

ESSENTIAL
STANDARD
no.03

Service Avoidance

Safe People
Happy People
Sustainable
Business

KEY MESSAGES

- The safety & wellbeing of our employees, supply chain partners, members of the public, & all other stakeholders is our foremost priority. We are committed to ensuring that our operational activities are conducted in a manner that does not expose any individual to risk.
- All work must be carried out in accordance with HSE guidance HSG47
- Designs should be carried out to avoid breaking the ground wherever possible.
- If breaking ground cannot be avoided, there needs to be sufficient planning to ensure all requirements are met this includes, obtaining services plans & drawings, locating, identifying & marking the underground services & undertaking safe excavations.
- All persons breaking ground must be trained, competent & understand the risks & control measures associated with the task.
- In line with HSG47 there is a legal requirement to isolate known live services prior to breaking ground.
- The following mandatory steps must be taken for any known live electrical service encased in concrete, whether known or found: **STOP WORK** - Report to your line manager - Contact the asset owner to request isolation and retain a record of the request.
- A permit to break ground must always be in place & signed off by a competent person before breaking ground.
- Re scan the ground as a minimum every 150mm in depth when excavating.
- Ensure Cable Avoidance Tool (CAT) data downloads are being undertaken at least weekly

1.0 Introduction

Breaking ground is a high-risk activity that kills or seriously injures people every year, either from striking services or structural collapses. All breaking ground and excavation work (shallow, deep, etc.) must be properly planned, managed, supervised and carried out to prevent incidents.

For the purpose of this standard, breaking ground is defined as any activity where the ground surface is disturbed. This includes excavation, the installation of road pins, earth rods, bore holing and driving fixed elements into the ground.

Breaking ground must be avoided wherever possible, but if it cannot be avoided then it should be reduced where possible. Consideration at design & planning stages should in the first instance consider alternative methods such as directional drilling or moleing activities, if deemed a safer alternative. If breaking the ground is required, then adopt the principles set out in this standard and document detailed controls in the project specific safe system of work

There are three key elements for working safely with regards to services:

- Planning the works
- Detecting, identifying and marking underground services
- Safe excavation/safe digging practices



2.0 Planning

During the design stage the hazard of excavation around services and under overhead services must be initially identified and be included within the Design Risk Register. Designers have a duty & must make an effort to eliminate or reduce the risks where reasonably practicable.



Early engagement with utility companies & asset owners & the commission of relevant surveys is key part of the design process.

2.1 Line Search Before U Dig

Clearly identify the extent of the work area & find out what underground & overground services are present within the area. You must complete a Line Search Before U Dig survey <https://lsbud.co.uk/> Obtain service drawings from the asset owners for the site. Ensure the plans are current, legible, in colour, show scales & cross sections where possible. You should allow sufficient time to obtain all drawings. In some instances, asset owners from Line Search Before U Dig search will ask for further information before the asset owner approves the breaking ground activities. **See Section 23 for further information.**



2.2 Ground Penetrating Radar (GPR)

GPR is a non-intrusive geophysical technique that uses radio waves to map anomalies. This method provides a non-destructive way to identify buried utilities, natural geological features, voids & other objects without the need for excavation. GPR surveys will provide drawings showing detected features. This method should not be relied upon & should be supported by drawings from asset owners.

Plans alone are not sufficient to identify & locate services, they give an indication only of the location, configuration & number of underground services at a particular location & should help with subsequent tracing. Drawings are not always drawn accurately to scale so should not be relied upon to obtain distances & depths.

