Streetworks Excavation and Reinstatement (6167-01)

March 2020 Version 1.1

Qualification Handbook

Qualification at a glance

Subject area	Utilities
City & Guilds number	6167
Age group approved	16+
Entry requirements	None
Assessment	Practical assignment Multiple choice knowledge test
Approvals	Automatic approval available from 6157
Support materials	Centre handbook Assessment recording forms
Registration and certification	Consult the Walled Garden/Online Catalogue for last dates

Title	City & Guilds number	Accreditation number
Streetworks Excavation and Reinstatement	6167-01	N/A

Version and date	Change detail	Section
1.1 March 2020	Formatting amends, ROC table clarification	Throughout
1.0 February 2020	Scheme number and unit amends	Throughout

Contents

1 Introduction

The New Roads and Street Works Act 1991 (NRSWA) requires work involving the installation, renewal, maintenance and inspection of underground apparatus in the highway to be under the control of competent persons. In order to comply with the Act, undertakers must ensure that (except in prescribed cases) the execution of street works is supervised by someone holding a supervisor's qualification that covers the work being undertaken. The supervisor need not be present on site at all times but must be able to carry out their role adequately. In addition, a person holding an appropriate operative qualification must be present on the site at all times when work activities are in progress.

The Street Works qualifications for operatives and supervisors are listed below. Please note that the supervisor qualifications **do not** replace or subsume the operative qualifications: any individual wishing to undertake a supervisor's role must hold the relevant supervisors' qualifications, and a qualified operative must hold the relevant operatives' qualifications. One person **cannot** cover both an operative role and a supervisor role at the same time.

To become a qualified operative or supervisor, a candidate must gain one or more of the qualifications listed below and must hold the appropriate certificate(s) issued by one of the three Street Works awarding bodies. The qualifications of operatives and supervisors must be registered with the Street Works Qualifications Register, which is administered by SQA in Scotland. In order for a person to continue to act as a qualified operative or supervisor, this registration must remain current.

Structure

6167-01 comprises sixteen single unit competence qualifications. These are listed in the table below, together with the unit required to achieve them.

Nine units are applicable to operatives and eight to supervisors. One of these units (unit 101) applies to both operatives and supervisors.

Streetworks Excavation and Reinstatement

HAUC reference	City & Guilds unit number	Unit title	Operative or Supervisor
LA	101	Location and avoidance of underground apparatus	Operative & Supervisor
O1	102	Signing, lighting and guarding	Operative
O2	103	Excavation in the highway	Operative
O3	104	Reinstatement and compaction of backfill materials	Operative
O4	105	Reinstatement of sub-base and base in non-bituminous materials	Operative
O5	106	Reinstatement in cold-lay bituminous materials	Operative
O6	107	Reinstatement in hot-lay bituminous materials	Operative
O7	108	Reinstatement of concrete slabs	Operative
O8	109	Reinstatement of modular surfaces and concrete footways	Operative
S1	110	Monitoring signing, lighting and guarding	Supervisor
S2	111	Monitoring excavation in the highway	Supervisor
S3	112	Monitoring reinstatement and compaction of backfill materials	Supervisor
S4	113	Monitoring reinstatement of sub-base and base in non-bituminous materials	Supervisor
S5	114	Monitoring reinstatement in bituminous materials	Supervisor
S6	115	Monitoring reinstatement of concrete slabs	Supervisor
S7	116	Monitoring reinstatement of modular surfaces and concrete footways	Supervisor

2 Centre requirements

Approval

If your Centre is approved to offer 6157-01 Streetworks Excavation and Reinstatement qualifications, you will be automatically approved to offer the new 6167-01 Streetworks Excavation and Reinstatement qualifications.

To offer these qualifications, new centres will need to gain both centre and qualification approval. Please refer to the *City & Guilds Centre Manual* for further information.

Centre staff should familiarise themselves with the structure, content and assessment requirements of the qualifications before designing a course programme.

Resource requirements

Centre staffing

Staff delivering the qualifications must be able to demonstrate that they meet the following occupational expertise requirements. They should:

- be occupationally competent or technically knowledgeable in the area[s] for which they are delivering training and/or have experience of providing training. This knowledge must be to the same level as the training being delivered
- have recent relevant experience in the specific area they will be assessing
- have credible experience of providing training.

See also section 6 'Roles and responsibilities' within the HAUC assessment strategy, which is available for download from **www.cityandguilds.com**

Centre staff may undertake more than one role, eg tutor and assessor or internal verifier, but cannot internally verify their own assessments.

Learner entry requirements

City & Guilds does not set entry requirements for these qualifications. However, centres must ensure that candidates have the potential and opportunity to gain the qualification(s) successfully.

Age restrictions

City & Guilds cannot accept any registrations for candidates under 16 as these qualifications are not approved for under 16s.

3 Delivering the qualifications

Initial assessment and induction

An initial assessment of each candidate should be made before the start of their programme to identify:

- if the candidate has any specific training needs,
- support and guidance, they may need when working towards their qualification(s).
- any content they have already completed, or credit they have accumulated which is relevant to the qualification.

We recommend that centres provide an induction programme, so the candidate fully understands the requirements of the qualifications, their responsibilities as a candidate, and the responsibilities of the centre. This information can be recorded on a learning contract.

Support materials

The following resources are available for these qualifications:

Description	How to access
Qualification handbook	www.cityandguilds.com
Practical recording forms	www.cityandguilds.com

4 Assessment

Summary of assessment methods

Unit title	Assessment method	Where to obtain assessment materials
Location and avoidance of underground apparatus	Practical observation (results entry component 101) Online knowledge test (e-volve test component 501) Or Paper-based knowledge test (results entry component 201)	Online via e-volve Or Or download from www.cityandguilds.com
Signing, lighting and guarding	Practical observation (results entry component 102) Online knowledge test (e-volve test component 502) Or Paper-based knowledge test (results entry component 202)	Online via e-volve Or Or download from www.cityandguilds.com
Excavation in the highway	Practical observation (results entry component 103) Online knowledge test (e-volve test component 503) Or Paper-based knowledge test (results entry component 203)	Online via e-volve Or Or download from www.cityandguilds.com
Reinstatement and compaction of backfill materials	Practical observation (results entry component 104) Online knowledge test (e-volve test component 504) Or Paper-based knowledge test (results entry component 204)	Online via e-volve Or Or download from www.cityandguilds.com
Reinstatement of sub-base and base in non-bituminous materials	Practical observation (results entry component 105) Online knowledge test (e-volve test component 505) Or Paper-based knowledge test (results entry component 205)	Online via e-volve Or Or download from www.cityandguilds.com

Unit title	Assessment method	Where to obtain assessment materials
Reinstatement in cold-lay bituminous materials	Practical observation (results entry component 106) Online knowledge test (e-volve test component 506) Or Paper-based knowledge test (results entry component 206)	Online via e-volve Or Or download from www.cityandguilds.com
Reinstatement in hot-lay bituminous materials	Practical observation (results entry component 107) Online knowledge test (e-volve test component 507) Or Paper-based knowledge test (results entry component 207)	Online via e-volve Or Or download from www.cityandguilds.com
Reinstatement of concrete slabs	Practical observation (results entry component 108) Online knowledge test (e-volve test component 508) Or Paper-based knowledge test (results entry component 208)	Online via e-volve Or Or download from www.cityandguilds.com
Reinstatement of modular surfaces and concrete footways	Practical observation (results entry component 109) Online knowledge test (e-volve test component 509) Or Paper-based knowledge test (results entry component 209)	Online via e-volve Or Or download from www.cityandguilds.com
Monitoring signing, lighting and guarding	Practical observation (results entry component 110) Online knowledge test (e-volve test component 510) Or Paper-based knowledge test (results entry component 210)	Online via e-volve Or Or download from www.cityandguilds.com
Monitoring excavation in the highway	Practical observation (results entry component 111) Online knowledge test (e-volve test component 511) Or Paper-based knowledge test (results entry component 211)	Online via e-volve Or Or download from www.cityandguilds.com

Unit title	Assessment method	Where to obtain assessment materials
Monitoring reinstatement and compaction of backfill materials	Practical observation (results entry component 112) Online knowledge test (e-volve test component 512) Or Paper-based knowledge test (results entry component 212)	Online via e-volve Or Or download from www.cityandguilds.com
Monitoring reinstatement of sub-base and base in non-bituminous materials	Practical observation (results entry component 113) Online knowledge test (e-volve test component 513) Or Paper-based knowledge test (results entry component 213)	Online via E-volve Or Or download from www.cityandguilds.com
Monitoring reinstatement in bituminous materials	Practical observation (results entry component 114) Online knowledge test (e-volve test component 514) Or Paper-based knowledge test (results entry component 214)	Online via e-volve Or Or download from www.cityandguilds.com
Monitoring reinstatement of concrete slabs	Practical observation (results entry component 115) Online knowledge test (e-volve test component 515) Or Paper-based knowledge test (results entry component 215)	Online via e-volve Or www.cityandguilds.com
Monitoring reinstatement of modular surfaces and concrete footways	Practical observation (results entry component 116) Online knowledge test (e-volve test component 516) Or Paper-based knowledge test (results entry component 216)	Online via e-volve Or Or download from www.cityandguilds.com

Knowledge assessments

All knowledge assessments are 20 question multiple-choice examinations with a time limit of 45 minutes. The pass mark for all examinations is set at 80%. The examinations are 'open book' and allow candidates to use appropriate documents (as detailed in the HAUC assessment strategy). Re-sits will be permitted where time allows at the discretion of the approved centre. Candidates can be informed of a pass or fail on the same day. Examinations may only take place at locations approved by City & Guilds as an Examination Centre.

NB – Knowledge assessments for all units are available online via e-volve or as paper-based results entry until 1st March 2021 only. **After that date knowledge assessments will only be available online via e-volve.**

Assessment strategy

The full HAUC streetworks assessment strategy document is available to download from the **www.cityandguilds.com** website. This includes full details of assessment provision including detail on assessment timescales, permitted resources, and candidate assessor ratios.

Recognition of prior learning (RPL)

Recognition of prior learning means using a person's previous experience or qualifications which have already been achieved to contribute to a new qualification. RPL is not allowed for this qualification.

5 Units

Availability of units

All units for the City & Guilds Streetworks Excavation and Reinstatement can be found in this document.

The units in these qualifications are written in a standard format and comprise the following:

- City & Guilds reference number
- Title
- Aim
- Learning Outcomes - made up of a number of assessment criteria
- Evidence requirements/scope
- Assessment requirements

Unit 101 Location and avoidance of underground apparatus

Unit Aim

This unit has been designed to allow the candidate to demonstrate the skills and knowledge required to successfully locate and avoid underground utilities apparatus and highways services. The candidate will be able to interpret plans and confirm that they correspond with the work site. The candidate will be able to identify different underground utilities apparatus and highways services that are encountered during excavation and understand the hazards, risks and consequences of damaging them. The candidate must be able to select, prepare and use pipe and cable location equipment to identify and mark the location of underground utilities apparatus and highways services.

Learning Outcome 1: Interpret information and plans showing the location of underground apparatus
Assessment criteria: 1.1 inspect the site to confirm that it corresponds with the information and plans provided 1.2 identify visual indications of services being present on the site location 1.3 interpret plans to identify utility and highway services 1.4 confirm that the information recorded on plans is accurate and current for the site

Learning Outcome 2: Understand how to interpret information and plans showing the location of underground apparatus
Assessment criteria: 2.1 define the criteria for checking that plans are current 2.2 identify the types of symbols and legends that are used on plans 2.3 identify how different types of services are shown on plans 2.4 define the importance of marking the site clearly prior to excavation.

Learning Outcome 3: Identify utilities apparatus and highways services encountered during excavation
Assessment criteria: 3.1 identify the underground utilities apparatus and highways services 3.2 identify damage to underground utilities apparatus and highway services

Learning Outcome 4: Understand how to identify utilities apparatus and highways services encountered during excavation
Assessment criteria: 4.1 identify the different types of underground utilities apparatus and highways services 4.2 identify the distinguishing characteristics of underground utilities apparatus and highways services.
Learning Outcome 5: Identify the hazards and risks associated with underground utilities apparatus and highways services

Assessment criteria:

5.1 conduct a site-specific risk assessment to identify the hazards, risks and suitable control measures

5.2 ensure that control measures and contingency plans are in place to reduce the likelihood and severity of consequences resulting from the damage of underground utilities apparatus and highways services.

Learning Outcome 6: Understand the hazards and risks associated with underground utilities apparatus and highways services

Assessment criteria:

6.1 define the information recorded within a site-specific risk assessment in relation to the location and avoidance of underground utilities apparatus and highways services

6.2 identify damage to underground utilities apparatus and highways services

6.3 state the potential consequences of damaging underground utilities apparatus and highways services

6.4 define the control measures used to reduce the likelihood and severity of consequences resulting from the damage of underground utilities apparatus and highways services

6.5 state the purpose of contingency plans in relation to damaged underground utilities apparatus and highways services.

Learning Outcome 7: Use pipe and cable location equipment

Assessment criteria:

7.1 select equipment for the pipe and cable location activity

7.2 ensure that the equipment to be used is fit for purpose

7.3 prepare equipment for use

7.4 conduct the search using the appropriate techniques to locate underground utilities apparatus and highways services

7.5 interpret the results of search procedures accurately

7.6 mark the site clearly showing the location of underground utilities apparatus and highways services

7.7 compare the results of searches undertaken with the information on the site plans.

Learning Outcome 8: Understand how to use of pipe and cable location equipment

Assessment criteria:

8.1 define the operational limitations of different pipe and cable location equipment

8.2 state how to select equipment that is fit for purpose

8.3 define the procedure for notifying the relevant authority of discrepancies between search results and site plans

8.4 state the procedure to follow where underground utilities apparatus and highways services cannot be found using pipe and cable location equipment.

Learning Outcome 9: Follow safe working practices

Assessment criteria:

9.1 identify the relevant health and safety regulations, standards and other legislation that must be applied in relation to:
- (a) working practices within the construction environment
- (b) working practices specific to any practical task that they are required to carry out

9.2 follow current relevant health and safety regulations, standards and other legislation relating to:
- (a) working practices within the construction environment
- (b) working practices specific to any practical task that they are required to carry out.

101: Evidence Requirements/Scope

Some terms, used in the assessment criteria, cover a range of situations, as follows:

1. Utilities apparatus includes:
   - (a) plastic and metallic gas mains and services
   - (b) plastic and metallic water mains and services
   - (c) sewers and drains
   - (d) low and high-voltage electricity cables
   - (e) telecommunications and television cables
   - (f) fibre optic cables.

2. Highways services includes:
   - (a) highway drainage
   - (b) culverts
   - (c) land drains
   - (d) Street lighting and traffic signal equipment
   - (e) highways/road with special engineering controls.

3. The symbols and legends must cover a minimum of three of the following types:
   - (a) water
   - (b) gas
   - (c) sewers
   - (d) telecommunications
   - (e) electricity.

4. Safe working practices may include:
   - (a) safe use of tools and equipment
   - (b) use of PPE, including, as necessary: high visibility jacket or waistcoat, hard hat, ear defenders, gloves, protective footwear, waterproof clothing, eye protection visor/goggles, dust mask
   - (c) use of risk assessment methods to identify and control hazards on site
   - (d) precautions to minimise danger or inconvenience to highway users
   - (e) precautions to minimise danger or inconvenience to site personnel
   - (f) precautions to minimise damage to equipment or apparatus.

5. **Regulations, standards and other legislation** include:
   (a) Health and Safety Guidance 47, *Avoiding Danger from Underground Services*
   (b) Health and Safety Guidance 150, *Health and Safety in Construction*
   (c) *Safety at Street Works and Road Works – A Code of Practice*.

