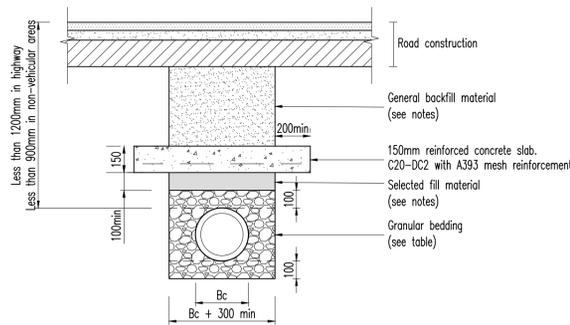
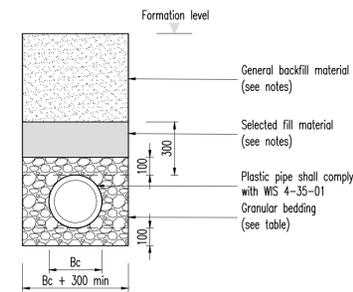


General Notes

- This drawing is to be read in conjunction with all OEC consulting engineers, Architects and M&E Consultants drawings and project specifications.
- All drainage works shall be carried out in accordance with the relevant parts of BS EN 752 Drains and Sewer Systems Outside Buildings, the current Building Regulations and the Local Authority Building Control specifications and requirements.
- The location, size and depth of all existing drains/sewers and services shall be established by the contractor prior to commencement of works on site. Any discrepancies from the information indicated on these drawings shall immediately be brought to the attention of the engineers.
- All levels and dimensions shall be verified on site prior to commencement of any works. Any discrepancies shall immediately be brought to the attention of the engineers.
- Position, size, depth, capacity, condition & status of existing drainage systems are not known. The design of the foul and surface water drainage assumed that no pumping, storage, modification, diversion, abandoning or improvement works are required on the existing systems. The design assumes a gravity connection for the foul system is possible. If the existing sewers are not deep enough then pump stations will be required.
- Design assumes that all works are not to be adopted.
- All works are assumed to be within public highway or within the land owners lands & no works are required on third party land owners property.
- All works within the public highway to be reinstated to the highway authority requirements. All drainage connections onto adoptable drainage systems shall be carried out to the water authority's approval.
- The contractor must allow for any fees required for road and sewer opening permits, sewer connections and make the appropriate applications.
- All in situ and precast concrete products shall comply with class DS1 requirements for sulphate exposure in accordance with the BRE Special Digest 1, Concrete in Aggressive Ground (2001) Part 1: Table 2.
- Manhole covers and frames shall comply with the relevant provisions of BS EN 124, have 600x600mm clear openings and be of a non-rocking design without cushion inserts and be kitemarked. Load class D400 in trafficked areas and load class B125 in footways, landscaped and pedestrian areas. Where required, covers shall be recessed to receive the Architects specified finish.
- The chamber size of manholes with more than one connection in them may need to be increased on increment to accommodate the connections and bends.
- All u-PVC pipes and fittings shall comply with BS 4-35-01 and shall be kitemarked.
- Pipes to be laid in Class "S" bedding (150mm granular bed and surround). Where depth of cover to the pipe barrel is less than 1.2m under vehicular trafficked areas and 0.9m under footways/gardens then a concrete slab protection should be provided above the granular bed and surround.
- All pipes shall be laid with soffits level. All manhole/inspection chamber invert levels shown are for the outlet pipe (unless specified otherwise). All pipe runs shall be laid to the levels indicated. All pipe gradients are approximate.
- 450mmØ chambers for depths greater than 1.2m, restricted access opening to 350mm is required for safety reasons.
- All RWP's & SVP's connections to be 100mm dia (unless specified otherwise by the Architect). Gully connections to be 100mm dia.
- All RWP's, SVP's and connections are shown inductively or to the latest Architects drawings. Position of down pipes must be confirmed from Architects drawing before laying underground pipework. All down pipes should be provided with a roddable access point above the FTL.
- Drains laid within 5 metres from deep roofing trees and hedges to have concrete bed and surround.
- Plastic channel sections in manholes are not acceptable and clayware is to be used. Plastic channels are difficult to set in concrete and a satisfactory finish cannot be obtained on the benching.
- Filled ground must be filled and consolidated before any drainage works are carried out.
- The strength of verified clay pipes (if used) to be 40kN/m for 100Ø, 40kN/m for 150Ø, 45kN/m for 225Ø and 72kN/m for 300Ø. All concrete products to be Class 120.
- All excavations in areas of high water tables and granular materials with high sand/silt contents shall be wrapped with a suitable geotextile filter membrane to prevent migration of sands/silts. Full height clay slanks across trenches and/or at manhole locations at 25m intervals to restrict water movement along the excavation shall be provided.
- Yorkshire Water is not obliged to accept filter drain/land drainage runoff into the public sewer network or adoptable drainage system (directly or in-directly). An alternative method of disposal of the land drainage runoff will therefore be required and liaison with the Land Drainage Authority with regard to the disposal of the filter drain/land drainage runoff is required.
- Do not scale from this drawing.



