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WT Knowles & Sons Limited

Guide to bedding and laying pipes in soft ground

Where trench formation has little bearing strength and is unable to support pipe bedding material effectively, it is necessary to provide a stable formation before laying clay pipe. Such conditions most commonly occur in peat, silty ground, soft to very soft alluvial clays, running sand, or in artificially filled ground.

Although trench formations are sometimes stabilized with concrete, this is unlikely to ensure long term stability in all cases, and a form of flexible bedding construction is the preferred method of dealing these ground conditions.

The trench formation and manhole base should be over-excavated by 600-800mm, depending on the bearing strength of the ground. Gravel rejects material or small hardcore, less than 75mm, is then compacted in layers to form a firm trench bottom. A 50mm thickness of lean-mix concrete is then placed as blinding followed by granular bedding material. These details are illustrated in Fig 1.

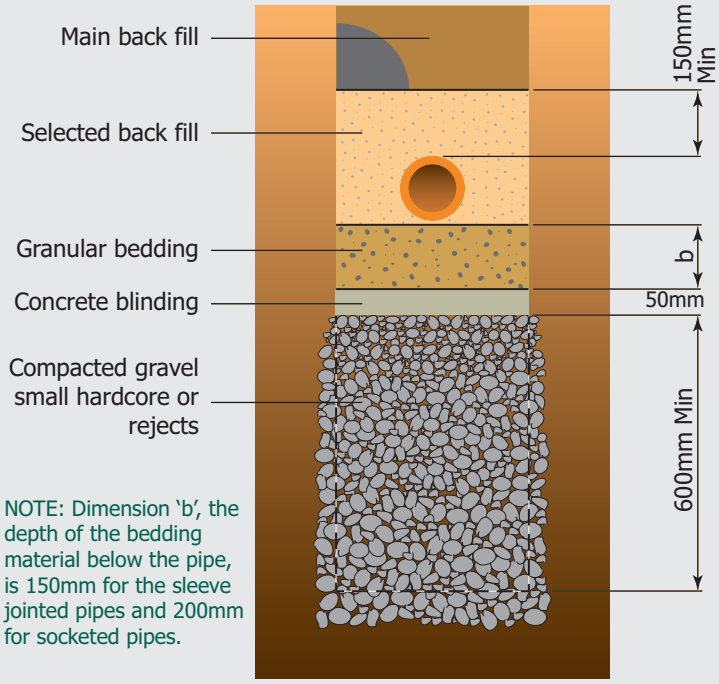
The pipe bedding construction requirements are calculated in the normal way, for example by using the CPDA's Bedding Tables or Simplified tables of external loads on buried pipelines. It is important that the Marston Wide Trench Theory is used because 'narrow trench' conditions cannot be guaranteed in this situation. The extra depths of granular bedding material shown in Fig. 1 are required (b = 150mm for sleeve jointed pipes and 200mm for socketed pipes) rather than the usual 50mm and 100mm respectively, because of the hard nature of the constructed trench bottom. For a class 'F' bedding, selected backfill material is then placed to 150mm above the pipe and compacted before the main backfill is placed. Where class 'B' or class 'S' beddings are required, additional bedding material will either partially or wholly replace the selected backfill material.

Where groundwater exists at a level above the interface between the gravel rejects and the new trench bottom, a geotextile wrap should surround both the material in the over excavated trench as well as the pipe bedding material.

Alternatively a stable base for the pipeline can be constructed by the construction of a geogrid reinforced granular mattress below the pipe bedding.

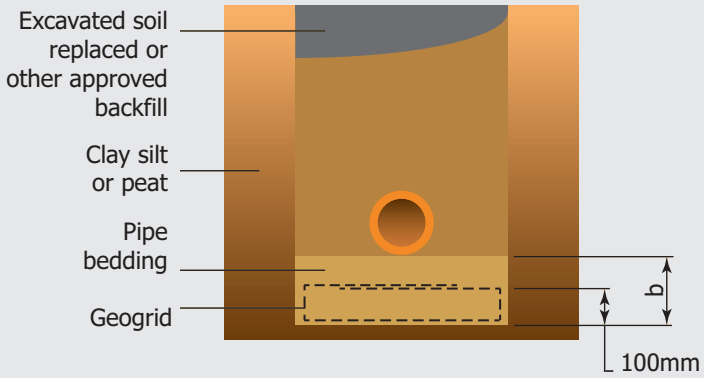
A high quality graded granular aggregate is considerably improved by the use of geogrids as a traditional pipe support as shown in Fig. 2. The unique interlock mechanism between grid and aggregate creates a flexibly stiff supporting mattress which provides an efficient load spread into the weaker ground and also helps to control any longitudinal differential settlement which may start to take place.

Fig 1 - Class F Bedding Construction in Soft Ground



NOTE: Dimension 'b', the depth of the bedding material below the pipe, is 150mm for the sleeve jointed pipes and 200mm for socketed pipes.

Fig 2 - Construction in Weak Ground using Geogrid



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