6. Potential consequences resulting from the damage to utilities apparatus and highways services include:
   (a) health and safety hazards including
      i. personal injury or death
      ii. dangerous situations
   (b) disruption of service
   (c) disruption of traffic
   (d) Damage to third party assets (highway and private property).

7. **Equipment** used when locating pipes and cables includes:
   (a) proprietary pipe and cable location equipment
   (b) suitable marking equipment
   (c) personal protective equipment.

101: Assessment Requirements

Assessment for this unit consists of practical observations and a multiple-choice knowledge examination to cover the requirements of the learning outcomes.

Current requirements for practical observations, including Assessor and Internal Quality Assurer qualifications and facilities requirements are provided in the HAUC (UK) The Street Works Assessment Strategy.

Unit 102 Signing, lighting and guarding

Unit Aim

This unit has been designed to allow the candidate to demonstrate the skills and knowledge required to successfully select, install, maintain and remove signing, lighting and guarding on a work site. The candidate will be able to survey the location and traffic conditions to ensure that suitable provision is selected and installed for the work site requirements. The candidate must be able to select, install and maintain the appropriate equipment, including portable traffic signals and stop/go boards, to protect pedestrians, site personnel, vehicular traffic and those with special needs including cyclists and horse riders.

Learning Outcome 1: Survey the work site
Assessment criteria: 1.1 conduct a site-specific risk assessment to identify the hazards, risks and suitable control measures relating to the installation and removal of signing, lighting and guarding 1.2 identify the appropriate provision for the requirements of the site location and its users 1.3 identify provision for the safe passage of pedestrians 1.4 identify ways to minimise disruption to and ensure the safety of vehicular traffic 1.5 identify provision for any special needs 1.6 produce a plan and equipment list that makes provision for the site location, vehicles and plant within the confines of the working space.

Learning Outcome 2: Understand how to survey the work site
Assessment criteria: 2.1 state the purpose of work site surveys and site-specific risk assessments in relation to the installation and removal of signing, lighting and guarding 2.2 state the potential requirements of the location and its users when selecting and installing signing, lighting and guarding 2.3 define the factors that influence provision for: (a) the safe passage of pedestrians (b) potential requirements of people with special needs (c) vehicles and plant within the working area (d) work near tramways and railway crossings 2.4 state how to minimise disruption to and ensure the safety of vehicular traffic 2.5 identify the circumstances in which mobile and short duration works would be applicable.

Learning Outcome 3: Protect pedestrians, vehicular traffic and site personnel
Assessment criteria: 3.1 select and use personal protective equipment appropriate for the task 3.2 create footways, traffic lanes and safety zones to provide for: (a) the requirements of the site location (b) the safe passage of pedestrians (c) minimising disruption to and ensuring safety of vehicular traffic (d) identified special needs 3.3 control the movement of pedestrians, vehicles and plant within the confines of the working space 3.4 select equipment that meets the requirements of the site location and any special needs 3.5 check that the equipment to be used is fit for purpose 3.6 position and remove equipment according to a specified sequence.

Learning Outcome 4: Understand how to protect pedestrians, vehicular traffic and site personnel
Assessment criteria: 4.1 define the personal protective equipment required for signing, lighting and guarding activities 4.2 state how to control the movement of pedestrians, vehicles and plant within the confines of the working area 4.3 define the distances and dimensions to accommodate advance signing 4.4 define the distances and dimensions to accommodate pedestrian walkways, traffic lanes, safety zones and portable pedestrian crossing facilities 4.5 state the requirements for the installation and use of warning lights 4.6 define how signs, barriers, footway boards, ramps and road plates are securely installed 4.7 state how to check that equipment is fit for purpose. 4.8 specify the sequences for installing, positioning and removing equipment.

Learning Outcome 5: Provide portable traffic signals and Stop/Go traffic control
Assessment criteria: 5.1 inspect and test signals for correct operation 5.2 position signals to meet the site location requirements 5.3 position signals in the correct sequence 5.4 adjust signal controls and timings to suit traffic conditions 5.5 dismantle and remove signals in the correct sequence 5.6 install and remove Stop/Go traffic control.

Learning Outcome 6: Understand how to provide portable traffic signals, Stop/Go and priority traffic control
Assessment criteria: 6.1 define the checks carried out to ensure that signals are operating correctly 6.2 state how the site location requirements affect the positioning of signals 6.3 specify the correct sequence for installing, positioning, dismantling and removing signals 6.4 define how the traffic conditions affect the adjustment of signal controls and timings 6.5 specify the appropriate site conditions for using: (a) Stop/Go boards (b) priority traffic control (c) give and take (d) stop work signs.

Learning Outcome 7: Follow safe working practices
Assessment criteria: 7.1 follow current relevant health and safety regulations, standards and other legislation relating to: (a) working practices within the construction environment (b) working practices specific to any practical task that they are required to carry out 7.2 identify the current relevant health and safety regulations, standards and other legislation that must be applied in relation to: (a) working practices within the construction environment (b) working practices specific to any practical task that they are required to carry out.

102: Evidence Requirements / Scope

Some terms, used in the assessment criteria, cover a range of situations, as follows:

1. Site location requirements include:
   (a) proximity to schools and hospitals
   (b) users of the route (including those with special needs)
   (c) weather conditions (including icy roads, heavy rain, snow, fog)
   (d) volume of traffic
   (e) speed of traffic
   (f) lighting on highways
   (g) highway situations (including lack of footways; pedestrianised areas; emergency service access; width of traffic lanes, footways and safety zones; inadequate lane widths; serious congestion; private access; bus stops, parking places, obstruction of driver's view at bends and summits; roundabouts and junctions; footways, ramps, boards and road plates; railway level crossings; tramways; cycle lanes and cycle tracks)
   (h) different requirements for working at day and night
   (i) mobile works and minor works
   (j) the safety zone (length of lead-in taper of cones (T); sideways clearance (S); longways clearance (L); length of exit taper of cones)
   (k) distances and dimensions and sizes for advance signing, traffic lanes, walkways and safety zones.

2. Those with **special needs** include:
   (a) visually impaired people
   (b) people with disabilities
   (c) users of prams and pushchairs
   (d) users of wheelchairs and other physically impaired people
   (e) cyclists
   (f) young children
   (g) horse riders.

3. **Safe working practices** may include:
   (a) safe use of tools and equipment
   (b) use of PPE including, as necessary: high visibility clothing, hard hat, gloves, protective footwear, waterproof clothing
   (c) precautions to minimise danger or inconvenience to road users
   (d) precautions to minimise danger or inconvenience to site personnel
   (e) precautions to minimise damage to equipment or apparatus.

4. **Equipment** may include as necessary:
   (a) adequate range of signing, lighting and guarding equipment (including signs, cones, lights, footway boards, barriers/enhanced barriers)
   (b) high visibility safety wear
   (c) suitable materials to construct ramps or proprietary ramps used.

5. **Signals** include:
   (a) proprietary two-way electrical or engine powered portable traffic lights
   (b) set of Stop/Go boards.

102: Assessment Requirements
Assessment for this unit consists of practical observations and knowledge questioning to cover the requirements of the learning outcomes. For safety reasons, observed assessments of candidates undertaking signing, lighting and guarding activities must take place at a centre, or a location linked to a centre, that has been approved by the centre's external verifier prior to use for assessment. The site used for assessment must be a real road with unpredictable traffic flows or one that would represent a real road where all performance criteria can be assessed. (Desktop or computer simulated scenarios are not permitted) Current requirements for practical observations, including Assessor and Internal Quality Assurer qualifications and facilities requirements are provided in the HAUC (UK) The Street Works Assessment Strategy.

Unit 103 Excavation in the highway

Unit Aim

This unit has been designed to allow the candidate to demonstrate the skills and knowledge required to carry out excavation in the highway. The candidate will be able to identify the characteristics of different types of footway and carriageway, including their construction layers. Candidates will be able to excavate safely, in line with the relevant specifications and codes of practice and will demonstrate the approved methods to safely support underground apparatus that is exposed during excavation. The candidate will also be able to identify, select and store excavated material that can be re-used as backfill.

Learning Outcome 1: Understand how to Identify different types of footway and carriageway
Assessment criteria:
1.1 identify the recognised footway and carriageway designs in accordance with the appropriate specifications
1.2 define the different construction layers within the recognised footway and carriageway designs in accordance with the appropriate specifications
1.3 identify the characteristics of recognised footway and carriageway designs
1.4 establish the characteristics of high duty and high amenity footways, footpaths and cycle tracks.

Learning Outcome 2: Excavate in the highway
Assessment criteria:
2.1 select and use the appropriate personal protective equipment for excavating in the highway
2.2 ensure the worksite is safe and that the appropriate signing, lighting and guarding is in place
2.3 identify the type of footway or carriageway to be excavated
2.4 select the appropriate tools and equipment required to safely excavate in the highway
2.5 ensure that the equipment selected is fit for purpose
2.6 employ the appropriate safe working practices to reduce the risk of damaging underground services
2.7 safely operate equipment to cut and break-up surface layers of the footway or carriageway
2.8 utilise the appropriate techniques to safely excavate the construction layers and avoid undercutting
2.9 separate and safely store excavated materials for re-use or disposal
2.10 ensure that excavation techniques minimise the risk of reinstatement failure
2.11 ensure excavations meet the specified dimensions and comply with the appropriate specifications.

Learning Outcome 3: Understand how to excavate in the highway
Assessment criteria: 3.1 identify the appropriate tools and equipment used to safely excavate in the highway 3.2 define the requirements that equipment must meet to be considered fit for purpose 3.3 define the appropriate specifications that should be referred to when excavating in the highway 3.4 define the appropriate methods used to identify areas of high risk relating to excavation activities 3.5 identify the relevant control measures that should be in place when excavating in the highway 3.6 define the appropriate precautions to take to when excavating in areas of high risk 3.7 define the characteristics of excavation and trench categories in accordance with the appropriate specifications 3.8 identify the appropriate measures that should be taken to ensure that excavations can accommodate materials and equipment for compaction and reinstatement.

Learning Outcome 4: Support underground utilities apparatus during excavation in the highway
Assessment criteria: 4.1 identify damage to utilities apparatus and take the appropriate actions to limit further damage and reduce the risks to health, safety and the environment 4.2 select and safely use the appropriate equipment and materials to support and protect exposed utilities apparatus from damage.

Learning Outcome 5: Understand how to support and protect underground apparatus during excavation in the highway
Assessment criteria: 5.1 state the potential consequences of damaging different types of utilities apparatus 5.2 identify the steps that should be taken when reporting damage to utilities apparatus 5.3 state the appropriate methods to be used to safely support and protect exposed utilities apparatus 5.4 define the circumstances in which trench support systems would be required, and where to find the guidelines for their installation and safe use.

Learning Outcome 6: Identify, select and store excavated materials for re-use as backfill
Assessment criteria: 6.1 identify and segregate excavated materials that are suitable for re-use as backfill or sub-base 6.2 identify and segregate excavated materials that are not suitable for re-use and provide safe temporary storage for them 6.3 demonstrate how to safely store and protect re-usable materials from contamination and excessive drying or wetting.

Learning Outcome 7: Understand how to identify, select and store excavated materials for re-use as backfill
Assessment criteria: 7.1 define how excavated materials are classified and considered suitable or unsuitable for re-use as backfill material 7.2 identify the circumstances in which excavated materials can be re-used 7.3 define how to protect excavated re-usable materials from: (a) contamination (b) loss of fines (c) excessive drying or wetting 7.4 state the requirements that excavated chalk should comply with for it to be considered suitable for re-use backfill material 7.5 define how to safely store and dispose of materials that are unsuitable for re-use 7.6 state the consequences of using unsuitable material for backfill or sub-base.

Learning Outcome 8: Follow safe working practices
Assessment criteria: 8.1 perform tasks in line with the relevant health and safety legislation and guidance documents relating to: (a) working practices within the construction environment (b) working practices specific to excavation in the highway 8.2 identify the relevant health and safety legislation and guidance documents relating to: (a) working practices within the construction environment (b) working practices specific to excavation in the highway.

103: Evidence Requirements / Scope

Some terms, used in the assessment criteria, cover a range of situations, as follows:

1. Types of footway and carriageway include:
   (a) flexible footway and carriageway
   (b) modular footway and carriageway
   (c) rigid footway and carriageway
   (d) composite carriageway.

2. Construction layers in footways and carriageways include:
   (a) surface course
   (b) binder course
   (c) base (roadbase)
   (d) sub-base
   (e) blocks or sett
   (f) slab
   (g) bed.

3. Regulations, standards and other legislation includes:
   (a) Specification for the Reinstatement of Openings in Highways
   (b) Health and Safety Guidance 47, *Avoiding Danger from Underground Services*
   (c) Health and Safety Guidance 150, *Health and Safety in Construction*
   (d) manufacturers' operating procedures for powered tools and plant.

4. Suitable equipment may include as necessary:
   (a) appropriate hand tools – including square and round mouth shovels
   (b) appropriate powered equipment – including pavement saw and breaking-out tools
   (c) appropriate equipment for supporting exposed utilities – including slings, ropes and props.

5. Safe working practices may include:
   (a) safe use of tools and equipment
   (b) use of appropriate PPE (including, as necessary: high visibility jacket or waistcoat, hard hat, ear defenders, gloves, protective footwear, waterproof clothing, eye protection visor or goggles, dust mask)
   (c) use of risk assessment methods to identify and control hazards on site
   (d) precautions to minimise danger or inconvenience to road users
   (e) precautions to minimise danger or inconvenience to site personnel
   (f) precautions to minimise damage to equipment or apparatus.

6. Utilities apparatus includes:
   (a) plastic and metallic gas mains
   (b) plastic and metallic water mains
   (c) sewers and drains
   (d) high- and low-voltage electricity cables
   (e) telecommunications and television cables.

7. **Excavated materials** described in specifications include:
   (a) Class A
   (b) Class B
   (c) Class C
   (d) Class D
   (e) Class E.

8. **High risk areas** include:
   (a) Working in close proximity to utilities apparatus
   (b) Working in close proximity to trees
   (c) Bad ground conditions
   (d) Bridge abutments
   (e) Special engineering difficulty.

103: Assessment Requirements

Assessment for this unit consists of practical observations and a multiple-choice knowledge examination to cover the requirements of the learning outcomes.

Current requirements for practical observations, including Assessor and Internal Quality Assurer qualifications and facilities requirements are provided in the HAUC (UK) The Street Works Assessment Strategy.

Unit 104 Reinstatement and compaction of backfill materials

Unit Aim

This unit has been designed to allow the candidate to demonstrate the skills and knowledge required to backfill an excavation. The candidate will be able to identify recognised footway and carriageway designs and their different construction layers in order to select the appropriate backfill materials to reinstate excavations safely to the correct level. The candidate will also be able to correctly identify and safely dispose of surplus materials and materials that cannot be re-used.

Learning Outcome 1: Understand how to identify different types of footway and carriageway
Assessment criteria: 1.1 identify the recognised footway and carriageway designs in accordance with the appropriate specifications 1.2 define the different construction layers within the recognised footway and carriageway designs in accordance with the appropriate specifications 1.3 identify the characteristics of recognised footway and carriageway designs 1.4 establish the characteristics of high duty and high amenity footways, footpaths and cycle tracks.

Learning Outcome 2: Select materials for backfill
Assessment criteria: 2.1 identify the type of footway or carriageway to be reinstated 2.2 identify and select excavated materials that are suitable for backfill 2.3 identify, segregate and temporarily store excavated materials not suitable for re-use 2.4 identify imported materials that are suitable for use as backfill 2.5 store backfill materials safely and protect them from excessive drying and wetting 2.6 unload and provide safe storage for imported materials 2.7 identify the correct backfill materials to use in high risk areas 2.8 store materials on site without obstructing or damaging essential facilities and street furniture.

