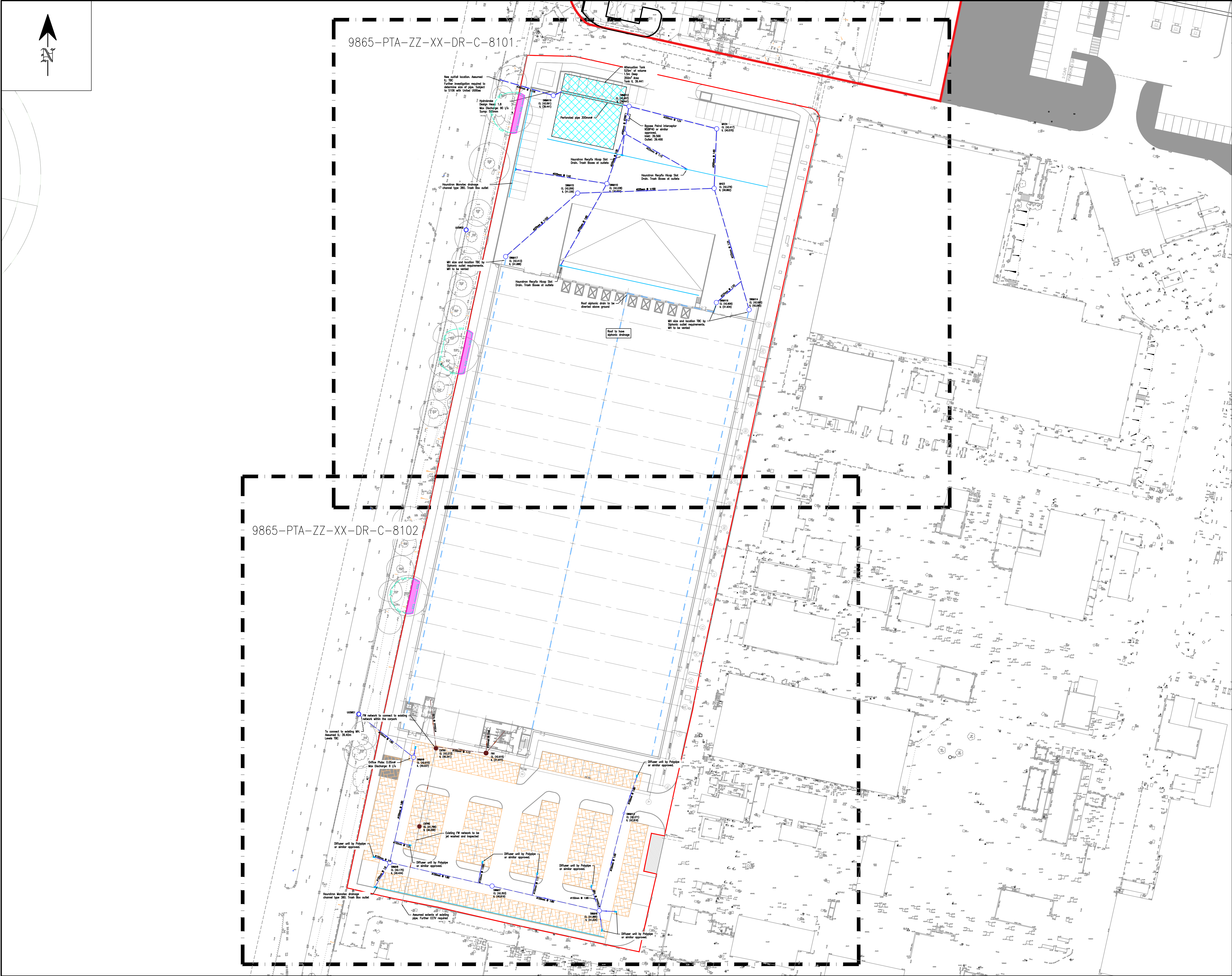


Appendix G – Proposed Drainage Strategy



Notes:

- Do not scale from this drawing.
- In case of any discrepancies in drawings, details or bills, refer to engineers for clarification; unilateral decisions by the Contractor will not be accepted.
- This drawing is to be read in conjunction with all related Architects, Consultants & Sub-Contractors drawings and specifications.
- The Contractor is advised that all design drawings and information are to be read concurrently and any discrepancies or omissions reported directly to PTA's Civil Engineering Department.

Key:

- Proposed SW Drainage
- Existing SW Drainage
- Proposed FW Drainage
- Existing FW Drainage
- Attenuation Tank
- Permeable Paving
- Diffuser Block
- Drain Channel
- Site Boundary
- Root Protection Area
- Area of Cellweb or similar required

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COSTING
NOT FOR CONSTRUCTION

REV	DESCRIPTION	BY	DATE	CHK'D

PROJECT TITLE
Image Business Park
Knowsley Site 3

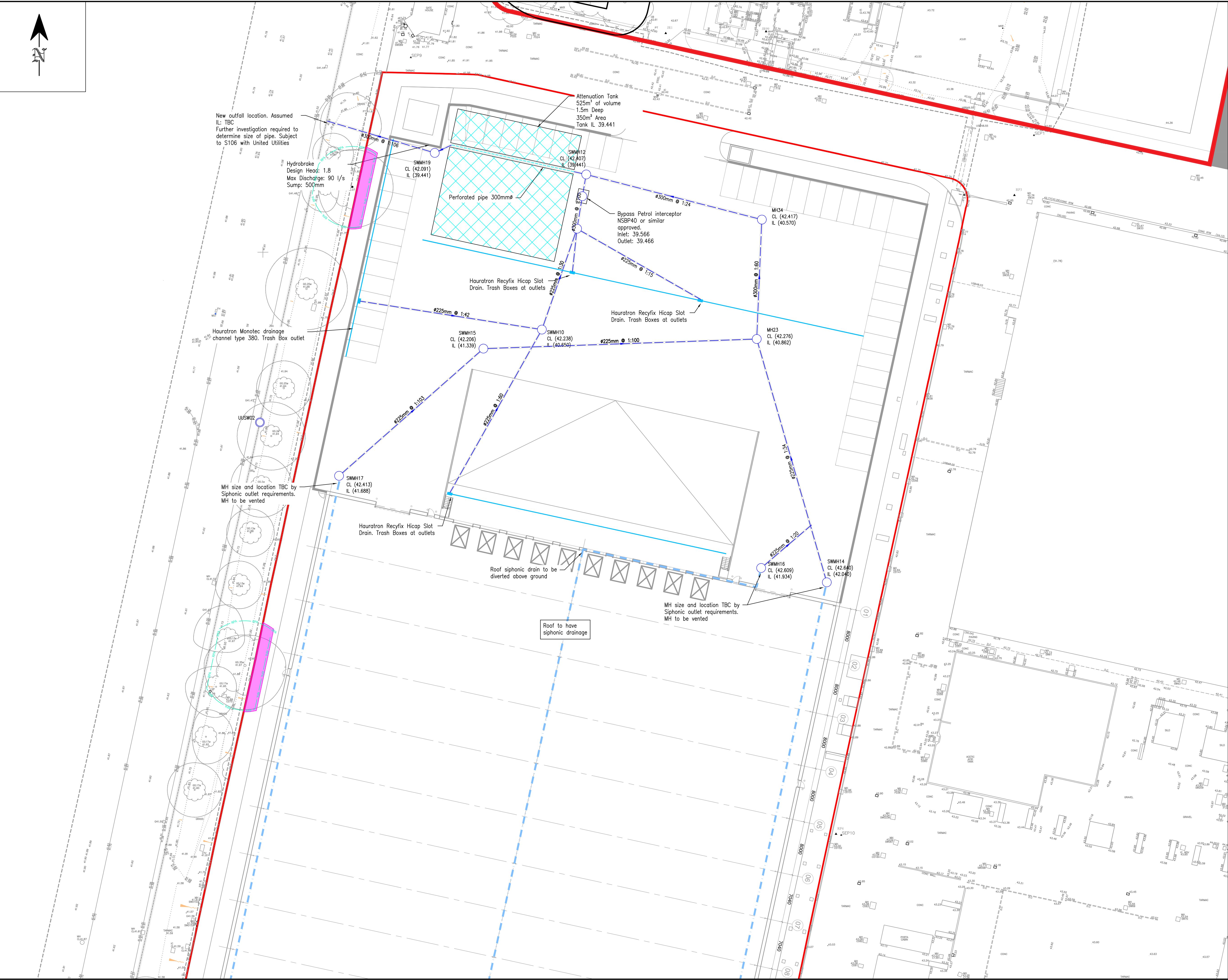
DRAWING TITLE
Drainage Strategy
Overview

