London Underground Safety Certificate and Safety Authorisation

May 2017

UNDERGROUND

EVERY JOURNEY MATTERS

Table of Contents

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This application for non-mainline Safety Certification and Safety Authorisation was approved by the Office of Rail & Road (ORR) in January 2017.

This document will be made available to the public on the Transport for London website (www.tfl.gov.uk).

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Revision Control

London Underground (LU) has maintained an approved Railway Safety Case since 1995 in accordance with the Railways (Safety Case) Regulations. Following the introduction of the Railways and Other Guided Transport Systems (Safety) Regulations in April 2006, LU's application for Safety Certification and Authorisation was approved by the Office of Rail Regulation (now known as the Office of Rail and Road) in March 2007. A subsequent renewal was approved in March 2011. The Safety Certification relates to train operations and the Safety Authorisation covers stations and infrastructure operation.

Revision Number	Date	Changes
Version 5	January 2017	Minor updates of LU's Safety Certificate and Safety Authorisation for formal re-submission to the Office of Rail and Road (ORR).
Version 5.1	May 2017	Minor changes resulting from organisational change - removal of the role of Chief Operating Officer

Section 1: Type, extent and particulars of operations and infrastructure

Contents

1.1 Introduction

London Underground (LU) is the metro system which serves London and surrounding counties. LU provides a non-mainline mass transit train and station service seven days a week and is an integral part of the transport system in London.

This Safety Certificate and Safety Authorisation document describes how LU manages its activities to deliver a safe railway. Safety performance has continuously improved over the past 15 years and LU's investment programme will further deliver safety and reliability benefits through the delivery of new rolling stock, upgrading of track, new signalling systems and upgraded stations.

This section provides a summary of the particulars of LU's operations, infrastructure and assets. The locations served and LU's boundaries of operations are shown on the map in Annex 1A.

1.2 Ownership

LU is a wholly owned subsidiary of Transport for London (TfL), the statutory body responsible for implementing a transport strategy for London, carrying out the Greater London Authority's transport duty and following the directions of the Mayor of London. The London Underground Board governs London Underground and the London Underground Managing Director reports directly to the TfL Commissioner. Details of governance, and the organisation and roles and responsibilities that enable the safe operation of the LU network are described in Section 2.

Following the integration of both Tube Lines Limited and Powerlink operations into TfL in recent years, a programme of work is underway to integrate management system content, identifying any gaps, capturing best practice and aligning processes. The TransPlant division - responsible for maintaining and operating engineering trains across the LU network - remains part of Tube Lines Limited, the contractual entity, and therefore maintains a separate Safety Certificate for the operation of these engineering vehicles for which Tube Lines Limited is the duty holder.

Other duty holders within TfL responsible for their own Safety Authorisation and/or Safety Certificates are:

- Rail for London Limited (Safety Authorisation); concessionaire, Arriva Rail London (Safety Certificate and Safety Authorisation);
- MTR Corporation (Crossrail) Limited (Safety Certificate and Safety Authorisation)
- Docklands Light Railway Limited (Safety Authorisation); franchisee, Keolis Amey Docklands Limited (Safety Certificate and Safety Authorisation).

London Trams, which are part of the TfL organisation, also have responsibilities under the Railways and Other Guided Transport Systems (Safety) Regulations 2006 (ROGS).

1.3 Employees

LU employs approximately 20,000 staff and operates in a hierarchical, functionally based structure. Within LU, a number of staff undertake safety critical activities. These activities are further detailed in Section 17.

The number of contractors employed by LU varies depending on the nature of project and maintenance work and can range from 5,000 to 20,000. This includes contractors employed at LU locations as well as those who work off-site (in or outside London).

1.4 Interfaces with other railway operators and infrastructure managers

LU lines comprise approximately 860 track kilometres linking 270 stations, 262 of which LU operates. The remaining eight stations are operated by Network Rail or other Infrastructure Managers. Several LU stations interface with other railway operators. LU operates on Network Rail infrastructure at a number of locations. Details of LU's interfaces with Network Rail and other operating companies and how these are managed to ensure co-operation between the parties are described in Section 13.

1.5 Signalling and control systems

The signalling system embodies significant safety redundancy in its design and implementation and is not reliant on the safety integrity of a single component. Signalling control systems on the Underground are organised to facilitate safe control of the railway on a line by line basis from line control centres. The underlying technology varies from line to line. Signalling assets are described in more detail in Section 16.

1.6 Infrastructure affecting safe operation

LU is the Infrastructure Manager for the LU network and as such is responsible for health and safety, the control of infrastructure and the operation of stations. The fundamental characteristics of the LU network have a major impact on the design and maintenance of assets, especially in the context of rising customer numbers:

- two different sizes of tunnel and train - tube and sub-surface
- curvature of the tracks restricting speed
- the space constraints of tube stock
- congestion due to the layout of many old stations
- the variety and age of assets used.

Health, safety and environment management arrangements are described in Section 2. The design, maintenance and operational arrangements are detailed in Sections 14, 15 and 16 respectively.

1.6.1 Track

A number of different track constructions are employed, using wood or concrete sleepers or concrete slabs. In open and sub-surface tunnels sleepers are laid on stone ballast. In tube tunnels, sleepers are fixed in place by concrete. Where assets are being upgraded, LU's strategy, where possible, is to replace bull headed rail with flat bottomed rail on concrete/modern form sleepers. Track geometry and the track environment, e.g. on a bridge, embankment, etc., influence the track construction.

The Category 1 Standard: *S1157 Track – Performance, design and configuration* outlines the issues to be considered during track design, including the normal track loading generated by speed and tonnage of both service vehicles and engineer's vehicles using any particular route. All track is designed and maintained so that track condition, geometry and track bed condition are preserved.

In total, the LU network extends over approximately 860km of running track, of which approximately 17km is single track. LU also has rights to operate over 17km of Network Rail track. Aldwych is not considered part of the operational railway as it is not used on a regular basis. King's Cross and Euston Loop are used on a regular basis by engineers trains and can be used for reversing empty passenger trains.

The LU network is over 150 years old and there are a number of complex rail junctions across the network. Safe operation of the passenger railway over these junctions and across the railway is managed as set out in Section 16.1.

There is only one public crossing of the track on the LU network, north of Amersham station, which is controlled with:

- reflective whistle boards positioned 200 metres and 400 metres on the approach side of the crossing in both directions
- warning signs to the public
- non-slip material covering the wooden walking area of the crossing.

1.6.2   Tunnels

Tunnels are subject to design and maintenance standards to limit the risk of failure. Surface stock is prevented from entering tube tunnels by surface stock detectors where necessary. These turn all signals to danger and raise trainstops. Nine pairs of Tube tunnels pass under the River Thames.

In the usual course of operations, the piston effect of trains moving through tunnels provides the majority of ventilation on the Underground. This is supplemented by tunnel vent shafts and fans on some lines.

Between Westminster station and the Canning Town portal on the Jubilee line, ventilation fans can be used to control smoke and direct air flows in an emergency as part of an integrated tunnel and public area ventilation system.

In each of the two tunnels between the Green Park junction and the Canning Town portal on the Jubilee line, there is a continuous walkway for use by the emergency services.

1.6.3   Pumps and floodgate

There are 2 operational floodgates located at Canning Town portal (that prevents flooding from the River Lea) and at Westminster on the Jubilee line (that prevents flooding from the River Thames). There are approximately 2,000 sumps and 720 pump sites on the LU network. Of these, 65 pump sites are at critical locations and there are over 270 sites that are monitored and controlled remotely.

1.6.4   Station assets

Stations are categorised as open, sub-surface or tube. This categorisation depends on the extent to which the station is underground. Most sub-surface and all Tube stations are fitted with additional fire prevention features and have two independent sources of power.

Customer flow in LU stations is managed through a combination of a gateline (in the majority of stations), structural design of station premises, fixed and temporary barriers, lattice gates and staff operational procedures. Station lighting is designed and maintained to provide appropriate lighting levels within the station environment. Stations have back up emergency lighting systems (where appropriate) in the event of a power failure.

LU has a number of disused stations, where a train service is no longer operated. Management responsibilities are defined for these stations and these managers are responsible for ensuring that regular inspections are undertaken to ensure that these locations pose no risk to the operational railway.

1.7   Train operations

Customers make over 1.3 billion journeys on the LU network each year.

Traffic hours are from approximately 05:00 until approximately 01:30 for the majority of LU lines. LU operates a 24 hour service on Friday and Saturday nights on the Central, Jubilee, Northern and Victoria lines. LU is likely to extend this service to the Piccadilly lines in the future. The number of train movements varies across the network, and is approximately 540 trains on a weekday peak, 465 trains on Saturday peak and 430 on a Sunday peak. The LU Working Timetables, which all train movements on the Tube network including empty trains and train movements in and out of depots, are available on the TfL web site.

LU operates a fleet of passenger rolling stock which is described in Section 18. LU also operates a number of specialist engineering vehicles (described in Section 16.1.1) and TransPlant maintains and operates engineering vehicles on the LU network in line with its Safety Certificate.

Annex 1A: LU Operations Map

The map below shows the full extent of LU operations

Section 2: Safety Management System overview

Contents

2.1   Introduction

LU's Health, Safety and Environmental Management System (HSEMS) provides the structure and framework within which health, safety and environmental risks are managed. The key objectives of the HSEMS are to:

- set out the strategic management arrangements and processes by which the commitments within the Health, Safety and Environmental Policy are met
- allow management of risks to a level that is 'as low as reasonably practicable' (ALARP).

LU's management arrangements are consistent with good practice and the principles in the Health and Safety Executive guidance contained in HSG 65, Managing for Health and Safety and OHSAS 18001 Occupational Health and Safety Management Systems specification.

2.2   HSE Policy

The London Underground Health, Safety and Environment (HSE) Policy (P002) sets out LU's overall health, safety and environmental aims, gives a commitment to improving health, safety and environmental performance and directs management arrangements and responsibilities. It is authorised by the LU Managing Director and sets out the principles of action for the organisation.

The policy has been communicated to all LU employees via the corporate email communication bulletin, the LU intranet, noticeboards and team briefings, and all LU Directors have a responsibility to ensure staff awareness and compliance. The commitments set out in the policy are articulated through specific requirements in the Management System. The Health, Safety and Environment Policy is reproduced in Annex 2A.

2.3   LU Management System framework

The Management System incorporates various elements relevant to the management of safety within LU. The structure of content within the Management System and how the content should be used is described in Reference Document: *R0010 Framework for the TfL Management System content*.

Access to the intranet-based Management System is available to all LU staff, and to suppliers on request.

Where other operating companies (TOCs) use LU's infrastructure or LU operates on other TOCs' infrastructure, appropriate agreements are put in place to allow the TOCs access to the relevant parts of the Management System, as described in Section 13.

Details of management responsibilities for updating the management system and the change control process are included in Sections 5 and 7.

2.3.1   Key elements of the Management System

The Management System is made up of the following key elements:

- Clear instructions and guidance including on-line handbooks, standards, and guidance that enable LU staff to carry out their activities safely
- Associated training for LU staff and managers

- Suitable metrics on business and safety performance where applicable and useful
- Performance management of LU employees to ensure the correct safety behaviours are being adopted
- Audit of requirements in the system, to ensure that safety procedures and standards are being met
- A flexible change control mechanism to use when parts of the system need to be expanded or changed, e.g. as a result of new safety developments (as outlined in Section 9.2 or as a result of lessons learnt from an incident (as outlined in Section 10.1.2)

These elements are aligned and support each other to create an integrated safety management system.
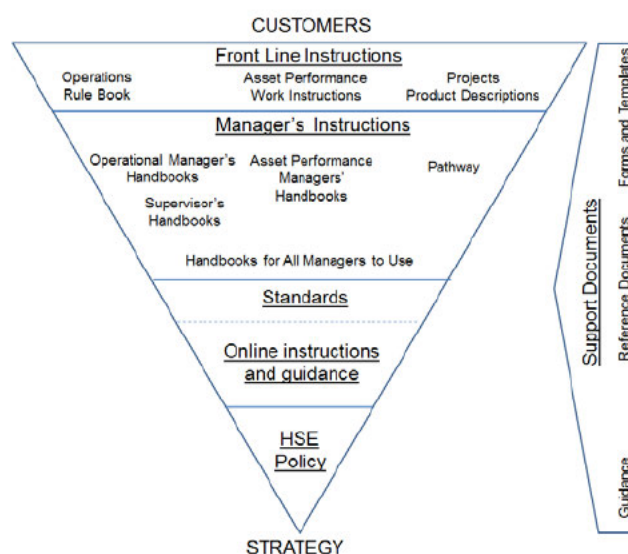
Figure 2.1   The Management System Documentation

LU is not a member of the Railway Group, but complies with relevant Railway Group Standards (RGS) where it operates over Network Rail infrastructure. Agreements are made with Network Rail about application of the relevant Railway Group or LU requirements as set out in Section 13.

2.4   Governance

The London Underground Board governs London Underground and is made up of six LU Directors. The London Underground Board is accountable for making strategic decisions which govern LU and for managing risks significant to LU's business objectives. The London Underground Executive meeting (which is attended by the LU Directors) reviews safety performance and key safety risks regularly.

The London Underground Board has granted decision making powers to a number of executive groups to assist in ensuring that the collective accountabilities of the LU Directors are discharged within a clear management framework. The Director's Risk and Assurance Change Control Team (DRACCT) is focuses on managing safety risks associated with changes.

2.4.1 LU Directors' Risk, Assurance and Change Control Team

The LU Directors' Risk, Assurance and Change Control Team (DRACCT) undertakes an important peer review role within LU under delegation by London Underground Executive. The group meets at least every four weeks and may meet more frequently if needed. Its core role is the peer review:

- of changes with the potential for significant safety impact (including those changes initiated by LU Programme Boards)
- of significant HSE changes to processes, technology, operational arrangements, engineering works, organisational change, etc. (as set out in Section 7)
- when Independent Safety Verification is required under the Railways and Other Guided Transport Systems (Safety) Regulations (2006)
- of formal investigations in terms of their adequacy and the outputs in terms of Formal Investigation Reports (FIR) and improvement programmes
- of all Rail Accident and Investigation Board (RAIB)/Office of Rail and Road (ORR) reports concerning LU
- of changes to standards and procedures
- of Operational Safety Plans.

The roles and responsibilities of DRACCT are set out in Category 1 Standard: *S1538 Assurance* and in the DRACCT Terms of Reference.

DRACCT is supported by a Filter Group that deals with less significant changes. Every change agreed by the DRACCT Filter Group is shared and reviewed with DRACCT.

2.5 LU management

The London Underground Managing Director is accountable for the health and safety of Underground customers, employees and others affected by LU operations, and for fulfilling obligations as infrastructure manager for the LU network. All Executive Directors report to the London Underground Managing Director. Collectively, they are responsible for policies, budget approval, strategic planning, proposals affecting corporate goals, safety risks and safety performance.

Each Executive Director is individually accountable for:

- implementing decisions to ensure HSE is effectively managed within their area
- controlling the significant risks associated with activities they are accountable for
- implementing the arrangements for HSE management set out in LU standards
- ensuring implementation and effectiveness of risk control systems.

Directors and senior managers are held accountable for their performance through a variety of means, including:

- delivery of Key Performance Indicators and targets, including safety performance; monitored at local and Board level
- incident monitoring, review and investigation
- compliance with the Management System which is monitored through audits, safety tours, etc.
- through the Performance and Development process described in Section 8.

LU shares corporate safety direction with other parts of TfL (Surface Transport, including London Rail, and TfL's Professional Services directorates) as part of the process of developing TfL corporate safety direction.

Where organisation changes are planned, the safety impacts of these changes are assessed in line with LU's change management processes to ensure risks are identified and appropriate mitigation put in place where required.

The LU organisation structure is set out below.
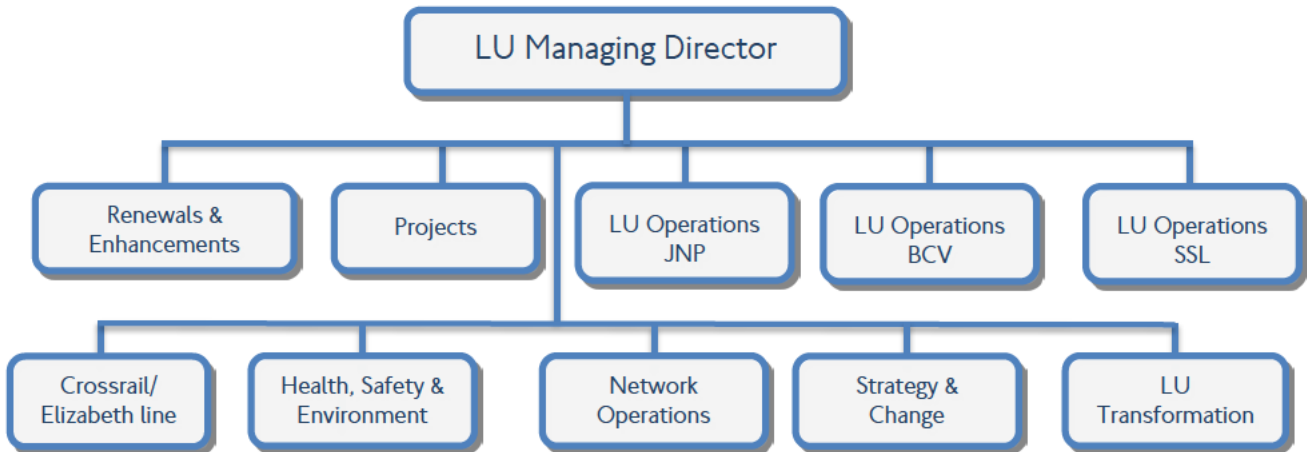
Figure 2.2   The LU Board

2.5.1   Health, Safety and Environment

The TfL Director of Health, Safety and Environment (HSE), who is an Executive Director of London Underground Limited and reports directly to the London Underground Managing Director, is accountable to the London Underground Managing Director for:

- providing strategic direction and support to LU management on health, safety and environment
- providing competent professional safety support to LU
- the ongoing development, implementation, maintenance and improvement of the health, safety and environmental management system for LU
- the development, maintenance and review of the health and fitness of LU staff and setting standards for suppliers and contractors.

HSE staff retain LU specific knowledge and experience, and are matrixed across LU. In addition, the Head of HSE Operations and Head of HSE Capital Projects Directorate have indirect reporting lines to the relevant LU Directors.

2.5.2   LU Managing Director

The LU Managing Director is accountable for the running of LU, including trains, stations, and service control, and the maintenance of LU assets. The structure is divided by line grouping with Operations Directors for BCV, SSL and JNP responsible for safety in operational and asset performance for their respective areas.

The LU Managing Director has overall accountability for:

- customer service delivery of train and station operations to meet performance, quality, safety and security, environmental, budgetary and real time information targets
- ensuring the effective and safe management of operational incidents and effective collaboration with emergency services

- ensuring operational readiness for the integration of new assets into customer service as part of the upgrade programme
- identifying, understanding and managing risks to safety and service from relevant assets and improving where reasonably practicable
- maintaining assets to an acceptable standard of safety and reliability on the basis of whole life cost analysis and the analysis of failure trends to identify areas of improvement
- improving asset management using new technology and best practice in accordance with LU change control and relevant legislation
- employing suitably competent, qualified resources to operate and maintain assets, and ensuring the continued competence through training and licensing
- responding to, and dealing with, reported asset faults
- working collaboratively with colleagues across LU to ensure effective sharing of information and good asset maintenance practice.

Specific details about how LU operates a safe railway service is set out through this document.

2.5.3   Projects Director

The Projects Director is responsible for the delivery of LU's capital programmes, including the safe design and delivery of new infrastructure (either directly or through third parties). The Projects Director ensures the delivery of actions through Programme Assurance by suppliers that are essential for the maintenance and the reduction of risk on the LU network.

2.5.4   Engineering Director

The Engineering Director reports to the Director of Renewals & Enhancements and provides competent engineering advice and support across LU. The Engineering Director establishes standards in relation to assets and seeks assurance that assets are designed, constructed, installed and maintained in accordance with those standards. The Engineering Director has overall accountability for LU's safety verification process as detailed in Section 7. The Engineering Director is supported by Heads of Technical Discipline for the relevant engineering disciplines.

