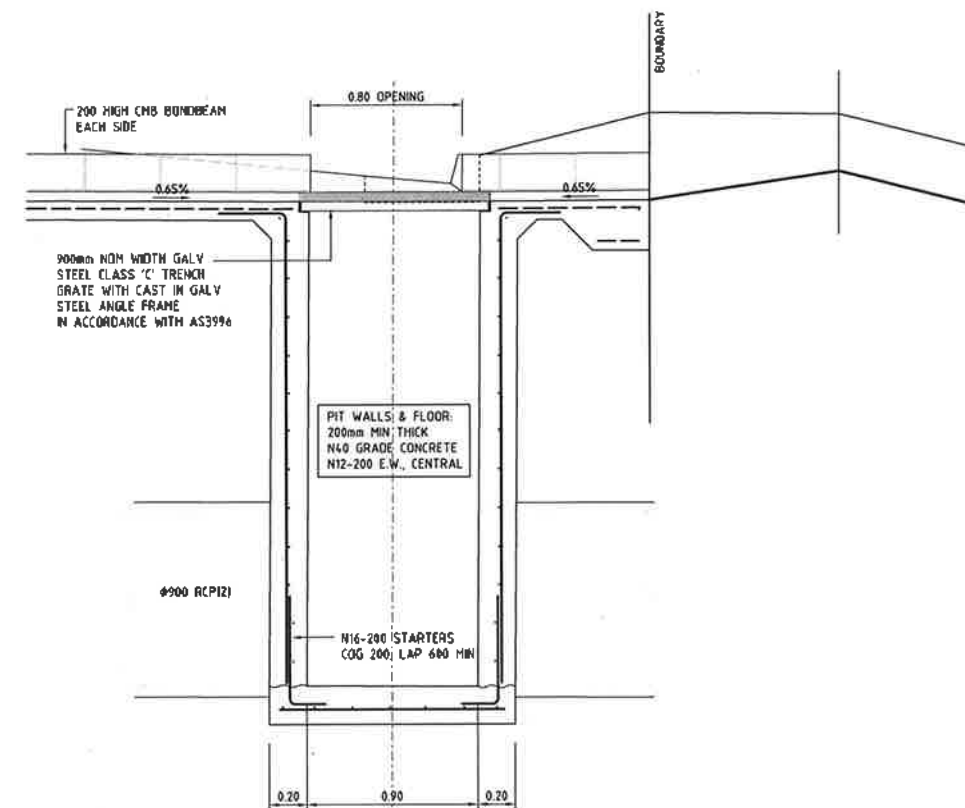


CJ
CONTRACTION JOINT

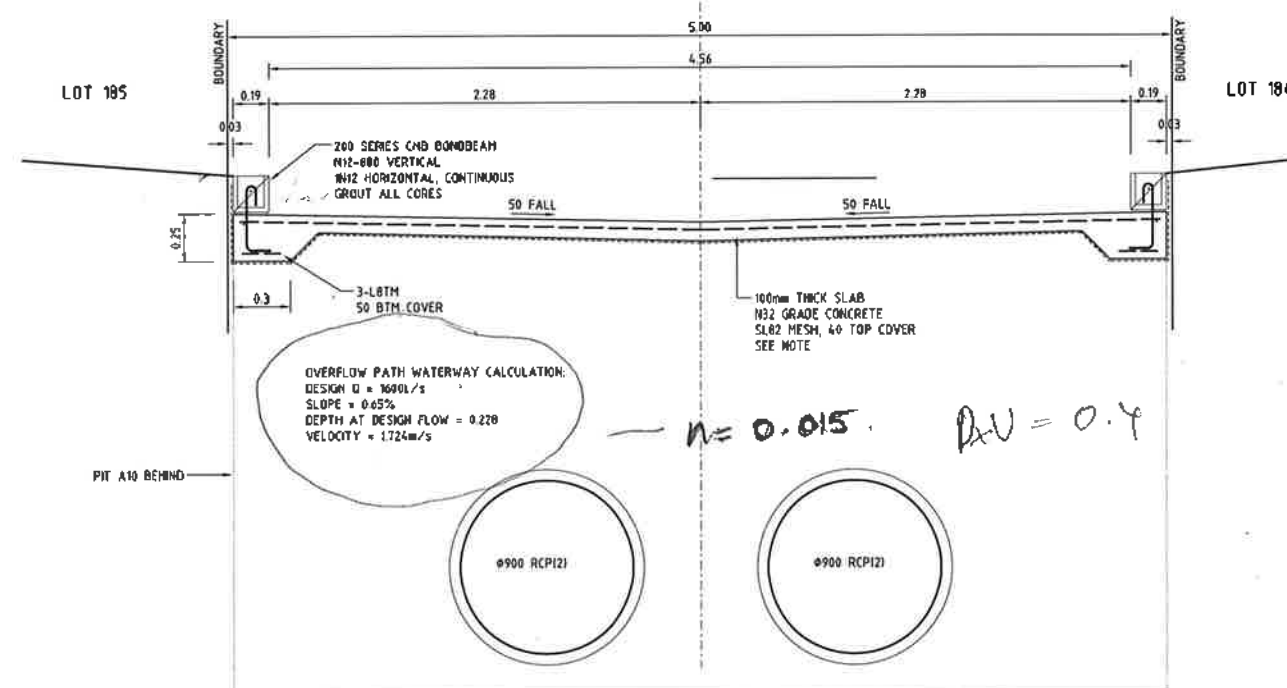


EJ
EXPANSION JOINT

CONCRETE PATH CONSTRUCTION:
100mm THICK SLAB
N12 GRADE CONCRETE
SL82 MESH, 40 TOP COVER
N12 TRIMMER, 300W x 2500 THICKENING
ALL ROUND AT EDGE, 3-LBTH 50 BTM COVER AT CHB MID WALL.
