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## 1. PURPOSE

The purpose of this procedure is to provide a process that ensures that work in the proximity to underground and overhead services is planned and carried out safely, including identification of services, assessment, control, supervision, monitoring and review.

This procedure specifies the safe system of work that is to be adopted when work is undertaken in the vicinity of buried electric cables, gas pipes, water pipes, telecommunication cables, high-pressure pipelines, drainage storm & foul, oil pipelines, overhead electricity lines, overhead communications cables, etc. It details the safe system of work to be adopted from design to site planning and execution of the work.

## 2. SCOPE

This procedure applies to all VolkerWessels UK business units with the exception of VolkerRail.

## 3. REFERENCES (INPUTS)

- Health and Safety at Work Act 1974
- Management of Health and Safety at Work Regulations 1999
- Construction (Design and Management) Regulations 2015
- Provision and Use of Work Equipment Regulations 1998
- New Roads and Street Works Act 1991
- HSG47 Avoiding Danger from Underground Services 3rd Edition 2014
- CIS No 8 Safety in Excavations
- NJUG Guidelines on Positioning and Colour Coding of Underground Utilities Apparatus
- Linewatch Pipeline Safe Working (Revision 15.06) June 2015
- Linewatch Pipelines Markers (Revision 13.4) March 2014
- National Grid - Work Safely Library
- National Grid Gas Safe Working High Pressure Gas Pipelines & Associated Installations T/SP/SSW/22 April 2014
- National Grid Gas Excavating Safely Leaflet
- National Grid Electricity Lines & Underground Cables Contact Map
- CIP Construction Health & Safety Manual
- Health & Safety Policy and Practice

## 4. ABBREVIATIONS & DEFINITION OF TERMS

**Underground and Overhead Services** - Means all underground / over ground pipes, cables and equipment associated with the electricity, gas, water (including piped sewage) signalling and telecommunications industries. It also includes other pipelines which transport a range of petrochemical and other fluids.

**Service Owner** - The operator in control of the utility (e.g. Owners, Distribution Network Operators etc.) as identified on utility plans.

**Detection Equipment** - Cable Avoidance Tool (CAT), Signal Generator (Genny), ground penetrating Radar (GPR) etc.

**Responsive Maintenance** - Work which is carried out in response to a request from a client / service provider to maintain or repair a service, which is not part of a scheduled work activity. This could include emergency work.

**Mechanical Excavation** - The use of any mechanical excavator, pneumatic, hydraulic or mechanical breaker, piling and drilling rig, hand-held or machine mounted powered breaker, etc.

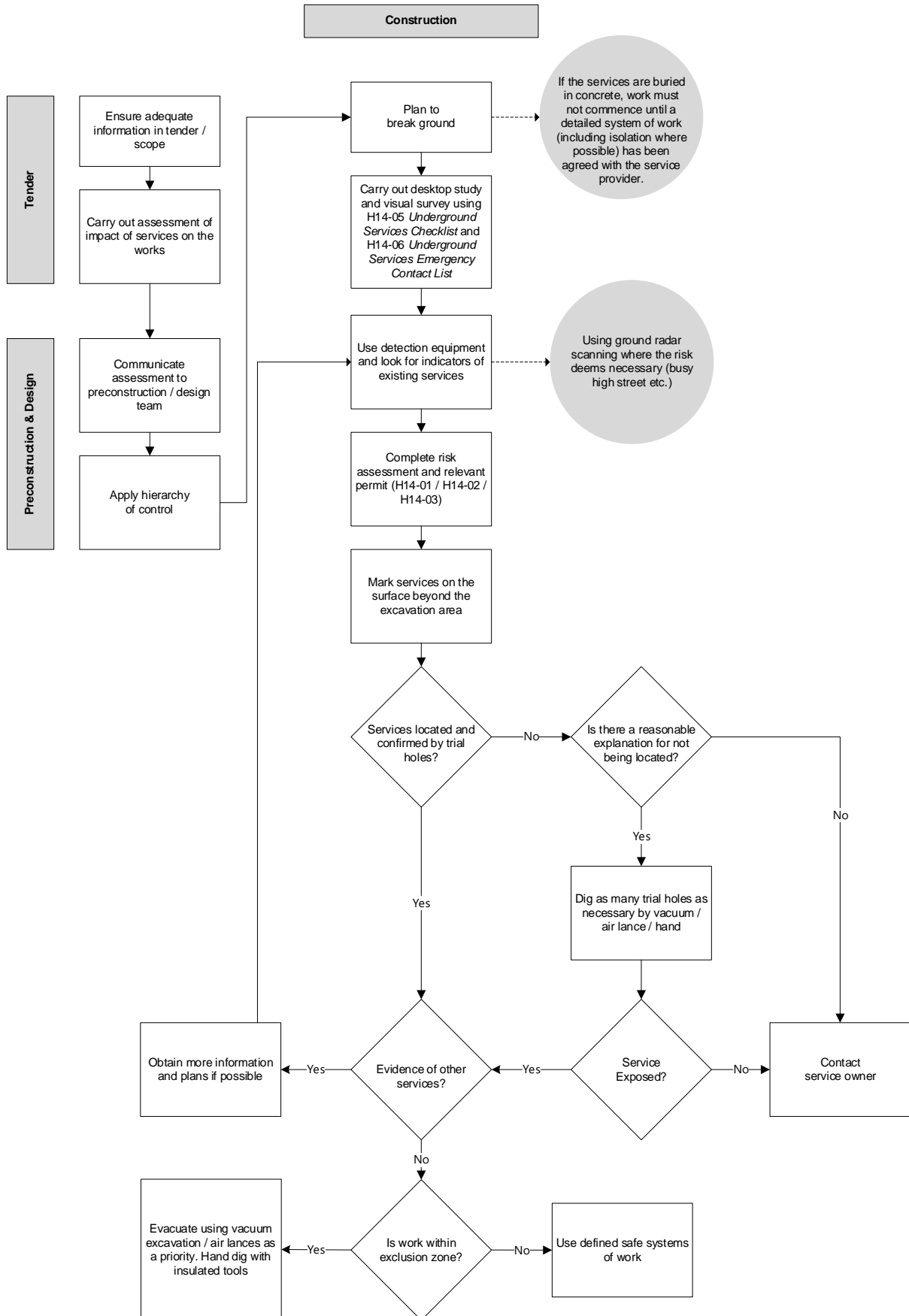
**Restriction Zone** - The horizontal distance of 1.0m from either side of the outside dimensions of any buried service and extends to the surface in which additional controls must be applied.

