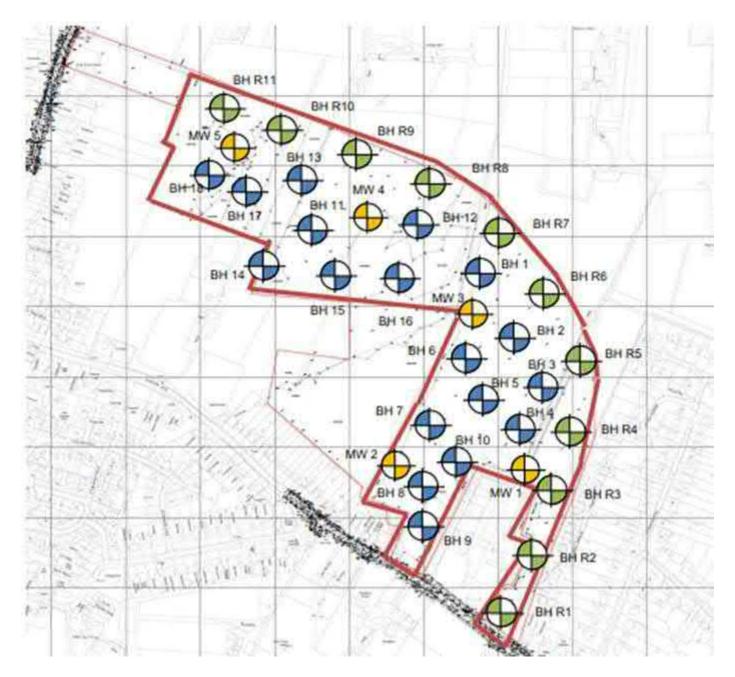
From: Sent: To: Cc: Subject:	<pre>@wilson-bailey.co.uk&gt; 06 January 2020 13:12  RE: *EXTERNAL: Eastergate Winter Water Level Monitoring 2018-2019</pre>
Filed: Filed Location:	-1 \\uk.wspgroup.com\central data\Projects\700607xx\70060779 - WSCC - A29 Phase 1 Planning Application\03 WIP\EI EIA and Flood Risk\07 Other Docs\01 Groundwater\200106 131208 RE EXTERNAL Eastergate Winter Water Level Monit.msg
Filed Location Folder:	\\uk.wspgroup.com\central data\Projects\700607xx\70060779 - WSCC - A29 Phase 1 Planning Application\03 WIP\EI EIA and Flood Risk\07 Other Docs\01 Groundwater
Confirmed – location 4 was upda Regards	ated and corrected on the plan excerpt that you sent over
Wil son Bail ey Partnership DD: Mob:	o-Geotechnical & Environmental
From: S < Sent: 06 January 2020 12:57 To:	@wsp.com>  @wilson-bailey.co.uk>  @wsp.com>;  @wsp.com>;  @barratthomes.co.uk>  gate Winter Water Level Monitoring 2018-2019
Hi,	- -

Thank you very much for the groundwater monitoring data. Please could you confirm if the borehole locations BH1 to BH5 are the same as MW1 to MW5 in the plan below?



Kind regards,

Engineer - Water



T+

Mountbatten House, Basing View Basingstoke, Hampshire RG21 4HJ

#### wsp.com

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From: Sent: 03 January 2020 11:49 @wsp.com> <E Subject: Fwd: \*EXTERNAL: Eastergate Winter Water Level Monitoring 2018-2019 Begin forwarded message: From: <E @westsussex.gov.uk> Date: 3 January 2020 at 11:21:30 GMT h@wsp.com> To: " t@wsp.com>, @jackson-civils.co.uk> Subject: FW: \*EXTERNAL: Eastergate Winter Water Level Monitoring 2018-2019 fyi Engineering Project Manager - Major Projects Highways, Transport and Planning Highways and Transport West Sussex County Council CALL ₽IM M EMAIL Location: 1st Floor Northleigh, County Hall, Chichester, West Sussex PO19 1RH Report a problem with a road or pavement or raise a highways related enquiry @WSHighways Follow us at @barratthomes.co.uk] From: [mailto: Sent: 18 December 2019 15:02 Subject: FW: \*EXTERNAL: Eastergate Winter Water Level Monitoring 2018-2019 Hi Please see below – scroll down for the results. Will get formal version over as soon as Dominic is not on site Kind regards From: @wilson-bailey.co.uk> Sent: 18 December 2019 10:40 @barratthomes.co.uk> To: Cc: @wilson-bailey.co.uk> Subject: \*EXTERNAL: Eastergate Winter Water Level Monitoring 2018-2019

**EXTERNAL EMAIL WARNING** 



Apologies for the delay.

Update as follows – I will incorporate into formal letter and re-issue.

These are taken from site notes



#### Nov 2018

BH 1 – 1.72m bgl

BH 2 – 1.92m bgl

BH 3 – 2.12 m bgl

BH 4 – 2.64 m bgl

BH 5 – 3.05 m bgl

#### Dec 2018

BH 1 – 1.52m bgl

BH 2 – 1.64m bgl

BH 3 – 1.92 m bgl BH 4 – 2.44 m bgl

BH 5 – 2.95 m bgl

Jan 2019

BH 1 - 1.36m bgl

BH 2 – 1.42m bgl

BH 3 - 1.87 m bql

BH 4 - 2.46 m bgl

BH 5 - 3.65 m bgl

Feb 2019

BH 1 - 2.09m bgl

BH 2 - 2.11m bgl

BH 3 - 2.22 m bgl

BH 4 - 3.32 m bgl

BH 5 - 3.55 m bgl

March 2019

BH 1 - 1.72m bgl

BH 2 - 1.92 m bgl

BH 3 - 2.12 m bgl

BH 4 - 2.64 m bgl

BH 5 - 3.05 m bgl

BSc MSc DIC FGS CGeol ARSM

Director

Wilson Bailey Partnership - Geotechnical & Environmental

@wil son-bail ey.co.uk

Web: www.wilson-bailey.co.uk

DD:

Mob:

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WILSON BAILEY

Site Mrs Smiths Land East of A29, Eastergate, Chichester, West Sussex

Client BDW Southampton



1	WI	LSON	I B	AILEY		Во	reh	ole Log	Borehole N	lo.
Projec	ct Name:	Roy Sm			Project No. J20201		Co-ords:	3	Sheet 1 of Hole Type WLS	
Locati	on:	Easterg	ate		102020 !		Level:		Scale 1:50	
Client:		BDW S	outhamp	oton			Dates:	09/01/2020	Logged B	у
Well	Water	Sample	e and In	Situ Testing	Depth	Level	Legend	Stratum Description		
	Strikes	Depth (m)	Туре	Results	(m)	(m)	Logona	TOPSOIL		_
		0.50	D		0.30			Firm pale brown silty CLAY		0.5 -
		1.00	D							1.0
		1.50	D		1.30			Firm brown silty CLAY with occasional be abundant fine to medium flint gravel	ecoming	1.5
		2.00	D		1.70			Pale brown silty locally slightly sandy ver to medium flint GRAVEL	ry clayey fine	220
		2.50	D							2.5
		3.00	D							330 —
		3.50	D							3.5 -
					4.00			End of Borehole at 4.00m		440
										4.5
										550
										5.5 -
										6.5 -
										6.5
										7.5 - 880 - 8.5 -
										889 —
										8.5 -

Groundwater not encountered. Standpipe installed with a response zone from 1.00m to 4.00m.



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9.5

#### Borehole No. **Borehole Log** WILSON BAILEY GEOTECHNICAL & ENVIRONMENTAL **BH10** Sheet 1 of 1 Project No. Hole Type Co-ords: Project Name: Roy Smith's Land J20201 WLS Scale Location: Eastergate Level: 1:50 Logged By Client: Dates: 10/01/2020 **BDW Southampton** Sample and In Situ Testing Water Depth Level Well Legend Stratum Description Strikes (m) (m) Depth (m) Type Results MADE GROUND (reworked topsoil with gravel) 0.25 Firm brown silty CLAY 0.50 D 0.5 1.00 D 1.10 1.50 1.5 1.80 Brown silty sandy clayey fine to medium flint GRAVEL 2.00 D 2.00 220 Pale yellowish brown silty locally clayey chalk derived fine to medium flint GRAVEL 2.50 D 2.5 3.00 D 330 3.50 D 3.5 4.00 440 End of Borehole at 4.00m 4.5

Remarks

Groundwater not encountered. Standpipe installed with a response zone from 1.00m to 4.00m.



