

Extract from Table A2 WIS 4-08-02

Processed granular bedding and sidefill material for flexible pipes

Pipe nominal bore (mm) see note (b)	Nominal maximum particle size (mm)	Material specified in British Standards see note (a)
100	10	10mm nominal single size
Over 100 to 150	14	10 or 14mm nominal single size or 14mm to 5mm graded
Over 150 to 300	20	10-14 or 20mm nominal single size or 14mm to 5mm graded or 20mm to 5mm graded
Over 300 to 500	20	14 or 20mm nominal single size or 14mm to 5mm graded or 20mm to 5mm graded
Over 550	40	14-20 or 40mm nominal single size or 14mm to 5mm graded or 20mm to 5mm graded or 40mm to 5mm graded

Notes:

- (a) Proposed granular material to include aggregates to BS 882, air-cooled blast furnace slag to BS1047 and lightweight aggregates BS3737
- (b) For the purpose of this table, PE pipe of 630mm O.D. can be regarded as having a nominal bore of over 550mm irrespective of wall thickness
- (c) Nominal bore is used in preference to DN because of the different nominal size classifications for flexible pipes

Minimum recommended trench widths for structural wall pipes in poor ground conditions

Native Soil Modulus between 3 and 4 Mpa  
Typical Soil Classifications: Very loose gravel, loose sand, medium dense clayey silty sand, firm clay

Nominal Pipe Diameter (mm)	150	225	300	375	450	525	600	750	900	1050	1200	1500	1800
Minimum Trench Width (mm)*	450	525	600	750	900	1050	1200	1500	1800				

\* A vertical trench face has been assumed to allow a modulus of 7 Mpa to be achieved for the pipe bedding and sidefill material

Other Assumed Values: Depth of cover = 6.00 meter max.  
Traffic Loading = Main Road  
Pipe Stiffness = SN8

Note: Where the native soil modulus is below 3Mpa or the depth of cover exceeds 6.0m guidance should be sought from the pipe manufacturer regarding structural design and installation details

Nominal Bore of Pipe (mm)	Alternative Aggregate Sizes Single Sized	(mm) Graded (Where directed)
100 - 125	10	-
150 - 200	10 or 14	14 - 5
225 - 300	10, 14 or 20	14.5 or 20-5
375 - 500	14 or 20	14.5 or 20-5
Exceed 500	14, 20 or 40	14.5 or 20-5 or 40-5

Pipe Diameter (mm)	Minimum Crushing Strength Clay Pipes
150	40KN/m
225	45KN/m
300	72KN/m
375 Concrete	45KN/m
1200 Concrete	144KN/m
1500 Concrete	180KN/m

Concrete minimum crushing strength should conform to class 120 EN1916/BS9111-1:2002

SEWERS TO BE LAID IN CLASS 'S' BEDDING 150mm GRANULAR BED AND SURROUND

THE CLEARANCE OF THE CROSSOVER POINTS (MIN 300MM) BETWEEN THE SURFACE WATER, FOUL SEWERS, RISING MAIN AND OTHER SERVICES SHOULD BE SUFFICIENT CLEARANCE TO PROVIDE 150MM GRANULAR BED AND SURROUND AROUND BOTH PIPES

ALL ADAPTABLE SEWER WORK AND MATERIAL TO BE IN ACCORDANCE WITH SEWER FOR ADOPTION 6th EDITION, THE RELEVANT BRITISH / EUROPEAN AND YORKSHIRE WATER STANDARD / REQUIREMENTS / ADDENDUM TO THE MECHANICAL AND ELECTRICAL SPECIFICATION AND KITEMARKED

Bryan G Hall Ltd. Registered in England & Wales Co No. 4104802

This drawing is copyright and shall not be reproduced nor used for any other purpose without the written permission of the Bryan G Hall Ltd. This drawing must be read in conjunction with all other related drawings and documentation.

It is the contractors responsibility to ensure full compliance with the Building Regulations. Do not scale from this drawing, use figured dimensions only. It is the contractors responsibility to check and verify all dimensions on site. Any discrepancies to be reported immediately. IF IN DOUBT ASK.

