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Level 2

Working safely in the vicinity of buried services (formerly NR/L2/AMG/1030)

CHANGE OF OWNERSHIP

This temporary front sheet facilitates change of ownership.

The reference above will be formally allocated to this standard when it is next changed. In the meantime the contents, date and issue number of this Network Rail Standard are **UNCHANGED**.

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Level 2

Working safely in the vicinity of buried services

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Issue record

Issue	Date	Comments
1	1 December 2008	New issue

Compliance

This Network Rail standard is mandatory and shall be complied with by all persons from 1st March 2009.

When this standard is implemented, it is permissible for all projects that have formally completed GRIP Stage 4 to continue to comply with the issue of any relevant Network Rail Standards current when GRIP Stage 4 was reached and not to comply with requirements contained herein, unless the designated Standard Owner has stipulated otherwise in the accompanying Briefing Note.

Reference documentation

GI/RT7033	<i>Lineside Operational Safety Signs</i>
NR/GN/ELP/45002	<i>The installation of electric point heating</i>
NR/L1/AMG/1010	<i>Policy on working safely in the vicinity of buried services</i>
NR/L2/MTC/006	<i>Maintenance and contents of the National Hazard Directory</i>
NR/L2/SIG/19812	<i>Cross track cable management</i>
NR/L2/AMG/1020	<i>Buried services data provision</i>
NR/L2/AMG/1040	<i>Buried services data feedback</i>
NR/L3/INI/CP044	<i>Work package planning process</i>
NR/L3/MTC/0001/GA019	<i>Task risk control sheet for ground penetration and excavations</i>
NR/PS/ELP/00022	<i>400 V 3 phase a.c. shore supply equipment for use in non-electrified areas</i>
NR/SP/CIV/044	<i>Design and construction of undertrack crossings</i>
NR/SP/ELP/27224	<i>Specification for installation of cable routes forming part of the traction distribution system</i>
NR/SP/ELP/27242	<i>Specification of low voltage electrical installations on railway premises (including plugs, sockets, trailing leads and appliances)</i>
HS(G) 47	<i>Avoiding danger from underground services, Health and Safety Executive</i>
www.njug.org.uk	<i>National Joint Utilities Group (NJUG) guidelines</i>
<i>Health and Safety at Work etc. Act 1974</i>	
<i>Management of Health and Safety at Work Regulations 1999</i>	

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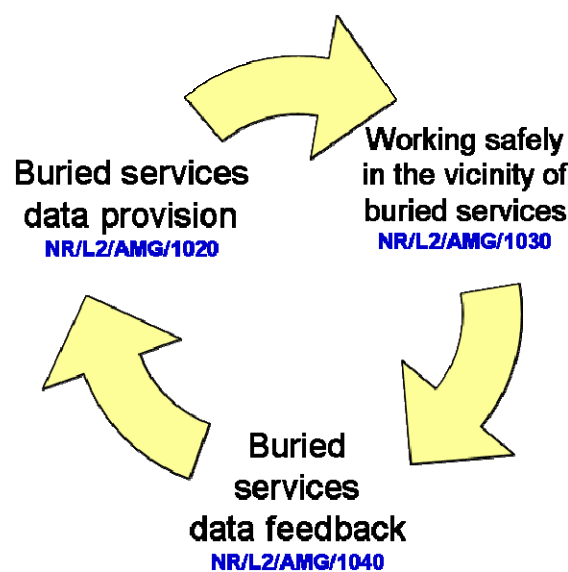
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1 Purpose

To mitigate the risk of damage to and danger from buried services, a standard and consistent method of planning a safe system of work and then working safely with these assets when on site is necessary.

Buried services are widespread on Network Rail owned infrastructure. These assets can pose a risk of danger to personnel and also suffer damage if handled incorrectly.

This standard is one of a suite of documents that support the policy shown in NR/L1/AMG/1010, *Policy on working safely in the vicinity of buried services*. Other standards in the suite are NR/L2/AMG/1020 and NR/L2/AMG/1040.



2 Scope

This standard applies to all persons who plan or carry out ground disturbance work on Network Rail infrastructure.

It applies to all works and activities to be carried out on or around those buried services located on Network Rail owned infrastructure where the ground provides containment or forms a significant part of the support given to that particular buried service.