5**5**0

5.5

660

6.5

770

7.5

880

8.5

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### Borehole Log

Borehole No. **BH11** 

Sheet 1 of 1

Project No. Hole Type Project Name: Roy Smith's Land Co-ords: J20201 WLS Scale Location: Eastergate Level: 1:50

									1.50	
Client:		BDW So	outham	pton			Dates:	10/01/2020	Logged E	Зу
Well	Water	Sample	e and Ir	n Situ Testing	Depth	Level	Legend	Stratum Description		
AAGII	Strikes	Depth (m)	Туре	Results	(m)	(m)	Legena			
					0.20			TOPSOIL  Firm brown silty CLAY		
		0.50	D					Film brown sitty CLAT		0.5
		0.50								0.5
		1.00	D		1.00					1.10 -
		1.00			1.00			Firm brown silty CLAY With abundant fi flint gravel	ne to medium	1.0
		1.50	D		1.50					1.5 -
		1.50			1.50			Pale yellowish brown and off white chal to medium flint GRAVEL	k derived fine	1.5
		2.00	D							220 —
										-
		2.50	D							2.5 -
					3.00			End of Borehole at 3.00m		330
										3.5 -
										440 -
										4.5 -
										550 —
										-
										5.5
										660 -
										6.5
										770 -
										7.5 -
										880 -
										8.5 -
										990 —
										9.5
										-
										10 -

Groundwater not encountered. Standpipe installed with a response zone from 1.00m to 4.00m.



-			-					_	Borehole N	ο.
1	WI	LSON	BENZ	ALLEY		Bo	reho	ole Log	BH2	
	0.0.				Duning t No				Sheet 1 of	
Projec	t Name:	Roy Sm	ith's La	nd	Project No. J20201		Co-ords:		Hole Type WLS	<del>)</del>
Locati	on:	Easterg	ate		1020201		Level:		Scale	
									1:50 Logged By	.,
Client:		BDW So	outham	pton			Dates:	09/01/2020	Logged By	y -
Well	Water Strikes			n Situ Testing	Depth (m)	Level (m)	Legend	Stratum Description		
	Otriitoo	Depth (m)	Туре	Results	(,,,,	(111)	X//XX//XX	TOPSOIL		_
					0.30			Firm brown silty CLAY		-
		0.50	D					FIIIII DIOWII SIILY CLAY		0.5
							===			-
		1.00	D							110 —
					1.20			Brown CLAY with abundant fine to med	dium flint gravel	
		1.50	D							1.5 -
					1.70			Off white chalk derived silty sandy loca	Ily clayey fine	
		2.00	D					to medium flint GRAVEL		220 —
										-
		2.50	D							2.5 -
		3.00	D							330-
		3.00								
		3.50	D							3.5 -
		3.50								3.5 -
					4.00					-
					4.00			End of Borehole at 4.00m		440 —
										:
										4.5 -
										-
										5 <b>5</b> 0 —
										-
										5.5 -
										-
										660 —
										-
										6.5
										-
										770 —
										-
										7.5
										:
										880 —
										8.5 -

Groundwater encountered at 3.00m.



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9.5

#### Borehole No. **Borehole Log** WILSON BAILEY GEOTECHNICAL & ENVIRONMENTAL **BH3** Sheet 1 of 1 Project No. Hole Type Co-ords: Project Name: Roy Smith's Land J20201 WLS Scale Location: Eastergate Level: 1:50 Logged By Client: Dates: 09/01/2020 **BDW Southampton** Sample and In Situ Testing Water Depth Level Well Legend Stratum Description Strikes (m) (m) Depth (m) Results Type 0.20 Firm brown silty CLAY with scattered fine to medium flint gravel 0.50 D 0.5 1.00 D 1.10 1.20 Firm brown silty locally sandy clay with fine to medium flint GRAVEL 1.50 1.5 1.70 Pale yellowish brown and off white chalk derived silty sandy locally clayey fine to medium flint GRAVEL 2.00 D 220 2.50 D 2.5 3.00 D 330 3.45 End of Borehole at 3.45m 3.5 440 4.5

Remarks

Groundwater not encountered.



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	14/1	LCON		OALL EV		D.	ما میں		Borehole No.	
	GEOT	ECHNICAL	& ENI	ALLEY		RO	ren	ole Log	BH4	
Projec	t Name:	Roy Sm	ith's La	nd	Project No. J20201		Co-ords:		Sheet 1 of 1 Hole Type WLS	
Location	on:	Easterg	ate		10-0-01		Level:		Scale 1:50	
Client:		BDW S	outham	pton			Dates:	09/01/2020	Logged By	
Well	Water	Sample	e and li	n Situ Testing	Depth	Level	Legend	Stratum Description		
vveii	Strikes	Depth (m)	Туре	Results	(m)	(m)	Legend	MADE GROUND (reworked topsoil with occa	sional	
		0.50	D		0.35			fine brick fragments)  Firm brown silty CLAY	0	).5 —
		1.00	D						1	10-
		1.50	D		1.70					-  .5
		2.00	D		1.80			Brown silty sandy very clayey fine to medium GRAVEL Pale yellowish brown and off white chalk derive sandy locally clayey fine to medium flint GRA	ved silty 2	220 — - -
		2.50	D						2	2.5 <del>-</del> - - -
					3.00			End of Borehole at 3.00m	3	30 —
									3	3.5 -
									4	140 — -
									4	I.5 — - -
									5	550 — -
									5	5.5 — -
									6	660 <del>-</del>
									6	3.5 — - -
									7	- - - - - -

Groundwater not encountered.



7.5

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1	WI GEOT	LSON	1 B	BAILEY		Во	reh	ole Log	Borehole N	
Projec	t Name:	Roy Sm	nith's La	nd	Project No.		Co-ords:		Sheet 1 of Hole Type	
Locati	on:	Easterg			J20201		Level:		WLS Scale 1:50	
Client:		BDW So	outham	pton			Dates:	09/01/2020	Logged By	У
Well	Water Strikes			n Situ Testing	Depth (m)	Level (m)	Legend	Stratum Description		
	Cuntos	Depth (m)	Type	Results	0.20	()		TOPSOIL  Firm pale brown and brown silty CLAY		-
		0.50	D							0.5 -
		1.45	D		1.20			Brown silty sandy clayey fine to medium fli	nt GRAVEL	1.5
		2.00	D		2.00			Pale yellowish brown and off white silty san clayey fine to medium flint GRAVEL	ndy locally	220
		2.50	D							2.5 -
		3.00	D		3.45			End of Borehole at 3.45m		330 —
								Elia di Bolci ide at 0.4011		440
										4.5
										550
										550 — - - - - 5.5 — -
										6.5
										6.5 — - - - 770 —
										7.5 -
										889 —

Groundwater not encountered. Poor recovery 1.00m to 2.00m.



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4	١٨/١	LSON	ı F	RAILEV		Do	robe		Borehole N	0.
	GEOT	ECHNICAL	& EN	AILEY		DO	rend	ole Log	BH6	
					Project No.				Sheet 1 of Hole Type	
Projec	t Name:	Roy Sm	nith's La	ind	J20201		Co-ords:		WLS	
₋ocati	on:	Easterg	ate				Level:		Scale 1:50	
Client:		BDW S	outham	pton		,	Dates:	09/01/2020	Logged B	y
Well	Water Strikes	Sample Depth (m)	e and I	n Situ Testing Results	Depth (m)	Level (m)	Legend	Stratum Description	ı	
		Dopur (III)	Турс	results				TOPSOIL		-
					0.25			Firm brown silty CLAY		-
		0.50	D				<u> </u>			0.5
										=
		1.00	D				11-17-11-			1.10 —
					1.40			Drawn ailte van alayay fina ta madiye	flint CDAV/EI	-
		1.50	D					Brown silty very clayey fine to medium	IIIII GRAVEL	1.5 —
					1.80			Pale yellowish brown and off white cha	alk derived silty	-
		2.00	D					sandy locally clayey fine to medium fli	nt GRAVEL	220 —
		0.50								-
		2.50	D							2.5 —
		3.00	D							330
		3.00								330 -
					3.45			End of Borehole at 3.45m		3.5 —
								End of boreflore at 5.45m		-
										440 —
										-
										4.5 —
										-
										550 —
										=
										5.5
										=
										660 —
										6.5
										7,70 —
										-
										7.5 —
										880 —
										=
										8.5
										] =
										990 —
										=
										9.5

Groundwater not encountered



1	WI GEOTI	LSON	B ENVI	AILEY		Во	reh	ole Log	Borehole N	
Projed	t Name:	Roy Sm	nith's Lan	d	Project No. J20201		Co-ords:		Sheet 1 of Hole Type WLS	
Locati	on:	Easterg	ate		320201		Level:		Scale 1:50	
Client:		BDW S	outhamp	ton			Dates:	10/01/2020	Logged B	У
Well	Water Strikes			Situ Testing	Depth (m)	Level (m)	Legend	Stratum Description		
	Strikes	Depth (m)	Туре	Results		(111)		TOPSOIL		-
		0.50	D		0.20			Firm brown silty CLAY		0.5
		1.00	D							1.10 —
		1.50	D		1.50			Brown silty locally slightly sandy very c medium flint GRAVEL	layey fine to	1.5 -
		2.00	D		2.00			Pale yellowish brown and off white silty clayey fine to medium flint GRAVEL	sandy locally	220
		2.50	D							2.5
		3.00	D							330
					3.45			End of Borehole at 3.45m		3.5 -
										440
										4.5
										550
										5.5 -
										660 —
										6.5
										_
										-
										7.5 - - - - 880 -
										889

Groundwater not encountered.



