

NOTES

- THIS DRAWING IS BASED UPON ORDNANCE SURVEY MAPPING, REPRODUCED BY PERMISSION OF ORDNANCE SURVEY ON BEHALF OF HMSO. © CROWN COPYRIGHT AND DATABASE RIGHT 2017. ALL RIGHTS RESERVED. ORDNANCE SURVEY LICENCE NUMBER IS 100016971.
- LEVELS AND HEIGHTS IN M.

- EXISTING MP GAS MAIN
- EXISTING WATER MAIN
- EXISTING TRUNK WATER MAIN
- EXISTING UNDERGROUND LV ELECTRIC
- EXISTING UNDERGROUND HV ELECTRIC
- EXISTING UNDERGROUND BT
- EXISTING VIRGIN MEDIA
- EXISTING OVERHEAD POWER LINE

FLOOD PROTECTION KEY

- INDICATIVE LOCATION OF FLOOD WALLS
- INDICATIVE LOCATION OF FLOOD EMBANKMENT
- INDICATIVE LOCATION OF RE-PROFILED CHANNEL
- RED LINE BOUNDARY
- IDENTIFIED LOCATION OF POTENTIAL CLASH WITH UTILITIES (NOT EXHAUSTIVE)
- LOCATION OF PROPOSED SECONDARY FLOODINGS MITIGATION
- INVASIVE WEEDS KEY
- SURVEYED LOCATION OF JAPANESE KNOTWEED (FALLOPIA JAPONICA)

Rev.	Date	Amendment Details	Dwnr	Chk'd	App'd
2	22/05/18	FOR INFORMATION: FREEBOARD AMENDED CHANGES TO EAST DEFENCES	BBMD	JJ	JJ
1	07/05/18	FOR INFORMATION: AMENDED FREEBOARD CHANGES TO GALLOWAY COMMENTS	BBMD	JJ	JJ
0	11/04/18	FOR INFORMATION	BBMD	JJ	JJ

This drawing should not be relied on or used in circumstances other than those for which it was originally prepared. It is the responsibility of the user to ensure that the information is up to date and that it is used in accordance with the provisions of the disclaimer shall identify Sweco UK Limited for all loss or damage arising therefrom.

SWECO
Spectrum House
2 Powderrail Road
Edinburgh
EH7 4GB
Tel: +44 (0)131 550 6300
Web: www.sweco.co.uk