Materials not in conformity with relevant British or European Standards/Codes of practice or materials known to be deleterious to health & safety must not be used or specified on this project.

Bryan G Hall Limited has not checked or verified, and shall therefore not be liable for any inaccuracies which may be attributable to any base plan(s) reports, data or information provided by the client, or purchased by the consultant on the client's behalf, that may have been utilised within this drawing.

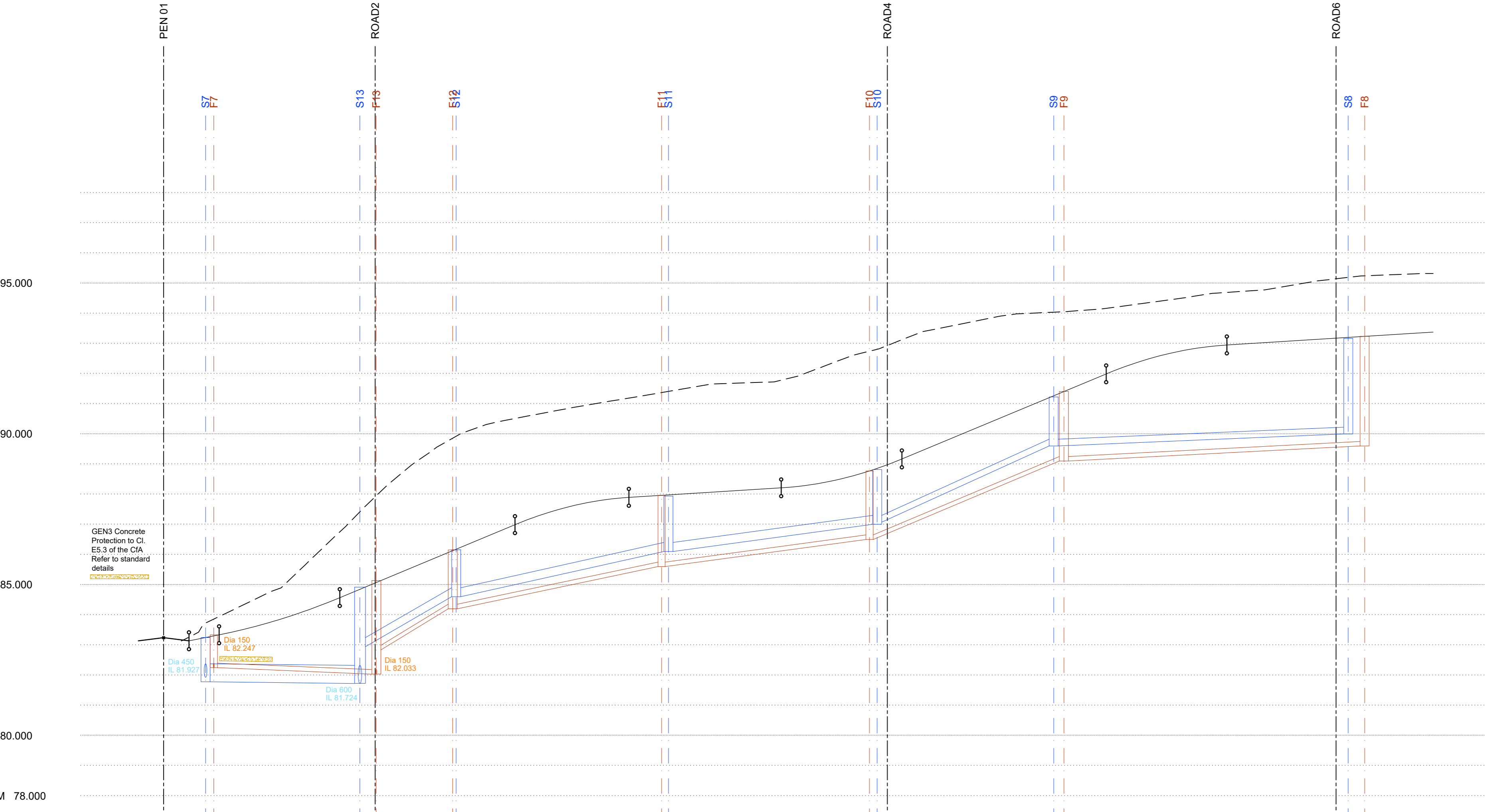
Bryan G Hall Limited shall not be liable for the use of this or any associated documents for any purpose, by any person other than that for which they were provided.