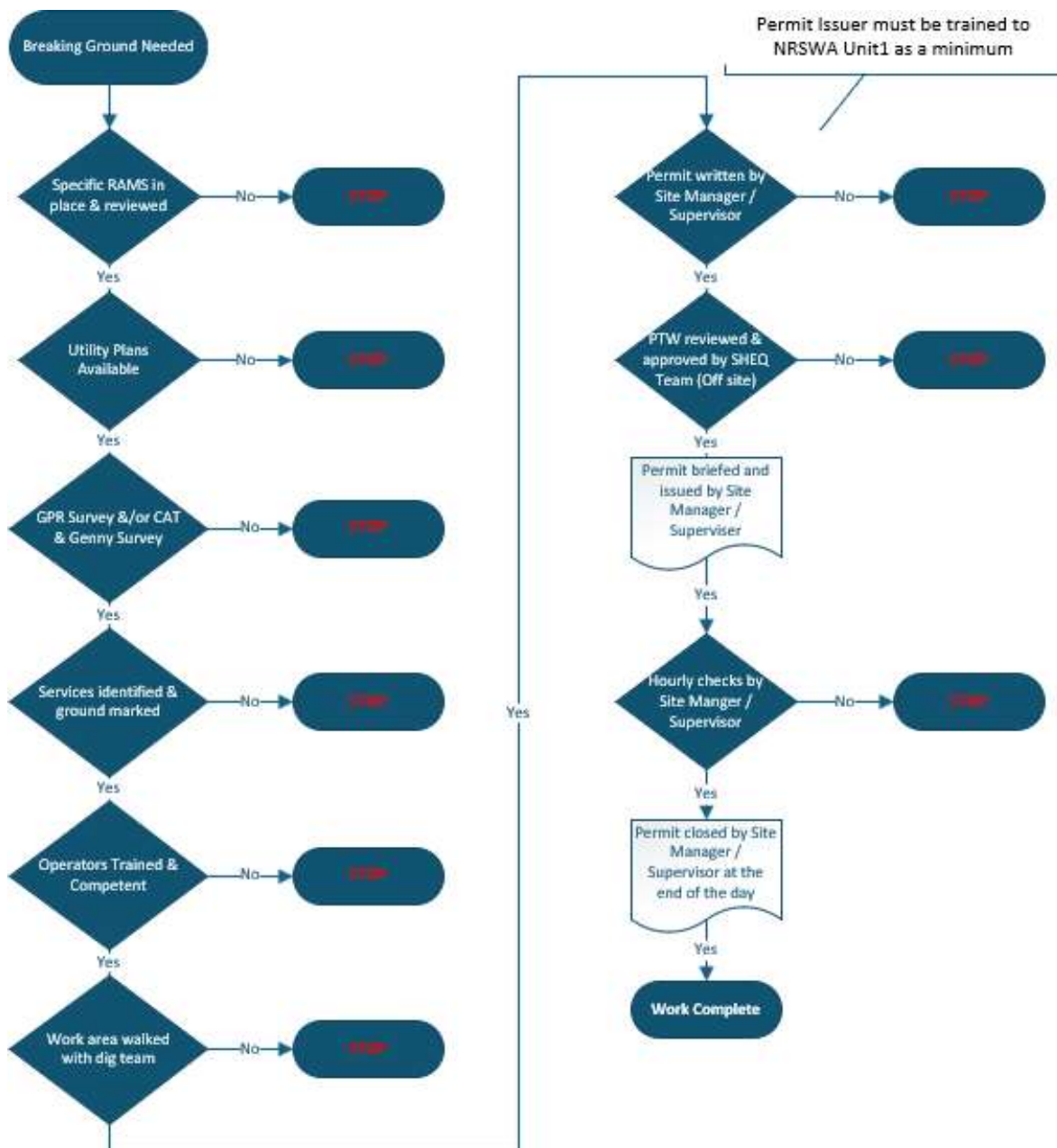
3.0 Avoiding Services

The Hierarchy of risk control for avoiding danger from underground services requires us to avoid and, where possible, to eliminate the need to dig completely. The table below offers some guidance on how to take a risk-based approach and should be considered at all stages of the works, i.e. design, construction, etc.

Eliminate	<ul style="list-style-type: none"> • Eliminate the need to break ground & use non-dig technology or complete the install above the ground • Redesign the planned route of the excavation to avoid the known services. • Divert the planned route of the new services to avoid existing. • Isolate existing services during the planned activities – record isolation requests. • Use non-ground penetrating designs for columns, fencing, etc.
Reduce	<ul style="list-style-type: none"> • Use improved technology such as vacuum excavation and air lances/soil picks. • Use Directional Drilling/moling systems. • Physically protect exposed services from damage. • Use of hand excavation techniques.
Inform	<ul style="list-style-type: none"> • Safe System of Work (SSoW) including permit to break ground, trial holes. • Make sure that the responsible person supervising the excavation work has service plans and knows how to use them. • Ensure that all persons involved are briefed and fully understand the scope of works and hazards associated with the activity. • Everyone carrying out the work should be familiar with safe digging practices and emergency procedures. • Look around for obvious signs of underground services, e.g. covers or patching of the road surface, signage, scaring, street lighting, HV transformers etc. • For overground services physically prevent access to them with barriers to isolate individual/plant/equipment coming into contact