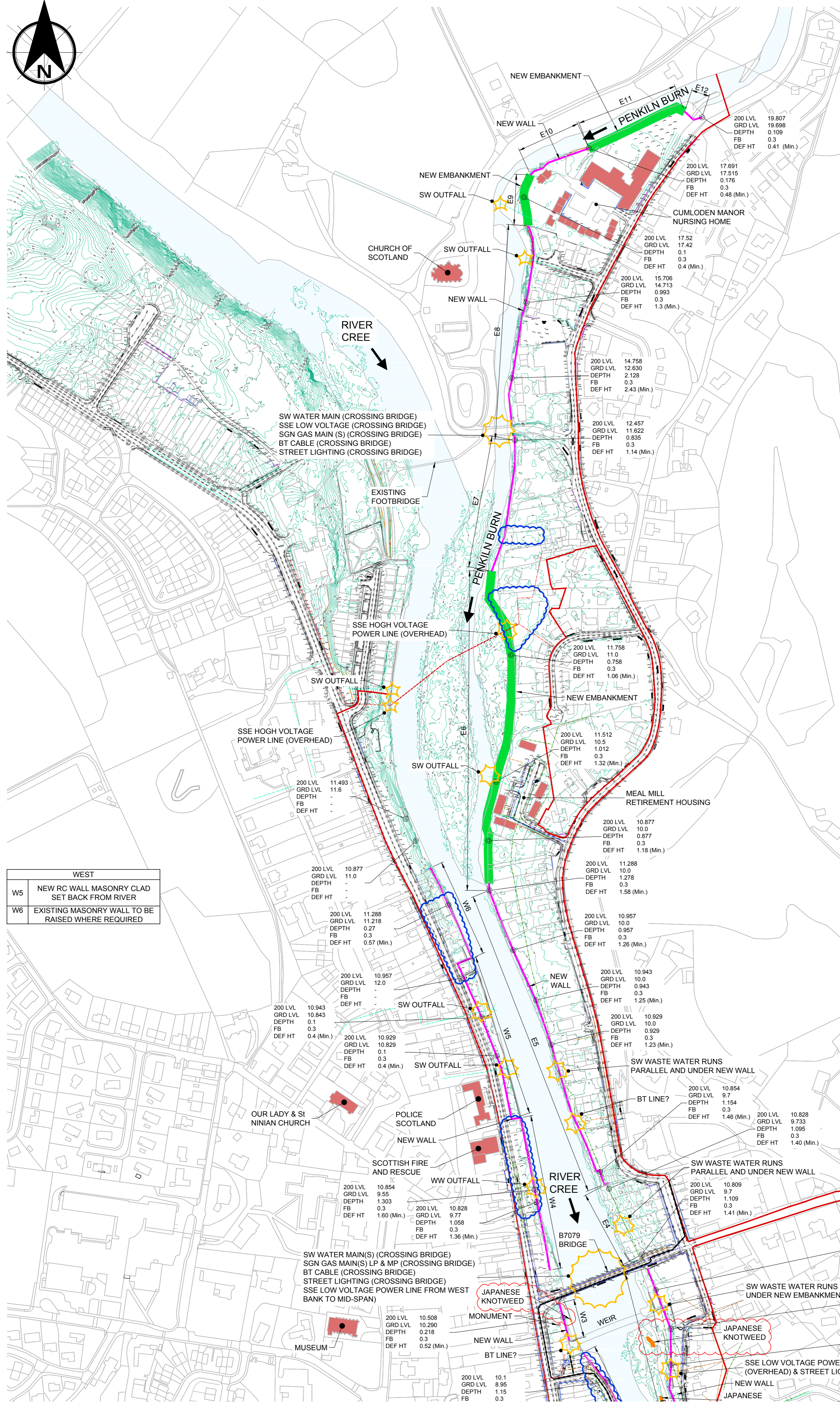
Dumfries & Galloway
COUNCIL

FOR INFORMATION

**NEWTON STEWART
FLOOD PREVENTION SCHEME**

**NEW FLOOD DEFENCES
CONSTRAINTS SHEET 1 OF 2**

Scale	1:2000	Drawn	JJ	Checked	DE	Approved	DL	
Original Size	A1	Date	18/04/18	Date	18/04/18	Date	18/04/18	
Drawing Number	118908 - SWECO - SK120							Revisions
								2



TYPICAL EXAMPLE OF EMBANKMENT



TYPICAL EXAMPLE OF BRICK FACED WALL (WATER OF LEITH, EDINBURGH)



EXAMPLE OF EXISTING STONE WALL WITH TOP MOUNTED GLASS AND STAINLESS STEEL FLOOD PROTECTION (RIVER GRETA, KESWICK)

EAST	
E4	WALL NO LONGER PROPOSED
E5	NEW RC WALL MASONRY CLAD
E6	NEW EARTH EMBANKMENT SET BACK FROM RIVERS EDGE POSITIONED TO MAXIMISE RETENTION OF MATURE TREES
E7	NEW RC WALL FORMED FINISH EXTENT TO BE DETERMINED TOPOGRAPHICAL SURVEY
E8	NEW RC WALL FORMED FINISH EXTENT TO BE DETERMINED TOPOGRAPHICAL SURVEY
E9	NEW EARTH EMBANKMENT SET BACK FROM RIVERS EDGE POSITIONED TO MAXIMISE RETENTION OF MATURE TREES
E10	NEW RC WALL FORMED FINISH EXTENT TO BE DETERMINED TOPOGRAPHICAL SURVEY
E11	NEW EARTH EMBANKMENT
E12	NEW RC WALL FORMED FINISH

WEST	
W5	NEW RC WALL MASONRY CLAD SET BACK FROM RIVER
W6	EXISTING MASONRY WALL TO BE RAISED WHERE REQUIRED

NOTES

- THIS DRAWING IS BASED UPON ORDNANCE SURVEY MAPPING, REPRODUCED BY PERMISSION OF ORDNANCE SURVEY ON BEHALF OF HMSO. © CROWN COPYRIGHT AND DATABASE RIGHT 2017. ALL RIGHTS RESERVED. ORDNANCE SURVEY LICENCE NUMBER IS 100016971.
- LEVELS AND HEIGHTS IN M.