CONCRETE PROTECTION FOR PIPES
(1:20)



CLASS S BEDDING
(1:20)

PIPE NOMINAL SIZE (mm)	NOMINAL MAXIMUM PARTICLE SIZE (mm)	MATERIALS SPECIFIED IN BRITISH STANDARDS
100	10	10mm nominal single size
110 to 150	16	10-14mm nominal single size or 14mm to 5mm graded
160 to 300	20	10-14mm or 20mm nominal single size or 14mm to 5mm graded or 20mm to 5mm graded
310 to 500	20	14 or 20mm nominal single size or 14mm to 5mm graded or 20mm to 5mm graded
Over 550	40	14 - 20mm or 40mm nominal single size or 14mm to 5mm graded or 20mm to 5mm graded or 40mm to 5mm graded

MINIMUM RECOMMENDED TRENCH WIDTHS FOR PIPES IN POOR GROUND CONDITIONS	
NOM PIPE DIA (mm)	MIN TRENCH WIDTH (mm)
150	450
225	525
300	Two times nom. diameter
And above	

Notes:

- Processed granular materials to include aggregates to BS 882, air-cooled blast furnace slag to BS1047 and lightweight aggregates to BS 3797
- For the purpose of this table, PE pipe of 630mm O.D. can be regarded as having nominal bores of over 550mm, irrespective of wall thickness.
- Nominal bore is used in preference to DN because of the different nominal size classifications for flexible pipes

Notes:

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

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

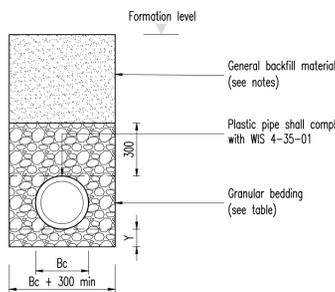
Other assumed values: Depth of cover = 6.0 metres (max)
Traffic Loading = Main Road
Pipe stiffness = SNB

Note. Where the native soil modulus is below 3Mpa or the depth of cover exceeds 6 metres guidance should be sought from the pipe manufacturer regarding structural design and installation details.

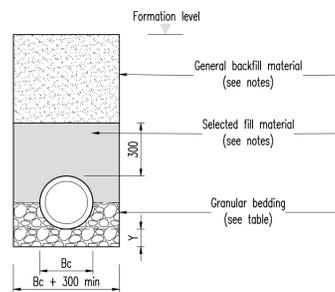
GRANULAR BEDDING MATERIAL
EXTRACT FROM TABLE A2 WIS-4-08-02

PLASTIC PIPE (UPVC) TRENCH BEDDING DETAILS
(1:20)

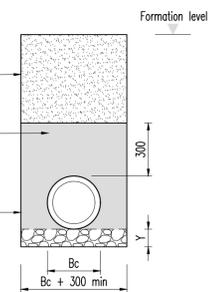
(plastic pipes shall comply with WIS 4-35-01)



CLASS S BEDDING
(1:20)



CLASS B BEDDING
(1:20)



CLASS F BEDDING
(1:20)

(mm) TRENCH WIDTHS	
PIPE I.D.	OVERALL TRENCH WIDTH
100	550
150	600
225	700
300	850
375	1050
450	1150
525	1200
600	1350
675	1450
750	1500
825	1600
900	1900
1050	2100
1200	2300
1350	2500
1500	2700
1800	3100

NOMINAL PIPE DIA (mm)	SINGLE SIZED (mm)	GRADED (mm)
150	10 or 14	14 to 5
200 to 300	10, 14 or 20	14 to 5 at 20 TO 5
375 to 525	14 or 20	14 to 5 at 20 to 5
Greater than 525	14, 20 or 40	14 to 5, 20 to 5 or 40 to 5

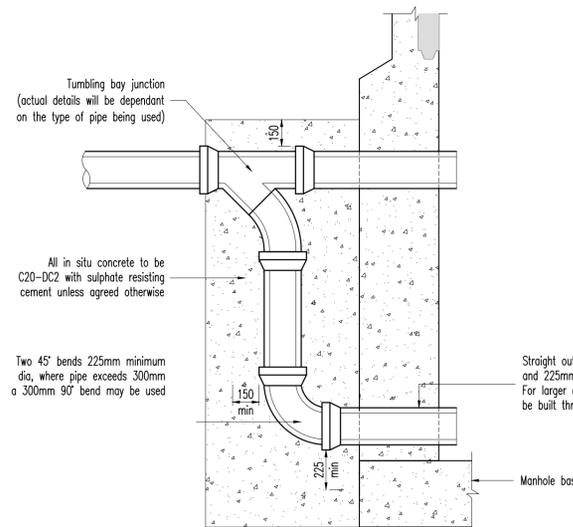
GRANULAR BEDDING MATERIAL
(all aggregates to table 4 of BS 882 :1983)

- Notes
A) Yc = outside diameter of pipe barrel.
B) Y = for uniform soils:
Sleeve jointed pipes, min. 50mm or 1/6Bc, whichever is the greater. Socketed pipe, min. 100mm or 1/6Bc, whichever is the greater under barrels and not less than 50mm under sockets. For rock or mixed soils containing rock bands, boulders, stones or other irregular hard spots:
Sleeve jointed pipes, min. 150mm or 1/4Bc, whichever is the greater. Socketed pipe, min. 200mm or 1/4Bc, whichever is the greater under barrels and not less than 150mm under sockets.