Control	<ul style="list-style-type: none"> • Employ Utility Mapping experts to help identify services. • Use locating devices to trace any services with data logging capability GCAT4+ & Genny4 as a minimum. Mark the ground accordingly – if a shown service cannot be found, stop work and escalate. • Continue to scan – every 150mm throughout the excavation (this applies to both hand digging and mechanical excavation). • Maintain safe distances from existing services (500mm for mechanical excavators) • Use insulated tools BS8020 – forks/picks are prohibited. • For overhead services goal posts & warning notices should be provided
PPE	<ul style="list-style-type: none"> • Wear flame/ARC retardant PPE. Ensure that it is in good working condition & doesn't exceed manufacturers' recommendations for number of washes as it will impact on the level of protection designed to withheld.
Discipline	<ul style="list-style-type: none"> • Use locating devices to trace any services with data logging capability (GCAT4+ & Genny4 as a minimum). Mark the ground accordingly – if a shown service cannot be found, stop and escalate.

Breaking Ground Procedure



4.0 Detecting, Identifying & Marking Underground Services

4.1 Drawings

Ensure all service drawings are printed & available on site, the drawings must be in colour & legible. Drawings must include those obtained from asset owners through Line Search Before You Dig & drawings as a result of other surveys such as ground penetrating radar surveys. Ideally, these will be a minimum of A3 in size.

4.2 Visual Inspection

A competent individual must visually scan the work area & surrounding areas for visual signs of the presence of uncharted services (i.e. street lighting columns, buildings, illuminated signs, inspection chamber covers, roadside cabinets, HV Transformers, patchi markers posts)



4.3 Scanning

All scanning equipment must be fully calibrated & in good working order. Carry out a pre-use inspection to ensure that the equipment is suitable for use. The minimum standard locating device is a gCAT4+ & Genny4. The individual using the device must be trained to a minimum in NRSWA Unit 1 (LA) – Location & Avoidance of Underground Apparatus Training or equivalent alternative.

The full work area must be scanned to positively identify the location of the underground services, as services may not run in straight lines. Once identified, the ground surface above the service must be highlighted with waterproof crayon, chalk or paint on paved surfaces (using biodegradable or erasing residual markings as far as possible after excavation), or with wooden pegs in grassed or unsurfaced areas.

Metal road pins are not permitted.



4.4 Positive Identification of Services

All underground services within or near to the work area must be 'positively' confirmed to establish the exact locations & depths under the control of a permit to break ground. In order to do this a series of trial holes must be hand or vacuum dug. The number of trial holes must be sufficient for the scope of the works particularly where services such as plastic pipes will not be detected by conventional service locators. Trial holes should be completed so that the line & level of the service is known throughout the work area.

Services should be exposed so that:

- It is visible to establish the type, colour & material is consistent with the service expected
- Its full circumference is visible to confirm the size is consistent with the service expected
- Adequate checks are made to ensure no new services have been laid adjacent to a redundant one

Never assume that underground services follow a straight line or are at a consistent depth between trial holes.

5.0 Excavating for Trial Holes

Excavating for trial holes must be undertaken following the issue of a permit to break ground.

Wherever possible this should commence approximately 500mm to the side of the line of the service. Final exposure of the service by horizontal digging is recommended.

Where there is a road, pavement or other hard surface, power tools such as road saws & jack hammers may be used to break through the surface. Such power tools should only be used 500mm or more away from the indicated line of the service. Once the surface has been broken the use of power tools must cease & careful hand digging to the side of the service should commence.

The ground must be rescanned every 150mm using the CAT & Genny.

Regular monitoring must be undertaken by the relevant Supervisor & Site Manager to ensure the work is being carried out in accordance with the permit controls. They must be competent in Service Avoidance and hold the relevant qualification.

Once a service is exposed, it must be physically identified by a competent person. Photographs should be taken of all completed trial holes & services located.

Once the trial holes have been completed the permit to break ground which is only applicable to trial holes, must be cancelled.

6.0 Breaking Ground

Once all the known services have been positively identified & located through trial holes, breaking ground can commence. A new permit to break ground must be issued with all relevant personnel being briefed at the location of the planned works & provided with specific instructions on the control measures/restrictions/limitations required to execute the works in a safe manner.

Scanning equipment must be used every 150mm, as service locations & its associated equipment is likely to become more accurate as cover is removed. A banksman must be present at all times to identify & report any signs of soil variances or warning tapes during the course of the work.



If services are buried in concrete, work must **stop** immediately & the asset owner contacted.

