

Ref – 10607 Barlow Moor Centre
Date 16 November 2021

DRAINAGE STATEMENT

1. Drainage is designed on the basis of separate systems for foul and surface water.
2. Surface water drainage design follows the SuDS hierarchy, of
 - i. Infiltration to ground
 - ii. Discharge to a surface water body
 - iii. Discharge to a surface water sewer
 - iv. Discharge to a combined sewer
3. The existing site (excepting a minor triangular area outside the building to the north) is entirely hard paved and positively drained. The pre-development impermeable area is approximately 600m².
4. Ground investigation has been undertaken to determine the suitability of the natural strata underlying the site for soakaway drainage.
5. Three trial pits were excavated and soakaway tests were performed in accordance with BRE 365.
6. The soil infiltration rate (f) was calculated for each trial pit.
7. The lowest recorded value was 2.2×10^{-5} m/s, which is equivalent to a rainfall of 79 mm/hr being able to infiltrate to ground directly, with no ponding or flooding off site.
8. The figure of 2.2×10^{-5} m/s is also equivalent to 0.022 l/s/m², so ties in with Figure NA.3 of BS EN 752, i.e. representative of a 1 in 5 year rainfall event.
9. When considered in light of the proposed solution to allow infiltration to ground, soil and groundwater sampling of the sub-strata indicated no impact on human health and controlled waters (confirmed by LKC, see email).
10. Thus it is proposed that all external paved areas will be constructed in permeable material, allowing infiltration to ground with a minimum of 1 in 5 year rainfall event being catered for, without ponding or flooding off the site.
11. Additional storage will be incorporated within the paved areas via a permeable sub-base, required for structural reasons.
12. As the pre-development roof area is positively drained, the proposed roof area is to be re-connected to the existing off-site discharge point.

Reid Jones Partnership Ltd
3 Cross Street Preston PR1 3LT Tel: 01772 498007
9 Orrell Road Orrell Wigan WN5 8EY Tel: 01942 216006
Email: enq@reidjonespartnership.co.uk Web: www.reidjonespartnership.co.uk

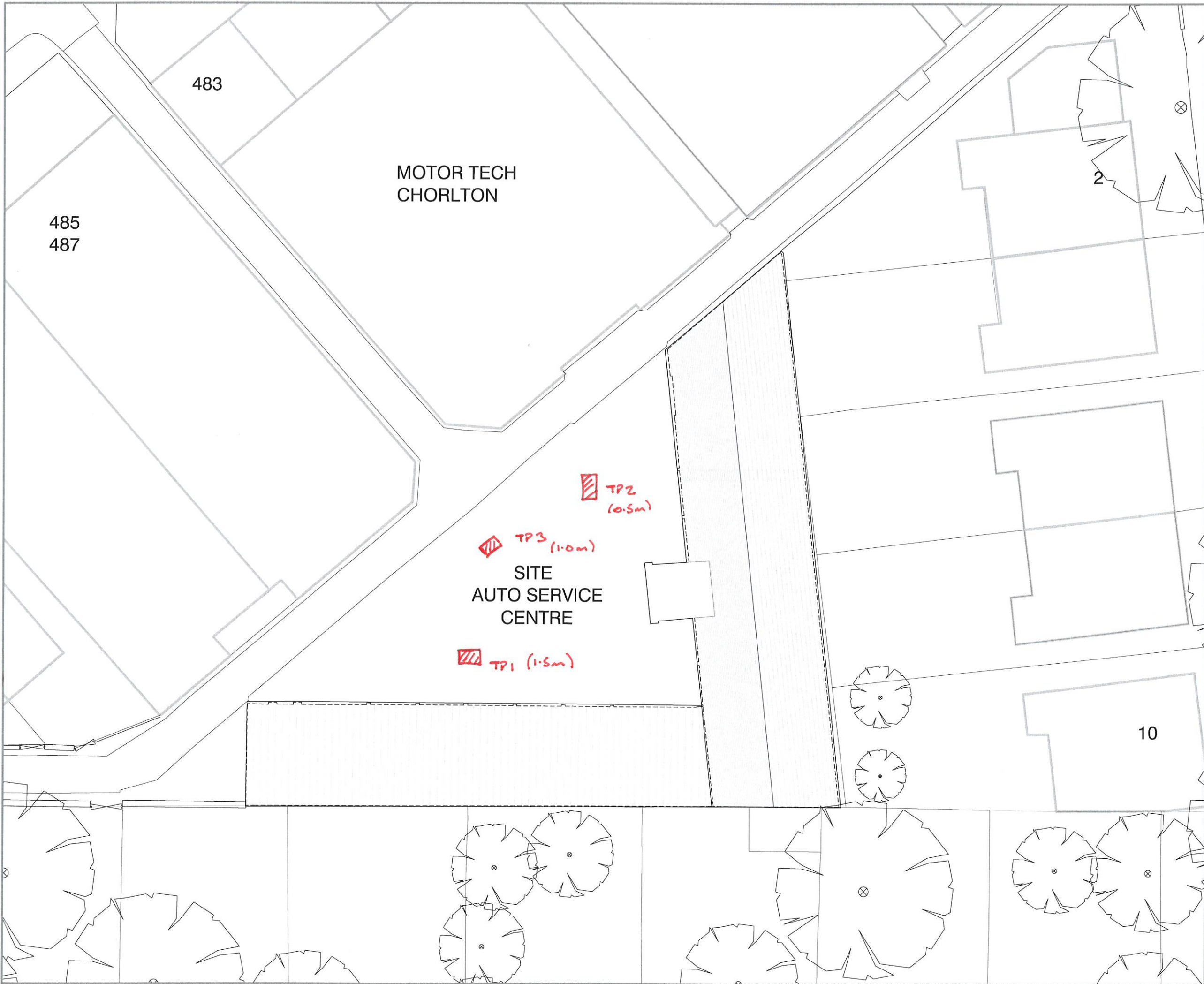
Directors: S John Reid, BSc(Hons) CEng MICE MStructE Edwin Jones, BEng (Hons) CEng MStructE MICE
Associate Director: Daniel Payne MEng(Hons) CEng MStructE