DATE	August 2021	PTA PROJ No
DRAWN	GW	9879
SCALE	1:500	REVISION
DWG SIZE	A1	P01

DRAWING No
9879-PTA-ZZ-XX-DR-C-8100

Consulting Civil & Structural Engineers

pta
29 Red Lion Street
Chesham
Bucks.
HP5 1EJ
Tel. 01494 772721
www.ptaconsult.co.uk



- Notes:**
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 2. In case of any discrepancies in drawings, details or bills, refer to engineers for clarification; unilateral decisions by the Contractor will not be accepted.
 3. This drawing is to be read in conjunction with all related Architects, Consultants & Sub-Contractors drawings and specifications.
 4. The Contractor is advised that all design drawings and information are to be read concurrently and any discrepancies or omissions reported directly to PTA's Civil Engineering Department.

Key:

- Proposed SW Drainage
- Existing SW Drainage
- Proposed FW Drainage
- Existing FW Drainage
- Attenuation Tank
- Permeable Paving
- Diffuser Block
- Drain Channel
- Site Boundary
- Root Protection Area
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DRAWING STATUS
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REV	DESCRIPTION	BY	DATE	CHK'D

PROJECT TITLE
Image Business Park
Knowsley Site 3

DRAWING TITLE
Drainage Strategy
Sheet 1 of 2

DATE	August 2021	This drawing is issued only for the purposes described in the drawing status box.	PTA PROJ No
DRAWN	GW		9879
SCALE	1:250		REVISION
DWG SIZE	A1		P01

DRAWING No
9879-PTA-ZZ-XX-DR-C-18101

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Bucks.
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Tel. 01494 772721



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3. This drawing is to be read in conjunction with all related Architects, Consultants & Sub-Contractors drawings and specifications.
4. The Contractor is advised that all design drawings and information are to be read concurrently and any discrepancies or omissions reported directly to PTA's Civil Engineering Department.

Key:

- Proposed SW Drainage
- Existing SW Drainage
- Proposed FW Drainage
- Existing FW Drainage
- Attenuation Tank
- Permeable Paving
- Diffuser Block
- Drain Channel
- Site Boundary
- Root Protection Area
- Area of Cellweb or similar required

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DRAWING STATUS

COSTING

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Image Business Park
Knowsley Site 3

Drainage Strategy
Sheet 2 of 2

DATE	June 2021	This drawing is issued only for the purposes described in the drawing status box.	PTA PROJ No
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DRG SIZE	A1		P01

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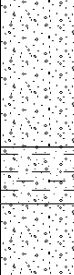
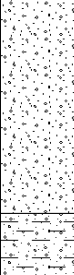
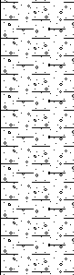
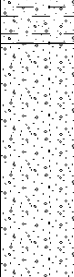
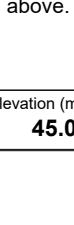
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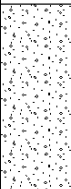
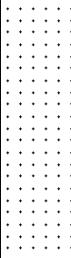
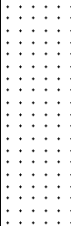
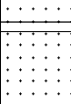
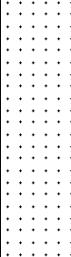
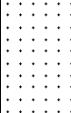


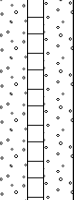
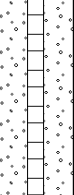
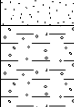
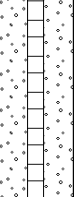
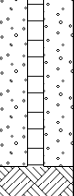
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HP5 1EJ
Tel. 01494 772721

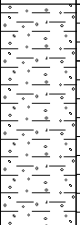
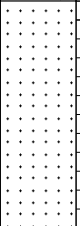
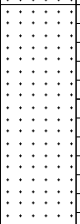
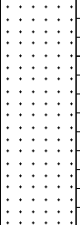
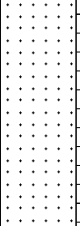
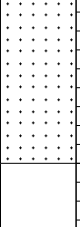
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Appendix H – Borehole Logs