**Exclusion Zone** - The horizontal distance of 0.5m (minimum) from either side and above and below the outside dimensions of any buried service within which mechanical excavation is not permitted. The exclusion zone for overhead cables is determined by the voltage of the cable and the configuration of the pole / pylon.

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### Process



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## 5. PRECONSTRUCTION AND DESIGN PLANNING

### 5.1 Dangers from Underground Services

Work on or around underground services is recognised as a hazardous activity. As well as the risk of death or serious injury other risks associated with the activity include loss of service to businesses and public, delays to the project, reputational harm and significant financial costs.

Common causes of accidents and incidents due to service damage fall into five broad categories; inadequate planning; quality of information received and prepared; training and competency at all levels; inadequate safe systems of work and non-compliance with procedures.

### 5.2 Planning

#### 5.2.1 Hierarchy of Risk Management Control

All work activities that may be impacted by underground and overhead services must be planned in accordance with the following hierarchy of control.

Hierarchy of Risk Control for Avoiding Danger from Underground Services	
Eliminate	<ul style="list-style-type: none"> <li>• Redesign the planned route of the excavation to avoid the known services</li> <li>• Divert the planned route of the new services to avoid existing</li> <li>• Isolate existing services during the planned activities</li> <li>• Use non-ground penetrating designs for columns, fencing</li> </ul>
Reduce	<ul style="list-style-type: none"> <li>• Use improved technology such as vacuum excavation and air lances / soil picks</li> <li>• Use Directional Drilling / moling systems</li> <li>• Physically protect exposed services from damage</li> <li>• Use hand excavation techniques</li> </ul>
Inform	<ul style="list-style-type: none"> <li>• Supervision and monitoring</li> <li>• Employ Utility Mapping experts to identify services</li> </ul>
Control	<ul style="list-style-type: none"> <li>• Safe System of Work including H14-01 <i>Permit to Break Ground (Trial Holes Only)</i> / H14-02 <i>Permit to Break Ground (Main Work Activities)</i> / H14-03 <i>Permit to Break Ground (Transient or Reactive Works)</i></li> <li>• Maintain safe distances from existing services</li> <li>• Use insulated tools</li> </ul>
PPE	<ul style="list-style-type: none"> <li>• Wear flame retardant PPE (ARC flash or flame-resistant PPE will be determined by risk assessment)</li> </ul>

#### 5.2.2 Information at Tender Stage

An individual within the tender / bid team should ensure the following information is requested at the tender stage if not already made available:

- Up to date service plans for the area of activity (Ideally 1:2500 scale, be no more than 3 months old although some service providers require the plans to be no less than 28 days old from date of issue so check specific service provider requirements)
- Results of any surveys and trial holes carried out within the area of activity
- The relevant asset owner contact details
- Special requirements and restrictions, for example, minimum exclusion distances from operational services, imposed by asset owners
- The requirements / restrictions / timescales for isolations or diversions
- As early as possible a detailed assessment should be made of the routes of existing and proposed services. The assessment should identify their impact on the planned work and detail where risks can be avoided or mitigated using the hierarchy of control
- All information collected at tender stage should be communicated to the construction team prior to work commencing on site

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## 5. PRECONSTRUCTION AND DESIGN PLANNING (CONTINUED)

### 5.3 Design and Pre-Construction

Design and preconstruction planning should identify the presence of underground services, identify measures to avoid associated risks, or if that is not possible, to reduce or control risks. The assessment will review the planned works in line with the hierarchy of control and also establish existing and planned routes of underground services, the coordination of utility contractors and temporary support requirements.

Where there are underground services in proximity to construction works, contact the designer and discuss possible options for redesign that will eliminate the requirement to excavate within or near the exclusion zone area.

Where redesign has not been granted, contact the Service Provider and request isolation or re-routing of the service.

Where isolation is carried out, written confirmation should be requested from the Service Provider. Where isolation is not carried out (and even where isolation has been confirmed) all underground services should be treated as live.

Where up to date utility plans for the area of activity have not been provided, utility plans must be obtained from the asset owner. Utility plans should be requested to be in colour, no less than three months old and in a condition that enables them to be accurately interpreted by end users. Unclear or out of date drawings must not be used.

## 6. CONSTRUCTION

### 6.1 Responsibilities and Competencies

All persons engaged in activities covered by this procedure must be competent and adequately trained for the task being undertaken. All persons must hold the relevant CSCS, CPCS, NPORS, NRSWA and EUSR qualifications as applicable to the task. Specific training regarding underground services must be evidenced to suit the requirements detailed below.

#### 6.1.1 Supervisors

An authorised supervisor must be present at all times when breaking ground is taking place. This can be an individual overseeing a number of excavations concurrently. On transient works, a supervisor may be overseeing several gangs at one time as they respond to reactive and planned works (such as highways maintenance works). The minimum qualification for all persons supervising excavation work is the CITB SSSTS. In addition, the supervisor must be trained and competent regarding:

- The risks associated with underground services and typical causes of service damage
- VolkerWessels UK (VW UK) procedures related to underground services and HSG47
- Understanding utility plans
- Service identification techniques
- Safe digging techniques
- The action in the event of an emergency

The supervisor must ensure that:

- The conditions of any permit to break ground / excavate are followed
- Safe digging techniques are applied
- The ground is scanned for services as work proceeds
- Exposed services are supported and protected as necessary
- Work is stopped if circumstances change

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## 6. CONSTRUCTION (CONTINUED)

### 6.1 Responsibilities and Competencies (Continued)

#### 6.1.2 Service Coordinator

A Service Coordinator must be appointed in writing on every site to implement and oversee the procedures for avoiding danger from underground services using H14-04 *Assessment & Appointment of Service Coordinator*. The competence of the Service Coordinator will be based upon training and experience of working with underground services; knowledge of service provider systems and procedures; understanding underground service drawings; understanding VW UK procedures; knowledge of underground service location techniques; understanding the dangers associated with underground services including knowledge of the consequence of service strikes.

