





FOUNDATIONS

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FOUNDATIONS

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1 For more detailed information, please refer to the Groundworks section of this manual.

2 The SiteM should reference the site specific foundation plan, which will determine the appropriate foundation solution as per the design. Ground conditions may be such that multiple foundation types are required across the site and in accordance with the soil investigation (SI) report and structural engineers designs.

3 It may be necessary to segregate parts of the site if specialist groundwork is underway such as piling (RHSEA should be consulted).

4 It is encouraged that the SiteM makes early contact with the warranty provider to assess if the inspector has any particular concerns regarding the foundations prior to commencement of foundation excavation. SiteM must make regular inspections of foundations and ensure that the warranty provider conducts key stage inspections. Prior to the commencement, the structural engineer should be contacted to agree monitoring procedures and consulted if any queries arise over ground conditions.

5 SiteM should ensure that the type of concrete is to the correct mix, strength and slump as per the site specific specification. The results of testing should be available from the Groundworker. Check manufacturer's specific instructions.

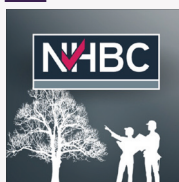
6 Concrete to be poured onto foundations with a minimum temperature of 5° C and the ambient temperature outside should be 2° C degrees and rising.

7 Site specific engineering drawings should be referenced and both SMT and the groundworks contractor must be working to the latest revision. External document management portal e.g. Dochosting).

8 For additional support, please refer to the NHBC Foundation Depth Calculator + for guidance on foundation depths and guidance working near trees. Where there is a variation between the SI and the foundation depth calculator, this should be queried.

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- 1** Marking out of foundation locations should be undertaken by a Setting Out Engineer using a consistent source for coordinates. The coordinates will be provided by TW Technical. SMT should check the handing and house type prior to excavation.



- 2** Foundations should be checked and be in accordance with the design. The bottom of excavations must be clear of debris, loose material and standing water. The digging of sumps should be undertaken to clear standing water prior to concrete pour. Organic material (e.g. tree roots) must be removed prior to foundation pour. Excavated sides should be as vertical as possible. The depth to the underside of the foundation in frost susceptible soils should be in line with TW standard details, Construction Specification and site specific structural engineering design. If soft spots are found to the bottom of excavated trenches, please consult Structural Engineer for further remedial advice.



FOUNDATION LEVELS

FOUNDATIONS



- 1 The appointed Structural Engineer should attend and agree bearing levels with the Groundworks Supervisor and SiteM. Foundation depths should be checked against engineering drawings and the foundation zoning plan. This is also a key inspection stage for a warranty provider.



- 2 The wall should be positioned on the centre of the foundation.



- 3 Steel reinforcement is generally required as per design and should specify the steel type, gauge and orientation. Proprietary supports for reinforced steel should be used for a 75mm minimum cover and should be supported every 1m maximum staggered centres and spacers should be staggered to avoid planes of weakness.



- 4 The SiteM must ensure levels are checked at key stages of direction in the build. Ensuring checks are undertaken prior to substructure brickwork and the level of foundation brickwork prior to floor. Concrete overpour must be avoided in any pour.

COMMON FOUNDATION TYPES



1 STRIP FOUNDATIONS

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Typically, strip excavations are within the range of 450 - 900mm deep. Please refer to TW standard details, Construction Specification and site specific structural engineers drawing. The depth to the underside of the foundation in susceptible soils should be at least 450mm below the finished ground level.



2 TRENCH FOUNDATIONS

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Trench fill excavations are usually 900 - 2500mm deep and 450mm wide. However, please refer to TW standard details, Construction Specification and site specific structural engineers drawing. Trench can be used as an alternative to strip when the depth of the foundation starts to become excessive.

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3 PILED FOUNDATIONS

Pile foundations are likely to be considered for foundation depths in excess of 2.5m or in areas of poor ground quality.