CJ - CONTRACTION JOINT - AT 25M MAX CRS
EJ - EXPANSION JOINT - AT 10M MAX CRS
200mm WATERPROOF MEMBRANE ON 50mm MIN COMPACTED SAND BEDDING.
COMPACT SUBGRADE TO 98% SDD PRIOR TO PLACING BEDDING SAND



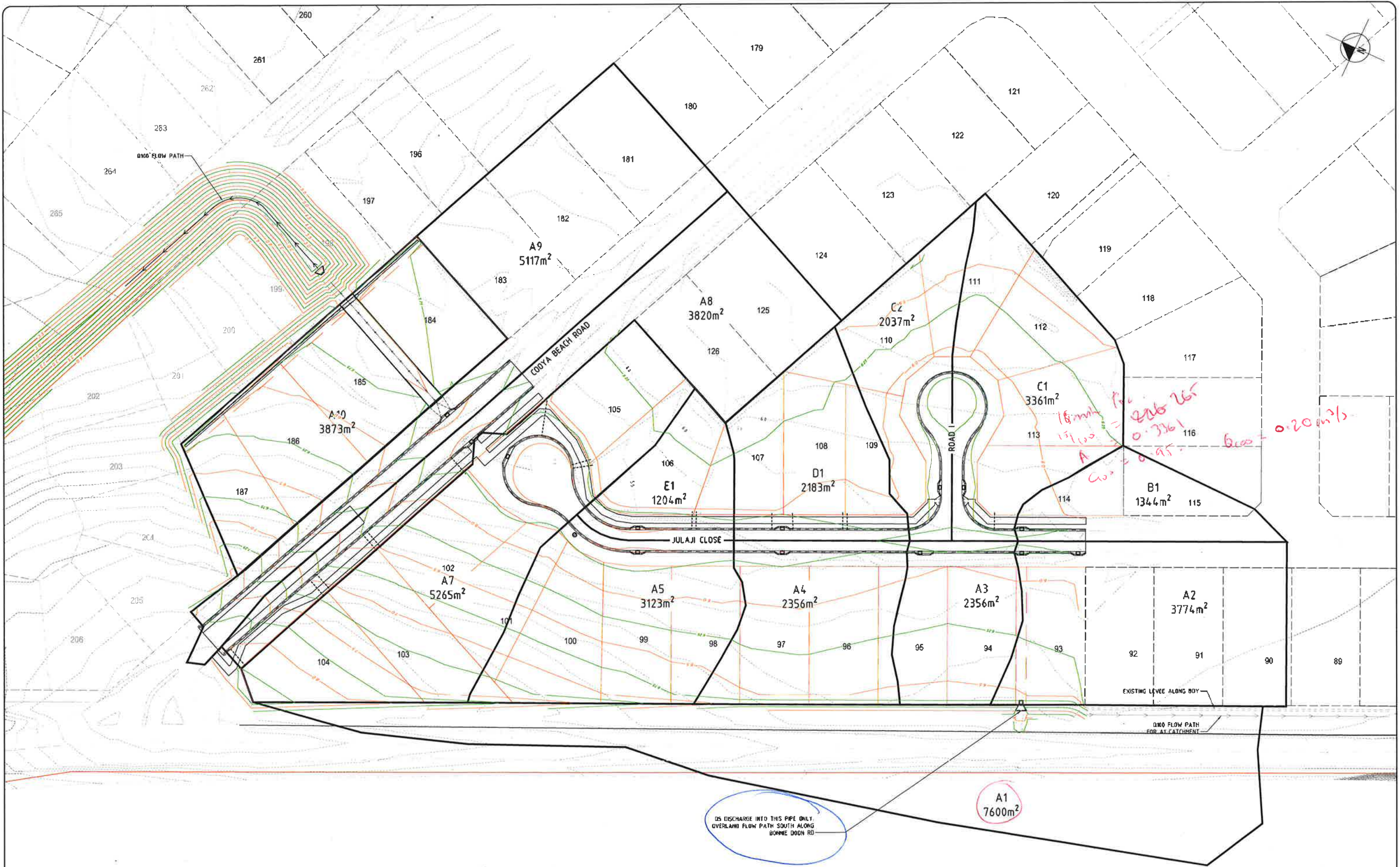
SECTION 2
STORMWATER PIT A10
TYPICAL SECTION