Regular monitoring must be undertaken by the site supervisor / manager to ensure that the work is being carried out in accordance with the permit to break ground. They must be competent in Service Avoidance and hold the relevant qualification.

A permit to break ground must only be issued for a maximum of 7 days after which it must be canceled & a new permit issued.

7.0 Permit to Break Ground

A permit to break ground must be issued before starting any activity that breaks the surface of the ground. The permit must be issued & canceled by a competent person that has been trained to NRSWA Unit1 as a minimum. The permit authorisation process below must also be followed.

The permit must be issued to a competent & trained individual who is responsible for supervising the breaking ground activities. As a minimum those supervising any breaking ground activities must hold a valid SSSTS/SMSTS or IOSH Managing Safety & where undertaking any street works NRASWA training appropriate to the level. If for any reason the work deviates from the that set out in the RAMS & permit the work must stop immediately.

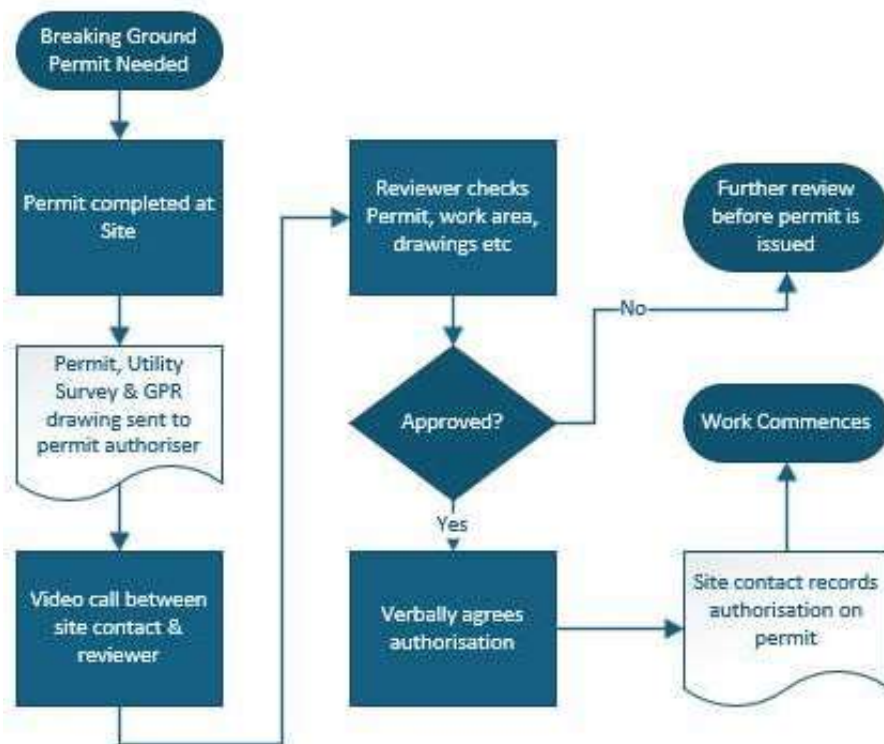


All those involved in the activity must be briefed at the location of the planned works & be provided with specific instructions relating to the presence of the services, the dangers associated with the services & the controls applied whilst excavating or exposing the services, through a safe system of works. All those involved must sign onto the permit to break ground following the briefing.

8.0 Permit Authorisation

Prior to issuing a permit to break ground, in all instances an off-site authorisation of the breaking the ground permit will be required. The SHEQ Department or nominated individuals will be responsible for carrying out this off-site authorisation.

Authorisation Procedure



9.0 Equipment

For all hand digging activities insulated tools, curved edged spades & shovels should be used rather than other tools.

10.0 PPE

Any excavation works either by hand or mechanically will put operators at risk, therefore all operatives involved in excavation activities including trial holes must wear full flame retardant overalls or arc flash clothing.

11.0 CAT & Genny Use Record

The CAT must be used at every 150mm depth during excavation. The site manager/supervisor must record witnessing its use every hour. This must be recorded on the Cable Avoidance Tool & Genny Scan Record.

12.0 CAT Data Downloads

CAT data downloads should be undertaken as a minimum weekly. The downloaded data provides a time stamped record of usage, showing that the procedures set out in this document are being followed.

Monitoring the usage identifies how the equipment is being used on site & can highlight if the operator is not using or misusing the equipment.

13.0 Vacuum Excavation

Vacuum excavation or 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 & 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.