8.5

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#### Borehole No. **Borehole Log** WILSON BAILEY GEOTECHNICAL & ENVIRONMENTAL BH8 Sheet 1 of 1 Hole Type Project No. Co-ords: Project Name: Roy Smith's Land J20201 WLS Scale Location: Eastergate Level: 1:50 Logged By Client: Dates: 10/01/2020 **BDW Southampton** Sample and In Situ Testing Water Depth Level Well Legend Stratum Description Strikes (m) (m) Depth (m) Results Type 0.20 Firm brown silty CLAY 0.50 0.5 1.00 D 1.10 1.50 D 1.5 1.80 1.90 Firm brown silty CLAY with abundant fine to medium flint gravel Pale yellowish brown and off white chalk derived silty sandy locally clayey fine to medium flint GRAVEL 2.00 D 220 2.50 D 2.5 3.00 330 End of Borehole at 3.00m 3.5 440 4.5 5**5**0 5.5 660 6.5 770 7.5 880 8.5

Remarks

Groundwater not encountered. Standpipe installed with a response zone from 1.00m to 3.00m.



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9.5

#### Borehole No. Borehole Log WILSON BAILEY GEOTECHNICAL & ENVIRONMENTAL BH9 Sheet 1 of 1 Project No. Hole Type Co-ords: Project Name: Roy Smith's Land J20201 WLS Scale Location: Eastergate Level: 1:50 Logged By Client: Dates: 10/01/2020 **BDW Southampton** Sample and In Situ Testing Water Depth Level Well Legend Stratum Description Strikes (m) (m) Depth (m) Results Type MADE GROUND (reworked topsoil with gravel and 0.45 0.50 D Firm brown silty CLAY 0.5 1.00 D 1.10 1.50 1.5 1.60 Firm brown silty CLAY with abundant fine to medium flint gravel Pale yellowish brown and off white chalk derived silty sandy locally clayey fine to medium flint GRAVEL 1.80 2.00 D 220 2.50 D 2.5 3.00 D 330 3.45 End of Borehole at 3.45m 3.5 440 4.5 5**5**0 5.5 660 6.5 770 7.5 880 8.5

Remarks

Groundwater not encountered



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9.5

#### Borehole No. Borehole Log WILSON BAILEY GEOTECHNICAL & ENVIRONMENTAL **BHR** Sheet 1 of 1 Project No. Hole Type Co-ords: Project Name: Roy Smith's Land J20201 WLS Scale Location: Eastergate Level: 1:50 Logged By Client: Dates: 09/01/2020 **BDW Southampton** Sample and In Situ Testing Water Depth Level Well Legend Stratum Description Strikes (m) (m) Depth (m) Results Type 0.20 Firm brown and dark orange-brown slightly silty CLAY 0.50 D 0.5 1.00 D 1.10 1.20 Dark brown very clayey silty slightly sandy fine to medium flint GRAVEL 1.50 1.5 1.80 Off white and pale yellowish brown chalk derived silty sandy fine to medium flint GRAVEL with occasional 2.00 D 220 flint cobbles 2.50 D 2.5 3.00 D 330 D 3.50 3.5 4.00 D 440 4.50 D 4.5

5.00

Remarks

Groundwater seepage at 3.00m. Standpipe installed with a response zone from 1.00m to 4.50m.



5**5**0

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7.5

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End of Borehole at 5.00m

								Trialpit N	Vo
WIL	SON BAILEY					Tri	al Pit Log	TP1	
<u>.</u>				Projec	st No		Co-ords: -	Sheet 1 o	
Projed Name	ct Roy Smi	th's Lar	d	J2020			Level:	10/01/20	
Locati	ion: Easterga	ato			<u> </u>		Dimensions	Scale	
Locat	Lasterya	ale					(m):	1:25	
Client				T	1		Depth 2.00	Logge	э 
Water Strike	Sample Depth	Type	n Situ Testing Results	Depth (m)	Level (m)	Legend	Stratum Description		
<b>≶</b> છ	Берш	туре	Nesuits	,	,		MADE GROUND (reworked topsoil with flint gra	avel,	-
							glass and concrete)		-
									=
	0.50			0.40			Firm brown silty CLAY		-
	0.50	D							=
									1 —
									=
	1.00	D							1 -
				1.20			Firm brown silty CLAY with scattered fine to me gravel	edium flint	-
				1.40			Off white and pale yellowish brown chalk derive	ed siltv	-
	1.50	D					sandy locally clayey fine to medium flint GRAV	EL	- - - - - -
									=
									-
	2.00	D		2.00			1		-
	2.00			2.00			End of pit at 2.00 m		2 -
									-
									-
									=
									=
									=
									3 -
									-
									-
									4 -
									=
									-
									-
									-
									-
									-
									5 -
Rema	rks. Groun	  dwater	not encountered. Tria	al nit uso	d for soc	kane ter	ting - result presented seperatley.		0
Stabil		,avval <del>c</del> i	not oncountered. The	ai pii usei	u 101 30d	mage ie	sang result presented seperation.	AG	S

Stability:

								Trialpit I	Vo
WIL GEOTES	SON BAILEY					Tr	ial Pit Log	TP2	2
D	.1			Projec	rt No		Co-ords: -	Sheet 1 o	
Projed Name	Roy Smi	ith's Land	d	J2020			Level:	10/01/20	
Locati	on: Easterga	ate		'			Dimensions	Scale	
							(m): Depth	1:25 Logge	
Client						T	2.20		
/ater trike		т т	Situ Testing	Depth (m)	Level (m)	Legend	d Stratum Description		
Water Strike	Depth  0.50  1.00  2.00	D D	Results	1.60 2.20	Level (m)	Legenc	TOPSOIL  Firm brown silty CLAY with scattered fine to me gravel  Off white and pale yellowish brown chalk derive sandy locally clayey fine to medium flint GRAV  End of pit at 2.20 m	ed silty	2
									5 —
Rema		ndwater i	not encountered. 1	Frial pit used	d for soa	akage tes	sting - result presented seperatley.	AG	I S

Stability:

								Trialpit I	No
WIL	SON BAILEY					Tri	al Pit Log	TPF	
				During	.4 NI -		O	Sheet 1	
Projed Name	ct Roy Smi	ith's Lan	d	Project J2020			Co-ords: - Level:	Date 10/01/20	
				02020	•		Dimensions	Scale	
Locati	ion: Easterga	ale					(m):	1:25	
Client	: BDW So	outhamp	ton				Depth 2.00	Logge	a
Water Strike			n Situ Testing Results	Depth (m)	Level (m)	Legend	Stratum Description		
S ⊠	Depth	Туре	Results	(***)	(***)	*********	MADE GROUND (reworked topsoil with occasi	onal	-
							gravel and tile)		=
				0.30			Firm brown silty CLAY with scattered and local	ly	1 -
	0.50	D					abundant fine to medium flint gravel		_
									-
									-
				0.90			Delevelle is because of a feeting the	-111-	1 -
	1.00	D					Pale yellowish brown and off white silty, sandy derived GRAVEL	chalk	1 -
									-
									-
							•		-
	1.50	D							-
									-
									-
	2.00	D		2.00					2 -
	2.00			2.00			End of pit at 2.00 m		2 -
									-
									-
									-
									-
									-
									-
									3 -
									-
									-
									-
									=
									=
									=
									4 -
									-
									=
									=
									-
									=
									5 -
Rema		i ndwater	not encountered. Tr	ial pit used	d for soa	⊥ ikage tes	l sting - result presented seperatley.	AG	II SS

