

**1 PURPOSE**

This procedure sets out the VolkerRail management arrangements for the protection of personnel and infrastructure against buried service strikes.

It underpins the general engineering and safety arrangements detailed within the VolkerRail Integrated Management System.

**2 SCOPE**

This procedure applies to all planning and delivery functions of the works that involve personnel working on site, including subcontracting organisations. Specifically, this includes the works associated with penetrating the ground at or below surface level, or creating a temporary stockpile of material. It does not address site specific issues of contaminated ground.

This procedure is also applicable to works utilising heavy plant on unbound road surfaces, which may cause ground disturbance.

**3 REFERENCES**

**Legislation & HSQE Guidance**

- The Construction, Design and Management Regulations 2015
- The Management of Health and Safety at Work Regulations 1999
- The Health and Safety at Work etc. Act 1974
- HSG47 Avoiding Danger from Underground Services
- HSG 144 The Safe use of Vehicles on Construction Sites

**Network Rail Standards**

- NR/L2/CIV/003                      Engineering Assurance of Design and Construction of Building and Civil Engineering Infrastructure
- NR/L2/INI/02009                  Engineering Management for Projects
- NR/L1/AMG/1010                  Policy on Working Safely in the Vicinity of Buried Services
- NR/L2/AMG/1020                  Buried Services Data Provision
- NR/L2/AMG/1030                  Working Safely in the Vicinity of Buried Services.
- NR/L2/AMG/1040                  Buried Services Data Feedback

**VolkerRail Procedures**

- SAF64 - Confined Space Entry and working
- SAF88 - Working Safely at Height
- CIV510 - The Management of Temporary Works

**4 DEFINITIONS**

Term / Abbreviation	Description
Cable Avoidance Tool (CAT)	Test equipment approved for the location of buried services and cables.
CDM	Construction, Design and Management regulations 2015
Works Supervisor	The term given, in this document, to the person responsible for the excavation.
Client	The organisation that has employed VolkerRail to undertake the work. e.g. Network Rail where VolkerRail act as the main contractor or Balfour Beatty where VolkerRail act as a sub-contractor.
CRE	Contractor's Responsible Engineer (Civils or Structures). The Engineer fulfilling the role as defined in Network Rail Standard NR/L2/INI/02009 Engineering Management for Projects who shall be responsible for safe construction of the designed works.

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Term / Abbreviation	Description
Excavation Depth	The depth from the highest adjacent ground level to the bottom of the excavation.
Method Statement	The generic name given to the document which describes the method of working. Known as the Work Package Plan in the Network Rail domain.
PM	VolkerRail Project Manager
Service/Utility Owner	Organisation that directly owns the service or is responsible for its operation

**5 MANAGEMENT ARRANGEMENTS**

**5.1 Pre-Start Works – Planning**

**5.1.1 Identification of Operational Requirements**

Determining the operational requirements is the first stage of this process. These can be broken down into the following key areas;

- Areas to be excavated. This will include all types of foundations including those which sit at ground level such as a mass concrete foundation, or those which penetrate the ground to depth. The considerations will need to cover plant movements in the vicinity of buried services.
- Areas where vehicles will form a roadway. This may consist of a general use roadway where vehicles pass on a regular basis, or a one-off roadway to facilitate a specific piece of plant such as a crane. Both will cause ground movement and have the potential to affect existing buried services.
- Areas where materials may be stockpiled. These areas will compress and consolidate the ground over time, and impact on buried services. They should also be considered in respect of excavations which may take place in the vicinity.
- Areas of de-vegetation. These areas often require a site strip which will disturb shallow buried cables if they are not identified beforehand.

These are the key areas where accidents occur. The accidents are usually caused by a failure to establish the location of buried services prior to the commencement of the works.

**5.1.2 Services Search**

It should be assumed that uncharted buried services are present at all sites until proven otherwise.

During the planning phase the project will nominate, and record in the construction phase plan, a person responsible for obtaining and recording 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 either a positive or nil response has been received.

