

# Installing Highway Electrical Systems NVQ/SVQ

## Level 2

	Page No.	
Introduction	3	
Target audience	3	
Qualification structure	4	
Certificates	6	
Entry requirements and guided learning hours	6	
Accreditation of Prior Achievement (APA)	6	
Health and safety – young people	6	
Expertise of assessors, internal verifiers and external verifiers	7	
Progression	8	
Independent assessment	8	
Internal and external verification	9	
Risk rating	10	
Useful publications	10	
Guidance for NVQ/SVQ centres	11	
Candidates with special needs	11	
Customer service statement	11	
Fees	11	
Key/core skills	12	
Languages other than English	12	
 <b>MANDATORY UNITS</b>		
Unit 1	Prepare to install components in highway electrical systems	15
Unit 2	Maintain a healthy and safe working environment	19
Unit 3	Implement safe site working practices when installing highway electrical systems	23

<b>OPTIONAL UNITS</b>		<b>Page No.</b>
<b>Unit 4</b>	<b>Operating mobile elevated platforms and other access equipment</b>	<b>27</b>
<b>Unit 5</b>	<b>Identify and replace faulty components in highway electrical systems</b>	<b>31</b>
<b>Unit 6</b>	<b>Remove and replace components in highway electrical systems</b>	<b>35</b>
<b>Unit 7</b>	<b>Apply surface protection to highway electrical systems</b>	<b>39</b>
<b>Unit 8</b>	<b>Install columns, signs and pillars in highway electrical systems</b>	<b>43</b>
<b>Unit 9</b>	<b>Install underground cables in highway electrical systems</b>	<b>47</b>
<b>Annex 1</b>	<b>Key/core skills mapping</b>	<b>51</b>

# Installing highway electrical systems NVQ/SVQ

## Level 2

### 1 Introduction

The NVQ/SVQ in Installing Highway Electrical Systems (level 2) is based on national standards, which reflect the working practices of highway electrical systems installers. This qualification is applicable to those working in the following occupations:

- Public lighting (the installation and maintenance of electrical apparatus and associated structural supports and cabling for highway lighting and traffic signs)
- Traffic signals (the installation and maintenance of permanent traffic control equipment and associated apparatus)
- Traffic signs (the installation of road traffic signs)

The standards were developed by Summitskills (formerly NET) which is the Sector Skills Council for the electrotechnical industry.

The qualification aims to give candidates the opportunity to develop their skills and demonstrate competence across the full range of activities that highway electrical systems installers need to be able to do as part of their everyday work. The qualification allows candidates to select units which apply to their particular job role.

### 2 Target audience

This qualification has been developed for those working in the highway electrical industry whose job role/function is to install, maintain and repair highway electrical systems in terms of:

- Installing equipment and components
- Installing columns, signs and pillars
- Installing underground cables
- Identifying, removing and replacing faulty components as appropriate
- Application of surface protection
- Use of access equipment
- Adhering to the relevant requirements of Health & Safety and working practices

Job roles/titles at Level 2 in the highway electrical Industry vary from region to region in the UK, examples of these are;

- Public Lamp Maintenance Attendant 1
- Public Lamp Maintenance Attendant 2
- Erector
- Lamp Attendant
- Installation Attendant
- Maintenance Attendant
- Labourer/Mate
- Structural Tester
- Public Lighting / Traffic Signs / Traffic Signals Operative 1
- Public Lighting / Traffic Signs / Traffic Signals Operative 2

By the very nature of the hazardous working environment and working conditions it is important to remember that the activities a Level 2 'Highway Electrical Systems Installer' will undertake shall;

- be approved in accordance with accepted industrial practice and standards

- be to an appropriate specification as issued by the person responsible for the completion of the installation
- not involve electrical testing and commissioning of the installation and its constituent parts other than functional testing. The Level 2 person will not be qualified to undertake this activity.
- have the authority to take decisions about the work they undertake such as the selection of suitable and safe access equipment, tools and equipment needed to complete the work they undertake
- have the responsibility for ensuring the work they undertake when completed, is as specified and in accordance with approved industrial practices and standards
- be able to work on their own and have the responsibility for identifying, communicating and co-operating with, as necessary, technical and non-technical persons when appropriate.

### **3 Qualification structure**

The qualification consists of three mandatory units and, depending on the job role of the candidate, two selected from each group of optional units. Candidates must achieve all three mandatory units.

#### **MANDATORY UNITS (3 units)**

Unit 1 (NET10)	Prepare to install components in highway electrical systems
Unit 2 (NET81)	Maintain a healthy and safe working environment
Unit 3 (NET17a)	Implement safe site working practices when installing highway electrical systems

**Candidates must complete two units from one of the following groups:**

#### **OPTIONAL UNITS**

##### **1) Maintenance**

Unit 4 (NET11)	Operating mobile elevated platforms and other access equipment
<b>and</b>	
Unit 5 (NET12)	Identify and replace faulty components in highway electrical systems
<b>or</b>	
Unit 6 (NET16)	Remove and replace components in highway electrical systems

##### **2) Surface protection**

Unit 4 (NET11)	Operating mobile elevated platforms and other access equipment
<b>and</b>	
Unit 7 (NET13)	Apply surface protection to highway electrical systems

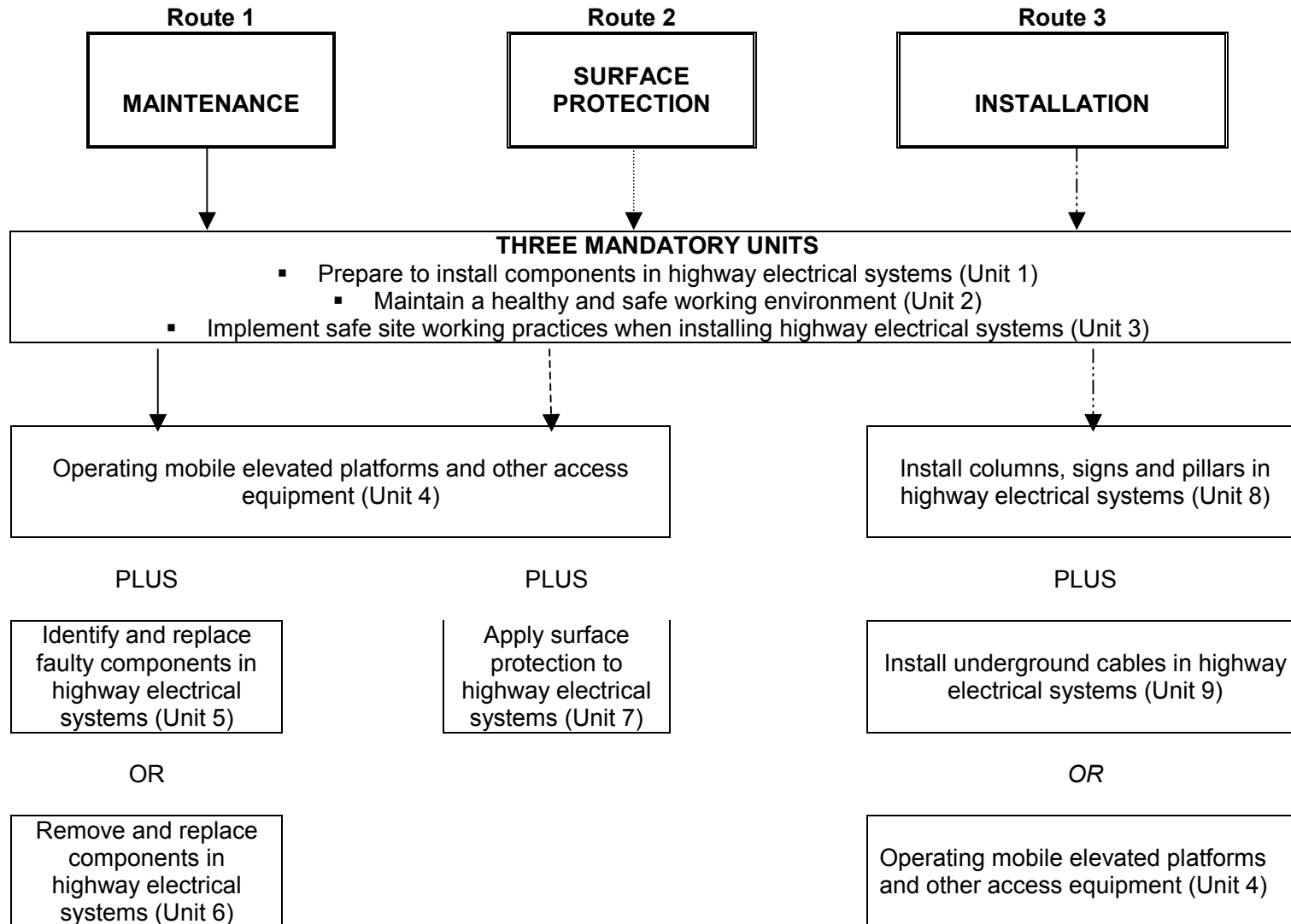
##### **3) Installation**

Unit 8 (NET30)	Install columns, signs and pillars in highway electrical systems
<b>and</b>	
Unit 9 (NET31)	Install underground cables in highway electrical systems
<b>or</b>	
Unit 4 (NET11)	Operating mobile elevated platforms and other access equipment



**Level 2 - Installing Highway Electrical Systems**

Choose one of three routes



## **4 Certificates**

Certificates will show the qualification title as Lantra Awards Level 2 NVQ (or SVQ) in Installing Highway Electrical Systems and will show the occupational context in which the qualification was achieved (public lighting / traffic signs / traffic signals) and the job role group selected by the candidates (eg Lantra Awards Level 2 NVQ (or SVQ) in Installing Highway Electrical Systems (Public Lighting - Surface Protection).