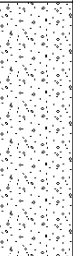
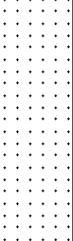
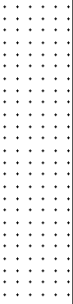
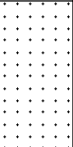
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Rotary Core Borehole Log						Project: Image Business Park, Knowsley (Plot B)									
						Date: 25/06/2019			Client: Knowsley (Image Business Park) Ltd						
Description of Strata	Legend	Strata Depth (m)	Strata Thickness (m)	Reduced Level (mAOD)	Casing Diameter (mm)	Water	Core Recovery			Sample Details		Test Details		Backfill	
							Run (m)	TCR% SCR% RQD%	Min. Fl Av. Fl Max. Fl	Depth (m)	Type Ref	Depth (m)	Results		
Grass over MADE GROUND: Dark brown slightly gravelly sand with abundant roots. Gravel is fine to medium angular brick and quartzite. (TOPSOIL) MADE GROUND: Medium dense light brown slightly silty gravelly sand with occasional pockets of soft sandy clay. Gravel is fine to coarse angular to subrounded brick, concrete, slag, plastic, quartzite. Rare cobbles of concrete and metal pole. Becoming slightly clayey below 1.20 m bgl. Medium dense light brown locally black slightly gravelly medium to coarse SAND. Gravel is fine to medium quartzite. (SHIRDLEY HILL SAND FORMATION) Stiff reddish brown slightly gravelly sandy CLAY. Gravel is fine to medium subrounded quartzite. (GLACIAL TILL) Medium dense light brown locally black slightly gravelly medium to coarse SAND. Gravel is fine to medium subrounded quartzite. (GLACIAL TILL) Poor recovery between 3.00 m and 4.00 m bgl. Stiff reddish brown slightly gravelly sandy CLAY. Gravel is fine to coarse subangular to subrounded quartzite and sandstone. (GLACIAL TILL) Poor recovery between 4.50 m and 5.00 m bgl. Reddish brown slightly clayey SAND (Drillers Description) (WEATHERED CHESTER SANDSTONE FORMATION)		0.20	(0.20)	44.81						0.40	ES 1	0.40	PID=0.2ppmv		
				(1.20)											
		1.40		43.61								1.20	SPT(S) N=12 (1,3/4,4,2,2)		
				(0.80)							1.60	D 2	1.60		PID=0.0ppmv
		2.20		42.81								2.00	SPT(S) N=17 (4,2/3,4,5,5)		
		2.50		42.51								2.40	PID=0.1ppmv		
				(1.50)									3.00		SPT(S) N=12 (3,2/3,3,3,3)
		4.00		41.01								4.00	SPT(S) N=10 (1,1/2,2,3,3)		
				(2.00)							4.40	D 4	4.40		PID=0.2ppmv
													5.00		SPT(S) N=29 (3,6/7,7,8,7)
		6.00		39.01								6.00	SPT(S) N=39 (5,6/7,9,11,12)		
			(2.70)									6.00	PID=0.1ppmv		
												7.50	SPT(S) N=50 (12,5/50 for 230mm)		
Remarks: 1. Hand dug service avoidance pit to 1.20 m bgl. 2. Borehole advanced to 5.00 m bgl using dynamic sampling techniques with rotary openhole follow on to 9.00 m bgl and rotary coring to 15.00 m bgl. 2. Borehole terminated at 15.00 m bgl. 3. Groundwater encountered at 8.70 m bgl. 4. Borehole installed with gas and groundwater standpipe as indicated above.							Water Level Observations					Flush			
							Date	Time	Strike	Duration	Standing	Depth (m)	Return		
							26/06/2019		8.70 m	20 min	8.50 m	9.00 - 10.50	90		
Coordinates: E344018.10 N398882.02		Elevation (mAOD): 45.01		Drilled By: Delta Drilling		Plant Used: Comacchio GEO 300		Logged: BHO	Checked: MY	Approved:	Scale (m): 1:40				

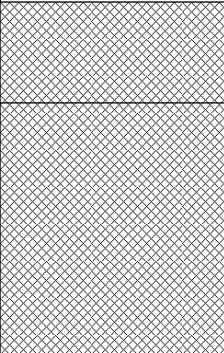
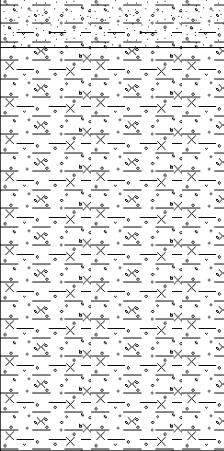
 Environment - Health & Safety - Sustainability Head Office 3 Henley Way, Doddington Road Lincoln, LN6 3QR Tel: +44 (0) 1522 882555 Email: info@deltasimons.com						Project No: 19-0654.02			Hole ID: BH1		Page: 2 of 2			
Rotary Core Borehole Log						Project: Image Business Park, Knowsley (Plot B)								
						Date: 25/06/2019			Client: Knowsley (Image Business Park) Ltd					
Description of Strata	Legend	Strata Depth (m)	Strata Thickness (m)	Reduced Level (mAOD)	Casing Diameter (mm)	Water	Core Recovery			Sample Details		Test Details		Backfill
							Run (m)	TCR% SCR% RQD%	Min. Fl Av. Fl Max. Fl	Depth (m)	Type Ref	Depth (m)	Results	
Reddish brown slightly clayey SAND (Drillers Description) (WEATHERED CHESTER SANDSTONE FORMATION)		8.70		36.31		8.50 8.70								
Strong red SANDSTONE. (Drillers Description) (CHESTER SANDSTONE FORMATION)		9.00	(0.30)	36.01								9.00	SPT(S) 50 (25 for 75mm/50 for 70mm)	
Weak to medium strong dark reddish brown medium grained thinly laminated SANDSTONE. (CHESTER SANDSTONE FORMATION)			(1.60)				1.5	68 58 44		9.70 - 10.00	C 5			
Bands of coarse sandstone gravel between 10.50 m and 10.60 m bgl		10.60		34.41								10.50	SPT(S) 50 (25 for 30mm/50 for 30mm)	
Weak to medium strong dark reddish brown medium to coarse grained thinly laminated SANDSTONE with occasional greenish grey fine to medium grained sandstone bands. (CHESTER SANDSTONE FORMATION)			(1.40)				1.5	100 30 10						
		12.00		33.01						11.80 - 12.00	C 6			
Weak light greenish grey fine to medium grained SANDSTONE. (CHESTER SANDSTONE FORMATION)		12.05		32.96								12.00	SPT(S) 50 (25 for 25mm/50 for 30mm)	
Medium strong dark reddish brown medium to coarse grained thinly laminated SANDSTONE with occasional bands of weak greenish grey fine to medium grained sandstone. (CHESTER SANDSTONE FORMATION)			(1.75)				1.5	84 62 47		12.55 - 12.70	C 7			
		13.80		31.21										
Medium strong greenish grey fine to medium grained thinly laminated SANDSTONE. (CHESTER SANDSTONE FORMATION)		13.95		31.06										
Strong dark reddish brown medium to coarse grained thinly laminated SANDSTONE. (CHESTER SANDSTONE FORMATION)			(1.05)				1.5	60 49 68		14.40 - 14.50	C 8			
Poor recovery between 14.50 m and 15.00 m bgl. Borehole complete at 15.00 m bgl.		15.00		30.01								15.00	SPT(S) 50 (5,10/50 for 45mm)	
Remarks: 1. Hand dug service avoidance pit to 1.20 m bgl. 2. Borehole advanced to 5.00 m bgl using dynamic sampling techniques with rotary openhole follow on to 9.00 m bgl and rotary coring to 15.00 m bgl. 2. Borehole terminated at 15.00 m bgl. 3. Groundwater encountered at 8.70 m bgl. 4. Borehole installed with gas and groundwater standpipe as indicated above.							Water Level Observations					Flush		
							Date	Time	Strike	Duration	Standing	Depth (m)	Return	
							26/06/2019		8.70 m	20 min	8.50 m	9.00 - 10.50	90	
Coordinates: E344018.10 N398882.02		Elevation (mAOD): 45.01		Drilled By: Delta Drilling		Plant Used: Comacchio GEO 300		Logged: BHO	Checked: MY	Approved:	Scale (m): 1:40			

