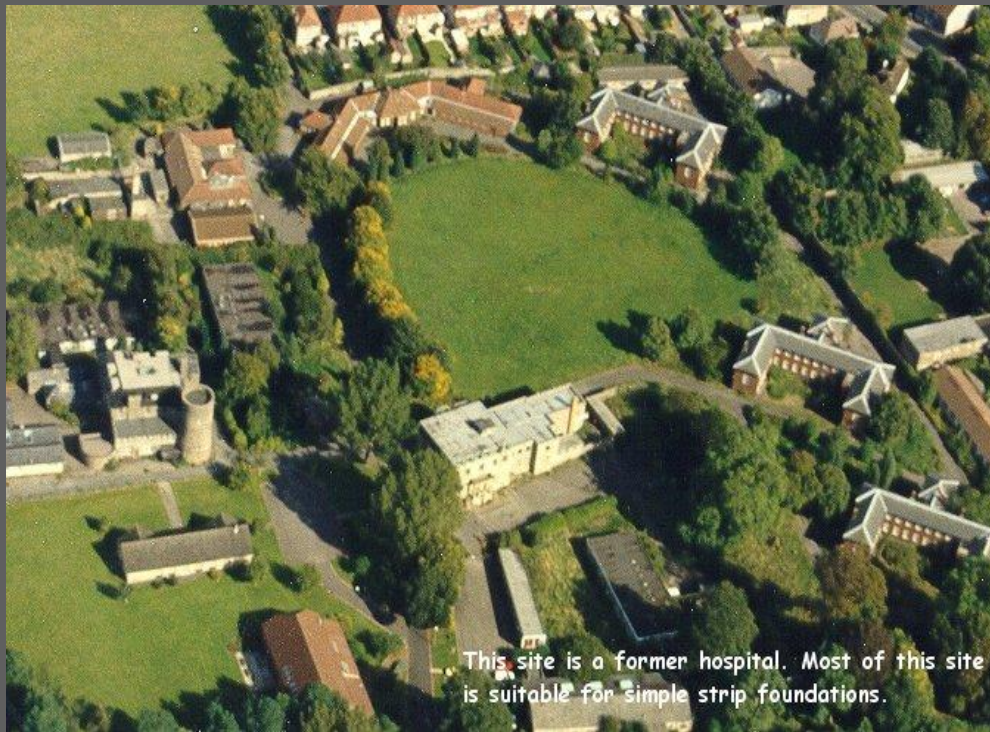


Built Environment Portfolio



This site is a former hospital. Most of this site is suitable for simple strip foundations.

Construction
Technology Level 1

Site investigation

Site investigation

- ➔ Involves a detailed evaluation of the proposed site both above and below ground and its environs.



Why carry out a site investigation?

- Helps to assess the site for possible resources
- Identifies contamination levels
- Establishes previous failures on the site
- Assesses potential risks



Why carry out a site investigation?



- Determines the method of construction
- Enables adequate and economic design
- Establishes potential ground difficulties and/or instabilities
- Assesses the suitability of the site and its surroundings