Candidates will receive unit certificates for all units they achieve.

## **5 Entry requirements and guided learning hours**

It is expected that all candidates will have received appropriate health and safety induction training. Candidates taking Unit 4 Operate Mobile Elevated Platforms and Other Access Equipment must have received basic training on this type of equipment before operating it.

Because NVQ/SVQs are intended for use by candidates in the workplace, where conditions can vary considerably, it is not possible to specify with any accuracy the guided learning hours required for delivery of the qualification. The length of time it takes to achieve the NVQ/SVQ will depend on what opportunities arise to generate evidence through work activities, but in general candidates can expect to complete a level 2 NVQ/SVQ within six months to a year. The qualification cannot be completed in less than 10 weeks.

## **6 Accreditation of Prior Achievement (APA)**

A certificate of basic training will provide some evidence towards Unit 4 Operate Mobile Elevated Work Platforms and Other Access Equipment. However, candidates will be expected to demonstrate competence in the workplace. Performance criteria relating to the workplace must be demonstrated in the workplace context.

Candidates who have already completed the Institution of Lighting Engineers (ILE) training scheme will have completed a significant amount of evidence for the knowledge requirements of each unit. For a mapping of the outcomes of the ILE training scheme to this NVQ/SVQ, contact Lantra Awards.

Assessors will be responsible for making a judgement about how much evidence can be accepted as accreditation of prior achievement for each individual.

Candidates who have already achieved Unit 2 Maintain a Safe and Healthy Working Environment (NET 81) of the level 2 qualification will not need to repeat this unit which also appears in the level 3 qualification.

As for any other NVQ/SVQ, units gained from any other awarding body are completely transferable and will be accepted by Lantra Awards towards the NVQ/SVQ in Installing Highway Electrical Systems level 2.

Centres cannot enter candidates for qualifications simultaneously where this results in 'double funding'.

## **7 Health and safety – young people**

This qualification can be offered to candidates in the 16-19 age group. However, the Health and Safety at Work Act 1974 requires employers to ensure the health, safety and welfare at work of their employees and for training providers to safeguard trainees. Young people under the age of 18 can be exposed to risk when using work equipment due to immaturity, lack of experience or lack of awareness of existing or potential risks. Therefore, young people in this age group will need close supervision.

In addition, young people are restricted by legislation on the operation of certain machines, vehicles and lifting appliances as a means of protecting their health and safety. It is not recommended that people under the age of 18 operate mobile elevated platforms.

For more information about young people at work, see The Health and Safety (Young Persons) Regulations 1997 and Young People at Work – a Guide for Employers, both obtainable from the Health and Safety Executive.

## **8 Expertise of assessors, internal verifiers and external verifiers**

All assessors, internal and external verifiers must be able to show that they possess formal recognition of achievement of the appropriate assessment and verification units of competence or show that they are working towards achieving these units of competence (usually through an action plan which shows progress on achievement).

The Employment NTO assessment and verification units (A and V units) came into effect in August 2002. Assessors must hold or be working towards A1 (A2 is optional). Internal verifiers must hold or be working towards V1 and must also hold both A1 and A2. External verifiers must hold or be working towards V2.

For those who achieved their assessment and verification units under the old system, assessors must hold or be working towards D32 and D33. Internal verifiers must hold or be working towards D34, and, ideally should also hold D32 and D33. External verifiers must hold D35.

Assessors and internal verifiers must have relevant occupational experience, as described below:

- Possess a qualification relevant to the occupation and level of competence being assessed
- Be at least 25 years old with a minimum of three years' experience as a qualified operative/practitioner in the electrotechnical sector
- Possess a current health and safety qualification, for example IOSH Working Safely certificate or an approved equivalent

Centres must make sure that all assessors are using currently accredited national occupational standards. This front cover of this booklet specifies the period for which this version of the standards are accredited. Centres are also responsible for making sure that candidates understand the national occupational standards against which they are being assessed, including the deciding the most appropriate route depending on the candidates' technical competence, job role and/or responsibilities.

External verifiers must:

- Have had relevant experience of occupational assessment

To enhance the assessment and verification system, assessors, internal verifiers and external verifiers must also have the following:

- A thorough understanding of the national occupational standards for electrotechnical qualifications
- Knowledge of current practice and emerging issues in the qualification area
- Experience and a working knowledge of the operation and assessment processes specifically for Electrotechnical NVQ/SVQs.

To help meet these requirements, Lantra Awards, working in partnership with the Institution of Lighting Engineers (ILE), will:

- Provide assessors and verifiers with opportunities to upgrade their professional development, particularly for relevant technical knowledge
- Monitor assessors' and verifiers' understanding of the relevant national occupational standards as well as their awareness of current practices and technologies by seeking feedback from appropriate sources, for example from employers
- Participate in sector briefings and activities, wherever feasible, to ensure a thorough understanding latest practices

Awarding bodies for any of the Electrotechnical NVQ/SVQs will meet with NET regularly to discuss assessment and verification issues.

Where centres believe that the national occupational standards could be reviewed to make them easier to understand or easier to assist in the assessment process, this information should be passed direct to NET with suggested changes in wording. They can be contacted by email at [info@net-works.org.uk](mailto:info@net-works.org.uk). The Lantra Awards external verifier visit report also includes a section for centres to give feedback. Where this is relevant, this information will also be fed back to NET.

## **9 Progression**

Candidates could progress from the Installing Highway Electrical Systems NVQ/SVQ at level 2 to the NVQ/SVQ in Installing Highway Electrical Systems at level 3.

The qualification provides progression to employment opportunities as a highway electrical systems installer working across the range of activities which are defined as appropriate for level 2 (see target audience). The qualification forms part of the requirements for the highway electrical systems sector scheme for Highways Agency contracts and for installers working on Major Contractor Group or the National Contractors Federation sites within the construction sector. For further information on sector schemes and the requirements of the Major Contractors Group, contact Lantra Awards.

## **10 Independent assessment**

Awarding bodies are required to provide external quality control for assessment over and above that provided by external verifiers. The method of independent assessment, set by the relevant NTO, varies between different NVQ/SVQs. For the NVQ/SVQ in Installing Highway Electrical Systems at level 2, NET requires enhanced verification.

### **a) Enhanced verification**

Enhanced verification means that the internal verifier must always include within their sampling **all** evidence for the following units:

Unit 1 Prepare to install components in highway electrical systems

Unit 2 Maintain a healthy and safe working environment

## **b) Simulation**

The most valid evidence of competence comes from assessment through the workplace.

However, the sector cannot afford for the candidate to make mistakes in key safety-critical areas within the workplace and candidates will not always have sufficient opportunities to gain sufficiency and quality of evidence for the key safety-critical aspects of the national occupational standards. Simulated conditions are therefore permitted for the following key safety-critical aspects:

- Aspects of health and safety

This applies to Unit 2 – Maintain a healthy and safe working environment; performance objectives 3 (hazards), 8 (emergencies) and 9 (injuries).

Assessors must ensure that candidates can demonstrate that they know what constitutes a hazard and how to identify hazards when reviewing working practices and working environments; what the procedures are in the case of emergencies (fire, explosions, toxic atmosphere, electrical shocks); how to deal with injuries.

All other units and the remainder of unit 2 must be assessed using evidence sourced from the workplace. Evidence must be sufficient (ie it fully covers all the performance objectives and knowledge requirements of each unit within the qualification), current (ie not more than two years old) and valid (ie only evidence which is relevant to the performance objectives and knowledge requirements is presented). Evidence and assessment planning must also demonstrate that the candidate has sufficient competence and experience for the role of a level 2 highway electrical systems installer. For general guidance on the collection of evidence, centres should refer to the Lantra Awards booklet 'Guidance for NVQ/SVQ Centres'.

## **11 Internal and external verification**

In addition, centres must follow the Lantra Awards guidance (see 'Guidance to NVQ/SVQ Centres') on sampling by the internal verifier. Sampling strategies must ensure that a representative sample of evidence is selected and that the sample size is at least 20% of the number of candidates or candidates' work. External verifiers will use a similar sampling strategy and will monitor the way in which internal verifiers have selected their sample.

All centres will receive two external verifier visits each year. If a centre has fewer than 10 candidates registered for the qualification, there will be a visit charge for the visit (£300 per visit). In some circumstances, additional visits may be required (see below). Centres may also request an additional visit by an external verifier, particularly where the centre is new or setting up a new programme. This can be arranged by Lantra Awards and a visit fee will be charged.

When external verifiers visit a centre, they will check that action points from the previous visit have been dealt with. Internal verifiers also have the opportunity to raise issues with the external verifier which can either be dealt with during the visit or referred on by the external verifier to another party (eg Lantra Awards). Lantra Awards checks every external verifier visit report to ensure that action points have been completed. Centres are also invited to forward any other comments on via the external verifier visit report form, all of which are reviewed by the Chief Verifier. The Chief Verifier produces an annual report which is circulated to all centres and the external verifier team.

External verifiers receive induction training into their role and also attend update events every year. These events give external verifiers the opportunity to consider candidate portfolios from centres other than their own and to ensure that their approach to external verification is consistent. Centres are also invited to attend these events so that assessors and internal verifiers can participate in these activities.