It remains the client's and/or its appointed contractor's responsibility to check for any discrepancies. Any anomalies discovered must be reported immediately to Bryan G Hall Limited for verification.

The locations of utilities apparatus, if shown, have been reproduced from plans supplied to Bryan G Hall Limited. Although care has been taken where duplicating this information, these locations are approximate only. No guarantee can be given by Bryan G Hall Limited for their accuracy. It is the client or its appointed agent/contractor's responsibility to verify the exact locations on site by appropriate means prior to mechanical excavation.

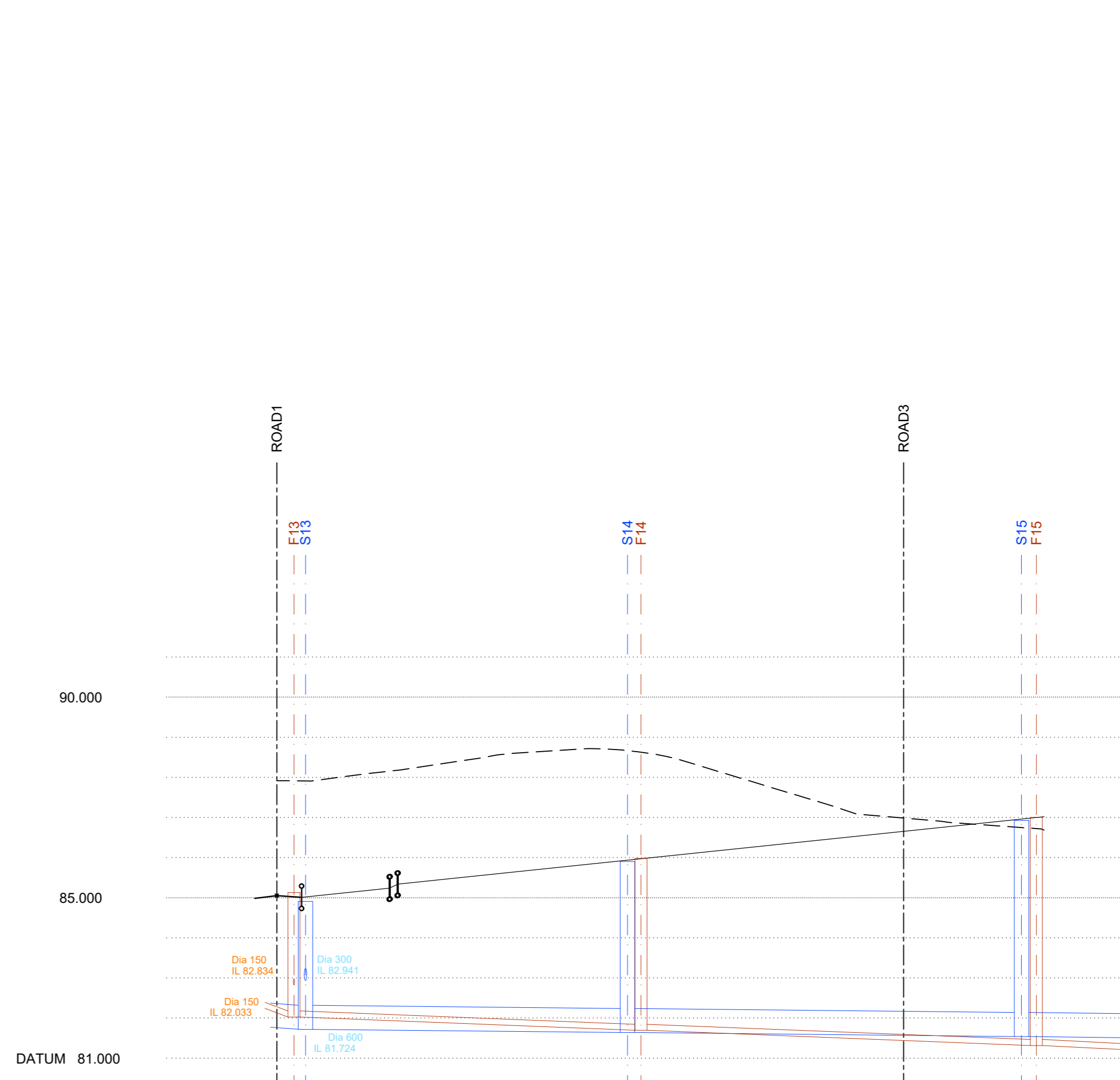
NOTES:

- All statutory undertakers equipment in footway and carriageway to be located and diverted before work commences
- A pedestrian route through the works shall be maintained at all times and clearly defined by suitable barriers and lights where necessary.
- The contractor is obliged to obtain necessary road opening and/or sewer connection licence prior to commencement of the work.
- One vertical joint per course of brick work shall be left open to allow drainage during construction.
- All statutory undertakers covers and frames to be adjusted to suit new carriageway levels prior to surfacing.
- All existing gutters and drain runs to be cleared of debris and high pressure water jetted prior to commencement of works.
- The existing sewers and culverts shown on this drawing are taken from various authorities, drainage plans and sewer records. Some of the information is contradictory and the locations shown are interpreted using existing features and marks locations shown on the survey. The exact depth and location should be verified on site prior to commencing construction.
- All adaptable sewer works and material to be in accordance with Sewer Sector Guidance (SSG) / DCS, and the Water Authorities requirements and Kitemarked.
- All drainage works that shall be adopted by the Water Authority to be subject to their approval prior to commencement on site.
- All hard standing and impervious areas outside the adopted highway boundary to be drained and collected in private drainage systems and discharged into the surface water sewer before water encroaches onto the public highway.
- Gullies should not be located in the area of dropped crossings.
- The chamber size of manholes with more than one connection in them may need to be increased and movement to accommodate the connection and tanks.
- Sewers to be laid in Class 'S' bedding (150mm granular bed and surround). Where depth of cover to top of the sewer is less than 1.2m in Highways and verges or less than 600mm in non-vehicular access areas then a concrete slab should be provided above granular bed and surround. Refer to Sewer Sector Guidance (SSG) / DCS for protection measures.
- Granular bedding for pipes shall consist of aggregates from natural sources complying with the relevant provisions of BS 882 stated in accordance with the table above.
- All pipes with a diameter larger or equal to 375mm shall be concrete. Pipes with a diameter less than 375mm shall be clay or ductile iron.
- Vertical drop pipes and fittings for sewers shall have flexible mechanical joints. Pipes for foul, surface and surface water sewers shall comply with relevant requirements of BS EN205 and BS 65 (surface water pipes only).
- Multiple cover quadrants shall have a clear opening of 600mm and shall be Class D400 to BS EN 124 with 100mm deep frames in Highways.
- Fill ground must be filled and consolidated under the supervision and to the satisfaction of the Water Authority before any sewer works are carried out.
- The Water Authority is not obliged to accept filter drain/drainage runoff into the public sewer network or adaptable drainage system (directly or indirectly). An alternative method of disposal of the roof drainage runoff will therefore be required and must be agreed with the Local Authority, Land Drainage Section with regard to the disposal of the filter drain/drainage runoff.
- Cover slabs must carry the BS2 Kitemark or will be rejected by the Water Authority Inspectors. (Where the clear opening of the Kitemarked product is different to that of the cover and frame, a loading bearing slab should be fitted above the cover slab to bring the size down to 600mm x 600mm for the Water Authority specified cover size. Please refer to Concrete Pipe Systems Association (CPSA), 'Technical Bulletin' issued Autumn 2004 for Kitemarked cover slab opening sizes.
- Sulphate Resistant cement (C20-CC2) and precast concrete products must be used or a laboratory report provided proving that such products are not necessary.
- The adaptable sewers should be a minimum of 1m and manholes 0.5m from kerb faces and service margins.
- Sewers must have 50m clearance from trees and hedges. (refer to Sewer Sector Guidance (SSG) / DCS for restrictions on tree planting adjacent to sewers).
- All private work to be in accordance with current building regulations.
- Drains passing through buildings to be protected with level cover.
- No building to take place within 3.0m of an adaptable sewer.
- Where adaptable pipes have 150mm concrete bed and surround protection, all joints to be provided with 10mm thick flexible filer.
- No services to be steeled over or within 1.0m of an adaptable sewer.
- Private drainage connections not direct to manholes are to be made via a 45 degree junction and not saddle.
- Bedding and backfill material to conform to the requirement of Water Industry Specification 4-08-02 (Table A2).
- Any proposed sewers located within 5 meters of the public sewer shall be ductile iron pipe work.