SECTION 1
TYPICAL SECTION
CONCRETE PATHWAY/OVERFLOW

SCALE 200 0 200 400 600 800 1000mm

1. KILAM/COOYA O'FLOW AMENDED, FOR CONSTRUCTION ISSUE DESCRIPTION DATE	Drawing Status FOR CONSTRUCTION	SCALE AS SHOWN DO NOT SCALE DRAWINGS Scales Before Reduction	Orig. Sheet A1 Disclaimer & Copyright THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF PDR ENGINEERS AND MAY NOT BE COPIED IN WHOLE OR IN PART WITHOUT PRIOR WRITTEN APPROVAL FROM THIS COMPANY. © PDR Engineers Copyright	Level 1, 238 Bridge Road PO Box 2551 CAIRNS QLD 4870 Ph: (07) 4051 5559 Fax: (07) 4051 5485 Email: admin@pdrengineers.com.au A.B.M. 60 126 211 461 A.C.M. 420 241 461	Client JONPA PTY LTD	Project STAGES 4B & 4C OCEAN BREEZE ESTATE COOYA BEACH, 4873	Drawing Title DETAILS SHEET 2 OF 2	Drawn GCH Designed GCH Verified AMCP Approved - Date JULY 2016 Drawing Number 15510 - C25 Revision 1
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			Drawing Status		SCALE 1:500		Orig. Sheet A1		Disclaimer & Copyright				Client		Project		Drawing Title		Drawn MP		Designed GCH		Verified AMcP	
			FOR CONSTRUCTION		DO NOT SCALE DRAWINGS				THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF PDR ENGINEERS AND MAY NOT BE COPIED IN WHOLE OR IN PART WITHOUT PRIOR WRITTEN APPROVAL FROM THIS COMPANY.				JONPA PTY LTD		STAGES 4B & 4C OCEAN BREEZE ESTATE COOYA BEACH, 4873		CATCHMENT PLAN		Approved -				Date JAN 2016	
1 JULIA/CODYA D/FLOW AMENDED, FOR CONSTRUCTION			27/07/16		Scales Before Reduction						Ph: (07) 4051 5509 Fax: (07) 4051 5455 Email: admin@pdrengineers.com.au													
2 CATCHMENT AS UPDATED			06/05/18								A.B.N. 68 126 211 461 A.C.N. 126 211 461													
A FOR COUNCIL APPROVAL			27/01/16						© PDR Engineers Copyright															
ISSUE DESCRIPTION			DATE																Drawing Number 15510 - C15				Revision 1	

Qs pipe
Q100 pipe
Q100 overland.

STRUCTURE NAME	STRUCTURE DESCRIPTION
----------------	-----------------------

PIPE SIZE (mm) AND PIPE CLASS	600(2)	600(2)	750(2)	900(2)	900(2)	900(2)	1050(2)	1050(2)	1050(2)	750(2) x 2
PIPE GRADE %	0.57%	1.05%	0.46%	0.30%	0.30%	0.31%	0.30%	0.40%	0.50%	1.00%
PIPE SLOPE 1 in	176.88	95.02	215.05	333.33	333.62	320.46	328.74	249.48	198.74	99.92
FULL PIPE FLOW (HGL) VELOCITY (m/s)	0.46	1.13	1.55	1.39	1.72	1.72	1.58	1.79	2.26	2.55
PIPE GRADE FLOW VELOCITY (m/s)	1.65	2.25	1.74	1.58	1.57	1.61	1.76	2.02		