## 12 Risk rating

Levels of external verification, monitoring control and support may vary according to the centre's level of risk (eg those under commercial pressures, centres experiencing difficulty with the assessment or internal verification process). Depending on the circumstances, the following actions may be taken by the external verifier or by Lantra Awards:

- Conduct a spot visit at short notice
- Meet and/or observe each candidate or a larger sample of the candidates at the centre in question
- Increase the frequency of external verification visits (for which a charge will normally be made)
- Conduct candidate and/or employer interviews, as required, over the telephone
- Other appropriate action

Centres may wish to refer to the NVQ Code of Practice, which is available on the QCA website ([www.qca.org.uk](http://www.qca.org.uk)). The Code of Practice (appendix 4) includes sanctions which awarding bodies must impose in the event of a centre's non-compliance with the approved centre criteria.

## 13 Useful publications

There may be a charge for some of the publications mentioned below. Details of cost can be obtained from the relevant organisation.

**Available from Lantra Awards, Lantra House, Stoneleigh Park, Coventry CV8 2LG (tel 024 7641 9703)**

Information leaflet – Installing Highway Electrical Systems NVQ/SVQs

Provides a summary of the contents of the NVQ/ SVQ and information about becoming a centre (free).

Guidance for NVQ/SVQ Centres

Information about how to apply for centre approval, the key roles, assessment and internal verification, external verification and sample documentation (free).

**Available from Qualifications and Curriculum Authority, 83 Piccadilly, London W1J 8QA Tel: 0207 509 555 or [www.qca.org.uk](http://www.qca.org.uk)**

NVQ Code of Practice

Provides the framework against which QCA monitors awarding bodies, and awarding bodies monitor their centres. Whilst it does not apply to SVQ centres, Lantra Awards operates both NVQs and SVQs in accordance with the NVQ Code of Practice and all centres are strongly recommended to familiarise themselves with its content.

Internal verification: a guide for internal verifiers

External verification: a guide for external verifiers

The booklets highlight the principals of quality assurance and internal/external verification and give examples of good practice.

Assessing NVQs

Essential reading for all NVQ (and SVQ) centres.

**Available from the Department for Education and Skills ([www.dfes.gov.uk/nvq/new.shtml](http://www.dfes.gov.uk/nvq/new.shtml))**

Joint Awarding Body Guidance on Internal Verification of NVQs

The internal verifier is at the heart of quality assurance in NVQ/SVQs. This booklet provides clear guidance on good practice for internal verification, focussing on verifying assessment, developing and supporting assessors and managing quality of NVQ/SVQ delivery. Useful too for anyone working towards the V1 unit.

Available from SQA, Hanover House, 24 Douglas Street, Glasgow G2 7NQ, Tel: 0141 242 2214 or [www.sqa.org.uk](http://www.sqa.org.uk)

SVQ Criteria and Guidance for Awarding Bodies  
The Scottish equivalent to the Common Accord.

SVQ: Guidance on Learning and SVQs  
A guide for assessors about how to put learning into practice in the SVQ context and suggesting ways to deal with problems.

Case Studies on Best Practice in External Verification  
Contains six case studies highlighting best practice external verification over a range of external verification activities.

#### **14 Guidance for NVQ/SVQ Centres**

Detailed guidance on centre approval, the implementation of NVQ/SVQ programmes, roles and responsibilities, record keeping and administration are provided in the Lantra Awards booklet 'Guidance to NVQ/SVQ Centres'. Copies are available from Lantra Awards, free of charge.

#### **15 Candidates with special needs**

Our equal opportunities policy is set out in the Lantra Awards Customer Service Statement and includes details of the arrangements which can be made for candidates with special needs. The Customer Service Statement is available from Lantra Awards, free of charge.

#### **16 Customer Service Statement**

Our procedures for dealing with appeals, complaints and cases of malpractice are set out in our Customer Service Statement. It also includes details of our quality strategy and monitoring policy and our customer service policy, target turnaround times for registrations and certificates and how we monitor and improve our service.

#### **17 Fees**

Centre evaluation visit (new centres only)	£300.00 (+VAT)
For the NVQ/SVQ (four or more units)	£120.00 (+VAT)
For three or fewer units	£70.00* (+VAT)

These fees include:

- A certificate for the full NVQ/SVQ and a certificate of unit credit stating the units achieved. Candidates who did not achieve the full NVQ/SVQ will receive only a certificate of unit credit.
- Two visits each year from the external verifier. A visit charge of £250 will be made for visits to centres where fewer than 10 candidates are registered at the time of the visit. Where more than two visits are required in a year, a charge of £250 will normally be made.

\*Candidates who registered initially for 3 or fewer units and who then want to add on further units will be charged an additional registration fee of £60.

Fees are reviewed annually and any changes will take effect from 1 April.

## **18 Key skills/core skills**

A key skills/core skills mapping is provided at Annex 1.

## **19 Languages other than English**

This qualification is available throughout the UK. Centres requiring materials in the medium of Welsh or Gaelic/Irish should contact Lantra Awards.

## **MANDATORY UNITS**

This page is intentionally blank

## **UNIT 1: PREPARE TO INSTALL COMPONENTS IN HIGHWAY *ELECTRICAL* SYSTEMS**

### **UNIT OVERVIEW**

#### **This unit is for:**

you if you are preparing to carry out works on highway electrical systems

#### **This unit is about:**

confirming that the highway electrical systems are appropriate for the work site and working conditions

#### **This is what you need to show:**

you need to show that you possess the skills and knowledge to:

- confirm the site boundaries and the type of equipment present
- assess the site and working conditions for any changes which might impact on the work you will do
- check that you have the right highway electrical components for the work
- carry out the correct procedures with regard to identifying the means of supply and site service cables
- follow instructions with regard to components and equipment being used.
- Communicate with people on site in the appropriate manner

#### **This is what you need to do next:**

turn to "Key Words and Phrases", which explains how some words and phrases have been used in this unit, and will help you understand it more easily.

## UNIT 1: PREPARE TO INSTALL COMPONENTS IN HIGHWAY ELECTRICAL SYSTEMS

### KEY WORDS AND PHRASES

Highway Electrical System	In this unit this covers street lighting units, illuminated traffic signs, traffic signals, motorway communications, CCTV, lighting for public areas, buildings, tunnels or subways.
Highway Electrical components	In this unit, these may include lamps, control gear, electronic parts, photo-electric cells, time-switches, luminaires, cutouts, columns, signs, brackets, bollards, cables.
Work Site:	In this unit this refers to the different types of work site where the installation or maintenance activity is to take place. It could be, for example, on a motorway, on a highway, on a footpath, on a car park, a public space or an area to which public have access. This is something you would not be able to change and will always be hazardous owing to traffic and interaction with the general public.
Working conditions	In this unit this refers to the working conditions which exist at that point in time when work is due to take place. These conditions could vary owing to, for example weather conditions, or the need to work around overhead or underground services (e.g. electricity, gas, water, telephone, drainage etc.) Or, perhaps other contractors come onto site to start their work - subsequent activities may cause the site to become hazardous. The need to protect the public access could also impact on your working conditions.
Relevant Person(s)	In this unit these include: customers, clients, client representatives, charge hands, supervisors, other contractors, non electrical operatives, colleagues and the public when necessary.
Current approved Codes of Practice	In this unit these are, for example, the Traffic Signs Manual (Chapter 8) Temporary Signing & Guarding, Codes of Practice from HSE, NJUG, G39/1, TCUG, ILE, HAUC and publications from relevant organisations.
Site services	In this unit these are electricity, water, gas, drainage, telecommunications, data transmission either underground or overhead.
Personal protective equipment	In this unit these may include safety helmet, high visibility clothing, rubber gloves, safety shoes/boots and fall arrest equipment (e.g. for use when working on Mobile Elevated Work Platforms).
Types of supply	In this unit these are either Regional Electricity (REC) or private
Industry Standards	These standards can include relevant British, European and International Standards.

## UNIT 1: PREPARE TO INSTALL COMPONENTS IN HIGHWAY ELECTRICAL SYSTEMS

### PERFORMANCE OBJECTIVES

#### You must ensure that:

1. you obtain details from the relevant person and confirm:
  - the work site and its boundary
  - the nature of the equipment present
  - the scope of the work to be carried out
  - authorisation to start work
2. you review the work site and working conditions for any changes which might impact on the work due to take place
3. you identify any variances in the working conditions which might impact on the work taking place
4. you comply with the approved procedures for reporting, recording and taking corrective action.
5. you have available highway electrical components which are
  - the appropriate type, quantity and size
  - fit for purpose
6. you identify accurately the means and point(s) of electrical isolation prior to commencing work
7. you determine the position of site services using suitable equipment and information
8. you wear suitable personal protective equipment throughout preparation activities.
9. you follow manufacturer's instructions or organisational procedures when installing components and equipment.

## UNIT 1: PREPARE TO INSTALL COMPONENTS IN HIGHWAY ELECTRICAL SYSTEMS

### KNOWLEDGE REQUIREMENTS

#### PERFORMANCE OBJECTIVE REFERENCE SHOWN IN BRACKETS [XX]

In order to prepare to carry out works on highway electrical systems you should know and understand the following aspects relating to:

##### Preparation work

- a. how to:
  - confirm site details [1]
  - understand boundary definitions [1]
  - identify different types of equipment under, on and over the highway [1]
- b. the scope of the work to be carried out [2]
- c. the application of common types of highway electrical systems [4]
- d. the materials which are recommended for use as electrical conductors and insulators [4]
- e. how to confirm the suitability of fixing methods for highway electrical systems in the environment of the installation including the threat from vandalism and unauthorised access [2]
- f. hazards that:
  - are present at the work site [2]
  - are from a change in working conditions [2]
  - need to be controlled [2]
- g. how to confirm quantities, size and types of components for highway electrical systems [5]
- h. the correct procedures for safe and secure isolation including the identification of:
  - the types of supply [6]
  - electrical circuits to be isolated [6]
  - isolation points [6]
- i. how to identify the position of site services using industry approved methods [7]
- j. procedures and method for avoiding site services at the work site [6/7]
- k. the importance of wearing appropriate personal protective equipment [8]
- l. the legal implications of current health and safety legislation, regulations and codes of practice [1 to 9]
- m. handling highway electrical electrical systems and equipment in the correct manner for health and safety reasons [3 to 8]

##### Principles and Theory

Current industry standards relevant to installing highway electrical systems such as:

- ILE Code of Practice for Public Lighting
- Electricity Association Memorandum G/39
- Traffic Signs Manual (Chapter 8), Department of Transport

## UNIT 2: MAINTAIN A HEALTHY AND SAFE WORKING ENVIRONMENT

### UNIT OVERVIEW

#### **This unit is for:**

a person at work. The Health and Safety at Work Act ,1974, seeks to secure the health, safety and welfare of people whilst they work and protect other people against risks to health or safety arising from the activity of people at work.