Site investigation

⇒ Some justification

- One third of construction projects are delayed by ground problems



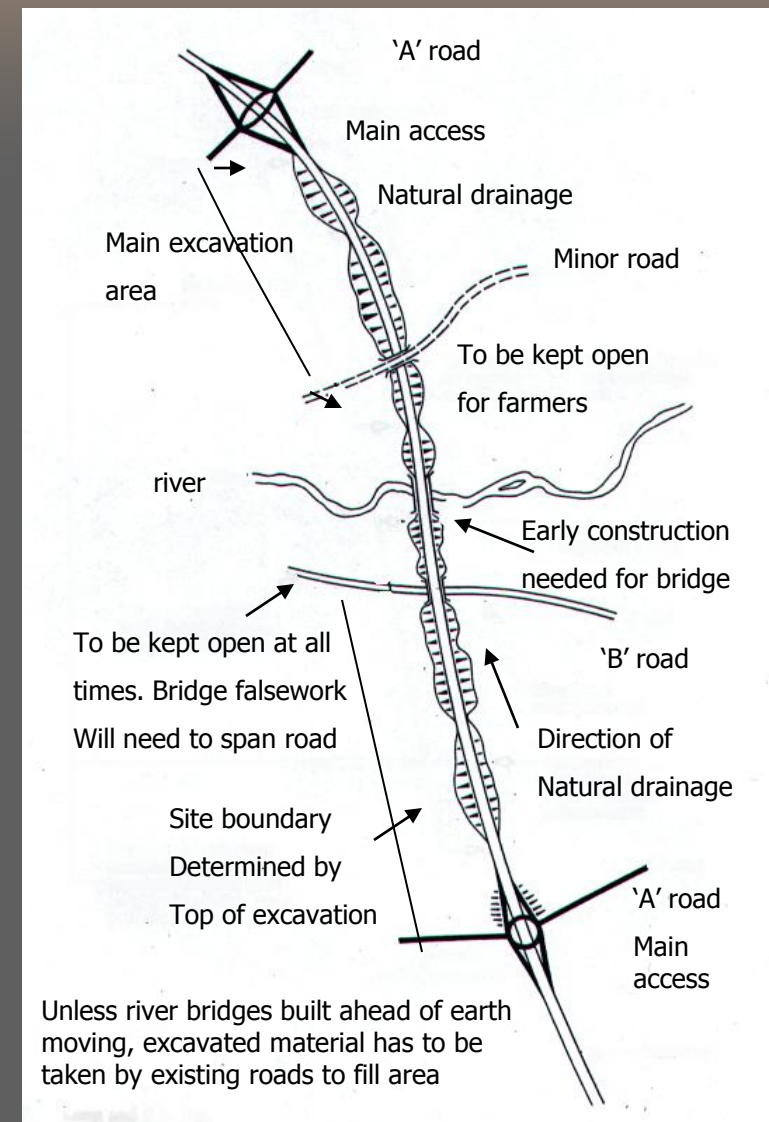
Site investigation



- Unforeseen ground conditions are the main cause of piling claims

Site investigation

- ➡ One half of over-tender costs on road projects are due to inadequate site investigation or poor interpretation of data



Site investigation: stages

- Preliminary investigation: desk study
 - ...comprises the collection and analysis of existing information about the site, i.e.
 - Maps / air photographs
 - Drawings and records
 - Past / present development
 - Planning details
 - Services
 - Location / access
 - Recognised publications





CI/SIB (A3s)
December 1995

Site investigation for low-rise building: direct investigations

Digest 411

The main objective of a site investigation is to examine the ground conditions so that the most appropriate type of foundation can be selected. A typical site investigation begins with a desk study and a walk-over survey to establish the general geology of the site, and continues with an examination of the geotechnical properties of the ground. This Digest discusses the various techniques for direct investigation of a site and provides guidance on how to select the appropriate method for a specific location. This is one of a set of Digests dealing with site investigations. The other Digests in the set are listed on page 12.

The aims of direct site investigation

Site investigation is the gathering of all the information on ground conditions which might be relevant to design and construction on a particular site. On a site intended for low-rise development, a desk study is the first stage of investigation (see Digest 318). This involves checking existing records, such as geological maps of the site. The desk study, and a walk-over survey (see Digest 348), will indicate the probable ground and groundwater conditions and the problems they might pose.

Direct investigations are carried out:

- To check the information from the desk study
- To obtain any additional information required to ensure safe and economic construction.

Direct investigations are never routine. On each site, the process is tailored to the specific project and the specific ground conditions.

The type of information provided

The soil profile

Ground investigations identify the levels of the various soil or rock types on the site by identifying the boundaries between them. Boundaries between soil types are not always distinct, eg when one type changes gradually into another.

Soil classification

Ground investigations classify the soils beneath the site into broad groups: each group contains soils with similar engineering behaviour.

The simplest classification used by geotechnical engineers divides the ground into five categories:

- Rock
- Granular soil (eg sands or gravels)
- Cohesive soil (eg clays)
- Organic soil (eg peats)
- Fill or made ground.

Broad soil classifications, coupled with simple tests to determine soil parameters or to detect the presence of chemicals harmful to construction materials, are normally sufficient for low-rise building projects.

The natural variability of the soil in each classification can be assessed using index tests – see Table 1.