WATER LEVEL IN STRUCTURE	6.087	6.087	6.045	5.877	5.601	5.460	5.460	5.460	5.460	5.460
HYDRAULIC GRADE LEVEL	6.048	6.045	5.930	5.877	5.749	5.601	5.460	5.460	5.460	5.460
PIPE FLOW (Cumecs)	0.133	0.330	0.705		0.914	1.131	1.408	1.595	1.841	1.999
PIPE CAPACITY AT GRADE (Cumecs)	0.482	0.659	0.792		1.036	1.035	1.056	1.567	2.016	2.323
DEPTH TO INVERT	1.272	1.312	1.332	1.744	1.894	2.231	2.383	2.596	2.618	2.623
INVERT LEVEL OF DRAIN	4.212	4.172	4.152	3.943	3.793	3.607	3.455	3.329	3.167	3.162
DESIGN SURFACE LEVEL	7.075	7.075	7.075	7.075	7.075	7.075	7.075	7.075	7.075	7.075
RUNNING CHAINAGE	7.075	19.853	26.534	36.587	40.000	42.000	42.000	42.000	42.000	42.000

2015\15510 Ocean Breeze Estate - Cooya\Drawings\Working\BANK_PCDRAIN\PCDlong2.DXF Scale: Horiz 1 in 1000 Vert 1 in 100
Project File: REVA S4B AND 4C.PCD

C2	GRADED KERB SAG PIT 24m Lintel, Type 'S'	6.087	6.087	6.045	5.877	5.601	5.460	5.460	5.460	5.460
C1	GRADED KERB SAG PIT 24m Lintel, Type 'S'	6.048	6.045	5.930	5.877	5.749	5.601	5.460	5.460	5.460
A3	GRADED KERB INLET PIT 24m Lintel, Type 'S'	6.045	6.045	5.930	5.877	5.749	5.601	5.460	5.460	5.460
A4	GRADED KERB SAG PIT 24m Lintel, Type 'S'	6.045	6.045	5.930	5.877	5.749	5.601	5.460	5.460	5.460
A5	GRADED KERB SAG PIT 24m Lintel, Type 'S'	6.045	6.045	5.930	5.877	5.749	5.601	5.460	5.460	5.460
A6	STORMWATER MANHOLE Circular 1200mm Dia	6.045	6.045	5.930	5.877	5.749	5.601	5.460	5.460	5.460
A7	GRADED KERB SAG PIT 24m Lintel, Type 'S'	6.045	6.045	5.930	5.877	5.749	5.601	5.460	5.460	5.460
A8	GRADED KERB SAG PIT 24m Lintel, Type 'S'	6.045	6.045	5.930	5.877	5.749	5.601	5.460	5.460	5.460
A9	GRADED KERB SAG PIT 24m Lintel, Type 'S'	6.045	6.045	5.930	5.877	5.749	5.601	5.460	5.460	5.460
A10	GRADED FIELD INLET PIT Type 'W' - With Roadstone	6.045	6.045	5.930	5.877	5.749	5.601	5.460	5.460	5.460
A11		6.045	6.045	5.930	5.877	5.749	5.601	5.460	5.460	5.460

OS 46.1
- 4.598
1.297 1385.

B1	GRADED KERB SAG PIT 24m Lintel, Type 'S'	6.186	6.186	6.170	6.168	6.168	6.168	6.168	6.168	6.168
A2	GRADED KERB SAG PIT 24m Lintel, Type 'S'	6.170	6.168	6.168	6.168	6.168	6.168	6.168	6.168	6.168
A3	GRADED KERB INLET PIT 24m Lintel, Type 'S'	6.168	6.168	6.168	6.168	6.168	6.168	6.168	6.168	6.168

A1	GRADED FIELD INLET PIT Type 'W' - With Roadstone	6.429	6.429	6.429	6.429	6.429	6.429	6.429	6.429	6.429
A2	GRADED KERB SAG PIT 24m Lintel, Type 'S'	6.429	6.429	6.429	6.429	6.429	6.429	6.429	6.429	6.429

D1	GRADED KERB SAG PIT 24m Lintel, Type 'S'	5.845	5.845	5.845	5.845	5.845	5.845	5.845	5.845	5.845
A4	GRADED KERB SAG PIT 24m Lintel, Type 'S'	5.845	5.845	5.845	5.845	5.845	5.845	5.845	5.845	5.845

E1	GRADED KERB SAG PIT 24m Lintel, Type 'S'	5.543	5.543	5.543	5.543	5.543	5.543	5.543	5.543	5.543
A5	GRADED KERB SAG PIT 24m Lintel, Type 'S'	5.543	5.543	5.543	5.543	5.543	5.543	5.543	5.543	5.543