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4 RAFT FOUNDATIONS

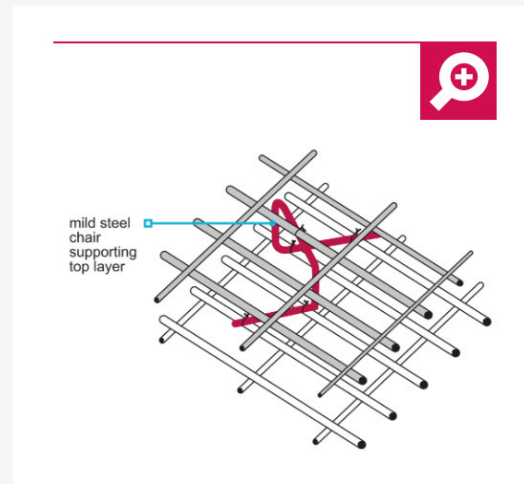
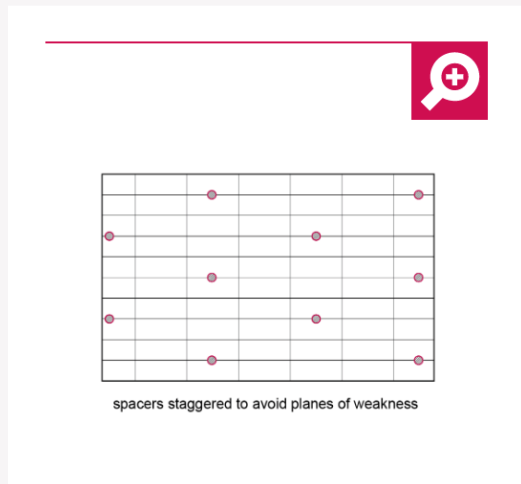
Raft foundations are used in favour of pile foundations where ground conditions permit. All raft foundations to be designed by a suitably qualified, independent Structural Engineer.



SUPPORT FOR REINFORCEMENT

Spacers should be either concrete blocks (no more than 50 x 50mm) or ready-made of steel or plastic. Support should be placed no more than one metre apart, or closer where necessary.

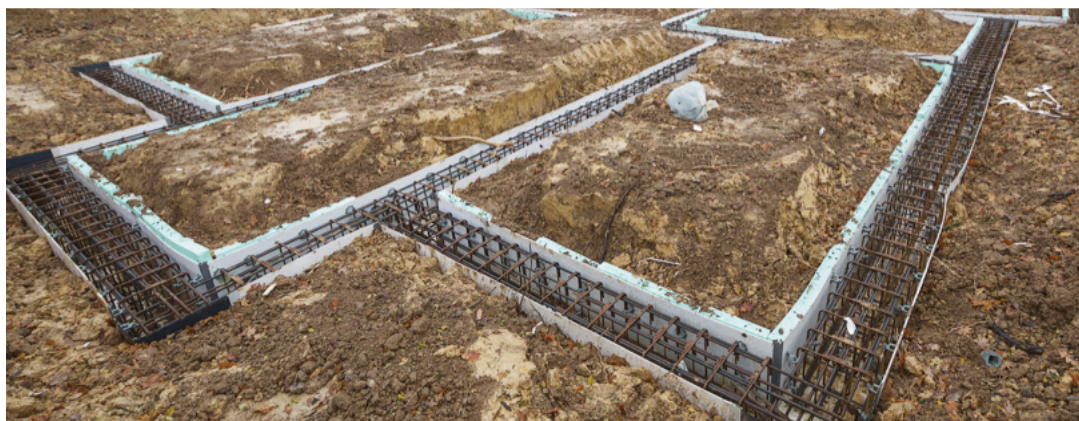
Spacers for parallel bars should be staggered to avoid creating a plane of weakness in the concrete. Support for top steel should be chairs, or other proprietary products.







HEAVE PRECAUTIONS



1 CLAY SHRINKAGE

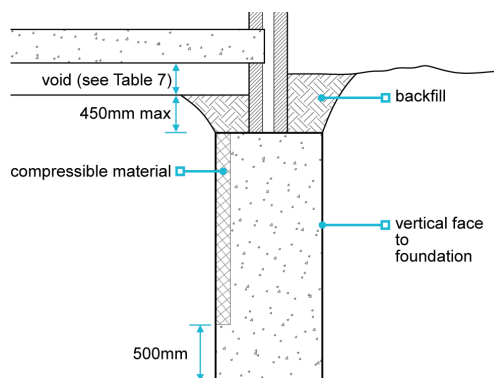
Clay soils can be prone to “clay heave” or “clay shrinkage” which causes the ground around foundations to move and undermine the structure.

The designed heave board must be in place and the foundation depth must be to specification and detail. More information on the position of heave precautions can be found in NHBC Standards 2022, 4.2.10, Table 8 and the relevant section in the HSE Manual.