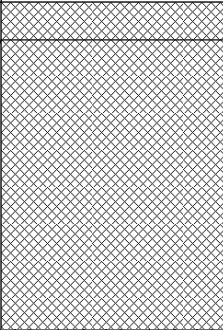
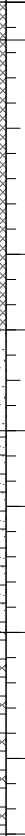
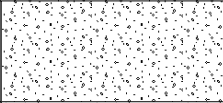
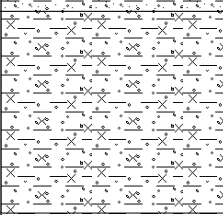
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						Project: Image Business Park, Knowsley (Plot B)									
Rotary Core Borehole Log						Date: 25/06/2019			Client: Knowsley (Image Business Park) Ltd						
Description of Strata	Legend	Strata Depth (m)	Strata Thickness (m)	Reduced Level (mAOD)	Casing Diameter (mm)	Water	Core Recovery			Sample Details		Test Details		Backfill	
							Run (m)	TCR% SCR% RQD%	Min. FI Av. FI Max. FI	Depth (m)	Type Ref	Depth (m)	Results		
Grass over MADE GROUND: Dark brown slightly gravelly sand with frequent roots. Gravel is fine to medium brick and quartzite. (TOPSOIL) MADE GROUND: Dark brown, locally yellowish brown, slightly clayey slightly gravelly sand with rare cobble of concrete. Gravel is fine to coarse brick, concrete, wood, glass, slag and quartzite.		0.20	(0.20)	44.56						0.30	ES 1	0.30	PID=0.1ppmv		
			(1.30)										1.20		SPT(S) N=7 (1,1/1,2,2,2)
		1.50		43.26											1.60
Firm to stiff reddish brown sandy CLAY with occasional coarse gravel of quartzite. (GLACIAL TILL) Soft reddish brown sandy CLAY with occasional coarse gravel of quartzite. (GLACIAL TILL)		1.70	(0.20)	43.06						1.60	D 2	1.60	PID=0.0ppmv		
			(1.30)										2.00		SPT(S) N=4 (1,1/1,1,1,1)
		3.00		41.76											3.00
Firm reddish brown sandy CLAY with occasional coarse gravel of quartzite. (GLACIAL TILL)			(1.70)							3.10	D 3	3.10	SPT(S) N=13 (2,2/2,3,3,5) PID=0.0ppmv		
													4.00		SPT(S) N=18 (2,2/3,6,4,5)
		4.70		40.06											4.80
Dense dark brown medium to coarse SAND with occasional coarse gravel of quartzite. (GLACIAL TILL) Firm to stiff brown slightly gravelly CLAY. (Drillers Description) (GLACIAL TILL)		5.00	(0.30)	39.76						4.80	D 4	4.80	PID=0.0ppmv		
			(3.90)										5.00		SPT(S) N=41 (6,10/10,11,10,10)
															6.00
												7.50	SPT(S) N=50 (5,6/50 for 280mm)		
Remarks: 1. Hand dug service avoidance pit to 1.20 m bgl. 2. Borehole advanced to 5.00 m bgl using dynamic sampling techniques with rotary openhole follow on to 9.00 m bgl and rotary coring to 15.00 m bgl. 2. Borehole terminated at 15.00 m bgl. 3. Groundwater encountered at 8.50 m bgl. 4. Borehole installed with gas and groundwater standpipe as indicated above.							Water Level Observations					Flush			
							Date	Time	Strike	Duration	Standing	Depth (m)	Return		
							27/06/2019		8.50 m			13.50 - 15.00	90		
Coordinates: E343949.70 N398853.17		Elevation (mAOD): 44.76		Drilled By: Delta Drilling			Plant Used: Comacchio GEO 300			Logged: BHO	Checked: MY	Approved:	Scale (m): 1:40		

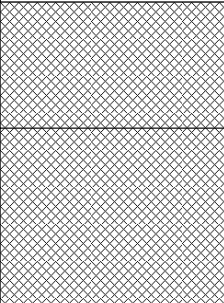
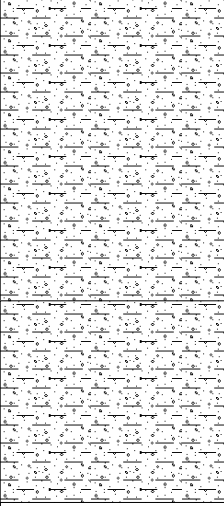
 Environment - Health & Safety - Sustainability Head Office 3 Henley Way, Doddington Road Lincoln, LN6 3QR Tel: +44 (0) 1522 882555 Email: info@deltasimons.com						Project No: 19-0654.02		Hole ID: BH2		Page: 2 of 2				
						Project: Image Business Park, Knowsley (Plot B)								
Rotary Core Borehole Log						Date: 25/06/2019		Client: Knowsley (Image Business Park) Ltd						
Description of Strata	Legend	Strata Depth (m)	Strata Thickness (m)	Reduced Level (mAOD)	Casing Diameter (mm)	Water	Core Recovery			Sample Details		Test Details		Backfill
							Run (m)	TCR% SCR% RQD%	Min. Fl Av. Fl Max. Fl	Depth (m)	Type Ref	Depth (m)	Results	
Firm to stiff brown slightly gravelly CLAY. (Drillers Description) (GLACIAL TILL)		8.90		35.86		8.50								
Weak reddish brown medium to coarse grained thinly laminated SANDSTONE. (CHESTER SANDSTONE FORMATION) <i>Band of weak reddish brown medium to coarse grained sandstone gravel between 9.00 m and 9.20 m bgl.</i>		10.50	(1.60)	34.26			1.5	46 33 28		9.30 - 9.50	C 5	9.00	SPT(S) 50 (25 for 130mm/50 for 150mm)	
Weak reddish brown medium to coarse grained thinly laminated SANDSTONE with bands of weak greenish grey fine to medium grained laminated sandstone. (CHESTER SANDSTONE FORMATION) <i>Band of weak reddish brown medium to coarse grained sandstone gravel between 10.50 m and 10.70 m bgl.</i>							1.5	33 4 0				10.50	SPT(S) 50 (25 for 20mm/50 for 25mm)	
<i>Band of weak reddish brown medium to coarse grained sandstone gravel between 13.50 m and 13.70 m bgl.</i>			(4.50)				1.5	43 16 0				12.00	SPT(S) 50 (25 for -29mm/50 for 50mm)	
							1.5	97 60 20		14.00 - 14.20	C 6	13.50	SPT(S) N=50 (25 for 15mm/50 for 25mm)	
Borehole complete at 15.00 m bgl.		15.00		29.76								15.00	SPT(S) 50 (25 for 20mm/50 for 35mm)	
Remarks: 1. Hand dug service avoidance pit to 1.20 m bgl. 2. Borehole advanced to 5.00 m bgl using dynamic sampling techniques with rotary openhole follow on to 9.00 m bgl and rotary coring to 15.00 m bgl. 2. Borehole terminated at 15.00 m bgl. 3. Groundwater encountered at 8.50 m bgl. 4. Borehole installed with gas and groundwater standpipe as indicated above.							Water Level Observations					Flush		
							Date	Time	Strike	Duration	Standing	Depth (m)	Return	
							27/06/2019		8.50 m			13.50 - 15.00	90	
Coordinates: E343949.70 N398853.17		Elevation (mAOD): 44.76		Drilled By: Delta Drilling		Plant Used: Comacchio GEO 300		Logged: BHO	Checked: MY	Approved:	Scale (m): 1:40			