During the planning phase the project will nominate, and record in the Site Management Plan / Construction Phase Plan, a person responsible for buried services. The nominated person will review the buried services provided at tender stage in the pre-start health and safety file. The review should ensure that a positive or nil response has been received.

The Service Coordinator must carry out a desktop study and visual survey, then complete the following documents:

- H14-05 *Underground Services Checklist*
- H14-06 *Underground Services Emergency Contact List*

#### 6.1.3 Service Locator

Only suitably trained and competent personnel shall be engaged to carry out underground service location / surveys using the specified detection equipment. The training must include:

- Understanding of VW UK procedures and full knowledge of the permit to break ground system
- Use of avoidance equipment
- Interpretation of utility drawings, line search documents and permit to break ground
- Methods of marking located underground services (see Appendix 1)
- Knowledge and understanding of HSG47
- Safe digging techniques
- Identify the dangers and hazards associated with underground services

#### 6.1.4 Excavation Team

Only suitably trained and competent personnel shall be engaged to undertake excavation work in the proximity of underground services. Relevant information and instruction must be produced and communicated to all persons involved prior to any work starting. Those tasked with excavating around underground services must be competent, adequately trained and briefed for the task. As a minimum, training should include:

- Use of avoidance equipment
- Interpret utility drawings, line search documents and permit to break ground to identify underground services
- Knowledge and understanding of HSG47
- Safe digging techniques
- Identify the dangers and hazards associated with underground services

#### 6.1.5 Utility Mapping Companies

Utility Mapping companies must be members of The Survey Association and registered to ISO 9001 which includes underground service surveying as part of their registered scope. British Standards Institution PAS 128, "Specification for underground service detection, verification and location" should be used to define the scope and specification when contracting a utility mapping company to carry out survey service work.

Existing service drawings should be provided to the mapping organisation in advance. The location of known future excavations should also be communicated to the mapping company as they will reduce the dimension between sweeps to provide better data in that area. Ideally, they need to mark services on the ground and provide an electronic drawing showing locations. There must be a VW UK company representative on site when scanning is taking place.

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## 6. CONSTRUCTION (CONTINUED)

### 6.2 Service Provider's Information

#### 6.2.1 Service Provider Drawings

At contract commencement, site management must determine if there are any underground services. During the tender handover the tender team should make specific reference to information obtained at tender stage. The Service Provider (statutory authority or service owner) must be contacted and up to date, legible drawings obtained, showing the location of all underground services. They must be understandable, readable, to a suitable scale and where possible in colour or appropriately marked as to what the service is and be no more than 3 months old. Please note: **some service providers require the plans to be no less than 28 days old from date of issue so check specific service provider requirements.**

In addition to obtaining the drawings from the service providers, a "line search before you dig" search should be carried out to determine if there are any other services in the area that have not been identified by other means. Visit [www.linesearchbeforeudig.co.uk](http://www.linesearchbeforeudig.co.uk) or contact on 08454 377365.

#### 6.2.2 Master Services Records

A detailed schedule of all charted underground services should be produced, updated where appropriate and maintained on file throughout the duration of the project. On fixed sites, a master services plan should be prepared. This must be updated and maintained throughout the project and displayed in a prominent position. The master services plan should include:

- The type and level of ground penetrating radar survey completed
- The presence of known underground services including known position of isolation valves and stop taps
- Known depths of any existing services plus any safe distances to be maintained
- Trial-hole results
- The location of any open permits
- All newly installed buried services (with coordinates)

It is the responsibility of the Service Coordinator to ensure that the master services drawing is updated with 'as built' information as the work proceeds.

#### 6.2.3 Responsive Maintenance

In the event of emergency repair works being required, site management shall ensure that facilities are in place to provide personnel with up-to-date service drawings prior to any excavation works being carried out. A safe system of work is documented for each contract that reflects the local process for providing service drawings. Where it is not possible for those undertaking the excavation work to obtain information, the work should be carried out as though there are buried services in the area.

## 7. EXCAVATION

### 7.1 Identification of Underground Services

Detailed surveys of the work area must be carried out prior to work commencing. The intention of this survey is to identify the position, depth and number of underground services present. When using external utility mapping companies, the scope of survey and expectations must be defined. The correct level of survey to suit the project conditions and level of risk that exists should be requested and specified in line with PAS 128, "Specification for underground service detection, verification and location".

Obtain assistance from underground service owners, where required, to identify and mark the exact location of their utilities. Some service owners may provide assistance in locating their services in some areas. Where the Service Provider does not provide this service, then the Service Coordinator must arrange for a trained competent person to scan the work area to positively identify the location of the underground services. The use of underground utility survey companies may be considered to provide a comprehensive survey.

The scanning equipment must be appropriate to the type and complexity of the underground services and those using the equipment must be trained in the specific equipment being used.

Local knowledge of a particular site or area of land (for example, from the landowner, nearby houses etc.) may be needed to assist in establishing the existence of any underground utility that might not otherwise be documented.

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## 7. EXCAVATION (CONTINUED)

### 7.1 Identification of Underground Services (Continued)

Arrangements must also be made for competent individuals to visually scan the work area and surrounding areas for visual signs of the presence of uncharted services (nearby dwellings, street lighting cables, highway lighting, illuminated signs and traffic control systems, inspection chamber covers, drainage access points and rodding eyes, roadside cabinets and roadside (verge) marker posts (these usually indicate the approximate distance from the post to a service)). If during an excavation an uncharted service is found, it is to be protected to facilitate the remaining works. Its position is to be recorded accurately with GPS coordinates and the information recorded on H14-01 *Permit to Break Ground (Trial Holes Only)* / H14-02 *Permit to Break Ground (Main Work Activities)* / H14-03 *Permit to Break Ground (Transient or Reactive Works)*.