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3 Roles and responsibilities

Authorising Person A generic term, not reflecting a post title, for the person who completes and approves Part B of the Permit to Dig form and takes responsibility for this action. The Authorising Person is part of the organisation responsible for doing the work on site.

The duties of the Authorising Person are independent of the Responsible Person wherever possible.

Buried Service National Specialist Team (NST) The organisation within Network Rail that responds to internal requests from Network Rail for information on buried services.

Network Rail Programme / Project Manager A generic term, not necessarily reflecting a post title, for the person who is responsible for the safe delivery of the works.

Responsible Person A generic term, not reflecting a post title, for the person who completes and approves Part A of the Permit to Dig form and takes responsibility for this action.

Whenever practicable the duties of the Responsible Person are independent of the Authorising Person.

Senior Manager A generic term, not necessarily reflecting a post title, for the person who is superior within the organisation to the person responsible for all the work on site.

NOTE Examples of a Senior Manager:

- *Programme Engineering Manager who has a number of Project Managers as direct reports;*
- *Infrastructure Maintenance Delivery Manager who has an Infrastructure Maintenance Engineer as a direct report.*

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4 Definitions

For the purposes of this standard, the following terms and definitions apply.

Ballast Box	Refer to Appendix A: Ballast Box
buried service	<p>service, either:</p> <p>a) intentionally laid below the ground and not directly visible by site inspection, even though indirect signs of its presence, e.g. access chambers, markers, might be visible;</p> <p>b) laid on the surface but which with time might have become partially covered over with ballast/other material or vegetation</p> <p><i>NOTE 1 The as-built drawing or plan might not show the service in the covered state.</i></p> <p><i>NOTE 2 A service does not include the presence of adjacent tunnels.</i></p>
Cable Avoidance Tool (CAT scanner)	<p>portable Network Rail accepted device that can be used on work sites to help to locate the position of buried services. It comprises a transmitter, also known as a signal generator (or “genny”) and a hand held receiver</p> <p><i>NOTE A range of products are available which have differing capabilities. Various techniques are used, including:</i></p> <ul style="list-style-type: none"> • <i>detection of naturally emitted signals from metallic services</i> • <i>detection of artificially generated signals input into services.</i>
emergency work	ground disturbance work, or reactive works to prevent an incident, carried out at short notice to restore fitness for purpose of the railway infrastructure in response to failure, accident or incident
ground disturbance	<p>penetration or disturbance of the ground by manual or mechanical means but excluding track tamping and stoneblowing.</p> <p><i>NOTE Ground disturbance includes, but is not limited to:</i></p> <ul style="list-style-type: none"> • <i>forming routes for vehicle and plant access and egress;</i> • <i>excavation by the use of hand tools, mechanical diggers or surface skimming;</i> • <i>the insertion into the ground of any device such as emergency/temporary speed restriction boards, temporary lighting, spikes, bars, thrust bores, piles, moles, augers, sheet pins, earth rods, and fence posts.</i>

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National Hazard Directory

list of health, safety and environmental conditions that could lead to an unintended event or series of events that results in harm at a specific site on or near Network Rail infrastructure

near miss

event at a work site that almost caused a buried service strike incident. The event had the potential to cause harm and/or damage but did not. No damage was caused to any buried services and their ability to function was not affected

over bridge

bridge that spans over a railway line

radar mapping tool (also known as Ground Penetrating Radar, or Ground Probing Radar, or GPR)

portable Network Rail accepted device that can be used on work sites to help to locate the position of buried services. It comprises a signal generator, transmitting and receiving antennae, recording facilities, and graphical output

safe system of work

Detailed description of work to include control measures identified within a work activity risk assessment or specialist risk assessment

NOTE The control measures will be identified within a work activity risk assessment, task risk control sheet or specialist risk assessment.

service

live, dormant or disused cable or pipeline owned by Network Rail or another party

NOTE A cable does not include mechanical signalling cable used in connection with the control of semaphore signals.

service marker

information directly attached to or marked on the outer surface of a cable or pipe to assist identification

Service Owner

organisation or statutory undertaking that is responsible for the operation and management of the services. Service Owners include utility companies, Network Rail and other commercial, industrial and military organisations

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undertrack crossing

buried service route passing under the track(s) below the level of the underside of the sleepers or track slab, which is neither a bridge nor a culvert

NOTE The term excludes a service laid through a bridge span or in the roadway beneath a bridge span.

warning sign

data plate to advise that at least one buried service is in close proximity to the sign location and that care is needed if ground disturbance activity is to take place. The buried service may be a cable or a pipe

NOTE It has previously also been referred to as a "marker plate", "cable marker" or "cable route marker".