14.0 Exclusion Zones





An exclusion zone is a defined area immediately around a utility within which safe excavation practices must be adopted & must be defined within the safe system of work. There must be no mechanical excavation within an exclusion zone unless there are specific permission given & strict controls applied. As a minimum exclusion zones must be 500mm, these must be marked up on the surface.

15.0 Earth Rod Installation

Earth rod installation can be a hazardous operation, for all earth rod installs follow the specific procedure for this activity, BHS HSI 121. This activity is permitted using BHS-F-089 Permit to Break Ground for Earth Rod Installation Only.

16.0 Identifying Apparatus

Utility companies use a colour coding scheme to identify apparatus & warning markers. However, it is important to remember that the apparatus may have been buried prior to the introduction of the universal colour scheme, therefore it is not always safe to assume, or expect, that the apparatus is compliant with the scheme. The current underground service colour coding scheme is detailed below:

Utility	Duct	Pipe/Cable	Marker/Tape	Notes
				
Electricity	Black or Red	Red or Black	Yellow with black & red legend or concrete tiles	Electricity cables can also be installed in clay ducting commonly used for sewage pipes
Gas	Yellow	Yellow	Black legend on PE pipes every linear metre	PE up to 2 bar – yellow or yellow with brown stripes (removable skin revealing white or black core pipe) Steel pipes – may have yellow wrap or black bar coating or no coating Ductile Iron may have plastic wrapping Asbestos & Pit/Spun Cast Iron – no distinguishable colour
Water	Blue	Blue	Blue	
Water (special)	n/a	Blue with brown stripes		
Water non potable & grey water	n/a	Black with green stripes		
Water – Firefighting	n/a	Black with red stripes or bands		
Telecoms	Grey, white, black or purples	Black or light grey	Various	
Streetlighting	Orange	Black	Yellow & black legend	
Communications	Purple	Grey or black	Yellow with black legend	

17.0 Types of Services

17.1 Electricity Mains

In line with HSG47 there is a legal requirement to isolate known live services prior to breaking ground. In most



cases, there will be no permanent surface marker posts or other visible indication of the presence of an underground cable. Even if no cables are shown on plans, or detected by a locator, there may still be cables present that could be live and you should keep a close watch for any signs that could indicate their presence.

A cable is positively located only when it has been safely exposed. Even then, digging should still proceed with care as there may be other cables and services adjacent or lower down. In addition, some lines of 11kV or greater can be laid out as separate single-phase cables and spread out particularly near cable joints.

Cables may have been laid directly in the ground with a bed or surround of fine soil or sand, or in cement-bound sand, or in earthenware or plastic pipes or ducts. Very occasionally, they may be in steel pipes or clay ducts. They may have a layer of tiles, slabs or coloured plastic marker tape laid above them. However, any such protection may have been disturbed and moved, and you should not rely on them to give an accurate indication of a cable position.

- **Cables encased in concrete**

Encasing or burying electrical cables in concrete is considered poor practice due to the significant safety risks involved. Unfortunately, such situations are not uncommon. The use of hand-held power tools to break concrete can result in damage to the cables. If the cable is live, this poses a serious risk of injury to personnel on site. Action to be taken if a cable is found encased in concrete:

Prior to any ground-breaking activity, or upon the discovery of a cable encased in concrete, the following steps must be strictly adhered to:

- Cease all work immediately.
- Inform your line manager or supervisor.
- Contact the relevant asset owner (electricity provider) to request isolation of the service.
- Document the request and any actions agreed upon



- **Planning & Risk Mitigation**



Thorough planning is essential to identify alternative cable routes. Where rerouting is not feasible, arrangements must be made to isolate the cable. Asset owners may wish to attend the site to assess the situation before authorizing isolation.

Work on or near live cables should only proceed if isolation is demonstrably impractical and if robust safety measures are implemented to mitigate risk. In cases where no alternative route exists and isolation is not possible; excavation methods must be agreed upon with the asset owner to ensure safe working practices.

- **HV Cables**

If HV cables are present the asset owner must be notified & request for isolation if work is to be carried out in close proximity to the service. If it is not possible to isolate the service, an agreed safe way of carrying out the activity must be agreed with the asset owner. All breaking ground activities within close proximity to a HV cable must use:

1. Vacuum excavation & air lance in the first instance. If this cannot be used, they must be
2. Hand dug where practicable. Do not use power tools within the 500mm exclusion zone from the indicated line of a service in or below a hard surface

17.2 Gas Mains

Damage to gas pipes can cause toxic and explosive atmospheres. Various materials are used for gas pipes such as cast iron, steel and plastic. Modern plastic pipes are bright yellow. Cast iron gas pipes look similar to cast iron water pipes and therefore any cast iron pipe must be treated as a gas pipe unless evidence is available stating otherwise.