Learning Outcome 3: Understand how to select materials for backfill
Assessment criteria: 3.1 identify the different types of excavated materials and their suitability for use as backfill 3.2 define the different types of imported materials and their suitability for use as backfill 3.3 state why excavated materials may be unsuitable for backfill 3.4 define the correct storage arrangements for backfill materials 3.5 identify backfill materials that are suitable as surround to utilities apparatus 3.6 state the consequences of using unsuitable material for backfill 3.7 identify the correct backfill materials to use in high risk areas 3.8 state how to prevent the obstruction or damage of essential facilities and street furniture.

Learning Outcome 4: Backfill the excavation
Assessment criteria: 4.1 select reinstatement and compaction equipment that: (a) is suitable to the material type and excavation dimensions (b) avoids damage to underground utilities apparatus and highways services (c) is in working condition and safe to use 4.2 reinstate the backfill layer to the correct level 4.3 complete backfilling without damaging underground utilities apparatus 4.4 compact backfill materials to provide a firm base for advancement and minimise the risk of reinstatement failure 4.5 Confirm the degree of compaction has been achieved.

Learning Outcome 5: Understand how to backfill an excavation
Assessment criteria: 5.1 define the factors that influence the selection of reinstatement and compaction equipment to suit the material type and excavation dimensions 5.2 identify the types of equipment that will minimise the potential for damage to underground utilities apparatus 5.3 state the level of backfill layer required for different footway and carriageway designs in accordance with the appropriate specifications 5.4 identify the required amount of compaction for each layer using specific equipment 5.5 state how the degree of compaction can be confirmed.

Learning Outcome 6: Dispose of surplus materials
Assessment criteria: 6.1 identify excavated materials that are surplus to requirements or unsuitable for re-use 6.2 store surplus materials and those unsuitable for re-use in safe temporary storage 6.3 ensure that materials for disposal are loaded safely for transportation.

Learning Outcome 7: Understand how to dispose of surplus materials
Assessment criteria: 7.1 specify how excavated materials are determined as surplus to requirements or unsuitable for re-use 7.2 state the importance of storing unsuitable and re-usable materials separately 7.3 state when surplus materials should be removed from site.

Learning Outcome 8: Follow safe working practices
Assessment criteria: 8.1 follow current relevant health and safety regulations, standards and other legislation relating to: (a) **working practices** within the construction environment (b) **working practices** specific to any practical task that they are required to carry out 8.2 identify the current relevant health and safety regulations, standards and other legislation that must be applied in relation to: (a) **working practices** within the construction environment (b) **working practices** specific to any practical task that they are required to carry out 8.3 leave the site in a clean and safe condition 8.4 describe how to leave the site in a clean and safe condition.

104: Evidence Requirements / Scope

Some terms, used in the assessment criteria, cover a range of situations, as follows:

1. **Types of footway and carriageway** include:
   (a) flexible footway and carriageway
   (b) modular footway and carriageway
   (c) rigid footway and carriageway
   (d) composite carriageway.

2. **Construction layers** in footways and carriageways include:
   (a) surface course
   (b) binder course
   (c) base (roadbase)
   (d) sub-base
   (e) block or sett
   (f) slab
   (g) bed.

3. **Specifications** and procedures include:
   (a) Specification for the Reinstatement of Openings in Highways
   (b) Health and Safety Guidance 47, *Avoiding Danger from Underground Services*
   (c) Health and Safety Guidance 150, *Health and Safety in Construction*
   (d) manufacturers' operating procedures for powered tools and plant.

4. **Materials** encountered during reinstatement include:
   (a) Class A
   (b) Class B
   (c) Class C
   (d) Class D
   (e) Class E.

5. Safe **working practices** may include:
   (a) safe use of tools and equipment
   (b) use of appropriate PPE (including, as necessary: high visibility jacket or waistcoat, hard hat, ear defenders, gloves, protective footwear, waterproof clothing, eye protection visor or goggles, dust mask)
   (c) use of risk assessment methods to identify and control hazards on site
   (d) precautions to minimise danger or inconvenience to road users
   (e) precautions to minimise danger or inconvenience to site personnel
   (f) precautions to minimise damage to equipment or apparatus.

6. **Equipment** for reinstatement may include as necessary:
   (a) appropriate hand tools – including square mouth shovel, tape measure, travelling site stick or depth-gauge and hard bristle brooms.
   (b) appropriate powered equipment – including vibrotamper or vibrating plate, percussive rammer and vibrating roller.
   (c) impact soil testing equipment.

7. Utilities apparatus includes:
   (a) plastic and metallic gas mains
   (b) plastic and metallic water mains
   (c) sewers and drains
   (d) high- and low-voltage electricity cables
   (e) telecommunications and television cables
   (f) fibre optic cables.

8. Highways services includes:
   (a) highway drainage
   (b) culverts
   (c) land drains
   (d) Street lighting and traffic signal equipment
   (e) highways/road with special engineering controls.

2. High risk areas include:
   (a) as a surround to utilities' apparatus
   (b) in close proximity to trees
   (c) bad ground conditions
   (d) special engineering difficulty.

104: Assessment Requirements

Assessment for this unit consists of practical observations and a multiple-choice knowledge examination to cover the requirements of the learning outcomes.

Current requirements for practical observations, including Assessor and Internal Quality Assurer qualifications and facilities requirements are provided in the HAUC (UK) The Street Works Assessment Strategy.

Unit 105 Reinstatement of sub-base and base in non-bituminous materials

Unit Aim

This unit has been designed to allow the candidate to demonstrate the skills and knowledge required to reinstate sub-base and base in non-bituminous materials. The candidate will be able to prepare the subgrade to receive subsequent layers. The candidate will be able to identify, select and reinstate materials to be used for the sub-base or base correctly using the correct equipment. The candidate will also be able to correctly identify and safely dispose of surplus materials and materials that cannot be re-used.

Learning Outcome 1: Prepare the backfill layer to receive subsequent layers
Assessment criteria: 1.1 remove loose and unacceptable materials from the area to be reinstated using suitable equipment 1.2 identify and correct backfill layer defects using approved materials and suitable equipment 1.3 use the appropriate equipment to check and confirm that the backfill layer is suitable and provides adequate depth to complete the remaining footway or carriageway layer construction.

Learning Outcome 2: Understand how to prepare the backfill layer for subsequent layers
Assessment criteria: 2.1 state why loose and unacceptable materials are removed from the area to be reinstated 2.2 state how loose and unacceptable materials are removed from the area to be reinstated 2.3 state the purpose and requirements for a firm backfill layer 2.4 identify materials that can be used to replace an inadequate backfill layer 2.5 define how potential backfill layer defects are identified and corrected 2.6 state the potential consequences if backfill layer defects are not corrected.

Learning Outcome 3: Select and store materials for sub-base and roadbase
Assessment criteria: 3.1 identify and select excavated materials that are suitable for re-use or disposal 3.2 identify imported materials suitable for use in sub-base and base 3.3 unload imported materials safely on site 3.4 store all materials safely on site to prevent degradation.

Learning Outcome 4: Understand how to select materials for sub-base and roadbase
Assessment criteria: 4.1 identify the different types of excavated and imported materials that are suitable for reinstating sub-base and base 4.2 define the permitted range of alternative reinstatement materials (ARMs), stabilised materials for fill (SMFs) and other materials for use as surround to apparatus 4.3 define how excavated materials suitable for re-use should be stored on site to prevent degradation 4.4 state how to safely unload and store imported materials on site 4.5 state how to prevent the obstruction or damage of essential facilities and street furniture.

Learning Outcome 5: Reinstate the sub-base and roadbase layers
Assessment criteria: 5.1 select reinstatement equipment that is: (a) suitable to the material type and excavation dimensions (b) in working condition and safe to use 5.2 identify the level to which the sub-base and base layers should be reinstated 5.3 reinstate the sub-base and base layers to the specified level using the correct quantities of materials 5.4 calculate the materials required to achieve full compaction of the layer construction 5.5 use selected compaction equipment to adequately compact the materials and layer thickness 5.6 complete the sub-base and base layer construction to specifications

Learning Outcome 6: Understand how to reinstate the sub-base and roadbase layers
Assessment criteria: 6.1 define the factors that influence the selection of equipment for the prescribed operation 6.2 state how to measure the specified level of each layer 6.3 state the checks required to confirm that the sub-base and base layer has been constructed to the correct specifications.

Learning Outcome 7: Dispose of surplus materials
Assessment criteria: 7.1 identify materials that are unsuitable for re-use or surplus to requirements 7.2 Store surplus materials and those unsuitable for reuse in safe temporary storage 7.3 ensure materials for disposal are loaded safely for transportation.

Learning Outcome 8: Understand how to dispose of surplus materials
Assessment criteria:

8.1 define how materials that are unsuitable for re-use or surplus to requirements are identified
8.2 state the importance of storing unsuitable and re-usable materials separately
8.3 state when surplus materials should be removed from site.

Learning Outcome 9: Follow safe working practices

Assessment criteria:

9.1 follow current relevant health and safety regulations, standards and other legislation relating to:
- (a) **working practices** within the construction environment
- (b) **working practices** specific to any practical task that they are required to carry out

9.2 identify the current relevant health and safety regulations, standards and other legislation that must be applied in relation to:
- (a) **working practices** within the construction environment
- (b) **working practices** specific to any practical task that they are required to carry out

9.3 leave the site in a clean and safe condition

9.4 describe how to leave the site in a clean and safe condition.

105: Evidence Requirements / Scope

Some terms, used in the assessment criteria, cover a range of situations, as follows:

1. **Equipment** includes:
   (a) Hand tools – including square and round mouth shovels, hand pick, hard bristle broom, measuring tape, hand rammer
   (b) powered equipment – including vibrotamper, vibrating plate, percussive rammer and vibrating roller.

2. Safe **working practices** include:
   (a) safe use of tools and equipment
   (b) PPE (including, as necessary: high visibility jacket or waistcoat, hard hat, ear defenders, gloves, protective footwear, waterproof clothing, eye protection visor or goggles, dust mask)
   (c) use of risk assessment methods to identify and control hazards on site
   (d) precautions to minimise danger or inconvenience to road users
   (e) precautions to minimise danger or inconvenience to site personnel
   (f) precautions to minimise damage to equipment or apparatus.

3. **Specifications** and procedures include:
   (a) Specification for the Reinstatement of Openings in Highways
   (b) Health and Safety Guidance 47, *Avoiding Danger from Underground Services*
   (c) Health and Safety Guidance 150, *Health and Safety in Construction*
   (d) manufacturers' operating procedures for powered tools and plant.

4. **Materials** identified for reinstating sub-base and roadbase include:
   (a) Granular Type 1 sub-base material
   (b) excavated granular sub-base material Class A
   (c) category 3 cement-bound material (CBM3)
   (d) foamed concrete.

5. **Materials** for disposal include:
   (a) unsuitable surplus materials
   (b) surplus materials that are suitable for re-use.

6. Utilities **apparatus** includes:
   (a) plastic and metallic gas mains
   (b) plastic and metallic water mains
   (c) sewers and drains
   (d) high- and low-voltage electricity cables
   (e) telecommunications and television cables
   (f) fibre optic cables.

105: Assessment Requirements
Assessment for this unit consists of practical observations and a multiple-choice knowledge examination to cover the requirements of the learning outcomes. Current requirements for practical observations, including Assessor and Internal Quality Assurer qualifications and facilities requirements are provided in the HAUC (UK) The Street Works Assessment Strategy.

Unit 106 Reinstatement in cold-lay bituminous materials

Unit Aim

This unit has been designed to allow the candidate to demonstrate the skills and knowledge required to carry out reinstatement using cold-lay bituminous surfacing material. The candidate will be able to prepare the pavement layer to receive cold-lay surfacing materials. The candidate will be able to identify and select materials to be used for the reinstatement and construction of the cold- lay bituminous binder and surfacing layer using the correct equipment. The candidate will also be able to correctly identify and safely dispose of surplus materials and materials that cannot be re- used.

Learning Outcome 1:Prepare the layer of pavement structure to receive permanent cold-lay surfacing materials
Assessment criteria: 1.1 remove loose and unacceptable materials from the area to be reinstated using suitable equipment 1.2 identify and correct pavement layer surface contamination or defect 1.3 use suitable equipment to trim back edges where damage has occurred 1.4 use suitable equipment to re-position displaced ironwork, kerbs and edge restraints in accordance with established levels 1.5 use the specifications to confirm that the correct depth is left for the cold-lay surfacing layers 1.6 check the polished stone value (PSV) of the permanent cold-lay surface course material meets specifications

Learning Outcome 2:Understand how to prepare the layer of pavement structure to receive cold-lay surfacing materials
Assessment criteria: 2.1 state why loose and unacceptable materials are removed from the area to be reinstated 2.2 state how loose and unacceptable materials are removed from the area to be reinstated 2.3 state the potential consequences of pavement layer surface contamination or defects 2.4 define how pavement layer surface contamination or defects are identified and corrected 2.5 state how to identify and correct edge damage and undercut 2.6 define how displaced ironwork, kerbs and edge restraints are repositioned 2.7 state the potential consequences of incorrect pavement layer construction.

Learning Outcome 3: Construct a cold-lay bituminous surfacing layer
Assessment criteria: 3.1 check that imported bituminous material complies with the specification (a) select compaction equipment and ensure that it is: (b) suitable for the operation 3.2 in working condition and safe to use 3.3 seal edges of the cavity using specified edge sealant 3.4 store cold-lay bituminous material to prevent contamination, oxidation and wetting 3.5 spread and level cold-lay bituminous material in binder course and surface course layers 3.6 handle cold-lay bituminous material correctly 3.7 reinstate around highway iron work according to the specification 3.8 compact the bituminous material according to the specification.

Learning Outcome 4:Understand how to construct a cold-lay bituminous surfacing layer
Assessment criteria: 4.1 define the factors that influence the selection of equipment for the prescribed operation 4.2 state the checks required to ensure that equipment is in working condition and safe to use 4.3 define the handling and storage procedures for cold-lay bituminous material 4.4 state why cavity edges are sealed before placing surface layers 4.5 state how to determine the surcharge prior to compaction of cold-lay surfacing materials 4.6 define the compaction procedures for cold-lay bituminous material 4.7 state how to confirm that the compacted layer thickness meets specifications.

Learning Outcome 5:Dispose of surplus materials
Assessment criteria: 5.1 identify materials that are unsuitable for re-use or surplus to requirements 5.2 store surplus materials and those unsuitable for reuse in safe temporary storage 5.3 ensure materials for disposal are loaded safely for transportation.

Learning Outcome 6:Understand how to dispose of surplus materials
Assessment criteria: 6.1 define how materials that are unsuitable for re-use or surplus to requirements are identified 6.2 state the importance of storing unsuitable and re-usable materials separately 6.3 state when surplus materials should be removed from site.

Learning Outcome 7: Follow safe working practices
Assessment criteria: 7.1 follow current relevant health and safety regulations, standards and other legislation relating to: (a) **working practices** within the construction environment (b) **working practices** specific to any practical task that they are required to carry out. 7.2 identify the current relevant health and safety regulations, standards and other legislation that must be applied in relation to: (a) **working practices** within the construction environment (b) **working practices** specific to any practical task that they are required to carry out 7.3 leave the site in a clean and safe condition 7.4 describe how to leave the site in a clean and safe condition.