- EXISTING MP GAS MAIN
- EXISTING WATER MAIN
- EXISTING TRUNK WATER MAIN
- EXISTING UNDERGROUND LV ELECTRIC
- EXISTING UNDERGROUND HV ELECTRIC
- EXISTING UNDERGROUND BT
- EXISTING VIRGIN MEDIA
- EXISTING OVERHEAD POWER LINE

FLOOD PROTECTION KEY

- INDICATIVE LOCATION OF FLOOD WALLS
- INDICATIVE LOCATION OF FLOOD EMBANKMENT
- INDICATIVE LOCATION OF RE-PROFILED CHANNEL
- RED LINE BOUNDARY

- IDENTIFIED LOCATION OF POTENTIAL CLASH WITH UTILITIES (NOT EXHAUSTIVE)
- LOCATION OF PROPOSED SECONDARY FLOODINGS MITIGATION

INVASIVE WEEDS KEY

- SURVEYED LOCATION OF JAPANESE KNOTWEED (FALLOPIA JAPONICA)

Rev.	Date	Amendment Details	Dwgn	CHK'd	App'd
2	22/5/18	FOR INFORMATION FREEBOARD AMENDED CHANGES TO EAST DEFENCES	BMMD	JJ	JJ
1	07/05/18	FOR INFORMATION AMENDED FOR INFORMATION COMMENTS (GALLOWAY COMMENTS)	BMMD	JJ	JJ
0	11/04/18	FOR INFORMATION	BMMD	JJ	JJ

SWECO
Spectrum House
2 Powderville Road
Edinburgh
EH7 4GB
Tel: +44 (0)131 550 6300
Web: www.sweco.co.uk