CHAINAGE	0+000	0+100	0+200	0+300	0+400	0+500	0+600	0+700	0+800	0+900	1+000	1+100	1+200	1+300	1+400	1+500	1+600	1+700	1+800	1+900	2+000	
EXISTING GROUND LEVEL	84.200	84.200	84.200	84.200	84.200	84.200	84.200	84.200	84.200	84.200	84.200	84.200	84.200	84.200	84.200	84.200	84.200	84.200	84.200	84.200	84.200	
ALIGNMENT LEVEL	84.150	84.150	84.150	84.150	84.150	84.150	84.150	84.150	84.150	84.150	84.150	84.150	84.150	84.150	84.150	84.150	84.150	84.150	84.150	84.150	84.150	
VERTICAL ALIGNMENT	G= 4.000% L= 20.000	KF= 4.81524 L= 20.000	G= 8.333% L= 1.120	G= 18.889 KF= -2.68667	G= 1.250% L= 1.800	KF= 2.82353 L= 20.000	G= 8.333% L= 1.120	G= 1.250% L= 1.800	KF= -2.62353	G= 2.089% L= 47.9	G= 2.089% L= 47.9											
HORIZONTAL ALIGNMENT			R= 20.000				R= 400.000															
STORMWATER COVER LEVEL	CL 83.240 IL 81.777	CL 83.240 IL 81.777	CL 83.240 IL 81.777	CL 83.240 IL 81.777	CL 83.240 IL 81.777	CL 83.240 IL 81.777	CL 83.240 IL 81.777	CL 83.240 IL 81.777	CL 83.240 IL 81.777	CL 83.240 IL 81.777	CL 83.240 IL 81.777	CL 83.240 IL 81.777	CL 83.240 IL 81.777	CL 83.240 IL 81.777	CL 83.240 IL 81.777	CL 83.240 IL 81.777	CL 83.240 IL 81.777	CL 83.240 IL 81.777	CL 83.240 IL 81.777	CL 83.240 IL 81.777	CL 83.240 IL 81.777	
STORMWATER DETAILS		Di 600 Circular CONC 1 in 100 34.903	Di 200 Circular CLAY 1 in 10 16.900	Di 200 Circular CLAY 1 in 25 34.968	Di 200 Circular CLAY 1 in 12 29.233	Di 225 Circular CONC 1 in 100 40.000	Di 600 Circular CONC 1 in 100 40.000	Di 600 Circular CONC 1 in 100 40.000	Di 600 Circular CONC 1 in 100 40.000	Di 600 Circular CONC 1 in 100 40.000	Di 600 Circular CONC 1 in 100 40.000	Di 600 Circular CONC 1 in 100 40.000	Di 600 Circular CONC 1 in 100 40.000	Di 600 Circular CONC 1 in 100 40.000	Di 600 Circular CONC 1 in 100 40.000	Di 600 Circular CONC 1 in 100 40.000	Di 600 Circular CONC 1 in 100 40.000	Di 600 Circular CONC 1 in 100 40.000	Di 600 Circular CONC 1 in 100 40.000	Di 600 Circular CONC 1 in 100 40.000	Di 600 Circular CONC 1 in 100 40.000	Di 600 Circular CONC 1 in 100 40.000
FOULWATER COVER LEVEL	CL 83.136 IL 82.247	CL 83.136 IL 82.247	CL 83.136 IL 82.247	CL 83.136 IL 82.247	CL 83.136 IL 82.247	CL 83.136 IL 82.247	CL 83.136 IL 82.247	CL 83.136 IL 82.247	CL 83.136 IL 82.247	CL 83.136 IL 82.247	CL 83.136 IL 82.247	CL 83.136 IL 82.247	CL 83.136 IL 82.247	CL 83.136 IL 82.247	CL 83.136 IL 82.247	CL 83.136 IL 82.247	CL 83.136 IL 82.247	CL 83.136 IL 82.247	CL 83.136 IL 82.247	CL 83.136 IL 82.247	CL 83.136 IL 82.247	
FOULWATER DETAILS		Di 150 Circular CLAY 1 in 100 27.153	Di 150 Circular CLAY 1 in 10 13.668	Di 150 Circular CLAY 1 in 25 34.903	Di 150 Circular CLAY 1 in 12 29.233	Di 150 Circular CLAY 1 in 100 40.000	Di 150 Circular CLAY 1 in 100 40.000	Di 150 Circular CLAY 1 in 100 40.000	Di 150 Circular CLAY 1 in 100 40.000	Di 150 Circular CLAY 1 in 100 40.000	Di 150 Circular CLAY 1 in 100 40.000	Di 150 Circular CLAY 1 in 100 40.000	Di 150 Circular CLAY 1 in 100 40.000	Di 150 Circular CLAY 1 in 100 40.000	Di 150 Circular CLAY 1 in 100 40.000	Di 150 Circular CLAY 1 in 100 40.000	Di 150 Circular CLAY 1 in 100 40.000	Di 150 Circular CLAY 1 in 100 40.000	Di 150 Circular CLAY 1 in 100 40.000	Di 150 Circular CLAY 1 in 100 40.000	Di 150 Circular CLAY 1 in 100 40.000	