Buried service records which are approaching, or in excess of a year old, or those which are missing will be re-requested from either the client or from statutory undertakers. It should be noted that these searches can often take up to sixteen weeks.

Certain sites will benefit from a ground penetrating radar survey, particularly those where congestion is likely i.e. level crossings, station platforms.

**5.1.3 Service Record Keeping**

On receipt of the buried service records, they should be filed on the shared drive. A hard copy should be available on site in all appropriate site offices.

The designers, if still in contract, should verify any new records and update the AFC drawings where appropriate. If this cannot be undertaken the changes between AFC drawings and current records should be documented.

It is good practice, particularly on fixed sites, to have a CAD drawing of the site which shows all known services relative to existing infrastructure. Marked up photographs also provide a good visual portrayal of services on site.

**5.1.4 Competency**

The application of this document needs a detailed knowledge of the procedure and of the on-site excavation processes. The Project Engineer, or whoever else is responsible for the application of this procedure should receive a detailed brief.

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The works will require competencies in CAT Scanning, the operative should be trained and competent to use the proposed equipment provided on site.

Where sub-contractors are to be used on site, their records must also be checked and a record made of their competency, within the shared drive. The Civils CRE, or PM if no VolkerRail CRE is appointed, will be responsible for this action.

The following table details the competency requirements for persons issuing, authorizing and utilizing permits;

Duty	Responsibility	Competency
Permit Issuer	Project Engineer or Construction manager	Attended:- CAT Training Course Working in and Around Excavations briefing.
Permit Authoriser	Responsible manager as detailed in the CPP, typically CRE, PM or site manager	Attended:- Working in and Around Excavations briefing.
Permit Receiver	Works Supervisor	Attended:- Working in and Around Excavations briefing. Demonstrable supervisory experience. CAT Training Course

**5.1.5 Equipment**

CAT Scanners – a number of CAT Scanning devices are available in the marketplace. In most instances, either the RD400/4000 CAT & Genny or Seektech SR20’s CAT scanners will be used as this will provide continuity and a reduction in risks associated with unfamiliar equipment. It should be noted that certain clients allow only specific approved equipment on their infrastructure.

**5.1.6 Sub-Contracting**

The requirements of this procedure must be met by all VolkerRail subcontractors who will use the VolkerRail permit system.

In exceptional circumstances, the professional Head of Civil Engineering may formally write to the project CEM stating that an alternative system may be used.

Formal alliance arrangements may create their own management system incorporating an alternative method of managing the risk from buried services.

**5.2 Pre-Start Works – Site**

**5.2.1 Identification & Protection of Services**

Planning works will have determined the position of buried services in areas of site which are to be trafficked by construction plant. Wherever possible, these services should be protected or diverted away from the area, though in practice this can incur impractical cost and delay.

These areas are to be protected at the earliest opportunity such that construction traffic movements are not restricted. Typically, this would be through use of road plates, designed and documented through CIV/510 The Management of Temporary Works.

All main cable routes, not in trafficked areas but in the compound, should be marked up using markers or spray paint that remains visible in all weathers, reapplied as necessary.

Slit trenches may be used to identify exact positions of services but can only be carried out under a safe system of work.

**5.2.2 Safe Systems of Work**

Safe systems of work will be produced for all intended works, normally in either method statement or Work Package Plan format. The documentation will confirm the risks to health and safety associated with excavations within them and outline the appropriate protective measures.

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Typical issues would include buried services and working in and around excavations, inclusive of associated plant movements. Section 5.3 details these dangers in more detail.

**5.2.3 Permit to Dig**

Whenever ground is to be broken or heavily loaded, the method of control is via a permit. In this instance the permit is known as a Permit to Dig. (Form CIV508F01)

The permit is to be available on site, with the team carrying out the excavation.

A methodology and flowchart for the permit to dig are contained within Appendix A & Appendix B respectively.

**a) Pre-requisites**

Before commencing production of a permit to dig, the earlier aspects of this procedure should be adhered to and the following achieved;

- Full understanding of the depth and location of proposed excavation.
- Nature of any buried services based on service records (or Ground Penetrating Radar) and a visual survey of site.