Registered in England No. 4022288 Registered Office – 105 Garstang Road, Preston PR1 1LD



13. The proposed roof area is 193 m^2 , and the estimated discharge is 2.7 l/s for a flat rate rainfall of 50 mm/hr .

14. Post-development, the reduction of area drained into the local sewer from 600 m^2 to 193 m^2 yields a betterment of 68%.



Where dimensions are not given, drawings must not be scaled and the matter referred to the Architect. In the event of any detail or dimensional conflict between drawings, the matter must be referred to the Architect for clarification. Do not scale from this drawing. This drawing is not to be copied or disclosed by or to any unauthorised persons without the prior written consent from Urbane Forms Ltd.

Notes

**MARKED-UP PLAN
SHOWING LOCATION
OF PITS FOR SOAKAWAY
TESTS**

B GENERAL UPDATE & PLANNING ISSUE 28.06.19 JWB
A PLANNING ISSUE 25.04.19 JWB

Status PLANNING

Drawn JWB

Date 12.03.2019

Scale @ A1 1:100

Review

Client MANCHESTER DEVELOPMENTS LTD

Project BARLOW MOOR CENTRE, MANCHESTER

Drawing Number 19001,(0-)09B
CAD File

Drawing Title EXISTING SITE PLAN

URBANE FORMS
architects
designers
project
managers
17 Redhill Street
Manchester
M4 5BA
T : +44(0)161 236 0688
F : +44(0)161 236 0690
E : info@urbaneforms.com
www.urbaneforms.com

REID JONES PARTNERSHIP JUNE 2021

EXISTING SITE PLAN

TRIAL PIT 1 WAS 2M X 0.6M AND 1500MM DEEP.

DAY 1

2pm	700mm
230pm	550mm
3pm	440mm
330pm	320mm
4pm	240mm
430pm	150mm
5pm	40mm
515pm	Empty

DAY 2

2pm	700mm
230pm	580mm
3pm	480mm
330pm	370mm
4pm	250mm
430pm	140mm
5pm	30mm
515pm	Empty

DAY 3

2pm	750mm
230pm	610mm
3pm	500mm
330pm	390mm
4pm	280mm
430pm	160mm
5pm	50mm
515pm	Empty

TRIAL PIT 2 WAS 2M X 0.6M AND 500MM DEEP.

Day 1

1pm	500mm
130pm	400mm
2pm	300mm
230pm	200mm
3pm	110mm
330pm	20mm
338pm	Empty

Day 2

2pm	500mm
230pm	390mm
3pm	280mm
330pm	180mm
4pm	100mm
430pm	20mm
435mm	Empty

Day 3

2pm	500mm
230pm	380mm
3pm	260mm
330pm	150mm
4pm	40mm
415pm	Empty

TRIAL PIT 3 WAS 2M X 0.6M AND 1000MM DEEP.