Locate PE gas pipes by hand digging before mechanical excavation begins. This may also be necessary for metallic pipes if they have not been successfully located by a pipe-detecting device. This is particularly important for service connection pipes, which will not be marked on plans. A suitable hand-digging method is to dig a trial trench along the

road near the kerb or in the footway where the service connection pipes are likely to be at their shallowest. When the position & depth of the pipes have been determined, work can proceed.

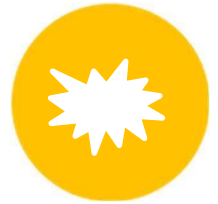
Gas pipes may have projections such as valve housings, siphons and standpipes and governors in rural areas that are not shown on the plans. A visual inspection of the area must be carried out during the survey phase to identify physical clues.

Do not use mechanical excavators within 500 mm of a gas pipe. The gas transporter may advise greater safety distances, depending on the pipeline pressure, this must be determined during the planning phase.

Never disturb pipe restraints or thrust blocks (or the ground supporting them) where they are close to gas mains as this can cause sudden failure of the main.

Because of the risks they pose, do not undertake the following without consulting the pipeline owner/operator:

- Piling or vertical boring within 15m of any gas pipe.
- Excavation work within 10m of any above-ground gas installation.
- Building a manhole, chamber, or other structure over, around or under a gas pipe.
- Work resulting in a reduction of cover or protection over a pipe.
- Welding or other hot work involving naked flames within 10m of exposed gas plant.



If heavy plant has to cross a gas pipe, keep the crossing points to a minimum and clearly mark them. Where necessary use sleepers, steel plates or a reinforced concrete slab where the service crosses unmade ground to prevent assets from failure due to excessive additional load/ground movement.

17.3 Water Pipes & Sewers

Water under pressure in a main can cause significant injuries. Damage to a water pipe may also cause stones & other hard objects on the ground around the pipe to become ejected into the air.

Leaks from underground pipes can affect adjacent services & reduce support for other structures. Damage to mains can cause flooding & affect the stability of excavations.

Most sewers are gravity fed rather than pumped, therefore the main risks associated with damage to a sewer are health of workers from exposure to sewage & environmental pollution.

Works on rising mains must only be completed once the pipe is isolated & cleaned.

17.4 Telecommunications

Any damage to telecommunications cables can bring sever disruption to the users of the system, such as residents & businesses. Risk to workers can come as a result of the build up of flammable & toxic gases within ducts, chambers & pits.

17.5 Other Pipelines

The danger arising from damage to other pipelines depends on the nature of the conveyed fluid and could include risk of fire, or explosion, from flammable liquids and gases, risk of poisoning from toxic liquids and gases, the risk of asphyxiation from inert gases and the risk of injury from the release of pressurised systems

18.0 Protection of Underground Services

Where services will remain exposed, it must be identified (marker) & adequately protected from physical damage e.g. provision of timber & sandbags

Services across a trench must be adequately supported, the service provider must be contacted to confirm the degree of support.

Services found in poor condition, or out with recommended specification depths/details should be photographed & formally recorded; the asset owner / local authority should be contacted & relevant details provided
Services should also be adequately protected from falling debris/objects & tools, provide edge protection, fencing or coverings.

19.0 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.



20.0 Supporting Excavations

Excavations should be properly supported, stepped or battered back to prevent them from collapsing. Excavation support may involve the use of shuttering & shoring or a trench box system. Specialist proprietary equipment must always be used as part of a temporary works design. Provide a safe means of access into the excavation, such as a secured ladder. Provide edge protection. Fencing & covering to prevent anyone falling into the excavation. Also take steps to prevent excavated material falling into the excavation.

21.0 Stepping

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

22.0 Backfilling

Backfilling of any excavation should be done carefully to make sure that services are not damaged. Put back warning tape, tiles etc. in their original position above the services unless visual examination after exposure showed this to be incorrect, in which case replace them above the surface to which they refer. Do not use warning tape for any other purpose & do not discard it in an excavation during backfilling.

Backfill materials containing items likely to damage the services such as large pieces of rock, should not be used.

Service must not be buried or encased in concrete.