As set out in Section 7, the LU Engineering Director has overall accountability for the safety verification process and is designated as LU's Independent Competent Person (ICP) under ROGS. Where safety verification activity is required, the independence of the Engineering Director, and/or any resource appointed to undertake safety verification, is achieved by recognition of the functional reporting line to the TfL Director of Health, Safety & Environment (or a person appointed by the TfL Director of HSE).

2.5.5   Human Resources

Human Resources (HR) plays a key role in establishing competence criteria for staff and establishing appropriate performance management arrangements. The Human Resources Directorate also monitors the drugs and alcohol testing programmes.

2.6 Consultation with employees

The consultation process provides an important feedback channel between employees and managers on health, safety and welfare matters enabling:

- managers and employees to understand their legal responsibilities
- constructive liaison and feedback between managers and Trade Union Health and Safety (H&S) Representatives
- the improvement of risk control systems.

LU recognises that the success of arrangements for consulting with employees on health and safety matters has the potential to provide significant benefit to HSE management arrangements. Such potential benefits include:

- managers receiving a 'front line' viewpoint before implementing changes,

- Trade Union Health and Safety Representatives made aware of forthcoming issues in sufficient time to enable them to obtain the view of employees they represent,

- better relationships are formed between managers and Trade Union Health and Safety Representatives, and

- enhancing the potential for continuous improvement in health and safety performance.

Staff are encouraged to make observations on local or wider health and safety issues to their managers.

Health and Safety Representatives are elected to represent all staff (regardless of whether they are a Trade Union member or not) on health and safety matters and to communicate and consult with the members they represent.

The intranet-based Management System content: *Communicating and consulting on HS&E* and the suite of HSEMS standards, developed in conjunction with employee Health and Safety Representatives, set requirements for employee involvement in key health and safety related activities. These include:

- the management of change
- risk assessment
- incident investigation
- monitoring and audit
- the development of applications for Safety Certification and Safety Authorisation.

2.6.1 Health and safety consultative framework

In addition to the involvement of LU's Health and Safety Representatives in these day-to-day consultation activities, LU, working with the Trades Unions, has established a consultation framework (*London Underground Health & Safety Machinery* document) that operates on a two level tier basis to enable regular consultation to take place at local, functional and company levels. This has been structured in such a way as to allow health and safety issues and concerns to be considered in the most appropriate way. Full details of the framework are available on the LU intranet.

2.7 Monitoring health, safety and environmental performance

The Category 1 Standard: *S1566 Monitoring Health, Safety and Environmental Performance* applies to LU and its suppliers, and sets requirements for a risk based monitoring framework whereby performance analysis provides assurance that the HSEMS is adequate and effective. The principal means by which LU monitors performance, including addressing shortcomings or poor performance, are set out in the standard. It also gives competence requirements for those carrying out the work and determines priorities for developing improvement actions.

Measuring performance occurs at all levels of management control from Board reviews of performance against safety objectives to operational management monitoring of specific workplace precautions.

Further details on safety performance targets and improvement actions are detailed in Section 6. Further details on incident reporting, investigation and learning lessons from incidents are set out in Section 10.

The intranet-based Management System section on *Reviewing HS&E Arrangements* sets out requirements for the review of the health, safety and environmental aspects of the Management System to ensure its continuing suitability, adequacy and effectiveness. These arrangements allow decisions about the nature and timing of necessary actions to remedy deficiencies and effect improvements. They also ensure effective review of compliance with the health, safety and environmental management system.

2.7.1 Confidential Reporting

LU subscribes to the Confidential Incident Reporting and Analysis System (CIRAS), which is an external service provided for the rail industry. This allows employees to raise concerns in strict confidence. Managers must ensure that all employees are aware of CIRAS. On receipt of reports from the confidential reporting agency, LU investigates the issue, provides a response and takes action as necessary.

Annex 2A: LU Health, Safety and Environment Policy

TfL Health, Safety and Environment Policy
December 2016

My commitment

Our customers, users, employees and suppliers have an expectation that when using or delivering our services or assets they will remain harm free. Our vision is "Everyone home safe and healthy every day". My Directors and I are committed to meeting our vision and these expectations.

We want to ensure that:

- every journey is a safe journey for our customers and users
- the security of our customers and employees is assured
- our employees, agency staff and contractors go home safe and healthy every day
- we maintain our assets and deliver projects safely
- we fulfil our commitments to prevent pollution and nuisance; protect biodiversity; improve air quality; and reduce waste and carbon emissions
- we are inclusive and accessible to all customers and users, including those with disabilities.

How we go about this

We have put in place health, safety and environment rules and procedures, including emergency procedures that are regularly updated. These are for you to use. If you do not know where to find them ask your line manager or your Health, Safety and Environment (HSE) manager.

We assess risks and introduce HSE measures to ensure risks remain as low as reasonably practicable. We tell you the risks and the measures we have taken to control risks. We will comply with legislation. There is regular review of safety, health and environment statistics to identify positive and adverse trends and their root causes, so necessary action can be taken. We also assure ourselves that our suppliers maintain a good health, safety and environment record.

Each year we develop detailed HSE improvement plans to enhance what we do. These plans are regularly reviewed by the Directors in your part of the business.

When working for TfL or one of its companies you will receive the necessary training and equipment to ensure that you can undertake your job safely, ensure the safety of customers and protection of the environment.

As an employee, your physical and mental health and wellbeing is also important and we provide occupational health services to help you stay healthy and in work and provide suitable welfare facilities at your work place.

We want to maintain a fair culture and employees or their representatives are consulted on health and safety matters as they arise, in a meaningful way through scheduled health and safety meetings or more regularly where needed.

What we can all do

We all need to look out for each other and speak up if anything is unsafe or damaging to health or the environment.

We all have a duty to follow our HSE rules and procedures. Do not take shortcuts. If you think rules or procedures are unhelpful let your manager know. Where necessary rules and procedures can be changed.

We can learn from the past, so always report accidents, incidents and near misses/close calls.

Demonstrate the TfL behaviours in everything we do.

In this way we can work together so that our vision for a safe and healthy environment is achieved.

Mike Brown MVO
Commissioner

Leon Daniels
Managing Director
Surface Transport

Mark Wild
Managing Director
London Underground
and TfL Rail

EVERY JOURNEY MATTERS

Section 3: Legislative requirements

Contents

3.1   Introduction

London Underground is aware of its statutory responsibilities as a Transport Undertaking and Infrastructure Manager for the railway. The requirements specified in the Railways and Other Guided Transport Systems (Safety) Regulations 2006 (ROGS) have been incorporated into London Underground's safety management arrangements.

3.2   Management of legislative requirements

The HSE Directorate maintains a Statutory Instruments Register – a register of all applicable health, safety, environmental and asset-related legislation on behalf of LU as set out on the intranet-based Management System section: *Change to HS&E law*. This requires the HSE directorate to maintain the Statutory Instruments register, to monitor changes to HSE legislation and to identify and address the implications of new or changed legislation. The Register contains two broad headings, Acts and Regulations, these cover statutory provisions in respect of health and safety, environment and assets.

A wide range of legislation applies to LU, including the Health and Safety at Work etc. Act 1974, Management of Health and Safety at Work Regulations 1999, Construction (Design and Management) Regulations 2015, Railways and Other Guided Transport Systems (Safety) Regulations 2006, etc. The Register provides a synopsis of the general requirements of these, and other, Acts and Regulations, a commentary on the relevance to LU and a designation in respect of whether the legislation has health and safety, environmental or asset implications. The Statutory Instruments Register is available to all employees through the LU intranet.

Relevant legislation is reviewed to understand how it applies to LU activities. Where required, information, instruction or guidance is added to the LU HSE Management System which will ensure that clear requirements are in place to ensure compliance with legislation (changes are made in line with LU's HSE Management System procedures for managing change outlined in Section 7). Where appropriate, LU's Management System specifically refers to external guidance setting out compliance, e.g. guidance from the Health & Safety Executive.

3.3   Ensuring legal compliance

LU subscribes to a recognised technical index which employees can access via the LU intranet site. To prepare for forthcoming legislation, a nominated manager within HSE regularly monitors a number of key web sites for consultation documents/new legislation. LU participates in the shaping of legislation by analysing the implications of proposed legislation and ensuring that any specific concerns are fed back to those proposing the legislation. This analysis is also presented to key decision makers within LU who ensure that suitable programmes are put in place to ensure compliance in the required timescale.

LU also submits comments on amendments to Railway Group Standards to the Railway Safety and Standards Board (RSSB). Where the need for a derogation is identified, this is requested from RSSB in accordance with Railway Group Standards GA/RT6004 Temporary Non-Compliance with Railway Group Standards and GA/RT6006 Derogations from Railway Group Standards. The process is set out in the LU Category 5 Standard: *S5631 Railway Group Standards Reconciliation*. The purpose of the Standard is to set the requirements for the management of Railway Group Standards to

ensure that LU complies with applicable standards and regularise non-compliances where they occur.

Relevant asset engineers and a dedicated role in the HSE directorate are required, through the Manager's Handbook: *H-027 Providing legal support, governance and audit*, to review and provide updates on relevant legislation to the HSE senior team. Where required, changes to documents in the Management System are made to ensure compliance. New or amended documents are developed via the change control process.

Compliance with the legal requirements and applicable Railway Group Standards, through LU's Management System, is ensured through local HSE monitoring, safety and technical assurance processes, verification and audit. This is supported by relevant training and competence management.

Section 4: Control of all categories of risk and risks arising from activities by other persons

Contents

4.1   Introduction

System risk is the totality of all safety risks to customers, employees, suppliers, other railway operators and other affected parties that arise due to LU operations. It comprises:

- risks arising from LU's actions or failures
- risks imported by customers and other third parties
- risks that LU exports to others.

The approach LU adopts to justifying safety decisions such that its risks are ALARP is outlined in the Category 1 Standard: *S1521 Safety Decision Making*. The purpose of this standard is to specify the requirements to ensure that safety decisions are made in a consistent and transparent manner and demonstrate that safety risks have been reduced to a level which is as low as reasonably practicable (ALARP). This standard specifies that the starting position of any ALARP decision is one of best practice and/or modern standards. Where best practice is unachievable, LU undertakes a qualitative analysis of the safety implications supported by a quantitative analysis as appropriate.

Mapping and recording hazards and controls as part of the risk assessment process provides a structured framework for:

- understanding the nature of the current risk on the LU network
- identifying areas needing in-depth risk analysis
- assessing the suitability of risk control arrangements
- assessing the safety significance of proposed changes to the railway
- helping to determine safety objectives, targets and measures.

4.2   Risk identification and assessment

LU and its suppliers are responsible for undertaking risk assessments for their activities that affect the railway in accordance with the Category 1 Standard: *S1526 The Assessment and Management of Health, Safety and Environmental Risk*. The purpose of this Standard is to specify the requirement to (a) identify, assess and manage health and safety risks (associated with activities and operations) to ensure they are reduced to as low as is reasonably practicable (ALARP), (b) Identify and assess environmental impacts to ensure that the principles associated with best available technique (BAT) are applied and (c) Maintain, develop and use the LU Quantified Risk Assessment (QRA) which communicates understanding of the risk from major hazards with the potential to cause fatality to LU customers and other members of the public and assists in managing those risks. The standard includes a requirement to consult and co-operate with other organisations that may be affected.

New risks are identified through considering a range of issues (depending on the activity). The Category 1 Standard: *S1526 The Assessment and Management of Health, Safety and Environmental Risk* sets out approaches for identifying and assessing risk. Methods of identifying risk includes accident and incident records, input from those knowledgeable with the activity (including Health and Safety representatives, engineers, HSE professionals, operational staff, third parties, etc. where appropriate), structured hazard identification (HAZID) sessions, legislative requirements (as set out below), etc. Similar methods are used, when appropriate, for reviewing existing risk assessments. The standard also requires LU and its suppliers to identify and assess the health and safety risks of all changes, activities or projects at the design, implementation, operational and decommissioning stages. This process also applies to assessing the risks to LU from third party activities.

Different situations require different risk assessment techniques. To reflect this, LU has developed a variety of risk assessment tools, these are:

- LU Quantified Risk Assessment (LU QRA)
- Customer Risk Assessment (CRA)
- Workplace Risk Assessment (WRA)
- Asset Based Risk Assessment (ABRA).

The LU Safety Risk Manager provides guidance to LU on the appropriate technique for assessing and quantifying different risks. Risk rating systems have been developed for these risk assessment methodologies.

Particular requirements have been specified in health and safety legislation for certain issues, e.g. noise. These risks are assessed using LU standards and instructions on the intranet-based Management System and UK Health and Safety Executive (HSE) / Office of Rail and Road (ORR) Guidance and Codes of Practice to ensure that best practice is employed.

4.2.1 Interfaces with other railway operators

LU has conducted risk assessments to identify the risks arising due to interfaces when:

- LU operates over Network Rail infrastructure
- LU services interface with other operators' stations
- other operators run over LU infrastructure
- LU trains run parallel to Network Rail infrastructure
- LU stations interface with other operators' services.

These assessments were carried out by operational and safety specialists from LU with support from NR, train operating companies and station operating companies where appropriate.

The findings of these assessments are, where applicable, integrated into the LU QRA. Risk reduction measures arising from these assessments are developed in liaison with those LU interfaces, via appropriate Interface Managers. LU also attends various specialist topic groups with railway industry bodies, e.g. RSSB, to discuss various risk reduction measures.

4.2.2 Interfaces with third parties

LU has a dedicated outside parties team within the Capital Programmes Directorate to manage interfaces with third parties where:

- there is a risk to LU assets
- designs and method statements need to be reviewed
- there is a requirement for technical judgement or detailed knowledge of assets
- access needs to be arranged and work needs to be supervised.

Works that interface with third parties are managed in accordance with the Category 1 Standard: *S1023 Infrastructure Protection*. The purpose of this Standard is to define how LU deal with Outside Parties to avoid disruption to LU operations or damage to LU assets when undertaking or proposing to undertake works on, over, under or adjacent to LU assets. Outside Parties are individuals, developers, contractors, etc. who are not procured by LU or their suppliers. The Standard also covers the requirement for LU to consider external risks.

Risks to the safe running of the railway and safety of LU staff and customers which are associated with the activities of other persons on LU's property, e.g. visiting contractors,

are managed through the access process. Category 1 Standard: *S1526 The Assessment and Management of Health, Safety and Environmental Risk* requires that LU and suppliers assess the health, safety and environmental risks and assess the impacts arising from their own and third party activities, in normal, abnormal and emergency conditions.

4.2.3   LU Quantified Risk Assessment models

Quantitative risk assessment methodology is used to assess the risk of major hazards with the potential to cause fatality to customers and other members of the public.

The LU QRA determines the expected aggregate statistical fatalities per year resulting from LU operations. This is achieved by evaluating the risk of fatality to LU customers and other members of the public from major hazards on each LU line separately. It then sums these to determine the total risk arising from LU operations. The major hazards are grouped into those that result in similar outcomes. Each of these outcomes is referred to as a 'Top Event'. The risk associated with each Top Event is represented graphically in the QRA risk profile. The QRA risk profile allows LU to easily determine the dominant Top Events.

The LU QRA utilises Fault Tree Analysis to estimate the frequency of a combination of events leading to a major hazard; and Event Tree Analysis to map how events can escalate, including the failure of control and mitigation measures.

LU's suppliers are required to provide qualified and experienced staff to assist with the provision of design, reliability, availability and maintenance data - including information derived from major projects, feasibility or business case studies. LU is responsible for integration of any revision into the LU QRA.

4.2.4   Asset Based Risk Assessments

Asset Based Risk Assessment (ABRA) models each asset class in order to understand and predict potential asset failures together with the safety consequences and likelihood of that failure. Knowing both impact and probability of failure allows LU to review and trend the risk and ensure appropriate mitigations and monitoring is in place. Presently ABRA covers JNP asset areas for all Primary Assets, Civil Assets and Station Systems and is in the process of a roll out to incorporate BCV and SSL assets.

The model is based on the Failure Modes, Effects, and Criticality Analysis (FMECA) approach. Each asset type is assessed for possible failure modes for customers as well as employees. Events data is obtained via an Asset Management Database or through reasoned judgement from experts. A risk assessment is then undertaken on each failure mode based on likelihood, consequences and probability of impact.

To assess the failure mode a simple calculation, based on a number or representative consequences, is used. Each representative consequence describes an event and has a standard severity assigned to it based on the number of probable fatalities or injuries. This is derived from the LU QRA and provides one of several integration points between the two risk models.

4.2.5   Customer and Workplace Risk Assessments

Site-specific customer risk assessments systematically analyse customer routes to identify local hazards and risks to customers. This process identifies lower consequence hazards (non-fatality risks) not covered in the LU QRA and provides input on location-specific hazards which could affect the risk of fatality. Where the CRA identifies fatality

risks or location-specific major hazards, these are put forward for incorporation into the LU QRA.

Workplace Risk Assessments (WRAs) identify hazard groups by analysing the activities carried out in the workplace. Each activity is reviewed to identify the foreseeable hazards associated with it. WRAs also help identify where specific risk assessments are required in relation to specific hazards or activities.

WRAs and CRAs are led by a competent assessor and the process applied ensures the involvement of personnel who are familiar with the location and activities being assessed. Consultation with local Trades Unions Health and Safety Representatives is undertaken in respect of WRA. The CRAs/WRAs include risks arising from the activities of other persons, e.g. malicious behaviour, verbal or physical assault.

To facilitate the capture of assessments and monitoring of compliance with WRA and CRA arrangements, LU requires all assessments to be entered on a central risk assessment database. This database stores all current and archived risk assessments. This approach to customer and workplace risk assessment allows LU to correctly identify and prioritise improvement actions locally and at a network level.

To determine the relative significance of risks, CRA and WRA use a risk rating matrix based on numerical scores for severity and likelihood giving an overall risk rating which enables the significance of each risk to be determined.

High risks are reviewed as a priority to establish tolerability and to ensure immediate action to reduce risks to ALARP is taken. Medium or low risks are reviewed to determine whether there are any further reasonably practicable risk reduction measures that could reduce the risk.

More detail on these types of risk assessment is available on the intranet-based Management System section: *Assessing and managing our HS&E risks*.

4.2.6 Fire risk assessment

While LU's risk assessment framework incorporates some aspects of the assessment of fire risk, LU also sets specific requirements for assessing and managing fire risk – the responsibilities and requirements are set out on the intranet-based Management System.

In line with the Regulatory Reform (Fire Safety) Order 2005, LU is required to demonstrate how compliance is achieved with the risk assessment provisions. The LU approach is based on a number of factors both at a LU network/generic level and an individual station level.

Requirements for maintaining fire compliance documentation are set out in LU's Category 1 Standard: *S1088 Managing Changes to Stations Fire Precautions*. The purpose of this standard is to define LU's requirements for the management of alterations to the general fire precautions on its railway station premises where these changes have the potential to affect the fire safety of stations and the safety of passengers, staff and emergency responders in the event of a fire on a station.

In the event that there is a control failure and a fire occurs, physical control measures are in place to provide detection, suppression, and containment in order to facilitate safe means of escape for customers, staff and contractors. The measures implemented in each part of the station are recorded on the Station Fire Plan.

In the event that changes at the station are required, LU standards require the assessment of the risk arising from the change and the implementation of appropriate control measures (as described in Section 7).

4.3 Control and mitigation of risks

LU has a duty to ensure the risks arising from its operations are ALARP. This requires LU to look for ways to improve safety and to make judgements on whether it is worthwhile to make these improvements. In doing this, LU considers

- the existing level of risk
- the risk reduction that the improvement would give
- the cost and difficulty of making that improvement
- the practicality of the option to achieve the improvement potential (e.g. new build versus refurbishment)
- the possibility of increased accident potential during implementation.

Figure 4.1 outlines the framework applied by LU to assess the tolerability of risk.

Following the assessment of risk, action is taken to control and mitigate risks where required. The action taken will depend on

1. Areas or activities for which risks are not tolerable and ALARP can be identified and programmes developed to address this. LU manages risks in line with the 'Hierarchy of Control': elimination, substitution, use of engineering controls, administrative controls and use of Personal Protective Equipment (in order of preferred priority). The application of the 'reasonably practical'/'ALARP are defined in Figure 4.1 (Category 1 Standard: *S1521 Safety Decision Making*).

2. Where there is a clear regulatory requirement to take action, e.g. Electricity at Work Regulations 1989 or Control of Noise at Work Regulations 2005;

Appropriate inspection, supervision, audit or monitoring is put in place to ensure that controls are applied effectively.