Day 1

2pm	700mm
230pm	570mm
3pm	450mm
330pm	350mm
4pm	260mm
430pm	160mm
5pm	70mm
545pm	Empty

Day 2

2pm	700mm
230pm	580mm
3pm	470mm
330pm	350mm
4pm	240mm
430pm	130mm
5pm	30mm
515pm	Empty

Day 3

2pm	750mm
230pm	620mm
3pm	500mm
330pm	390mm
4pm	270mm
430pm	160mm
5pm	60mm
535pm	Empty

Reid Jones Partnership

3 Cross Street,
Preston
PR1 3LT

Proj: 10607

Ref : TP1

Date: 11/10/21

Page: 1

Barlow Moor Centre
Soil Infiltration Rate

Soakaway design - Soil infiltration rate calculation to BRE Digest 365

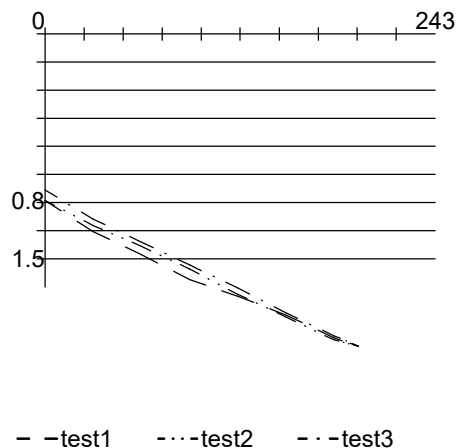
Test pit details

Reference = TP1; L length = 2 m; B readth = 0.6m; D epth = 1.5m

Depth of water at start = 0.8 m

Test data

Time Vs Water depth plot



Test 1			Test 2		Test 3	
Step	Time (minutes)	Water depth (m)	Time (minutes)	Water depth (m)	Time (minutes)	Water depth (m)
1	0	0.8	0	0.8	0	0.75
2	30	0.95	30	0.92	30	0.89
3	60	1.06	60	1.02	60	1
4	90	1.18	90	1.13	90	1.11
5	120	1.26	120	1.25	120	1.22
6	150	1.35	150	1.36	150	1.34
7	180	1.46	180	1.47	180	1.45
8	195	1.5	195	1.5	195	1.5

Maximum effective storage depth

= 0.7 m

Volume outflow, V_{p75-25}

= 0.42 m³

Mean outflow surface area, a_{p50}

= 3.02 m²

Time taken for mean outflow, t_{p75-25}

= 104.85 ; 93.95 ; 93.07 min.

Soil infiltration rate

= 0.000022 ; 0.000025 ; 0.000025 m/s

Average soil infiltration rate, f

= 0.000024 m/s

Reid Jones Partnership

3 Cross Street,
Preston
PR1 3LT

Proj: 10607

Ref : TP2

Date: 11/10/21

Page: 1

Barlow Moor Centre
Soil Infiltration Rate

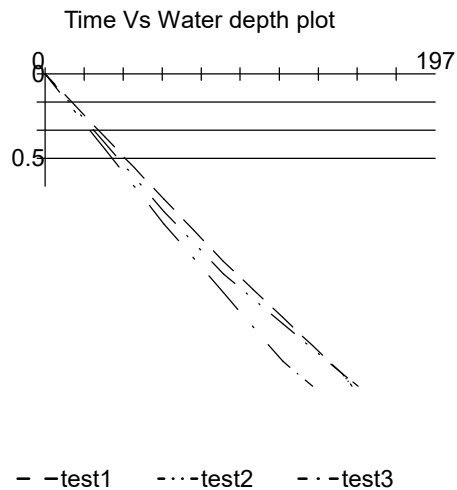
Soakaway design - Soil infiltration rate calculation to BRE Digest 365

Test pit details

Reference = TP2; L length = 2 m; B readth = 0.6m; D epth = 0.5m

Depth of water at start = 0 m

Test data



Test 1			Test 2		Test 3	
Step	Time (minutes)	Water depth (m)	Time (minutes)	Water depth (m)	Time (minutes)	Water depth (m)
1	0	0	0	0	0	0
2	30	0.1	30	0.11	30	0.12
3	60	0.2	60	0.22	60	0.24
4	90	0.3	90	0.32	90	0.35
5	120	0.39	120	0.4	120	0.46
6	150	0.48	150	0.48	135	0.5
7	158	0.5	155	0.5	-	-

Maximum effective storage depth

= 0.5 m

Volume outflow, V_{p75-25}

= 0.3 m³

Mean outflow surface area, a_{p50}

= 2.5 m²

Time taken for mean outflow, t_{p75-25}

= 77.5 ; 76.53 ; 65.57 min.