It is important to note the following that according to the Health and Safety at Work Act:

Employers must safeguard so far as is reasonably practicable, the health, safety and welfare at work of all the people who work for them and “other persons”. This applies in particular to the provision and maintenance of safe plant and systems of work, and covers all machinery, equipment and substances used.

People at work also have a duty under the Act to take reasonable care to avoid harm to themselves or to others by their working practices, and to co-operate with employers and others in meeting statutory requirements. The Act also requires employees not to interfere with or misuse anything provided to protect their health, safety or welfare in compliance with the Act.

#### **This unit is about:**

having an appreciation of hazards which may cause serious harm in the workplace and knowing how to deal with them. It describes the competencies required to ensure that:

- your own actions do not create any health and safety risks,
- you do not ignore hazards with significant risk in your workplace, and
- you take sensible action to put things right, including: reporting situations which pose a danger to people in the workplace and seeking advice

#### **This is what you need to show:**

that you understand the health and safety requirements in the workplace, and that you check your own work activities and work area for any hazards which may harm you or others. You should be able to identify those risks you can safely deal with yourself, and those which you must report to the “responsible” person for attention.

#### **This is what you need to do next:**

Turn to the section on “Key Words and Phrases”. This explains how some words and phrases have been used in this standard, and will help you understand it more easily.

## UNIT 2: MAINTAIN A HEALTHY AND SAFE WORKING ENVIRONMENT

### KEY WORDS AND PHRASES

The Health and Safety Executive (HSE) is the body appointed to support and enforce health and safety law. They have defined two important concepts as follows:

Hazard	A hazard is something with potential to cause harm.
Risk	A risk is the likelihood of the hazard's potential being realised.

Emergencies	This includes: fire, explosions, toxic atmosphere, electrical shocks.
Working conditions	In this unit this refers to the working conditions which exist at that point in time when work is due to take place. These conditions could vary owing to, for example weather conditions, or the need to work around overhead or underground services (e.g. electricity, gas, water, telephone, drainage etc.) Or, perhaps other contractors come onto site to start their work - subsequent activities may cause the site to become hazardous. The need to protect the public access could also impact on your working conditions.
Working environment	In this unit this refers to the different types of working environment where the installation or maintenance activity is to take place. It could be, for example, on a motorway, on a highway, on a footpath, on a car park, a public space or an area to which public have access. This is something you would not be able to change and will always be hazardous owing to traffic and interaction with the general public.
Relevant people	in this unit these include: customers, clients, client representatives, charge hands, supervisors, other contractors, non electrical operatives, colleagues and the public when necessary.
Working practices	This includes activities, procedures, use of materials or equipment and working techniques used in carrying out your job.

## **UNIT 2: MAINTAIN A HEALTHY AND SAFE WORKING ENVIRONMENT**

### **PERFORMANCE OBJECTIVES**

#### **You must ensure that:**

1. you identify which workplace health and safety procedures are relevant to your working environment
2. you identify evacuation procedures and emergency exits before work commences
3. you review your working practices and your working environment for hazards which could cause serious harm
4. you control those health and safety hazards within your capability and job responsibility limits
5. you report those hazards which may present a high risk to the relevant persons responsible for health and safety in the workplace
6. your personal conduct around the workplace does not endanger the health and safety of yourself or other persons
7. you follow the workplace policies and suppliers' or manufacturers' instructions for the safe use of tools, plant and equipment
8. you follow agreed procedures in the event of an emergency warning
9. you follow correct procedures in the event of injuries to self and others

## UNIT 2: MAINTAIN A HEALTHY AND SAFE WORKING ENVIRONMENT

### KNOWLEDGE REQUIREMENTS

#### PERFORMANCE OBJECTIVE REFERENCE SHOWN IN BRACKETS [XX]

In order to maintain a healthy and safe working environment you should know and understand the following aspects relating to:

#### Health and Safety

- a. your legal duties for health and safety in the workplace as defined by the Health and Safety at Work Act 1974 [1]
- b. your duties for health and safety as defined by any specific legislation covering your job role [1/2]
- c. what hazards may exist in your workplace [3]
- d. the particular health and safety risks which may be present in your own job role [3]
- e. the importance of remaining alert to the presence of hazards in the whole work place [1 to 9]
- f. agreed workplace health and safety procedures including site evacuation procedures and procedures for dealing with injured persons [6/7/8/9]
- g. responsibilities for health and safety in your job description [4]
- h. the responsible persons to whom to report health and safety matters [5]

## **UNIT 3: IMPLEMENT SAFE SITE WORKING PRACTICES WHEN INSTALLING HIGHWAY ELECTRICAL SYSTEMS**

### **UNIT OVERVIEW**

#### **This unit is for:**

those preparing to undertake work on highway electrical systems. They will implement safe working practices and this means confirming that the work site is safe to start work, that it remains safe during work and is safe on completion of the job.

#### **This unit is about:**

monitoring the safety of the site at all times including at the end of the day and at the end of the work. It is also about assembling, positioning and operating access equipment in accordance with safe practices.

#### **This is what you need to show:**

You need to show that you can:

- follow correct procedures for safe site working and good housekeeping practices
- operate access equipment safely and correctly
- store all tools, equipment and materials safely and securely

#### **What you need to do next:**

look at the “Key Words and Phrases” section. This explains some words and phrases which have been used in this unit, and will help you understand it more easily.

**UNIT 3: IMPLEMENT SAFE SITE WORKING PRACTICES WHEN INSTALLING HIGHWAY ELECTRICAL SYSTEMS**

**KEY WORDS AND PHRASES**

Mobile Elevated Work Platform (MEWP)	In this unit this may include access equipment of the type Scissor Lift, Telescopic Boom/Jib or Articulated - Towed, Vehicle Mounted or Self-Propelled.
Other access equipment	In this unit this may include scaffold, ladders, steps, staging, trestles.
Highway Electrical System	In this unit this covers street lighting units, illuminated traffic signs, traffic signals, motorway communications, CCTV, lighting for public areas, buildings, tunnels or subways.
Work site	In this unit this refers to the different types of work site where the installation or maintenance activity is to take place. It could be, for example, on a motorway, on a highway, on a footpath, on a car park, a public space or an area to which public have access. This is something you would not be able to change and will always be hazardous owing to traffic and interaction with the general public.
Working conditions	In this unit this refers to the working conditions which exist at that point in time when work is due to take place. These conditions could vary owing to, for example weather conditions, or the need to work around overhead or underground services (e.g. electricity, gas, water, telephone, drainage etc.) Or, perhaps other contractors come onto site to start their work - subsequent activities may cause the site to become hazardous. The need to protect the public access could also impact on your working conditions.
Relevant Person(s)	In this unit these include: customers, clients, client representatives, charge hands, supervisors, other contractors, non electrical operatives, colleagues and the public when necessary.
Current approved Codes of Practice	In this unit these are, for example, the Traffic Signs Manual (Chapter 8) Temporary Signing & Guarding, Codes of Practice from HSE, NJUG, G39/1, TCUG, ILE,HAUC and publications from relevant organisations.
Site services	In this unit these are electricity, water, gas, drainage, telecommunications, data transmission either underground or overhead.
Personal protective equipment	In this unit these may include safety helmet, high visibility clothing, rubber gloves, safety shoes/boots and fall arrest equipment (e.g. for use when working on Mobile Elevated Work Platforms).
Industry Standards	These standards can include relevant British, European and International Standards.

**UNIT 3: IMPLEMENT SAFE SITE WORKING PRACTICES WHEN INSTALLING HIGHWAY ELECTRICAL SYSTEMS**

**PERFORMANCE OBJECTIVES**

**You must ensure that:**

1. you seek confirmation from the relevant person that the site is safe to start work
2. you monitor regularly that the working conditions remain safe for work to occur
3. you check that warning notices and barriers to prevent unauthorised entry are installed in suitable positions
4. you confirm with the relevant person a programme of work which is safe and practical
5. you identify when it is appropriate to use approved access equipment for work sites
6. you operate the access equipment correctly and according to suppliers' instructions
7. you check that on completion of work all tools, equipment and materials on site are
  - removed, and
  - stored safely and securely
8. you check the work site is cleared after the work ends and left in a safe and satisfactory condition in accordance with health and safety regulations and good housekeeping practice

## **UNIT 3: IMPLEMENT SAFE SITE WORKING PRACTICES WHEN INSTALLING HIGHWAY ELECTRICAL SYSTEMS**

### **KNOWLEDGE REQUIREMENTS**

#### **PERFORMANCE OBJECTIVE REFERENCE SHOWN IN BRACKETS [XX]**

In order to be able to implement safe site working practices you should know and understand the following aspects relating to:

##### Health and Safety

- a. The regulatory requirements for correctly storing tools, equipment and materials [7/8]
- b. The regulatory requirements for using approved access equipment [5/6]
- c. When a work-site is safe for work to proceed or to leave when work finishes [1/2/8]
- d. Your legal responsibilities for health and safety as required by the Health and Safety at Work Act 1974 and the Electricity At Work Regulations of 1989 appropriate to site working [1 to 8]
- e. The need for safety, welfare and access arrangements to be in force at the site [3/8]
- f. Use, care and storage of substances covered by COSHH [7]

##### **And**

You should know and understand the following aspects relating to:

##### Working on site

- g. The importance of "housekeeping" procedures in relation to site working [8]
- h. The importance of following correct procedures to minimise damage to property, fabric and equipment [1 to 8]

##### Principles and theory

Current industry standards relevant to installing highway electrical systems such as:

- The ILE Code of Practice
- Electricity Association Engineering Memorandum G39
- Traffic Signs Manual (Chapter 8), Department of Transport

## **UNIT 4: OPERATING MOBILE ELEVATED PLATFORMS AND OTHER ACCESS EQUIPMENT**

### **UNIT OVERVIEW**

#### **This unit is for**

you if you are to undertake works on highway electrical systems which requires the use of a mobile elevated work platform (MEWP) and other access equipment.