'Intolerable' region

Risk > 1 fatality in 10,000 p.a. for customer
Risk of fatality > 1 in 1,000 p.a. for employee/supplier

Immediate action required to reduce risk to below these levels and ALARP

'Tolerable' region

Action taken to reduce risks to ALARP

'Broadly acceptable' region

Risk of fatality< 1 fatality in 1,000,000 p.a.

No significant effort spent to find further risk reduction measures. Effectiveness of existing risk controls maintained.
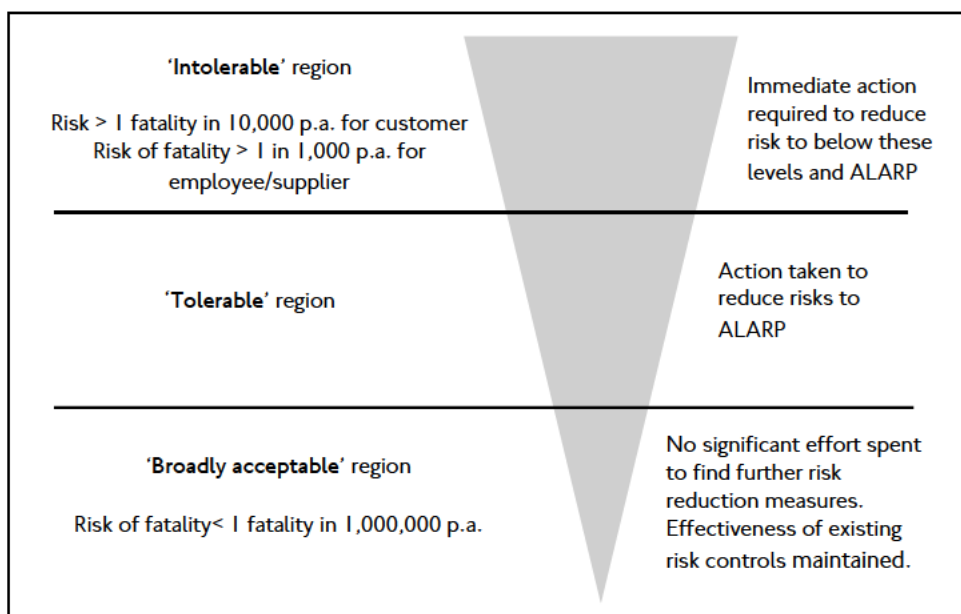
Figure 4.1   Tolerability of Risk (from LU Category 1 Standard: *S1521 Safety Decision Making*)

The ranking of the LU QRA Top Events identifies priority areas. Section 6 provides further details of LU's business planning arrangements. Additionally, the LU QRA is used to inform LU's network safety and technical assurance arrangements, as outlined in Section 14, which monitor the effectiveness of risk controls.

Risk assessment findings are communicated through presentations to the appropriate Director/senior management and local audiences. The LU QRA findings are communicated to LU managers via a report and presentations. The WRA and CRA findings are communicated by local managers to staff via Health and Safety Representatives, notice boards and inductions.

At a network and asset-based level, the findings of risk assessments enable LU to develop a risk based approach to business planning. At a local level, employing managers use relevant risk assessments to develop and implement local action plans with advice from their HSE Manager, to reduce risk within their area of responsibility. The Head of HSE Operations is responsible for ensuring the appropriate responsible managers within LU are identified to implement the corporate actions.

LU's risk assessments and the LU QRA are used to identify pre-cursor events which are then monitored as described in Section 2.

4.4   Controlling risk from maintenance, materials and contractors

Controlling access to infrastructure is a component of LU's statutory duty as infrastructure manager and system risk is controlled by managing:

- who can physically get onto the LU network
- when any other organisation can carry out any work on the LU network
- the extent to which the public can gain access to the LU network.

This is done through:

- clearly defined responsibilities across organisations for planning access and control of work on the LU network
- assessment of the safety risks associated with any work
- restriction of access to competent individuals
- prevention of trespass.

Category 1 Standard: *S1526 The Assessment and Management of Health, Safety and Environmental Risk* requires LU and its suppliers to identify and assess the health and safety risks of all changes, activities or projects at the design, implementation, operational and decommissioning stages. Where required, controls are put in place with appropriate monitoring, inspection or supervision.

The Access Charter and associated Rule Books facilitate a controlled system for reserving and claiming access to the LU network for maintenance and improvement works. It maintains safety risk associated with access to levels that are ALARP by clearly defining interfaces between the various organisations seeking access and mitigating against competitive pressures, in accordance with the Category 1 Standard: *S1538 Assurance*. The purpose of this Standard is to define the requirements for the management and delivery of assurance by both providers and receivers of assurance.

If an individual who is not a member of LU staff wishes to access parts of the LU network from which they would usually be prohibited, they require a Sentinel identification card in accordance with the relevant LU Rule Book concerning access.

In order to deter and prevent trespassers gaining access, LU staff follow the arrangements contained in the LU Rule Book for the opening and closing of stations and for station security. LU also has extensive security arrangements to prevent illegal access. Trespass is also managed by use of the powers to convict, under the provisions of the British Transport Commission Act.

The intranet-based Management System: *Managing HS&E with contractors and suppliers* sets out the arrangements in place whereby LU ensures HSE risks are taken into consideration when selecting suppliers and purchasing goods and equipment.

The Asset Performance Managers Handbook: *Materials and Stores* sets out requirements for materials management and appropriate risk management. Risks associated with the introduction of new materials are assessed in line with the change management process outlined in Section 7.

Fire risks, including use of appropriate materials, and workplace risks, including Control of Substances Hazardous to Health (COSHH) assessments, are managed through LU's standards regime, including LU's Category 1 Standard: S*1085 Fire Safety Performance of Materials*.

4.5   Monitoring risk management arrangements

The Top Event risks that are currently reflected in the LU QRA have evolved from initial work carried out in 1988 to identify the major hazards that had the potential to affect the LU network. This initial work was undertaken in the form of a hazard identification exercise, Fault Tree Analysis and consequence analysis. New failure and event data has progressively been incorporated in the QRA models as part of on-going review. The Category 1 Standard: *S1526 The Assessment and Management of Health, Safety and Environmental Risk,* describes the arrangements which ensure that the LU QRA is reviewed and developed. The LU QRA review work plan is reviewed regularly and Top Events updated in line with this plan.

The regular review of the LU QRA ensures any gaps in understanding of risks are identified and their precursors and controls are understood and incorporated into the LU QRA. This is facilitated through structured hazard identification (HAZID) sessions, the incorporation of independent risk assessments, and the review of incidents occurring on the LU network, the mainline railways or international railways.

The TfL Director of Health, Safety and Environment is accountable for maintenance and improvement of the risk assessment processes. To ensure risk assessments remain valid, LU assesses changes to activities for their potential impact upon WRA and CRA.

Employing managers are responsible for ensuring that risk assessments are carried out, that they remain valid and that they are reviewed in light of changes, e.g. following an incident, or at least every three years. The central risk assessment database is used to monitor WRAs and CRAs to ensure that timely reviews take place. This is also monitored through audit activities.

Requirements for monitoring actions and controls are set out in the intranet-based Management System: *HS&E in everyday activities*. This sets out requirements for planning and managing PGIs, HSE Tours, management systems checks, etc.

Section 5: Procedures to meet technical specifications and procedures for operations and maintenance

Contents

5.1 Safety, operational and technical instructions

All documents, including LU standards, are accessible via the Management System library. This provides access to all company documents for TfL/LU employees (via the LU intranet) and suppliers (via the internet), and ensures users are accessing the latest versions. The standards library includes the documents in the following table.

The LU Policy: *P020 Asset Management Policy* sets out LU's plans to select, inspect, maintain, renew, improve and dispose of our assets in order to maximise customer satisfaction, maintain high levels of safety, manage risks, minimise whole life costs and enable delivery of LU's outcomes and priorities. This policy is supported by detailed documents relevant to different asset types, infrastructure and operation which sets out requirements for different stages of the lifecycle (design, implementation, operation. maintenance and decommissioning), as appropriate. Further details are set out in Section 15.2.

Standard topic	Sub-group
People	Competency and licensing Customer interface Management Security Training
Stations	Station assets (further subdivided by station asset type – infrastructure, civils, premises, power, lifts and escalators) Station operations
Trains and Infrastructure	Train and infrastructure assets (further sub-divided by asset type – signalling, rolling stock, permanent way, communications, engineering, etc.) Train operations
Health, Safety & Environment	Health, Safety and Environment (HSEMS)
Management	Asset management Assurance and compliance Business management Standards management
Rule Books	Publications (for information) Publications (Protection & Track Access) Publications (Stations & Trains) Rule Books and supporting information Upgrades Network Improvement SAP Team (NIST) Useful forms

Table 5.1   Topic structure of the LU standards

5.2 Production and monitoring

In accordance with LU's principles of risk ownership and accountability, designated managers are responsible for developing the content of standards and making sure that they are up to date. Directors are accountable for ensuring compliance with LU's Management System, including standards, in their directorate. Compliance with the Management System and standards (by LU and contractors) is ensured through local HSE monitoring and audit, where appropriate. The relevant audit process, which includes monitoring of compliance with HSE standards, is set out in the TfL Internal Audit Manual and a supporting Work Instruction: *WOO85 HSE & Technical Audit process* (set out in Section 12). .

Section 7 describes arrangements for the introduction of new or revised LU Management System documents, including standards, and for controlling change.

A bulletin listing all amendments to LU standards is issued every four weeks via the Management System library. Suppliers can request access to the library and access to LU standards.

Standards, and the supporting documentation, provide clear direction on the stage of the lifecycle or process to which the standard applies, for example, all or specific stages of a process/lifecycle.

5.3 Corrective action

5.3.1 Queries to standards

Category 1 Standard: *S1646 Queries to Standards* sets out the formal mechanism to query or ask for clarification of standards, or raise issues such as resolving disputes on the intent behind a standard or correcting errors and/or conflicts with another standard.

LU issues a formal response via a written notice which is then attached to the standard. Queries and their associated written notices are communicated via email to internal stakeholders and external suppliers.

5.3.2 Management of non-compliance to standards

LU has two mechanisms for dealing with non-compliance:

- Temporary Approved Non Compliance (TANC) - the arrangements are defined in the LU Category 1 Standard: *S1642 The Management of Temporary Authorised For Use Non-Compliance (TANC)*. This requires the regularisation of non-compliances which are either discovered through routine maintenance, asset inspection or audits. The TANC process applies solely to LU standards.
- Concessions - the mechanism by which all identified non-compliances with LU standards are regularised, as set out in the LU Category 1 Standard: *S1641 Concessions to Standards*. In reviewing the concession request, the LU responsible manager, supported where necessary by an HSE Manager, will consider the safety implications of the concession. The most safety significant concessions are subject to peer review by the LU Directors' Risk and Assurance Change Control Team.

Section 6: Targets

Contents

6.1   Introduction

The London Underground *Health, Safety & Environment Policy* (P002) commits LU to developing improvement plans to improve HSE management and performance. The London Underground Board ensures that challenging targets are set each year. Targets are cascaded from LU's top level scorecard to local scorecards as appropriate.

This section explains how targets are set, the planning process enabling targets to be achieved and the process by which safety performance is improved.

6.2   Setting targets

The purpose of scorecards and targets is to drive a change in performance, including improving safety performance. The process and accountabilities for scorecard setting are described in the Manager's Handbook: *H-045 Business and resource planning* and the Category 1 Standard: *S1566 Monitoring health, safety and environmental performance*.

Typically, the performance scorecards include relevant safety performance indicators such as:

- Accidental customer injuries per million hours on LU infrastructure
- Lost Time Injuries (LTIs)
- Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR) reportable accidents

Targets for Key Performance Indicators are developed annually and agreed by the Board at corporate level and then cascaded into the business. A number of factors are taken into account when setting Key Performance Indicators and the associated targets. These include H&S performance for the previous year, changes within LU, emerging risks, outputs from incident investigations, audits or other reports, changes in regulatory requirements, Targets may be quantitative, e.g. number of RIDDOR reportable accidents or qualitative, e.g. a ORR Railway Maturity Model score. The targets also take into account the broader TfL HSE vision and goals, national railway industry strategy, e.g. the RSSB's health and safety strategy 'Leading health and safety on Britain's railways' and other relevant national and international bodies.

All LU scorecards and the status of performance against targets are available on the LU intranet. Scorecards and performance metrics are also an integral part of the asset maintenance regime described in Section 15.

Once targets have been agreed, performance is monitored and reported regularly at local and senior levels. HSE performance is included as standard in LU period performance reports which give Directors clear information on performance against H&S standards. Review of these reports provides Directors with the opportunity to take actions when targets are not being achieved. Similar reviews occur at appropriate levels within each team.

The HSE Directorate is responsible for ensuring that LU is involved in the Railway Safety and Standards Board (RSSB)-led discussions on the railway health and safety improvement plans. This ensures that LU has visibility of and can contribute to other railway safety initiatives. This also provides a comparative benchmark for LU's safety improvement programme(s) and allows LU to identify suitable actions to meet any commitments required as a train operator on Network Rail infrastructure.

LU is also a member of the Community of Metros (CoMET) which allows benchmarking against non-UK metros and identification of best industry practice and safety improvement opportunities that may arise from this.

6.3 Meeting targets

LU activities require a strategic and sustained level of planned investment to ensure assets are fit for purpose over the whole of their planned life. This is documented in the Handbook: *H-045 Business and Resource Planning*.

Corporate level planning is achieved through the corporate business planning cycle including investment appraisal, the Health, Safety and Environment Improvement Plan and the development of Line Asset Network Plans (LANPs). Alongside LU's Asset Strategies, the LANPs enable and inform the identification of areas of future investment required to feed future TfL Business Planning.

The TfL Director of Health, Safety and Environment is accountable for advising the Board on appropriate health and safety objectives and supporting the development of the plans. These processes contribute to the delivery of the LU vision which influences the management of safety risks.

The London Underground Plan and the TfL Health, Safety and Environment Improvement Plan (which includes London Underground) are communicated to the business. Each Director is accountable for developing their own action plans that contribute towards corporate level delivery.

The results of performance scorecards are utilised in the setting and monitoring of the performance of individual managers as described in Section 8.

The monitoring of performance against targets is undertaken period by period throughout the year at LU, directorate and business unit level. The directors review operational performance at the London Underground Board meeting and more frequently through visualisation meetings in the local teams.

In the event that performance is falling behind target, significant improvement actions are identified through analysis of underlying causes for safety management issues, risk assessment and findings from audits and incident investigations. The action is reviewed by the London Underground Board meeting or via senior manager meetings to ensure that there is a robust implementation plan with appropriate key milestones. In addition, this review process ensures that:

- appropriate accountable managers and action managers are identified,
- scope of work, deadlines and completion requirements are clearly defined, and
- the requirements for assured closeout are defined.

Accountable managers for delivery are identified for all improvement actions. The accountable manager is responsible for ensuring that appropriately detailed implementation plans are developed and regular updates provided.

Safety related actions arising from location specific risk assessments, monitoring and audits are captured in local action plans. For each action, timescales and an accountable manager are allocated. Progress against these plans is monitored by local management. The TfL HSE and Technical Audit Programme includes checks to ensure local safety improvement actions have been implemented.

At least twice a year, the TfL Director of Health, Safety and Environment reports to the Board on progress on the safety aspects of the London Underground Plan.

Section 7: Control of new risks

Contents

7.1   Introduction

LU's change management arrangements ensure that the safety implications of any proposed change, introduced by any party affecting the LU network or its operations, are assessed before the change is made.

7.2   Aims of change management

The objectives of change management are to:

- Ensuring changes are identified at the appropriate time
- correctly identify the safety implications of proposed changes,
- ensure changes are planned safely,
- ensure changes are implemented to plan,
- ensure changes are implemented safely, and
- reviewing the changes following implementation to ensure the change has been effective and has not had any adverse safety consequences.

LU requires the objectives above are met whenever any non-routine change is implemented. This is achieved through application of the LU Category 1 Standard: *S1538 Assurance* via the Manager's Handbook: *Change Control.*

7.3   Scope of change management

The requirements to safety assure and verify changes apply to changes that could affect the safety of anyone affected by LU operations. The scope of the change management process includes:

- organisational or management changes
- changes to staffing levels
- operational changes
- changes to the Management System, including standards
- changes to assets (including functional changes)
- changes from third parties, e.g. other transport undertakings, which impact on LU
- impact of LU changes on third parties, e.g. other transport undertakings
- changes to inspection or maintenance regimes.

Routine changes and deviations, carried out in accordance with authorised standards, procedures and instructions, are not included in the scope of LU Category 1 Standard: *S1538 Assurance* as they are an integral part of day-to-day activity which will have already been considered and allowed for in the development of the specified safe systems of work for carrying out these activities.

The LU change management arrangements describe the responsibilities and actions to assess, review and implement non-routine changes. The manager or executive body, e.g. London Underground Board or DRACCT, with the authority to approve a change ensures this is complied with.

LU's requirements for communication with managers and employees is an important aspect of change control. Requirements for health and safety communication and consultation are defined on the intranet-based Management System section: *Communicating and consulting on HS&E* and described further in Sections 2.6 and 9. The change management requirements are set out in Managers' Handbook: *Change Control*. Where necessary, these requirements are highlighted to managers undertaking change by the HSE directorate.

7.4   Evaluation of new risks

When a change is proposed, the safety risks of the change are assessed in accordance with the risk assessment arrangements described in Section 4.2 as required by LU Category 1 Standard: *S1538 Assurance* (further described in Section 14). This includes an assessment by someone with the competence to identify hazards, assess risks and determine actions necessary, before, during and on completion of the change. Where changes have safety or other risk implications, a Change Assurance Plan (CAP) is produced which:

- assesses and records the impact of the change (including safety assessment)
- demonstrates how safety and other risks will be maintained or reduced to a level which is ALARP before, during and after the change.

As part of this process, consultation is undertaken with affected parties, including Health and Safety Representatives where the change affects employees' health and safety. This process applies to changes proposed within LU or by a third party, e.g. another transport undertaking.

Change to an existing LU standard, or the development of a new standard, may be required as a result of the output from the risk assessment process, corporate planning processes, safety related incidents, local identification of a need or an external influence such as legislation/external standards. Any party may propose a new standard or a change to an existing standard. Controlled deviation from an LU standard is managed through the TANC and concessions processes detailed in Section 5.

The safety assurance requirements have been integrated into the standards change documentation. Each proposal for a new standard, or change to an existing standard must be safety assured in accordance with change management arrangements.

Change proposals are submitted to DRACCT for approval. DRACCT is supported by a Filter Group that deals with less significant changes. For changes that are complex or pose significant risk (determined by the DRACCT Filter Group), DRACCT provides an overview of the assessment's quality and provides documented feedback to managers on what further assurance may be required. DRACCT will accept the change when a robust case has been made.

Changes which constitute a significant change to the LU Safety Certification or Safety Authorisation are advised to the Office of Rail
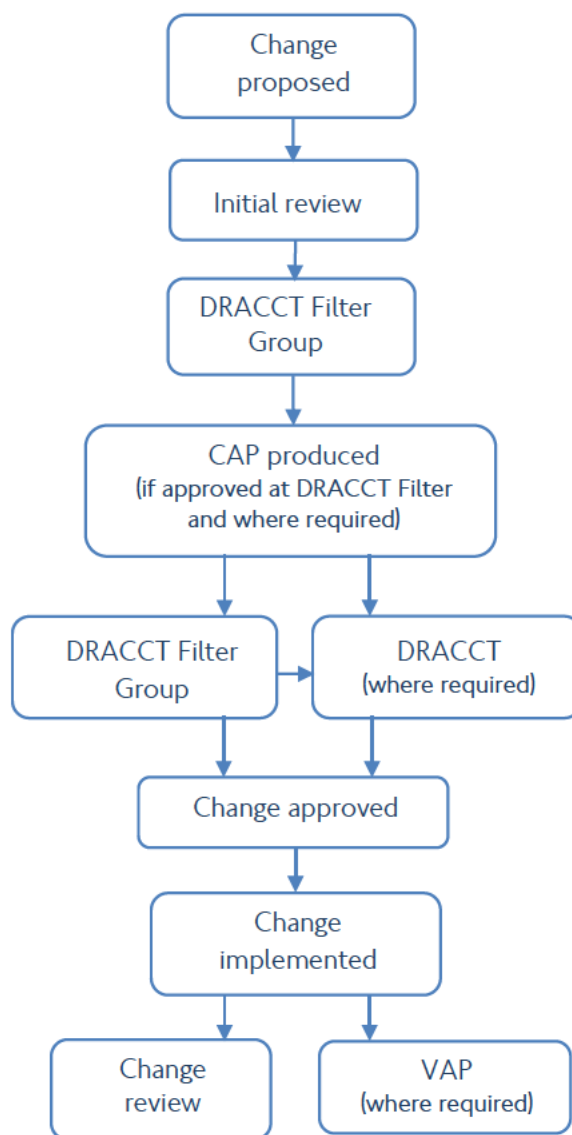

Figure 7.1   LU change process

and Road (ORR). They are also notified to other affected operators to enable them to highlight any concerns to the ORR.