**b) Permit Register**

A register of all permits will be maintained. The register will be maintained on the shared server and will note the following;

- Date produced and closed
- Known services
- Author
- Person responsible for excavation
- Excavation identification
- Permit number

On completion of the excavation the register will reflect that the works are complete and whether uncharted services have been found.

The VolkerRail Permit to Dig Register is referenced CIV508F02.

**c) The Permit**

The VOLKERRAIL Template for the Permit to Dig is referenced CIV508F01. A methodology and flowchart for the permit to dig are contained within Appendix A & Appendix B respectively.

The requirement for a permit to dig should be acknowledged in advance of the works through good planning, or other system as developed by the project. It should be managed centrally from within the site management team.

The need will be identified in advance allowing the paperwork to be initially produced in the office and by subsequently attending site, utilising the guidance held in Appendix A of this document. This must be supported by a sketch, site extract or drawing of the proposed area, annotated with the known services. Clients may have their own version of this document which can be used in replacement of the form subject to it being inclusive of the requirement of the VolkerRail form. Subcontractor permits are not to be used.

The office aspect of the form should be produced in consultation with the design and the buried service records. Copies of the buried services should be documented on a sketch attached to the rear of the form before it is issued.

If not already marked out, existing services in the vicinity of the worksite are to be located and identified. CAT scanning can commence under a suitable safe system of work following checks on equipment and operator competency. The exercise should always be carried out with accompanying genny.

Completed permits should be retained on the shared drive.

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Part 1: To be completed by the site management team prior to the works following review of available records. The site drawing should be included with the form at this stage.

Part 2: To be completed by the site supervisor following investigation of services from the site survey & CAT scanning.

Part 6: to be signed off by site supervisor, responsible Manager and Author prior to works commencing and following completion of the works.

**5.2.4 Plant Management**

Once on site, the impact of plant movements on services can be considered. The positions of the site access roads are to be set out with consideration of buried services and with the appropriate protective measures, including signage and barriers.

A permit to dig is required for heavy plant movements along unbound site haulage roads.

**5.2.5 Spoil/Material Management**

Where materials and spoil are being stockpiled in the vicinity of excavations, the CRE will confirm the minimum distances to be observed between spoil and excavation.

Consideration is to be given to the loading of buried services through stockpiling of materials. This is to be avoided wherever possible. If avoidance isn't practical, a temporary works design is to be provided, determining the likely stresses that are to be exerted on the service. It should be noted that buried gas pipelines are particularly susceptible to vertical loading.

Spoil may be contaminated. Where this is suspected, an appropriate risk assessment must be undertaken. A permit to dig is required prior to any significant stockpiling of materials.

When removing the stockpiled materials, a safe method of working is to be documented to avoid excavating into the original ground.

**5.3 During the Works**

**5.3.1 Permit to Dig**

CAT scanning will be competed at depth intervals as prescribed by the permit, with hand excavation being carried out when services are anticipated (either from buried services or from CAT scanning). This will be in accordance with section 5 of the permit.

**5.3.2 Safe Digging Methods**

Following the use of plans and cable locating devices and issue of the permit to dig and supporting diagram of the cleared area, the Site Supervisor in charge of the excavation shall ensure that the excavation is undertaken with extreme care. Trial trenches should first be dug using suitable insulated hand tools, i.e. spades and shovels, preferably with curved edges, to confirm the positions of any buried services.

Hand-held power tools and excavating machines are the main causes of danger and damage and they should not be used too close to underground services. A minimum working distance of 500mm either side of the suspected service location should be left when working with power tools. Forks, picks and bars must not be used to break up or loosen the area around the excavation.

A site specific safe digging practice should include:

- Digging trial trenches to accurately locate services.
- Use of insulated hand tools.
- Digging with extreme care.
- Using insulated spades and shovels and not forks, picks and bars.
- Not using hand power tools such as breakers.
- Looking out for markers such as tiles and plastic tape and always excavating by hand below this level.
- Digging well clear of the services and using shovels etc. to widen out the excavation to explore the services in the side of the hole as the material falls away.