Soil infiltration rate

= 0.000026 ; 0.000026 ; 0.000031 m/s

Average soil infiltration rate, f

= 0.000027 m/s

Reid Jones Partnership

3 Cross Street,
Preston
PR1 3LT

Proj: 10607

Ref : TP3

Date: 11/10/21

Page: 1

Barlow Moor Centre
Soil Infiltration Rate

Soakaway design - Soil infiltration rate calculation to BRE Digest 365

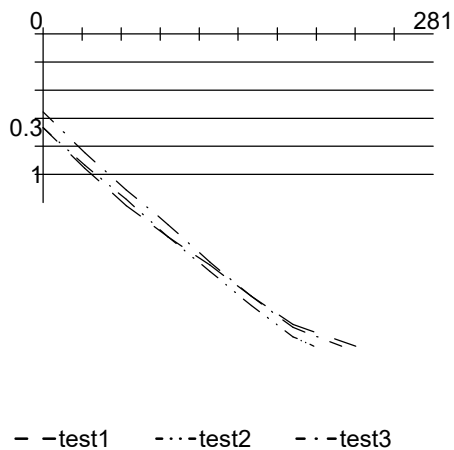
Test pit details

Reference = TP3; L length = 2 m; B readth = 0.6m; D epth = 1 m

Depth of water at start = 0.3 m

Test data

Time Vs Water depth plot



Test 1			Test 2		Test 3	
Step	Time (minutes)	Water depth (m)	Time (minutes)	Water depth (m)	Time (minutes)	Water depth (m)
1	0	0.3	0	0.3	0	0.25
2	30	0.43	30	0.42	30	0.38
3	60	0.55	60	0.53	60	0.5
4	90	0.65	90	0.65	90	0.61
5	120	0.74	120	0.76	120	0.73
6	150	0.84	150	0.87	150	0.84
7	180	0.93	180	0.97	180	0.94
8	225	1	195	1	215	1

Maximum effective storage depth

= 0.7 m

Volume outflow, V_{p75-25}

= 0.42 m³

Mean outflow surface area, a_{p50}

= 3.02 m²

Time taken for mean outflow, t_{p75-25}

= 104.25 ; 92.73 ; 92.16 min.

Soil infiltration rate

= 0.000022 ; 0.000025 ; 0.000025 m/s

Average soil infiltration rate, f

= 0.000024 m/s

Sarah Dop

Subject: FW: Barlow Moor Centre (Your ref. LKC 20 1970)

From: Paul Quimby <P.Quimby@thelkgroup.com>
Sent: 04 August 2021 09:11
To: Rachel Peart <R.Peart@thelkgroup.com>; Sarah Dop <sarah@reidjonespartnership.co.uk>
Cc: Mark Jones <M.Jones@thelkgroup.com>
Subject: RE: Barlow Moor Centre (Your ref. LKC 20 1970)

Hi Sarah

Going off the data soil and groundwater were not impacted (human health and controlled waters) so from that perspective shouldn't be an issue.

I am not a flood risk or drainage expert, but the only thing I can think of you must consider is for soakaways LA/EA don't like them in made ground, but not sure if that applies for permeable paving.

Mark, please could you advise?

Paul



Dr Paul Quimby
Technical Director
Office: 0161 763 7200 Mobile: 07912 894 078
Manchester | London | Liverpool | Glasgow | www.thelkgroup.com
I N C R E A S I N G L A N D V A L U E



Disclaimer Information [Here](#)



From: Sarah Dop <sarah@reidjonespartnership.co.uk>
Date: 3 August 2021 at 14:56:30 BST
To: Rachel Peart <R.Peart@thelkgroup.com>
Cc: John Reid <john@reidjonespartnership.co.uk>
Subject: Barlow Moor Centre (Your ref. LKC 20 1970)

Hi Rachel

Following our phone conversation we would be very grateful if you could confirm that the above site can be assumed suitable for infiltration drainage via permeable surfacing in the car park and yard areas. Concern arises due to the previous use of the site and the possibility of contamination. Final pavement/drainage design would be confirmed following further site testing (permeability).

Best regards

Sarah Dop
Civil Engineer
Reid Jones Partnership