For less significant changes, the HSE Managers, working with their counterparts in the supplier organisations where appropriate, provide an overview of the implications of change to ensure safety issues are adequately addressed.

As LU's assurance standard is a Category 1 standard, suppliers are required to have arrangements in place to provide safety assurance in line with this standard.

7.5   Validation of change

On completion of the necessary reviews and approvals, including DRACCT approval, the change is communicated to all affected parties and implemented in accordance with the measures stated in the CAP.

The manager authorising a change is responsible for monitoring the implementation of the change and ensuring it is carried out in accordance with the accepted CAP. This includes implementation of any required controls.

During more detailed planning or implementation, if a need is identified to significantly deviate from the proposals in the accepted CAP, the authorising manager is responsible for ensuring that the safety implications of the deviation are assessed and a revised CAP is developed and accepted.

Where required (by the change manager, DRACCT Filter Group or DRACCT), the CAP implementation plan will set out relevant monitoring, checking, review and other validation to ensure that that change has been implemented effectively and safely.

7.6   Safety verification

LU's requirements for compliance with the safety verification provisions of ROGS are set out in Category 5 Standard: *S5540 Safety Verification*. This document describes the safety verification process applied where new or altered vehicles or significant differences to infrastructure are introduced and they bring the potential for a significant increase in levels of risk.

The London Underground Engineering Director has overall accountability for the safety verification process and is designated as LU's Independent Competent Person (ICP) under ROGS.

Where safety verification activity is required, the independence of the Engineering Director, and/or any resource appointed to undertake safety verification, is achieved by recognition of the functional reporting line to the TfL Director of Health, Safety & Environment (or a person appointed by the TfL Director of HSE).

For projects which require safety verification, a Verification Activity Plan (VAP) is produced, in line with Category 5 Standard: *5-539 Verification of Assurance*. The VAP is the mechanism through which LU drives the delivery for a written safety verification scheme. The VAP, which may be part of the CAP, identifies, using a risk-based approach, specific issues which require monitoring during and after the change to ensure safety risks are managed effectively.

These requirements are embedded in Pathway, the TfL project management methodology, which is part of the LU Management System and is mandatory for LU programmes or projects.

Section 8: Training and maintenance of competence

Contents

8.1 Introduction

In order for arrangements for HSE management to be effectively implemented and operated, it is essential that employees and others who work on or about LU's infrastructure are competent to do so. TfL and LU have comprehensive arrangements for the management of recruitment, training, assessment and competence to ensure that this is achieved through all levels of the workforce.

8.2 Competence and training roles and responsibilities

The LU Competence and Compliance team is responsible for maintaining the competence management documentation and verifying its content, and providing support to business users.

Responsibilities for managing employee competence across LU are discharged through Human Resources (HR) standards and intranet-based Management System content. The intranet-based Management System section: *Performance and development conversations* sets out management responsibilities for managing competence, in line with the Competence Management System.

Employing managers are responsible for the quality and integrity of competence assessments and for ensuring sufficient competent resource is available, employees have access to appropriate information, and competence development plans are in place. Managers of safety critical employees have the following responsibilities:

- establishing and maintaining a register of all posts within their area of responsibility that are safety critical
- issuing and updating authority to operate
- monitoring hours worked
- ensuring that safety critical training and development requirements are kept up to date and competence assessment is carried out on a continuing basis.

The Skills Development team is responsible for the design and provision of effective and efficient training material and resources. The Skills Development teams work with the relevant managers/teams to ensure that training is available at appropriate time, i.e. to accommodate varying work patterns to ensure that competence is maintained.

8.3 Competence System

8.3.1 Recruitment

The HR requirements for recruitment and selection of LU employees supports the organisation's aim to attract well-motivated people, who will enable TfL/LU to achieve its objectives and deliver LU's services safely and effectively.

The recruitment and selection process is documented on the intranet-based Management System: *Recruitment*. This process is:

- based upon a person specification and job description for each post that describes the experience, knowledge, skills, behaviours and qualifications required for successful job performance
- designed to consider each applicant objectively against job requirements and make appointments in accordance with these.

These processes are measured and monitored for fairness, reliability and validity to ensure that the TfL/LU objectives for recruitment and selection are met.

8.3.2 Training

In accordance with the intranet-based Management System section: *Performance and development conversations*, all LU employees receive the appropriate training and development to enable them to perform their jobs safely and effectively. General requirements include:

- employees to have a competence development plan which is reviewed regularly, access to learning and development advice, guidance and opportunities
- equipping employees in identifying their own development needs and the knowledge to ensure that steps are taken to meet those needs
- monitoring and evaluation of the efficiency and effectiveness of all operational learning activities.

On appointment to role, initial training is given, an assessment of knowledge and competence is undertaken and location-specific training is provided.

8.3.3 Performance development and competence review

The effective performance management of employees helps achieve LU's goals and objectives. It ensures that employees individually and collectively understand how they can contribute towards the achievement of these goals and objectives. The Performance and Development process provides company standards for target setting and measurement.

Performance and development management is carried out informally and formally. Managers are encouraged to regularly discuss individual and team performance with their team. The intranet-based Management System section: *Performance and development conversations* outlines the requirement for managers to carry out a formal discussion of performance and development at key points in the year. These formal review meetings provide the opportunity to review performance against overall operational competence, clarify expectations and standards and to identify related development needs.

8.3.4 Competence monitoring and assessment

After completing the core training, where required, trainees shadow a competent person for a period of time determined by the competence requirements (time varies depending on role). This is followed by a practical assessment where required by the competence system. Trainees are assessed in accordance with the competence system. Subject to completion of this assessment and with reference to knowledge assessments conducted during core training, authority to operate work is issued by the employing manager. Further assessments then take place where required by the competence system.

The reassessment of competence is ongoing and timescales for when this is carried out are detailed in the relevant role specific competence plans. Competence is also monitored and reviewed by managers locally. LU ensures that those who do not meet the competence requirements are provided with competence development action plans and where necessary are stopped from undertaking the activity.

8.3.5 Record keeping

Records of the competence of each member of LU staff, TfL employees who directly support LU or suppliers' employees/contractors undertaking safety critical activities are required to include as a minimum:

- each activity that the person has been assessed or reassessed as competent to carry out
- records of assessment completed
- the expiry date of the competence.

They are retained for a period at least equal to twice the normal period between assessments. Employee training is recorded within Human Resources and/or by local management. This ensures that line managers are aware, in advance, of the expiry dates of licences and training courses are programmed as necessary. This also ensures local managers are aware of details of any medical restrictions that may apply to their staff.

8.4 Safety related tasks

The ROGS Regulations, place specific requirements on employers to ensure that employees are suitably trained and supervised when carrying out safety critical tasks as part of railway operations. LU discharges these obligations through its Competence Management System which identifies what competence needs to be managed in relation to the risks pertaining to each task, which are identified through the risk assessment process detailed in Section 4. Details of safety related tasks can be found in Section 17.

8.5 Compliance

Individuals carrying out any form of safety critical work for which there is a competence management system are informed regarding the competence requirements, including any LU standards they need to comply with, and the content and frequency of any assessments and/or re-assessments.

These are detailed in the competence requirements related to their work activities. Requirements are set in respect of:

- initial training and assessment of knowledge on appointment
- location based requirements
- initial assessment of competence
- on-going assessment of competence.

Competence is monitored and reviewed by managers locally. LU ensures that those who do not meet the competence requirements are provided with competence development action plans and where necessary are stopped from undertaking the activity.

Changes to the Competence Management System are subject to the assurance process and the task and risk assessments are reviewed at defined frequencies and whenever jobs change.

Section 9: Safety information

Contents

9.1 Introduction

This section details the arrangements for the provision of safety information to:

- LUL employees
- suppliers
- other railway operators
- external parties
- customers.

General health, safety and environmental communication requirements for LU are contained on the intranet-based Management System sections: *Communicating and consulting on HS&E,* and *Managing HS&E with contractors and suppliers*, LU standards including LU Category 1 Standard: *S1311 Customer information - stations* and the LU Rule Books.

9.2   Internal communication

The principal methods of communication with employees rely on centrally developed information being cascaded down through the management levels. The LU Head of Communications is responsible for communicating corporate non-critical safety information. The TfL Director of Health, Safety & Environment is responsible for communicating urgent safety information (via Safety Alerts) and some non-critical safety information. The intranet-based Management System section: *Communicating and consulting on HS&E* sets out requirements for the HSE directorate and local managers for communicating this urgent safety information.

Managers are responsible for ensuring information is cascaded to employees in their area. Local or company-wide communications events are held on an ad-hoc basis if there are significant matters or concerns to address. Specific information of health, safety and environmental significance is communicated in a variety of ways, including the following:

- Health and Safety notice boards
- Intranet updates
- employee surveys – Viewpoint is the regular survey carried out within LU. The findings are communicated across LU and are used by local managers to identify improvement actions which can be built into future business plans
- 'On The Move' - the organisation's magazine aims to reinforce messages, launch campaigns and communicate current issues, including those relating to health and safety matters
- induction training - provided to all employees on joining LU, including basic health and safety information
- employee bulletins - emailed to all relevant staff and printed locally for those without access to email
- Safety Alerts and Safety Bulletins
- Other mechanisms – e.g. TeamTalk briefings, Centurion Briefing Packs, Safety Hours.
- Traffic Circular - see details below.

Different mechanisms are used for communication depending on the target audience.

Vital/urgent safety critical information is communicated via Safety Alerts. These are issued by the HSE Directorate and managers are required to share relevant information in Safety Alerts (in line with the requirements set out by the intranet-based Management

System: *Communicating and consulting on HS&E)*. Where required, procedures, instructions, guidance are changed in line with LU's change management process (described in Section 7).

There are a number of structured mechanisms by which staff can pass on safety information to their supervisors or managers, e.g. through the Health and Safety communication and consultation mechanism (as outlined in Section 2.6), Team Talk discussions, feedback on employee surveys, etc.

Receipt, by any manager, of information of regulatory concern or action from a health, safety and environmental regulator is notified to the appropriate HSE Manager who assesses the significance of the information, takes any required action and circulates to those affected.

Suppliers are required to provide LU with specific health, safety and environmental related information to ensure LU has adequate knowledge about their risks.

9.2.1 Communication of operational information

Some of the significant risks associated with the day-to-day operation of the railway are mitigated by operational communications, for example, on train and station announcements to communicate with customers, other LU employees and suppliers/contractors working on the station.

There are also a number of communication tools within LU. Those with a bearing on safety are set out below. Where Network Rail or Train Operating Companies' information is relevant, this information is included in the appropriate document.

- Connect - LU's network-wide mobile communications system.

- Traffic Circular - latest available information about aspects of railway operations, sent to operational staff on a two weekly basis including timetables and track, signalling and equipment alterations. Also includes details of the status of other publications, to ensure the latest versions are being used.

- Guide to Switching Traction Current On And Off

- Defective In Service Information (DISI) - actions that Train Operators of each type of Passenger Rolling Stock must take to deal with defects either in or out of service to ensure practice, during traffic hours.

- Line Supplements - information and instructions specific to each line, published on the intranet and in hard copy.

- Working Timetables - the train schedule for each line. Train staff receive them on an individual basis from Duty Managers. These are sent directly to Train Crew Service Control depots. Station staff have access to a reference copy.

- Scheduled Train Frequency Tables - used to determine if traffic hours track access is safe and viable.

- Rule Book and associated publications - periodic or special publications that supplement the LU Rule Books, all of which are also available on the LU Intranet site.

- Look Ahead - contains details of planned work (for the forthcoming week) carried out on or about the track where this may affect others' access requirements. The target audience include the Track Access Control, Power Control and Service Control teams, and people who have booked work. It is also used by people who

have non-exclusive general access works to check for work site clashes. This is published on the Rule Book intranet site with copies posted on the Access department site. Suppliers and contractors can register to view the publications.

- Nightly Engineering Protection Arrangements (NEPA) - published every day and sets out details for the coming night, i.e. details of first and last trains, and traction current switching times. The target audience is protection staff. Those involved in Protecting Workers on the Track (Engineering Hours) activity must read the NEPA before booking on.

- Engineering Notices - issued daily; this is the final version of the Look Ahead and may contain details of late requests of an urgent nature. They are published on the Rule Book intranet site with copies posted on the Access department site.

- Planned Work Reports - detail work to be undertaken at LU stations. Weekly reports and additional daily information is published on the Access Team intranet site.

- Timetable Notices - issued when there are changes to the Working Timetable. Paper copies are sent to Train Crew depots affected and managers ensure Train Operators receive them.

- Operational Standard Notices (OSN) - used to publish and brief changes to rules.

- Rule Book Briefing - used to brief changes to the Rule Book and are communicated to relevant staff.

To ensure that communication of the listed publications is effective, the intranet-based Management System requires appropriate managers/supervisors to ensure:

- employees are aware of publications as soon as possible after receiving them
- employees are instructed in revised procedures, guidelines, standards etc. and that they understand and follow them
- employees sign for all printed publications they are issued with and if material is received electronically, an audit trail is developed to prove that employees have received or been made aware of the contents
- that up to date copies of publications are available at their stations, depots, signal boxes, control rooms and signalling control centres.

There are also requirements for operational employees to:

- be familiar with publications which affect them
- make sure they are aware of new publications which affect them
- make sure the publications are current
- sign for all publications they are issued with.

9.3   Communication with customers

The TfL Marketing Communications team, with the TfL Director of Health, Safety and Environment, are responsible for communicating with customers. The Director of News at the TfL Press Office is responsible for communicating with the media. The TfL Press Office is notified of any health, safety or environmental matter that is likely to arouse media interest to ensure that the appropriate response is provided.

LU carries out a variety of campaigns which aim to provide safety information to customers. This information is provided to customers via posters across the network (in stations and train cars), supported by station and train PA messages, information on social media, in London print media, etc. A number of safety messages are also

embedded within the infrastructure (Mind the Gap signs on platforms, yellow and white lines on the platform, etc.). A range of customer safety information is available on the TfL website.

9.4 Communication with other railway operators

Communication with other railway operators over corporate issues and safety matters is managed by the National Rail Agreements Team in line with contract obligations, as detailed in Section 13, by the relevant operational team or by the Health, Safety & Environment team. Communication through is complemented by the communication of Network Rail's Regional Weekly Operating Notices which are transmitted electronically by Network Rail to key LU operating staff for information. The LU NOC receives Network Rail alerts on defective equipment. The technical aspects of these notices are reviewed by the Engineering Director as appropriate and communicated internally and to suppliers where appropriate.

The Managers Handbook: *Working with Stakeholders* sets out requirements for working with local operators. At a local level, interfaces with other railway operators are the responsibility of the relevant Area Manager or Train Operations Manager. Issues of greater significance or network-wide issues must be referred to the National Rail Agreements Team. This includes discussing and resolving safety issues.

9.5 Safety Critical Communications

Requirements for safety critical communications are set in *Rule Book 01 Communications*. This covers:

- giving and receiving messages including the use of communications protocols
- using communications equipment
- reporting emergencies
- station communications including handing over information and conducting safety briefings.

A review of the safety critical communications is conducted on a period or quarterly basis using a volume sampling method. The Manager's Handbook: *Monitoring operational communication* requires that centurion level managers undertake monitoring of the effectiveness of safety critical communications and take corrective action where necessary.

Section 10: Accidents, incidents, near misses and other dangerous occurrences

Contents

10.1 Incident reporting and investigation

Incident reporting and investigation requirements are set out in the following management system documentation:

- Category 1 Standard: *S1556 Incident Reporting and Investigation* (defines the requirements for the notification, reporting and investigation of health, safety and environmental incidents)
- Intranet-based Management System section: *Managing formal incident investigations and their outcomes* (defines the requirements for managing formal investigations, the criteria for formal investigations, and requirements for completion of formal investigations)
- Category 5 Standard: *S5557 Incident Reporting and Local Investigation* (LU except JNP) (defines the requirements to ensure that a robust method of recording and investigating local incidents is maintained to prevent recurrence)
- Procedure: *PR0603 Incident Reporting and Immediate Investigation* (JNP) (defines the requirements for reporting and investigation of health, safety and environmental incidents)

LU standards are held on the LU intranet (as described in Section 2.3).

10.1.1 Incident reporting

Requirements for incident reporting cover:

- ensuring awareness of the need to report incidents
- the roles and responsibilities of those involved in the reporting of incidents
- reporting arrangements for different types of incident
- the need to notify employee health and safety representatives and other operators
- safety alerts that require urgent communication
- standard reporting forms and their distribution
- additional incident records e.g. for staff assaults and Signals Passed At Danger
- record keeping
- confidential reporting systems.

All HSE related incidents must be recorded at the earliest opportunity, within 24 hours and by the end of the shift if possible. All recorded incidents are entered onto the LU HSE electronic incident reporting systems. LU incidents which occur on Network Rail infrastructure are logged on the RSSB's Safety Management Information System.

LU's Category 5 Standard: *S5557 Incident Reporting and Local Investigation* sets out the requirements for notifying the ORR (TfL Team) and RAIB of incidents in order to comply with the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR) and the Railways (Accident Investigation and Reporting) Regulations.

10.1.2 Incident investigation

The intranet-based Management System section: *Managing formal incident investigations and their outcomes*, defines the types of incident that require a formal investigation. Once the investigation is completed and the draft Formal Investigation Report (FIR) is prepared, the commissioning manager submits the report to the LU Directors' Risk, Assurance and Change Control Team (DRACCT) for peer review and acceptance of the report, actions, time scales and allocation of accountable managers.

The commissioning manager may only close the investigation when:

- DRACCT has confirmed that the terms of reference (including verification activities) for the investigation have been met
- recommendations and actions are clearly defined, have accountable managers assigned to them and have agreed completion dates
- the report and recommendations have been accepted by DRACCT
- recommendations have been entered on the FIR action tracker.

For particularly significant incidents, the FIR may also be submitted to the London Underground Board for review. At the discretion of the Board, regular reports on progress with the implementation of the recommendations may be requested.

Once finalised, the FIR is circulated to relevant staff and placed on the intranet. Where appropriate, specific recommendations for sharing of lessons learnt are included in the FIR.

Submission and review of FIRs by Directors and senior managers at DRACCT ensures that high quality FIRs are produced. The HSE Directorate also carries out ad hoc reviews of FIRs to ensure that the investigations and reports meet the standard required.

For incidents that do not require a designated Formal Investigation, a local investigation is undertaken. Local investigations are normally commissioned by the local accountable manager for the area where the incident occurred. As happens with an FIR, actions and recommendations are made which allow sharing and implementation of lessons leant.

Where an incident occurs on Network Rail infrastructure, LU complies with the relevant Railway Group Standard.

10.1.3 Investigator – resource and training

The intranet-based Management System section: *Managing formal incident investigations and their outcomes*, requires that the HSE Team set and maintain the competence requirements for incident investigators and ensures that competent resources are appointed. Competence requirements are met through a combination of formal training and previous experience assisting in a formal investigation or leading a smaller investigation.

10.2 Improvement actions

All RAIB or ORR reports/recommendations on LU incidents are reviewed at DRACCT and, if requested, by the directors at the London Underground Board. Where appropriate, actions are agreed, timescales set and accountable managers defined. These actions are tracked and, once completed, formal closure is requested through the ORR.

LU has established arrangements for the review of reports of significant incidents which occur outside LU and the development of an appropriate LU response. This includes ORR and RAIB reports, and also any safety incident that might have a bearing on LU's arrangements or operations.

The focal point for such reports is the HSE Lead Investigator, who undertakes an initial review and evaluation in order to establish the potential implications for LU and to identify who within LU or its main suppliers needs to receive a copy of the report and undertake a more detailed review and, where required, develop improvement actions.