Stability:

SP7 9DE

WILSON BAILEY
GEOTECHNICAL & ENVIRONMENTAL

Site

Mr Smiths Land, Fontwell Avenue, Eastergate

Client

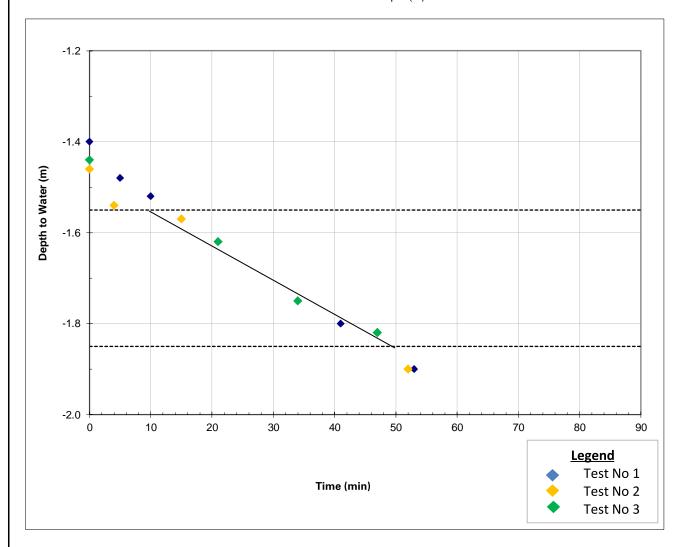
BDW Southampton

Trial Pit No.

TP1

Pit Length (m) 1.8 Pit Width (m) 0.5

Pit Depth (m) 1.8



Design Soakage Rate

4.8E-05 r 4.15 r

m/s m/day (based on linear portion of graph as shown)

#### Notes

Soakage test carried out in accordance with requirements of BRE365 with three completed fills

Trial Pit Log presented separately

Groundwater not encountered

1.8

SP7 9DE

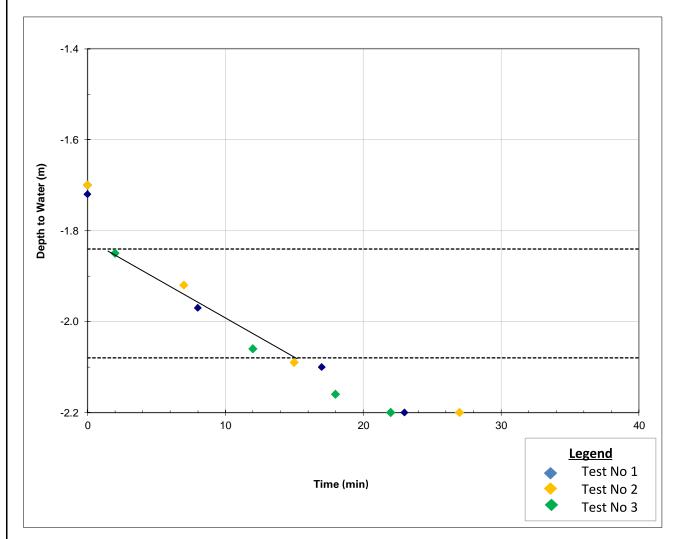
WILSON BAILEY
GEOTECHNICAL & ENVIRONMENTAL

Site Mr Smiths Land, Fontwell Avenue, Eastergate

Client BDW Southampton

Trial Pit No. TP2 Pit Length (m)
Pit Width (m)

Pit Width (m) 0.5 Pit Depth (m) 1.8



Design Soakage Rate

1.3E-04 m/s 11.66 m/day (based on linear portion of graph as shown)

#### Notes

Soakage test carried out in accordance with requirements of BRE365 with three completed fills

Trial Pit Log presented separately

Groundwater not encountered

WILSON BAILEY
GEOTECHNICAL & ENVIRONMENTAL

Site

Mr Smiths Land, Fontwell Avenue, Eastergate

R

Client

BDW Southampton

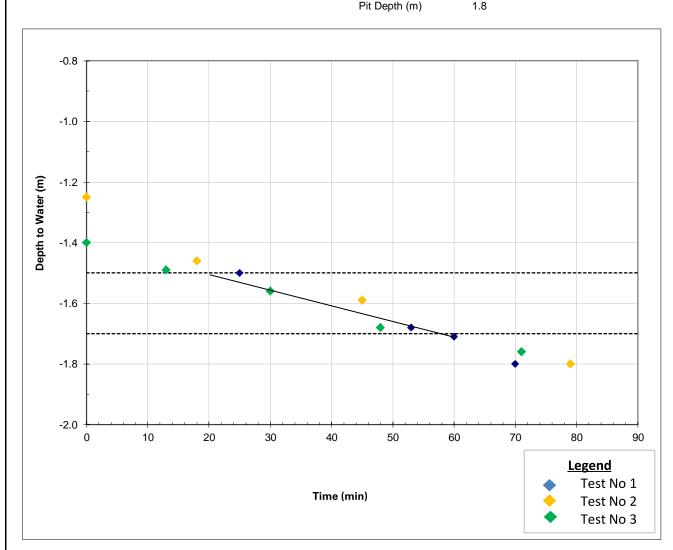
Trial Pit No.

Pit Length (m) Pit Width (m)

Pit Depth (m)

1.8 0.5

Wiltshire SP7 9DE



Design Soakage Rate

4.0E-05 3.48

m/s m/day (based on linear portion of graph as shown)

#### Notes

Soakage test carried out in accordance with requirements of BRE365 with three completed fills

Trial Pit Log presented separately

Groundwater not encountered

# **Appendix E.2**

ADDITIONAL GROUND INVESTIGATION





#### **TRIAL PIT LOG - TP201**

Site:

A29 Realignment Scheme

Client:

Jackson Civil Engineering

Method of Excavation:
Mechanical Excavator

Dimensions:
2.80m x 0.90m

G20107

Logged by: IJW Ground Level: 15.504m AOD

Date: 02/01/2020

Location: - 494651E, 105963N

Scale: 1:25

Logged	by: IJW	Ground Lev	/el: 15.5	504m AOD		Date:	02/01/2020	Location: -	494651E, 105963N	Scale:	1:25
Ref:	mples and In si Depth (m)	tu Tests Result	Water	Level (mAOD)	Depth (m)			Strata Description		Legend	Backfill
				15.20	0.30		ROUND - Topsoil		v 11		
				15:20	6.50	fragmen angular PID hed	its of chicken wire, b		nd metal. Gravel is sub-		
				13.50	2.00	Brown g	ravelly CLAY. Gravel	is angular to sub-angula	ar fine to coarse flint		
			_	13.20	2.30		own very clayey GRA lint and chalk	AVEL. Gravel is angular t	o sub-rounded fine to		
				12.20	3.30						

Remarks and Water Observations

Sheet 1 of 1

- 1. Trial pit excavated with tracked machine. and utilised for soakaway testing.
- 2. Groundwater seepage encountered at 3.30m and rose to 2.90m upon completion of test pit.
- 3. Trial pit backfilled with 20mm gravel from 3.30m-2.50m.
- 4. Groundwater continued to rise to 2.66m after 60mins water level monitored at 20 minute intervals 2.57m, 2.60m, 2.58m, 2.58m.
- 5. Soakaway infiltration test undertaken within test zone of 0.50m-2.00m.
- 7. Test zone specification in accordance with Capita instructions.





#### **TRIAL PIT LOG - TP202**

Site:

A29 Realignment Scheme

Client:

Jackson Civil Engineering

Method of Excavation:

Mechanical Excavator

Dimensions:
2.50m x 0.60m

G20107

Logged by: IJW Ground Level: 15.352m AOD

Date: 02/01/2020

Location: - 494618E, 105915N

Scale: 1:25

Logged	by: IJW	Ground Lev	/el: 15.3	352m AOD		Date:	02/01/2020		Location: -	494618E, 105915N	Scale:	1:25
Sa Ref:	mples and In s Depth (m)	itu Tests Result	Water	Level (mAOD)	Depth (m)			Strata De	escription		Legend	Backfill
				15.05	0.30	MADE G and frag fine to c	GROUND - Topsoil was seen of the seen of t	lightly sand d clay pipe. Idstone	ly gravelly CLAY Gravel is sub-a	with occasional roots angular to sub-rounded		
				14.35	1.00		own very clayey Gf lint and chalk	RAVEL. Gra	vel is angular to	o sub-rounded fine to		
				13.45	1.90	Brown g and chal		el is angula	r to sub-angula	r fine to coarse flint		0 0
				12.35	3.00							

Remarks and Water Observations

Sheet 1 of 1

- 1. Trial pit excavated with tracked machine and utilised for soakaway testing.
- 2. Water seepage encountered at 2.98m, water rose to 2.71m after 40 minute duration,.
- 3. water level monitored at 10 minute intervals 2.82m, 2.80m, 2.79m, 2.71m.
- 4. Soakaway infiltration test undertaken within test zone of 2.30m-2.71m.
- 5. Test zone specification in accordance with on-site Capita instructions.