5 General

Buried services are widespread and shall always be assumed to be present and in use unless proven otherwise.

When work is being designed or planned, this shall be done in such a way as to minimise the risk of danger from or damage to surface and buried services. Account shall be taken of not just ground disturbance but of all activities that could affect buried services, including, but not limited to, the passage of vehicles and plant, vibration and the generation of heat.

NOTE The generation of heat from track welding activity is managed by specific risk controls outside the scope of this standard.

When considering the risks associated with surface and buried services the extent of the workscope considered shall include not only the actual area where work is taking place but also the access route to the site of work.

The process for working safely in the vicinity of buried services described in clauses **6** to **10** shall always be followed except when emergency work is being carried out, in which case the alternative process specified in clause **11** shall be followed.

When undertaking maintenance type tasks in the Ballast Box or in the space in between adjacent sleepers, a simpler process may be used, refer to the full requirements in clause **9.12**. To summarise, if buried services are believed not to be present in the Ballast Box, and until buried services are discovered, the following requirements may be omitted,:

- buried services search request, clause **6.1**;
- the normal site survey process described in clause **7**;
- permit to dig, clauses **8**, **9.2** and **10.7.3**;
- repeat survey, clause **9.16**.

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6 Preparation and planning

6.1 Introduction

When designing or planning work, the location of all recorded buried services at the site shall be understood. However, this on its own is not sufficient to provide a safe method of work and it shall be supplemented by site surveys and appropriate on-site practice.

An iterative approach shall therefore be followed to identify buried services present on the site:

- search existing records for information on buried services, clause **6.1.1**;
- develop a safe system of work, clause **6.2**;
- carry out non-intrusive survey, clause **7**;
- obtain "Permit to dig" for trial holes, clause **8**;
- dig trial holes and add information collected to existing information, clause **9.4**;
- obtain "Permit to dig" for work, clause **8**;
- monitor work for further evidence of buried services, clause **9.3**.

NOTE A buried services search by itself will not provide a safe method of working.

6.1.1 Search existing records

The location of all known buried services in the vicinity of the site of work shall be established following the process specified in NR/L2/AMG/1020, *Buried services data provision*.

The results of the buried services search shall be received and understood before ground disturbance work, or activity likely to lead to heat transfer, takes place. Evidence of the buried services search shall be retained.

The drawings/plans, provided as part of the results of the buried services search, shall not be relied on to show the position of services accurately. The position of services shown on such plans shall be regarded as approximate only.

These limitations shall be taken into account when planning a safe system of work.

NOTE A buried services search does not include the presence of bridges, culverts or tunnels.

6.1.2 Buried service(s) summary sheet

The results obtained from the buried services search shall be summarised on a "Location of buried services sheet" form, a copy of which is provided in Appendix E: FORM - *Location of buried services summary sheet*, or on an equivalent form that captures the information shown on it.

NOTE The summary sheet will help the development of a safe system of work.

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6.2 Safe system of work

A safe system of work shall be developed and authorised before work on site commences to control:

- the risk of danger to personnel from buried services;
- the risk of damage to buried services.

There is a risk that not all buried services will be detected by record searches and site surveys so the safe system of work shall allow for the presence of additional services.

NOTE Business functions within Network Rail each have their own process to achieve a safe system of work, e.g.:

- *Infrastructure Investment: NR/L3/INI/CP044, Work package planning process;*
- *Infrastructure Maintenance: Task risk control sheets, particularly NR/L3/MTC/0001/GA019.*

The safe system of work shall describe how buried services and any trial hole locations are to be temporarily marked on the ground. It shall also describe how the buried services at the site are to be protected. Some possible options for protecting buried services are described in *Appendix C: Protection of services*.

As specified in **9.5**, hand held power tools and mechanical excavators shall not be used within 0.5 metres of a buried service unless there is no practicable alternative. Where this is not practicable the need for physical precautions to prevent the tool or excavator striking the service shall be considered as part of the development of the safe system of work.