Once underground services have been identified, the ground surface above the service must be highlighted with markers, tape, or waterproof paint. The colour used to mark the service should be identified and be specific to the marking of underground services. This will avoid confusion with other markings. The marking should show the exclusion zones (encroachment lines) required for each service (see Appendix 1).

The marking of services should not be restricted to areas where excavating is planned as underground services can be damaged by plant and vehicle movements or vibration from piling or demolition. Marking should extend at least 500mm beyond the limit of the excavation.

Utility companies use a colour-coding scheme to identify apparatus and 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 or Cable	Marker or Tape
Gas	Yellow	Yellow	Yellow with Black Legend
Electricity	Black	Black or Red for Some HV	Yellow with Black Legend
Water	Blue	Blue	Blue
Water (Special)		Blue with Brown Stripes	
Sewerage		Black	
Telecommunications	White or Grey	Light Grey or Black	Yellow with Blue Legend
Communications	Grey or Green		White with Blue Legend or Green and Yellow
Street Lighting Scotland	Purple	Purple	Yellow with Black Legend
Street Lighting England and Wales	Orange	Black	Yellow with Black Legend
Communications (Motorway) Scotland	Black or Grey	Black	Yellow with Black Legend
Communications (Motorway) England and Wales	Purple	Grey or Black	Yellow with Black Legend

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## 7. CONSTRUCTION (CONTINUED)

### 7.2 Permit to Break Ground

H14G *Working in the Vicinity of Underground and Overhead Services Requirements Briefing* has been created as an introductory overview to the permit to break ground process for those people who have responsibility for managing, supervising, or coordinating work around underground services.

#### 7.2.1 Construction

Where work activities involve penetrating the ground the Service Coordinator must control the Permit to Break Ground process and ensure through liaison with site management, competent individuals are appointed to carry out service location and completion of the relevant permit using either H14-01 *Permit to Break Ground (Trial Holes Only)*, H14-02 *Permit to Break Ground (Main Work Activities)* and H14-03 *Permit to Break Ground (Transient or Reactive Works)*.

The Permit to Break Ground cannot be authorised and accepted by the same person. The Service Coordinator is responsible for ensuring the permit system is correctly applied. On fixed projects, the Service Coordinator would normally be responsible for authorising the Permits to Break Ground. In business units where this may not be practicable (e.g. transient or multiple site operations), the Service Coordinator is responsible for identifying authorised competent persons to carry out this task. The acceptor must be a competent and trained supervisor. Both the supervisor and operatives(s) must accept the permit. The supervisor must ensure compliance with the permit and challenge nonconformities.

All within the working gang must be briefed on the requirements of the permit. The relevant Permit to Break Ground is to be issued to personnel involved in the works, (together with a specific sketch / drawing depicting the location of the services), specifying the precautions to be taken and the safe methods to be adopted within the timescale defined in the permit.

Where underground services are identified (noted on services plans, from physical surface evidence or by detection equipment) within or near the work area, these must be 'positively' confirmed by trial holes prior to any works commencing. Once all known underground services have been 'positively' confirmed, works may then continue under the controls identified in the relevant permit.

For Rail work, it is preferable that alternative arrangements are made when spiking is proposed. Where it is not possible to avoid the use of spikes, a permit to spike must be obtained from Network Rail. The permit must be based on service searches and a CAT scan with genny. Where work is for other clients, the CRE will authorise a proposal to spike if appropriate. It should be noted that certain clients, including Network Rail, require approval of proposals to spike prior to works commencing.

#### 7.2.2 Transient / Reactive Work

Due to the high volume of works carried out within the transient work streams (Highways operations) then the Contract Manager (or similar) will appoint appropriately qualified supervisors with the responsibility for issuing H14-03 *Permit to Break Ground (Transient or Reactive Works)* on transient work. The supervisor is responsible for ensuring that the permit system is being properly applied. The supervisor (issuer) will issue the H14-03 *Permit to Break Ground (Transient or Reactive Works)* to a member of the digging team (acceptor). The acceptor must remain on site (with the permit) during the excavation process. The acceptor must be competent and trained in excavation and underground services operations. Both the issuer and the acceptor must ensure compliance with the permit and challenge any nonconformities.

If the ground conditions or known service positions are complex / challenging, contact your supervisor to plan works using trial holes under control of H14-01 *Permit to Break Ground (Trial Holes Only)*.

### 7.3 Restriction and Exclusion Zones

#### 7.3.1 Restriction Zone

When working near underground services a minimum 1.0m restriction zone shall apply (3.0m for gas > 2 bar). Within the restricted zone:

- The hierarchy of control set out in section 5.2.1 must be followed
- Preference shall be given to vacuum excavation over other digging methods
- Trial holes must be excavated to positively locate underground services within this zone (this may not be practical in street and other highly congested environments where this may involve exposing services unnecessarily)

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## 7. CONSTRUCTION (CONTINUED)

### 7.3 Restriction and Exclusion Zones (Continued)

#### 7.3.2 Exclusion Zone

The minimum exclusion zone is 0.5m. For underground services the exclusion zone is defined as the horizontal distance from either side and above and below the outside dimensions of any buried service. Mechanical excavators cannot be used to dig within the exclusion zone.

#### 7.3.3 Critical Assets

On some projects, such as when working on operational sites, there may be critical assets to the operation. The Service Coordinator must liaise with the Client at the start of the project to understand the location of any critical assets and identify exclusion zones and other control measures. These must be clearly identified on the permit and within the risk assessment and method statement for the task.

For medium / intermediate / high pressure gas mains mechanical excavation is not permitted within 3m of the main. If excavation is required within 3m, contact the service provider on 0800 688 588 prior to commencing work. Whenever excavating in the location of medium and high-pressure mains, contact the asset owner to discuss the proposed methods of work.

The service provider must be contacted prior to carrying out any construction activity within 30m of high-pressure steel pipelines containing petroleum products. The above are minimum requirements. Check with the local regional provider or asset owner as additional restrictions may be in place.

### 7.4 Positive Identification and Trial Hole Excavation

In order to establish that any work requiring penetration of the ground is within or outside of the exclusion zone, all underground services within the restriction zone must be positively confirmed to establish the exact locations and depths under the control of H14-01 *Permit to Break Ground (Trial Holes Only)* (see Appendix 1).