#### **TRIAL PIT LOG - TP203**

Site

A29 Realignment Scheme

					Method of E		Dimensions:		Project No.:	
Jackson Civil Engineering				Mechanical Excavator		3.00m x 0.60m		G20107		
Logged by: IJW	Ground Lev	el: 15.5	59m AOD		Date:	02/01/2020	Location: -	494661E, 105927N	Scale:	1:25
Samples and In situ	. Tosts		Loved	Donth						

Logge	ed by: IJW	Ground Lev	el: 15.5	9m AOD		Date:	02/01/2020	Location: -	494661E, 105927N	Scale:	1:25
Ref	Samples and In Depth (m)	situ Tests Result	Water	Level (mAOD)	Depth (m)			Strata Description		Legend	Backfill
	Separt (m)	nessit		15.29	0.30	MADE G		ghtly sandy gravelly CLAY pipe. Gravel is sub-angul			
				14.50	1.00	to coarse PID hea	e flint and mudston adspace test at 0.50	e Om = Oppm			
				14.59	1.00	flint		ravel is angular to sub-an			
				13.79	1.80	Light bro coarse fl	own very clayey GR/ lint and chalk	AVEL. Gravel is angular to	sub-rounded fine to		
				12.49	3.10						

Remarks and Water Observations

Sheet 1 of 1

- 1. Trial pit excavated with tracked machine and utilised for soakaway testing.
- 2. No groundwater seepages encountered during excavation.
- 3. Soakaway infiltration test undertaken within test zone of 2.10m-3.10m.
- 4. Test zone specification in accordance with on-site Capita instructions.



#### **INSITU SOAKAWAY TEST RESULTS**

Page 1 of 2

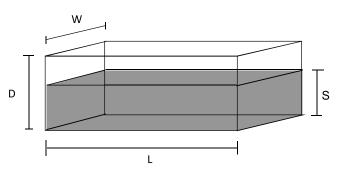
**Trialpit No.:** TP201

#### **Soil Profile:**

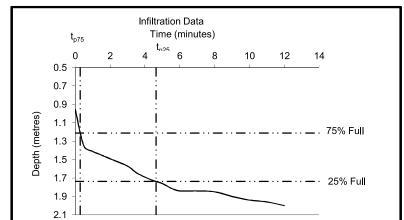
Depth (m)		Description
From:	To:	
0.00	0.30	MADE GROUND - Topsoil
0.30	2.00	MADE GROUND - Brown slightly sandy gravelly CLAY
2.00	2.30	Brown gravelly CLAY
2.30	3.35	Light brown very clayey GRAVEL

#### Sketch plan of test zone

Not to scale
All dimensions in metres.
D = Depth of test pit = 3.35
W = Width of test pit = 0.90
L = Length of test pit = 2.80
S= Storage depth (of water) = 1.05
N = Porosity = 0.42



#### Soakaway Test Run 1



Гime	Depth
(minutes)	(m)
0	0.95
1	1.35
1	1.41
2 2 3	1.45
2	1.49
3	1.57
4	1.64
4	1.69
5	1.73
5	1.76
6	1.84
7	1.85
8	1.90
9	1.85
10	1.94
12	2.00

#### Notes:

- 1. Trial pit excavated to 3.35m bgl gravel backfill depth: 2.50m-3.30m bgl.
- 2. Groundwater level formed to 2.58m 1hr 20mins after completion of soakaway test pit. Test zone adjusted to 0.50m-2.00m (as Capita instructions).

Test Date: 02/02/2021

3. 1000l of water added to test pit formed a level at 0.95m bgl.

#### Therefore:

S= 1.05 m 
$$a_{p50}$$
= 6.41  $m^2$   $V_{p75-25}$ = 1.323  $m^3$ 

$$t_{p25}$$
= 0.3 (min)  $t_{p75}$ = 4.65 (min)

Soil Infiltration Rate: 
$$f = V_{p75-25} \times N$$
 = 3.32E-04  $f_{run1} = 3.32 \times 10^{-4} \text{ m/s}$ 

Test and analysis carried out in general accordance with BRE Digest 365: 2016

Job No.: G20107

Site: A29 Realignment Scheme
Client: Jacksons Civil Engineering

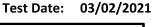


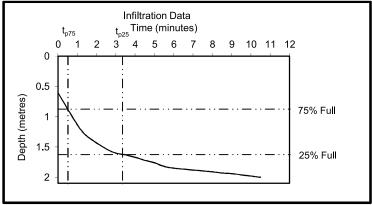
#### **INSITU SOAKAWAY TEST RESULTS**

Page 2 of 2

**Trialpit No.: TP201** 

Soakaway Test Run 2





Time	Depth
(minutes)	(m)
0	0.60
1	0.87
1	1.13
3	1.32
	1.53
3	1.60
4	1.63
5	1.72
5	1.76
6	1.82
6	1.85
9	1.93
9	1.94
12	2.00

#### Notes:

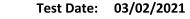
1. 1000l of water added to test pit formed a level at 0.60m bgl (storage depth 0.40m).

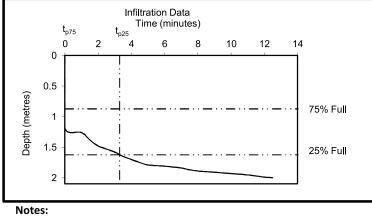
Therefore: 1.89 m<sup>3</sup> 1.50 8.07  $m^2$ S=  $V_{p75-25} =$ From the above graph,

 $t_{p25} =$ 0.52 (min) 3.35 (min)  $t_{p75}=$ 

 $f_{run2} = 5.79 \times 10^{-4} \text{ m/s}$ Soil Infiltration Rate:  $f = V_{p75-25} \times N$ = 5.79E-04 $a_{p50} \ x \ t_{p75-25}$ or = 2.09E+00or 2.09 m/hr

Soakaway Test Run 3





Time	Depth
(minutes)	(m)
0	0.95
1	1.41
2	1.49
3	1.57
4	1.64
4	1.69
5 5	1.73
5	1.76
6	1.84
7	1.84
8	1.85
9	1.90
10	1.94
11	1.96
12	2.00

1. 1000l of water added to test pit formed a level at 0.95m bgl (storage depth 1.05m).

1.89 m<sup>3</sup> S= 1.50 8.07  $V_{p75-25} =$  $a_{p50} =$ 

From the above graph, (min) t<sub>p25</sub>= 0 3.3 (min)

f <sub>run3</sub>= **4.97 x 10<sup>-4</sup>** m/s Soil Infiltration Rate:  $f = V_{p75-25} \times N$ = 4.97E-04 $a_{p50} \times t_{p75-25}$ or = 1.79E+001.79 m/hr

Test and analysis carried out in general accordance with BRE Digest 365: 2016

G20107 Job No.:

Site: A29 Realignment Scheme **Client: Jacksons Civil Engineering** 

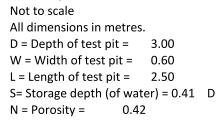


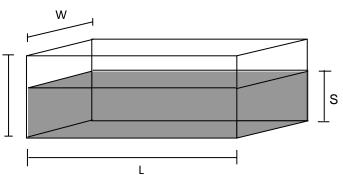
Trialpit No.: TP202

#### **Soil Profile:**

Depth (m)		Description
From:	To:	
0.00	0.30	MADE GROUND - Topsoil
0.30	1.00	MADE GROUND - Brown slightly sandy gravelly CLAY
1.00	1.90	Creamy brown very clayey gravel
1.90	3.00	Brown gravelly CLAY

