ESSENTIAL STANDARD no.3

Breaking Ground

Safe People
Happy People
Sustainable Business

KEY MESSAGES

- Ensure that public safety and the safety of those doing the work is the number one priority
- Breaking ground means any activity that could cause a person or object to come into contact with a below ground service (installing an earth rod, fence post, excavating etc)
- Plan to use the best/correct method. For example, where space allows, battering the sides of the excavation
- Plan to avoid any utility strike, and have a responsible, authorised person in charge where any activity breaks ground.
- **A `Permit to Break Ground` (BHS F084) MUST be completed & authorised before any breaking ground activity is commenced. To enable the permit to be completed, the `Permit to Break Ground Checklist` (BHS F085) must first be worked through and completed**
- Ensure the necessary plans, service drawings, equipment and materials are available on site.
- Use a locating device, gCAT4+ & Genny 4 as a minimum to trace & mark all services
- Anyone performing this work must be trained and competent and understand the risks and controls. Minimum competency required is NRSWA Unit 1 (LA) - Location and Avoidance of Underground Apparatus.
- No work will be carried out on live GRP/UPVC mains
- The mandatory PPE appropriate to the task must be worn at all times. When breaking ground, flame/ARC retardant PPE clothing must be worn.
- Always ensure excavations are adequately protected from collapse and that the edges are protected to prevent persons from falling in.
- The use and upkeep of site safety information boards are seen as essential in visibly communicating safety information as conditions and personnel change.
- Where mobile plant is used Essential Standard 6 must be followed

1. Introduction

The undertaking of any activity which involves breaking ground or excavations is a high risk activity.

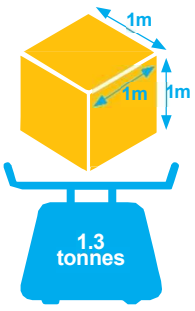
Each year people are killed or seriously injured when utility services are struck or from collapse of the excavation. The activity must be properly planned, managed, supervised and carried out to prevent incidents. In most cases, straightforward physical protection measures can prevent incidents occurring but all too often a lack of thought and poor management control mean that protection is neglected leading to incidents and injuries.

Where anything other than minor excavation work is required, this should be carried out by an approved specialist sub-contractor. Bridges do not have the required in-house competency to carryout large scale excavation works.

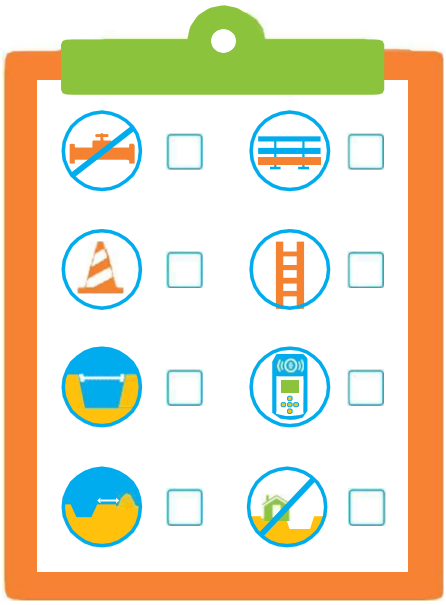
The type of activity carried out in-house that may expose people to risks from breaking ground or excavation works includes the installation of:

- Earth Rods
- Fencing Posts
- Signage
- Cable Ducts
- Kiosk or Equipment Plinths
- Minor Demolition

This list is not exhaustive but does cover the majority of activities.



- **Remember**, no ground can be relied on to stand unsupported in all circumstances and one cubic metre of earth weighs approximately 1.3 tonnes.



2. Planning

Plan to do the following before performing any excavation activity or breaking ground:

- Avoid contact with underground services
- Provide safe working areas to keep highway users and members of the public away from excavations and machinery
- Protect operational staff from plant and vehicles
- Prevent trench collapse
- Keep excavated ground and other materials away from the excavation
- Provide visible and secure edge protection as necessary
- Avoid nearby structures or possible undermining
- Have appropriate access to the excavation
- Effectively control fumes or gasses

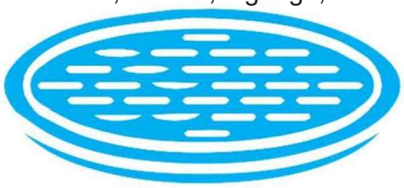
3. Avoiding Underground Services

Before you start, you must have a written permit* to dig/break ground and have a responsible, authorised and trained person present at all times.