OCEAN BREEZE
Q100

Q5 at $A_9 \Rightarrow A_{10}$

**engineers**

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Client

JONPA PTY LTD

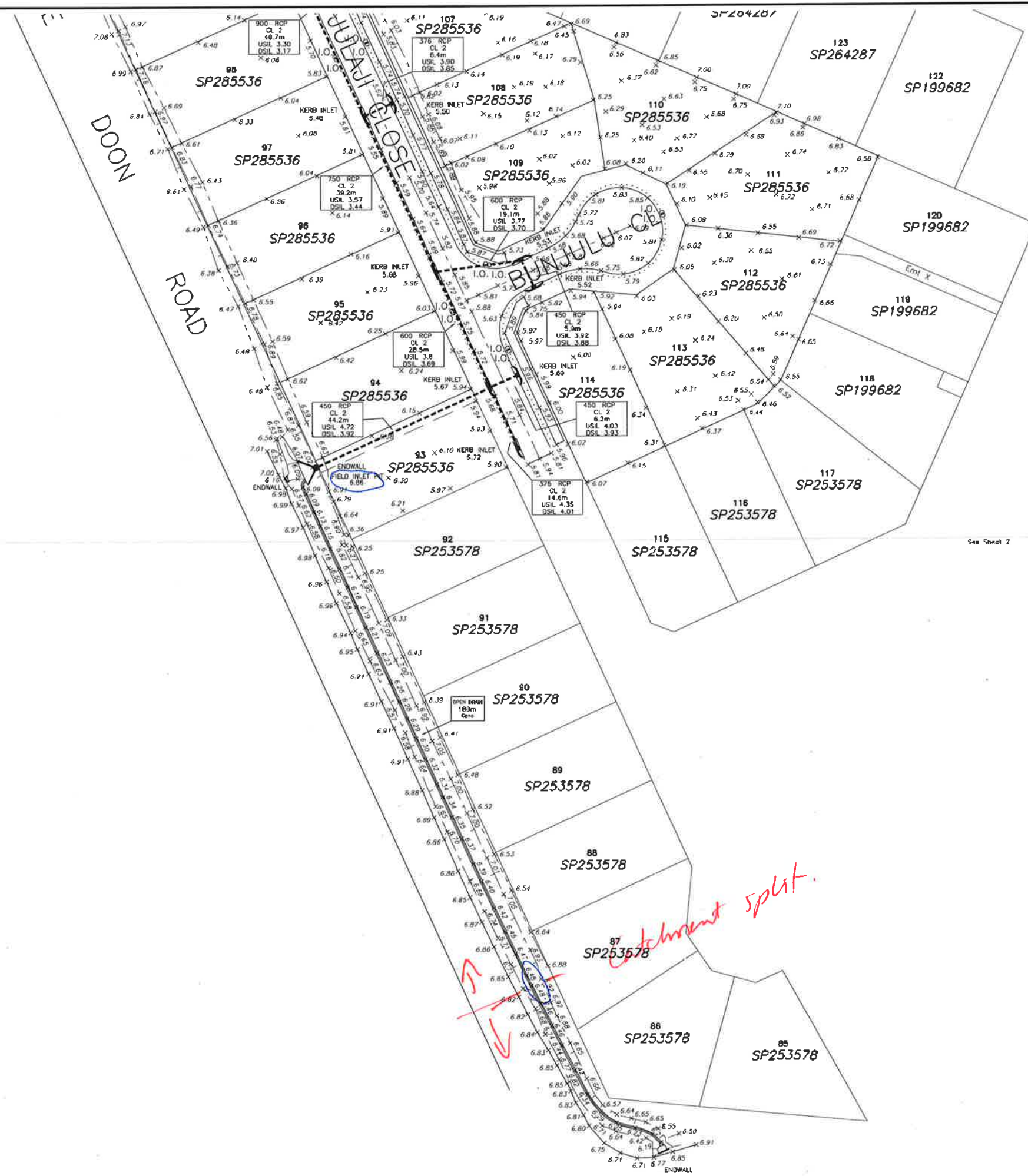
	Project
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STAGES 4B & 4C
OCEAN BREEZE ESTATE
COOYA BEACH, 4873

Drawing Title

DRAINAGE CALCULATION TABLE

Drawn NP	Designed GCH	Verified AMCP
Approved -		Date JAN 2016
Drawing Number 15510 - C17		Revision 1



CERTIFICATION
RPS Australia East Pty Ltd (ACN 140 292 782) certifies that the locations, surface and level of the stormwater drainage system shown on this plan have been surveyed in accordance with the Survey Act 1986 and the Survey Regulation 2008.