#### Sketch plan of test zone

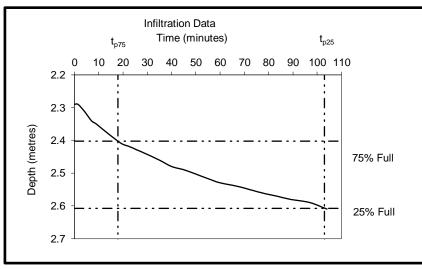




03/02/2021

Test Date:

#### Soakaway Test Run 1



ime	Depth
minutes)	(m)
0	2.29
7	2.34
14	2.38
20	2.41
26	2.43
35	2.46
45	2.49
56	2.52
60	2.53
67	2.54
72	2.55
77	2.56
83	2.57
89	2.58
97	2.59
104	2.61

#### Notes:

- 1. Groundwater seepage encountered at 2.98m, rising to 2.71m after 40 minutes.
- 2. Response zone: 2.30 to 2.71m (as instructed by Capita)

Therefore:

S= 0.41 m 
$$a_{p50}$$
= 2.77  $m^2$   $V_{p75-25}$ = 0.3075

From the above graph,

Soil Infiltration Rate: 
$$f = V_{p75-25} \times N$$
 = 9.14E-06  $f_{run1} = 9.14 \times 10^{-6}$  m/s or = 3.29E-02 or 3.29 × 10<sup>-2</sup> m/hr

Test and analysis carried out in general accordance with BRE Digest 365: 2016

Job No.: G20107

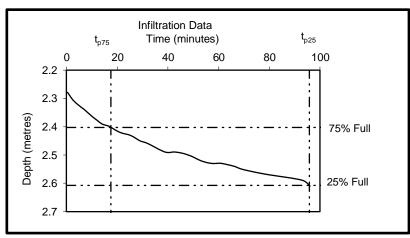
Site: A29 Eastergate

Client: Jacksons Civil Engineering



Trialpit No.: TP202

Soakaway Test Run 2 Test Date: 03/02/2021



Time	Depth
(minutes)	(m)
0	2.28
3	2.31
7	2.34
7	2.34
14	2.39
21	2.42
32	2.46
43	2.49
53	2.52
61	2.53
74	2.56
80	2.57
96	2.61

Therefore:

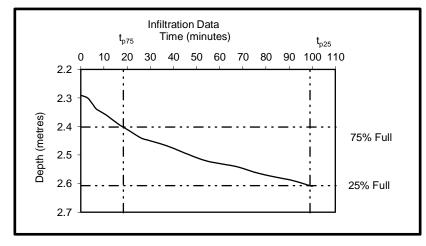
S= 0.41 m 
$$a_{p50}$$
= 2.77  $m^2$   $V_{p75-25}$ = 0.3075  $m^3$ 

From the above graph,

$$t_{p75}$$
= 17.5 (min)  $t_{p25}$ = 95.75 (min)

Soil Infiltration Rate: 
$$f = V_{p75-25} \times N$$
 = 9.93E-06  $f_{run2} = 9.93 \times 10^{-6}$  m/s or = 3.57E-02 or 3.57 x 10<sup>-2</sup> m/hr

Soakaway Test Run 3 Test Date: 03/02/2021



Time	Depth
(minutes)	(m)
3	2.30
5	2.32
7	2.34
11	2.36
16	2.39
20	2.41
26	2.44
30	2.45
38	2.47
47	2.50
54	2.52
60	2.53
67	2.54
86	2.58
100	2.61

Therefore:

S= 0.41 m 
$$a_{p50}$$
= 2.77  $m^2$   $V_{p75-25}$ = 0.3075  $m^3$ 

From the above graph,

$$t_{p75}$$
= 18.5 (min)  $t_{p25}$ = 99 (min)

Soil Infiltration Rate: 
$$f = V_{p75-25} \times N$$
 = 9.65E-06  $f_{run3} = 9.65 \times 10^{-6}$  m/s or = 3.47E-02 or 3.47 x 10<sup>-2</sup> m/hr

Test and analysis carried out in general accordance with BRE Digest 365: 2016

Job No.: G20107

Site: A29 Eastergate

Client: Jacksons Civil Engineering



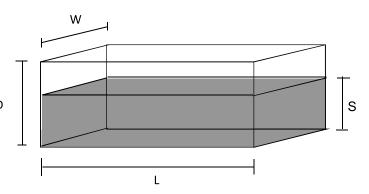
**Trialpit No.: TP203** 

#### **Soil Profile:**

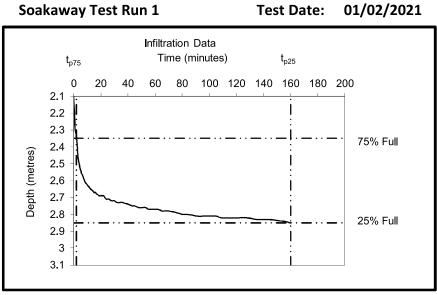
Depth (m)		Description
From:	To:	
0.00	0.30	MADE GROUND - Topsoil
0.30	1.00	MADE GROUND - Brown slightly sandy slightly gravelly CLAY
1.00	1.80	Brown very gravelly CLAY
1.80	3.10	Light brown very clavey GRAVEL

#### Sketch plan of test zone

Not to scale All dimensions in metres. D = Depth of test pit = 3.10 W = Width of test pit = 0.60 L = Length of test pit = 3.00 S= Storage depth (of water) = 1.00 D N = Porosity = 0.42



#### Soakaway Test Run 1



Time	Depth
(minutes)	(m)
0	2.10
1	2.65
2	2.34
5	2.52
10	2.62
17	2.68
30	2.72
40	2.74
53	2.76
58	2.77
67	2.78
80	2.80
91	2.81
109	2.82
135	2.83
160	2.85

Therefore:

S= 1.00 m 
$$a_{p50}$$
= 5.40 m<sup>2</sup>  $V_{p75-25}$ = 0.9 m<sup>3</sup>

From the above graph,

$$t_{p75}$$
= 2 (min)  $t_{p25}$ = 160 (min)

Soil Infiltration Rate: 
$$f = V_{p75-25} \times N = 7.38E-06$$
  $f_{run1} = 7.38 \times 10^{-6}$  m/s

**Test Date:** 

or **2.66 x 10<sup>-2</sup>** m/hr or = 2.66E-02

Test and analysis carried out in general accordance with BRE Digest 365 : 2016

Job No.: G20107

Site: **A29 Realignment Scheme Client: Jacksons Civil Engineering** 

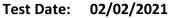


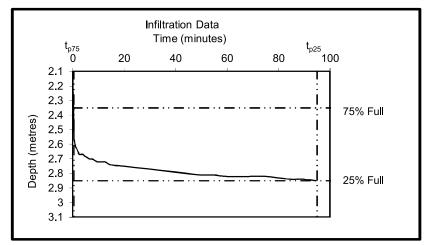
#### **INSITU SOAKAWAY TEST RESULTS**

Page 2 of 2

Trialpit No.: **TP203** 

Soakaway Test Run 2





Time	Depth
(minutes)	(m)
0	2.10
1	2.55
3	2.67
5	2.68
7	2.70
9	2.71
11	2.72
13	2.72
20	2.75
35	2.78
50	2.81
70	2.82
85	2.84
95	2.85

Therefore:

S= 1.00 m 
$$a_{p50}$$
= 5.40 m<sup>2</sup>  $V_{p75-25}$ = 0.9 m<sup>3</sup>

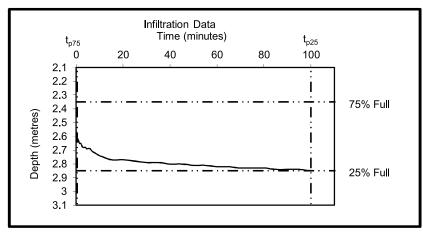
From the above graph,

$$t_{p75}$$
= 0.5 (min)  $t_{p25}$ = 95 (min)

Soil Infiltration Rate: 
$$f = V_{p75-25} \times N$$
 = 1.23E-05  $f_{run2} = 1.23 \times 10^{-5}$  m/s  $a_{p50} \times t_{p75-25}$  or = 4.44E-02 or 4.44  $\times 10^{-2}$  m/hr

Soakaway Test Run 3





Time	Depth
(minutes)	(m)
0	2.10
1	2.56
2	2.65
3	2.67
4	2.68
5	2.69
7	2.71
10	2.74
20	2.77
25	2.78
60	2.82
80	2.83
90	2.84
100	2.85

Therefore:

S= 1.00 m 
$$a_{p50}$$
= 5.40 m<sup>2</sup>  $V_{p75-25}$ = 0.9 m<sup>3</sup>

From the above graph,

$$t_{p75}$$
= 0.5 (min)  $t_{p25}$ = 100 (min)