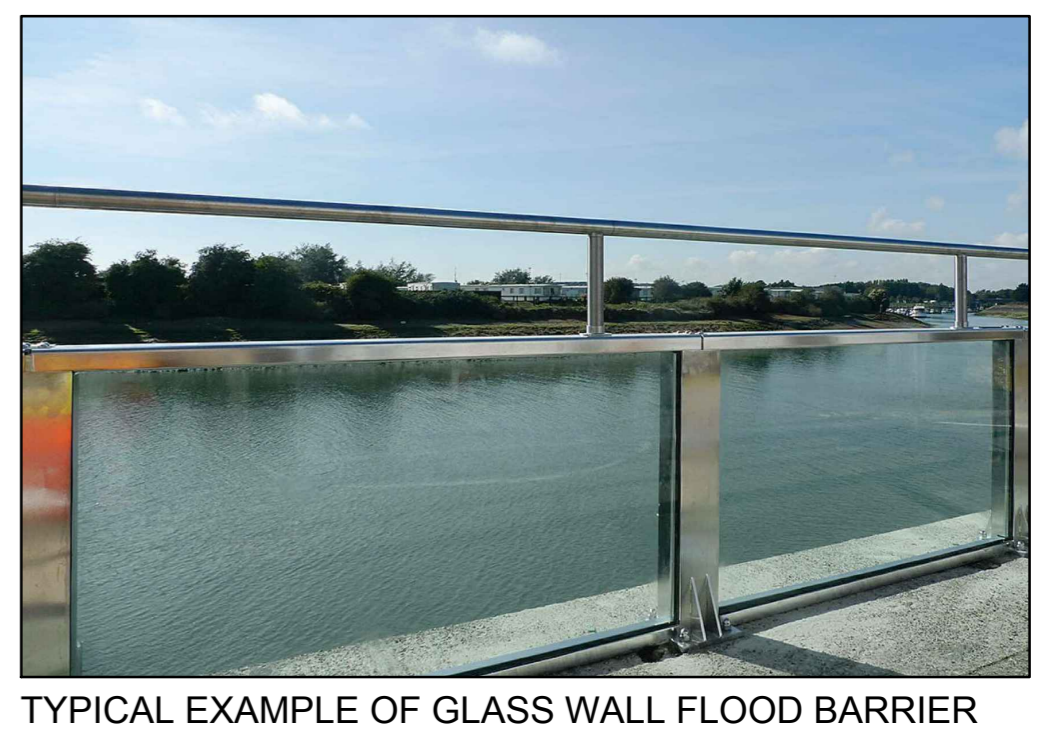
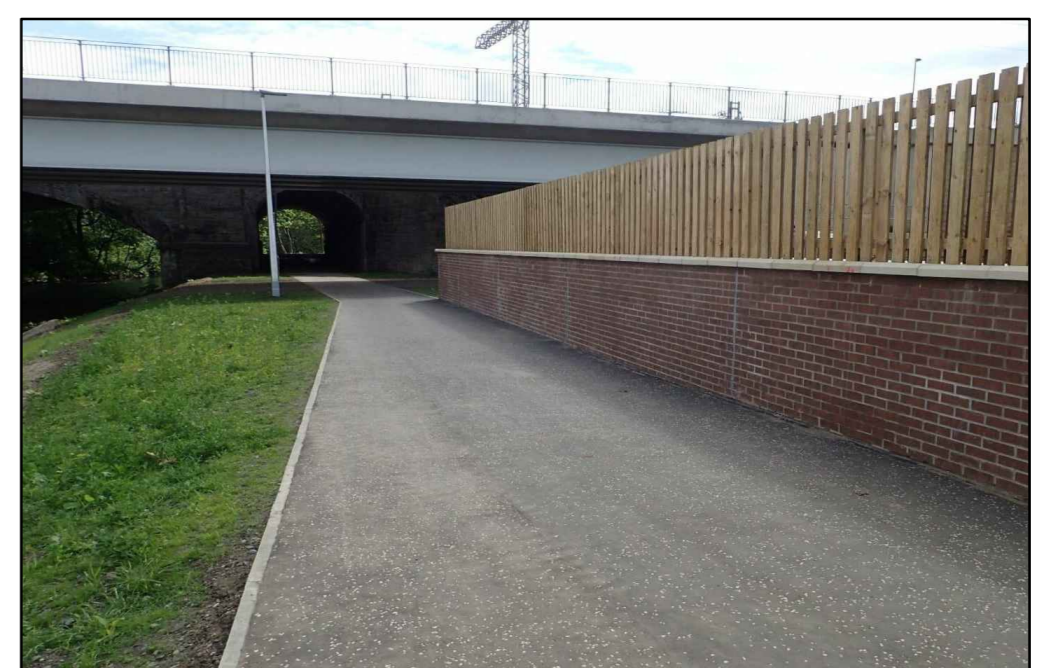
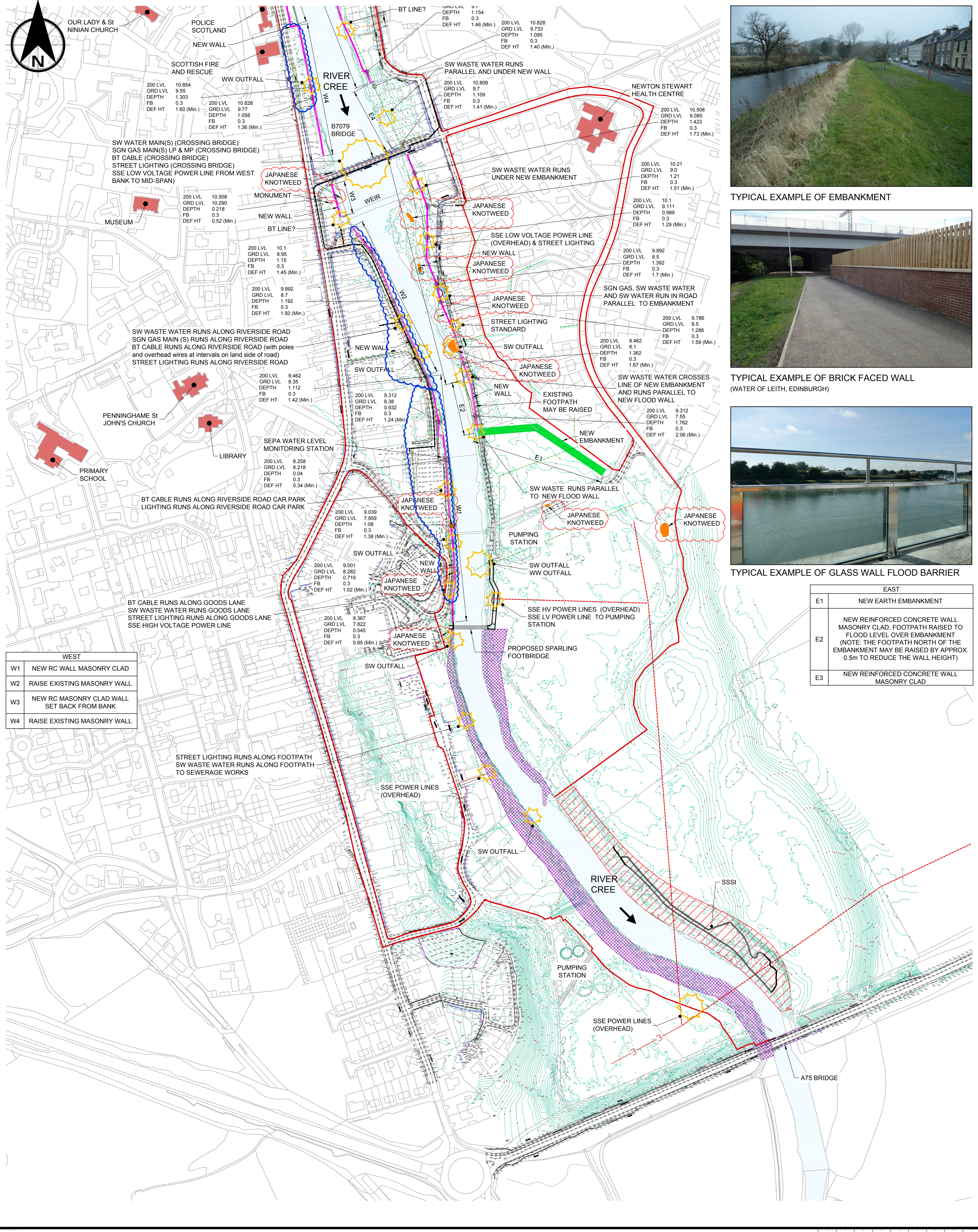
Dumfries & Galloway
FOR INFORMATION