Once the underground service has been located, trial holes must be carefully excavated, using vacuum excavation, air lances and if required hand dug using insulated tools. Trial holes must be carried out to identify the location of underground services prior to any mechanical excavation. H14-09 *Trial Hole Record Sheet* can be used to map out and sketch the location of the trial hole(s) and H14-10 *Trial Hole Register* can be used to record the details of each of the excavated trial holes.

Where underground services pose a potentially significant risk, the Service Provider should be contacted to request isolation of the service. Do not assume that this will not be granted. Where isolation is carried out written confirmation should be requested from the Service Provider. Where isolation is not carried out (and even where isolation has been confirmed) all services should be treated as live.

All personnel involved in the activity must be briefed in the presence of the services, the dangers associated with the services and the controls to be applied whilst excavating or exposing the services. 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 or where the line and level could vary (e.g. cables).

Regular monitoring must be undertaken by the relevant supervisor to ensure that the work is being carried out in accordance with the permit controls. Once a service is exposed, it must be physically identified by a Competent Person, and if necessary, the Service Provider should be contacted to identify their service. When a service will remain exposed, it must be identified (marker) and adequately protected, from physical damage. Services across a trench must be adequately supported; the Service Provider should be contacted to confirm the degree of support.

Service Marker Tubes should also be installed where possible. A Service Marker Tube is a length of 150mmØ duct or larger pipe, cut to length and positioned vertically so that after backfill of the trial hole, the marker tape above the services is still visible and the depth below ground of the service can be easily measured. Protective tiles must be placed above the services for protection should the Service Marker Tube be forced downward accidentally from being run over by plant / site vehicles (see Appendix 3).

H14-07 *Underground Services Notice* should be used to inform personnel of the presence of services below ground.

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## 7. CONSTRUCTION (CONTINUED)

### 7.5 Safe Digging

#### 7.5.1 Excavating within Exclusion Zones

Where there is a road, pavement, or other hard surface, a jackhammer may be used to break through the surface. Great care must be taken to avoid over penetration and power tools must never be used over the indicated line of the service, nor within 0.5 metres of the service. Once the hard surface has been broken, the use of power tools must cease and hand digging, using a spade or shovel should commence using insulated tools. The hand dig should be vertical to the side of the service until the anticipated depth is reached then across until the service is exposed (see Appendix 2).

#### 7.5.2 Excavating Outside the Exclusion Zone

Excavation methods such as vacuum excavation and the use of water or air pressure jet systems to loosen and dig into soil must be considered and where practicable, implemented. Appropriate safety margins (as specified by the relevant Service Provider) for each type of service must be implemented and recorded on the relevant Permit to Break Ground. No mechanical excavation can take place within the exclusion zone without prior agreement of the service provider and in line with agreed additional controls.

Where the line and level of the service cannot be confirmed with confidence for its full length, mechanical excavation is not permitted and further trial holes under the control of H14-01 *Permit to Break Ground (Trial Holes Only)* must be carried out.

Frequent and repeated use should be made of scanning equipment, as service locations and its associated equipment (such as a junction box, branch, or siphon valve) are likely to become more accurate as ground cover is removed. A close watch must also be kept to identify and report any signs of soil variances or warning marker tapes during the course of the work.

If the services are buried in concrete, work must not commence until a detailed system of work (including isolation where possible) has been agreed with the Service Provider.

H14-PM01 *Avoiding Underground Services* is a copy of a process map provided by the Utility Strike Avoidance Group and provides further information.

### 7.6 Exposed Services

All exposed services must be protected from damage. The necessary equipment to support or cover cables, ducting or clay pipes within an excavation must be provided.

If HV electrical cables are exposed, consider covering them with fire retardant mats or blankets to prevent injury to workers within the excavation in the event of unexpected failure of the cable.

### 7.7 Backfilling Underground Services

Backfilling must be effectively planned and executed to ensure services are not damaged during the backfill process, or at a later date, due to improper backfilling technique. Where the backfill requirements are not clearly identified in the specification, the Service Provider should be contacted to discuss and agree the backfill material and technique. Where applicable, a Supervisor and Operatives trained and certificated under The New Roads and Street Works Act should be appointed to conduct the work.

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## 8. TOOLS, EQUIPMENT AND PPE

### 8.1 Insulated Tools

All hand excavation gangs should be equipped with insulated tools and where practicable, air lances to assist in disturbing the ground without damaging cables and pipes. Picks and forks may not be used for digging, with the exception of lifting slabs.

### 8.2 Detection Equipment

Only approved detection equipment should be used for services location. Within VolkerWessels UK we have the current requirements:

- VolkerFitzpatrick: eCAT4+ / gCAT4 / RD4000
- VolkerStevin: gCat4+ / RD8200
- VolkerHighways: Eazicat 650i / eCAT4+ / gCAT4 / RD8200
- VolkerLaser: eCAT4+

The equipment must have the data logging, strike alert and dynamic overload protection features enabled.

The detection equipment must be provided as a minimum with:

- A compatible transmitter
- A Genny Clamp
- Live plug connector
- A direct connection lead, an earth extension lead, an earth stake and a high-strength neodymium magnet

The cable avoidance tool and signal generator must be supplied with copies of their current calibration certificates. The cable avoidance tool and signal generator must only be operated by a trained competent person or a trainee under the direct supervision of a trained competent person.

### 8.3 Flame Retardant PPE

All operatives when digging or operating around live or potentially live services must wear flame retardant clothing to minimise the risk of a burn should uncharted services be encountered, or chartered services be accidentally damaged. All outer clothing must be flame retardant. Arc resistant clothing must be utilised when there is an increased risk of arc flash incidents when operating in the vicinity of high voltage services, as determined by risk assessment. The flame-retardant properties must not degrade when washed.

## 9. REMOVAL OF SERVICES

Where the scope of the works involves the removal of existing services, then in addition to compliance with the foregoing conditions, the undernoted must also be implemented. Under no circumstances should anyone attempt to break or sever any service until this procedure is fully implemented.