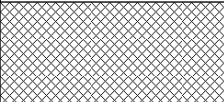
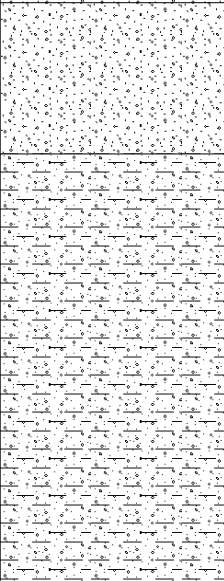
 Environment - Health & Safety - Sustainability Head Office 3 Henley Way, Doddington Road Lincoln, LN6 3QR Tel: +44 (0) 1522 882555 Email: info@deltasimons.com							Project No: 19-0654.02			Hole ID: BH3		Page: 1 of 2		
Rotary Core Borehole Log							Project: Image Business Park, Knowsley (Plot B)							
							Date: 26/06/2019		Client: Knowsley (Image Business Park) Ltd					
Description of Strata	Legend	Strata Depth (m)	Strata Thickness (m)	Reduced Level (mAOD)	Casing Diameter (mm)	Water	Core Recovery			Sample Details		Test Details		Backfill
							Run (m)	TCR% SCR% RQD%	Min. FI Av. FI Max. FI	Depth (m)	Type Ref	Depth (m)	Results	
Grass over MADE GROUND: Dark brown slightly gravelly sand with frequent roots. Gravel is fine to medium brick and quartzite.			(1.40)							0.40	ES 1	0.40	PID=0.2ppmv	
MADE GROUND: Medium dense dark brown slightly clayey gravelly sand with rare cobble of brick. Rare glass and timber.		1.40		43.38										
											2.00	SPT(S) N=13 (2,2/3,3,4,3)		
										2.50	D 2	2.50	PID=0.0ppmv	
										3.00	SPT(S) N=12 (1,2/2,2,4,4)			
MADE GROUND: Brown sandy gravel with brick. (Drillers Description)			(3.60)									4.00	SPT(S) N=19 (2,2/5,5,4,5)	
											5.00	SPT(S) N=37 (5,6/6,10,11,10)		
		5.00		39.78										
MADE GROUND: Brown sandy gravel with brick. (Drillers Description)			(1.00)											
		6.00		38.78										
Reddish brown slightly gravelly clayey fine SAND. (Drillers Description) (WEATHERED CHESTER SANDSTONE FORMATION)			(1.10)							6.00	D 3	6.00	SPT(S) N=50 (8,10/50 for 275mm) PID=0.0ppmv	
Reddish brown slightly gravelly medium SAND. (Drillers Description) (WEATHERED CHESTER SANDSTONE FORMATION)		7.10		37.68										
												7.50	SPT(S) N=50 (10,13/50 for 170mm)	
Remarks: 1. Hand dug service avoidance pit to 1.20 m bgl. 2. Borehole advanced to 6.00 m bgl using dynamic sampling techniques with rotary openhole follow on to 10.50 m bgl and rotary coring to 15.00 m bgl. 2. Borehole terminated at 15.00 m bgl. 3. Groundwater encountered at 7.80 m bgl. 4. Borehole installed with gas and groundwater standpipe as indicated above.							Water Level Observations					Flush		
							Date	Time	Strike	Duration	Standing	Depth (m)	Return	
							28/06/2019		7.80 m			7.50 - 9.00	90	
Coordinates: E343921.87 N398909.25		Elevation (mAOD): 44.78		Drilled By: Delta Drilling		Plant Used: Comacchio GEO 300		Logged: BHO	Checked: MY	Approved:	Scale (m): 1:40			

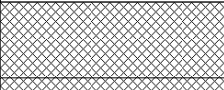
 Environment - Health & Safety - Sustainability Head Office 3 Henley Way, Doddington Road Lincoln, LN6 3QR Tel: +44 (0) 1522 882555 Email: info@deltasimons.com						Project No: 19-0654.02			Hole ID: BH3		Page: 2 of 2			
Rotary Core Borehole Log						Date: 26/06/2019			Client: Knowsley (Image Business Park) Ltd					
						Project: Image Business Park, Knowsley (Plot B)								
Description of Strata	Legend	Strata Depth (m)	Strata Thickness (m)	Reduced Level (mAOD)	Casing Diameter (mm)	Water	Core Recovery			Sample Details		Test Details		Backfill
							Run (m)	TCR% SCR% RQD%	Min. Fl Av. Fl Max. Fl	Depth (m)	Type Ref	Depth (m)	Results	
Reddish brown slightly gravelly medium SAND. (Drillers Description) (WEATHERED CHESTER SANDSTONE FORMATION)			(2.10)			7.80								
Poor recovery between 9.05 m and 10.50 m bgl due to obstruction.		9.20		35.58								9.00	SPT(S) N=50 (25 for 85mm/50 for 75mm)	
Reddish brown SANDSTONE. (Drillers Description) (CHESTER SANDSTONE FORMATION)			(1.30)				1.5	3 3 0						
		10.50		34.28										
Medium strong dark reddish brown medium to coarse grained thinly laminated SANDSTONE. (CHESTER SANDSTONE FORMATION)			(2.00)				1.5	76 58 46		11.10 - 11.35	C 4	10.50	SPT(S) N=50 (25 for 60mm/50 for 40mm)	
		12.50		32.28										
Medium strong to strong reddish brown medium to coarse grained thinly laminated SANDSTONE. (CHESTER SANDSTONE FORMATION)			(1.70)				1.5	92 70 38		12.50 - 12.60 12.70 - 12.95	C 5 6 C	12.00	SPT(S) N=50 (25 for 30mm/50 for 40mm)	
		14.20		30.58										
Medium strong reddish brown medium to coarse grained thinly laminated SANDSTONE. (CHESTER SANDSTONE FORMATION)			(0.80)				1.5	100 86 83		13.60 - 13.85 14.40 - 14.50	C 7 C 8	13.50	SPT(S) N=50 (25 for 30mm/50 for 45mm)	
		15.00		29.78										
Borehole complete at 15.00 m bgl.												15.00	SPT(S) N=50 (25 for 25mm/50 for 30mm)	
Remarks: 1. Hand dug service avoidance pit to 1.20 m bgl. 2. Borehole advanced to 6.00 m bgl using dynamic sampling techniques with rotary openhole follow on to 10.50 m bgl and rotary coring to 15.00 m bgl. 2. Borehole terminated at 15.00 m bgl. 3. Groundwater encountered at 7.80 m bgl. 4. Borehole installed with gas and groundwater standpipe as indicated above.							Water Level Observations					Flush		
							Date	Time	Strike	Duration	Standing	Depth (m)	Return	
							28/06/2019		7.80 m			7.50 - 9.00	90	
Coordinates: E343921.87 N398909.25		Elevation (mAOD): 44.78		Drilled By: Delta Drilling		Plant Used: Comacchio GEO 300		Logged: BHO	Checked: MY	Approved:	Scale (m): 1:40			