*Refer to Appendix for an example of a "Permit Checklist & Permit to Break Ground".

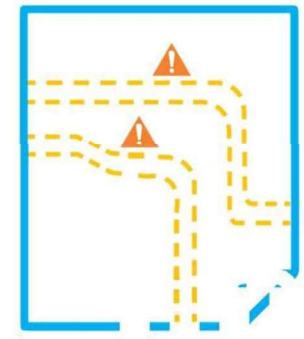
- Isolate the service where possible.

- Isolate all services (electricity / water / gas) mains before work starts, if not they MUST be positively identified and marked.
- If it is a live GRP/UPVC, isolate the mains before work starts.
- Look around for obvious signs of underground
- services, e.g. valve covers or patching of the road surface, covers, signage, etc.



- Consult existing services drawings.
- Use locating devices to trace any services, gCAT4+ & Genny 4 as a minimum and mark the ground accordingly. Re-scan every 150mm.

- Complete the Form BHS F085 ` Permit to Break Ground Checklist` and ensure a Permit to Break Ground (BHS F084) is in place
- Use safe digging practices, i.e. locate and dig trial holes by hand – no machines within 500mm of a service.
- The most senior person on site overseeing the excavation must be familiar with the requirements of how to avoid danger from underground services and the specific risk assessment.
- Make sure that the person supervising the excavation work has service plans and knows how to use them. Everyone carrying out the work should know about safe digging practices and emergency procedures.



- Ensure that the work gangs are briefed and fully understand the scope of works and hazards associated with the activity.

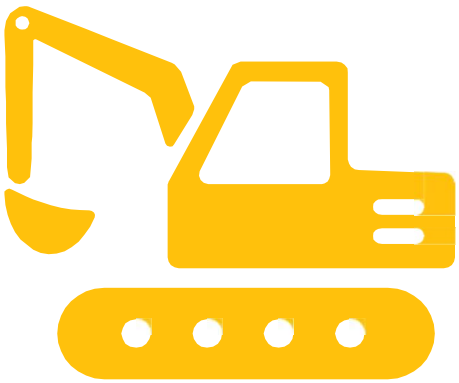
4. Protecting the Public

- Avoid exposing members of the public to the risks associated with our activities.
- Fence off all excavations and work places to prevent pedestrians and vehicles from entering.
- Inspect all works each day, ensuring that precautions are put in place, such as back illing or covering excavations where the excavation is left open overnight or for long periods, in order to prevent collapse or unauthorised access.

The following information is provided to assist in the monitoring of our specialist sub-contractors

5. People Being Struck By Plant

Keep workers separate from moving plant such as excavators. Where this is not possible, use safe systems of work to prevent people being struck. Where mobile plant is used Essential Standard 6 must be followed.



- Plant operators must be competent, trained & authorised.
- Make sure excavations do not affect the footings of scaffolds or the foundations of nearby structures. Walls may have very shallow foundations which can be undermined by even small trenches.
- Decide if the structure needs temporary support before digging starts – use surveys of the foundations and the advice of a structural engineer.

6. Supporting of Excavations

- Identify the type of ground and surrounding space before starting any excavation.

- Groundwater or mains water can affect the stability of the soil, what support can be used, and, depending on the ground, what dewatering technique should be used.

- **Use the ‘Stop and Assess’ approach on any excavations over 1.2m deep or adjacent to a live carriageway.**

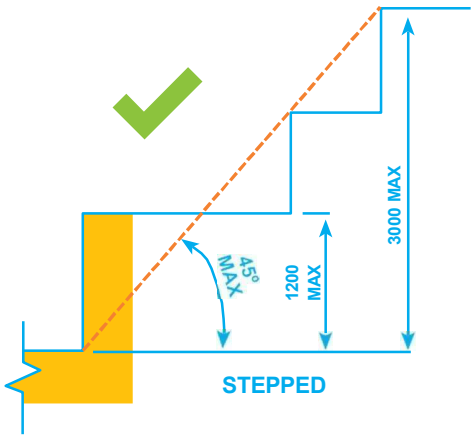
- **Consider what support is needed and get the appropriate temporary works signed off by a competent person.**