A Service Coordinator must be appointed to manage the activity and to ensure that all of the information used is verified as being correct. The Service Provider must be contacted, and a site meeting convened at which a record must be made to confirm the under noted:

- The extent of the service to be removed
- The timescale of the activity
- The means of verifying isolation e.g. spiking cables
- The method of removal

The Service Provider must be requested to conduct the removal of the service. If this is agreed, then it must be recorded in writing. If the Service Provider will not remove the service, then the following must be applied:

- The location of the service must be confirmed
- The Service Provider must be requested to isolate the service and confirm isolation in writing
- The timescale of the work must be recorded
- The method of removing the service must be recorded
- The Service Coordinator must confirm that all controls have been applied before commencing the removal of the service
- The Service Provider will be requested to witness the removal of the service

Once the aforementioned conditions have been met, the service may be removed.

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## 10. OVERHEAD LINE PROTECTION (NON-RAIL)

A permit to work (H14-08 *Permit to Work Near Power Lines*) is required prior to any work near power lines.

Prior to any operations (including initial vehicular access) commencing adjacent to any electrical overhead line, the line must be highlighted and protected in strict compliance with the requirement of the HSE Guidance Note GS6 “Avoiding Danger from Overhead Power Lines”. The standards of protection specified in this publication must be applied.

Where it is necessary to carry out operations under or adjacent to overhead power lines, contact must be made with the service provider to request isolation or re-routing of the line. If the line cannot be isolated or re-routed, a safe system of work must be agreed with the electricity authority prior to the work commencing. A competent person must be appointed to regularly check and maintain the integrity of overhead line protection.

Other overhead services, such as BT cables and overhead pipelines, should be given similar consideration. H14-G01 *Overhead Line Protection* provides further guidance.

## 11. EMERGENCIES

Emergency arrangements must be made to deal with any contingency relating to the work. Emergency contacts (including telephone numbers) must be identified and recorded on H14-06 *Underground Services Emergency Contact List* and made available to responsible persons who must be nominated to make contact with the Service Provider and the Emergency Services (where appropriate) in the event of a damaged service or other emergency.

Specific actions must be identified to deal with the danger relating to the type of service e.g. gas leaks would involve evacuating the immediate vicinity, prohibiting smoking, naked flames, or ignition sources, contacting the Service Provider, contacting the Police and Fire Service, advising local occupants and generally assisting as directed by the Service Provider or Emergency Services.

It should be noted that certain clients have mitigation measures for emergency measures. Network Rail mandate the review of the hazard directory data and request submission of the form contained in Appendix G of NR/L2/AMG/1030.

First aid arrangements must be considered and made readily available where appropriate.

All personnel must be instructed and be aware of the action to be taken in the event of any emergency including any degree of damage to a service.

## 12. CRITICAL ASSET CONTINGENCY

Where critical assets have been identified by an asset owner, such as on an operational site, contingency plans must be established to identify what actions are needed in the event of damage or interruption to service caused. The contingency plan should include:

- Critical contact details
- Emergency standby plant required
- Standby / available resource to carry out an effective repair
- Customer / stakeholder liaison requirements

## 13. SERVICE DAMAGE INVESTIGATION

All service damage should be investigated and reported in line with H07-08 *Utility Damage or Close Call - HSEQS Investigation Report*.

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## 14. ASSOCIATED GUIDANCE & INFORMATION

- H14G *Working in the Vicinity of Underground and Overhead Services Requirements Briefing*
- H14-G01 *Overhead Line Protection*
- H14-G02 *Safe Digging - Requirements Briefing*
- H14-G02 *Safe Digging - ONLY FOR BOOKLET PRINTING*
- H14-G02 *Romanian Safe Digging Guide - ONLY FOR BOOKLET PRINTING*
- H14-PM01 *Avoiding Underground Services*

## 15. DOCUMENTATION (OUTPUTS)

Standard VolkerWessels UK Record Documents are referenced in brackets. Any digital forms will be referenced VFORMS APP. Where alternative formats are used, they shall contain the same or additional content.

- (H14-01 *Permit to Break Ground (Trial Holes Only)*)
- (H14-02 *Permit to Break Ground (Main Work Activities)*)
- (H14-03 *Permit to Break Ground (Transient or Reactive Works)*)
- (H14-04 *Assessment & Appointment of Service Coordinator*)
- (H14-05 *Underground Services Checklist*)
- (H14-06 *Underground Services Emergency Contact List*)
- (H14-07 *Underground Services Notice*)
- (H14-08 *Permit to Work Near Power Lines*)
- (H14-09 *Trial Hole Record Sheet*)
- (H14-10 *Trial Hole Register*)
- (H07-08 *Utility Damage or Close Call - HSEQS Investigation Report*)

## 16. ISSUE RECORD

Issue	Date	Comments
1 - 8	Oct 2022	Please review 'Issue Record' Section in Issue 8 for a log of changes between Issue 1 and Issue 8.
9	Jun 2023	Review and update of H14 procedure. New additional safe digging guidance document H14-G02 <i>Romanian Safe Digging Guide - ONLY FOR BOOKLET PRINTING</i> added.
10	Aug 2023	H14-01, H14-02 and H14-03 have had some boxes reorganised and an additional 'Calibration due date' box added.

## 17. WHAT HAS CHANGED IN THIS LATEST ISSUE AND WHY

The following have had some boxes reorganised and an additional 'Calibration due date' box added.

- (H14-01 *Permit to Break Ground (Trial Holes Only)*)
- (H14-02 *Permit to Break Ground (Main Work Activities)*)
- (H14-03 *Permit to Break Ground (Transient or Reactive Works)*)

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## 18. BRIEFING REQUIREMENTS

All new employees will receive an introduction to the Integrated Management System (IMS) at induction, according to the nature of the role.

All employees with an email address receive the 'Record of Revisions' each month, which details changes to the IMS. All Line Managers retain the responsibility to ensure their staff are briefed on changes as appropriate.

The following table defines how revised issues of this document are briefed to existing employees according to related specific responsibilities.