106: Evidence Requirements / Scope

Some terms, used in the assessment criteria, cover a range of situations, as follows:

1. **Equipment** includes:
   (a) Hand tools – including square and round mouth shovels, hand pick, hard bristle broom, profile gauge and measuring tape
   (b) Powered equipment – including breakout equipment, road saw, disc cutter, vibrotamper, vibrating roller or vibrating plate and Turk's head brush or aerosol applied sealant

2. Safe **working practices** include:
   (a) safe use of tools and equipment
   (b) PPE (including, as necessary: high visibility jacket or waistcoat, hard hat, ear defenders, gloves, protective footwear, waterproof clothing, eye protection visor or goggles, glasses, dust mask)
   (c) use of risk assessment methods to identify and control hazards on site
   (d) precautions to minimise danger or inconvenience to road users and pedestrians
   (e) precautions to minimise danger or inconvenience to site personnel
   (f) precautions to minimise damage to equipment or apparatus.

3. **Specifications** and **procedures** include:
   (a) Specification for the Reinstatement of Openings in Highways
   (b) Safety and Street Works and Road Works – A Code of Practice.
   (c) Health and Safety Guidance 47, Avoiding Danger from Underground Services
   (d) Health and Safety Guidance 150, Health and Safety in Construction
   (e) manufacturers' operating procedures for powered tools and plant.

4. **Materials** identified for reinstating a cold-lay bituminous surfacing layer include:
   (a) deferred set mixtures for reinstatement
   (b) permanent cold-lay binder and surfacing materials
   (c) cold edge sealant.

5. **Materials** for disposal include:
   (a) unsuitable surplus materials
   (b) surplus materials that are suitable for re-use.

106: Assessment Requirements

Assessment for this unit consists of practical observations and a multiple-choice knowledge examination to cover the requirements of the learning outcomes.

Current requirements for practical observations, including Assessor and Internal Quality Assurer qualifications and facilities requirements are provided in the HAUC (UK) The Street Works Assessment Strategy.

Unit 107 Reinstatement in hot-lay bituminous materials

Unit Aim

This unit has been designed to allow the candidate to demonstrate the skills and knowledge required to carry out reinstatement using hot-lay bituminous surfacing material. The candidate will be able to prepare the pavement layer to receive hot-lay surfacing materials. The candidate will be able to identify and select materials to be used for the reinstatement and construction of the hot-lay bituminous binder course and the asphalt surface course using the correct equipment. The candidate will also be able to correctly identify and safely dispose of surplus materials and materials that cannot be re-used.

Learning Outcome 1: Prepare the layer of pavement structure to receive hot-lay surfacing materials
Assessment criteria: 1.1 remove loose, unacceptable or interim reinstatement materials from the area to be reinstated using suitable equipment 1.2 identify and correct any pavement layer surface contamination or defects 1.3 use suitable equipment to trim back edges where damage has occurred 1.4 use suitable equipment to re-position displaced ironwork kerbs and edge restraints in accordance with established levels 1.5 use the specifications to confirm that the correct depth is left for the hot-lay binder and surface course.

Learning Outcome 2: Understand how to prepare the layer of pavement structure to receive hot-lay surfacing materials
Assessment criteria: 2.1 state how the depth is checked to confirm that it is suitable for reinstating binder and surface course layers 2.2 state why loose and unacceptable materials are removed from the area to be reinstated 2.3 state the potential consequences of pavement layer surface contamination or defects 2.4 define how pavement layer surface contamination or defects are identified and corrected 2.5 state how to identify and correct edge damage and undercut 2.6 define how displaced ironwork, kerbs and edge restraints are repositioned 2.7 state the potential consequences of incorrect pavement layer construction.

Learning Outcome 3: Construct the bituminous binder course
Assessment criteria: 3.1 confirm the delivery temperature of hot-lay bituminous material prior to laying 3.2 select compaction **equipment** and ensure that it is

(a) suitable for the operation
(b) in working condition and safe to use

3.3 maintain specialist tools at the correct temperature for working with hot bituminous material
3.4 seal the edges according to the specification
3.5 confirm the polished stone value (PSV) of the surface course materials meets specifications
3.6 select, spread and level hot bituminous material binder course
3.7 handle hot-lay bituminous material correctly
3.8 store hot-lay bituminous material correctly
3.9 compact the hot bituminous material according to the specification.

Learning Outcome 4:Understand how to construct a bituminous base (roadbase) and binder course
Assessment criteria:
4.1 state the quality requirements of the selected material
4.2 state the temperature ranges of hot-lay bituminous materials
4.3 define why it is important to maintain tool temperatures when working with hot-lay bituminous materials
4.4 state how the bituminous material in base and/or binder course and surface course layers is spread and levelled
4.5 define the factors that influence the selection of equipment for the prescribed operation
4.6 state the checks required to ensure that equipment is in working condition and safe to use
4.7 define the handling and storage procedures for hot-lay bituminous material
4.8 state why cavity edges are sealed before placing surface layers
4.9 define the compaction procedures for hot-lay bituminous material
4.10 state how to confirm that compacted layer thickness meets specifications.

Learning Outcome 5: Construct the asphalt surface course
Assessment criteria:
5.1 apply tack coat as necessary
5.2 check the temperature of hot bituminous material before laying it
5.3 maintain specialist tools at the appropriate temperature for working with bituminous material
5.4 handle hot-lay bituminous material correctly
5.5 store hot-lay bituminous material correctly
5.6 use suitable equipment to select, spread and level hot bituminous material in a surface course layer
5.7 select compaction equipment that is in working condition and safe to use
5.8 compact the hot-lay bituminous material according to the specification
5.9 make adequate provision for skid resistance and texture depth in the surface course

Learning Outcome 6: Understand how to construct an asphalt surface course
Assessment criteria: 6.1 define the correct procedures and requirements for applying tack coat 6.2 define the quality requirements for the selected material 6.3 state why it is important to use hot-lay bituminous material at the correct temperature 6.4 state why it is important to maintain tool temperatures when working with hot-lay bituminous materials 6.5 define how to spread and level bituminous material in an asphalt surface course layer 6.6 define the factors that influence the selection of equipment for the prescribed operation 6.7 define the handling and storage procedures for hot-lay bituminous material 6.8 state how to check that equipment is in working condition and safe to use 6.9 define the compaction procedures for hot-lay bituminous material 6.10 state the method used to ensure skid resistance and texture depth from specifications

Learning Outcome 7: Dispose of surplus materials
Assessment criteria: 7.1 identify materials that are unsuitable for re-use or surplus to requirements 7.2 store surplus materials and those unsuitable for reuse in safe temporary storage 7.3 ensure materials for disposal are loaded safely for transportation

Learning Outcome 8: Understand how to dispose of surplus materials
Assessment criteria: 8.1 define how materials that are unsuitable for re-use or surplus to requirements are identified 8.2 state the importance of storing unsuitable and re-usable materials separately 8.3 state when surplus materials should be removed from site.

Learning Outcome 9: Follow safe working practices for locating and avoiding underground apparatus and highways services
Assessment criteria: 9.1 follow current relevant health and safety regulations, standards and other legislation relating to: (a) working practices within the construction environment (b) working practices specific to any practical task that they are required to carry out. 9.2 identify the current relevant health and safety regulations, standards and other legislation that must be applied in relation to: (a) working practices within the construction environment (b) working practices specific to any practical task that they are required to carry out.

9.3	leave the site in a clean and safe condition
9.4	describe how to leave the site in a clean and safe condition.

107: Evidence Requirements / Scope

Some terms, used in the assessment criteria, cover a range of situations, as follows:

1. **Equipment** includes:
   (a) Hand tools – including square and round mouth shovels, hand pick, hard bristle broom, profile board, measuring tape, rake hot hand tamper, tool heater, wheelbarrow, water butt, probe thermometer, bitumen bucket, edge seal applicator, Turk's head brush.
   (b) powered equipment – including breakout equipment, pavement saw, vibrotamper, vibrating roller or vibrating plate, disc cutter, road saw
   (c) tool heater

2. Safe **working practices** include:
   (a) safe use of tools and equipment
   (b) PPE (including, as necessary: high visibility jacket or waistcoat, hard hat, ear defenders, gloves, protective footwear, waterproof clothing, eye protection visor or goggles, glasses, dust mask)
   (c) use of risk assessment methods to identify and control hazards on site
   (d) precautions to minimise danger or inconvenience to road users and pedestrians
   (e) precautions to minimise danger or inconvenience to site personnel
   (f) precautions to minimise damage to equipment or apparatus
   (g) safe working practices for working with molten bitumen
   (h) personal hygiene measures in connection with skin contamination.

3. **Specifications** and **procedures** include:
   (a) Specification for the Reinstatement of Openings in Highways
   (b) Health and Safety Guidance 47, *Avoiding Danger from Underground Services*
   (c) Health and Safety Guidance 150, *Health and Safety in Construction*
   (d) manufacturers' operating procedures for powered tools and plant.

4. **Materials** identified for constructing a bituminous binder course include:
   (a) dense binder course materials (20mm nominal aggregate size), hot rolled asphalt 50/20 binder course
   (b) close graded surface course materials (10mm aggregate size), hot rolled asphalt 30/14 surface course.

5. **Materials** identified for constructing an asphalt concrete surface course to BS EN 13108 and PD 6691 in accordance with specifications to include:
   (a) hot rolled asphalt binder and surface course
   (b) close graded surface course materials (10mm stone size)
   (c) asphalt concrete dense surface course
   (d) stone mastic asphalt surface and binder course
   (e) pre-coated 14mm or 20mm chippings
   (f) edge sealants

(g) tack coat.

6. **Materials** for disposal include:
   (a) unsuitable surplus materials
   (b) surplus materials that are suitable for re-use.

7. **Procedures** for handling, transportation and laying of asphalt concrete in accordance with specifications BS 594987 and PD 6691. *(Note: These standards and documents replace earlier ones and should be used in conjunction with the BS EN 13108.)*.

107: Assessment Requirements

Assessment for this unit consists of practical observations and a multiple-choice knowledge examination to cover the requirements of the learning outcomes.

Current requirements for practical observations, including Assessor and Internal Quality Assurer qualifications and facilities requirements are provided in the HAUC (UK) The Street Works Assessment Strategy.

Unit 108 Reinstatement of concrete slabs

Unit Aim

This unit has been designed to allow the candidate to demonstrate the skills and knowledge required to carry out the reinstatement of a concrete slab. The candidate will be able to prepare the sub-base to receive the concrete slab. The candidate will be able to prepare the edges of the existing slab for concrete reinstatement, lay mesh reinforcement and form the concrete slab using the correct equipment and materials. The candidate will also be able to correctly identify and safely dispose of surplus materials and materials that cannot be re-used.

Learning Outcome 1: Prepare sub-base to receive concrete slab

Assessment criteria:

1.1 remove loose and unacceptable materials from the area to be reinstated using suitable equipment

1.2 identify and correct any defects in the sub-base using specified materials

1.3 select sub-base compaction equipment and ensure that it is

- (a) suitable for the operation
- (b) in working conditions and safe to use

1.4 compact the sub-base according to specification

1.5 use the specification to confirm that the finished sub-base level accommodates the correct slab thickness.

Learning Outcome 2: Understand how to prepare sub-base to receive concrete slab

Assessment criteria:

2.1 state why loose and unacceptable materials are removed from the area to be reinstated

2.2 state how loose and unacceptable materials are removed from the area to be reinstated

2.3 identify different sub-base defects that could be encountered

2.4 identify approved sub-base materials for replacing unacceptable materials

2.5 define the procedures for replacing defective sub-base materials with approved materials

2.6 define the factors that influence the selection of equipment for the prescribed operation

2.7 state the checks required to ensure that equipment is in working condition and safe to use

2.8 state how to check that the sub-base material is adequately compacted

2.9 define how the cavity depth is checked to ensure it will accommodate the specified slab thickness.

Learning Outcome 3: Prepare the edges of existing slab to receive concrete reinstatement
Assessment criteria: 3.1 saw cut the edge of the existing slab according to the specification, using the appropriate equipment 3.2 prepare the unsawn section of the exposed slab edge according to the specification to form a support using steel dowel bars or taper edge support 3.3 place the slip membrane in position and overlap it 3.4 clean and wet all edges prior to placing the concrete.

Learning Outcome 4:Understand how to prepare the edges of existing slab to receive concrete reinstatement
Assessment criteria: 4.1 state how to correctly saw cut the edge of an existing slab 4.2 state how to rough cut the unsawn section of the exposed slab edge to form a taper-edge support 4.3 define the support requirements for concrete slab reinstatement using dowel bars including (a) how to drill the unsawn section to provide a sliding fit for dowel bars (b) the diameter and length of dowel bars required for the reinstatement (c) how to cut and position dowel bars 4.4 define the problems that may be caused by not placing slip membranes in accordance with specifications 4.5 state the importance of cleaning and wetting the edges of the existing slab prior to the placement of concrete.

Learning Outcome 5: Lay mesh reinforcement
Assessment criteria: 5.1 expose the existing mesh reinforcement 5.2 select new mesh reinforcement to match the existing reinforcement 5.3 cut the mesh reinforcement to the correct size, including the required overlap 5.4 tie the new mesh reinforcement securely to the existing reinforcement.

Learning Outcome 6:Understand how to lay mesh reinforcement
Assessment criteria: 6.1 state the minimum length of the existing reinforcement to expose, and when to use further trimming 6.2 define the factors that influence the selection of mesh reinforcement 6.3 state the procedures for measuring and cutting mesh reinforcement 6.4 define how to position new reinforcement and how to attach it to existing reinforcement

Learning Outcome 7: Form concrete slab
Assessment criteria: 7.1 replace missing or damaged joints to match existing joints 7.2 carry out slump testing of concrete to confirm workability 7.3 place concrete to a uniform level according to the specification 7.4 compact the concrete using suitable equipment to achieve maximum density 7.5 finish the concrete surface to the approved texture to ensure skid resistance 7.6 apply suitable curing method appropriate to prevailing conditions.

Learning Outcome 8: Understand how to form concrete slab
Assessment criteria: 8.1 identify the types of carriageway on which concrete reinstatement is carried out 8.2 state the correct procedures for replacing and constructing different types of joints 8.3 define how to check that concrete conforms to specifications and quality requirements 8.4 identify equipment required to compact concrete safely and achieve maximum density 8.5 state the strength of concrete required prior to opening to traffic 8.6 define how to confirm the workability of concrete 8.7 state the texture and skid resistance required for the finished surface 8.8 define the methods and purpose of curing concrete according to prevailing conditions.

Learning Outcome 9: Dispose of surplus materials
Assessment criteria: 9.1 identify materials that are unsuitable for re-use or surplus to requirements 9.2 Store surplus materials and those unsuitable for reuse in safe temporary storage 9.3 ensure materials for disposal are loaded safely for transportation

Learning Outcome 10: Understand how to dispose of surplus materials
Assessment criteria: 10.1 define how materials that are unsuitable for re-use or surplus to requirements are identified 10.2 state the importance of storing unsuitable and re-usable materials separately 10.3 state when surplus materials should be removed from site.

Learning Outcome 11: Follow safe working practices
Assessment criteria: 11.1 follow current relevant health and safety regulations, standards and other legislation relating to: (a) working practices within the construction environment (b) working practices specific to any practical task that they are required to carry out. 11.2 identify the current relevant health and safety regulations, standards and other legislation that must be applied in relation to: (a) working practices within the construction environment (b) working practices specific to any practical task that they are required to carry out. 11.3 leave the site in a clean and safe condition 11.4 describe how to leave the site in a clean and safe condition.

108: Evidence Requirements / Scope

Some terms, used in the assessment criteria, cover a range of situations, as follows:

1. **Equipment** includes:
   (a) hand tools – including as necessary square mouth shovel, hand pick, rake, hand rammer, reinforcing bar cutters, wire cutting tools, trowel, hand tamping beam, hard bristle broom.
   (b) powered equipment – including as necessary vibrotamper, powered concrete cutting equipment, powered concrete drill, powered saw, a proprietary vibrator.