Responses or action plans are co-ordinated by the HSE Lead Investigator who also arranges for appropriate peer review via DRACCT. Agreed actions are tracked and monitored.

Analysis of incidents and incident types within LU is undertaken within the Insight team. Information, including trend analysis, is presented to HSE and business managers in weekly, periodic and quarterly Safety Performance Reports. This is used in the implementation of improvement and preventative measures.

Further detail on the analysis of incidents to improve safety performance is included in Section 2.7.

Section 11: Emergency planning

Contents

11.1 Emergency planning

LU has three levels of emergency plan:

- the LU Network Plan which covers major incidents that may affect a number of lines or the entire LU network involving stations and trains, e.g. major power failure, major loss of communications systems, major flooding and terrorist attack
- line plans which cover incidents (stations and trains) that may affect specific lines, and form part of each Service Delivery Unit's emergency plan, e.g. stalled trains, loss of local signalling or power control, infrastructure failures, derailments, etc.
- local plans which cover specific locations, e.g. stations, service control centres, train crew depots.

A specific emergency plan is also maintained by the Head of Network Operations and Resilience specifying the arrangements and methodology to be adopted in response to a major incident affecting the supply or distribution of electrical supplies. These plans (SYS Plan 1 and SYS Plan 2) deals specifically with a complete failure of the national grid supply to London or the loss of a bulk supply point. In this event, an emergency power supply will be provided by Central Emergency Power Supply (CEPS) and local supplies by Off Line Battery Inverter (OLBI) or Uninterruptible Power Supply (UPS) units installed in all sub-surface stations. This plan differs from the LU Network Plan which covers major power failure incidents, regardless of cause.

All emergency plans are integrated and mutually support one another. The findings of the risk assessment process are used to structure the content of these plans, as necessary. The LU Contingency Planning Team is responsible for managing the LU emergency plans. Local emergency plans (including Congestion Control and Emergency Plans), Line Emergency Plans (LEP) and the Network plan are available on the LU intranet. Access to some emergency plans is limited due to their confidential nature.

LU's requirements for emergency planning and related arrangements are contained in the Manager's Handbook: *H-038 Providing emergency, contingency and business continuity and security support*. Requirements for managing incidents are set out in Rule Book 2: *Managing incidents*. The Rule Books defines different categories of incidents, e.g. Category 1 incidents include incidents where there is potential for trains to be stalled for more than 30 minutes, serious infrastructure damage, serious injury or loss and for major flooding event, a major power failure, Person Under a Train incident and other similar incidents. The Rule Books defines actions and accountabilities for managing these incidents safely.

For incidents involving other infrastructure managers and train operating companies (either on or adjacent to other infrastructure), TfL/LU employees work jointly with other relevant organisations to deal with the initial incident and investigation. If an incident occurs on Network Rail property, then the Network Rail Emergency Plan comes into operation.

11.2 Third party co-operation

Where required, third parties, such as TRANSEC (the Department for Transport's Transport Security team), emergency services, large event organisers or other transport undertakings, are involved in the development of LU's emergency plans. This close

working, including joint development of Congestion Control and Emergency Plans at LU stations, allows LU to build more robust and effective emergency plans.

London Underground is classified as a Category 2 responder in the Civils Contingencies Act 2004. The Act and supporting Regulations places duties on LU to co-operate and share information with emergency services which will enable the Emergency Services to plan their response to a major accident on the railway. These duties cover risk assessment, emergency planning, Business Continuity Plans, Warning and Information and Promotion of Business Continuity Management.

LU works with a number of emergency services, including the London Fire & Emergency Planning Authority, British Transport Police, London Metropolitan Police and the Ambulance Services. LU also works with local authorities and other public bodies, such as Public Health England and the Environment Agency, as required. Regular formal and informal interfaces and interaction is well established with the Emergency Services. For day-to-day issues, communication and interface with the Emergency Services is managed by the London Underground Control Centre in line with requirements set out in Rule Book 2: *Managing incidents*. This interface is clearly defined and well established. Rule Book 2: *Managing incidents* also sets out responsibilities for working with the Emergency Services and external agencies. Regular meetings are held with the different Emergency Services which allow both parties to maintain an overview of our interfaces, arrangements for operating a safe railway, sharing appropriate information and lessons learnt from incidents, etc. LU also interfaces with the Emergency Services through the London Resilience Forum as appropriate.

Whilst LU involves the emergency services in exercises in respect of its emergency plans, emergency plans are not, by agreement, routinely provided as they are predominantly for the utilisation of LU staff and managers. However, stations' Fire Compliance Plans are made available to the Fire Service. These plans and the axonometric diagrams show the physical layout and configuration of sub-surface stations including the fire precautions and controls. These plans are maintained by the Contingency Planning and Resilience team.

11.3   Training

LU ensures that its employees are trained and prepared in emergency planning arrangements through specific role and competency requirements, training modules and participation in emergency exercises. Details on training and competence are set out in Section 8 and communication in Section 9.

The Manager's Handbook: *Emergency planning and equipment* requires the production of emergency plans that define individual roles and responsibilities in degraded and emergency conditions. It also establishes arrangements that provide effective response to all types of incident. Suppliers are required to produce emergency plans through clauses in their contracts.

Staff are trained to handle a comprehensive range of emergencies as required by the Rule Books as part of the continuous development training. Managers receive training for dealing with emergencies that are appropriate to their post. All operational employees also undertake fire training.

Periodic table-top and live emergency exercises are carried out in accordance with a rolling programme to test the effectiveness of emergency plans and their interaction with

other agencies, including other transport undertakings. These are multi-agency exercises involving the emergency services. These exercises enable LU to demonstrate its ability to respond to emergencies and review the effectiveness of current arrangements. Table-top testing of the LU Network Plan is carried out at least once a year. Line Plans are tested with both table-top and live exercises held at least once a year.

11.4 Roles and responsibilities

Incidents on the LU network are managed in accordance with emergency planning arrangements and the incident organisation structure set out in the LU Rule Book. This defines the roles of all those involved in incident response and sets out the arrangements that are put into place following an incident.

Rule Book 2 sets requirements for:

- initial actions following an incident
- co-operation with others
- roles, responsibilities and actions
- incident control structure, including a 'gold, silver, bronze' control structure
- preservation of evidence
- additional arrangements for particularly serious or protracted incidents
- special events requiring the implementation of incident control arrangements
- interfaces with Network Rail and other operating companies.

Effective communication is managed through clear identification of responsibilities as set out in the Formal Incident Management system in the Rule Book 2.

A senior LU manager, the Senior Operating Officer (SOO), is rostered on shift 24/7 and is based in the LU Control Centre (LUCC). The SOO assumes overall command during an incident and is responsible for formulating the strategy for dealing with the incident and its effects on other LU services outside of the incident site.

Where necessary, the LUCC also calls out the Emergency Response Unit (ERU) and advises the Office of Rail and Road (ORR) (TfL Team), Rail Accident Investigation Branch (RAIB) and others as appropriate.

LU's mobile communication system (Connect) allows communication across all aspects of the network during normal and degraded operations, and is available for use by the emergency services.

The ERU provides emergency response capability across the whole LU network on a 24-hour standby basis, and is trained to deal with all foreseeable rail related incidents. Through mutual aid agreements, the ERU supports Network Rail when incidents occur on its infrastructure. The ERU takes part in a minimum of one live emergency exercise per year.

For incidents that require significant or protracted recovery arrangements outside the scope of the incident organisation, the Head Network Operations and Resilience will initiate the Emergency Recovery Process, working with the Emergency Planning Manager. In the event that the impact of the incident has implications beyond the Line, the SOO will initiate the recovery process at network level.

Where it is established that an emergency recovery response team is required, this is established by the relevant senior manager in conjunction with the Resilience Planning Manager. The role of the team is to assess what is required in order to return LU lines

or network services to normal operation, and developing the arrangements to achieve this including priorities, strategy, funding requirements and additional resourcing needs.

The requirements for undertaking a post-incident assessment and developing and delivering the recovery plan are embodied in the LU Network Plan.

Section 12: Audit

Contents

12.1 Introduction

Within London Underground's safety and technical assurance regime, audit is an important means of establishing the level of compliance with requirements. The TfL Internal Audit team maintains safety and technical audit programmes in order to provide assurance that LU health and safety risks are being controlled, that LU complies with the relevant aspects of the HSE Management System and that safety and technical assurance arrangements are working effectively.

TfL Internal Audit (IA) plans and undertakes internal audits and audits of external suppliers to TfL.

The main activities within the audit process are set out in the TfL Internal Audit Manual and a supporting Work Instruction: *W0085 HSE & Technical audit process*, specific to the work of the HSE & Technical Audit Team. This Manual and Work Instruction include identification of auditing requirements and the planning of audits, through to the structured collection of evidence and information on the efficiency, effectiveness and reliability of systems for managing health and safety, and agreement and monitoring of corrective action.

12.2   Arrangements for auditing

The Internal Audit processes have been designed to ensure the principle of independence is maintained for all activities and in accordance with the principles of the TfL Integrated Assurance Framework (IAF). The purpose of the IAF is to provide a regime within TfL for the efficient and effective generation and provision of assurance over all of its activities and is built around a common set of assurance principles:

Proportionality: the volume of assurance work carried out should be proportionate to the risk associated with the area under review, having regard, as appropriate, to financial impact, health and safety, operational continuity, reputation, and legal and regulatory compliance.

Risk based planning: assurance work should be planned so as to focus attention on areas of highest risk to the organisation.

Independence: all assurance engagements should include an adequate element of independence from the management responsible for the area under review.

Competence: assurance engagements should be carried out by staff with appropriate qualifications, knowledge, skills and experience commensurate with the nature of the engagement.

Engagement planning: assurance engagements should be properly planned, including defining the engagement's objective, scope, timing and resource allocation.

Documentation of evidence: there should be sufficient documented evidence to support the findings from assurance engagements. Documentation will include notes of meetings, details of key documents reviewed, details of items tested and explanations of the rationale for all matters of judgement.

Reporting: the results of assurance engagements should be communicated to members of management responsible for the area under review, and to others as appropriate, and a management response obtained.

Action: all remedial actions arising out of assurance engagements should be defined

by the accountable manager, and have a defined owner and agreed timescale for completion.

Follow up: there should be a process of follow up to confirm that all significant agreed actions are implemented.

Spreading good practice: areas of good practice identified through assurance activity should be communicated to other areas of the business as appropriate with the aim of improving control across the organisation.

Quality control: all assurance providers should have in place appropriate procedures to review the quality of their work to ensure that appropriate standards are maintained. At appropriate intervals this should include a process of external or peer review.

12.2.1   HSE and technical audit planning

The TfL annual Integrated Assurance Plan (IAP) is produced in accordance with the Internal Audit Manual which complies with the internationally recognised framework for internal auditing provided by the Chartered Institute of Internal Auditors (IIA). The annual planning process is assisted by workshops with senior management and other assurance providers to identify key risks in specific business areas.

The Director of Internal Audit (DIA) and the Senior Audit Managers are responsible for producing the risk based audit plan. For health and safety risks this is the responsibility of the Senior Audit Manager (HSE & Technical and Crossrail). In developing the plan consideration is given to certain key factors, in particular:

- business risk registers, including health, safety and environment
- major procurement exercises
- the main business processes
- major IT processes and development projects
- areas of concern identified by management.

Other factors considered include the degree of management or process change, the date of the last relevant audit and coverage by other assurance providers.

IA adopt a flexible approach to planning and review the IAP on an ongoing basis.

12.2.2   External inspection and review of LU

LU is subject to inspection by the ORR and other regulatory authorities. LU is committed to full co-operation with the requirements of such bodies. This is facilitated through the relevant senior manager in the area concerned.

12.3   Improvement from audit findings

Audit reports are issued following the completion of all safety and technical audits carried out. This report includes the agreed management response to the audit findings. Agreed management actions are required to be in the form of an action plan detailing:

- action to be taken in respect of each audit finding
- manager accountable for implementing the action
- agreed completion date for the action.

Assurance Partners are stakeholders within TfL who normally have an assurance role and are independent of the delivery areas being audited. They contribute to the HSE & Technical audit process regarding scoping audits and agreeing findings and actions.

Agreed actions are tracked by Internal Audit. Actions are not closed unless both the

Assurance Partner (where used) and Internal Auditor are satisfied suitable assurance has been provided.

Internal Audit provides periodic updates to LU senior management on progress with audit actions including the escalation of overdue actions. Internal Audit reports progress to both the TfL Audit & Assurance Committee and the London Underground Board.

12.4 Review of Health, Safety and Environment arrangements

London Underground's Management System review arrangements enable monitoring and decision-making about compliance with, and the adequacy and effectiveness of, health, safety and environmental management arrangements and allow decisions about the nature and timing of necessary actions to remedy deficiencies and effect improvements. The highest level of review takes place at the London Underground Board.

In order to ensure that the London Underground arrangements for health, safety and environment management remain adequate and effective over time, London Underground complies with the intranet-based Management System section: *Reviewing health, safety and environment arrangements*. This establishes the scope of such review and how the results of reviews are utilised in order to achieve improvements. In broad terms, and subject to risk based priorities, all components of London Underground's Health, Safety and Environment Management System are reviewed on a rolling 3 yearly basis.

London Underground has identified the key elements of arrangements that need to be the subject of thorough review and these are set out below. These arrangements ensure that the review has visibility at Board level.

12.4.1 Key elements of review

LU uses the ORR's Rail Management Maturity Model to assess the capability of its HSEMS. This includes the following:

- compliance with and the suitability of the Health, Safety and Environmental Policy
- the validity of risk assessments and control measures
- performance against targets and objectives including the London Underground Health, Safety and Environment Improvement Plan
- the effectiveness of the Management System in respect of Health, Safety and Environmental arrangements
- the effectiveness of the communication of health, safety and environmental information
- the implications of new or changed legislation and how requirements will be complied with
- on-going compliance with legislation and best practice
- the suitability of competency and training arrangements
- the effectiveness of previous corrective actions.

12.4.2 Means of review

Section 2 described the governance and management arrangements for Health, Safety and Environment within London Underground, including roles and responsibilities for review activities. In addition to the periodic review described above, London Underground undertakes review activities when the need is identified as the result of:

- audit findings
- achievement of safety performance targets/objectives
- changes to internal or external standards
- developments in best practice and technology
- changes in policy
- organisational change
- changes to legislation
- risk assessments
- incidents/incident investigations.

12.4.3   Actions as the result of HSE review activities

The results of significant Health, Safety and Environment review activities are recorded and the actions required determined accordingly. This may include actions being incorporated in the London Underground Health, Safety and Environment Improvement Plan/the London Underground Plan for the most significant items or else included in lower level action plans as part of local improvement monitoring. Sections 2 and 14 set out more fully London Underground's Health, Safety and Environment monitoring and assurance arrangements.

Section 13: Co-operation

Contents

13.1   Introduction

As part of the overall transport system for Greater London, LU has physical interfaces with other infrastructure managers, train operating companies (TOCs) and freight operating companies.

LU is committed to effective co-operation and the pro-active handling of interface risks with other infrastructure managers and train operating companies. This approach ensures that LU and other train/freight operating companies are able to fulfil their respective obligations to provide services safely and reliably. These arrangements are underpinned by regular operational liaison meetings between LU operational managers and their counterparts in other transport undertakings where day-to-day health and safety management matters are addressed, along with arrangements for responding to incidents and ad-hoc requirements. At an operational level, this also facilitates the local sharing of information and plans.

The key areas where LU's HSE management arrangements set requirements for co-operation are:

- interface risk assessment and control
- emergency planning and incident response
- incident reporting and investigation
- change management
- health and safety communications.

A list of stations where LU interfaces with other infrastructure managers is included in Annex 13A.

13.2   Liaison and co-operation arrangements

LU's interfaces with other railway operators are managed through LU's National Rail Agreements team at a corporate level. Local interface management is the responsibility of the relevant Area Manager.

Where changes to LU assets are instigated by LU, which may export risk to Network Rail or TOCs, these changes are communicated to the relevant party via LU's Infrastructure Protection Team and, where contractual obligations are impacted, the National Rail Agreements team. These teams also act as the first point of contact for Network Rail or TOCs when their changes are likely to impact on LU's activities. Agreements made in certain instances with other operators are also managed by the National Rail Agreements team.

The National Rail Agreements team operates by:

- developing and maintaining contracts with all national network parties for which there is a commercial and / or operational relationship
- supporting the day-to-day performance of the safety, commercial and operational interfaces between LU and the national rail companies
- addressing performance issues or impacts which arise at the network boundaries
- managing the processes of generating, reviewing, renewing and updating agreements and arrangements with national network parties
- working with other TfL bodies, such as DLR and London Overground, to provide similar contractual relationships as those to national network parties.

13.3 Documentation of co-operation arrangements

13.3.1 Managing National Rail Agreements

The National Rail Agreements framework has the following elements:

- statutory and legal vesting provisions that impose duties on LU and other railway operators
- track and station agreements that provide access for LU over Network Rail infrastructure or other rail operators access over LU infrastructure. These include provisions for:

    - safe operation
    - compliance with LU or Railway Group Standards
    - changes to legislation
    - a performance regime with incentives (where applicable).

- the London Transport / British Rail Works Access Agreement 1964 which provides for access to and maintenance of infrastructure at the national network interfaces to applicable safety and engineering standards
- site specific engineering arrangements that describe the boundaries between LU and Network Rail in terms of ownership of property and fixed assets and state the maintenance and safety obligations arising for each asset
- the LU protocol for works that reaffirms both parties' commitment to work safely, to minimise the risk of loss to the other party as a consequence of works and to maximise business and customer benefits through co-operation
- the LU/Department for Transport (DfT) Memorandum of Understanding that provides for the DfT to consult with LU whenever there is a change to a train operating company franchise so that the safety, commercial and operational implications for LU can be reviewed and commented on.

All stations subject to regulated access have a Station Access Conditions document which sets out the arrangements between London Underground/Network Rail and TOCs. Each regulated Station has its own Station Access Agreement which makes reference to the Stations Access Conditions and is registered with the ORR.

Each agreement between national rail network parties and LU is specific as to the infrastructure involved, the services provided and the contracts used for authority to manage processes arising. Track agreements include a map of the route and definitions of routes, crossovers, sidings and reversing points, which may be used. At station interfaces, the exclusive and shared facilities and services are detailed in the schedules to the station agreements. This enables risks to be quantified and understood. Accountabilities for providing specified services and for maintaining the infrastructure are identified.

Station dispute resolution is managed in line with the conditions set out in the National Station Access Conditions (Condition H: Litigation and Disputes). Where there is unregulated station access then disputes are either referred to independent conciliation or to the court.

All of these interfaces have an impact on LU operations and could pose risk. Therefore, LU liaises with relevant operators when conducting risk assessments. Further details on LU's risk assessment process are set out in Section 4. LU's process for managing the impact of proposed changes is set out in Section 7.

The two track agreements (detailed in Section 13.3.3) set out the terms upon which LU should conduct its operations over the NR tracks, as well setting out the terms upon which NR is to provide access. The agreements oblige the parties to ensure that they each conduct their operations using suitably qualified, trained and experienced personnel, and that alcohol and drugs policies are in place prohibiting the same. Under the agreements LU and NR are to work together to reduce trespass,

The parties are to make available to each other relevant engineering and technical data when requested. There are also obligations to comply with Railway Group Standards.

The parties are to comply with their own safety obligations, which covers health and safety obligations and any relevant statutes or mandatory codes of practice, and not to act to put each other in breach of those obligations. Breach of a safety obligation which affects safe operation is an event of default under the agreements. The agreements allow NR to perform joint emergency exercises.

In the event of any disputes arising under the agreements, the Track Agreement sets out a process by which the issues are escalated internally to a senior level, and if that fails to achieve resolution the parties can apply to court or to independent conciliation.

All of these interfaces have an impact on LU operations and could pose risk. Therefore, LU liaises with relevant operators when conducting risk assessments. Further details on LU's risk assessment process are set out in Section 4. LU's process for managing the impact of proposed changes is set out in Section 7.

For the operation of LU train services on the railway infrastructure which is owned, controlled and operated by Network Rail, modules have been extracted from the Network Rail Rule book and are developed into four RSSB Rules books (RSSB Rules Books 1-4) which underpin Network Rail rules and regulations for LU trains running on Network Rail lines. These instructions are maintained and kept by LU Operational Standards and are included in the training schedule for Train Operators that work on the Bakerloo and District Line Network Rail Interfaces for familiarisation.