 Head Office 3 Henley Way, Doddington Road Lincoln, LN6 3QR Tel: +44 (0) 1522 882555 Email: info@deltasimons.com		Project No: 19-0654.01		Hole ID: TP2		Page: 1 of 1		
		Project: Image Business Park, Knowsley (Plot B)						
Trial Pit Log		Date: 25/06/2019		Client: Knowsley (Image Business Park) Ltd				
Description of Strata	Legend	Strata Depth (m)	Reduced Level (mAOD)	Water Strike (m)	Sample Details		Test Details	
					Depth (m)	Type Ref	Depth (m)	Results
Grass over MADE GROUND: Blackish brown slightly gravelly silty sand with frequent roots. Gravel is fine to coarse angular to subrounded brick, quartzite and sandstone. (TOPSOIL)		0.40	44.32		0.50 0.70 - 0.90	ES 1 B 2	0.50	PID=0.00ppmv
MADE GROUND: Reddish brown slightly silty gravelly sand with occasional pockets of firm yellowish brown sandy clay and occasional cobbles of brick and concrete. Gravel is fine to coarse angular to subrounded brick, concrete, glass, plastic, clinker, quartzite and sandstone. Rare metal pole and timber.		1.40	43.32					
Firm light grey mottled orangish brown slightly gravelly sandy CLAY. Gravel is fine to medium subrounded quartzite. (GLACIAL TILL)		1.60	43.12					
Firm reddish brown mottled orangish brown slightly gravelly slightly sandy CLAY with rare pocket of yellowish brown fine grained sand. Gravel is fine to medium subangular to rounded quartzite and sandstone. (GLACIAL TILL)		3.20	41.52		3.10	D 4	3.10	PID=0.00ppmv
Trial pit complete at 3.20 m bgl.								
Dimensions and Orientation: Length = 3.10 m Width = 0.85 m 		Orientation: Inclination:		Remarks: 1. Trial pit terminated at 3.20 m. 2. Groundwater was not encountered during excavation. 3. Trial pit sides stable. 4. Trial pit backfilled with arisings upon completion.				
Coordinates: E343959.68 N398901.15		Elevation (mAOD): 44.72		Excavated By: Boundary Plant Hire		Plant Used: 13T Tracked Excavator		Logged: BHO Checked: MY Approved: Scale: 1:30

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		Project: Image Business Park, Knowsley (Plot B)						
Trial Pit Log		Date: 26/06/2019		Client: Knowsley (Image Business Park) Ltd				
Description of Strata	Legend	Strata Depth (m)	Reduced Level (mAOD)	Water Strike (m)	Sample Details		Test Details	
					Depth (m)	Type Ref	Depth (m)	Results
Grass over MADE GROUND: Blackish brown slightly gravelly silty sand with frequent roots. Gravel is fine to coarse angular to subrounded brick, quartzite and sandstone. (TOPSOIL)		0.15	44.87		0.50	ES 1	0.50	PID=0.20ppmv
MADE GROUND: Dark brown slightly clayey gravelly sand with occasional cobbles of brick and concrete and occasional pockets of yellowish brown medium to coarse sand. Gravel is fine to coarse angular to subrounded brick, concrete, glass, sandstone and quartzite.		1.30	43.72					
Orangish brown slightly gravelly medium to coarse SAND. Gravel is fine to coarse subrounded to rounded quartzite. (SHIRDLEY HILL SAND FORMATION)		1.70	43.32		1.40 - 1.50	B 2	1.40	PID=0.00ppmv
Soft light grey mottled orangish brown slightly gravelly sandy CLAY. Gravel is fine to coarse subrounded to rounded quartzite. (GLACIAL TILL)		2.50	42.52					
Firm reddish brown slightly gravelly sandy CLAY. Gravel is fine to coarse subrounded to rounded quartzite. (GLACIAL TILL)		3.30	41.72		3.00	D 3	3.00	PID=0.00ppmv
Trial pit complete at 3.30 m bgl.								
Dimensions and Orientation: Length = 3.20 m Width = 0.90 m 		Orientation: Inclination:		Remarks: 1. Trial pit terminated at 3.30 m. 2. Slight groundwater seepage was encountered at 2.20 m bgl during excavation. 3. Trial pit sides stable. 4. Trial pit backfilled with arisings upon completion.				
Coordinates: E344010.48 N398834.15	Elevation (mAOD): 45.02	Excavated By: Boundary Plant Hire		Plant Used: 13T Tracked Excavator	Logged: BHO	Checked: MY	Approved: 	Scale: 1:30

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		Project: Image Business Park, Knowsley (Plot B)						
Trial Pit Log				Date: 25/06/2019		Client: Knowsley (Image Business Park) Ltd		
Description of Strata	Legend	Strata Depth (m)	Reduced Level (mAOD)	Water Strike (m)	Sample Details		Test Details	
					Depth (m)	Type Ref	Depth (m)	Results
Grass over MADE GROUND: Blackish brown slightly gravelly silty sand with frequent roots. Gravel is fine to coarse angular to subrounded brick, quartzite and sandstone. (TOPSOIL)		0.50	44.23		1.00 - 1.10	B 1	1.00	PID=0.00ppmv
MADE GROUND: Dark brown slightly silty gravelly sand with occasional cobbles of brick and concrete. Gravel is fine to coarse angular to subrounded brick, concrete, ceramics, wood, sandstone and quartzite.		1.20	43.53					
Orangish brown slightly gravelly medium to coarse SAND. Gravel is fine to coarse subrounded to rounded quartzite. (SHIRDLEY HILL SAND FORMATION)		1.50	43.23					
Firm, locally stiff, grey slightly gravelly sandy CLAY. Gravel is fine to medium rounded quartzite. (GLACIAL TILL)		2.70	42.03		1.60	D 2	1.60	PID=0.00ppmv
Firm light grey mottled reddish brown slightly gravelly slightly sandy CLAY. Gravel is fine to coarse subrounded to rounded quartzite. (GLACIAL TILL)		3.50	41.23					
Trial pit complete at 3.50 m bgl.								
Dimensions and Orientation: Length = 3.90 m Width = 0.85 m 				Orientation: Inclination:		Remarks: 1. Trial pit terminated at 3.50 m. 2. Groundwater was not encountered during excavation. 3. Trial pit sides stable. 4. Trial pit backfilled with arisings upon completion.		
Coordinates: E343988.81 N398808.07		Elevation (mAOD): 44.73		Excavated By: Boundary Plant Hire		Plant Used: 13T Tracked Excavator		Logged: BHO Checked: MY Approved: Scale: 1:30