2. **Sub-base material** includes:
   (a) granular sub-base Type 1 material
   (b) pavement quality concrete (as described in specifications and SHW 1000)
   (c) alternative reinstatement materials (ARMs).

3. Safe **working practices** may include:
   (a) safe use of tools and equipment
   (b) use of appropriate PPE (including, as necessary: high visibility jacket or waistcoat, hard hat, ear defenders, gloves, protective footwear, waterproof clothing, eye protection visor or goggles, dust mask)
   (c) use of risk assessment methods to identify and control hazards on site
   (d) precautions to minimise danger or inconvenience to road users
   (e) precautions to minimise danger or inconvenience to site personnel
   (f) precautions to minimise damage to equipment or apparatus.

4. **Specifications** and **procedures** include:
   (a) Specification for the Reinstatement of Openings in Highways
   (b) Specification for Highways Works Series 1000 (Clause 1001)
   (c) Safety and Street Works and Road Works – A Code of Practice.
   (d) Health and Safety Guidance 47, Avoiding Danger from Underground Services
   (e) Health and Safety Guidance 150, Health and Safety in Construction
   (f) manufacturers' operating procedures for powered tools and plant.

5. **Support** must be provided using
   (a) steel dowel bars of 20mm or 25mm nominal diameter.

6. The **mesh reinforcement** includes standard weights of mesh reinforcement.

7. **Joints** include:
   (a) contraction joints
   (b) expansion joints
   (c) warping joints.

8. The **concrete** includes:
   (a) Class 32/40 concrete
   (b) air entrainment additive.

9. **Materials** for disposal include:
   (a) unsuitable surplus materials
   (b) surplus materials that are suitable for re-use.

10. **Types of carriageway** includes Types 0, 1, 2, 3 and 4 concrete and bituminous overlaid concrete roads.

108: Assessment Requirements

Assessment for this unit consists of practical observations and a multiple-choice knowledge examination to cover the requirements of the learning outcomes.

Current requirements for practical observations, including Assessor and Internal Quality Assurer qualifications and facilities requirements are provided in the HAUC (UK) The Street Works Assessment Strategy.

Unit 109 Reinstatement of modular surfaces and concrete footways

Unit Aim

This unit has been designed to allow the candidate to demonstrate the skills and knowledge required to carry out the reinstatement of modular surfaces and concrete footways. The candidate will be able to remove existing modular or concrete surfacing, prepare the sub-base, lay bedding materials and modular or concrete surfacing using the correct equipment. The candidate will also be able to correctly identify and safely dispose of surplus materials and materials that cannot be re- used.

Learning Outcome 1: Remove existing modular and concrete surfacing

Assessment criteria:

1.1 select **equipment** and ensure that it is
- (a) suitable for the prescribed operation
- (b) in working condition and safe to use

1.2 take up the existing modules and concrete surfacing without causing unnecessary damage

1.3 remove any adhesive residues and brush modules clean

1.4 identify any damaged modules and set them aside for disposal or for use in an interim reinstatement

1.5 set aside broken concrete for disposal

1.6 identify modules that are suitable for re-use in permanent reinstatement

1.7 stack modules for reuse safely on site.

Learning Outcome 2: Understand how to remove existing modular and concrete surfacing

Assessment criteria:

2.1 state the factors that influence the selection of equipment for the prescribed operation

2.2 state how to check that equipment is in working condition and safe to use

2.3 define the methods or techniques used to avoid damage when taking up existing modules

2.4 define the procedures for taking up concrete surfacing

2.5 state why adhesive residues are removed, and modules brushed clean

2.6 differentiate between
- (a) damaged modules that cannot be reused
- (b) modules suitable for interim reinstatement
- (c) modules suitable for permanent reinstatement

2.7 state the storage methods for
- (a) damaged modules that cannot be reused
- (b) modules suitable for interim reinstatement
- (c) modules suitable for permanent reinstatement
- (d) broken concrete.

Learning Outcome 3: Prepare sub-base
Assessment criteria: 3.1 Remove loose and unacceptable materials from the area to be reinstated using suitable equipment 3.2 identify any defects in the sub-base 3.3 make good any defects in the sub-base using specified materials 3.4 select sub-base compaction equipment and ensure that it is (a) suitable for the operation (b) in working condition and safe to use 3.5 compact the sub-base according to the specification 3.6 use suitable equipment to re-position displaced ironwork, kerbs and edge restraints in accordance with established levels

Learning Outcome 4:Understand how to prepare the sub-base
Assessment criteria: 4.1 state why loose and unacceptable materials are removed from the area to be reinstated 4.2 state how to remove loose and unacceptable materials from the area to be reinstated 4.3 identify different sub-base defects that could be encountered 4.4 identify approved sub-base materials for replacing defective materials 4.5 define the procedures for replacing defective sub-base materials with approved materials 4.6 define the factors that influence the selection of sub-base compaction equipment for the prescribed operation 4.7 state the checks required to ensure that sub-base compaction equipment is in working condition and safe to use 4.8 define the consequences of poor reinstatement of sub-base materials 4.9 define how displaced ironwork, kerbs and edge restraints are repositioned.

Learning Outcome 5: Lay bedding materials
Assessment criteria: 5.1 select equipment and ensure that it is (a) suitable for the prescribed operation (b) in working condition and safe to use 5.2 select and lay the specified bedding material uniformly 5.3 compact the bedding material as necessary.

Learning Outcome 6: Understand how to lay bedding materials
Assessment criteria: 6.1 define the factors that influence the selection of bedding materials 6.2 define the factors that influence the selection of equipment for the prescribed operation 6.3 state the check required to ensure that equipment is in working condition and safe to use 6.4 state the importance of laying bedding material evenly and to a specified depth 6.5 state the specified tolerances for laying bedding material 6.6 define the consequences of poor compaction of bedding materials.

Learning Outcome 7: Lay modular or concrete surfacing
Assessment criteria: 7.1 select **equipment** and ensure that it is (a) suitable for the prescribed operation (b) in working condition and safe to use 7.2 select modules and concrete for the reinstatement operation 7.3 position the modules to match the existing bond or pattern 7.4 cut modules for reinstatement to the required size 7.5 bed modules using suitable bedding material 7.6 compact modules to the existing line and level 7.7 apply and finish jointing material according to the specification 7.8 lay and compact paving concrete according to the specification 7.9 place a membrane and lay quality checked concrete surfacing 7.10 texture the finished surface and cure the concrete.

Learning Outcome 8: Understand how to lay modular or concrete surfacing
Assessment criteria: 8.1 define the factors that influence the selection of equipment for the prescribed operation 8.2 define the checks required to ensure that equipment is in working condition and safe to use 8.3 identify modules and concrete that are suitable for different reinstatement operations 8.4 identify the different bond patterns used in modular construction 8.5 state the methods used for cutting modules 8.6 define the procedures for bedding and compacting modules to the existing line and level 8.7 define the procedures for applying and finishing jointing material 8.8 define the consequences of inadequate compaction 8.9 define the consequences of not replacing the membrane to specifications 8.10 state how concrete is checked to confirm it is acceptable for use 8.11 define the procedures for laying the concrete surfacing 8.12 define the procedures for applying a texture to the finished concrete surface

8.13 define the procedures for curing the concrete.

Learning Outcome 9: Dispose of surplus materials
Assessment criteria: 9.1 identify materials that are unsuitable for re-use or surplus to requirements 9.2 Store surplus materials and those unsuitable for reuse in safe temporary storage 9.3 Ensure materials for disposal are loaded safely for transportation.

Learning Outcome 10: Understand how to dispose of surplus materials
Assessment criteria: 10.1 define how materials that are unsuitable for re-use or surplus to requirements are identified 10.2 state the importance of storing unsuitable and re-usable materials separately 10.3 state when surplus materials should be removed from site.

Learning Outcome 11: Follow safe working practices for locating and avoiding underground apparatus and highways services
Assessment criteria: 11.1 follow current relevant health and safety regulations, standards and other legislation relating to: (a) **working practices** within the construction environment (b) **working practices** specific to any practical task that they are required to carry out 11.2 identify the current relevant health and safety regulations, standards and other legislation that must be applied in relation to: (a) **working practices** within the construction environment (b) **working practices** specific to any practical task that they are required to carry out 11.3 leave the site in a clean and safe condition 11.4 describe how to leave the site in a clean and safe condition.

109: Evidence Requirements / Scope

Some terms, used in the assessment criteria, cover a range of situations, as follows:

1. **Modules** must include:
   (a) natural or pre-cast concrete paving slabs
   (b) pre-cast concrete blocks or similar units.

2. **Concrete is Class 25/30 concrete for footway concrete paving reinstatement**

3. **Equipment** includes:
   (a) hand tools – including square and round mouth shovels, lifting and clearing tools (including hand pick, crowbar, bolster, club hammer, wire brush, hard bristle broom, rake), hand rammer, straight edge (or suitably cut) timber, trowel, a textured roller.
   (b) powered equipment – including concrete cutting equipment, concrete saw, vibrotamper, vibrating plate.

4. **Sub-base materials** include granular Type 1 sub-base or Class A material.

5. **Bedding material** includes:
   (a) cement mortar or lime mortar
   (b) sharp sand or fine aggregate.

6. Safe **working practices** include:
   (a) safe use of tools and equipment
   (b) use of PPE (including, as necessary: high visibility jacket or waistcoat, hard hat, ear defenders, gloves, protective footwear, waterproof clothing, eye protection visor or goggles, dust mask)
   (c) use of risk assessment methods to identify and control hazards on site
   (d) precautions to minimise danger or inconvenience to road users
   (e) precautions to minimise danger or inconvenience to site personnel
   (f) precautions to minimise damage to equipment or apparatus.

7. **Specifications** and **procedures** include:
   (a) Specification for the Reinstatement of Openings in Highways
   (b) Safety and Street Works and Road Works – A Code of Practice.
   (c) BS 7533 Series
   (d) Health and Safety Guidance 150, Health and Safety in Construction
   (e) manufacturers' operating procedures for powered tools and plant.
   (f) Interpave guidance for laying and reinstatement of concrete block paving and slabs

8. **Materials** for disposal include:
   (a) unsuitable surplus materials
   (b) surplus materials that are suitable for re-use.

109: Assessment Requirements
Assessment for this unit consists of practical observations and a multiple-choice knowledge examination to cover the requirements of the learning outcomes. Current requirements for practical observations, including Assessor and Internal Quality Assurer qualifications and facilities requirements are provided in the HAUC (UK) The Street Works Assessment Strategy.

Unit 110 Monitoring signing, lighting and guarding

Unit Aim

This unit has been designed to allow the candidate to demonstrate the skills and knowledge required to successfully monitor the signing, lighting and guarding of a work site. The candidate will be able to monitor a work site survey to ensure that suitable provision is in place for the site location requirements. The candidate will be able to monitor the protection of pedestrians, site personnel and vehicular traffic on site. The candidate be able to monitor the provision and control of portable traffic signals in line with site location requirements and traffic conditions. The candidate will also be able to monitor site safety throughout the signing, lighting and guarding operation.

Learning Outcome 1: Monitor a work site survey
Assessment criteria: 1.1 ensure that the planned provision of footways, traffic lanes and safety zones from a site survey and risk assessment meet the requirements of: (a) the site location (b) vehicular traffic and site traffic, including plant and machinery (c) pedestrians and site personnel, including people with special needs (d) road/highway authority/recognised codes of practice and specifications. 1.2 ensure that the planned provision of footways, traffic lanes and safety zones minimises disruption to traffic and provides for the safe passage of pedestrians 1.3 ensure that the planned provision for vehicles and plant within the confines of the working area provides adequate coverage for the safety of people and vehicles in the vicinity 1.4 check for issues with the planned provision arising from the site survey and confirm the appropriate action required 1.5 carry out a site-specific risk assessment in accordance with current health and safety regulations and codes of practice to determine the requirements for footways, traffic lanes, 1.6 safety zones, works area and working space.

Learning Outcome 2: Understand how to monitor a work site survey
Assessment criteria: 2.1 define the requirements of the Code of Practice in respect of surveying the work site 2.2 state the health and safety requirements relating to surveying the work site 2.3 state the planning requirements for the provision of footways, traffic lanes and safety zones to meet the needs of: (a) the site location (b) vehicular and site traffic including plant and machinery (c) pedestrians and site personnel, including people with special needs (d) road/highway authority/recognised codes of practice and specifications. 2.4 define how disruption to traffic can be minimised whilst ensuring the safe passage of pedestrians when planning provision of footways, traffic lanes and safety zones 2.5 state the planning requirements for the provision for vehicles and plant within the confines of the working area to ensure that it is adequate for: (a) traffic lanes (b) safe passage through the site (c) advance signing (d) type of traffic (e) volume of traffic (f) working near tramways and railway crossings 2.6 state the problems that can occur with planned provision arising from a work site survey, and the appropriate remedial action to resolve them 2.7 define the appropriate site conditions for the use of stop/go, priority signing, and give and take systems of working 2.8 state the conditions or limitations for using the Stop Works sign 2.9 define the appropriate circumstances for using mobile and short duration works.

Learning Outcome 3: Monitor the protection of pedestrians, vehicular traffic and site personnel
Assessment criteria: 3.1 ensure that personal protective equipment is selected to meet the job requirements 3.2 assess the provision of footways, traffic lanes and safety zones for: (a) the requirements of the site location (b) the safe passage of pedestrians and vulnerable users (c) minimising disruption to and ensuring safety of vehicular traffic (d) any identified special needs 3.3 confirm that the provision for controlling the movement of pedestrians, vehicles and plant within the confines of the working area: (a) minimises delay and inconvenience (b) makes adequate safety provisions 3.4 ensure that equipment selected meets the site location requirements and any special needs 3.5 ensure that pre-use inspection checks of equipment are completed

3.6 monitor the positioning and removal of equipment according to the specified sequence
3.7 check for problems with the protection of pedestrians, vehicular traffic and site personnel, and confirm the appropriate action required.

Learning Outcome 4: Understand how to monitor the protection of pedestrians, vehicular traffic and site personnel

Assessment criteria:

4.1 define the personal protective equipment to meet the job requirements
4.2 define the factors governing the provision of footways, traffic lanes and safety zones and when it is necessary to liaise with the highway authority
4.3 state how the equipment meets the requirements of the site location and any special needs, including:
  (a) the safe passage of pedestrians and vulnerable users
  (b) minimising disruption to and ensuring safety of vehicular traffic
  (c) site specific hazards.
4.4 define the range of pre-use checks used to establish if equipment is fit for purpose and the required actions where equipment is deemed unfit for purpose
4.5 identify the specified sequences for positioning and removing equipment
4.6 define the potential problems with the protection of pedestrians, vehicular traffic and site personnel, and the appropriate remedial action.

Learning Outcome 5: Monitor the provision of portable traffic signals and Stop/Go traffic control

Assessment criteria:

5.1 monitor the inspection and testing of signals for correct operation
5.2 ensure that signals are positioned in the correct sequence, and to meet the requirements of the site location
5.3 monitor the adjustment of signal controls to suit the prevailing traffic conditions
5.4 ensure that signals are dismantled and removed in line with current relevant specifications and procedures
5.5 ensure that Stop/Go traffic control is installed in a specified sequence
5.6 check for any problems with the provision of portable traffic signals and Stop/Go traffic control and confirm the appropriate action required.

Learning Outcome 6: Understand how to monitor the provision of portable traffic signals and Stop/Go traffic control

Assessment criteria:

6.1 define the specifications used to identify that portable traffic signals are suitable for use on the highway
6.2 state the procedures for inspecting and testing signals for correct operation
6.3 define how the site location requirements affect the positioning of signals, and the circumstances under which the highway authority must be consulted
6.4 state the correct sequence for positioning signals
6.5 state how the prevailing traffic conditions affect the adjustment of signal controls
6.6 define the requirements for dismantling and removal of portable traffic signals
6.7 define the requirements for installation and removal of stop/go traffic control

6.8	state potential problems with the provision of portable traffic signals and stop/go traffic control and the appropriate remedial action.