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**5.3.3 Excavation Related Dangers**

**a) Danger of Collapse**

There is always a danger of a freely supported excavation face collapsing. The SSOW devised by the CRE shall ascertain the risk of collapse and provide an appropriate temporary works design/assessment in all cases where an operative will or may need to enter the excavation to complete trial holes.

The Competent Person supervising the work must have been assessed on working in trenches and shall ensure that the support arrangements are in place according to the design before anyone enters the excavated hole. The requirements of CIV510 must be adhered to at all times.

The Site Supervisor shall ensure that an excavation reflects the risks involved. Given the nature of the work, hazards involved and as the excavation proceeds the changing nature of those hazards and conditions, Supervisors should check regularly that, among other things, the work is being carried out according to the SSOW & instructions and that all precautions necessary are in place.

**5.3.4 Discovery of Uncharted Services**

If, during the course of 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 the permit to dig. The information should subsequently be recorded in spreadsheet form by the site management team.

The spreadsheet should be forwarded to the client on a regular basis and be included in the handback file. Additionally, where buried services are recorded on an overall site plan in CAD format, the document should be updated and the results distributed accordingly.

**5.3.5 Emergency Works**

Should it be necessary to carry out emergency or short notice excavation works, it may not be possible to obtain search information from service owners in advance.

Surveys of the ground using locating equipment should be carried out more frequently than usual during the works and special care taken when excavating, assuming at all times that buried services are present. The undertaking of a ground penetrating radar survey should be given serious consideration.

All other requirements including the provision of a safe system of work and permit to dig must be followed.

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

**5.3.6 Use of Spikes**

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 endorsed by 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 the works commencing.

The flowchart in Appendix C details the methodology associated with obtaining a permit to spike from Network Rail.

**5.4 Retention of Records**

There are no VolkerRail record retentions associated with this procedure beyond contractual completion.

Permit to Dig records should be maintained for the duration of the project unless there is a contractual requirement to keep records for longer.

Certain clients may wish to see records included in the H&S file.

There is a requirement for buried service feedback to be given in line with the requirements of NR/L2/AMG/1040.

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This is to be managed by the civils construction CRE.

**6 ASSOCIATED GUIDANCE & INFORMATION**

- Appendix A – Permit to Dig description
- Appendix B – Permit to Dig flowchart
- Appendix C – Permit to Spike flowchart
- Appendix D – Level Crossing Guidance

**7 DOCUMENTATION (OUTPUTS)**

- CIV508F01 Permit to Dig
- CIV508F02 Permit to Dig Register

**8 ISSUE RECORD**

Issue	Date	Comments
1	16/01/2014	New standard. Incorporates previous issues of P&E/322, CE/507 and P&E/310 which have been withdrawn upon this issue.
2	16/09/2016	New Permit to Dig applied and Permit to dig and Permit to Spike flowcharts added.
3	23/10/2019	Scope amended to include subcontracting organisations. CIV508F02 Permit to Dig register has been added.
4	02/07/2024	5 year review undertaken with no change to requirements but with the addition of guidance in Appendix 4 covering Level Crossings.

**9 WHAT HAS CHANGED IN THIS LATEST ISSUE AND WHY**

The scope and requirements have not changed as a result of the 5-year review. Additional guidance has been provided to assist with the implementation of this procedure for the delivery of Level Crossing renewals which includes outputs from recent investigations.

**10 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.

This is determined using the ‘RACI’ principle. Those roles identified as ‘Responsible’ and ‘Accountable’ should receive a formal awareness briefing facilitated by the Document Owner.