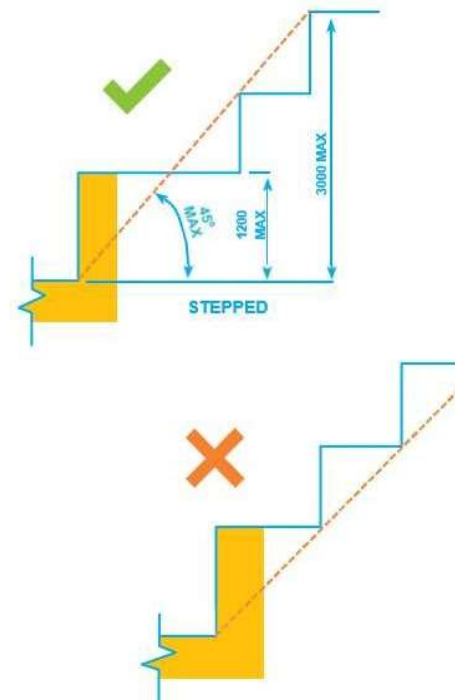
23.0 Access/Egress

Suitable safe access into the excavation must be provided, such as a secure ladder. For smaller excavations & slopes, steps can be cut into to provide access/egress. These should be in line with the following dimensions.

Rise (max) 170mm (min) 150mm & the rise needs to be constant & kept flat & level.

The going (max) 425mm – (min) 250mm, there should ideally be landing points top & bottom 900mm.

Where there are 3 or more risers a handrail should be provided & extend 300mm beyond the top & bottom steps. The height of the hand rail should be (max) 1000mm to (min) 850mm from the pitch line of the steps.



24.0 Working In/Around Excavations

- Do not store spoil or other materials close to the sides of excavations. It may fall into the excavation & the extra loading will make the sides collapse
- Protect the edges of excavations against falling materials
- Provide substantial barriers, to prevent people falling into the excavation
- Keep vehicles away from excavations wherever possible
- Use stop blocks to prevent vehicles that are tipping materials into the excavations from over running. The sides of the excavation may need extra support
- Do not straddle the excavation with any vehicle or plant

25.0 Updating Plans

If the plans or other information have proved to be inaccurate (for example, a service has been found well away from its recorded position) or if the present work changes the path or depth of a service, inform the asset owner. The plans for new services should show how they have been laid, not how they were designed. Design drawings may need to be amended accordingly.

26.0 Emergency Arrangements

26.1 Underground Cable

- Immediately STOP work
- Call the emergency services if there is immediate danger i.e. injury, fire or risk to life
- Keep others well away & ensure everyone involved in the activity stays clear
- Always treat the cable as LIVE even if it's damaged or not sparking – damaged cables can remain 'live' or be re-energised
- Don't touch any machinery, tools or equipment in contact with the damaged cable.
- Report the damage to asset owner as soon as possible – call **105** – the National Emergency Number for the electricity network.
- If your machine is still in contact with the cable JUMP CLEAR without touching any part of the machine

26.2 Gas

If a gas leak is suspected do not attempt to repair the pipe, instead take the following action:

- Immediately STOP work
- Evacuate the area immediately to a safe distance
- If the service connection to a building or the adjacent main has been damaged, warn the occupants to leave the building, & any adjoining building
- Prohibit smoking & extinguish all naked flames
- From a safe location call the National Gas Emergency Service on 0800 111 999
- Never try to repair the pipe or handle it yourself

For all other services, contact the asset owners.

27.0 Linesearch (Additional Information)

Note, not all asset owners are registered with Linesearch, therefore it is important to ensure you undertake additional utility enquiries directly with the provider.

After the enquiry is sent and the enquiry confirmation is received it's easy for your eye to be drawn to the red section **Affected LSBUD members** and then to the green of **List of not affected LSBUD members**.

You could miss the blue section further down the letter of **Non-LSBUD members (Asset owners not registered on LSBUD)**. These are the asset owners who you should contact directly to check if they have assets in the area of work.

28.0 Above Ground Services

Utility services can also be above ground. These services can be commonly struck in construction activities by plant/equipment such as lorry mounted cranes, Mobile Elevated Work Platforms (MEWP's), scaffold poles, tipper vehicles, cranes, ladders etc. Above ground services are commonly electricity and telecoms, however gas, water, and other services such as sludge can be above ground. Some services may be ground level, such as pipework/cables for temporary installations. These must always be sufficiently protected and signed to warn people of their presence as they are subject to strikes, i.e., a temporary cable could be struck by a ground's maintenance contractor.