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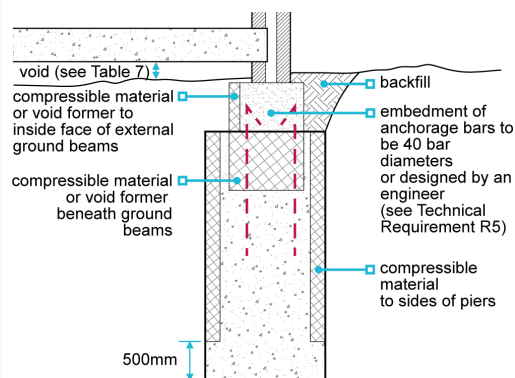
It is essential that:

- Compressible material is provided to the entire area shown, and the foundation excavation has a vertical face.
- Where the excavation is battered or if there is overbreak or concrete overspill, it may be necessary to consult an engineer.



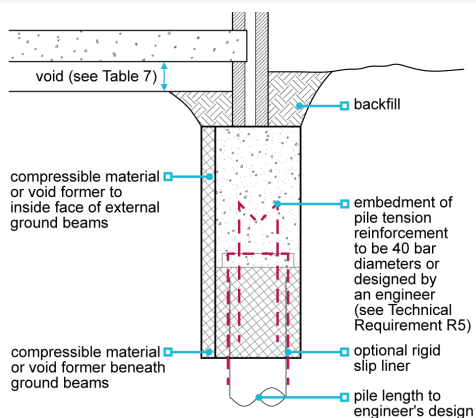
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It is essential that heave material is provided to the entire areas shown. Particular care should be taken to ensure that the full width of the ground beam is protected.



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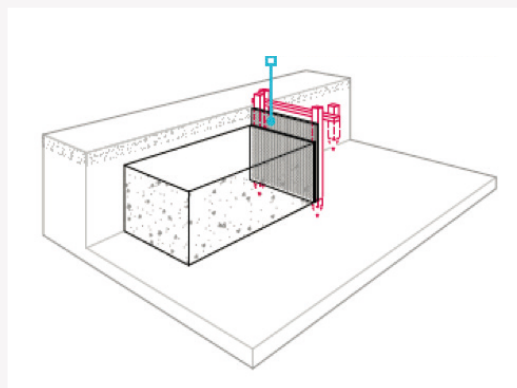
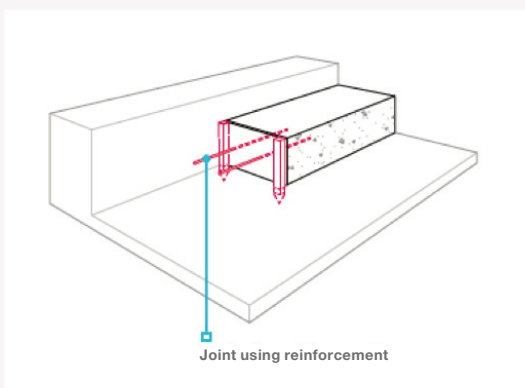
It is essential that heave material is provided to the entire areas shown. Particular care should be taken to ensure that the full width of the ground beam and the areas around the piles are protected.



FOUNDATION REINFORCEMENT



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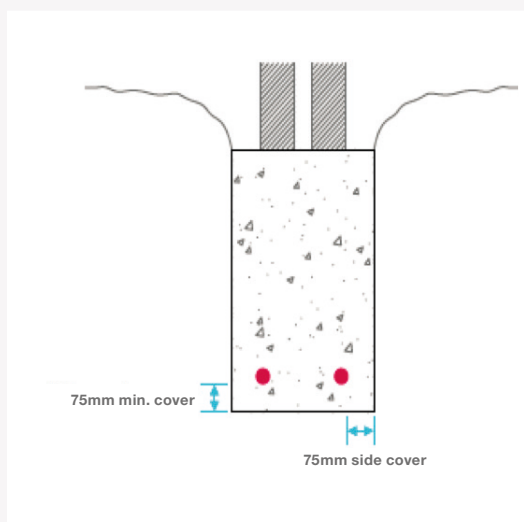
1 REINFORCED CONCRETE AND STRUCTURAL JOINTS

For reinforced concrete, SiteM to check the structural engineers design for concrete cover to reinforcement. If this isn't shown on the structural engineers details, then follow the NHBC recommendations in NHBC standards "Concrete and its reinforcement" for each scenario. SiteM should check structural engineer design and the minimum lap requirements to reinforced steel work.

Construction joints in strip and trench fill foundation should be suitably formed. Where construction joints are unavoidable: they should not be positioned near a return in the foundation, and all shuttering must be removed before work continues beyond the construction point.

