

Guidance for the Evaluation of Method Statements for Excavations

What is an excavation?

Excavation is the breaking, digging or removal of ground with the purpose to expose underground services or plant, install or maintain underground services or plant or to install foundations and other building structures.

Hazards in Excavations

Unstable Ground Conditions – depending on the topography and geology of the ground to be excavated, soil and rock, once disturbed can become unstable and slip. This can lead to the collapse of trenched and excavations, the subsidence of building structures and the breach of services.

Underground structures or water courses – natural water courses such as underground rivers and streams exist under much of the UK. Once disturbed they can alter their flow and cause flooding and land slippage. Many other structures can be found underground ranging from oil and gas distribution pipes, disused service tunnels, residual voids from previous mining activity and natural caves and caverns.

Interference with plant and underground services – most of our highways and footpaths cover a wide range of underground plant and utilities; these include gas pipes and distribution valves, high and low voltage electric cables, water distribution pipes and valve boxes, telecommunications cables, fibre optic cables and both foul and storm drain networks. Each of these carries their own hazards and risks when damaged or broken.

Asphyxiation of personnel due to the presence on toxic gasses, fumes and vapours in the excavation - this could be caused by residues of hazardous substances in subsoil, leaks from pipe work, or valves being accidentally opened whilst personnel are working in excavations.

Drowning of Personnel – this could be caused by the unexpected ingress of water into the excavation, water from natural sources and from distribution pipe work should be considered.

Collapse of excavations – caused by a range of factors such as unstable bedrock or subsoil, unsupported sides of an excavation, water ingress, explosion and vehicle movement close to the edges of excavations.

Falling or dislodging material – the surface edges of an excavation are usually unstable and the topsoil and subsoil are usually easily dislodged by pedestrian or vehicle movement around the edge of the excavation. Falling or dislodged material can fall into the excavation causing a risk for those working in the excavation. Spoil piles placed too close to the edge can also be easily dislodged and fall into the excavation.

Falling into excavations – personnel and vehicles may fall into an excavation if they work in proximity of the edge and no edge protection is provided around the perimeter of the excavation.

Fire or explosion - caused by the presence of flammable gas or fume in sufficient quantities to be within the substances lower and upper explosion limit. Fire caused by the ignition of flammable material from cutting, welding and other hot work may cause smoke generation which could put personnel at risk. Oxygen enriched atmospheres due to chemical reactions or use of oxy-gas equipment can create additional hazards.

Biological hazards – a range of bacteria, fungi, viruses, hazardous substances and animal bi-products could be present in soil and water within an excavation. The most prevalent risks are; leptospirosis (Weils disease), anthrax, radon gas, asbestos and bacterial infections such e-coli from sewerage pipes.

Precautions for excavations

As a **minimum** the following precaution should be applied to all Excavation work;

1. All excavation work must be subject to the University's Permit to Work System; no other local arrangements or contractors systems should be accepted. The permit must not be issued until a suitable and sufficient risk assessment and safe system of work has been supplied by the company or individuals undertaking the work.
2. The whole activity should be supervised by an individual who has the responsibility to ensure that all of the necessary precautions are implemented and must have received training in safe working precautions during excavations.
3. All excavation work should be supported by up to date utility plans, relevant ground surveys (mining, previous land use etc.) and the results of local cable locations surveys. The method statement provided by the company undertaking the work should reflect the likely services to be found in the area to be excavated. It would not be acceptable to state that they will dig with caution or undertake CAT scanning on the day of the work.
4. Where underground services exist it would be expected that the excavation would use hand digging methods using non conductive tools as well as using mechanical digging methods when at a sufficient distance from plant and services.
5. Sides of excavations should be supported where there is a risk of collapse of the trench. There is not set depth at which trenches and excavations should be supported, but a risk assessment of the topsoil, subsoil and bedrock should identify if this is necessary. Support using close boarding, sheet piling, trench boxes, battering or boarding should be identified in the method statement.
6. Once the excavation has been dug, and before personnel enter the excavation the air should be tested to ensure that a suitable atmosphere exists to support life. All excavations where personnel are expected to enter should be regarded as confined spaces.
7. The barriering off of the perimeter of the excavation, pedestrian barriers should be placed one meter from the edge of the excavation. Where vehicles are expected to reverse to excavations for backfilling, stop blocks should be used to prevent vehicles falling into the excavation.
8. Safe access and egress must be maintained from any excavation, which is usually implemented by the use of ladders and hoists.
9. If the excavation is likely to be open during the night times then the perimeter should be lit and warning lamps fitted to warn pedestrians of the risks.
10. The excavation must be inspected before each shift, by a competent person. This inspection must be recorded and made available for inspection by a Estates representative or a member of the health and safety team.
11. Staff should receive training in hygiene practices and wear protective clothing where known contaminants and infectious material may be present in the excavation. The organisation undertaking the work may also need to provide welfare facilities such as showers and decontamination units.
12. The wearing of Personal Protective Equipment (PPE) such as overalls, safety footwear, gloves, safety helmets and dust masks. Consideration should be given the specification of PPE to be flame resistant during hot work activity.

Further Guidance

Further Guidance on safe working in excavations is available from the Safety and Risk Management Team or excavation permit authorisers in the Estates Department.

Additional guidance is available in the HSE's guidance note HSG 47 – Avoiding danger from underground services. Which can be downloaded from the HSE web site <http://www.hse.gov.uk/pubns/priced/hsg47.pdf>.