FOR INFORMATION

NEWTON STEWART
FLOOD PREVENTION SCHEME

NEW FLOOD DEFENCES
CONSTRAINTS SHEET 2 OF 2

Scale	1:2000	Drawn	JJ	Checked	DE	Approved	DL	
Original Size	A1	Date	18/04/18	Date	18/04/18	Date	18/04/18	
Drawing Number	118908 - SWECO - SK121							2



EAST	
E1	NEW EARTH EMBANKMENT
E2	NEW REINFORCED CONCRETE WALL MASONRY CLAD, FOOTPATH RAISED TO FLOOD LEVEL OVER EMBANKMENT (NOTE: THE FOOTPATH NORTH OF THE EMBANKMENT MAY BE RAISED BY APPROX. 0.5m TO REDUCE THE WALL HEIGHT)
E3	NEW REINFORCED CONCRETE WALL MASONRY CLAD

WEST	
W1	NEW RC WALL MASONRY CLAD
W2	RAISE EXISTING MASONRY WALL
W3	NEW RC MASONRY CLAD WALL SET BACK FROM BANK
W4	RAISE EXISTING MASONRY WALL



British Geological Survey

NATURAL ENVIRONMENT RESEARCH COUNCIL

BGS ID: 630934 : BGS Reference: NX46SW742/TPE1

British National Grid (27700) : 241991,564861

[Report an issue with this borehole](#)

British Geological Survey HYDRACRAT LTD. British Geological Survey SUBSOIL BORE LOG

Location Herton Stewart Date Job No.
 Bore No. TP 01
 Bore Dia. Ground level 22.35 Water level / Initial Final

Description	Thickness m	Depth m	Level m	W Value blows/ft.	Samples	m (%)	s kg/m ³	sd kg/m ³	c N/m ²	φ (deg)	L.L. (%)	P.L. (%)	Group Symbol	Net Bearing Capacity KN/m ²				
														Strip	Spread			
TOPSOIL	0.1	0.1	22.25															
Compact BOULDERS and COBBLES with some fine to coarse gravel and a little fine to coarse sand.	5.9			26	B													
					0.5													
					B													
					1.0													
					B													
					1.5								R.D. 95					
					B													
					2.0													
					50 Blows for penetration of 0.15m													
					5.0													
52																		
4.65																		
38																		
6.15																		
		6.46																
REMARKS:- B 0.5 to 1.5 suitable for compaction 70 and 85, greater than 1.5m B 2.0 British Geological Survey for 85, greater than 2.0m British Geological Survey																		



British Geological Survey

NATURAL ENVIRONMENT RESEARCH COUNCIL

BGS ID: 620801 : BGS Reference: NX46NW7
 British National Grid (27700) : 241087,566149

[Report an issue with this borehole](#)

BOREHOLE RECORD

LOCATION: ... Old Cornmill, "Minnigaff", Newton Stewart JOB NO.: 6257 DATES: COMMENCED: ... 19.7.88 ... WATER LEVELS: INITIAL: ... 5.45 .. m
 BOREHOLE NO.: 1 DIAMETER: 150 mm SURFACE LEVEL: m COMPLETED: ... 19.7.88 ... (Depth bg1) FINAL: ... 5.45 .. m

Description	Depth (m)	Thick-ness (m)	Level (m)	Samples	N	w (%)	ρ (Mg/m³)	c (kN/m²)	φ (deg.)	LL (%)	PL (%)	PI (%)	Indicated Safe Bearing Capacity (kN/m²)	
													Strip	Square
Filling:- Brick, sand and boulders	0.25	0.25												
Filling:- Medium dense dark brown clayey sand and gravel with sandy rubble and pockets of clay	3.90	3.65		D 0.50 D 2.00 D 3.00 D+B 4.00	15									
Medium dense dark brown clayey sand and gravel	5.45	1.55			4.15									
Loose fine uniform brown clayey silty sand and gravel	5.80	0.35		D+B 5.50	7									
Medium dense coarse sand and fine to coarse gravel	7.00	1.20 pen.		D+B 6.50	15									
					6.65									