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STRIP AND TRENCH FILL FOUNDATIONS



- 1 Reinforcement for strip and trench fill foundations shall ensure the safe transfer of loads and be suitable for local ground conditions.

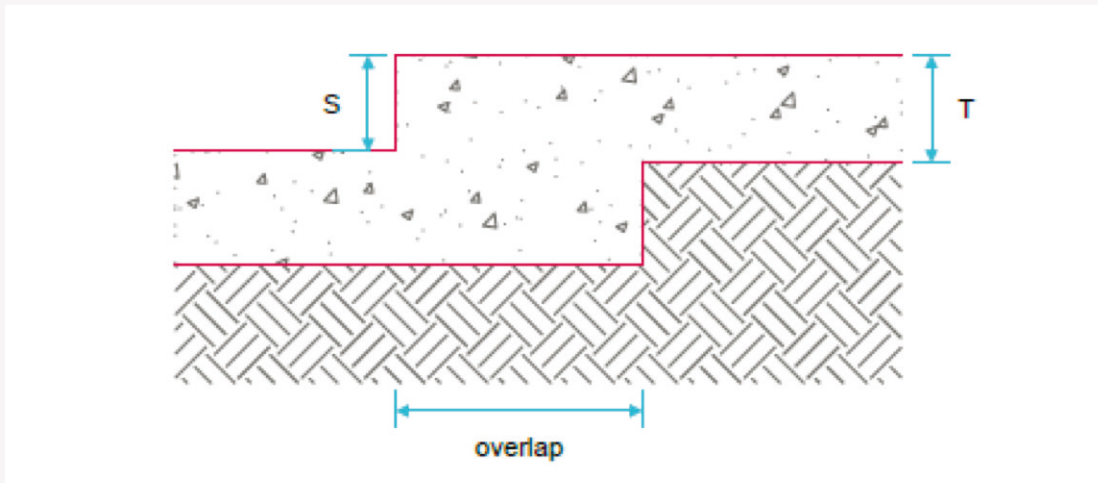
Reinforcement should be suitably sized, placed correctly, clean and free from loose rust, secured at laps and crossings, and supported to ensure that they are 75mm above the base of the foundation or as indicated in the design. Proprietary support is preferred.

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On suitable methods of support to the reinforcement.



SLOPING GROUND & STEPPED FOUNDATIONS



- 1** Strip and trench fill foundations shall be taken to a suitable bearing level when building on sloping ground and steps shall be suitably formed.

Where foundations are stepped, the height of the step (S) should not exceed the thickness (T) of the foundation, unless it forms part of a foundation designed by an engineer. The overlap dimensions

NEW should be twice the dimensions of S. For more information refer to NHBC Technical Guidance 4.3/02.

	STRIP FOUNDATIONS	TRENCH FILL FOUNDATIONS
The overlap should be not less than:	<ul style="list-style-type: none"> • 2 x S, or • T (maximum 500mm), or • 300mm, whichever is largest 	<ul style="list-style-type: none"> • 2 x S, or • 1 metre, whichever is largest



- 2** The finished height of concrete after pour must be level.

Stepped foundations may be required on sloping sites. It is acceptable for steps in strip and trench fill foundations to be positioned in straight lengths, at corners and at intersections. Trench bottoms should be horizontal with all loose material removed with trench sides vertical (as near as possible). Please see warranty provider guidelines to ensure that the design complies with their standards.



- 1 This type of foundation is similar to a piled foundation but the head supports a preformed beam.

This involves digging holes around the perimeter of the structure, placing concrete in the holes to serve as piers and laying beams on the piers. Piers must be installed to the maximum frost depth. This is not a common foundation type, but the principles remain similar to pile and beam. The fundamental difference with pier and beam is that the beam is not in direct contact with subsoil / ground.

Once the foundation has been prepared to specification it can be set out by an engineer in preparation for the substructure blockwork to commence. The SiteM should ensure bar bending schedules are available and have been approved and supplied by the Structural Engineer, design is being followed and the required time allowed for manufacture and delivery.

When installed correctly the beam will sit centred over piers unless otherwise specified by the design (cantilevered design principles). The tops of piers should be cropped and level as per design to ensure the steel reinforcement is exposed to tie into ring beam reinforcement.



2 VIBRATORY GROUND IMPROVEMENT TECHNIQUES

This is a ground improvement technique that is applied to weak soils / ground to improve the load-bearing capacity, reduce settlement and provide an adequate bearing stratum for the foundation supporting the home. Ground improvement techniques should only be carried out in accordance with design and specification provided by a specialist.