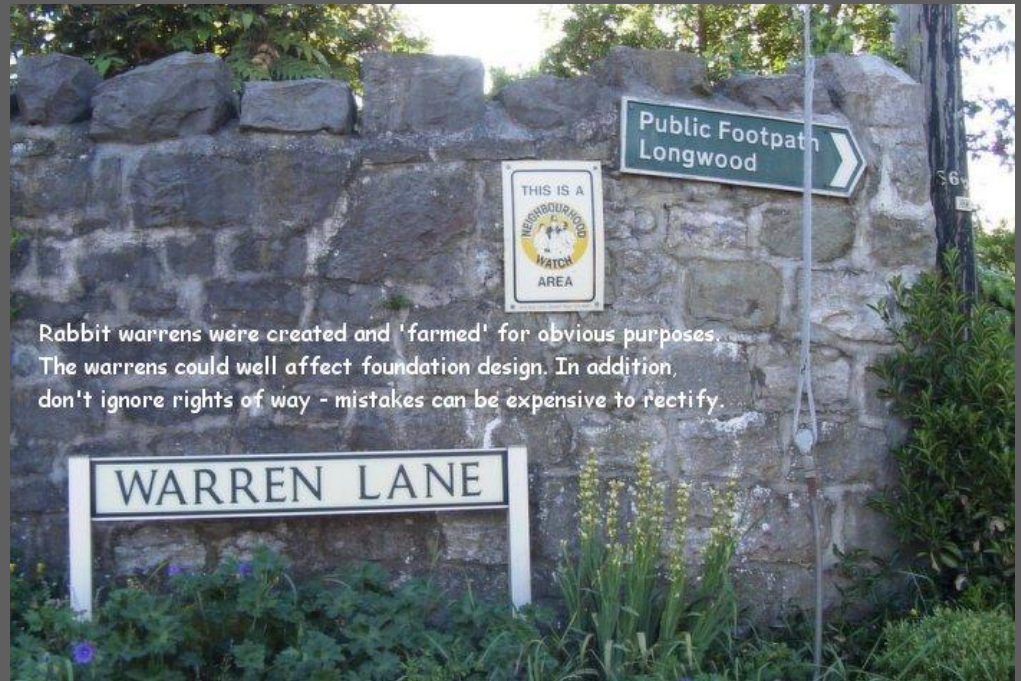
Soil parameters

Engineering design and calculation may require the determination of soil parameters. In many situations, soil parameters will not be required for

Site investigation

⇒ Firm conclusions about:

- Ground below site
- Landslip
- Mining
- Vegetation
- Past usage
- Water
- Contaminants
- Soft spots



Site investigation

➡ Detailed site survey

- Topography
- Soils and rocks
- Surface and ground water
- Vegetation
- Structural information
- Local information

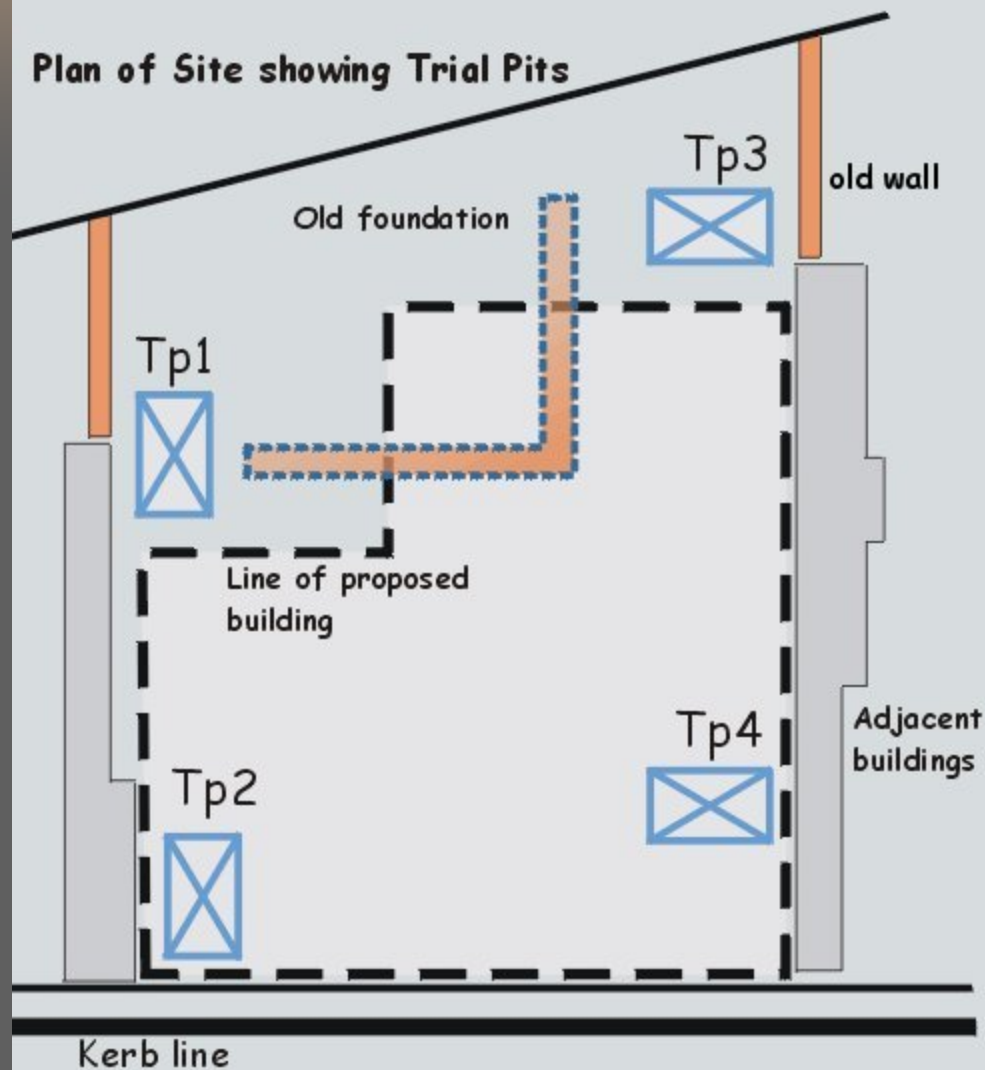


Site investigation

- ➔ Detailed site investigation and sampling
 - Include information from site survey
 - Trial pits
 - Bore holes
 - Soundings
 - GIS
 - Samples for analysis