Remarks: Water sample taken

SO₂ at 3.00 metres = 0.05% pH at 3.00 metres = 7.0
 SO₂ on water sample = 0.11g/litre pH on water sample = 7.5

Symbols: N - Number of blows in Standard Penetration Test w - Natural moisture content ρ - Natural bulk density c - Apparent cohesion φ - Angle of internal friction
 LL - Liquid limit PL - Plastic limit FI - Plasticity index U - 100 mm diameter undisturbed sample D - Disturbed sample B - Bulk sample

NICHOLSON (SITE INVESTIGATION) LIMITED, BATHGATE ROAD, ARMADALE



British Geological Survey

NATURAL ENVIRONMENT RESEARCH COUNCIL

BGS ID: 620802 : BGS Reference: NX46NW8
British National Grid (27700) : 241097,566143

[Report an issue with this borehole](#)

BOREHOLE RECORD

LOCATION: Old Cornmill, "Minnigaff", Newton Stewart JOB NO: 6257 DATES: COMMENCED: 20.7.88 WATER LEVELS: INITIAL: 4.80 m
BOREHOLE NO.: 2 DIAMETER: 150 mm SURFACE LEVEL: m COMPLETED: 20.7.88 (Depth bgl) FINAL: 4.50 m

Description	Depth (m)	Thick-ness (m)	Level (m)	Samples	N	w (%)	ρ (Mg/m³)	c (kN/m²)	φ (deg.)	LL (%)	PL (%)	PI (%)	Indicated Safe Bearing Capacity (kN/m²)	
													Strip	Square
Filling:- Bricks, gravel, boulders and sand	2.00	2.00		D										
				0.50										
Filling:- Medium dense dark brown clayey sand, gravel, boulders with pockets of clay	4.10	2.10		D										
				2.50										
Medium dense dark brown clayey sand and gravel	4.80	0.70		D+B	16									
				4.20	4.35									
Medium dense coarse sand and fine to coarse gravel	7.00	2.20 pen.		D+B	16									
				5.00	5.15									
				D+B	17									
				6.50	6.65									

Remarks: Water sample taken SO₂ at 2.50 metres = 0.09% pH at 2.50 metres = 7.5

British Geological Survey

British Geological Survey

British Geological Survey

Symbols: N - Number of blows in Standard Penetration Test w - Natural moisture content ρ - Natural bulk density c - Apparent cohesion φ - Angle of internal friction
LL - Liquid limit PL - Plastic limit PI - Plasticity index U - 100 mm diameter undisturbed sample D - Disturbed sample B - Bulk sample

NICHOLSON (SITE INVESTIGATION) LIMITED, BATHGATE ROAD, ARMADALE



British Geological Survey

NATURAL ENVIRONMENT RESEARCH COUNCIL

BGS ID: 620803 : BGS Reference: NX46NW9

British National Grid (27700) : 241088,566125

[Report an issue with this borehole](#)

BOREHOLE RECORD

LOCATION: Old Cornmill, "Minnigaff", Newton Stewart JOB NO.: 6257 DATES: COMMENCED: 21.7.88 WATER LEVELS: INITIAL: 5.20 m
 BOREHOLE NO.: 3 DIAMETER: 150 mm SURFACE LEVEL: m COMPLETED: 21.7.88 (Depth bgl) FINAL: 5.00 m

Description	Depth (m)	Thick-ness (m)	Level (m)	Samples	N	w (%)	ρ (Mg/m³)	c (kN/m²)	φ (deg.)	LL (%)	PL (%)	PI (%)	Indicated Safe Bearing Capacity (kN/m²)		
													Strip	Square	
Topsoil	0.10	0.10													
Filling:- Firm clay, clayey sand and medium to coarse gravel	1.10	1.00		D+B	20										
Dense fine to coarse brown clayey sand and gravel	2.40	1.30		D+B	40*										
Medium dense fine to coarse greenish brown clayey sand and gravel with traces of clay	5.20	2.80		D+B	19										
				D+B	2.65										
				D+B	4.00										
				D+B	4.15										
Medium dense greenish brown medium to coarse sand and fine to coarse gravel	7.00	1.80 pen.		D+B	20										
				D+B	5.65										

Remarks: Water sample taken
 * N value at 1.65 metres = 40 for 95mm below seating drive

British Geological Survey symbols: N - Number of blows in Standard Penetration Test w - Natural moisture content ρ - Natural bulk density c - Apparent cohesion φ - Angle of internal friction
 LL - Liquid limit PL - Plastic limit PI - Plasticity index U - 100 mm diameter undisturbed sample D - Disturbed sample B - Bulk sample