Learning Outcome 7: Monitor site safety
Assessment criteria:
7.1 ensure that a site-specific risk assessment has been carried out
7.2 monitor site operations in accordance with health and safety requirements
7.3 assess site conditions in accordance with health and safety requirements
7.4 ensure that safety equipment is available and fit for purpose
7.5 ensure that safe working practices are followed in line with current relevant specifications
7.6 check for risks to site safety, and confirm the appropriate action required.

Learning Outcome 8: Understand how to monitor site safety
Assessment criteria:
8.1 define the purpose of a site-specific risk assessment
8.2 state the health and safety requirements for site operations
(a) Works at or near railway property
(b) Mobile and short duration works
(c) Temporary traffic light equipment failure
8.3 state the safety equipment required during site operations and how to ensure that it is fit for purpose
8.4 describe safe working practices on site
8.5 describe the potential risks to site safety and the appropriate remedial action.

110: Evidence Requirements / Scope

Some terms, used in the assessment criteria, cover a range of situations, as follows:

1. **Site location** requirements include:
   (a) proximity to schools and hospitals
   (b) users of the route (including those with special needs)
   (c) weather conditions (including icy roads, heavy rain, snow, fog, etc.)
   (d) volume of traffic
   (e) speed of traffic
   (f) lighting on highways
   (g) highway situations (including lack of footways; pedestrianized areas; emergency service access; width of traffic lanes, footways and safety zones; inadequate lane widths; serious congestion; private access; bus stops, parking places, etc.; obstruction of driver's view at bends and summits; roundabouts and junctions; footways, ramps, boards and road plates; railway level crossings; tramways; cycle lanes and cycle tracks)
   (h) different requirements for working at day and night
   (i) mobile works, minor works and short duration works
   (j) the safety zone (length of lead-in taper of cones (T); sideways clearance (S); longways clearance (L); length of exit taper of cones).

2. Those with **special needs** include:
   (a) visually impaired people
   (b) people with disabilities
   (c) users of prams and pushchairs
   (d) users of wheelchairs and other physically impaired people
   (e) cyclists
   (f) young children
   (g) horse riders.

3. **Safe working practices** include:
   (a) safe use of tools and equipment
   (b) use of PPE (including, as necessary: high visibility jacket or waistcoat, hard hat, gloves, protective footwear, waterproof clothing)
   (c) use of risk assessment methods to identify and control hazards on site
   (d) precautions to minimise danger or inconvenience to road users
   (e) precautions to minimise danger or inconvenience to site personnel
   (f) precautions to minimise damage to equipment or apparatus.

4. **Equipment** may include as necessary:
   (a) adequate range of signing, lighting and guarding equipment (including signs, cones, signals, warning lights, footway boards, barriers, portable traffic signals)
   (b) high visibility safety equipment
   (c) suitable materials to construct ramps.

5. **Signals** include:
   (a) proprietary electrical or engine powered portable traffic lights

(b) set of Stop/Go boards.

110: Assessment Requirements

Assessment for this unit consists of practical observations and a multiple-choice knowledge examination to cover the requirements of the learning outcomes.

For safety reasons, observed assessments of candidates undertaking signing, lighting and guarding activities must take place at a centre, or a location linked to a centre, that has been approved by the centre's External Quality Assurer prior to use for assessment. The site used for assessment must be a real road with unpredictable traffic flows or one that would represent a real road where all performance criteria can be assessed.

Current requirements for practical observations, including Assessor and Internal Quality Assurer qualifications and facilities requirements are provided in the HAUC (UK) The Street Works Assessment Strategy.

Unit 111 Monitoring excavation in the highway

Unit Aim

This unit has been designed to allow the candidate to demonstrate the skills and knowledge required to monitor excavation in the highway. The candidate will be able to monitor excavation work in line with the relevant specifications and codes of practice and will demonstrate how to monitor the action taken to avoid damage to underground apparatus during excavation. The candidate will also be able to monitor the selection, storage and disposal of re-usable and unusable materials on site, and they will be able to monitor site safety throughout the excavation operation.

Learning Outcome 1: Monitor excavation work in the highway
Assessment criteria: 1.1 ensure that the type of footway or carriageway has been identified correctly prior to excavation 1.2 ensure that materials are excavated at all construction layers complying current specifications 1.3 ensure that the techniques used to excavate minimise the risk of reinstatement failure 1.4 ensure that the size of the excavation is sufficient for the work activity and future reinstatement 1.5 check for any problems with the excavation work, and confirm the appropriate action required.

Learning Outcome 2: Understand how to monitor excavation work in the highway
Assessment criteria: 2.1 identify the characteristics of recognised footway and carriageway designs 2.2 describe the equipment required for excavating in the highway and the factors influencing their selection 2.3 define the requirements that equipment must meet to be considered fit for purpose 2.4 define the appropriate methods used to identify areas of high risk relating to excavation activities 2.5 define the appropriate precautions to take when excavating in areas of high risk 2.6 state how to check that a trench has been excavated to the correct specifications 2.7 state the excavation techniques that minimise subsequent reinstatement problems 2.8 identify potential issues poor excavation work may cause and the appropriate remedial actions.

Learning Outcome 3: Monitor the action taken to avoid damage to underground apparatus during excavation
Assessment criteria: 3.1 ensure that utilities apparatus is located and marked correctly on site 3.2 ensure that exposed utilities apparatus is identified correctly 3.3 ensure that precautions are taken to minimise the risk of damage to utilities apparatus

3.4 identify damage to utilities apparatus and confirm the action required
3.5 ensure that exposed utilities apparatus is safely supported and protected to prevent damage.

Learning Outcome 4: Understand how to monitor the action taken to avoid damage to underground apparatus during excavation

Assessment criteria:

4.1 define how to locate and mark the different types of utilities apparatus found in the highway
4.2 specify the characteristics used to identify the different types of exposed utilities apparatus
4.3 state the potential consequences of damaging underground utilities apparatus
4.4 state the appropriate remedial action to take when underground utilities apparatus has been damaged
4.5 state the precautions required to avoid damage to utilities apparatus
4.6 specify how to safely support and protect exposed utilities apparatus
4.7 define the circumstances in which trench support systems would be required, and where to find the guidelines for its installation and safe use.

Learning Outcome 5: Monitor the selection, disposal and storage of excavated materials

Assessment criteria:

5.1 ensure that excavated materials selected for re-use are tested following the guidance within the appropriate specification
5.2 ensure that materials selected for disposal are confirmed as unsuitable for re-use
5.3 ensure that re-usable materials are stored in line with the appropriate specifications and ensure that materials that cannot be re-used are stored and disposed of in line with current relevant specifications and procedures
5.4 check for any problems with the selection, storage and disposal of materials and confirm the appropriate actions required.

Learning Outcome 6: Understand how to monitor the selection, disposal and storage of excavated materials

Assessment criteria:

6.1 identify the range of backfill, sub-base materials that may be re-used
6.2 define the factors influencing the selection of materials for re-use or for disposal and the consequences of using unsuitable materials
6.3 state the suitable and safe storage procedures for re-usable materials
6.4 specify how the characteristics of excavated materials affect storage arrangements
6.5 define the storage and disposal procedures for materials that cannot be re-used
6.6 state the potential problems with selection, storage and disposal of materials and the appropriate remedial action.

Learning Outcome 7: Monitor site safety

Assessment criteria:

7.1 ensure that a risk assessment has been carried out and that adequate control measures are in place

7.2 monitor site operations in accordance with health and safety legislation and guidance

7.3 assess site conditions in accordance with health and safety legislation and guidance

7.4 ensure that safety equipment and personal protection equipment is available, in use and fit for purpose

7.5 ensure that safe working practices are followed in line with the appropriate specifications

7.6 review the sites safety hazards, and confirm the appropriate actions required.

Learning Outcome 8: Understand how to monitor site safety

Assessment criteria:

8.1 define the purpose of a site-specific risk assessment

8.2 state the health and safety requirements for site operations

8.3 define the health and safety requirements for different site conditions

8.4 define the safety equipment required during site operations and how to ensure that it is fit for purpose

8.5 state the safe working practices on site

8.6 define the potential risks to site safety and the appropriate remedial action

8.7 state how to leave the site in a clean and safe condition.

111: Evidence Requirements / Scope

Some terms, used in the assessment criteria, cover a range of situations, as follows:

1. Specifications and procedures include:
   (a) Specification for the Reinstatement of Openings in Highways
   (b) Health and Safety Guidance 47, Avoiding Danger from Underground Services
   (c) Health and Safety Guidance 150, Health and Safety in Construction
   (d) Safety and Street Works and Road Works – A Code of Practice.
   (e) National Joint Utilities Group – Colour coding and positioning of underground apparatus Volume 1
   (f) manufacturers' operating procedures for powered tools and plant.

2. Factors influencing the size and depth of excavation and support equipment include:
   (a) trench width, length and depth
   (b) ease of access
   (c) types of ground

3. Suitable equipment includes as necessary:
   (a) hand tools
   (b) powered equipment – pavement saw, breaking-out tools
   (c) equipment to support exposed utilities – slings, ropes, props.
   (d) equipment to minimise dust nuisance

4. Safe working practices include:
   (a) safe use of tools and equipment
   (b) use of PPE (including, as necessary: high visibility jacket or waistcoat, hard hat, ear defenders, gloves, protective footwear, waterproof clothing, eye protection visor or goggles, dust mask)
   (c) use of risk assessment methods to identify and control hazards on site
   (d) precautions to minimise danger or inconvenience to road users
   (e) precautions to minimise danger or inconvenience to site personnel
   (f) precautions to minimise damage to equipment or apparatus.

5. Utilities apparatus includes:
   (a) plastic and metallic gas mains
   (b) plastic and metallic water mains
   (c) sewers and drains
   (d) high- and low-voltage electricity cables
   (e) telecommunications, television cables and fibre optic
   (f) highway drainage

6. Excavated materials include:
   (a) Class A Graded granular
   (b) Class B Granular
   (c) Class C Cohesive granular
   (d) Class D Cohesive
   (e) Class E Unacceptable.

7. **Safety equipment** may include as necessary:
   (a) adequate range of signing, lighting and guarding equipment (including signs, cones, signals, lamps, footway boards, barriers, portable traffic signals)
   (b) high visibility safety equipment
   (c) suitable materials to construct ramps.

8. **High risk areas** include:
   (a) Utilities apparatus
   (b) in close proximity to trees
   (c) bad ground conditions
   (d) special engineering difficulty.

111: Assessment Requirements

Assessment for this unit consists of practical observations and a multiple-choice knowledge examination to cover the requirements of the learning outcomes.

Current requirements for practical observations, including Assessor and Internal Quality Assurer qualifications and facilities requirements are provided in the HAUC (UK) The Street Works Assessment Strategy.

Unit 112 Monitoring reinstatement and compaction of backfill materials

Unit Aim

This unit has been designed to allow the candidate to demonstrate the skills and knowledge required to monitor the reinstatement and compaction of backfill materials. The candidate will be able to monitor the selection and storage of backfill materials, monitor the selection of compaction plant for backfilling operations, monitor the construction of the backfill layer, and monitor the action taken to avoid damage to underground apparatus during backfilling. The candidate will also be able to monitor site safety throughout backfill operations.

Learning Outcome 1: Monitor the selection and storage of backfill materials in footway and carriageway reinstatement
Assessment criteria: 1.1 ensure that materials selected for re-use and imported materials are checked against the range of backfill materials permitted in the current specification 1.2 ensure that the correct materials are selected for use as surround to utilities' apparatus and in 1.3 sensitive areas 1.4 ensure that the correct quantities of materials are calculated for use 1.5 ensure that safe arrangements are made for the storage of re-usable and imported materials in accordance with current specifications and procedures 1.6 ensure that safe temporary storage arrangements are made for materials not suitable for re- use in accordance with current specifications and procedures 1.7 ensure that the quantities of materials selected for re-use meet the reinstatement requirements 1.8 check for problems with the selection and storage of backfill materials and confirm the appropriate action required.

Learning Outcome 2: Understand how to monitor the selection and storage of backfill materials in footway and carriageway reinstatement
Assessment criteria: 2.1 identify the range of backfill materials permitted in the current specification 2.2 define the factors that influence the selection of materials for use as backfill or for disposal 2.3 state the consequences of using unsuitable materials for backfill 2.4 identify the materials that are suitable for use in high risk areas 2.5 define the safe storage arrangements for: (a) re-usable materials (b) imported materials (c) materials unsuitable for re-use 2.6 state how the characteristics of materials affect storage arrangements 2.7 state the potential problems with selection and storage of backfill materials, and the appropriate remedial action.

Learning Outcome 3: Monitor the selection of plant for compaction of backfill material
Assessment criteria: 3.1 ensure that the compaction plant and equipment are: (a) suitable for the location and materials (b) suitable for the dimensions and access provisions of the site (c) in good working condition and safe to use 3.2 check for any problems with the selection of compaction plant and confirm the appropriate action required.

Learning Outcome 4: Understand how to monitor the selection of plant for compaction of backfill material
Assessment criteria: 4.1 define the factors that influence the selection of compaction plant and equipment 4.2 state how to check that the compaction plant is fit for purpose 4.3 state the potential problems with the selection of compaction plant, and the appropriate remedial action.

Learning Outcome 5: Monitor the construction of the backfill layer
Assessment criteria: 5.1 ensure that the backfill layer is constructed in accordance with the (a) specification (b) existing pavement structure (c) road type 5.2 ensure that the backfill layer is checked using suitable equipment and materials for the job 5.3 check that the backfill layer is constructed correctly to (a) the structural level (b) the layer thickness (c) the number of compaction passes and the degree of compaction (d) high risk areas 5.4 check for any problems with the construction of the backfill layer and confirm the appropriate action required.

Learning Outcome 6: Understand how to monitor the construction of the backfill layer
Assessment criteria: 6.1 describe how to interpret the specification for constructing the backfill layer in footway and carriageway reinstatement 6.2 describe how to check the construction of the backfill layer to ensure: (a) the correct use of **equipment** and **materials** (b) the achieved compaction level (c) the correct layer thickness and degree of compaction (d) correct construction in **high risk areas**

6.3 state the methods used to confirm that construction of the backfill layer meets specifications
6.4 state the potential problems with the construction of the backfill layer, and the appropriate remedial action.

Learning Outcome 7: Monitor the action taken to avoid damage to underground apparatus during backfill operations

Assessment criteria:

7.1 ensure that exposed utilities apparatus is identified correctly
7.2 ensure the exposed utilities apparatus is safely supported and protected
7.3 ensure that precautions are taken to minimise the risk of damage to utilities apparatus
7.4 identify damage to underground utilities apparatus and confirm the action required.

Learning Outcome 8: Understand how to monitor the action taken to avoid damage to underground apparatus during backfill operations

Assessment criteria:

8.1 state how to identify the different types of utilities apparatus on site
8.2 identify the different methods of safely supporting and protecting exposed utilities apparatus
8.3 define the potential risks and consequences of damage to utilities apparatus
8.4 state the precautions required to avoid damage to utilities apparatus
8.5 state the potential problems arising from damage to utilities' apparatus, and the appropriate remedial action.