Scales - Horizontal - 1 : 500  
Vertical - 1 : 100



CHAINAGE	0+000	0+100	0+200	0+300	0+400	0+500	0+600	0+700	0+800	0+900	1+000	1+100	1+200	1+300	1+400	1+500	1+600	1+700	1+800	1+900	2+000
EXISTING GROUND LEVEL	87.250	87.250	87.250	87.250	87.250	87.250	87.250	87.250	87.250	87.250	87.250	87.250	87.250	87.250	87.250	87.250	87.250	87.250	87.250	87.250	87.250
ALIGNMENT LEVEL	87.017	87.017	87.017	87.017	87.017	87.017	87.017	87.017	87.017	87.017	87.017	87.017	87.017	87.017	87.017	87.017	87.017	87.017	87.017	87.017	87.017
VERTICAL ALIGNMENT	G= 2.089% L= 47.9	G= 2.089% L= 47.9	G= 2.089% L= 47.9	G= 2.089% L= 47.9	G= 2.089% L= 47.9	G= 2.089% L= 47.9	G= 2.089% L= 47.9	G= 2.089% L= 47.9	G= 2.089% L= 47.9	G= 2.089% L= 47.9	G= 2.089% L= 47.9	G= 2.089% L= 47.9	G= 2.089% L= 47.9	G= 2.089% L= 47.9	G= 2.089% L= 47.9	G= 2.089% L= 47.9	G= 2.089% L= 47.9	G= 2.089% L= 47.9	G= 2.089% L= 47.9	G= 2.089% L= 47.9	G= 2.089% L= 47.9
HORIZONTAL ALIGNMENT			R= 50.000																		
STORMWATER COVER LEVEL	CL 86.914 IL 84.724	CL 86.914 IL 84.724	CL 86.914 IL 84.724	CL 86.914 IL 84.724	CL 86.914 IL 84.724	CL 86.914 IL 84.724	CL 86.914 IL 84.724	CL 86.914 IL 84.724	CL 86.914 IL 84.724	CL 86.914 IL 84.724	CL 86.914 IL 84.724	CL 86.914 IL 84.724	CL 86.914 IL 84.724	CL 86.914 IL 84.724	CL 86.914 IL 84.724	CL 86.914 IL 84.724	CL 86.914 IL 84.724	CL 86.914 IL 84.724	CL 86.914 IL 84.724	CL 86.914 IL 84.724	CL 86.914 IL 84.724
STORMWATER DETAILS		Di 600 Circular CONC 1 in 100 40.000	Di 600 Circular CONC 1 in 100 40.000	Di 600 Circular CONC 1 in 100 40.000	Di 600 Circular CONC 1 in 100 40.000	Di 600 Circular CONC 1 in 100 40.000	Di 600 Circular CONC 1 in 100 40.000	Di 600 Circular CONC 1 in 100 40.000	Di 600 Circular CONC 1 in 100 40.000	Di 600 Circular CONC 1 in 100 40.000	Di 600 Circular CONC 1 in 100 40.000	Di 600 Circular CONC 1 in 100 40.000	Di 600 Circular CONC 1 in 100 40.000	Di 600 Circular CONC 1 in 100 40.000	Di 600 Circular CONC 1 in 100 40.000	Di 600 Circular CONC 1 in 100 40.000	Di 600 Circular CONC 1 in 100 40.000	Di 600 Circular CONC 1 in 100 40.000	Di 600 Circular CONC 1 in 100 40.000	Di 600 Circular CONC 1 in 100 40.000	Di 600 Circular CONC 1 in 100 40.000