Job role, department, function	Method of briefing revised issue
CR Director	CR Director is the document owner, approves changes, no briefing required.
HSEQ Leads	Briefing from CR Director.
Health and Safety Managers	Briefing from HSEQ Leads.
Project / Site Managers	Briefing from HSEQ Leads or Health and Safety Managers.
All Employees	Record of Revisions and cascade briefings as appropriate.

## 19. IMS AUTHORISATION

**Document owner approval:**

**Adrian Shah-Cundy**, CR Director - 11.08.2023

**Approval for IMS:**

**Andria Georgiou**, IMS Coordinator - 11.08.2023

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VolkerFitzpatrick  
✓

VolkerFitzpatrick-Rail  
✓

VolkerRail  
n/a

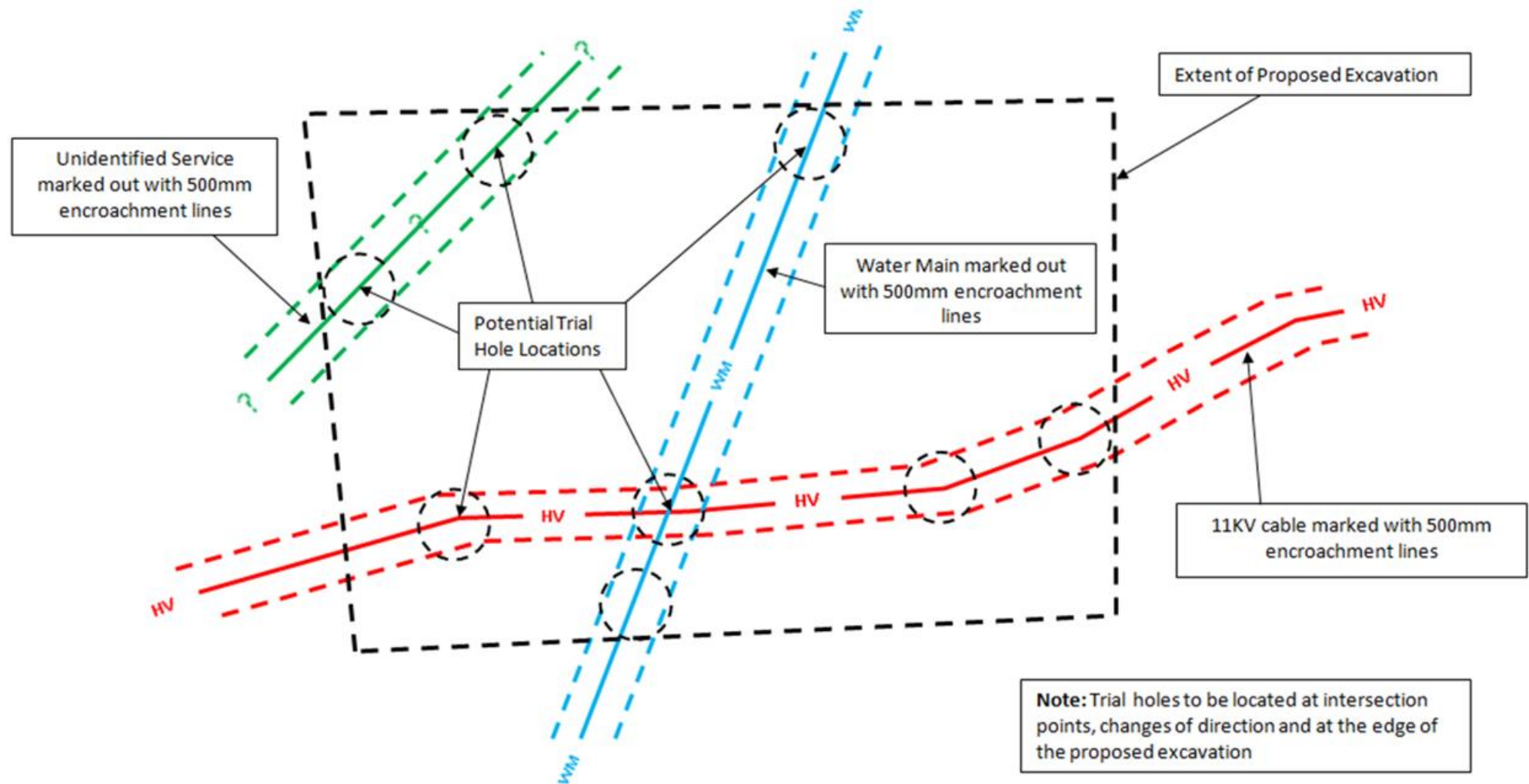
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VolkerLaser  
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VolkerServices  
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### Appendix 1 - Marking Out Example