Test and analysis carried out in general accordance with BRE Digest 365: 2016

Job No.: G20107

Site: **A29 Realignment Scheme Jacksons Civil Engineering** Client:







Client:

Jackson Civil Engineering

Project:

A29 Realignment Scheme

Drawing No: G20107-FR/03

Title:

Exploratory Hole Location Plan -Soakaways

Date:

February 2020







#### **File Note**

09 March 2021

## A29 Realignment Scheme – Review of the Winter Infiltration Testing Results

A29-CAP-HDG-00-AN-D-0078

Issue/Revision S3-P02

Prepared by: Rob Prior

Checked by: Kim Still

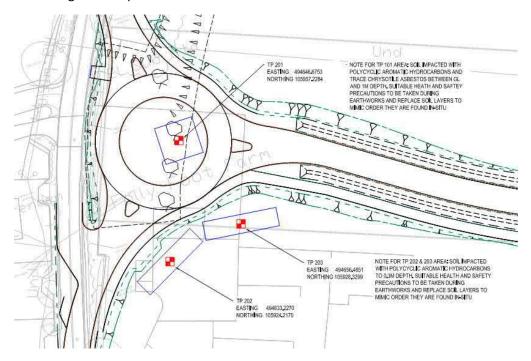
Authorised by: Andrew Burrows

#### 1. Catchment 1 - Fontwell Avenue Roundabout

Further to the meeting with Arun DC held on 16<sup>th</sup> June 2020, additional ground investigation work was undertaken for soakaway tests during the winter period.

This Technical Note reviews the impact on the current design and storage volume provisions with regards to the latest infiltration rates recovered from site.

Three trial pits, TP201, TP202 and TP203 were excavated on 02/02/21 at the location of the proposed storage installations as shown in Figure 1. The level of the TP relative to the proposed IL of the storage cells is provided in table 2.



**Figure 1. Location of Trial Pits** 

#### Property and infrastructure

Capita Symonds House, Wood Street, East Grinstead, West Sussex, RH19 1UU Tel +44 (0)1342 327161 Fax +44 (0)1342 315 927 www.capita.co.uk/property Capita Property and Infrastructure Ltd





#### 2. <u>Infiltration Tests Results and Recorded Ground Water Levels</u>

Three infiltration tests were undertaken within each trial hole, the results are summarised in Table 1 below. Worst case infiltration rates are highlighted in yellow. Groundwater level data is summarised in Table 2. Detailed Trial Pit Logs can be found in Appendix A.

TP	Infiltration Rate m/s	Infiltration Rate m/hr	Infiltration Tank Locations	Infiltration rate used in design (TN Drainage Strategy)
201	Test 1: 3.32 x 10-4 m/s Test 2: 5.59 x 10-4 m/s Test 3: 4.97 x 10-4 m/s	Test 1: 1.20 m/hr  Test 2: 2.09 m/hr  Test 3: 1.79 m/hr	Roundabout central island	0.144 m/hr
202	Test 1: 9.14 x 10-6 m/s Test 2: 9.93 x 10-6 m/s Test 3: 9.65 x 10-6 m/s	Test 1: 3.29 x 10 <sup>-2</sup> m/hr  Test 2: 3.57 x 10 <sup>-2</sup> m/hr  Test 3: 3.47 x 10 <sup>-2</sup> m/hr	South of the roundabout	0.144 m/hr
203	Test 1: 7.38 x 10-6 m/s Test 2: 1.23 x 10-5 m/s Test 3: 1.17 x 10-5 m/s	Test 1: 2.66 x 10 <sup>-2</sup> m/hr  Test 2: 4.44 x 10 <sup>-2</sup> m/hr  Test 3: 4.22 x 10 <sup>-2</sup> m/hr	South of the roundabout	0.144 m/hr

**Table 1 - Summary of Infiltration Test Results** 

ТР	Depth to Groundwater (m)	Groundwater level m AOD	Groundwater Level previously assumed m AOD	the TP for	Invert Level of Storage Cells m AOD
201	2.580	12.925	12.700	13.004 (Excavated to 12.200 but backfilled due to the GWL)	13.000
202	2.710	12.640	12.700	12.350	13.000
203	Not encountered	Not encountered	12.700	12.490	13.000

**Table 2 - Groundwater Levels** 





#### 3. Assessment on the impact on the proposed installation volumes

#### 3.1. Design Parameter used in the FLOW model design

- Rainfall Data FEH-13
- CV value 1.0
- Safety factor 2
- Infiltration rate base only

#### 3.2. Centre of Roundabout Installation

It can be seen that the lowest infiltration rate at TP201 (1.20m/hr), within the centre of the proposed roundabout, is higher than the assumed design value of (0.144m/hr). The groundwater level, however, was higher than anticipated at 12.925m AOD (0.075m below the invert of the tank). It is proposed that the size of the installation remains unchanged at 125 m³ as the spare capacity can be utilised to offset the risk of associated with high groundwater level.

Invert level: 13.000 m AOD

Storage Plan area: 125 m<sup>2</sup>
Storage depth: 1 m

#### Based on critical 1 in 100 yr + 40% C.C. storm

For Infiltration rate: 1.44 x 10-1 m/hr		For Infiltration rate:	1.2 m/hr
(Assumed design)		(New Result)	
Runoff stored Vol. (m³)	Water level	Runoff stored Vol. (m³)	Water level
94.32	13.755	45.95	13.368

#### Based on critical 1 in 100 yr + 20% C.C. storm

For Infiltration rate: 1.44 x 10-1 m/hr		For Infiltration rate: 1.2 m/hr	
(Assumed design)		(New Result)	
Runoff stored Vol. (m³)	Water level	Runoff stored Vol. (m³)	Water level
77.35	13.619	36.78	13.294

#### Based on critical 1 in 30 yr storm

For Infiltration rate: 1.44 x 10-1 m/hr		For Infiltration rate:	1.2 m/hr
(Assumed design)		(New Result)	
Runoff stored Vol. (m³)	Water level	Runoff stored Vol. (m³)	Water level
49.29	13.394	20.3	13.162

#### Hence, the spare capacity in the storage cells for each storm event is as follows:-

	Storm Event	Water Level mAOD	Percentage Full (%)	Spare Capacity (%)
	1 in 30 yr	13.162	16.2	83.8
ĺ	1 in 100 yr + 20% C.C	13.294	29.4	70.6
ĺ	1 in 100 yr + 40% C.C	13.368	36.8	63.2





#### 3.3. South of Roundabout Installation

To the south of the roundabout the lowest infiltration results obtained in TP202 and TP203 are less than that assumed in design but are above the threshold for infiltration systems. The groundwater level recorded in TP202 was 12.640m AOD, below the value assumed for the design (12.700m AOD). Groundwater was not encountered in TP203.

The design of the storage cell installations has been checked using the latest infiltration rate as follows:-

Invert level: 13.000 m AOD

Storage Plan area: 220 m2 Storage depth: 1 m

#### Based on critical 1 in 100 yr + 40% C.C. storm

For Infiltration rate: 1.44 x 10-1 m/hr		For Infiltration rate: 2.6	66 x 10-2 m/hr
(Assumed de	(Assumed design)		lt)
Runoff stored Vol.	Water level	Runoff stored Vol.	Water level
196.9	13.895	208.63	13.948

#### Based on critical 1 in 100 yr + 20% C.C. storm

For Infiltration rate: 1.44 x 10-1 m/hr		For Infiltration rate: 2.66 x 10-2 m/hr	
(Assumed des	ssumed design) (New Resu		lt)
Runoff stored Vol.	Water level	Runoff stored Vol.	Water level
177.27	13.806	203.4	13.925

#### Based on critical 1 in 30 yr storm

For Infiltration rate: 1.44 x 10-1 m/hr		For Infiltration rate: 2.6	66 x 10-2 m/hr
(Assumed design)		(New Result)	
Runoff stored Vol.	Water level	Runoff stored Vol.	Water level
108.52	13.493	163.31	13.742

#### Hence, the spare capacity in the storage cells for each storm event is as follows:-

Storm Event	Water Level mAOD	Percentage Full (%)	Spare Capacity (%)
1 in 30 yr	13.742	74.2	25.8
1 in 100 yr + 20% C.C	13.925	92.5	7.5
1 in 100 yr + 40% C.C	13.948	94.8	5.2





With a view to improving the spare capacity, the plan area of the cells was increased slightly, the layout being predominately constrained by the site red line boundary. The results for this revised layout (revised layout shown in figure 2 below) are as follows.