FOULWATER COVER LEVEL	CL 86.135 IL 84.033	CL 86.135 IL 84.033	CL 86.135 IL 84.033	CL 86.135 IL 84.033	CL 86.135 IL 84.033	CL 86.135 IL 84.033	CL 86.135 IL 84.033	CL 86.135 IL 84.033	CL 86.135 IL 84.033	CL 86.135 IL 84.033	CL 86.135 IL 84.033	CL 86.135 IL 84.033	CL 86.135 IL 84.033	CL 86.135 IL 84.033	CL 86.135 IL 84.033	CL 86.135 IL 84.033	CL 86.135 IL 84.033	CL 86.135 IL 84.033	CL 86.135 IL 84.033	CL 86.135 IL 84.033	CL 86.135 IL 84.033
FOULWATER DETAILS		Di 150 Circular CLAY 1 in 100 27.153	Di 150 Circular CLAY 1 in 10 13.668	Di 150 Circular CLAY 1 in 25 34.903	Di 150 Circular CLAY 1 in 12 29.233	Di 150 Circular CLAY 1 in 100 40.000	Di 150 Circular CLAY 1 in 100 40.000	Di 150 Circular CLAY 1 in 100 40.000	Di 150 Circular CLAY 1 in 100 40.000	Di 150 Circular CLAY 1 in 100 40.000	Di 150 Circular CLAY 1 in 100 40.000	Di 150 Circular CLAY 1 in 100 40.000	Di 150 Circular CLAY 1 in 100 40.000	Di 150 Circular CLAY 1 in 100 40.000	Di 150 Circular CLAY 1 in 100 40.000	Di 150 Circular CLAY 1 in 100 40.000	Di 150 Circular CLAY 1 in 100 40.000	Di 150 Circular CLAY 1 in 100 40.000	Di 150 Circular CLAY 1 in 100 40.000	Di 150 Circular CLAY 1 in 100 40.000	Di 150 Circular CLAY 1 in 100 40.000

Scales - Horizontal - 1 : 500  
Vertical - 1 : 100

B 22.02.24 Details reviewed and amended following VE exercise from Newett Homes dated 05.02.24.  
A 28.11.23 Drainage reviewed and amended following request from Newett Homes dated 28.11.23. Tank invert level raised to avoid assumed bedrock levels.

Rev: Date: Approved: DRN CHK APR

**BRyanGHall**  
CONSULTING CIVIL & TRANSPORTATION PLANNING ENGINEERS  
LEEDS | 0113 246 1355 LONDON | 0203 552336  
www.bryanghall.co.uk  
Sulite E15 | Josephs Well  
Hanover Walk | LEEDS | LS1 1AB | transport@leeds.bryanghall.co.uk

Client: Newett Homes

Status:

Scale: 1:250  
Size: A3