#### **This unit is about**

ensuring the safe and appropriate use of mobile elevated work platforms when carrying out work on highway electrical and associated equipment.

#### **This is what you need to show**

you need to show you possess the skills and knowledge to;

- confirm the correct access equipment for the work and site conditions
- carry out correct procedures for the use of mobile elevated work platforms

#### **This is what you need to do next**

turn to 'Key Words and Phrases', which explains how some words and phrases have been used in this unit, and will help you to understand it more easily.

## UNIT 4: OPERATING MOBILE ELEVATED PLATFORMS AND OTHER ACCESS EQUIPMENT

### KEY WORDS AND PHRASES

Mobile Elevated Work Platform (MEWP)	In this unit this may include access equipment of the type Scissor Lift, Telescopic Boom/Jib or Articulated - Towed, Vehicle Mounted or Self-Propelled.
Other access equipment	In this unit this may include scaffold, ladders, steps, staging, trestles.
Highway Electrical System	In this unit this covers street lighting units, illuminated traffic signs, traffic signals, motorway communications, CCTV, lighting for public areas, buildings, tunnels or subways.
Work site	In this unit this refers to the different types of work site where the installation or maintenance activity is to take place. It could be, for example, on a motorway, on a highway, on a footpath, on a car park, a public space or an area to which public have access. This is something you would not be able to change and will always be hazardous owing to traffic and interaction with the general public.
Working conditions	In this unit this refers to the working conditions which exist at that point in time when work is due to take place. These conditions could vary owing to, for example weather conditions, or the need to work around overhead or underground services (e.g. electricity, gas, water, telephone, drainage etc.) Or, perhaps other contractors come onto site to start their work - subsequent activities may cause the site to become hazardous. The need to protect the public access could also impact on your working conditions.
Relevant person(s)	In this unit these include: customers, clients, client representatives, charge hands, supervisors, other contractors, non electrical operatives, colleagues and the public when necessary.
Current approved Codes of Practice	In this unit these are, for example, the Traffic Signs Manual (Chapter 8) Temporary Signing & Guarding, Codes of Practice from HSE, NJUG, G39/1, TCUG, ILE, HAUC and publications from relevant organisations.
Site services	In this unit these are electricity, water, gas, drainage, telecommunications, data transmission either underground or overhead.
Personal protective equipment	In this unit these may include safety helmet, high visibility clothing, rubber gloves, safety shoes/boots and fall arrest equipment (e.g. for use when working on Mobile Elevated Work Platforms).
Industry standards	These standards can include relevant British, European and International Standards.

## **UNIT 4: OPERATING MOBILE ELEVATED PLATFORMS AND OTHER ACCESS EQUIPMENT**

### **PERFORMANCE OBJECTIVES**

#### **You must ensure that:**

1. you confirm with the relevant person the scope of the work to be carried out
2. you review the work site and working conditions for any changes which might impact on the work due to take place
3. you identify any variances in the working conditions which might impact on the work taking place
4. you comply with the approved procedures for reporting, recording and taking corrective action
5. you confirm that the Mobile Elevated Work Platform or other access equipment you are to use is suitable for the work to be undertaken
6. you confirm that all preliminary procedures have been carried out to ensure the safe and correct operation/use of the Mobile Elevated Work Platform and other access equipment
7. you determine the position of site services using relevant equipment and information
8. you wear suitable personal protective equipment throughout all preparation activities
9. you follow manufacturer's instructions or organisational procedures in the use of the Mobile Elevated Work Platform and other access equipment.

## UNIT 4: OPERATING MOBILE ELEVATED PLATFORMS AND OTHER ACCESS EQUIPMENT

### KNOWLEDGE REQUIREMENTS

#### PERFORMANCE OBJECTIVE REFERENCE SHOWN IN BRACKETS [XX]

In order to carry out works on highway electrical systems requiring the use of Mobile Elevated Work Platforms and other access equipment you should know and understand the following aspects relating to their operation and use:

- a. the scope of the work to be carried out [1]
- b. hazards present at the work site or from a change in working conditions which need to be controlled [2]
- c. how to confirm the suitability of access equipment for the work to be carried out [3]
- d. how to confirm the safe working load of Mobile Elevated Work Platforms [3/5/7]
- e. how to confirm safe reach of Mobile Elevated Work Platforms [3/5/7]
- f. how to confirm the effect of weather conditions on the safe use of Mobile Elevated Work Platforms [3/7]
- g. how to ensure operation of Mobile Elevated Work Platform in compliance with manufacturers instructions [6]
- h. how to ensure stability of Mobile Elevated Work Platform for all site conditions [4]
- i. how to confirm correct operation of safety interlocks and other emergency procedures [6]
- j. how to identify the position of site services and ensure safe working distances are maintained in accordance with current legislation, approved codes of practice and guidance [5]
- k. the importance of wearing appropriate personal protective equipment and the correct anchorage points for fall arrest systems [6/8]
- l. the correct signing and guarding appropriate to the site and in accordance with current legislation [2/4]
- m. health and safety legislation regulations and codes of practice including the need for a thorough examination of equipment at the required statutory intervals [1 to 9]

#### Principles and Theory

Current industry standards relevant to installing highway electrical Systems such as;

- ILE Code of Practice for Public Lighting
- Electricity Association Memorandum G39
- Traffic Signs Manual Chapter 8, Department of Transport

## **UNIT 5: IDENTIFY AND REPLACE FAULTY COMPONENTS IN HIGHWAY *ELECTRICAL* SYSTEMS**

### **UNIT OVERVIEW**

#### **This unit is for:**

you if you are required to identify and correct common faults in highway electrical systems and associated equipment, and carry out remedial action.

#### **This unit is about:**

ensuring the safe identification and replacement of faulty components in highway electrical systems using safe and approved methods

#### **This is what you need to show:**

you need to show that you possess the skills and knowledge to:

- follow correct procedures to identify the location of the faulty component(s)
- carry out safe and secure isolation procedures
- identify the faults in highway electrical and associated equipment components
- correct faults using safe and approved methods
- select and use test equipment and tools correctly

#### **This is what you need to do next:**

turn to the section on "Key Words and Phrases". This explains how some words and phrases have been used in this standard, and will help you understand it more easily.

**UNIT 5: IDENTIFY AND REPLACE FAULTY COMPONENTS IN HIGHWAY ELECTRICAL SYSTEMS**

**KEY WORDS AND PHRASES**

Component faults	In this unit this refers to items or conditions which cause a non-satisfactory operation of highway electrical and associated equipment and can include faults in lamps, ballasts, ignitors, electronic components, photo-electric control units, lampholders, and electrical protection devices
Connection	In this unit this refers to the connection of components which have been installed to replace similar equipment which has been removed following fault diagnosis
Highway Electrical System	In this unit this covers street lighting units, illuminated traffic signs, traffic signals, motorway communications, CCTV, lighting for public areas, buildings, tunnels or subways.
Work site	In this unit this refers to the different types of work site where the installation or maintenance activity is to take place. It could be, for example, on a motorway, on a highway, on a footpath, on a car park, a public space or an area to which public have access. This is something you would not be able to change and will always be hazardous owing to traffic and interaction with the general public.
Working conditions	In this unit this refers to the working conditions which exist at that point in time when work is due to take place. These conditions could vary owing to, for example weather conditions, or the need to work around overhead or underground services (e.g. electricity, gas, water, telephone, drainage etc.) Or, perhaps other contractors come onto site to start their work - subsequent activities may cause the site to become hazardous. The need to protect the public access could also impact on your working conditions.
Relevant Person(s)	In this unit these include: customers, clients, client representatives, charge hands, supervisors, other contractors, non electrical operatives, colleagues and the public when necessary.
Current approved Codes of Practice	In this unit these are, for example, the Traffic Signs Manual (Chapter 8) Temporary Signing & Guarding, Codes of Practice from HSE, NJUG, G39/1, TCUG, ILE,HAUC and publications from relevant organisations.
Site services	In this unit these are electricity, water, gas, drainage, telecommunications, data transmission either underground or overhead.
Personal protective equipment	In this unit these may include safety helmet, high visibility clothing, rubber gloves, safety shoes/boots and fall arrest equipment (e.g. for use when working on Mobile Elevated Work Platforms).
Safe system of work	In this unit refers to a system of work which will include procedures such as safe isolation, permits to work, wearing of personal protective equipment and other procedures as appropriate confirmed as a result of an assessment of risk. The system of work may include a method statement.
Industry Standards	These standards can include relevant British, European and International Standards.