Discipline	Role	RACI	Type of briefing
Project Management	Project Engineer	Responsible	Detailed
Project Management	Construction Managers	Responsible	Detailed
Project Management	Supervisors	Responsible	Detailed
Project Management	Project Managers	Informed	Awareness

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Competence	RACI	Type of briefing
CEM	Responsible	Detailed
CRE	Responsible	Detailed

**11 IMS AUTHORISATION****Document owner approval:**

**Ben Mather**, Professional Head of Civil Engineering and Multidiscipline Design, 02/07/2024

**Approval for IMS:**

**Paula Roberts**, IMS Coordinator, 02/07/2024

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## APPENDIX A: PERMIT TO DIG FORM COMPLETION - DESCRIPTION CIV508

### Header

To be completed to reflect the contract details and referencing numbers. The RAG rating is to be based on the following;

- Green – Non-trackside, no services.
- Amber – Trackside, no services  
Trackside, known services
- Red - Trackside, unknown services. H&S Director approval required  
HV Service present  
High pressure gas main present

The whole ribbon is to be highlighted in the appropriate colour, leaving just the 'RAG Rating' text showing.

### Part 1 – Permit to Dig details

This is to be undertaken from an office environment where buried services can be reviewed in a clean safe and dry environment. The description of the works is to be detailed, including the limits of the site.

### Part 2 – Client & Statutory Services Review

Undertaken from the office, this is used to describe the services which the client and statutory service providers indicate as being present, and to document that the author has considered them.

If the service records have not been provided, then the permit cannot be progressed without the director responsible for Health and Safety giving authorisation.

### Part 3 - Client & Statutory Services

This is the element of the form which is used to record the on-site findings following the CAT scanning. Services which cannot be found using the CAT scanner will necessitate hand dug trial holes to find the buried services.

Services which cannot be found are recorded.

Additional services not anticipated from the record drawings are detailed.

A comprehensive sketch of all the known services, plus any services which were anticipated but not found is provided to conclude this section.

### Part 4

Used to describe additional site features or other notes

### Part 5

Details how the excavation may proceed based on a risk-based description which commences with the scenario of services under haulage roads and proceeds to more traditional excavation works.

Only one option may be chosen – each option providing a scenario and the level of mitigation required.

### Part 6

Area for the issuer of the permit to confirm that the checks have been made.

Area for the person in charge of the investigation to acknowledge the permit inclusive of the method of excavation and the associated services.

Area for the acknowledgement of briefings.