**COPY STORED
AUTHORISED
DELEGATE**

IMPORTANT NOTE

1. This plan was prepared for the sole purpose of the drainage system for the purpose of recording the information for the Council's Regional Council. This plan is strictly limited to the purpose and does not imply liability of any kind for the use of the plan for any other purpose, including, but not limited to, the use of the plan for any other purpose, including, but not limited to, the use of the plan for any other purpose.

2. RPS Australia East Pty Ltd will not be liable (in negligence or otherwise) for any loss or damage, including, but not limited to, the use of the plan for any other purpose, including, but not limited to, the use of the plan for any other purpose.

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LEGEND

Drainage Pipe U/G -----
Catch Drain
Sub-surface Drain
Flushing Point o I.O.

NOTES

Level Datum: AHD
Origin of Levels: PSM 76389
RL 3.363

Metric: SP199682

Origin of Coordinates: PSM 76389
E 9853.42
N 80445.36

0 5 10 15 20 25
metres

SCALE 1:500 IS APPLICABLE ONLY
TO THE ORIGINAL SHEET SIZE (A1)
(1:1000 @ A3)

AMENDMENTS

A	RMS: CONC DRAIN FROM LOTS 85 TO 90 AMENDED
B	RMS: EARTH DRAIN UPDATED

PROJECT MANAGER	SURVEYED
D. PINKHAM	MW 28/4/2017
COMPILED	CAD REF
RMS	PR120973-16b.DWG
SHEET SIZE	126973-104-Stage4b-Ascon.CCX
A1	3
	XR PR120973-14b.DWG

RPS

RPS Australia East Pty Ltd
ACN 140 292 782
10th Pioneer Close
PO Box 355
CRANGLIE QLD 4877

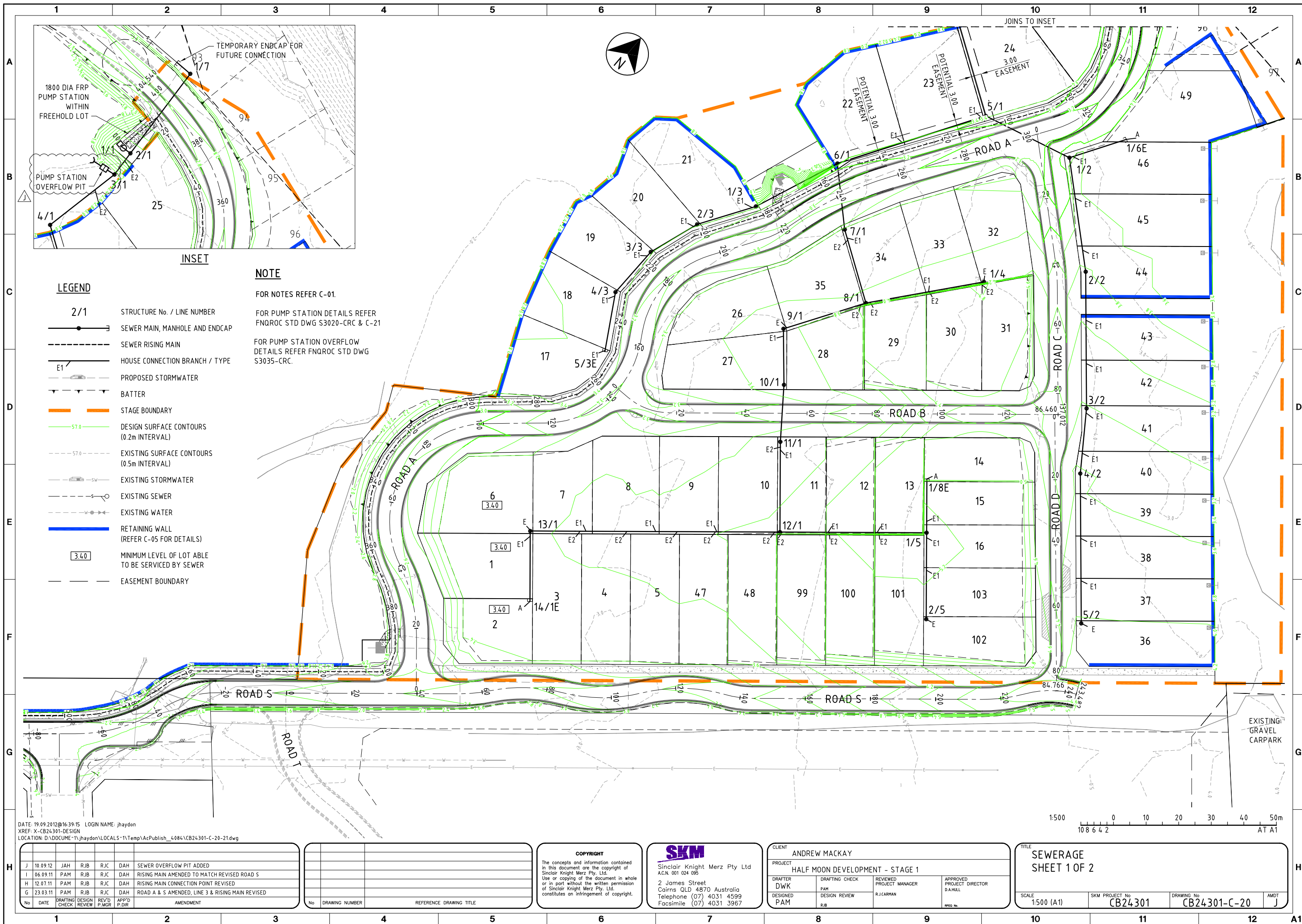
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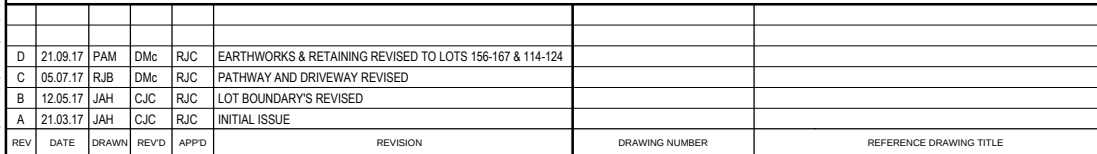
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W rps@rps.com.au