## **UNIT 5: IDENTIFY AND REPLACE FAULTY COMPONENTS IN HIGHWAY ELECTRICAL SYSTEMS**

### **PERFORMANCE OBJECTIVES**

#### **You must ensure that:**

1. you obtain clear and accurate information about the reported fault
2. you agree the appropriate repairs, procedures and component replacement with the relevant people in accordance with organisational procedures
3. when appropriate, you confirm with the relevant people the implications of the repair, procedures and component replacement
4. you follow the correct agreed procedures for carrying out a safe and secure isolation, where required, before diagnosing and correcting the fault
5. to identify the fault, you confirm safe working practices and undertake relevant tests on the installed highway electrical and associated equipment
6. you follow the appropriate procedures when correcting the fault, including the use of suitable tools, instruments, equipment and materials
7. where the fault cannot be corrected immediately, you leave the highway electrical system in a safe condition
8. you carry out a functional test to ensure that the repaired highway electrical system is operating satisfactorily.
9. you complete written functional information and supply it to the relevant people in accordance with organisational procedures.

## UNIT 5: IDENTIFY AND REPLACE FAULTY COMPONENTS IN HIGHWAY ELECTRICAL SYSTEMS

### KNOWLEDGE REQUIREMENTS

#### PERFORMANCE OBJECTIVE REFERENCE SHOWN IN BRACKETS [XX]

In order to **identify and correct component faults** in highway electrical systems you should know and understand the following aspects relating to:

- a. how to confirm and follow a safe system of work in terms of:
  - access to the workplace [1/3]
  - preventing unauthorised access [1/3]
  - other persons at the work-site [1/3]
- b. the operation of lighting circuits in terms of:
  - the function of control gear and switching equipment [1to 9]
  - lamp types [1 to 9]
  - rating (watts) of lamps [1 to 9]
- c. how to interpret diagrams and drawings to enable the correct positioning and fixing of highway electrical system equipment and components [1 to 9]
- d. the correct sequence of tests for locating faults [2/4/5]
- e. the procedures for a safe and secure isolation with regard to [2/3/4]:
  - an assessment of safe working practice
  - identification of circuits and components to be isolated
  - selection of test and proving instruments
  - use of testing methods
  - selection of devices for securing isolation
- f. the methods and procedures to follow for correcting component faults [2/4/5]
- g. the procedures for functional testing following the rectification of faults in highway electrical systems [8]
- h. the appropriate functional tests to be carried out on completion of fault rectification [8]
- i. safe action to take to remedy common defects [5]
- j. organisational reporting and recording procedures [9]
- k. the importance of using personal protective equipment and tools that are safe and fit for purpose for specific jobs [4/5]
- l. the legal responsibilities in accordance with current health and safety regulations, legislation and industry codes of practice [1 to 9]
- m. the hazards associated with using electrical equipment and plant including their lifting, handling, fixing and disposal [1to9]
- n. importance of providing information clearly, courteously and professionally [6/8]
- o. the consequences of supplying inaccurate or incomplete information to the relevant person in terms of safety and system operation [6/8]

#### Principles and Theory

Current industry standards relevant to installing highway electrical systems such as:

- ILE Code of Practice for Public Lighting
- Electricity Association Memorandum G/39
- Traffic Signs Manual (Chapter 8), Department of Transport

## **UNIT 6: REMOVE AND REPLACE COMPONENTS IN HIGHWAY ELECTRICAL SYSTEMS**

### **UNIT OVERVIEW**

#### **This unit is for:**

you if you are required to remove and replace components in highway electrical systems

#### **This unit is about:**

following the correct procedures for the replacement of components in highway electrical systems

#### **This is what you need to show:**

you need to show that you possess the skills and knowledge to:

- remove and replace components in highway electrical and associated equipment
- confirm the correct methods of safe and secure isolation of the electricity supply on site.

#### **This is what you need to do next:**

look through the "Key Words and Phrases", as they explain how some words phrases have been used in this unit, and will help you understand it more easily.

## UNIT 6: REMOVE AND REPLACE COMPONENTS IN HIGHWAY ELECTRICAL SYSTEMS

### KEY WORDS AND PHRASES

Mobile Elevated Work Platform (MEWP)	In this unit this may include access equipment of the type Scissor Lift, Telescopic Boom/Jib or Articulated - Towed, Vehicle Mounted or Self-Propelled.
Other access equipment	In this unit this <i>may</i> include scaffold, ladders, steps, staging, trestles.
Highway Electrical System	In this unit this covers street lighting units, illuminated traffic signs, traffic signals, motorway communications, CCTV, lighting for public areas, buildings, tunnels or subways.
Work site	In this unit this refers to the different types of work site where the installation or maintenance activity is to take place. It could be, for example, on a motorway, on a highway, on a footpath, on a car park, a public space or an area to which public have access. This is something you would not be able to change and will always be hazardous owing to traffic and interaction with the general public.
Working conditions	In this unit this refers to the working conditions which exist at that point in time when work is due to take place. These conditions could vary owing to, for example weather conditions, or the need to work around overhead or underground services (e.g. electricity, gas, water, telephone, drainage etc.) Or, perhaps other contractors come onto site to start their work - subsequent activities may cause the site to become hazardous. The need to protect the public access could also impact on your working conditions.
Safe system of work	In this unit refers to a system of work which will include procedures such as safe isolation, permits to work, wearing of personal protective equipment and other procedures as appropriate confirmed as a result of an assessment of risk. The system of work may include a method statement.
Relevant Person(s)	In this unit these include: customers, clients, client representatives, charge hands, supervisors, other contractors, non electrical operatives, colleagues and the public when necessary.
Current approved Codes of Practice	In this unit these are, for example, the Traffic Signs Manual (Chapter 8) Temporary Signing & Guarding, Codes of Practice from HSE, NJUG, G39/1, TCUG, ILE, HAUC and publications from relevant organisations.
Site services	In this unit these are electricity, water, gas, drainage, telecommunications, data transmission either underground or overhead.
Personal protective equipment	In this unit these may include safety helmet, high visibility clothing, rubber gloves, safety shoes/boots and fall arrest equipment (e.g. for use when working on Mobile Elevated Work Platforms).
Industry Standards	These standards can include relevant British, European and International Standards.

## **UNIT 6: REMOVE AND REPLACE COMPONENTS IN HIGHWAY ELECTRICAL SYSTEMS**

### **PERFORMANCE OBJECTIVES**

#### **You must ensure that:**

1. you obtain clear information about the components to be removed and/or replaced
2. you agree the appropriate removal and replacement methods with the relevant people in accordance with organisational procedures
3. you follow the correct procedures for carrying out a safe and secure isolation, where required, before removing or replacing components
4. you confirm safe working practices for removing and/or replacing components appropriate to the type of highway electrical system
5. you remove and replace highway electrical and associated equipment components;
  - to enable ease of access and facilitate future maintenance
  - in accordance with relevant regulations, manufacturers' instructions and organisation procedures
6. you follow agreed standard procedures to remedy any identified defects
7. you complete written functional information and supply it to the relevant people in accordance with organisational procedures.

## UNIT 6: REMOVE AND REPLACE COMPONENTS IN HIGHWAY ELECTRICAL SYSTEMS

### KNOWLEDGE REQUIREMENTS

#### PERFORMANCE OBJECTIVE REFERENCE SHOWN IN BRACKETS [XX]

In order to **remove and replace** components in highway electrical systems you should know and understand the following aspects relating to:

- a. the necessary information for removing and/or replacing components [1]
- b. how to confirm and follow a safe system of work with regard to;
  - access to the work place [4]
  - preventing unauthorised access [4]
  - other persons at the work site [4]
  - the working conditions and the working environment [4]
- c. the procedures for a safe and secure isolation with regard to:
  - an assessment of safe working practice [3]
  - identification of circuits to be isolated [3]
  - test and proving instruments selected [3]
  - use of testing methods, and selection of devices for securing isolation [3]
- d. the confirmation of the correct application of manufacturers instructions and organisational procedures for removing and/or replacing components [5]
- e. the operation of lighting circuits in terms of;
  - the function of control gear and switching equipment [1]
  - lamp types [5/6]
  - rating (watts) of lamps [5/6]
- f. the procedures for ensuring that components are;
  - electrically and mechanically sound [6]
  - identified clearly and correctly [6]
- g. the appropriate functional tests to be carried out on the completion of installing components [5]
- h. safe system of work for removing and/or replacing components [5]
- i. organisational reporting and recording procedures [1 to 7]
- j. the importance of using personal protective equipment and safe tools [4]
- k. the legal responsibilities in accordance with current health and safety regulations, legislation and codes of practice [1 to 7]
- l. the hazards associated with using electrical equipment and plant including their lifting, handling, fixing and disposal [1 to 7]
- m. the importance of providing information clearly, accurately, courteously and professionally [7]
- n. the consequences of supplying inaccurate or incomplete information to the relevant person in terms of safety and system operation [7]

#### Principles and Theory

Current industry standards relevant to installing highway electrical systems such as;

- The ILE Code of Practice.
- Electricity Association Engineering Memorandum G39
- Traffic Signs Manual (Chapter 8), Department of Transport

## **UNIT 7: APPLY SURFACE PROTECTION TO HIGHWAY ELECTRICAL SYSTEMS**

### **UNIT OVERVIEW**

#### **This unit is for:**

you if you are to apply the surface protection to highway electrical systems

#### **This unit is about:**

Following the correct procedures and instructions received from the relevant person to prepare for and apply surface protection to highway electrical systems

#### **This is what you need to show ;**

you need to show that you possess the skills and knowledge to ;

- confirm what surface preparation is required
- prepare highway electrical systems prior to the application of surface protection
- apply surface protection to highway electrical systems
- take appropriate measures to protect the public and property during the work activity

#### **This is what you need to do next:**

turn to "Key Words and Phrases", which explains how some words and phrases have been used in this unit, and will help you to understand it more easily.