Plan of Site showing Trial Pits



Tp1

Description	Depth
Topsoil	300
Loose fill and bricks	500
Firm red marl with specks of blue-green mudstone	1000mm
	1800
Stiff red marl	2000mm
	2750
Base of pit 2750mm	3000mm

Site investigation

■ Laboratory testing

Tests on disturbed and undisturbed soil samples for:

- ◆ Classification
- ◆ Quality
- ◆ Permeability
- ◆ Shear strength
- ◆ Compressibility



Site investigation

■ Laboratory testing

Tests on rock cores and samples to establish:

- ◆ Strength
- ◆ Durability
- ◆ Petrographic examination
- ◆ Chemical analysis



Site investigation

⇒ Insitu testing

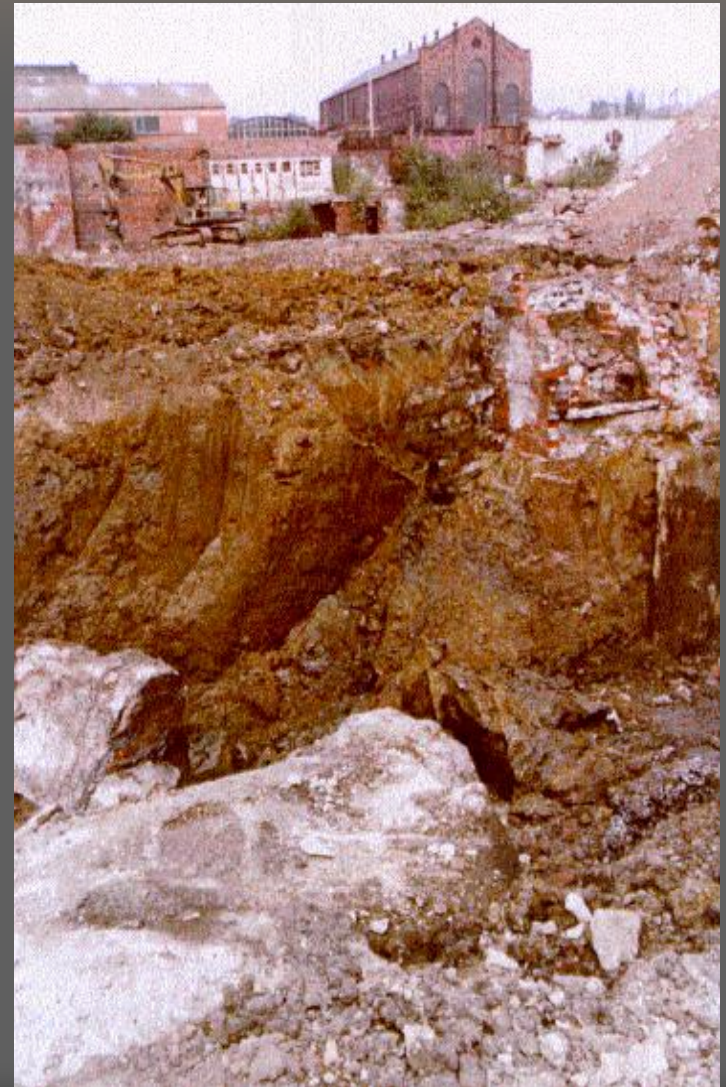
- Tests on site
- Penetration tests
- Loading tests
- Post-construction monitoring



Site investigation

⇒ Typical hazards

- Unstable rock faces
- Mine shafts / wells
- Old foundations / buildings / archaeology
- Shrinkable clay soils
- Sulfates / chemical substances



Site investigation

- Slopes subject to slip or creep
- Long term consolidation
- Previous waste tips
- Underground water courses – flooding!
- Existing services / drains



Site investigation

■ Reporting

- Written report
- Procedures and results
- Maps and drawings
- Location and geology
- Borehole / trial pit logs
- Tables of results
- Interpretation of data
- Recommendations and advice



Site investigation

Workshop

The detailed site survey proposes a number of factors that must be considered so that accurate information can be obtained of the site.

Taking each of these factors, outline the key issues that will need to be addressed.