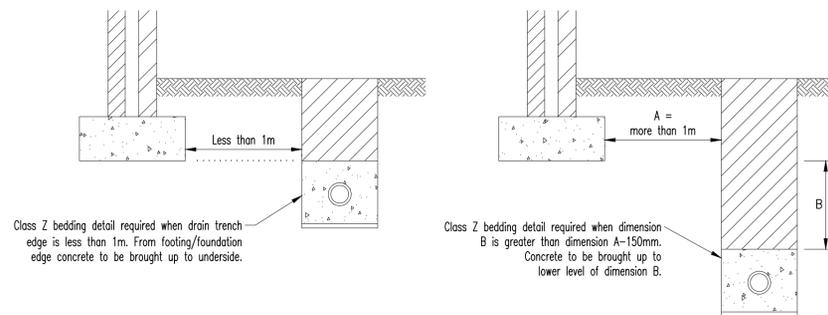
RIGID PIPE TRENCH BEDDING DETAILS
(1:20)

- Mechanical compaction of fill material shall not be permitted until there is a total depth of cover of 300mm above barrel/crown of the pipe
- Sidefill material to be placed evenly on both sides of pipes taking care to work the material under the lower quadrant of the pipe ensuring the pipe is not filled. Both sides of the trench should be filled simultaneously to avoid horizontal movement of the pipe
- Any trench box/sheeting to terminate 150mm above crown of pipe to prevent displacement of granular material. Boxing/sheeting to be removed progressively during placement of main backfill

- NOTE:- General Backfill
General backfill to drainage trenches in vehicular trafficked areas above the pipe bedding shall be suitably selected material (in accordance with BS 8301 clause 5.7.6.1.) and be placed in layers not exceeding 225mm, each layer compacted to form a stable trench backfill, should the material be unsuitable or weather conditions affect the materials stability, then a hard granular material shall be used up to formation level.
- NOTE: Selected Backfill
Selected fill material shall consist of uniform soil, free from stones larger than 40mm, clay lumps larger than 75mm, tree roots, contaminated material. Selected backfill material is to be placed in layers not exceeding 150mm thickness. Should the excavated material be unsuitable or weather conditions affect the materials stability, then a suitable hard granular material shall be used.



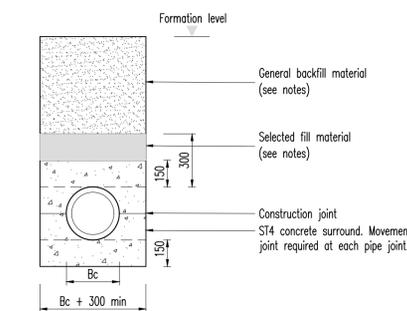
TYPICAL BACKDROP DETAIL
(1:20)



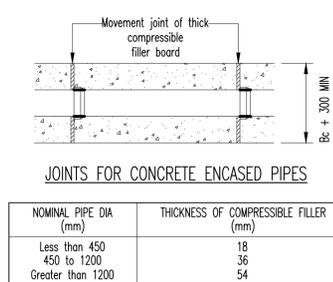
BEDDING DETAIL IN VICINITY OF FOOTINGS/FOUNDATIONS

NOTE:- THIS IS A TYPICAL DETAIL TO BE CROSS REFERENCED WITH STRUCTURAL DRAWINGS

(1:20)



CLASS Z BEDDING
(1:20)



JOINTS FOR CONCRETE ENCASED PIPES

NOMINAL PIPE DIA (mm)	THICKNESS OF COMPRESSIBLE FILLER (mm)
Less than 450	18
450 to 1200	36
Greater than 1200	54

COMPRESSIBLE FILLER TABLE

(bitumen impregnated insulating board to BS 1142: Part 3)

Rev	By	Date	Description	Chk
A	CG	31.07.23	Title block revised	WW
/	WW	13.12.19	Issued for approval	WW



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Project FOREST ROAD, ALMONDBURY

Title TYPICAL DRAINAGE DETAILS
SHEET 1 OF 2

Scale	Drawn	Checked	Date
1:20	WW	WW	DEC.19

Drawing Status APPROVAL

Job No.	Drawing No.	Revision
116.009	07.01	A