7 Site survey

7.1 General

A site survey shall always be carried out, even when the response from the buried services search does not indicate the presence of buried services.

The site survey shall comprise:

- a visual inspection;
- a cable avoidance tool (CAT scanner) survey;
- optionally, an additional radar mapping survey.

NOTE A radar mapping survey can be particularly useful at overbridges.

When surveying buried services, it shall be assumed that they do not necessarily follow straight lines and they are not always at a constant depth below ground level.

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7.2 Visual inspection

A visual inspection of the site and the surrounding area shall be carried out after the results of the search of existing records has been received.

NOTE 1 The purpose of the inspection is to identify any evidence on the site of buried services not identified by the search of existing records and to check for evidence that will confirm the location of the services that were identified.

The visual inspection shall always check for the existence of signalling and telecoms cables as the records of these often exist only in schematic form and schematic drawings are not provided as part of a records search. Information shall also be sought from local contacts to help establish cable locations.

The results of the visual inspection, even if a nil result, shall be used to update the information already recorded on a "Preparatory Site Services" form, a copy of which is provided in Appendix H: FORM – *Preparatory Services Survey*, or on an equivalent form that captures the information shown on it.

NOTE 2 A list of local contacts relevant to the buried services works scope is supplied as part of the search results by the Buried Services NST. Refer to NR/L2/AMG/1020, Buried services data provision.

NOTE 3 The cess is always regarded as having the potential for containing buried services and warning signage is not normally provided.

NOTE 4 Indications of a buried service can include, among others, the presence of lamp posts, pit covers, service markers, warning signs or cable connections to rails or lineside equipment.

7.3 Cable avoidance tool

A search shall be made of the work site by trained and competent staff using a Network Rail accepted Cable Avoidance Tool (CAT scanner) and accepted transmitter/signal generator ("genny").

The CAT scanner shall not be damaged or defective and the service or calibration date shown on the tool shall not have expired.

Arrangements shall be made so that the devices will always have sufficient power to enable them to work correctly for the duration of time that they are required to be in use at the site of work.

In combination with the use of available plans, the physical location of buried services shall be determined.

The results of the CAT scan shall be interpreted and recorded by a competent person on a "Preparatory Site Services" form, a copy of which is provided in Appendix H: FORM – *Preparatory Services Survey*. The form shall be a continuation of the same form that was used during the site visual inspection. Refer to 7.2.

7.4 Radar mapping tool (GPR)

A radar mapping tool may be used to identify the location of buried services. The equipment and the method used shall be approved by Network Rail.

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The GPR survey, if undertaken, shall be made of the work site by trained and competent staff.

The GPR device shall not be damaged or defective and the service or calibration date shown on the device shall not have expired. The equipment shall be operated according to the manufacturer's instructions.

Arrangements shall be made so that the device will always have sufficient power to enable it to work correctly for the duration of time that it is required to be in use at the site of work.

The results of the GPR survey shall be interpreted and recorded by a competent person on the same form that was used during CAT scanning for the same site of work, as specified in 7.3. If a paper print out of the GPR survey has been produced, this shall be attached to the form.

7.5 Temporary marking of service routes

When the route of any service is confirmed, it shall be noted and marked across the work site. The marking shall indicate the location of the buried service route and shall be easily distinguishable from markings that indicate a safe place to dig or spike.

The method of marking used shall not endanger the buried service or add additional hazards, and shall enable the position and depth of the buried services to be readily established at all times.

The specification and method of temporary ground marking shall be identified in the safe system of work.

8 Permit to dig

8.1 Controlling ground disturbance

A permit to carry out ground disturbance work shall be required for each site of work, except for specific types of work undertaken within the Ballast Box, as specified in 9.12.

8.2 "Permit to Dig" form – Parts A and B

8.2.1 Relevant information

Prior to the commencement of any ground disturbance works, a "Permit to Dig" form, Appendix F: FORM – *Permit to Dig* or an equivalent form that captures the information shown on it, shall be completed and used as authority to proceed.

The "Permit to Dig" form shall not be used for emergency ground disturbance work. For this type of activity, refer to clause 11.

NOTE A "Permit to Dig" is a control measure to prevent unauthorised digging. It is also an effective method for the person in charge of supervising the excavation work on site to be in possession of the relevant information.