There are clear reporting lines within the Network Rail operational environment and Control (LU and Network Rail Operational Teams) to Control Protocols which are adhered to by LU staff when operating on or around the Network Rail track and stations infrastructure.

Regular four weekly meeting take place with the Train Operating Companies, London Underground and Network Rail which refers to continuous improvement through regular reviews of previous period performance and discussions take place to highlight associated risks with compliance for safe operations and contractual performance measures to be met. This covers all the operational and engineering environmental impacts for services provided to our mutual served customers on the shared railway interface, these meetings are commonly known as Joint Delivery Group meetings.

There are also quarterly meetings attended to by Network Rail and London Underground Operational / Infrastructure General Managers and Directors in which the is commonly known as the Joint Executive meeting in which escalation of risks can be driven and tracked.

13.3.2 Use of LU infrastructure by other operators

Chiltern Railways (north of Amersham to south of Harrow-on-the-Hill) and South West Trains (between Wimbledon and East Putney) operate trains over LU infrastructure in accordance with:

- the relevant Track Agreement between London Underground and the TOC
- LU Rule Books
- TOC's Safety Certification,
- relevant LU engineering standards
- Metropolitan line supplement to the LU Rule Books.
- the agreement between London Underground and South West Trains Ltd
- the RSSB GE/RT8000 rulebook
- LU Wimbledon to East Putney Local Operational Arrangement dated August 2003.

The following train operating companies operate engineering trains over the LU network:

- TransPlant: the train operating division contractually owned by Tube Lines Limited which operates over the entire LU network, apart from the Waterloo & City line, for maintenance and train testing purposes
- Colas Rail Ltd: operates over the East Putney to Wimbledon branch for maintenance purposes
- GB Railfleet (part of Europorte): operates engineering trains on behalf of the LU Capital Programmes Directorate for Ballasted Track Renewals on the District and Metropolitan lines, in possessions only
- DB Cargo (UK) Ltd: operates the water jetting train between Amersham and Harrow on the Hill

Before these companies can operate on LU infrastructure, LU reviews their applications for Certification/Authorisation (as appropriate) and makes representations to the ORR where required. LU also ensures that vehicle approvals are undertaken in accordance with LU standards. This approvals process assesses the third party operators train protection systems. Operations are carried out in accordance with the arrangements outlined above.

Any organisation wishing to access the LU network applies to the Infrastructure Protection Team who will manage the request. The Access Team operates the access booking system and is responsible for publishing station and track access requests.

13.3.3   LU operations over Network Rail infrastructure

LU operates over Network Rail infrastructure in a number of locations: operations from Gunnersbury to Richmond and Queen's Park to Harrow and Wealdstone, which take place over Network Rail infrastructure, are undertaken in accordance with:

- the Track Agreements between LU and Network Rail entitled: Track Agreement T03 (un-regulated) between Network Rail Infrastructure Ltd and London Underground relating to the provision of track access and operations on the LU Bakerloo line between Queen's Park and Harrow & Wealdstone stations, and Track Agreement T04 (un-regulated) between Network Rail Infrastructure Limited and London Underground relating to the provision of track access and operations on the LU District line between Gunnersbury and Richmond stations)
- the Network Code
- a valid LU Safety Authorisation / Safety Certificate
- relevant Network Rail and, where appropriate, LU standards.

Engineering acceptance of LU's vehicles over Network Rail Infrastructure is in accordance with Railway Group Standards. LU station staff do not have safety critical track responsibilities in respect of Network Rail infrastructure. Where activities require

access to third party infrastructure, appropriate licences must be held, e.g. Personal Track Safety certificate for Network Rail.

There are a number of interfaces where LU trains run parallel with Network Rail infrastructure. LU also has further interfaces with Network Rail where LU is the infrastructure manager. These are between East Putney and Wimbledon on the District line, where Network Rail operate the signals and provide the power supply, and on the Waterloo & City line where Network Rail provides the power supply. These interfaces are managed by contracts between Network Rail and LU.

13.3.4 LU's use of other operators' stations

LU services call at a number of stations where the infrastructure is managed by others. These include:

- Arriva Rail London: manages Willesden Junction and Kilburn High Road (LU uses the latter for non-passenger moves only) on the Bakerloo line and Kensington (Olympia) on the District line
- c2c: manages Barking and Upminster stations on the District line
- South West Trains which operate Wimbledon and Richmond stations on the District line
- Heathrow Express Operations Company Ltd: manages Heathrow Terminal 5.

LU has a number of management arrangements with other operators in place for stations, including:

- Stratford station: LU is Infrastructure Manager for platforms used by the Jubilee line. Two of LU's Central line platforms are situated on part of the station operated by MTR Crossrail (where MTR Crossrail is the Infrastructure Manager). A Local Agreement is in place which outlines the arrangements in place.
- Ealing Broadway: LU owns the platforms which service the District and Central lines and pays First Great Western for the gating facilities and the staffing of shared areas.
- Network Rail stations: LU is the Station Facility Owner (SFO) at 14 stations in a regulated leased agreement with Network Rail. This involves operation and light maintenance at the following stations: Harrow & Wealdstone, Kenton, South Kenton, North Wembley, Wembley Central, Stonebridge Park, Harlesden, Kensal Green, Queens Park, Kew Gardens, Gunnersbury and the parts of the station served by Arriva Rail London at Highbury & Islington, Blackhorse Road and West Brompton. At these last 3 stations, LU owns or has leases for the remainder of the station.
- Train Operating Companies have access agreements with LU to use these stations and, currently in the case of Wembley Central & Highbury and Islington, provide additional staff to assist their own customers for at least part of the day.

LU has established arrangements to manage the risks where stations:

- contain another infrastructure manager's infrastructure
- are linked to another station operator's station
- share access with another station operator's station
- share a common site with another station operator.

At sites where other operators have responsibilities to ensure the safety of LU services, information about how these interfaces are managed is contained in their HSE arrangements.

Where LU assets are located on Network Rail's or another operator's station, LU maintenance responsibilities are shown on their station plans.

13.3.5   Other operational interfaces

London Underground has operational interfaces with London Rail services in the following locations:

- with Rail for London Limited as the Infrastructure Manager for the East London Line and Arriva Rail London as the Train Operator at Whitechapel and Canada Water stations
- the Docklands Light Railway (DLR) at Bank, Canning Town, Stratford and West Ham stations. DLR is the railway and the infrastructure manager. KeolisAmey Docklands is the train operator for DLR. At these stations, KeolisAmey Docklands staff operate the part of the station that serves its infrastructure. However, LU has responsibility for some maintenance of the DLR platforms (e.g. lighting and power).

There are operational interfaces with Govia Thameslink Railway at Blackfriars, Farringdon, Kentish Town, Highbury & Islington, Finsbury Park, Moorgate and Old Street.

Annex 13A: Infrastructure Manager Interfaces

Station	Train Services	Infrastructure Managers[#]
Bank/ Monument	Circle District Northern Central Waterloo & City DLR	LUL
Barbican	Circle H & C Metropolitan	LUL
Barking	District H & C c2c London Overground	LUL Network Rail c2c
Blackfriars	Circle District Thameslink (GTR) South Eastern	LUL GTR Network Rail
Blackhorse Road*	Victoria London Overground	LUL Network Rail
Canada Water	Jubilee London Overground	LUL Rail for London
Canning Town	DLR Jubilee	DLR LUL
Cannon Street	Circle District South Eastern	LUL Network Rail
Charing Cross	Bakerloo Jubilee (emergency and special workings) Northern South Eastern	LUL Network Rail
Ealing Broadway	Central District First Great Western	LUL First Great Western Network Rail
Elephant & Castle	Northern Bakerloo Thameslink (GTR)	LUL Network Rail GTR
Euston	Northern Victoria London Overground London Midland Virgin West Coast Caledonian Sleeper	LUL Network Rail
Farringdon	Circle Metropolitan H & C Thameslink (GTR)	LUL Network Rail
Finsbury Park	Piccadilly Victoria Great Northern (GTR)	LUL GTR Network Rail

Station	Train Services	Infrastructure Managers#
Greenford	Central First Great Western	LUL First Great Western Network Rail
Gunnersbury*	District London Overground	LUL Network Rail
Harlesden*	Bakerloo London Overground	LUL Network Rail
Harrow and Wealdstone*	Bakerloo London Overground London Midland Southern	LUL Network Rail
Heathrow Terminal 5	Piccadilly line	LUL Heathrow Express
Highbury and Islington*	Victoria Great Northern (GTR) London Overground	LUL Arriva Rail London Network Rail
Kensal Green*	Bakerloo London Overground	LUL Network Rail
Kensington (Olympia)	District London Overground Southern	LUL Arriva Rail London Network Rail
Kentish Town	Northern Thameslink (GTR)	LUL GTR Network Rail
Kenton*	Bakerloo London Overground	LUL Network Rail
Kew Gardens*	District London Overground	LUL Network Rail
King's Cross St Pancras	Circle Metropolitan Northern H & C Victoria Piccadilly Thameslink (GTR) Eurostar Virgin Trains East Coast East Midlands Hull Trains Grand Central South Eastern	LUL Network Rail
Liverpool Street	Circle Metropolitan H & C Central London Overground Great Anglia MTR Crossrail (TfL Rail)	LUL Network Rail
London Bridge	Northern Jubilee Thameslink (GTR) South Eastern Southern (GTR)	LUL Network Rail

Station	Train Services	Infrastructure Managers#
Marylebone	Bakerloo Chiltern Railways	LUL Chiltern Railways Network Rail
Moorgate	Circle Metropolitan Hammersmith & City Northern Great Northern (GTR)	LUL Network Rail
North Wembley*	Bakerloo London Overground	LUL Network Rail
Old Street	Northern Great Northern (GTR)	LUL Network Rail
Paddington (Praed Street for Main Line)	Circle District Bakerloo First Great Western Heathrow Express Heathrow Connect	LUL Network Rail
Paddington (suburban)	Hammersmith & City Circle	LUL Network Rail
Queen's Park*	Bakerloo London Overground	LUL Network Rail
Richmond	District London Overground South West Trains	LUL South West Trains Network Rail
Seven Sisters	Victoria London Overground Rail for London	LUL Arrival Rail London Network Rail
South Kenton*	Bakerloo London Overground	LUL Network Rail
South Ruislip	Central Chiltern Railways	LUL Chiltern Railways Network Rail
Stonebridge Park*	Bakerloo London Overground	LUL Network Rail
Stratford (suburban)	Central Jubilee DLR London Overground c2c Great Anglia MTR Crossrail (TfL Rail)	LUL MTR Crossrail
Tottenham Hale	Victoria Great Anglia	LUL Network Rail Great Anglia
Upminster	District c2c	LUL c2c Network Rail
Victoria	Circle District Victoria Southern (GTR) South Eastern Gatwick Express (GTR)	LUL Network Rail

Station	Train Services	Infrastructure Managers[#]
Walthamstow Central	Victoria London Overground	LUL Network Rail Rail for London
Waterloo	Northern Bakerloo Jubilee Waterloo & City South West Trains	LUL Network Rail
Wembley Central*	Bakerloo London Overground London Midland Southern	LUL Network Rail
West Brompton*	District London Overground Southern	LUL Network Rail
West Ham	District Hammersmith & City DLR Jubilee c2c	LUL c2c Network Rail
West Ruislip	Central Chiltern Railways	LUL Chiltern Railways Network Rail
Whitechapel	Hammersmith & City District London Overground	LUL Rail for London
Willesden Junction	Bakerloo London Overground	LUL Arriva Rail London Network Rail
Wimbledon	District South West Trains Southern (GTR) Thameslink (GTR) Trams Operations Ltd	LUL South West Trains Network Rail London Trams

* LU is the Station Facility Owner at the14 asterisked stations in a regulated agreement with Network Rail. Network Rail is the Infrastructure Manager for these stations. LU's responsibilities as Station Facility Owner involves operation and light maintenance at the following stations: Harrow & Wealdstone, Kenton, South Kenton, North Wembley, Wembley Central, Stonebridge Park, Harlesden, Kensal Green, Queens Park, Kew Gardens, Gunnersbury and the parts of the station served by Arrival Rail London at Highbury & Islington, Blackhorse Road and West Brompton. At these last 3 stations, LUL owns or has leases for the remainder of the station.

[#] Where there is more than one Infrastructure Manager (IM) at a station, the Infrastructure Manager accountabilities have been defined in documented agreements. All agreements are held by the LU National Rail Agreements team. The relevant IM is responsible for the relevant areas of the station concerned, in accordance with the documented agreements.

Section 14: Safe design of infrastructure

Contents

14.1 Introduction

LU aims, through the design of its assets, to keep operational and maintenance risks ALARP and to provide stations through which customers can transit easily and safely.

This section describes how LU complies with statutory requirements in relation to design, and how LU is assured that requirements are met and processes complied with in achieving deliverables.

14.2 Arrangements for meeting statutory requirements

The design of LU assets is compliant with the relevant statutory requirements, including the Health and Safety at Work Act 1974, ROGS and CDM 2015; these requirements are supplemented by LU's engineering standards. The Statutory Instruments Register (Section 3), which contains details of all applicable asset-related legislation, is part of the Asset Management System, which is described in Section 15. Design is controlled by technical and process standards which are published in the LU Management System standards library under the Stations, and Trains and Infrastructure headings (Table 5.1 in Section 5).

The related management process standards are contained under the Management heading in the LU Management System standards library.

14.3 Overview of design standards

LU's Category 1 standards mandate that systems are in place so that risks to safety associated with assets through all stages of the asset life cycle are effectively managed. Standards, procedures and working arrangements reflect the accountabilities and responsibilities for all safety and technical assurance activities for each stage of the asset design, maintenance and project delivery cycles and asset life cycles. Engineering design is subject to standards whether it is carried out by internal project delivery, external parties or LU maintenance teams. Where designs result in significant changes to infrastructure or rolling stock, the safety verification arrangements (Section 7) are applied.

Depending on the asset, standards may be internal standards or external (e.g. British or European) standards. The relevant Head of Profession is responsible for ensuring that appropriate design standards are in place.

As part of contractual arrangements, all suppliers are required to put appropriate safety management systems and controls in place to ensure compliance with regulations and LU's Category 1 standards. Where work is carried out by third parties, LU's role in design is as setter of requirements and associated standards, and seeker of assurance of compliance with such requirements and standards.

Assets are designed and built to the standards applicable at the time of construction. LU ensures that these assets are fit for purpose through the asset management regime described in Section 15. Non-compliance to standards is managed through the TANC and concessions processes (Section 5) and appropriate mitigations are implemented to ensure risk is ALARP.

14.4 Assurance

LU's arrangements for assurance of the design of infrastructure are set out in the Category 1 Standard: *S1538 Assurance*, which ensures safety is secured on an on-

going basis and that corrective action is taken when assurance activity identifies that it is required. The standard establishes requirements for:

- compliance with legislation, internal and external standards
- the accreditation to perform delivery and assurance activities
- verification activity - including audit, inspection, monitoring, review, observation and licensing
- the management of assurance evidence
- determining the level of assurance evidence and verification required.

The primary role for providing safety and technical assurance lies with both internal and external suppliers, who provide details of their proposed assurance activities and evidence to LU for approval in the form of an assurance plan. The receiver of this assurance is the Head of Technical Discipline or their agent.

14.4.1   Application of the assurance regime

All suppliers are obliged to deliver assets which are safe and fit for use, accompanied by assurances that those assets are safe and fit and that any potential impacts of work being undertaken on them are properly controlled. This applies to new or enhanced assets and assets subject to routine maintenance or repair.

The Engineering Director agrees, through the Head of Technical Assurance, roles, verification and surveillance plans on a risk basis with the respective Heads of Technical Discipline for their respective asset or system areas. The Heads of Technical Discipline provide assurance to the Engineering Director that these plans have been completed and that any non-compliance or safety issues have been addressed or an appropriate action is in place to address the issue. Where necessary, the Engineering Director escalates non-compliance or safety issues to the TfL Director of Health, Safety and Environment.

14.4.2   Assurance through the complete asset life cycle

LU has defined the roles and responsibilities for safety and technical assurance throughout the asset life cycle. These include what assurance activities are carried out and who performs them. Running through each phase of the life cycle are continuous assurance activities such as audit, inspection, review, observation, accreditation, licensing, validation and provision of assurance evidence. The position in the assurance chain of regulators, LU, LU's suppliers and their suppliers have all been identified. These positions are reflected in the assurance process operated and the supporting standards and procedures. LU's assurance role is to ensure that suppliers' assurance and self-assurance activities are adequate. LU also undertakes safety and technical audits on suppliers' design and maintenance arrangements.

14.5   Asset design pre-dating current standards

Compliance with current standards for LU assets is not applied retrospectively. Our obligation is to ensure that we remain ALARP at all times. When changes to standards take place, there is a consideration of any potential safety implications for pre-existing assets. If for any reason a safety shortcoming is identified, it will be addressed in order to ensure we remain ALARP, but this does not necessarily extend to achieving full compliance with the requirements of the new standard.

Section 15: Safe maintenance of infrastructure

Contents

15.1 Introduction

LU provides a safe and reliable service for customers by maintaining assets in line with legislation and industry best practice and keeping risks as low as reasonably practicable.

15.2 Asset Management System

LU's Asset Management System is certified against ISO 55001: 2014 - Asset Management. LU has an effective management system in place linking LU's strategic objectives to delivery through a TfL Asset Management (AM) Policy, an Asset Management Strategy, and a Line, and Asset, Network Plan (LANP). LU's approach to AM is based on a whole life cost approach ensuring that expenditure is optimised throughout the life of an asset taking into consideration the balance between cost, performance, condition and risk.

LU's Asset Management System is supported through clear requirements embedded in the LU Management System including statutory requirements and asset standards, summarised in Section 5. The Statutory Instruments Register, which contains details of all applicable asset-related legislation, is part of the Asset Management System. The process to identify new and changing statutory requirements and to amend and update standards to reflect these requirements is described in Section 3. All changes to LU standards are controlled and made in accordance with the change management arrangements detailed in Section 7.

15.2.1 Maintenance standards

LU's Category 1 Standards mandate that systems are in place so that risks to safety are effectively managed through all stages of the asset life cycle. These requirements state that:

- assets are maintained in accordance with standards
- assets shall be entered into and withdrawn from service in a controlled manner
- assets are maintained by competent staff in accordance with safe systems of work.

These standards set the requirements for maintenance activities carried out by LU or by suppliers to LU. Details on how risk is controlled in LU are included in Section 4.

15.2.2 Asset maintenance regime

LU's maintenance regime is set out in the Management System, including the Maintenance Work Instructions, engineering standards, HSEMS and the assurance regime. It aims to ensure that all safety risks are effectively managed in line with the Asset Management system. Details on maintenance of Management System documents (including standards and procedures) are set out in Section 5. LU has defined maintenance standards for LU assets. Some of these standards are internal standards, others are external standards (e.g. British or European standards), where appropriate.

Lead Maintenance Assurance Engineers produce a Maintenance Assurance Plan (MAP) each year which describes the practices and arrangements for the assurance of the Track, Signals or Rolling Stock assets. The MAP also references the maintenance delivery schedule for the coming year, which describes specific and ongoing maintenance activities. The MAP supports the London Underground (LU) Assurance Regime and demonstrates how, for the Track, Signals and Rolling Stock assets,

compliance is met with LU Cat 1 Standard: *S1538 Assurance*. The MAP is required to describe the boundaries of the Track, Signals and Rolling Stock assets, delivery organisations, performance metrics, surveillance arrangements and improvement activities and forms the basis of a maintenance regime.

Verification Activity Plans (VAPs) are normally created at project level as described in Section 7. Within maintenance, verification arrangements are detailed within the MAP in the form of plans for surveillance activity on the maintainer; this enables the Lead Maintenance Assurance Engineer to be satisfied that the maintenance regime is being complied with and standards met.

Asset Condition Reports are prepared each year for each asset type in accordance with Category 1 Standard: *S1042 Asset Condition Reporting (ACR)*. Asset condition is assessed against set criteria, to prepare Asset Safety and Management Certificates. The Asset Condition Reports and Asset Safety & Management Certificates together:

- provide assurance to the London Underground Board and other stakeholders that the assets are of known condition and are fit for purpose
- allow asset condition trends to be monitored
- identify residual safety and performance risks and their associated mitigations and controls
- inform the asset investment planning process.