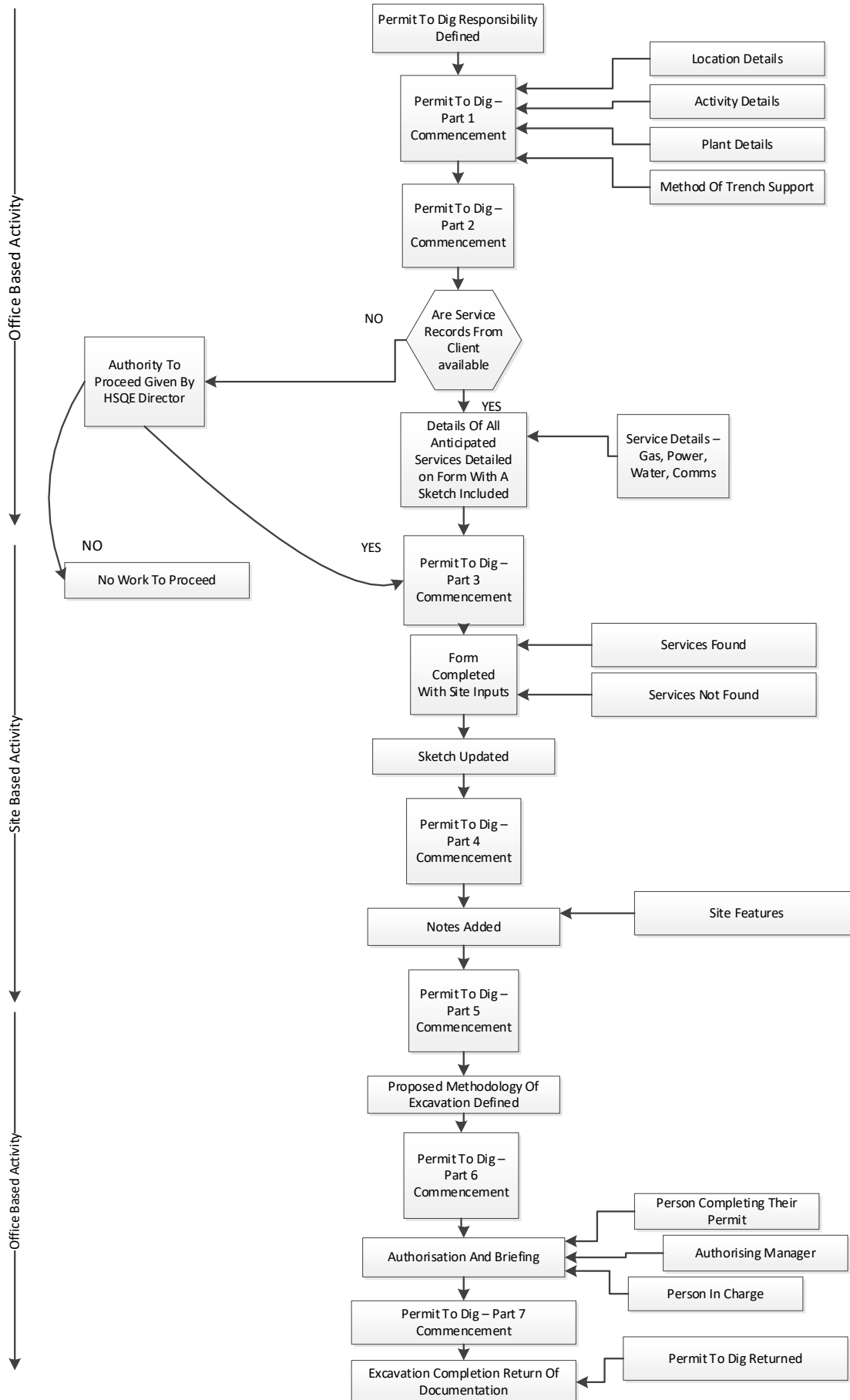
### Part 7

Used to acknowledge that the form is no longer required and has been returned to site management for inclusion in the H&S file.