Learning Outcome 9: Monitor site safety

Assessment criteria:

9.1 ensure that a risk assessment has been carried out
9.2 monitor site operations in accordance with health and safety requirements
9.3 assess site conditions in accordance with health and safety requirements
9.4 ensure that safety equipment is available and fit for purpose
9.5 ensure that safe working practices are followed in line with current relevant specifications
9.6 check for risks to site safety, and confirm the appropriate action required
9.7 ensure that the site is left in a clean and safe condition

Learning Outcome 10: Understand how to monitor site safety

Assessment criteria:

10.1 define the purpose of a site-specific risk assessment
10.2 state the health and safety requirements for site operations
10.3 define the health and safety requirements for different site conditions
10.4 define the safety equipment required during site operations and how to ensure that it is fit for purpose
10.5 state the safe working practices on site
10.6 define the potential risks to site safety and the appropriate remedial action

10.7	state how to leave the site in a clean and safe condition.

112: Evidence Requirements / Scope

Some terms, used in the assessment criteria, cover a range of situations, as follows:

1. **Materials** include:
   (a) Class A Graded Granular
   (b) Class B Granular
   (c) Class C Cohesive Granular
   (d) Class D Cohesive
   (e) Class E Unacceptable.

2. **Specifications and procedures** include:
   (a) Specification for the Reinstatement of Openings in Highways/Roads
   (b) Health and Safety Guidance 47, Avoiding Danger from Underground Services
   (c) Health and Safety Guidance 150, Health and Safety in Construction
   (d) manufacturers' operating procedures for powered tools and plant
   (e) Safety and Street Works and Road Works – A Code of Practice.

3. **Safe working practices** may include:
   (a) safe use of tools and equipment
   (b) use of appropriate PPE (including, as necessary: high visibility jacket or waistcoat, hard hat, ear defenders, gloves, protective footwear, waterproof clothing, eye protection visor or goggles, dust mask)
   (c) use of risk assessment methods to identify and control hazards on site
   (d) precautions to minimise danger or inconvenience to road users
   (e) precautions to minimise danger or inconvenience to site personnel
   (f) precautions to minimise damage to equipment or apparatus.

4. **Compaction plant**/powered **equipment** includes:
   (a) vibrotamper
   (b) vibrating plate
   (c) vibrating roller
   (d) percussive rammer
   (e) hand rammer.

5. Measuring **equipment** may include as necessary:
   (a) measuring devices, rule and tape
   (b) impact soil testing equipment.

6. **Utilities apparatus** includes:
   (a) plastic and metallic gas mains
   (b) plastic and metallic water mains
   (c) sewers and drains
   (d) high- and low-voltage electricity cables

(e) telecommunications and television cables.

7. Utilities apparatus is **safely supported and protected** using:
   (a) slings
   (b) ropes
   (c) props.

8. **Safety equipment** may include as necessary:
   (a) adequate range of signing, lighting and guarding equipment (including signs, cones, signals, lamps, footway boards, barriers, portable traffic signals)
   (b) high visibility safety equipment
   (c) suitable materials to construct ramps.

9. **High risk areas** include:
   (a) as a surround to utilities' apparatus
   (b) in close proximity to trees
   (c) bad ground conditions
   (d) special engineering difficulty.

112: Assessment Requirements

Assessment for this unit consists of practical observations and a multiple-choice knowledge examination to cover the requirements of the learning outcomes.

Current requirements for practical observations, including Assessor and Internal Quality Assurer qualifications and facilities requirements are provided in the HAUC (UK) The Street Works Assessment Strategy.

Unit 113 Monitoring reinstatement of sub-base and base in non-bituminous materials

Unit Aim

This unit has been designed to allow the candidate to demonstrate the skills and knowledge required to monitor the reinstatement of sub-base and base in non-bituminous materials. The candidate will be able to monitor the selection of non-bituminous materials, monitor the selection of compaction plant for the reinstatement of sub-base and base and monitor the construction of the sub-base and base. The candidate will also be able to monitor site safety throughout sub-base and base reinstatement.

Learning Outcome 1: Monitor the selection of non-bituminous materials for sub-base and base reinstatement
Assessment criteria: 1.1 ensure that excavated materials for reuse or disposal are identified and checked against the current specification 1.2 ensure that imported materials selected for use are identified and checked against the current specification 1.3 ensure that the quantities of materials selected for use meet reinstatement requirements 1.4 ensure that re-usable and imported materials are stored in accordance with current specifications and procedures 1.5 ensure that safe temporary storage arrangements are made for materials not suitable for re- use in accordance with current specifications and procedures 1.6 check for any problems that arise with the selection and storage of sub-base and base (roadbase) materials and confirm the appropriate action required.

Learning Outcome 2: Understand how to monitor the selection of non-bituminous materials for sub-base and base reinstatement
Assessment criteria: 2.1 identify the range of sub-base and base materials permitted in the current specification 2.2 describe the factors influencing the selection of materials for use in sub-base and base and the consequences of using unsuitable materials 2.3 calculate quantities of different materials that are used in sub-base and base reinstatement 2.4 define the safe storage arrangements for: (a) re-usable (b) imported materials (c) materials unsuitable for re-use 2.5 state the potential problems with selection and storage of sub-base and base materials, and the appropriate remedial action.

Learning Outcome 3: Monitor the selection of plant for compaction of sub-base and roadbase material
Assessment criteria: 3.1 ensure that the compaction plant is (a) suitable to the location and materials (b) suitable to dimensions and access provisions of the site (c) in working condition and safe to use 3.2 check for any problems with the selection of plant for the compaction of sub-base and base material and confirm the appropriate action.

Learning Outcome 4: Understand how to monitor the selection of plant for compaction of sub-base and roadbase material
Assessment criteria: 4.1 define the factors that influence the selection of compaction plant 4.2 state how to check that the compaction plant is in working condition and safe to use 4.3 state the potential problems with the selection of compaction plant for sub-base and base reinstatement, and the appropriate remedial action.

Learning Outcome 5: Monitor the construction of sub-base and roadbase materials
Assessment criteria: 5.1 ensure that the backfill or surround has been adequately prepared to receive subsequent layers 5.2 ensure that the non-bituminous layer is constructed in accordance with (a) the specification (b) the existing pavement structure and road type 5.3 Using the correct measuring equipment check that the layers are constructed (a) using suitable powered equipment and materials (b) to the correct degree of compaction level and layer thickness (c) to the correct layer thickness and degree of compaction (d) correctly in high risk areas 5.4 check for any problems with the construction of the sub-base and base, and confirm the appropriate action.

Learning Outcome 6: Understand how to monitor the construction of sub-base and roadbase materials
Assessment criteria: 6.1 state how to identify when the backfill or surround is adequately prepared to receive subsequent layers 6.2 state how to interpret the specification for constructing the non-bituminous layer in different pavement structures and road types. 6.3 define how to check the construction of layers to ensure the (a) correct use of equipment and materials (b) achieved compaction level (c) correct layer thickness and degree of compaction (d) correct construction in high risk areas 6.4 define the measuring equipment for checking the construction of the sub-base and base 6.5 state the potential problems with the construction of the sub-base and base, and the appropriate remedial action.

Learning Outcome 7: Monitor site safety
Assessment criteria: 7.1 ensure that a risk assessment has been carried out 7.2 monitor site operations in accordance with health and safety requirements 7.3 assess site conditions in accordance with health and safety requirements 7.4 ensure that safety equipment is available and fit for purpose 7.5 ensure that safe working practices are followed in line with health and safety requirements and current relevant specifications 7.6 check for risks to site safety, and confirm the appropriate action required 7.7 ensure that the site is left in a clean and safe condition.

Learning Outcome 8: Understand how to monitor site safety
Assessment criteria: 8.1 define the purpose of a site-specific risk assessment 8.2 state the health and safety requirements for site operations 8.3 define the health and safety requirements for particular site conditions 8.4 define the safety equipment required during site operations and how to ensure that it is fit for purpose 8.5 state the safe working practices on site 8.6 define the potential risks to site safety and the appropriate remedial action 8.7 state how to leave the site in a clean and safe condition.

113: Evidence Requirements / Scope

Some terms, used in the assessment criteria, cover a range of situations, as follows:

1. **Materials** include:
   (a) Granular Type 1 sub-base material
   (b) excavated granular sub-base material Class A
   (c) category 3 cement-bound material (CBM3)
   (d) foamed concrete

2. **Specifications and procedures** include:
   (a) Specification for the Reinstatement of Openings in Highways
   (b) Health and Safety Guidance 150, Health and Safety in construction
   (c) Safety at Street Works and Road Works – A Code of Practice.

3. **Safe working practices** include:
   (a) safe use of tools and equipment
   (b) use of PPE (including, as necessary: high visibility jacket or waistcoat, hard hat, ear defenders, gloves, protective footwear, waterproof clothing, eye protection visor or goggles, dust mask)
   (c) use of risk assessment methods to identify and control hazards on site
   (d) precautions to minimise danger or inconvenience to road users
   (e) precautions to minimise danger or inconvenience to site personnel
   (f) precautions to minimise damage to equipment or apparatus.

4. **Compaction plant/powered equipment** includes:
   (a) vibrotamper
   (b) vibrating plate
   (c) vibrating roller
   (d) percussive rammer
   (e) hand rammer.

5. **Measuring equipment** may include as necessary:
   (a) m measuring devices, rule and tape
   (b) impact soil testing equipment.

6. **Utilities apparatus includes:**

   (a) plastic and metallic gas mains
   (b) plastic and metallic water mains
   (c) sewers and drains
   (d) high- and low-voltage electricity cables
   (e) telecommunications and television cables.

7. Appropriate equipment for supporting and protecting utilities' apparatus includes:
   (a) slings
   (b) ropes

(c) props.

8. Safety equipment may include as necessary:
   (a) adequate range of signing, lighting and guarding equipment (including signs, cones, signals, lamps, footway boards, barriers, portable traffic signals)
   (b) high visibility safety equipment
   (c) suitable materials to construct ramps.

9. **High risk areas** include:
   (a) as a surround to utilities' apparatus
   (b) in close proximity to trees
   (c) bad ground conditions
   (d) special engineering difficulty.

10. **Pavement structures and road types** (AC 6.2)
   (a) Type 0, 1, 2, 3, and 4 Flexible road construction

113: Assessment Requirements

Assessment for this unit consists of practical observations and a multiple-choice knowledge examination to cover the requirements of the learning outcomes.

Current requirements for practical observations, including Assessor and Internal Quality Assurer qualifications and facilities requirements are provided in the HAUC (UK) The Street Works Assessment Strategy.

Unit 114 Monitoring reinstatement in bituminous materials

Unit Aim

This unit has been designed to allow the candidate to demonstrate the skills and knowledge required to monitor the reinstatement of surface layers in bituminous materials. The candidate will be able to monitor the selection of bituminous materials (hot and cold-lay), monitor the selection of compaction plant for the reinstatement of bituminous materials and monitor the construction of the flexible base (roadbase) and surface layers. The candidate will also be able to monitor site safety throughout sub-base and base reinstatement.

Learning Outcome 1: Monitor the selection of bituminous materials for flexible footway and carriageway reinstatement
Assessment criteria: 1.1 ensure that the bituminous materials are identified and checked against the current specification 1.2 ensure that the quantities of materials selected for use meet reinstatement requirements 1.3 ensure that bituminous materials are stored in line with current specifications and procedures 1.4 check for any problems with the selection and storage of bituminous materials and confirm 1.5 the appropriate action.

Learning Outcome 2: Understand how to monitor the selection of bituminous materials for flexible footway and carriageway reinstatement
Assessment criteria: 2.1 define the range of bituminous materials permitted in the current specification 2.2 define the factors influencing the selection of bituminous materials and the consequences of using unsuitable materials 2.3 calculate quantities of different bituminous materials used in flexible footway and carriageway reinstatement 2.4 state the suitable and safe storage procedures for bituminous materials 2.5 state the potential problems with selection and storage of bituminous materials, and the appropriate remedial action.

Learning Outcome 3: Monitor the selection of plant for compaction of bituminous materials
Assessment criteria: 3.1 ensure that the compaction plant is: (a) suitable to the location and materials (b) suitable to dimensions and access provisions of the site (c) in working condition and safe to use 3.2 check for any problems with the selection of plant for the compaction of bituminous material and confirm the appropriate action

Learning Outcome 4: Understand how to monitor the selection of plant for the compaction of bituminous materials

Assessment criteria:

4.1 define the factors that influence the selection of compaction plant

4.2 state how to check that the compaction plant is in working condition and safe to use

4.3 state the potential problems with the selection of compaction plant for reinstatement in bituminous materials, and the appropriate remedial action.

Learning Outcome 5: Monitor the construction of flexible base (roadbase) and surface layers in hot and cold-lay bituminous materials

Assessment criteria:

5.1 ensure that the base and flexible surface layers are constructed in accordance with
- (a) the specification
- (b) the existing pavement structure and road type

5.2 check using the correct measuring equipment that the layers are constructed
- (a) using suitable powered equipment and materials
- (b) to the correct compaction level
- (c) to the correct layer thickness and degree of compaction

5.3 check that the texture depth and finished level of the surface reinstatement are correct

5.4 ensure that the profile of the finished surface is within permitted tolerances

5.5 check for any problems with the construction of the base and flexible surface layers and confirm the appropriate action.

Learning Outcome 6: Understand how to monitor the construction of flexible, base (roadbase) and surface layers in hot and cold-lay bituminous materials

Assessment criteria:

6.1 state how to interpret the specification for constructing the bituminous flexible, base and surface layers in different pavement structures and road types

6.2 define the intervention limits permitted in specifications

6.3 state how to check construction of the layers to ensure the
- (a) correct use of equipment and materials
- (b) achieved compaction level
- (c) correct layer thickness, degree of compaction and permitted tolerances

6.4 state how to check that the texture depth and finished level of the surface reinstatement are correct

6.5 state how to check that the profile of the finished surface is within permitted tolerances

6.6 state the potential problems with the construction of the base and surface layers and the appropriate remedial action.

Learning Outcome 7: Monitor site safety
Assessment criteria: 7.1 ensure that a risk assessment has been carried out 7.2 monitor site operations in accordance with health and safety requirements. 7.3 assess site conditions in accordance with health and safety requirements. 7.4 ensure that safety equipment is available and fit for purpose 7.5 ensure that safe working practices are followed in line with health and safety requirements and current relevant specifications 7.6 check for risks to site safety, and confirm the appropriate action required 7.7 ensure that the site is left in a clean and safe condition.

Learning Outcome 8: Understand how to monitor site safety
Assessment criteria: 8.1 define the purpose of a site-specific risk assessment 8.2 state the health and safety requirements for site operations 8.3 define the health and safety requirements for particular site conditions 8.4 define the safety equipment required during site operations and how to ensure that it is fit for purpose 8.5 state the safe working practices on site 8.6 define the potential risks to site safety and the appropriate remedial action 8.7 state how to leave the site in a clean and safe condition.

114: Evidence Requirements / Scope

Some terms, used in the assessment criteria, cover a range of situations, as follows:

1. Materials include:
   Materials identified for constructing base and for constructing an asphalt concrete surface course to BS EN 13108 and PD 6691 in accordance with specifications to include:
   (a) deferred set mixtures for reinstatement
   (b) permanent cold-lay binder course materials
   (c) edge sealants
   (d) dense binder course materials (20mm nominal stone size), hot rolled asphalt 50/20 binder course
   (e) close graded surface course materials (10mm stone size), hot rolled asphalt 30/14 surface course
   (f) hot rolled asphalt binder and surface course
   (g) close graded surface course materials (10mm stone size)
   (h) asphalt concrete dense surface course
   (i) stone mastic asphalt surface and binder course
   (j) pre-coated 14mm or 20mm chippings
   (k) tack coat.
   (Note: In small excavations and narrow trenches, the preferred binder course mixture may be replaced by any surface course mixture given in the Specification, for the respective road Type, provided the same mixture is used as the surface course.)