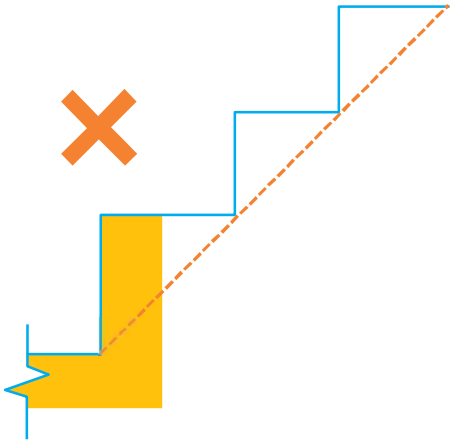
7. Battered Sides

Incidents resulting from properly designed and executed battered systems are rare.
If you use battering, ensure the design allows for proper access and egress to be made. Consider the presence of ground water or mains water when selecting this method because it can affect the stability of battered slopes

8. Stepping

An alternative to battering is cutting steps into the excavation sides. Determine the depth of the step needed using the typical slope angle as outlined in the below diagram. The vertical distance must not exceed 1.2 metres without a competent engineer's approval and sign off.





9. Support Systems

Involves the use of waling's and horizontal struts. For example, trench box, trench sheets, frames and struts.

Specialist proprietary equipment must always be used as part of a Temporary Works Design

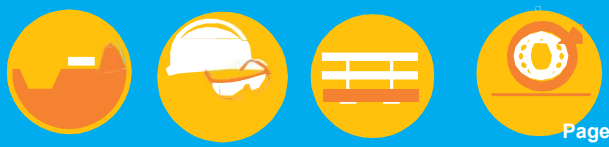
10. Undertaking Excavations

There are a number of risks that you must control while working on excavations. Risks and relevant control measures include:

- Excavation collapse.
- Prevent the sides and the ends from collapsing by battering them to a safe angle or supporting them with timber, sheeting or proprietary support systems.
- Assess all excavations (even ones less than 1.2m deep) before entry as even work in shallow trenches can be dangerous. You may need to provide appropriate support if the work involves bending or kneeling down inside them.
- Never work ahead of the support.
- Support all exposed services and ensure they are never used for access and egress to the excavation.
- Use the appropriate engineered support for any excavation over 1.2 metres deep or adjacent to a live carriageway.
- Make, and record, proper assessments for all excavations that are 1.2 metres deep before excavating further.
- the total depth must not exceed 3.0 meters without full temporary works design and a competent engineer's approval and sign off.

11. Working In/Around Excavations

- Do not store spoil or other materials close to the sides of excavations. It may fall into the excavation and the extra loading will make the sides collapse.
- Protect the edges of excavations against falling materials. Provide toe boards where necessary.
- Wear mandatory PPE.
- Provide substantial barriers, e.g. guard rails and toe boards, to prevent people falling into excavations.
- Keep vehicles away from excavations wherever possible. Use brightly painted baulks or barriers where necessary.
- Use stop blocks to prevent vehicles that are tipping materials into excavations from over-running. The sides of the excavation may need extra support too.
  Do not straddle the excavation with any vehicle or plant, e.g. excavator



12. Access

Where possible, provide a proprietary or ladder access to ensure safe means of getting in and out of the excavation. Regularly inspect ladders to ensure they're in good order and secure.

13. Fumes

Exhaust fumes can be dangerous. Only use petrol or diesel engine equipment, such as generators or compressors, in or near the edge of excavations if the fumes can be ducted away or the area can be ventilated.

14. Training and Competence

A competent person must supervise the installation, alteration or removal of excavation support. People working in excavations should be given clear instructions on how to work safely.

Bridges requires the responsible person/ supervisor to have an appropriate level of competence (training and experience) to supervise any excavation activity (e.g. formalhealth and safety training e.g. SSSTS/SMSTS,IOSH managing/supervising safety etc.) andwhere undertaking any street works NRASWAtraining appropriate to their level.