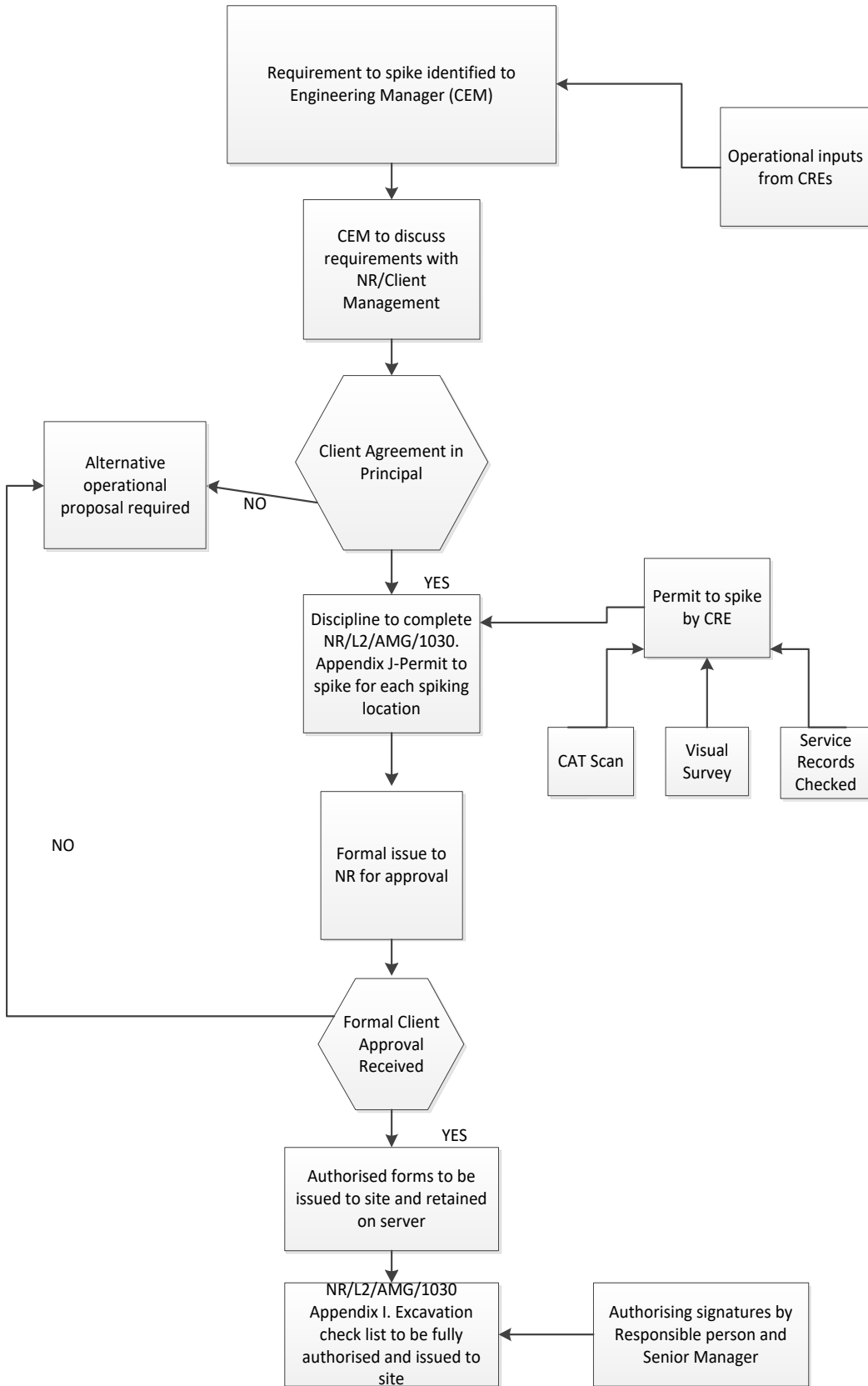
### Part 8

To be completed if unchartered services are found, or if a service strike occurs. Details are to be provided to VRCC.

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Introduction

In 2023/2024 VolkerRail experienced a higher frequency of cable strike incidents resulting insignificant loss of productivity and an increase in cost. Investigations 321982 and 292273 were undertaken and resulted in a proposed change to the methodology which would provide a greater understanding of cable positions whilst providing efficiencies for the project.

Requirement

The civils construction CRE is accountable for ensuring that a permit to dig is place for all civils installations within the level crossing footprint.

Rationale

Level crossings have extensive buried services installed throughout their footprint which has created a high-risk environment for contractors undertaking renewals work. Renewals works are often extensive due to the CDM regulations which mandate the requirement for safe maintenance areas including numerous pocket foundations for retention, walkways and handrailing, in addition to the primary infrastructure requirements.

Emphasis is to be placed on determining the position of all cable in advance of determining that any particular excavation is clear of services.

Guidance

1. This guidance proposes that a permit to dig is created for each of the ZN, YN, YO, ZO corners of the level crossing, plus an additional permit for each URX where applicable.
2. Each permit is to fully determine the position of all cables within the immediate area of the quadrant.
3. Each permit is to be supported by a site visit to view conditions and record the position of cables which may not be recorded on the buried services, but which may be visible during a visit.
4. CAT Scanning is to include the use of a genny.
5. Buried service positions are to be verified through slit trenches which are to be recorded on the permit (position and depth).
6. Each sketch detail is to be reflective of the proposed and existing infrastructure and avoid containing surplus information that dilutes the intended content.
7. The sketch detail should remove any need for the inclusion of the service owner’s drawings though these should be used in the on-site identification of services activity.
8. Ground penetrating radar should be used where there is a high intensity of buried services – it is usually of lower cost than the costs associated with an investigation.
9. The resulting information should be used to mark up the position of all buried services in survey spray paint prior to works commencing.

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