NICHOLSON (SITE INVESTIGATION) LIMITED, BATHGATE ROAD, ARMADALE



British Geological Survey

NATURAL ENVIRONMENT RESEARCH COUNCIL

BGS ID: 620804 : BGS Reference: NX46NW10

British National Grid (27700) : 241077,566121

[Report an issue with this borehole](#)

BOREHOLE RECORD

LOCATION: ..Old Cornhill..Minnigaff..Newton Stewart JOB NO.:6257..... DATES: COMMENCED: ..20.7.88.... WATER LEVELS: INITIAL:5.30. m
 BOREHOLE NO.:4.... DIAMETER:150. mm SURFACE LEVEL: m COMPLETED: ..20.7.88.... (Depth bgl) FINAL:4.90. m

Description	Depth (m)	Thick-ness (m)	Level (m)	Samples	N	w (%)	ρ (Mg/m³)	c (kN/m²)	φ (deg.)	LL (%)	PL (%)	PI (%)	Indicated Safe Bearing Capacity (kN/m²)		
													Strip	Square	
Filling:- Dense brown, dark brown and grey sandy clay with fine to coarse gravel	2.30	2.30		D+B											
				0.50	39										
				D+B	0.65										
				2.00	22										
Medium dense brown clayey sand and fine to coarse gravel	3.00	3.00		D+B											
				2.50	17										
				D+B	2.65										
				4.00	17										
Medium dense coarse sand and fine to coarse gravel	5.30	1.70 pen.		D+B											
				5.50	21										
					5.65										

Remarks: Water sample taken SO₁ at 0.50 metre = 0.06% p_h at 0.50 metre = 7.0

Symbols: N - Number of blows in Standard Penetration Test w - Natural moisture content ρ - Natural bulk density c - Apparent cohesion φ - Angle of internal friction
 LL - Liquid limit PL - Plastic limit PI - Plasticity index U - 100 mm diameter undisturbed sample D - Disturbed sample B - Bulk sample

NICHOLSON (SITE INVESTIGATION) LIMITED, BATHGATE ROAD, ARMADALE



British Geological Survey

NATURAL ENVIRONMENT RESEARCH COUNCIL

BGS ID: 630924 : BGS Reference: NX46SW742/100
 British National Grid (27700) : 241943,564832

[Report an issue with this borehole](#)

HYDRACRAT LTD. SUBSOIL BORE LOG

Location Newton Stewart Date Job No.
 Bore No. 100
 Bore Dia. Ground level Water level / Initial DRY Final DRY

Description	Thickness m	Depth m	Level m	N Value blows/ft.	Samples	m (%)	s kg/m ³	sd kg/m ³	c N/m ²	φ (deg)	L.L. (%)	P.L. (%)	Group Symbol	Net Owing Capacity kN/m ²	
														Strip	Spread
Topsoil and gravel	0.23	0.23													
Compact cobbles, boulders and fine to coarse gravel with a little fine to coarse sand	2.21	2.44			1.52										
Compact cobbles and boulders with a little fine to coarse gravel	3.66	6.10			B										
					3.05										
					4.57										
					6.10										

REMARKS:--

SYMBOLS: N - No. of blows per foot in standard penetration test m - Natural moisture content s - Natural bulk density sd - Dry Density c - Apparent cohesion φ - Angle of internal friction
 L.L. - Liquid Limit, P.L. - Plastic Limit



British Geological Survey

NATURAL ENVIRONMENT RESEARCH COUNCIL

BGS ID: 630925 : BGS Reference: NX46SW742/101

British National Grid (27700) : 241806,564763

[Report an issue with this borehole](#)

HYDRACRAT LTD.		SUBSOIL BORE LOG													
British Geological Survey		British Geological Survey													
Location <u>Nexon, Stewart</u>		Date													
Bore No. <u>101</u>		Job No.													
Bore Dia.		Ground level <u>21.91</u> Water level / Initial <u>DRY</u> Final <u>DRY</u>													
Description	Thickness m	Depth m	Level m	'N' Value blows/ft.	Samples	m (%)	s kg/m ³	sd kg/m ³	c N/m ²	φ (deg)	L.L. (%)	P.L. (%)	Group Symbol	Nat Bearing Capacity kN/m ²	
														Strip	Spread
Topsail and gravel	0.38	0.38	21.53												
Compact cobbles, boulders and fine to coarse gravel with a little fine to coarse sand.	1.98	2.36	19.55		B 1.52										
		6.86	15.05		B 4.57 B 6.10										
Compact cobbles and boulders with a little fine to coarse gravel	4.50														
		8.99	12.92		B 8.84										
Compact fine to coarse gravel with some fine to coarse clayey sand	2.15														
REMARKS:- Bore opened up to 4.6 metres by JCB to confirm findings															