## UNIT 7: APPLY SURFACE PROTECTION TO HIGHWAY ELECTRICAL SYSTEMS

### KEY WORDS AND PHRASES

Mobile Elevated Work Platform (MEWP)	In this unit this may include access equipment of the type Scissor Lift, Telescopic Boom/Jib or Articulated - Towed, Vehicle Mounted or Self-Propelled.
Other access equipment	In this unit this may include scaffold, ladders, steps, staging, trestles.
Highway Electrical System	In this unit this covers street lighting units, illuminated traffic signs, traffic signals, motorway communications, CCTV, lighting for public areas, buildings, tunnels or subways.
Work site	In this unit this refers to the different types of work site where the installation or maintenance activity is to take place. It could be, for example, on a motorway, on a highway, on a footpath, on a car park, a public space or an area to which public have access. This is something you would not be able to change and will always be hazardous owing to traffic and interaction with the general public.
Working conditions	In this unit this refers to the working conditions which exist at that point in time when work is due to take place. These conditions could vary owing to, for example weather conditions, or the need to work around overhead or underground services (e.g. electricity, gas, water, telephone, drainage etc.) Or, perhaps other contractors come onto site to start their work - subsequent activities may cause the site to become hazardous. The need to protect the public access could also impact on your working conditions.
Relevant Person(s)	In this unit these include: customers, clients, client representatives, charge hands, supervisors, other contractors, non electrical operatives, colleagues and the public when necessary.
Current approved Codes of Practice	In this unit these are, for example, the Traffic Signs Manual (Chapter 8) Temporary Signing & Guarding, Codes of Practice from HSE, NJUG, G39/1, TCUG, ILE,HAUC and publications from relevant organisations.
Site services	In this unit these are electricity, water, gas, drainage, telecommunications, data transmission either underground or overhead.
Personal protective equipment	In this unit these may include safety helmet, high visibility clothing, rubber gloves, safety shoes/boots and fall arrest equipment (e.g. for use when working on Mobile Elevated Work Platforms).
Surface protection	In this unit can include paints, primers, rust inhibitors and compounds.
Industry Standards	These standards can include relevant British, European and International Standards.

## UNIT 7: APPLY SURFACE PROTECTION TO HIGHWAY ELECTRICAL SYSTEMS

### PERFORMANCE OBJECTIVES

#### You must ensure that:

1. you confirm with the relevant person the scope of the work to be carried out
2. you review the work site and working conditions for any changes which might impact on the work due to take place
3. you identify any variances in the working conditions which might impact on the work taking place
4. you comply with the approved organisation procedures for reporting, recording and taking corrective action.
5. you confirm that the access equipment you are to use is suitable for the work to be undertaken
6. you confirm with the relevant person the materials and equipment to be used are correct for the work to be undertaken
7. you use/wear suitable personal protective equipment throughout all work activities
8. you follow manufacturers instructions or organisational procedures and current legislation in the use and disposal of all materials
9. you confirm the surface preparation and application of surface protection requirements
10. you take adequate precautions to prevent damage to property, persons and the environment from spillage

## UNIT 7: APPLY SURFACE PROTECTION TO HIGHWAY ELECTRICAL SYSTEMS

### KNOWLEDGE REQUIREMENTS

#### PERFORMANCE OBJECTIVE REFERENCE SHOWN IN BRACKETS [XX]

In order to carry out surface protection on highway electrical systems and associated equipment you should know and understand the following aspects relating to:

##### Preparation for and application of surface protection

- a. the scope of the work to be carried out [1]
- b. hazards present at the work site or from a change in working conditions which need to be controlled [2]
- c. how to confirm the suitability of access equipment for the work to be carried out [3]
- d. how to determine the surface preparation required to minimise contamination, rusting or flaking paint [1/4]
- e. how to confirm the system and colours of surface protection material to be used for surface protection [4/9]
- f. how to apply organisational procedures/requirements, the current codes of practice and regulations for the work to be carried out [5]
- g. how to determine the correct tools/equipment for the application of surface protection materials [4/8/9/10]
- h. the importance of wearing appropriate personal protective equipment [7]
- i. the correct anchorage points for fall arrest equipment when using MEWPs and other access equipment [7]
- j. the correct signing and guarding appropriate to the site and in accordance with current legislation [5]
- k. the correct disposal of materials [8]

##### Principles and Theory.

Current industry standards relevant to installing highway electrical systems such as:

- ILE Code of Practice for Public Lighting
- Electricity Association Memorandum G/39
- Traffic Signs Manual (Chapter 8), Department of Transport
- C.O.S.H.H. Regulations.

## **UNIT 8: INSTALL COLUMNS, SIGNS AND PILLARS IN HIGHWAY ELECTRICAL SYSTEMS**

### **UNIT OVERVIEW**

#### **This unit is for:**

you if you are to undertake the installation, adjustment or removal of lighting columns, traffic sign posts or feeder pillars in highway electrical systems

#### **This unit is about:**

ensuring the safe and correct installation, adjustment and removal of lighting columns, traffic sign posts and feeder pillars in highway electrical systems

#### **This is what you need to show:**

you need to show you possess the skills and knowledge to:

- install lighting columns, traffic sign posts and feeder pillars
- adjust lighting columns, traffic sign posts and feeder pillars
- remove lighting columns, traffic sign posts and feeder pillars
- confirm that you have the correct materials and equipment for the work and site conditions
- carry out the correct procedures for excavation and reinstatement
- carry out the correct procedures for lifting and handling

#### **This is what you need to do next:**

turn to "Key Words and Phrases", which explains how some words and phrases have been used in this unit, and will help you to understand it more easily

## UNIT 8: INSTALL COLUMNS, SIGNS AND PILLARS IN HIGHWAY ELECTRICAL SYSTEMS

### KEY WORDS AND PHRASES

Mobile Elevated Work Platform (MEWP)	In this unit this may include access equipment of the type Scissor Lift, Telescopic Boom/Jib or Articulated - Towed, Vehicle Mounted or Self-Propelled.
Other access equipment	In this unit this may include scaffold, ladders, steps, staging, trestles.
Lifting equipment	In this unit this refers to any equipment/plant designed to lift loads, including equipment mounted on vehicles.
Highway Electrical System	In this unit this covers street lighting units, illuminated traffic signs, traffic signals, motorway communications, CCTV, lighting for public areas, buildings, tunnels or subways.
Work site	In this unit this refers to the different types of work site where the installation or maintenance activity is to take place. It could be, for example, on a motorway, on a highway, on a footpath, on a car park, a public space or an area to which public have access. This is something you would not be able to change and will always be hazardous owing to traffic and interaction with the general public.
Working conditions	In this unit this refers to the working conditions which exist at that point in time when work is due to take place. These conditions could vary owing to, for example weather conditions, or the need to work around overhead or underground services (e.g. electricity, gas, water, telephone, drainage etc.) Or, perhaps other contractors come onto site to start their work - subsequent activities may cause the site to become hazardous. The need to protect the public access could also impact on your working conditions.
Relevant Person(s)	In this unit these include: customers, clients, client representatives, charge hands, supervisors, other contractors, non electrical operatives, colleagues and the public when necessary.
Current approved Codes of Practice	In this unit these are, for example, the Traffic Signs Manual (Chapter 8) Temporary Signing & Guarding, Codes of Practice from HSE, NJUG, G39/1, TCUG, ILE,HAUC and publications from relevant organisations.
Site services	In this unit these are electricity, water, gas, drainage, telecommunications, data transmission either underground or overhead.
Personal protective equipment	In this unit these may include safety helmet, high visibility clothing, rubber gloves, safety shoes/boots and fall arrest equipment (e.g. for use when working on Mobile Elevated Work Platforms).
Industry Standards	These standards can include relevant British, European and International Standards.

## UNIT 8: INSTALL COLUMNS, SIGNS AND PILLARS IN HIGHWAY ELECTRICAL SYSTEMS

### PERFORMANCE OBJECTIVES

#### You must ensure that:

1. you confirm with the relevant person the scope of the work to be carried out
2. you review the work site and working conditions for any changes which might impact on the work due to take place
3. you identify any variances in the working conditions which might impact on the work taking place
4. you comply with the approved procedures for reporting, recording and taking corrective action
5. you determine the position of site services using suitable equipment and information
6. you confirm details of columns, signs, pillars and associated equipment to be installed in terms of:
  - weight
  - lifting points
7. you confirm details of foundation depths for the columns, signs, pillars and associated equipment to be installed
8. you confirm that the lifting equipment you are to use is suitable for the work to be undertaken
9. you have the appropriate foundation/reinstatement materials for the work to be completed
10. you use/wear suitable personal protective equipment throughout all work activities
11. you follow manufacturers instructions or organisational procedures in the use of equipment and materials
12. you ensure vertical alignment and orientation

## UNIT 8: INSTALL COLUMNS, SIGNS AND PILLARS IN HIGHWAY ELECTRICAL SYSTEMS

### KNOWLEDGE REQUIREMENTS

#### PERFORMANCE OBJECTIVE REFERENCE SHOWN IN BRACKETS [XX]

In order to install columns, signs and pillars in highway electrical systems you should know and understand the following aspects relating to :

#### Installation of lighting columns, traffic sign posts and feeder pillars

- a. the scope of the work to be carried out [1]
- b. hazards present at the work site or from a change in working conditions which need to be controlled [2/3]
- c. how to confirm the suitability of Crane/Lifting equipment to be used [8]
- d. how to confirm the safe working load of the Crane/Lifting equipment [8]
- e. how to ensure operation of the Crane/Lifting equipment in compliance with manufacturers instructions [9]
- f. how to ensure stability of Crane/Lifting equipment for all site conditions [6/9]
- g. how to identify the position and avoid damage to existing site services [3]
- h. the use of cable/pipe detection instruments [5]
- i. the correct selection of lifting slings/chains [6]
- j. the methods of sling/chain inspection prior to use [6]
- k. how to determine the weights to be lifted including column/post removal [6]
- l. the correct use of slings/chains [6]
- m. the correct foundation depths for columns, posts and feeder pillars [7]
- n. the correct method and choice of reinstatement methods and materials [7/9]
- o. the correct methods for the disposal of surplus site materials [7/9/11]
- p. the importance of wearing appropriate personal protective equipment [10]
- q. the correct signing and guarding appropriate to the site and in accordance with current legislation [1/2]
- r. health and safety legislation, regulations and codes of practice relevant to lifting equipment [1 to 12]

#### Principles and Theory

Current industry standards relevant to installing highway electrical systems such as;

- ILE Code of Practice for Public Lighting
- Electricity Association Memorandum G39
- Traffic Signs Manual Chapter 8, Department of Transport
- Code of Practice for Reinstatement (N.R.S.W.A.)