**NORTHERN CIVIL
EARTHWORKS PTY LTD**

**OCEAN BREEZE ESTATE
STAGES 4B & 4C
AS-CONSTRUCTED
STORMWATER SHEET 1 of 3
COOYA BEACH**

SCALE	DATE	DRAWING NO.	ISSUE
1:500	6/9/2017	PR120973-16 B	





ABN 37 001 024 095 and ACN 001 024 095
Jacobs Group (Australia) Pty Ltd
2 James Street
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DRAWN JAH	DRAWING CHECK RJB	REVIEWED D.McEWAN	APPROVED R.J.CARMAN
DESIGNED PAM	DESIGN REVIEW RJC	DATE 21.03.17	DATE 21.03.17

SCALE 1:500 (A1)	DRAWING No IH094400-CI-DG-0119
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REV	
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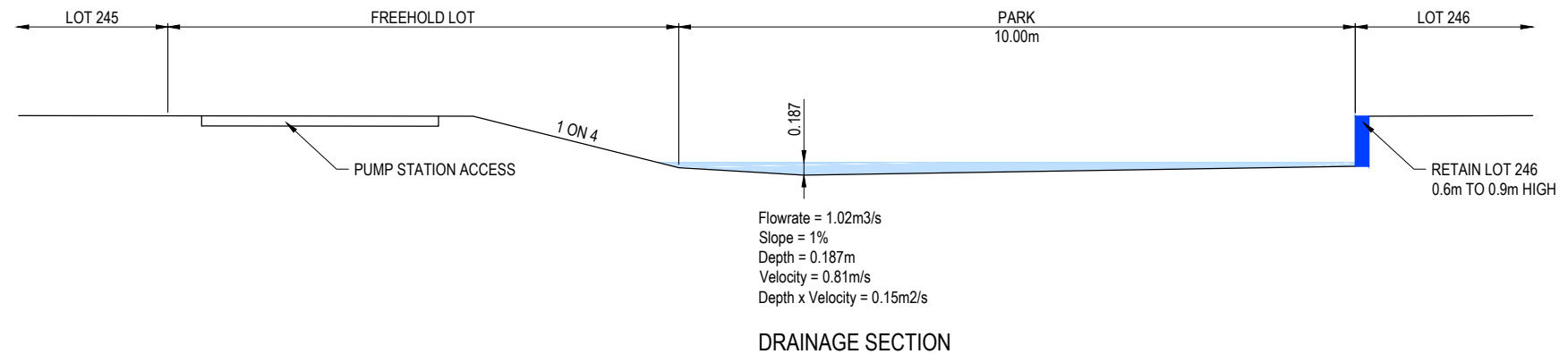