The Asset Safety and Management Certificates are signed by the appropriate Head of Technical Discipline.

The Asset Condition Reports also feed into the LANP which covers each asset area. The LANP reflects the strategies set out in the Asset Management Strategy (AMS) and are produced by the LU Strategy and Service Development Directorate. The LANP provides details of what work is planned for the next 9 years in order to deliver the AMS.

To improve asset maintenance performance and management, the responsible Heads of Asset Maintenance conduct regular reviews of performance indicators and failure history in order to prioritise remedial work based upon data maintained by LU Operations and/or provided by the HSE Directorate.

Where it is identified that an asset needs major improvement or replacement, Asset Managers in LU Asset Strategy and Investment (part of the Strategy directorate) determine the most cost effective asset management solution based on:

- the nominal life expectancy of the asset
- the asset condition and performance
- the asset environment and usage
- the asset technology strategy
- the best whole life cost.

Details of assets maintained by LU Operations are stored on the Ellipse and Maximo Asset Management Systems. A programme exists to fully populate all assets onto these systems and for those assets not yet populated, existing systems will continue to be used to manage assets. Some existing, specialised, legacy systems will continue to be used for managing a small number of assets until the systems are fully populated. Each Head of Asset Maintenance is responsible for providing assurance that details of their assets are kept up to date in accordance with LU standards.

All risks from the ACR are assessed against a standard matrix, which takes into account the likelihood of the risk occurring and its potential impact in accordance with Category

5 standard: *S5044 Asset Risk Standard*. Any risk assessed as greater than 8 will be assessed by the Asset Manager with appropriate risk plans developed and entered into the TfL risk register ARM.

For safety related risks the Head of Technical Discipline, liaising with the Health, Safety and Environmental team, will determine if the risk control measures, planned or existing, are sufficient to maintain safety risk at a tolerable level in accordance with Category 1 standard: *S1521 Safety Decision Making*.

15.3   Compliance with maintenance regimes

The mechanisms in place to manage non-compliance with maintenance / engineering standards, both within LU and by suppliers, is set out in Section 5. In addition compliance is ensured through:

- risk-based audit/surveillance of performance in accordance with the assurance regime
- regular LU-supplier contract meetings where health, safety and environmental issues are discussed
- delivery of the Verification Activity Plan
- direction which allows LU to instruct that a specific action be undertaken or works stopped
- Engineering Regulatory Notices (ERNs) which must be complied with, including removing the asset from service if necessary.

Requirements for the control of health and safety aspects of supplier management are established through the intranet-based Management System section: *Managing HS&E with contractors and suppliers*. This includes:

- supplier selection and tender evaluation
- the management of suppliers/contractors
- the application of the Construction (Design and Management) Regulations
- management of work interfaces.

Accountable managers responsible for managing contractors/suppliers working on LU sites provide data on supplier performance including health and safety data. This data is used in the management of contractors/suppliers. It is also considered during the procurement process. All LU suppliers must comply with LU Category 1 standards.

Contracts are managed through contractual regimes that ensure the supplier meets the required level of performance, quality, safety and security. The contracts also contain provisions for compliance with appropriate standards.

Audit is used to ensure processes are being adhered to by suppliers and safety and technical audits are programmed and co-ordinated by the Director of Internal Audit.

Regular contract meetings are held where safety, quality and environmental performance matters are reviewed. The LU contract teams are actively supported by an LU Health, Safety and Environment Manager.

Section 16: Safe operation of infrastructure

Contents

16.1　Safe operation of railway

LU's organisational structure, operating in line with corporate governance and documented processes and standards, ensures the safe operation of the infrastructure – during normal operation and in degraded or emergency conditions. The processes and standards are set out in the HSE Management System (as outlined in Section 2) and Rule Books (Sections 9.2 and 16.2).

Specific details of safe operation of trains (including signalling), stations, service control and power are set out below. In each area, roles and responsibilities for operating the railway safely are clearly defined (in the HSE Management System and/or Rule Books), in particular where there are overlaps in infrastructure/asset management.

Where LU operates over Network Rail infrastructure LU complies with the relevant parts of Network Rail's safety arrangements. Where LU's activities interface with other railway operators, LU works with those organisations to ensure the safe operation of the infrastructure (during normal and degraded/emergency conditions) as set out in Section 13.

16.1.1　Train operations

LU holds overall responsibility for health and safety aspects of its train operations. Train operations includes all train movements (whether carrying customers or not) along permanent way over specific routes, usually to a timetable and normally under the control of a Service Controller and the signalling system. All train operations are managed to the standards set out in the LU Rule Book, Line Supplements and other appendices.

The speed of trains across the LU network varies from line to line. The highest speed is 60mph. At certain locations, emergency, temporary or permanent speed restrictions may be put in place to manage the train service, e.g. to mitigate the risk of derailment.

All LU passenger rolling stock is One Person Operated (OPO). Train Operators are responsible for operating trains in accordance with the timetable, signals and operational rules; they remain in radio contact with Service Control. The *Train Operations Competence Standards and Guidance* published on the Competence Management System sets out the mandatory principles, practices and instructions against which train operators are monitored and assessed for competence.

LU also operates a number of specialist engineering vehicles. Where these vehicles need to move in Traffic Hours under their own power, a Train Operator / competent pilot works the vehicle to its work site or competent resources will be brought in to operate these miscellaneous vehicles. The vehicles have valid certificates of technical conformance and operating approvals in accordance with LU standards.

LU employs Test Train Operators who undertake a range of activities such as:

- testing and commissioning of both current and replacement rolling stock
- stock transfers
- brake and ancillary equipment testing
- journey time metric proving
- ATO testing
- training of LU instructor/operators on new rolling stock
- rail adhesion activities
- excursion, tour and heritage trains
- gauging activities

- ▪ acting as a pilot for specialist self-propelled on-track engineering vehicles travelling in Traffic Hours where required.

These activities involve, typically, the operation of between 60 and 100 train paths per week. Whilst these activities may be carried out during traffic hours, they do not involve the carriage of customers, with the exception of the excursions, tours and heritage trains, where specific Operational Safety Plans are used.

All such operations are carried out under LU's Safety Certificate and in accordance with LU standards for operations safety and competence assurance. The effectiveness of the arrangements is subject to the assurance and approvals regimes described in Section 14.

16.1.2   Signal operations

Signalling controls train movements and maintains safe separation between trains. Signalling is co-ordinated from line control centres. For the majority of London Underground lines, signallers are co-located with the line controllers, although some legacy signal cabins remain on the sub-surface network.

The Central, Jubilee, Northern and Victoria lines are provided with continuous Automatic Train Protection (ATP) and Automatic Train Operation (ATO). The ATP equipment will command an over-speeding train to reduce its speed to below the maximum safe speed and keep trains a safe distance apart. The remaining lines have a train protection system comprising trackside trainstops and train-borne tripcocks. When a signal is at danger its associated trainstop is in the "up" position, so if a train passes the signal, its tripcock will be mechanically operated, activating the train emergency brake. All other lines with the exception of the Chesham branch of the Metropolitan line (axle counters) are equipped with train detection in the form of jointed or non-jointed (except points and crossing areas) track circuits, with location accuracy supported by delta track circuits or position detectors.

In areas of points and crossings, interlocking systems are employed to ensure that trains are safely routed. These use either mechanical, relay or computer-based technology.

At terminal stations with limited over-run distances beyond the platform ends, there are special arrangements for monitoring the speed of trains entering the platforms, whereby emergency brake applications are initiated for over-speeding trains.

Signal control systems are logically separated from vital interlocking so that, under most failure conditions, signal control can be maintained by direct control of site interlocking.

16.1.3   Station operations

The LU stations structure is organised along a number of station areas. Each area has an Area Manager who is accountable for station operations. The Area Managers are landlord of the area and are the employing manager of the rostered staff in their area. The Area Manager reports to the Line Performance Manager Stations.

Each station is run by a Customer Service Manager or Customer Service Supervisors (CSS). The number of Customer Service Managers allocated to a particular station reflects the station's size, type (e.g. sub-surface) and operational risks. Customer Service Supervisors are responsible for stations operations at Gateway and Destination stations under the direction of the Customer Service Manager (CSM). Customer Service Supervisors (CSS) staff local stations supported by at Customer Service Manager.

Depending on the station type CSMs and CSSs may be responsible for deploying Customer Service Assistant.

Each station holds a Congestion Control and Emergency Plan (CCEP) which addresses foreseeable risks and response at the station. The plans cover congestion control, evacuations and summarise emergency response/incident management arrangements. The CCEPs are reviewed at intervals defined in the Manager's Handbook in respect of emergency plans and following changes or incidents.

16.1.4   Service Control

The Service Control Manager is accountable for the management of:

- the operation and monitoring of service control equipment in a designated area to optimise the safe and efficient operation of train services whilst providing train service information to customers and other operational management
- the monitoring, recording and signalling of trains through designated areas, operating multi-site signalling equipment including emergency back-up systems ensuring safe and efficient train services
- the competence management of relevant staff
- the proactive prevention of incidents, line performance reviews and the investigation of reasons for poor service performance and development of ways to improve performance.

16.1.5   Power Supply

LU operates to Category 1 Standard: *S1105 Power Service Contract - Performance Specification*. LU source power from the local Distribution Network Operators at high voltage and transform and distribute this for use across the railway. Power is derived from the national grid via Bulk Supply Points (BSPs) and a series of high voltage feeders. In addition, gas turbine alternator sets provided by LU's Central Emergency Power Supply (CEPS) are used from time to time to generate commercial income and very occasionally to provide power to support the distribution system. The LU distribution network generally has sufficient redundant capacity to permit failure or disconnection for maintenance of elements of the network without loss of power. Section 11 contains details of the alternative power supplies used in the event of a power failure.

The operational management of the distribution systems is undertaken by the LU Shift Supply Engineers (SSEs) in the main Power Control Centre. LU has operational control of traction current supplies to the operational railway and to rolling stock depots and low voltage power supplies for signalling, pumps, lighting and lifts and escalators.

The respective sections of the power distribution network are managed, controlled and constantly monitored by the power control room staff using computer-based supervisory control and data acquisition (SCADA) systems. Emergency control facilities are available for use in the event of equipment failure or the need to evacuate the main power control centre.

Traction current is switched on or off by LU's power control room staff using SCADA systems in consultation with the appropriate LU Line and Track Access Controllers and in compliance with the LU Rule Book. In tunnel and sub-surface areas, traction current can also be switched off in an emergency via the tunnel telephone system on some lines.

Variations to traction current switching on and off times to allow engineering works are published in line with the communication of operational information processes detailed in Section 9.

Clear processes are in place for ensuring safe access to the track environment whether during Traffic Hours or Engineering Hours. These rules are set out in the Rule Books or in a Code of Practice.

Where Network Rail supplies power to Network Rail infrastructure, or where LU infrastructure abuts that of Network Rail, the arrangements for traction power provision are set out in LU-Network Rail infrastructure agreements (which sit with the National Rail Agreements team, Section 13).

16.2   Operational standards

Operational risks are predominantly controlled via the LU Rule Book and Appendices, and the Managers Handbooks.

LU is responsible for maintaining these documents and reviewing to incorporate industry best practice and changes in British, European and International standards and legislation. The process for proposing a change to a standard, Rule Book or handbook is through DRACCT and is set out in Sections 2 and 7.

Integration between the Management System and operational arrangements are managed by ensuring staff are competent to carry out the prescribed tasks as documented in Section 8.

The relevant legislative requirements and the methods by which LU ensures compliance are set out in Section 3.

Section 17: Types of work and compliance with legislative requirements

Contents

17.1 Categories of work with a safety element

The activities detailed below are deemed to be safety critical when carried out on the LU network. These include practical training in the areas identified and the additional LU activities that are not designated safety critical by the Regulations but are considered to be equivalent in risk from activities within the scope of the Regulations. Individual detailed sets of requirements, including relevant practical elements, have been developed covering each safety critical activity. These requirements are maintained by the appropriate area of LU or supplier responsible for the activity. There are approximately 8,300 safety critical staff employed by LU. Precise staff numbers for LU are recorded on the LU HR systems. Suppliers' staff details are recorded on their local HR systems.

Railway operations:
- train operations
- signal operations
- station operations
- degraded and emergency operations

Engineering – installation, inspection, maintenance and repair:
- track and structures
- pumps and drainage
- fleet maintenance
- use of engineering vehicles/trains and on-track machines
- signalling
- telecommunications systems
- power supply, distribution and current collect system
- testing trains and use of test track.

Safety on the track:
- protection, train and possession duties
- activities that have safety implications in terms of decisions made; these are typically activities undertaken by operational managers and supervisors.

A comprehensive list of LU's safety critical activities is included in Category 1 Standard S1548: *Safety critical work*. The standard sets out requirements on employees and managers for providing assurance on competence, requirements on identification and working hours for safety critical staff in order to ensure compliance with Railway and Other Guided Transport Systems (Safety) Regulations 2006 (as amended) and ORR's Railway Safety Publication 4 (*Safety Critical Tasks - Clarification of ROGS Regulations Requirements*)

17.2 Competence management

LU complies with the Office of Rail and Road Safety Publication Developing and Maintaining Staff Competence via the LU Competence Management Systems (CMS). This sets out responsibilities for ensuring the training and maintenance of competence. The under-pinning objective is to ensure that any individual who controls safety risk is competent to do so and that this competence can be demonstrated. The CMS applies to those who undertake activities:

- that affect or have the potential to affect safe operation
- that affect occupational health and safety

- that are critical for controlling risk.

Access to the LU network is restricted to individuals carrying staff passes or Sentinel cards. Access arrangements are applied through the LU Rule Books which requires employees or suppliers carrying out safety critical work to be competent. The relevant Rule Books include:

- Rule Book 10: *Station Access*
- Rule Book 13: LU Staff responsibilities – Traffic Hour Protection
- Rule Book 14: Possessions planning and management
- Rule Book 16: Going on the Track in Engineering Hours,
- Rule Book 17: Managing access to the track in Engineering Hours
- Rule Book 20: Engineering Staff – Traffic Hours Protection
- Rule Book 21: Personal Safety on the Track

Access to train cabs is restricted to authorised personnel in accordance with the LU Rule Book 6: *General Train Operations*. Access to potentially hazardous environments, such as equipment rooms or machine chambers, is restricted to individuals who are appropriately competent and who operate to a safe system of work.

The CMS outlines the high level requirements for LU employees and their suppliers when working on LU Infrastructure. Where a role involves operation over another Infrastructure Manager's infrastructure, the competence management process will include all of the necessary elements to operate on LU and third party infrastructure.

Those who undertake competence assessments are selected, assessed and accredited to allow the maintenance of competence as an assessor and competence in the skill being assessed.

LU suppliers must establish arrangements to meet the legal requirements for Competence Management and the LU Category 1 Standard: *S1548 Safety Critical Work*, and are subject to TfL audits for compliance with the arrangements put in place. This includes providing assurance to LU, where required, of their compliance with limits spent at work. The LU Category 1 Standard: *S1548 Safety Critical Work* sets out working hour limits which are designed to manage the risk of fatigue.

Further details on competence management are set out in Section 8.

Section 18: Types of rolling stock and compliance with legislative requirements

Contents

18.1   Types of rolling stock

LU's passenger trains are either tube stock or sub-surface stock. Tube stock is designed to operate on lines with the restricted structure gauge of tube tunnels. Surface stock is built to a gauge that is similar to main line stock.

All trains are one person operated (OPO). On the Central, Jubilee, Northern and Victoria lines, trains are driven by an automatic driving system. Safety on these lines is assured using Automatic Train Protection (ATP) systems that set the maximum safe speed at which the train may proceed and the limit of its movement authority. In the absence of such data, the trains will stop.

If the maximum safe speed is exceeded when operating in Automatic Train Operation (ATO) mode on the Central, Jubilee, Northern or Victoria lines, the train will be automatically braked using the emergency brake until the speed is below the maximum safe speed. If the ATO is defective or the train is being driven by the Train Operator in protected manual and the maximum safe speed set by the signalling system is exceeded, an emergency brake application will be made until the train is brought under the maximum safe speed. If the train exceeds its limit of movement authority, in either ATO or protected manual modes, the train will be automatically braked to a standstill using the emergency brake.

In the event of a manually operated train passing a signal at danger the train will be immediately brought to a standstill by the emergency brake. A Speed Control After Tripping (SCAT) system ensures that the Train Operator cannot exceed 16 km/h for a defined time after the tripcock is reset. On the Victoria, Jubilee, Northern and Central lines, if the trackside or train borne signalling system fails and it is necessary to move the train, a Restricted Manual mode may be used. The train's control system prevents the train exceeding 16 km/h at all times whilst restricted manual is in use by making an emergency brake application if 16km/h is exceeded for any reason. The brake is released by the train's control system once the speed is below the 16 km/h limit.

All trains are fitted with service and emergency braking systems that provide redundancy. All trains, including the automatic trains when being driven manually, are provided with Dead Man's Handles. These apply the emergency brakes if released by the Train Operator. Emergency brake rates are compatible with signal overlaps.

All trains have been designed and are maintained to:

- operate within a defined swept envelope that is within the structure gauge
- control the risk of parts falling from trains to minimise the risk of derailment
- minimise the risk of collision through train protection/signalling/braking systems
- minimise the consequences of collisions through structural design.

Stock which travels on Network Rail tracks also carry Network Rail track circuit operating clips to maintain the signal in the rear at danger in the event of Network Rail lines being obstructed.

A summary of the passenger fleet is given in Tables 18.1 – 18.2 below [Note: The dates referred to are the first date of build. The process of building and commissioning the required trains took several years.]. LU also operates specialist and heritage rolling stock on its network (as outlined in Section 16.1.1).

Stock	Lines	Composition	Fleet size	Nominal Build date	Built by
D78	District (are being replaced with S7s)	2 x 3 car	Currently being reduced as S7 Stock is brought into service	1978	Metro Cammell
S7	Circle, District and Hammersmith & City (already replaced C Stock and started replacing D Stock from 2015)	1 x 7 car	133 (this will be the final total when the D Stock replacement is complete)	2012	Bombardier Transportation Ltd
S8 Stock	Metropolitan	1 x 8 car	58	2010	Bombardier Transportation Ltd

Table 18.1 Surface stock

Stock	Lines	Composition	Fleet size	Nominal Build date	Built by
1972 Mark 1&2	Bakerloo	1 x 3 car + 1 x 4 car	36	1972	Metro Cammell
1992	Central	4 x 2 car	85	1993	Adtranz
1992	Waterloo & City	2 x 2 car	5	1993	Adtranz
2009	Victoria	2 X 4 car	47	2009	Bombardier Transportation Ltd
1996	Jubilee	1 x 4 car + 1 x 3 car	63	1997/2005	Alstom
1995	Northern	2 x 3 car	106	1998	Alstom
1973	Piccadilly	2 x 3 car	86	1974	Metro Cammell

Table 18.2 Tube stock - the 1995 Tube Stock is maintained by Alstom

LU operates heritage trains and engineering vehicles on the network (listed below). These trains must have approval to operate in order to operate on the network (as described in Section 18.4). Not all the vehicles listed below currently hold a Certificate of Technical Conformance.

Heritage vehicles
- 1923 Metropolitan Electric Loco - Met 12 "Sarah Siddons" (Bo-Bo electric)
- Coach driving trailer set Ex BR class 483 DTS76297, TF71163, TBS70823, DTS76324
- A stock 5110, 6110, 6111, 5111
- 1938 Tube stock driving motor car, A-end, No. 10012, 1938
- 1938 Tube stock driving motor car, D-end, No. 11012, 1939

- 1938 Tube stock non-driving motor car No. 12048, 1939
- 1938 Tube stock trailer car No. 012256, 1939
- Metropolitan Railway 'Jubilee' carriage No. 353, 1892
- 9466 – ex BR(W) 94xx class steam locomotive
- Ex - BR class 20 locomotives – 20227, 20142, 20189, 20205
- Ex - BR class 20 locomotives – 20227, 20142, 20189, 20205
- Ex-LT 1960TS 3 car unit 3906, 4927, 3907 (Craven Heritage)
- L150 (5521) – ex GWR 4575 class steam locomotive
- Metropolitan Ashbury Coaches – 4 car "Chesham Set"
- Metropolitan No1 – ex Metropolitan E class steam locomotive
- Ex-BR Mk1 BSK Coach brake std compartment

Engineering vehicles
- A Stock Rail Adhesion Train 5110, 6110, 6036, 6111, 5111
- 1962 Tube Stock 8 car rail adhesion train 1407, 9459, 9577, 1682, 1681, 9125, 2406, 1406
- 1962 Tube Stock 5 car rail adhesion train 1570, 9691, 2440, 9441, 1441
- Ex-BR class 20 Diesel electric locomotives
- GBRf Class 73 Diesel electric locomotives
- Track recording coach train - with Class 73 loco, Mk1 generator coach, High speed track recording coach, plain line pattern recognition 3 coach, MK2 barrier coach, Class 73 loco
- Class 960 3 car diesel multiple unit - Sandite laying and water jetting train
- Class 66, 3 FEA wagons, class 66 - Rail head treatment train
- MLA wagon Falcon box
- FEA Wagon
- Bogie tank KBA wagon

Engineering vehicles operated by TransPlant are operated under the TransPlant Safety Certificate (as described in Section 1.2).