Invert level: 13.000 m AOD

Storage Plan area: 242 m<sup>2</sup> (Width increased from 5.5m to 6m as per the red outline)

Storage depth: 1m

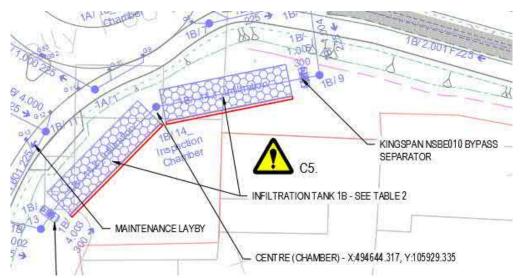


Figure 2. Revised storage plan areas

#### Based on critical 1 in 100 yr + 40% C.C. storm

For Infiltration rate: 1.4	14 x 10-1 m/hr	For Infiltration rate: 2.6	66 x 10-2 m/hr
(Assumed de	sign)	(New Resu	lt)
Runoff stored Vol.	Water level	Runoff stored Vol.	Water level
196.9	13.895	225.46	13.932

#### Based on critical 1 in 100 yr + 20% C.C. storm

For Infiltration rate: 1.4	14 x 10-1 m/hr	For Infiltration rate: 2.6	66 x 10-2 m/hr
(Assumed de	sign)	(New Resu	lt)
Runoff stored Vol.	Water level	Runoff stored Vol.	Water level
177.27	13.806	220.2	13.910

#### Based on critical 1 in 30 yr storm

For Infiltration rate: 1.4	14 x 10-1 m/hr	For Infiltration rate: 2.6	66 x 10-2 m/hr
(Assumed de	sign)	(New Resu	lt)
Runoff stored Vol.	Water level	Runoff stored Vol.	Water level
108.52	13.493	161.24	13.666

#### Hence, the spare capacity in the storage cells for each storm event is as follows:-

Storm Event	Water Level m AOD	Percentage Full (%)	Spare Capacity (%)
1 in 30 yr	13.666	66.6	33.4
1 in 100 yr + 20% C.C	13.910	91.0	9.0
1 in 100 yr + 40% C.C	13.932	93.2	6.8

The revised layout has improved spare capacity for the 1 in 30yr event, but only a little additional spare capacity for both the 1 in 100yr events.





#### 4. Conclusions

The latest investigation work has shown that infiltration rates in the centre of the roundabout are reasonable and exceed the values assumed in the design. Recorded groundwater levels are higher than previously assumed. The design of the storage cells in the centre of the roundabout as previously presented will include spare capacity to reduce the risk associated with fluctuating groundwater levels.

Infiltration rates to the south of the roundabout however are above the threshold for infiltration systems but were lower than the values assumed in the design. The plan area of the storage cells has been increased within the constraints of the site red line boundary and the storage volume provided is now 242m<sup>3</sup>. Groundwater levels recorded were slightly lower than that assumed for the design.

The results show that, while the distance between the invert of the tanks and the ground water level is less than expected the infiltration rates are still sufficient to enable the 100yr + 40% event to be fully managed within the proposed system.

#### 5. **Summary**

Centre of Roundabout Installation:

Invert level: 13.000 m AOD

Storage Plan area: 125 m<sup>2</sup>
Storage depth: 1 m
Storage Volume: 125 m<sup>3</sup>

Infiltration Rate: 1.20 m/hr (3.32 x 10-4 m/s)

Groundwater Level: 12.925 m AOD

South of Roundabout Installation:

Invert level: 13.000 m AOD

Storage Plan area: 242 m<sup>2</sup>
Storage depth: 1m
Storage Volume 242 m<sup>3</sup>

Infiltration Rate: 2.66 x 10-2 m/hr (7.38 x 10-6 m/s)

Groundwater Level: 12.640 m AOD

The above is presented to WSCC and ADC for further discussion and agreement with our proposals.





#### **APPENDIX A - TRIAL PIT LOGS**





NICHOLLS COLTON					00	TI	RIAL PIT LOG - TP20	)1			
	OUP	LL3	U	L	7	Site: A29 Realignment Scheme					
Client:	on Civil Engir	neering				Method of Excavation: Mechanical Excavator	Dimensions: 2.80m x 0.90m	10 E 10 C 10 C	Project No.:		
855,635	R CONTRACTOR	TO STATE OF						100	G20107		
Logged	by: UW emples and in s	Ground Le	I	Level	Depth	Date: 02/01/2020	Location: - 494651E, 103	The Control of the Co	1:25		
Ref:	Depth (m)	Result	Water	(mADD)	(m)	22	trata Description	Legend	Backfill		
	N. YES SEASONS				EDATION.	MADE GROUND - Topsoil			$\mathfrak{X}^{(2)}$		
				15.20	0.30			sub-			
						PID headspace test at 1.50m	= 0ppm				
				13.50	2.00	Brown gravelly CLAY. Gravel is	angular to sub-angular fine to coarse fi	int	Ė		
l				12220	2.2.2.27		W. W.		Ä.		
				13.20	2.30	Light brown very clayey GRAVE coarse fint and chalk	EL. Gravel is angular to sub-rounded fin	eto			
				12.20	3.30						

Remarks and Water Observations

Sheet 1 of 1

- 1. Trial pit excavated with tracked machine, and utilised for soakaway testing.
  2. Groundwater seepage encountered at 3.30m and rose to 2.90m upon completion of test pit.
  3. Trial pit backfilled with 20mm gravel from 3,30m-2,50m.
  4. Groundwater continued to rise to 2,66m after 60mins water level monitored at 20 minute intervals 2,57m, 2,60m, 2,58m, 2,58m.
  5. Soakaway inflitration test undertaken within test zone of 0,50m-2,00m.
  7. Test zone specification in accordance with Capita instructions.

**W**AGS





GRO	GROUP						Site: A29 Realignment Scheme										
olient: lackson	Civil Engin	eering				Method of Excavation: Mechanical Excavator		Dimensions: 2.50m x 0.60m		Project No.: G20							
logged by	ogged by: UW Ground Level: 15.352m ACO		Date:	02/01/2020	Location: -	494618E, 105915N	Scale:	1-25									
	ples and In si Depth (m)	tu Tests Result	Water	(mAOD)	Depth (m)		S	rata Description		Legend	Backfil						
				15.05	0.30	MADE G		ly sandy gravelly CLAY y pipe. Gravel is sub-a	with occasional roots								
				14.35 1.00		14.35 1.00		14.35 1.00	1435 1.	1435 1	14.35 1.0	PID her	fine to coarse flint and mudstone PID headspace test at 0.30m = 0ppm  Light brown very clayey GRAVEL. Gravel is angular to sub-rounded fine to coarse flint and chalk				
			•	13.45	1.90	Brown g and cha	ravelly CLAY. Gravel is	angular to sub-angular	fine to coarse flint								
				12.35	3.00												
- 9										2	4						
	and Water Ot	servations	io							SI	eet 1 of						





n	ICHOI	LLS	CO	LT	on	Tf Site:	RIAL PIT LOG - TP203		
	OUP				-	A29 Realignment Scheme			
Client: Jackso	on Civil Enginee	ering				Method of Excevation: Mechanical Excevator	Dimensions: 3.00m x 0.60m	Project No.: G20107	
Logged	by: UW	Ground Lev	el: 15.5	9m AOD		Date: 02/01/2020	Location: - 494661E, 105927N	Scale:	1:25
S Ref:	amples and In situ Depth (m)	Tests Result	Water	Level (mAOD)	Depth (m)	St	rata Description	Legend	Backfill
					-	MADE GROUND - Topsoil		XXX	XXX
				15.29	0.30	MADE GROUND - Brown slight fragments of brick and clay pip to coarse flint and mudstone PID headspace test at 0.50m	ly sandy gravelly CLAY with occasional e. Gravel is sub-angular to sub-rounded fine = Oppm		
				14.59	1.00	Brown very gravelly CLAY. Grav fint	el is angular to sub-angular fine to coarse		
				13.79	1.80	Light brown very clayey GRAVE coarse flint and chalk			
				12.49	3.10				

Thial pit excavated with tracked machine and utilised for soakaway testing.
 No groundwater seepages encountered during excavation.
 Soakaway infiltration test undertaken within test zone of 2.10m-3.10m.
 Test zone specification in accordance with on-site Dapita instructions.

**\|**\AGS