Any activities within 10m, measured at ground level horizontally from below the nearest wire, must manage be planned & managed. Never carry out lifting or loading within 5 m of power lines.

28.1 Remove the Risk

Eliminate the risk by not carrying our work where there is a risk of contact with, or close approach, to the wires. Where this is not possible, consult the network provider, to see whether the line can be permanently diverted away from the works area or replaced by underground cables. If this is not an option contact the asset owner to find out if the overhead line can be temporarily switched off while the work is being done. The network provider will need significant time to consider these requests & it may incur a charge.



28.2 Working Near but not Underneath Overhead Lines

Where there will be no work or passage of machinery or equipment under the line, reduce the risk of accidental contact by erecting ground level barriers to establish a safety zone to keep people & machinery away from the overhead lines. This area should not be used to store materials or machinery.

The safety zone should extend 6m horizontally from the nearest wire on either side of the overhead line.

Where plant such as a crane operating in the area, additional high level indication should be erected to warn the operators, such as coloured plastic flags or bunting mounted 3-6m above ground level over the barriers is suitable.

28.3 Passing underneath overhead lines

If equipment or machinery capable of breaching the safety clearance distance has to pass underneath the overhead line, you will need to create a passageway through the barriers, using goal posts. The line must be highlighted & protected in strict compliance with the requirements of HSE Guidance Note GS6 - Avoiding Danger from Overhead Electrical Lines.

- Keep the number of passageways to a minimum
- Define the route, erect goal posts at each end to act as gateways using a rigid non-conducting goalpost
- Ensure the surface of the passageway is levelled & maintained to prevent undue tilting or bouncing of the equipment
- Put warning notices at either side of the passageway, on or near the goalposts & on approaches to the crossing giving the crossbar clearance height & instructing drivers to lower jibs, booms, tipper bodies etc. & to keep below this height while crossing
- Make sure the goal posts & barriers are maintained



28.4 Working underneath overhead lines

Where work has to be carried out close to or underneath overhead lines e.g. roadworks, pipe laying etc. there is no risk of accidental contact or safe clearance distances being breached, no further precautionary measures are required.

A risk assessment must take into account any situations that could lead to danger from the overhead lines, for example someone may need to stand on scaffold platform & lift a long item above their head.

If you cannot avoid ground-level work where there is a risk of contact from, for example, the upward movement of cranes or tipper trailers etc. the risks should be carefully be assessed. Find out if the overhead line can be switched off for the duration of the works if this cannot be done, establish exclusion zones around the line & any other equipment that may be fitted to the pole or pylon. The minimum extent of these zones varies according to the voltage of the line as follows:

- Low-voltage line – 1m
- 11kV & 33kV lines – 3m
- 132kV line – 6m
- 275kV & 400kV – 7m

Under no circumstances must any part of plant or equipment such as ladders, poles & hand tools be able to encroach

within these zones. Make sure site operatives understand the risks & are provided with instructions about the risk prevention measures. The work must be directly supervised by someone who is familiar with the risks & can make sure that the required safety precautions are observed

You must give the electricity network operator at least 2 weeks' notice of any minor works close to overhead power lines, & at least a month's notice for major works. Always assume that overhead power lines (even if you think they are shrouded) unless you have been informed otherwise in writing by the electricity network provider. Always follow the advice given by the electricity network provider.

27 Look Out, Look Up!



- Look Out, Look Up for overhead powerlines, always assume the lines are live, do not touch or get close to them
- Keep 5 m away from fallen or damaged overhead powerlines
- Damaged lines can stay live or be re-energised automatically or remotely without warning if the electricity network provider is not aware of the incident
- At high voltage electricity can jump gaps, so even getting too close to overhead power lines can be dangerous

28 Emergency Arrangements

If you inadvertently come into contact with an overhead power line & the machine is not operable or cannot be driven clear of the line:

- Stay in the cab
- Phone the electricity network provider by calling 105
- Instruct everyone outside of the vehicle to not approach it
- Do not exit the cab until given confirmation by the electricity network provider that it is safe to do so

105

If the machine is inoperable or cannot be driven free & there is no risk of fire or other immediate hazard:

- If you must get off, then you must jump clear making leaping strides so that one foot is off the ground at all times until you are at least 5 m away
- Do not return to the vehicle unless told by the electricity network provider it is safe
- Keep others away from the vehicle. Touching it or even getting too close could kill them.