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		Project: Image Business Park, Knowsley (Plot B)									
Trial Pit Log		Date: 25/06/2019		Client: Knowsley (Image Business Park) Ltd							
Description of Strata	Legend	Strata Depth (m)	Reduced Level (mAOD)	Water Strike (m)	Sample Details		Test Details				
					Depth (m)	Type Ref	Depth (m)	Results			
Grass over MADE GROUND: Blackish brown slightly gravelly silty sand with frequent roots. Gravel is fine to coarse angular to subrounded brick, quartzite and sandstone. Rare glass. (TOPSOIL)		0.40	44.26		0.60	ES 1	0.60	PID=0.10ppmv			
MADE GROUND: Dark brown slightly silty gravelly sand with occasional cobbles of brick and concrete. Gravel is fine to coarse angular to rounded brick, concrete, slag, sandstone and quartzite.		0.90	43.76								
Greenish grey and orangish brown gravelly SAND. Gravel is fine to coarse subrounded to rounded quartzite. (SHIRDLEY HILL SAND FORMATION)		1.20	43.46								
Light grey locally orangish brown gravelly SAND. Gravel is fine to coarse subrounded to rounded quartzite. (SHIRDLEY HILL SAND FORMATION)	1.80	42.86	1.10						D 2	1.10	PID=0.00ppmv
Stiff, locally firm, reddish brown mottled greyish brown slightly sandy slightly gravelly CLAY. (GLACIAL TILL)		3.50									
Trial pit complete at 3.50 m bgl.											
Dimensions and Orientation: Length = 3.90 m Width = 0.90 m 		Orientation: Inclination:		Remarks: 1. Trial pit terminated at 3.50 m. 2. Groundwater was not encountered during excavation. 3. Instability in upper 1.00 m of Made Ground. 4. Trial pit backfilled with arisings upon completion.							
Coordinates: E343949.17 N398839.03		Elevation (mAOD): 44.66		Excavated By: Boundary Plant Hire		Plant Used: 13T Tracked Excavator		Logged: BHO Checked: MY Approved: Scale: 1:30			

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		Project: Image Business Park, Knowsley (Plot B)									
Trial Pit Log		Date: 26/06/2019		Client: Knowsley (Image Business Park) Ltd							
Description of Strata	Legend	Strata Depth (m)	Reduced Level (mAOD)	Water Strike (m)	Sample Details		Test Details				
					Depth (m)	Type Ref	Depth (m)	Results			
Grass over MADE GROUND: Blackish brown slightly gravelly silty sand with frequent roots. Gravel is fine to coarse angular to subrounded brick, quartzite and sandstone. Rare glass. (TOPSOIL)		0.30	44.55		0.60	ES 1	0.60	PID=0.10ppmv			
MADE GROUND: Dark brown slightly silty gravelly sand with occasional lenses of yellowish brown fine to medium sand and occasional pockets of soft dark brown sandy clay. Gravel is fine to coarse angular to subrounded brick, concrete, slag, coal, clinker, quartzite and sandstone. Rare timber and boulder of concrete.		1.30	43.55								
Orangish brown slightly silty slightly gravelly SAND. Gravel is fine to coarse subrounded to rounded quartzite. (SHIRDLEY HILL SAND FORMATION)		1.80	43.05								
Greenish grey and orangish brown gravelly clayey SAND with occasional pockets of soft reddish brown clay. Gravel is fine to coarse subrounded to rounded quartzite and sandstone. (SHIRDLEY HILL SAND FORMATION)	2.00	42.85	3.40						D 3	3.40	PID=0.00ppmv
Soft, locally very soft, greenish grey mottled reddish brown slightly gravelly sandy CLAY with occasional pockets of greenish grey fine to medium sand. Gravel is fine to coarse subrounded to rounded quartzite. (Wet) (GLACIAL TILL)	3.50	41.35									
Trial pit complete at 3.50 m bgl.											
Dimensions and Orientation: 				Orientation: Inclination: Remarks: 1. Trial pit terminated at 3.50 m. 2. Slight groundwater seepage was encountered at 1.90 m bgl during excavation. 3. Trial pit sides stable. 4. Trial pit backfilled with arisings upon completion.							
Coordinates: E343886.60 N398837.44		Elevation (mAOD): 44.85		Excavated By: Boundary Plant Hire		Plant Used: 13T Tracked Excavator		Logged: BHO Checked: MY Approved: Scale: 1:30			

Appendix I – Knowsley Proforma

PRO-FORMA 1: Sustainable Drainage System: Planning Permission

This pro-forma is a requirement of the Planning Validation Checklist. You **must complete all white boxes in full** and submit this pro-forma along with your supporting evidence to the Local Planning Authority for any application which seeks planning permission for major development (as defined in section 2 of [Statutory Instrument 2015 No. 595](#)).

This pro-forma supports developers and regulators in **summarising and confirming** how surface water from a development will be managed sustainably under current and future conditions. It should be completed in conjunction with the Council's 'Completing your Pro Forma' document and your sustainable drainage system should be designed in accordance with [CIRIA The SuDS Manual C753](#).

The pro-forma follows Policy CS24 of [Knowsley MBC's Local Plan](#), [National Planning Policy Framework](#), [House of Commons Written Statement \(HWSW 161\) on SuDS](#), [Planning Practice Guidance](#) and [Defra's Non-Statutory Technical Standards for Sustainable Drainage Systems](#). It is supported by the [Defra/EA Guidance on Rainfall Runoff Management](#) and can be completed using freely available tools such as [Tools for Sustainable Drainage Systems](#) or approved Industry Standard surface water management design software. The Council's [Sustainable Drainage & Surface Water Management Technical Guidance document](#) also provides further information.