Anyone issuing permits to break ground must be trained in service avoidance to Level 2.

15. Inspecting Excavations

A competent person must inspect excavations:

- At the start, and before, each shift begins;
- After any event likely to have affected the strength or stability of the excavation; and
- After any accidental fall of rock, earth or other material.

A written report must be made after inspections. Stop work if the inspection shows the excavation to be unsafe and take action to correct it immediately.

The use and upkeep of the site safety information boards are seen as essential in visibly communicating safety information as conditions and personnel change.

16. Vacuum Excavation

Vacuum excavation (Vac-ex) provides a safer, lower-risk of excavation alternative to more traditional excavation techniques. A vac-ex is a construction vehicle that removes heavy debris and material from a hole in the ground, minimising the risk of damaging services.
The bladed attachment that goes on the end of the vacuum hose is banned from use across all Bridges sites.

Appendix A: "Permit to Break Ground Checklist (BHS F085)"

Permit to Break Ground Checklist

Project Name		Project Number	
Permit Compiled by		Permit Issued to	
Permit Validity	From To	Permit Reference	

Was the area fully scanned using all modes of the scanning equipment? (If no, which modes were used?)	YES	NO	Radio ☐	Power ☐
			Genny ☐	Avoidance ☐

Where the answer to any question is NO, STOP work & contact your Project Manager / Project Engineer

	YES	NO	N/A
Site specific method statement & risk assessment in place?			
Flame retardant clothing worn?			
Insulated shovels available?			
Confirmation of service isolation received? (where applicable)			
Do you have accurate up to date drawing(s) of the site showing the location of all the services in the area, a key or legend, and the boundaries of your working area?			
Are known services marked on the ground?			
Will there be suitable support / protection in place for exposed services?			
Is there a requirement to backfill & place markers for future identification?			
Edge protection available?			
Overhead services identified & marked? (Goalposts)			
Gas detection available & calibrated?			
Safe access / egress into excavation?			
Suitable excavation support? Hold Point – if the excavation is unstable or exceeds the original job specification, stop work & contact your PM			

- All works must be carried out in line with Bridges Breaking the Ground procedure BHS HSI 116, Bridges Essential Safety Standard No.3 Breaking the Ground & No. 15 Underground Services
- Continue scanning during excavation
- Do not break out live services encased in concrete or similar materials – isolation will be required
- Excavate alongside the service rather than directly above it

Declaration - Excavation is safe to proceed	YES ☐	NO ☐

Name	Signed	Date

Appendix B: "Permit to Break Ground (BHS F084)"

Permit to Break Ground

Project Name		Project Number	
Permit Compiled by		Permit Issued to	
Permit Validity	From To	Permit Reference	

1. Location & brief description of work

2. Utility Drawings – confirmation of legible, coloured utility drawings available on site

Underground Electrical	Gas	Water	Telecoms	Surface / Sewer	Overhead Electrical	Other (Please State)

3. Known Services. The utilities listed below are within or near to the excavation area and are required to be located by trial hole excavation and protected from overhead strike

Underground Electrical	Gas	Water	Telecoms	Surface / Sewer	Overhead Electrical	Other (Please State)
Drawing ref:	Drawing ref:	Drawing ref:	Drawing ref:	Drawing ref:	Drawing ref:	Drawing ref:

4. Services Marked Out. Have the locations of all identified services been adequately marked out? Yes / No

5. Equipment & Plant – functioning & within calibration / thorough examination	
CAT Serial No:	Genny Serial No.
Calibration Date	Calibration Date
Plant Model / Serial No.	Thorough Examination Date
6. Personnel – training undertaken & in date (CAT & Genny / CPCS)	
Name	Date Training Expires
Name	Date Training Expires

7. Authorisation of Method

Breaking the surface	Trial holes by hand	Trial holes by machine
Excavation by hand	Excavation by machine	

8. Exclusion Zones. Does the work involve excavating within the exclusion zone? Yes / No

If yes provide details of specific safe working practices, this should include any requirements for restrictions on the use of mechanical equipment and hand-held power tools and/or proximity to high pressure mains / fuel / gas pipes.

Issued to	Signed	Date
[illegible]	Rev 2	May 2021