18.2   Statutory requirements

As LU is not part of the interoperable railway, legislative requirements which apply include those arising from the Health and Safety at Work etc. Act 1974, Regulations enabled under this Act and other regulations such as the Rail Vehicle Accessibility (Non-Interoperable Rail System) Regulations 2010 and the Railways and Other Guided Transport Systems (Safety) Regulations 2006. The way that LU responds to new or amended legislation is described in Section 3.

The regulations which apply in respect of the design and maintenance of LU's rolling stock include:

Regulations	Design	Maintenance	Rolling Stock
Locomotives and Wagons (used in line and sidings) Regulations 1906	Y	Y	All
Railways Consolidated Clauses Act 1845	Y	N	All
Railway Safety (Miscellaneous Provisions) Regulations 1997	Y	Y	All
Railway Safety (Miscellaneous Amendments) Regulations 2001	Y	Y	All
Rail Vehicle Accessibility (Non-Interoperable Rail Systems) Regulations 2010	Y	N	All

Railways and Other Guided Transport Systems (Safety) Regulations 2006	Y	Y	All
Railways and Other Guided Transport Systems (Safety) (Amendment) Regulations 2006	Y	Y	All
Railways and Other Guided Transport Systems (Safety) (Amendment) Regulations 2011	Y	Y	All
Railway Safety Regulations 1999.	Y	Y	All

Other relevant railway legislation which affects the operation of the railway include:

- Railways Act 1993
- Railways and Transport Safety Act 2003
- Rail Vehicle Accessibility (Networks) Exemption Order 2010
- Rail Vehicle Accessibility (London Underground Victoria Line 09TS Vehicles) Exemption Order 2008
- Rail Vehicle Accessibility (London Underground Metropolitan Line S8 Vehicles) Exemption Order 2010
- Rail Vehicle Accessibility (London Underground Metropolitan Line S8 Vehicles) Exemption Order 2011
- Rail Vehicle Accessibility (Non-Interoperable Rail System) (London Underground Circle, District and Hammersmith & City Lines S7 Vehicles) Exemption Order 2012

The requirements of these regulations are integrated into LU's Management System through standards.

18.3   Maintenance plans

All rolling stock operated by LU is maintained by LU's Asset Maintenance teams or the train manufacturer under contract. Maintenance requirements are mandated via the maintenance provisions within LU Category 1 Standard: *S1180 Standard for Rolling Stock*. The standard mandates for each type of rolling stock:

- acceptance of the maintenance regime by LU, including changes to the regime
- periodic review of the maintenance regime
- documentation requirements
- train maintenance plans covering all systems and sub-systems to be produced
- record keeping
- Minimum Acceptable Condition Standards (MACS)
- dealing with faults in service
- post-maintenance testing
- monitoring and review of train performance and condition.

The maintenance requirements differ for different rolling stock.

Compliance with requirements is assured through the assurance arrangements described in Section 14 and the audit arrangements described in Section 12. An overview of maintenance plans is maintained by the relevant manager.

18.4   Approval to operate

The arrangements for trains to run over the LU network are governed by:

- certificates of technical conformance which confirm that the rolling stock complies with standards, is compatible with the route and there are appropriate maintenance regimes in place
- the company's Safety Certification and Safety Authorisation
- safety assurance of operational arrangements.

Approval for LU rolling stock to operate on Network Rail infrastructure is achieved in accordance with Railway Group Standards. Where LU rolling stock operates in proximity to other transport undertakings' infrastructure, comments are sought from the relevant parties and considered as part of the LU approvals process, as described in LU's Category 1 standard: *S1538 Assurance*.

Other train operating companies are also governed by track agreements that dictate how often a train operating company is allowed to operate.

All rolling stock that is new or reintroduced to the LU network, or modifications to existing stock, is formally approved before it can be operated in accordance with S1538. This standard requires the production and approval of appropriate engineering certificates and production and approval of operating procedures.

Certificates of Technical Conformance certify that vehicles, when operated in planned mode will comply with all appropriate legislation and engineering standards. The relevant legislation is identified through the mechanisms described in Sections 3.1 and 3.2. The Head of Technical Discipline for Rolling Stock, or his authorised deputy, issues these certificates and may at any time withdraw, suspend or modify them. The scope of the certificates includes compliance, where relevant, with standards for:

- train protection
- crash worthiness and structural strength
- performance of power and parking brakes
- performance of traction system
- type of materials employed
- fire performance
- provision of fixed and portable safety equipment.

These certificates also certify that the rolling stock is compatible with the route and include:

- kinematic envelope within the structure gauge
- weight distribution compatible with the infrastructure
- ability to operate track circuits correctly
- interaction of the vehicle with the track and power supply
- compatibility with other vehicles using the route
- compatibility of doors and step-plates with platforms.

The certificates also certify there is an appropriate maintenance policy in place.

Plant Approval Certificates, issued on behalf of the Head of Technical Discipline - Permanent Way, are required for track maintenance plant or equipment.

These certificates cover the following:

- identification number
- type of operation

- area of operation
- operational limitations or conditions
- type of approval granted
- period of certification.

All, but the first bullet point, are only relevant in relation to rail mounted plant.

The Plant Approval Certificates certify that the equipment complies with statutory regulations, company requirements and track engineering standards. Where the plant is defined as a rail vehicle, a Certificate of Technical Conformance is also required.

Where the operational arrangements proposed for rail vehicles differ from the LU Rule Books, LU requires that, prior to the commencement of operations, a concession against the relevant standard is in place, in accordance with the arrangements described in Section 5. This applies:

- when a new piece of rolling stock or on-track plant is introduced to the Underground, such as TransPlant equipment
- when a maintenance contractor wants to use on-track plant for a specific job, the vehicle will usually be removed from the Infrastructure once the job/project has been completed
- when test train movements are required where the stock being used is not regular passenger stock formations, or cannot be operated in the usual way.

The Network Services Director, or his authorised deputy, reviews the proposed arrangements to ensure that they comply with legislation and do not compromise the safety of LU's operations. Operation of the rail vehicles is permitted once the following assurances have been provided:

- that the risk associated with the operation of the rail vehicle is as low as reasonably practicable
- all responsibilities have been identified and assigned, and training has been provided.

The frequency and timings of any train operation are agreed between LU Timetables and the train operator. Trains will only come on to the LU network under the control of the Service Controller.

Where other rolling stock, e.g. historic rolling stock, is operated on LU's infrastructure, appropriate assurance arrangements (as set out in Section 7) ensure that this stock is operated safely.

18.5   Rolling stock modifications

Rolling stock modifications are managed by LU's Asset Maintenance teams. Details of all rolling stock modifications and supporting information are maintained on databases that record details of the changes/modifications, drawing numbers, programme information and any special instructions. All changes are reviewed and signed off by the Head of Technical Discipline for Rolling Stock or delegated authority.

Details of changes/modifications that have been sufficiently significant to require approval by LU and the ORR are also maintained by LU's Asset Maintenance teams or the Train Supplier, as appropriate to the arrangements in place.

Section 14 describes LU's assurance process through which LU is assured that the safety and technical requirements of bringing modified, upgraded or renewed rolling stock into service are met.

Glossary

a. Abbreviations

A	
ABRA	Asset Based Risk Assessment
ACR	Asset Condition Reports
ALARP	As Low As Reasonably Practicable
AMS	Asset Management Strategy
ATO	Automatic Train Operation
ATP	Automatic Train Protection (Signalling)
B	
BCV	Bakerloo, Central, Waterloo & City and Victoria lines
BSP	Bulk Supply Point
C	
c2c	c2c Rail Limited
CAP	Change Assurance Plan
CCEP	Congestion Control and Emergency Plan
CCTV	Closed Circuit Television
CDM	Construction (Design and Management) Regulations 2015
CEPS	Central Emergency Power Supply
CIRAS	Confidential Incident Reporting and Analysis System
CMS	Competence Management System
COSHH	Control of Substances Hazardous to Health
CRA	Customer Risk Assessment
CRCL	Chiltern Railway Company Limited
D	
DLR	Docklands Light Railway
DRACCT	Director's Risk, Assurance and Change Control Team
E	
ERN	Engineering Regulatory Notice
F	
FIR	Formal Investigation Report
G	
None	
H	
HR	Human Resources
HSE	Health, Safety & Environment
HSEMS	Health, Safety and Environmental Management System
I	
IAF	Integrated Assurance Framework
IAP	Internal Audit Plan
ICP	Independent Competent Person
J	
JNP	Jubilee, Northern and Piccadilly lines
K	
None	
L	
LANP	Line and Asset Network Plan
LFEPA	London Fire and Emergency Planning Authority
LU	London Underground

LUCC	London Underground Control Centre
M	
MACS	Minimum Acceptable Condition Standards
N	
None	
O	
OLBI	Off Line Battery Invertor
OPO	One Person Operated
ORR	Office of Rail and Road
P	
None	
Q	
QRA	Quantitative Risk Assessment
QUENSH	Quality, Environmental, Safety and Health Conditions
R	
RAIB	Rail Accident Investigation Branch
RGS	Railway Group Standards
RIDDOR	Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013
ROGS	Railways and Other Guided Transport Systems (Safety) Regulations
RSSB	Rail Safety and Standards Board
S	
SABRE	Site Access Booking Railway Engineering
SAP	An enterprise management information system which manages procurement, HR functions, Duty Allocation, payrolls etc.
SCADA	Supervisory Control and Data Acquisition (computer-based system)
SCAT	Speed Control After Tripping
SOO	Senior Operating Officer
SPAD	Signal Passed At Danger
SSE	Shift Supply Engineer
SSL	Sub-Surface Lines (Circle, District, Hammersmith & City and Metropolitan lines)
T	
TANC	Temporary Approved Non Compliance
TOC	Train Operating Company
TfL	Transport for London
U	
UPS	Uninterruptible Power Supply
V	
VAP	Verification Activity Plan
W	
WRA	Workplace Risk Assessment
X, Y, Z	
None	

b. **Terms and definitions**

A

Accountability - Assigned to the person who has the ultimate responsibility for completion of the activity to the required standard and has the authority to veto. Within LU, this authority resides with the appropriate Executive Director.

ALARP - Under UK legislation, LU is required to do whatever is reasonably practicable to reduce the health and safety risks to its employees and others affected by its operations; in other words, risks must be reduced to a level which is as low as reasonably practicable (ALARP). The term reasonably practicable means that safety measures should be undertaken unless the cost, in terms of money, time and trouble, is grossly disproportionate to the safety benefit, which is expressed in terms of the value of the risk averted by the safety measure.

Asset - An item of property owned or leased by LU.

Asset Life Cycle - The life of an asset can be represented by a series of stages commencing with identification of need through specification, design, manufacture or construct, install, commissioning (sometimes included with installation), operate and maintain (the service life) and ending with withdrawal and disposal. This is one cycle of the asset life cycle. Assuming continued requirement for an asset the commissioning stage of a second life cycle will coincide with withdrawal of the asset used in the first life cycle.

Asset Management - Asset Management is the way assets (such as trains, signals, stations and tunnels) are managed throughout their life to achieve the right balance of cost, performance and risk for the organisation. Asset Management covers demand analysis, asset acquisition, operation, maintenance and renewal/disposal and follows a plan, do, check, act process.

Automatic Train Operation - The subsystem of automatic train control, responsible for the automatic driving of trains.

B

None

C

Centurion - Senior operational manager.

Competence – A combination of practical and thinking skills, knowledge, experience, fitness and behaviour.

Contractor - A company, firm, person, supplier, consultant, sub-contractor, agent or stockist, providing goods, materials or services. Contractors may be company employees.

D

None.

E

Emergency - An undesired event which has life threatening and/or extreme loss implication and requires immediate action.

Engineering Hours - The period of time between the published time or actual time, if later, traction current is switched off **and** the published time or amended time, if earlier, traction current is switched on. Note therefore that Engineering Hours cannot be extended.

Environment - Surroundings in which an organisation operates, including air, water, land, natural resources, flora, fauna, humans and their interrelation.

F

Formal Investigation - A Formal Investigation aims to identify underlying causes of an incident and to make recommendations to address these causes, any contributory factors, and any issues relating to managing incidents and business recovery. The recommendations are included in a report which is circulated widely and formally held within the Company and is reviewed by DRACCT.

G

None.

H

None.

I

Incident - An undesired event that results in, or under slightly different circumstances could have resulted in, harm to people, damage to property, damage to the environment, or loss of process.

Infrastructure Manager – Has the meaning ascribed to it by the Railways and Other Guided Transport Systems (Safety) Regulations.

Interlocking Machine Rooms - A large signalling equipment room which houses the equipment associated with the signalling interlocking system.

J

None.

K

None.

L

LU network - The geographic extent of the services provided by London Underground.

M

None.

N

None.

O

None.

P

Performance Management - The means by which performance measures are defined and set, and against which a comparison of actual vs. planned/targeted performance can be continuously monitored.

Points - A mechanical installation enabling vehicles to be guided from one track to another at a junction. Points can be either mechanically powered or hand-worked.

Possession - A designated section of track where a Possession Master has control. Unauthorised train movements into the section are prevented by the arrangements shown in the Possession Standards.

Possession Master - A person certificated by LU to take control and give up a possession in order to carry out engineering and similar work.

Q

None.

R

Railway Group - Organisations that are bound to comply with Railway Group Standards.

Railway Group Standards - Standards mandated by Railway Safety and Standards Board (RSSB) for use by organisations that operate on or support the operations of Network Rails' infrastructure.

Responsibility - Normally assigned to the person who undertakes the activity, the 'doer'. The person may delegate the task or a part thereof to another or contract the work to a third party, but retains responsibility for the outcome.

Risk Profile - A graphical representation of LU's 'Top Events'.

S

Safe System of Work - A set of controls which result from a risk assessment on a task. It defines safe methods to ensure that risks are reduced to as low as reasonably practicable.

Sentinel - The membership and Smartcard scheme for Engineering and Construction workers on London Underground.

Special Event - An event which is known about in advance, including those organised and managed by an outside party or parties, which requires LU to plan for any alteration to operational arrangements; for example the Notting Hill Carnival, or a Royal Wedding.

Speed Control After Tripping (SCAT) - A system ensuring that a train can only proceed at slow speed for a defined period of time after tripping past a signal at danger and resetting the tripcock.

Standards - Standards articulate minimum constraints on internal and external designers, suppliers and contractors to LU and third parties.

Station Control Room - Room on a station from which the station is controlled on a minute by minute basis.

Sub-surface Station – A station where the ceiling above the station platform is below the adjacent surface level and where the ceiling encloses more than half the length of the platform. These stations are regulated by the Fire Precautions (Sub-surface Railway Stations) Regulations 2009.

Surface Station – A station which is not in scope of the Fire Precautions (Sub-surface Railway Stations) Regulations 2009.

Surface Stock - Rolling Stock, which through the structure gauge employed in its design, cannot operate through tube tunnels.

System Risk - The totality of all safety risks to customers, employees, suppliers, other railway operators and other third parties that arise due to LU operations. This includes risks imported by customers and other third parties.

T

Technical Specification - Documents defining requirements to be satisfied by equipment, systems or services, and the methods by which compliance with the requirements shall be verified. They are used to purchase goods and services.

Top Event - LU's major hazards as identified by the LU Quantified Risk Assessment.

Traction Current - Electrical supply to third and fourth conductor rail system.

Trade Union Health and Safety Representative - An individual elected by a Trade Union to represent their members, or non-union members they have agreed to represent, on health, safety and welfare matters. Their responsibilities are governed by

the Safety Representatives and Safety Committee Regulation 1977 (as amended by the Management of Health & Safety at Work Regulations 1992).

Transport Undertaking – Has the meaning ascribed to it by the Railways and Other Guided Transport Systems (Safety) Regulations.

Traffic Hours - The period between the published time or amended time, if earlier, traction current is switched on and published time or actual time, if later traction current is switched off. On non-electrified tracks and tracks within depots or sidings where traction current is normally on at all times, trains could move at any time and in any directions.

Train Arrestors - A device designed to decelerate a slow moving train so as to minimise the risk of damage to the train and injury to staff and customers should it overrun the correct stopping position at a terminal location.

Trainstops - A track side device adjacent to a signal which interacts with the tripcock arm to stop the train, should the train attempt to pass a signal at danger.

Tripcocks - A device attached to the leading right hand side of the leading bogie of a train, operated by an arm which when pushed back by a train stop in the up position, causes the automatic operation of the train's emergency brakes by the loss of train line air or round the train circuit.

Tube Stock - Rolling stock, which through the structure gauge employed in its design, is capable of operating through tube tunnels.

U

None.

V

None.

W

None

X

None.

Y

None.

Z

None.

References

Reference	Title
P002	London Underground Health, Safety and Environment Policy
P020	Asset Management Policy
5-539	Verification of Assurance
S1023	Infrastructure Protection
S1042	Asset Condition Reporting (ACR)
S1085	Fire Safety Performance of Materials.
S1088	Managing Changes to Stations Fire Precautions
S1105	Power Service Contract - Performance Specification
S1157	Track - Performance, Design And Configuration
S1180	Standard For Rolling Stock
S1311	Customer information - stations
S1521	Safety Decision Making
S1526	The Assessment and Management of Health, Safety and Environmental Risk
S1538	Assurance
S1548	Safety Critical Work
S1556	Incident Reporting and Investigation
S1566	Monitoring Health, Safety And Environmental Performance
S1641	Concessions To Standards
S1642	The Management Of Temporary Authorised For Use Non-Compliance (TANC)
S1646	Queries To Standards
S5044	Asset Risk Standard
S5540	Safety Verification
S5557	Incident Reporting and Local Investigation
S5631	Railway Group Standards Reconciliation
Rule Book 01	Communications
Rule Book 02	Managing Incidents
Rule Book 03	Traction current and high voltage supply
Rule Book 04	Moving a stalled train and authorised detrainments
Rule Book 05	Movement of trains due to exceptional circumstances
Rule Book 06	General train operations
Rule Book 07	Train incidents and safety equipment
Rule Book 08	Managing the platform train interface
Rule Book 09	Lifts, escalators and moving walkways
Rule Book 10	Station access
Rule Book 11	Station management
Rule Book 12	Station emergency response
Rule Book 13	LU staff responsibilities - traffic hours protection
Rule Book 14	Possessions planning and management
Rule Book 15	Protection possession methods
Rule Book 16	Going on the track in engineering hours
Rule Book 17	Managing access to the track in engineering hours
Rule Book 18	Engineer's trains, vehicles and trolleys

Reference	Title
Rule Book 20	Engineering staff - traffic hours protection
Rule Book 21	Personal safety on the track
Rule Book 22	LU operational staff - track access
Rule Book 23	Incompatible train operations
	Train Operations Competence Standards & Guidance
Intranet-based Management System	Assessing and managing our HS&E risks
	Changes to HS&E law
	Communicating and consulting on HS&E
	Managing formal incident investigations and their outcomes
	Managing HS&E with contractors and suppliers
	Managing the way we work
	Performance and development conversations
	Recruitment
	Reviewing HS&E arrangements
H-027	Providing legal support, governance and audit
H-038	Providing emergency, contingency and business continuity and security support
H-045	Business and Resource Planning
Asset Performance Managers Handbook	Materials and Stores
Managers Handbook	Change Control
	Safety Security and Environment
	Monitoring Operational Communication
	Performance & Competence Management
PR0603	Incident Reporting and Local Investigation (JNP)
R0010	Content framework for TfL's management system
W0085	HSE & Technical Audit Process

All documents are available on the TfL intranet.

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UNDERGROUND

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