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VolkerFitzpatrick  
✓

VolkerFitzpatrick-Rail  
✓

VolkerRail  
n/a

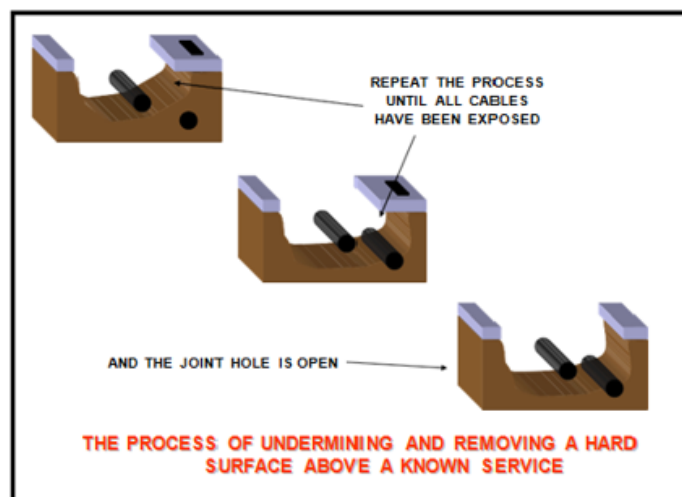
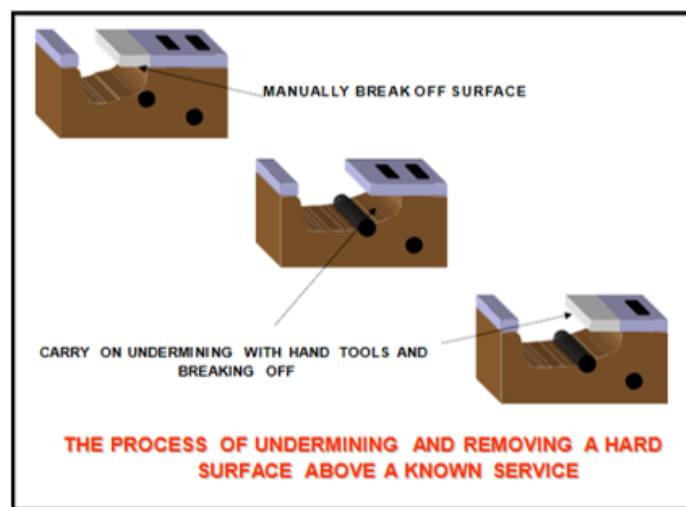
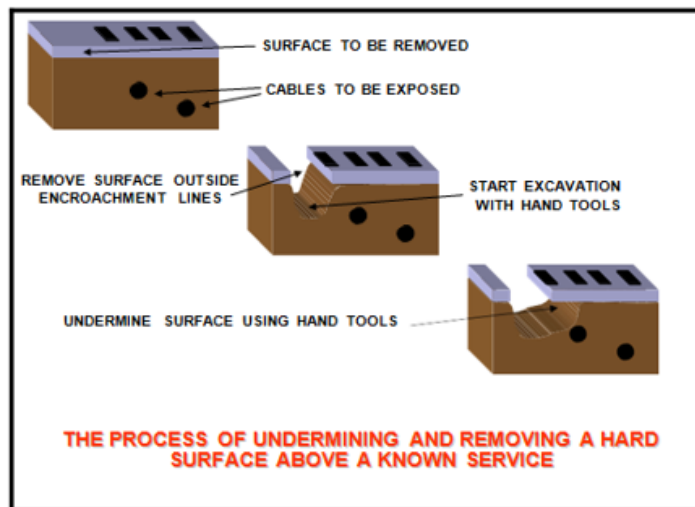
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VolkerLaser  
✓

VolkerServices  
n/a

### Appendix 2 - Process for Undermining a Hard Surface and Excavating to Locate Underground Services



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VolkerFitzpatrick  
✓

VolkerFitzpatrick-Rail  
✓

VolkerRail  
n/a

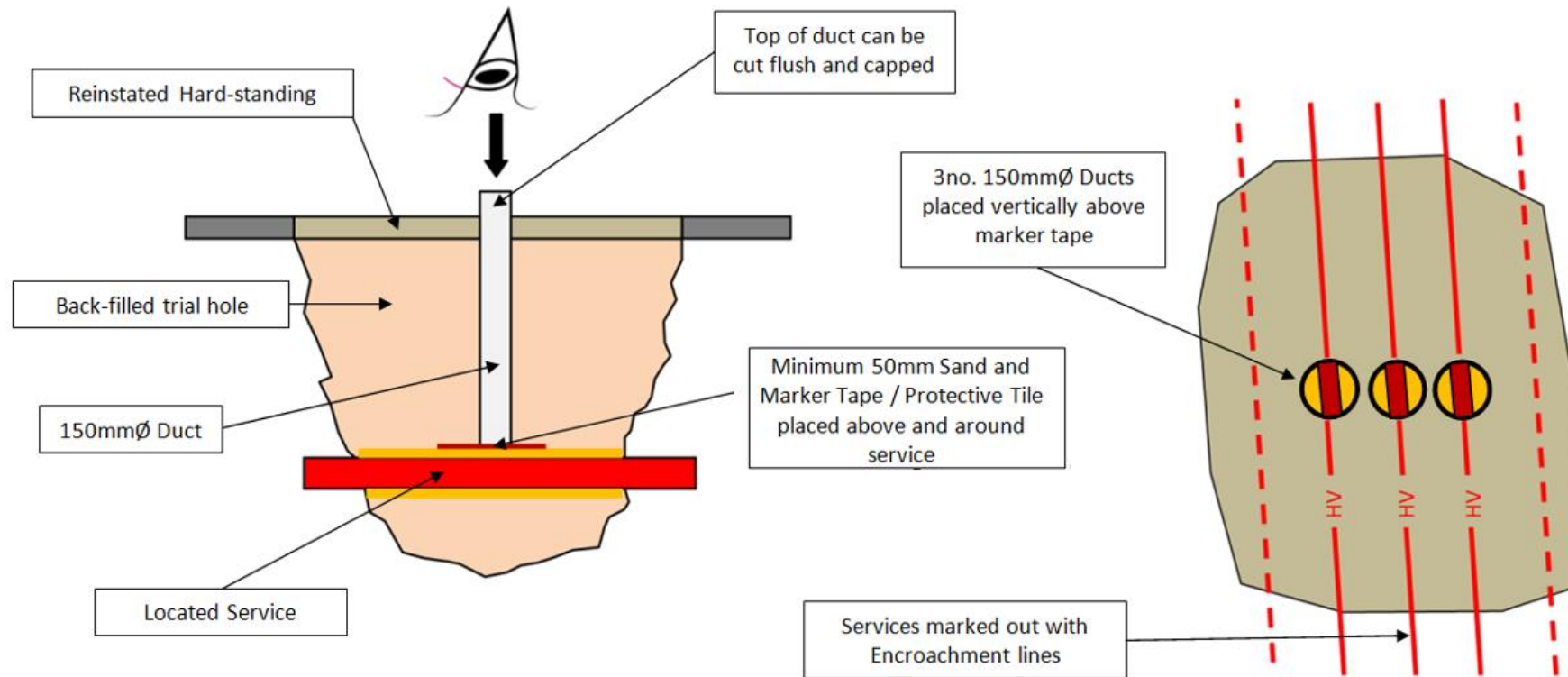
VolkerStevin  
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VolkerHighways  
✓

VolkerLaser  
✓

VolkerServices  
n/a

### Appendix 3 - Example Service Marker Tube



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