## **UNIT 9: INSTALL UNDERGROUND CABLES IN HIGHWAY ELECTRICAL SYSTEMS**

### **UNIT OVERVIEW**

#### **This unit is for:**

you if you are to install underground cables to highway electrical and associated equipment

#### **This unit is about :**

ensuring the safe and correct installation of underground cables which are to provide electrical supplies to highway electrical and associated equipment.

#### **This is what you need to show :**

you need to show that you possess the skills and knowledge to:

- carry out the correct procedures for excavation and reinstatement
- confirm the cable and duct type is correct for the work to be undertaken
- confirm the correct installation methods for the type of cable to be installed

#### **This is what you need to do next :**

turn to "Key Words and Phrases", which explains how some words and phrases have been used in this unit, and will help you to understand it more easily

## UNIT 9: INSTALL UNDERGROUND CABLES IN HIGHWAY ELECTRICAL SYSTEMS

### KEY WORDS AND PHRASES

Cable duct	In this unit this refers to structures manufactured for the purpose of protecting underground cables and providing a provision for future maintenance.
Underground cables	In this unit this refers to cable installed underground connected to a highway electrical system and its associated equipment/components.
Highway Electrical System	In this unit this covers street lighting units, illuminated traffic signs, traffic signals, motorway communications, CCTV, lighting for public areas, buildings, tunnels or subways.
Work site	In this unit this refers to the different types of work site where the installation or maintenance activity is to take place. It could be, for example, on a motorway, on a highway, on a footpath, on a car park, a public space or an area to which public have access. This is something you would not be able to change and will always be hazardous owing to traffic and interaction with the general public.
Working conditions	In this unit this refers to the working conditions which exist at that point in time when work is due to take place. These conditions could vary owing to, for example weather conditions, or the need to work around overhead or underground services (e.g. electricity, gas, water, telephone, drainage etc.) Or, perhaps other contractors come onto site to start their work - subsequent activities may cause the site to become hazardous. The need to protect the public access could also impact on your working conditions.
Relevant Person(s)	In this unit these include: customers, clients, client representatives, charge hands, supervisors, other contractors, non electrical operatives, colleagues and the public when necessary.
Current approved Codes of Practice	In this unit these are, for example, the Traffic Signs Manual (Chapter 8) Temporary Signing & Guarding, Codes of Practice from HSE, NJUG, G39/1, TCUG, ILE,HAUC and publications from relevant organisations.
Site services	In this unit these are electricity, water, gas, drainage, telecommunications, data transmission either underground or overhead.
Personal protective equipment	In this unit these may include safety helmet, high visibility clothing, rubber gloves, safety shoes/boots and fall arrest equipment (e.g. for use when working on Mobile Elevated Work Platforms).
Industry Standards	These standards can include relevant British, European and International Standards.

## **UNIT 9: INSTALL UNDERGROUND CABLES IN HIGHWAY ELECTRICAL SYSTEMS**

### **PERFORMANCE OBJECTIVES**

**You must ensure that :**

1. you confirm with the relevant person the scope of the work to be carried out
2. you review the work site and working conditions for any changes which might impact on the work due to take place
3. you identify any variances in the working conditions which might impact on the work taking place
4. you comply with the approved procedures for reporting, recording and taking corrective action
5. you confirm that the equipment and materials you are to use are suitable for the work to be undertaken.
6. you determine the position of site services using suitable equipment and information
7. you wear suitable personal protective equipment throughout all underground cable installation work.
8. you follow all appropriate manufacturers instructions, organisational procedures and industry standards for the installation of underground cables and equipment used.

## UNIT 9: INSTALL UNDERGROUND CABLES IN HIGHWAY ELECTRICAL SYSTEMS

### KNOWLEDGE REQUIREMENTS

#### PERFORMANCE OBJECTIVE REFERENCE SHOWN IN BRACKETS [XX]

In order to undertake the installation of underground cables for highway electrical and associated equipment you should know and understand the following aspects :

##### Installation of underground cables

- a. the scope of the work to be carried out [1]
- b. hazards present at the work site or from a change in working conditions which need to be controlled [2]
- c. how to confirm the suitability of cable, marker tape and duct for the work to be carried out [5/6]
- d. how to confirm the appropriate method of installation for the work to be carried out [1/6]
- e. the use of cable/pipe detection equipment [6]
- f. how to identify the position and avoid damage to existing site services [6]
- g. the correct methods and choice of reinstatement methods and materials [1/5]
- h. the correct methods for the correct disposal of surplus site materials [1/8]
- i. the importance of wearing appropriate personal protective equipment [7]
- j. the correct signing and guarding appropriate to the site and in accordance with current legislation [1/8]
- k. health and safety legislation. regulations and codes of practice relevant to the work to be undertaken [1 to 8]

##### Principles and Theory.

Current industry standards relevant to installing highway electrical systems such as;

- ILE Code of Practice for Public Lighting
- Electricity Association Memorandum G39
- Traffic Signs Manual Chapter 8, Department of Transport
- H.S.E Guidance Notes
- Specification for Excavation and Reinstatement. (H.A.U.C.)

**KEY/CORE SKILLS MAPPING**

This page is intentionally blank

## KEY/CORE SKILLS

### Installing Highway Electrical Systems

#### Level 2 Unit Index

UNIT 1: Prepare to install components in highway electrical systems

UNIT 2: Maintain a healthy and safe working environment

UNIT 3: Implement safe working practices when installing highway electrical systems

UNIT 4: Operate mobile elevated platforms and other access equipment

UNIT 5: Identify and replace faulty components in highway electrical systems

UNIT 6: Remove and replace components in highway electrical systems

UNIT 7: Apply surface protection to highway electrical systems

UNIT 8: Install columns, signs and pillars in highway electrical systems

UNIT 9: Install underground cables in highway electrical systems

The Key-Core Skills/Level 2 Installing Highway Electrical Systems matrix below identifies where a candidate has the opportunity to develop and provide evidence of particular Key/Core Skills within the N/SVQ Level 2: Installing Highway Electrical Systems learning/assessment programme. Please refer to the unit index for the unit titles.

#### Key Skills/Units Matrix

UNIT NUMBER	1	2	3	4	5	6	7	8	9	Please refer to NOS Unit Index above for unit titles.												
LEVEL INDICATED IN BRACKETS [X]																						
KEY SKILL ELEMENTS																						
<b>Communications [2]</b>																						
Take part in discussions	#	#	#	#	#	#	#	#	#													
Give a short talk			#		#	#		#	#													
Read & summarise information	#	#	#	#	#	#	#	#	#													
Writing of two different types of document	#	#	#	#	#	#	#	#	#													
<b>Information Technology [1]</b>																						
Find & develop information	#			#	#	#		#	#													
Present information	#				#			#	#													

UNIT NUMBER	1	2	3	4	5	6	7	8	9	Please refer to NOS Unit Index above for unit titles.												
<b>Application of Number [2]</b>																						
Interpret results and present findings	#	#			#	#		#	#													
Carry out calculations					#	#		#	#													
Interpret information	#		#	#	#	#		#	#													
<b>Working with others</b>	Opportunities to develop and provide evidence of these Key Skills are generic in all units																					
<b>Improving own learning and performance</b>																						

### Core Skills/Units Matrix

UNIT NUMBER	1	2	3	4	5	6	7	8	9	Please refer to NOS Unit Index above for unit titles.												
LEVEL INDICATED IN BRACKETS [X]																						
CORE SKILL ELEMENTS																						
<b>Communications [Intermediate 1]</b>																						
Speaking	#	#	#	#	#	#	#	#	#													
Reading and understanding	#	#	#	#	#	#	#	#	#													
Writing	#	#	#	#	#	#	#	#	#													
<b>Information Technology [Access 3]</b>																						
Operating the computer	#			#	#	#		#	#													
Finding information	#			#	#	#		#	#													
Using software	#				#			#	#													
<b>Numeracy [Intermediate 1]</b>																						
Understanding tables, charts and diagrams	#	#			#	#		#	#													
Producing tables, charts and diagrams																						
Using number skills					#	#		#	#													
Measuring	#		#	#	#	#		#	#													
<b>Working with others</b>	Opportunities to develop and provide evidence of these Core Skills are generic in all units																					
<b>Problem Solving</b>																						