Section 1: Development Details				
Development Name		Image Business Park, Knowsley Site 3		
Development Address (including postcode)		L33 7UF	Planning Application Reference (if available)	-
Development Grid Reference	Northings	343767	Expected lifetime of development (years)	100
	Eastings	398801	Have you submitted a Flood Risk Assessment?	Yes ☐ No ☒
Total Development Site Area (Ha)		2.246	Type of Planning Application (✓)	Outline ☐
Site area served by proposed drainage system (excluding open space) (Ha)*		2.246		Full ☒
Is your surface water drainage system designed to a (tick all that apply):				Hybrid ☐
Greenfield Standard - Site is undeveloped and a new drainage system will be installed; OR - Site is already developed and a new surface water drainage system will be installed to serve the new development.		☐		Reserved Matters ☐
Previously Developed Standard Site is already developed and the <u>entirety</u> of the existing surface water drainage system will be used to serve the new development.		☒		

PRO-FORMA 1: Sustainable Drainage System: Planning Permission

Section 2: Impermeable Area and Existing Drainage For outline or reserved matters applications, go to Section 3

	Existing (E)	Proposed (P)	Difference (P – E)	Evidence Checklist	
Impermeable Area (Ha)	2.2457	1.7845	0.4612	☒	Plans showing development layout of site with existing and proposed impermeable areas.
State Drainage Method	-	Hydrobrake, permeable paving and storage tanks	N/A	☒	Plans showing current and proposed locations of sustainable drainage system.
Are there existing sewers, watercourses, water bodies, highway drains, soakaways or filter drains on the site?			Yes ☐ No ☒	☒	Plans showing existing layout to include: • Watercourses, open or culverted • Water bodies – ponds, swales etc. • Sewers, including manholes • Highway drains, include manholes • Soakaways, filter drains

Section 3: Surface Water Discharge Hierarchy – Planning Practice Guidance

Surface Water Discharge Method	Proposed?	If YES - Evidence Checklist		If NO - Evidence Checklist	
1. Infiltration to ground	Yes ☐ No ☒	☐	Completed Infiltration Checklist from CIRIA The SuDS Manual C753 Appendix B <i>An editable version of this form is available on SusDrain website.</i>	☒	Geotechnical Survey, including Soil Permeability Testing stating Percolation Coefficient, in accordance with BRE 365 AND Statement providing justification in your Sustainable Drainage Strategy
2. Discharge to watercourse or surface water body (Main River or Ordinary)	Yes ☐ No ☒	☐	Watercourse and/or Water Body Survey Report	☐	Plan showing nearby watercourses and water bodies AND Statement providing justification in your Sustainable Drainage Strategy
3. Discharge to surface water sewer	Yes ☒ No ☐	☐	Water and Sewerage Company written agreement for the Right to Connect.	☒	Plan showing nearby sewers AND Statement providing justification in your Sustainable Drainage Strategy
4. Discharge to combined sewer	Yes ☐ No ☒				

PRO-FORMA 1: Sustainable Drainage System: Planning Permission

Section 4: Calculate Peak Discharge Rates – Technical Standards S2 and S3 (unless S1 applies)

Rainfall Event	Existing Rate (l/s)	Greenfield Rate (l/s)	Proposed Rate (l/s) <i>Brownfield sites must reduce discharge rates by 50%</i>	Evidence Checklist	
Qbar		-		☒	MicroDrainage (or equivalent) calculations
1:1 Year Event	185.06	-	90		
1:30 Year Event	453.73	-	90		
1:100 Year Event	586.20	-	90		

Section 5: Calculate Discharge Volume – Technical Standards S4 and S6 (unless S1 applies)

Rainfall Event	Existing Volume (m ³)	Greenfield Volume (m ³)	Proposed Volume (m ³)	Evidence Checklist	
1:100 Year 6 Hour Event				☐	MicroDrainage (or equivalent) calculations

Section 6: Infiltration

Site Information	✓	Evidence Checklist	
Do your sustainable drainage proposals include any infiltration?	Yes ☐ No ☒ <i>If NO, please move on to Section 7</i>	☒	Proposed sustainable drainage plans
You should submit an alternative 'Plan B' sustainable drainage design utilising an alternative discharge method if site specific ground conditions are unknown at this stage. This will become the default design in the event infiltration proposals are not feasible upon site specific ground investigation. Have you submitted an alternative 'Plan B' sustainable drainage design?	Yes ☐ No ☒	☒	'Plan B' conceptual sustainable drainage plans and statement of approach

PRO-FORMA 1: Sustainable Drainage System: Planning Permission

Section 7: Storage – Technical Standards S7, S8 and S9

Storage Details	Details	Evidence Checklist	
State climate change allowance used (%)	40%	☒	State / use in MicroDrainage
State storage volume provided (m ³) (excluding non-void spaces) <i>Must include an allowance for climate change and urban creep.</i>	526.5m ³	☒	Drainage plans showing location of attenuation and all flow control devices and any supporting calculations
Summarise how storage will be provided for 1:30 year event on site. <i>Storage must be designed to ensure that at no flooding occurs onsite in a 1 in 30 year event except in designed areas and no flooding occurs offsite in a 1 in 100 year (+ climate change allowance) event.</i>	Storage tank and permeable paving will hold the 1:30 storm storage.	☒	Plans showing size and location of storage and supporting calculations
Summarise how storage will be provided for 1:100 year (+ climate change) 6 hour event on site. <i>Where storage above the 1:30 year rainfall event is provided in designated areas designed to accommodate excess surface water volumes, plans showing storage locations and surface water depths and supported by MicroDrainage (or equivalent) calculations.</i>	Storage tank and permeable paving will hold the 1:30 storm storage.	☒	Plans showing size and location of storage and supporting calculations

Section 8: Operation and Maintenance – Technical Standard S12 and HCWS161

Consideration	Select <u>ALL</u> that apply (✓)		Evidence Checklist
State how <u>ALL</u> components of the sustainable drainage system will be maintained for the design life of the development.	Sustainable drainage features are at property level	☒	☒ Statement provided within your Sustainable Drainage Strategy
	Sustainable drainage system to be adopted by Water and Sewerage Company through a Section 104 agreement (Water Industry Act 1991)	☒	
	Applicant to secure maintenance of sustainable drainage features by entering into a Section 106 agreement (Town and Country Planning Act 1990)	☐	

PRO-FORMA 1: Sustainable Drainage System: Planning Permission

Declaration and Submission

This pro-forma has been completed using evidence from information which has been submitted with my planning application.

The information submitted in the Sustainable Drainage Strategy and site-specific Flood Risk Assessment (FRA), where submitted, is proportionate to the site conditions, flood risks and magnitude of development and I agree that this information can be used as evidence to this sustainable drainage approach.

Submitter Details

Form <u>completed</u> by	George Westgarth	Email Address	George.westgarth@ptaconsult.co.uk
		Daytime Telephone	01494 772 721
Form <u>signed off</u> by	George Westgarth	Accreditation(s) and/or Qualification(s) of Signatory	-
Date (dd/mm/yyyy)	31/08/21	Company	PTA

Client Details

Name	-	Company	-
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