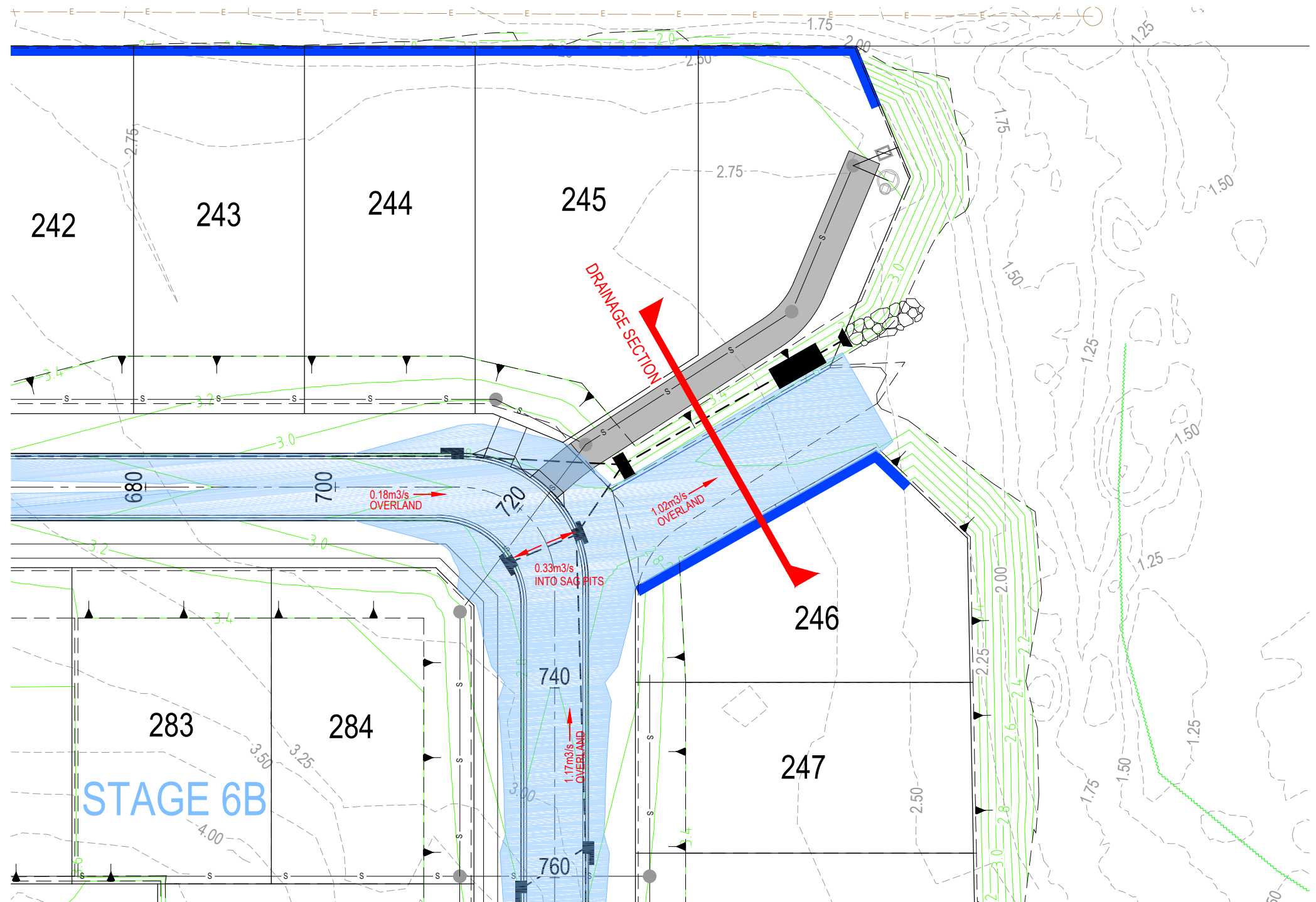
REV	DATE	DRAWN	REV'D	APP'D	REVISION	DRAWING NUMBER	REFERENCE DRAWING TITLE
A	29.01.18	PAM			INITIAL ISSUE		



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CLIENT JONPA PTY LTD				TITLE HIGHLIGHT AREA BELOW RL 1.40m	
PROJECT OCEAN BREEZE ESTATE - COOYA BEACH				SCALE AS SHOWN	REV A
DRAWN TAB	DRAWING CHECK	REVIEWED	APPROVED	DRAWING No. IH105400-CI-SK-0013	
DESIGNED	DESIGN REVIEW	DATE	DATE		



PROJECT
OCEAN BREEZE COOYA BEACH
TITLE
OVERLAND FLOW FLOOD EXTENT
SEWER PUMP STATION
DATE
07.03.18
SCALE
AS SHOWN
PROJ. No.
IH132900

JACOBS

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SCALE 1:250 (A1)
1:500 (A3)
0 5 10 15 20 25m
5 2.5