SYMBOLS: 'N' - No. of Blows per foot in standard penetration test m - Natural Moisture content s - Natural bulk density sd - Dry Density c - Apparent cohesion φ - Angle of internal friction
 L.L. - Liquid Limit P.L. - Plastic Limit U.C. - Undisturbed Sample U.C. - 19" Dia. Undisturbed Sample D - Disturbed Sample B - Bulk Sample



British Geological Survey

NATURAL ENVIRONMENT RESEARCH COUNCIL

BGS ID: 630929 : BGS Reference: NX46SW742/105
 British National Grid (27700) : 241606,564663

[Report an issue with this borehole](#)

British Geological Survey **HYDRACRAT LTD.** British Geological Survey **SUBSOIL BORE LOG**

Location Newton Stewart Date 20th April, 1992 Job No.

Bore No. 105

Bore Dia. Ground level 4.94 Water level / Initial 1.83 Final 1.83

Description	Thickness m	Depth m	Level m	N Value blows/ft.	Samples	w m (%)	s kg/m ³	ed kg/m ³	c N/m ²	φ (deg)	L.L. Et	P.L. (%)	Group Symbol	Net Bearing Capacity KN/m ²		
														Strip	Spread	
British Geological Survey Compact fine to coarse GRAVEL with cobbles and a little fine to coarse sand,	6.10			50 Blows for initial penetration of 0.76	B 1.0				0.15						910	
															50 Blows for initial penetration of 0.15	910
															50 Blows for initial penetration of 0.23	650
															B 2.0	
	6.10	-1.16														
British Geological Survey																

REMARKS:- Bore opened up to 4.6 metres with JCB

SYMBOLS: N - No. of blows per foot in standard penetration test. w - Natural moisture content. s - Natural bulk density. ed - Dry density. c - Unconfined compression. φ - Angle of internal friction.



British Geological Survey

NATURAL ENVIRONMENT RESEARCH COUNCIL

BGS ID: 630930 : BGS Reference: NX46SW742/106
 British National Grid (27700) : 241564,564657

[Report an issue with this borehole](#)

Description		Thickness m	Depth m	Level m	N Value blows/ft.	Samples	w %	sd kg/m ³	sd kg/m ³	c N/m ²	φ (deg)	L.L. (%)	P.L. (%)	Group Symbol	Net Bearing Capacity KN/m ²		
															Strip	Spread	
Compact fine to coarse GRAVEL with cobbles and a little dark brown fine to coarse sand (changing to light brown)		3.05			50 BLOWS FOR INITIAL	B				0.15				British Geological Survey		910	
					0.76										50 BLOWS FOR INITIAL	0.10	1350
					1.52										50 BLOWS FOR INITIAL	0.15	910
					2.13										B		
Compact fine to coarse GRAVEL with a little fine to coarse sand and occasional cobbles and boulders		13.10	16.15	2.78	50 BLOWS FOR INITIAL	B				0.08			British Geological Survey		1800		
					4.6												

REMARKS:-

British Geological Survey

SYMBOLS: N—No. of blows per foot in standard penetration test w—Natural moisture content sd—Natural bulk density sd—Dry Density c—Apparent cohesion φ—Angle of internal friction



British Geological Survey

NATURAL ENVIRONMENT RESEARCH COUNCIL

BGS ID: 630933 : BGS Reference: NX46SW742/TPD1

British National Grid (27700) : 242129,564943

[Report an issue with this borehole](#)

Description		Thickness m	Depth m	Level m	'N' Value blows/ft.	Samples	w (%)	s kg/m ³	sd kg/m ³	c N/m ²	φ Ideg	L.L. (%)	P.L. (%)	Group Symbol	Net Bearing Capacity kN/m ²				
															Strip	Spread			
TOGGIL		0.2	0.2	15.60															
Compact Boulders and Cobbles with some fine to coarse sand		1.0	1.2	17.60		B 0.5													
Coarse fine to coarse SAND with some fine to coarse gravel and occasional layers of fine to medium sand		0.7	1.9	16.90	22 1.65	B 1.5				R.D. 90%						600			
Compact Boulders and Cobbles with some fine to coarse gravel and occasional layers of fine to coarse sand		4.1	6.0	17.60	39 3.15	B 2.5				R.D. 100%						650			
					40	✓			R.D. 95%									625	
British Geological Survey					4.65							R.D. 100%							600
					6.15														
REMARKS:- D.C.S. unsuitable for CBR 90% greater than 5"																			