2. Factors:
   (a) constituent mix for asphalt concrete
   (b) temperature limits for hot bituminous materials
   (c) polished stone values
   (d) aggregate abrasion values
   (e) penetration grade of binders
   (f) constituent mix for hot dense bituminous materials

3. Specifications and procedures include:
   (a) Specification for the Reinstatement of Openings in Highways
   (b) Health and Safety Guidance 150, Health and Safety in Construction,
   (c) manufacturers' operating procedures for powered tools and plant
   (d) Safety and Street Works and Road Works – A Code of Practice.

4. Safe working practices include:
   (a) safe use of tools and equipment
   (b) use of appropriate PPE (including, as necessary: high visibility jacket or waistcoat, hard hat, ear defenders, gloves, protective footwear, waterproof clothing, eye protection visor or goggles, dust mask)
   (c) use of risk assessment methods to identify and control hazards on site
   (d) precautions to minimise danger or inconvenience to road users
   (e) precautions to minimise danger or inconvenience to site personnel

(f) precautions to minimise damage to equipment or apparatus
(g) safe working practice for working with molten bitumen
(h) personal hygiene measures in connection with skin contamination.

5. **Compaction plant/powered equipment** includes:
(a) vibrotamper
(b) vibrating plate
(c) vibrating roller
(d) percussive rammer.

6. **Equipment** may include as necessary:
(a) measuring devices, rule and tape
(b) forks
(c) rakes
(d) shovels
(e) tool heater
(f) hand tamper.

7. **Safety equipment** may include as necessary:
(a) adequate range of signing, lighting and guarding equipment (including signs, cones, signals, lamps, footway boards, barriers, portable traffic signals)
(b) high visibility safety equipment
(c) suitable materials to construct ramps.

114: Assessment Requirements

Assessment for this unit consists of practical observations and a multiple-choice knowledge examination to cover the requirements of the learning outcomes.

Current requirements for practical observations, including Assessor and Internal Quality Assurer qualifications and facilities requirements are provided in the HAUC (UK) The Street Works Assessment Strategy.

Unit 115 Monitoring reinstatement of concrete slabs

Unit Aim

This unit has been designed to allow the candidate to demonstrate the skills and knowledge required to monitor the reinstatement of concrete slabs. The candidate will be able to monitor preparation and construction of concrete slab and will be able to monitor site safety throughout concrete slab reinstatement.

Learning Outcome 1: Monitor the preparation for concrete slab reinstatement
Assessment criteria: 1.1 ensure that the materials selected for use are identified and checked against the current specification 1.2 ensure that the equipment selected for use is: (a) suitable to the site conditions and materials (b) suitable to the prescribed operation (c) in working condition and safe to use 1.3 ensure that sub-base defects are identified and made good using specified materials 1.4 ensure that slab edges are prepared according to the specification to form a support using steel dowel bars 1.5 ensure that the slip membrane is positioned according to the specification 1.6 ensure that slab edge support is provided 1.7 ensure that mesh reinforcement is fixed according to specification 1.8 check for any problems with the preparation for concrete slab reinstatement and confirm the appropriate action.

Learning Outcome 2: Understand how to monitor the preparation for concrete slab reinstatement
Assessment criteria: 2.1 identify the type of carriageway on which the reinstatement of concrete slabs is carried out 2.2 define the factors that influence the selection of materials and equipment for reinstating concrete slabs 2.3 identify different potential sub-base defects 2.4 state how to rectify different sub-base defects 2.5 define the procedures for positioning the slip membrane and preparing slab edges 2.6 define the procedures for providing taper edge and dowel bar support 2.7 define the procedures for laying and fixing mesh reinforcement 2.8 state the potential problems with the preparation for concrete slab reinstatement and the appropriate remedial action.

Learning Outcome 3: Monitor the reinstatement of concrete slabs
Assessment criteria: 3.1 monitor the construction of the concrete slab, checking: (a) replacement of missing or damaged joints (b) use of concrete (c) degree of compaction (d) air entrainment 3.2 ensure that the finish is laid to the permitted tolerances and textured to match the existing surface 3.3 check the use of a curing membrane 3.4 check for any problems with the reinstatement of concrete slabs and confirm the appropriate action.

Learning Outcome 4: Understand how to monitor the reinstatement of concrete slabs
Assessment criteria: 4.1 define the methods used to construct concrete slabs 4.2 state the different joints used in constructing concrete slabs 4.3 define the construction methods for different joints 4.4 define factors that affect the quality of the finished concrete surface 4.5 define the checks and tests to confirm the quality of the concrete slab and finished surface 4.6 state the potential problems with the reinstatement of concrete slabs, and the appropriate remedial action.

Learning Outcome 5: Monitor site safety
Assessment criteria: 5.1 ensure that a risk assessment has been carried out 5.2 monitor site operations in accordance with health and safety requirements 5.3 assess site conditions in accordance with health and safety requirements 5.4 ensure that safety equipment is available and fit for purpose 5.5 ensure that safe working practices are followed in line with health and safety requirements and current relevant specifications 5.6 check for risks to site safety, and confirm the appropriate action required 5.7 ensure that the site is left in a clean and safe condition.

Learning Outcome 6: Understand how to monitor site safety
Assessment criteria: 6.1 define the purpose of a site-specific risk assessment 6.2 state the health and safety requirements for site operations 6.3 define the health and safety requirements for particular site conditions 6.4 define the safety equipment required during site operations and how to ensure that it is fit for purpose 6.5 state the safe working practices on site 6.6 define the potential risks to site safety and the appropriate remedial action

6.7	state how to leave the site in a clean and safe condition.

115: Evidence Requirements / Scope

Some terms, used in the assessment criteria, cover a range of situations, as follows:

1. **Equipment** includes:
   (a) hand tools – including as necessary square mouth shovel, hand pick, rake, hand rammer, reinforcing bar cutters, wire cutting tools, trowel, hand tamping beam, hard bristle broom
   (b) powered equipment – including vibrotamper, powered concrete cutting equipment, powered concrete drill, powered saw, a proprietary vibrator.

2. **Sub-base material** includes:
   (a) granular sub-base type 1 material
   (b) pavement quality concrete (as described in specifications and SHW 1000)
   (c) alternative reinstatement materials (ARMs).

3. **Specifications** and **procedures** include:
   (a) Specification for the Reinstatement of Openings in Highways
   (b) Specification for Highways Works Series 1000
   (c) Health and Safety Guidance 150, Health and Safety in Construction
   (d) manufacturers' operating procedures for powered tools and plant.
   (e) Safety and Street Works and Road Works – A Code of Practice.

4. **Safe working practices** include:
   (a) safe use of tools and equipment
   (b) use of PPE (including, as necessary: high visibility jacket or waistcoat, hard hat, ear defenders, gloves, protective footwear, waterproof clothing, eye protection visor or goggles, dust mask)
   (c) use of risk assessment methods to identify and control hazards on site
   (d) precautions to minimise danger or inconvenience to road users
   (e) precautions to minimise danger or inconvenience to site personnel
   (f) precautions to minimise damage to equipment or apparatus.

5. The **dowel bars** are steel dowel bars of 20mm or 25mm nominal diameter.

6. The **mesh reinforcement** includes standard weights of mesh reinforcement.

7. **Joints** include:
   (a) dowel bars and their assembly
   (b) tie bars
   (c) supporting cradles
   (d) contraction joints
   (e) expansion joints
   (f) warping joints

(g) construction joints
(h) prefabricated joint assemblies

8. The **concrete** includes:
   (a) Class 40 concrete
   (b) air entrainment additive.

9. **Safety equipment** may include as necessary:
   (a) adequate range of signing, lighting and guarding equipment (including signs, cones, signals, lamps, footway boards, barriers, portable traffic signals)
   (b) high visibility safety equipment
   (c) suitable materials to construct ramps.

10. Types of roads (including Type 0-4 concrete and bituminous overlaid concrete roads and commercial vehicle crossings) AC 2.1

11. Factors influencing selection of materials and equipment (including the specification options for concrete slabs, quality control of ready mix and site-mixed concrete, the position and spacing of dowel bars and reinforcement, methods of curing concrete and the treatment of commercial vehicle access) AC 2.2

12. Factors that affect the finished quality of concrete (including visual defects – transverse, longitudinal and random cracking) AC 2.9

13. Checks to confirm quality of concrete (including profile checks – finished level in respect of surrounding surface and surface texture, concrete cube crushing test, slump test) AC 2.10

115: Assessment Requirements

Assessment for this unit consists of practical observations and a multiple-choice knowledge examination to cover the requirements of the learning outcomes.

Current requirements for practical observations, including Assessor and Internal Quality Assurer qualifications and facilities requirements are provided in the HAUC (UK) The Street Works Assessment Strategy.

Unit 116 Monitoring reinstatement of modular surfaces and concrete footways

Unit Aim

This unit has been designed to allow the candidate to demonstrate the skills and knowledge required to monitor the reinstatement of modular surfaces and concrete footways. The candidate will be able to monitor the reinstatement of concrete blocks (or similar modules) in carriageways or footways, the reinstatement of paving slabs in footways and the reinstatement of concrete footways. The candidate will also be able to monitor site safety throughout modular surface and concrete footway reinstatement.

Learning Outcome 1: Monitor the reinstatement of concrete blocks in carriageways or footways

Assessment criteria:

1.1 ensure that the materials selected for use are identified and checked against the current specification

1.2 ensure that the equipment is:

- (a) suitable to the site conditions and materials
- (b) suitable to the prescribed operation
- (c) in working condition and safe to use

1.3 ensure that sub-base defects are identified and made good using specified materials

1.4 monitor the reinstatement operation including:

- (a) the laying of bedding material
- (b) the thickness of the surcharge and compactive effort
- (c) the treatment of joints
- (d) matching and bonding of modules with existing modules

1.5 assess the finished modular surface to ensure the quality of the reinstatement operation

1.6 check for any problems with the reinstatement of concrete blocks and confirm the appropriate action.

Learning Outcome 2: Understand how to monitor the reinstatement of concrete blocks in carriageways or footways
Assessment criteria: 2.1 Identify the types of road on which the reinstatement of concrete blocks is carried out 2.2 define the factors that influence the selection of materials and equipment for reinstating concrete blocks 2.3 state how to identify different potential sub-base defects 2.4 state how to rectify different sub-base defects 2.5 define the procedures and quality checks and tests relating to: (a) laying of bedding materials (b) laying concrete blocks (c) jointing 2.6 define the factors that affect the quality of the finished modular surface 2.7 define the checks required to ensure the quality of the finished modular surface 2.8 state the potential problems with reinstatement of concrete blocks and the appropriate remedial action.

Learning Outcome 3: Monitor the reinstatement of paving slabs in footways
Assessment criteria: 3.1 ensure that the equipment is: (a) suitable to the site conditions and materials (b) suitable to the prescribed operation (c) in working condition and safe to use 3.2 ensure that sub-base defects are identified and made good using specified materials 3.3 monitor the reinstatement operation including: (a) the laying of bedding material (b) the thickness of the surcharge and compactive effort (c) the treatment of joints (d) matching and bonding of modules with existing modules 3.4 assess the finished modular surface to ensure the quality of the reinstatement operation 3.5 check for any problems with the reinstatement of paving slabs and confirm the appropriate action.

Learning Outcome 4: Understand how to monitor the reinstatement of paving slabs in footways
Assessment criteria: 4.1 ensure that materials selected for use are identified and checked against the current specification 4.2 identify the types of road on which the reinstatement of paving slabs is carried out 4.3 define the factors that influence the selection of materials and equipment for reinstating paving slabs 4.4 state how to identify different potential sub-base defects 4.5 state how to rectify different sub-base defects 4.6 define the procedures and quality checks and tests relating to:

(a) laying bedding materials
(b) laying paving slabs
(c) jointing

4.7 define the factors that affect the quality of the finished modular surface
4.8 define the checks required to ensure the quality of the finished modular surface
4.9 state potential problems with reinstatement of paving slabs and the appropriate remedial action.

Learning Outcome 5: Monitor the reinstatement of concrete footways

Assessment criteria:

5.1 ensure that the materials selected for use are identified and checked against the current specification
5.2 ensure that the equipment is:
(a) suitable to the site conditions and materials
(b) suitable to the prescribed operation
(c) in working condition and safe to use
5.3 ensure that sub-base defects are identified and made good using specified materials
5.4 monitor the reinstatement operation including:
(a) laying the concrete
(b) compaction operations
(c) concrete curing method
5.5 assess the finished surface to ensure the quality of the reinstatement operation
5.6 check for any problems with the reinstatement of concrete footways and confirm the appropriate action.

Learning Outcome 6: Understand how to monitor the reinstatement of concrete footways

Assessment criteria:

6.1 identify the types of footway on which concrete reinstatement is carried out
6.2 define the factors that influence the selection of materials and equipment for reinstating concrete footways
6.3 state how to identify different potential sub-base defects
6.4 state how to rectify different sub-base defects
6.5 define the procedures and quality checks and tests relating to:
(a) laying concrete
(b) compacting concrete
(c) curing concrete
6.6 affect the quality of the finished surface
6.7 define the checks required to ensure the quality of the finished surface
6.8 state the potential problems with reinstatement of concrete footways and the appropriate remedial action.
6.9

Learning Outcome 7:Monitor site safety

Assessment criteria:

7.1 ensure that a risk assessment has been carried out
7.2 monitor site operations in accordance with health and safety requirements
7.3 assess site conditions in accordance with health and safety requirements
7.4 ensure that safety equipment is available and fit for purpose
7.5 ensure that safe working practices are followed in line with health and safety requirements and current relevant specifications
7.6 check for risks to site safety, and confirm the appropriate action required
7.7 ensure that the site is left in a clean and safe condition.

Learning Outcome 8: Understand how to monitor site safety

Assessment criteria:

8.1 define the purpose of a site-specific risk assessment
8.2 state the health and safety requirements for site operations
8.3 define the health and safety requirements for particular site conditions
8.4 define the safety equipment required during site operations and how to ensure that it is fit for purpose
8.5 state the safe working practices on site
8.6 define the potential risks to site safety and the appropriate remedial action

116: Evidence Requirements / Scope

Some terms, used in the assessment criteria, cover a range of situations, as follows:

1. **Materials** include:
   (a) appropriate sub-base materials for making good defects
   (b) bedding and grouting materials for use in modular reinstatement (including sand and mortar)
   (c) pre-cast concrete blocks (or similar modules) to match the existing paving for reinstatement
   (d) natural or pre-cast paving slabs to match the existing surface for reinstatement
   (e) Class 25/30 concrete for concrete footway reinstatement
   (f) slip membrane (for concrete footway reinstatement)
   (g) curing material (for concrete footway reinstatement).

2. **Specifications** and **procedures** include:
   (a) Specification for the Reinstatement of Openings in Highways
   (b) BS 7533 Series
   (c) Health and Safety Guidance 150, Health and Safety in Construction
   (d) manufacturers' operating procedures for powered tools and plant
   (e) Application Guide 26
   (f) Safety and Street Works and Road Works – A Code of Practice.

3. **Safe working practices** include:
   (a) safe use of tools and equipment
   (b) use of PPE (including, as necessary: high visibility jacket or waistcoat, hard hat, ear defenders, gloves, protective footwear, waterproof clothing, eye protection visor or goggles, dust mask)
   (c) use of risk assessment methods to identify and control hazards on site
   (d) precautions to minimise danger or inconvenience to road users
   (e) precautions to minimise danger or inconvenience to site personnel
   (f) precautions to minimise damage to equipment or apparatus.

4. **Equipment** includes:
   (a) hand tools – including as necessary square and round mouth shovels, lifting and clearing tools (hand pick, crowbar, bolster, club hammer, wire brush, hard bristle broom, rake), hand rammer, straight edge (or suitably cut) timber, trowel, textured roller.
   (b) powered equipment – including as necessary concrete cutting equipment, concrete saw, vibrotamper, vibrating plate.

5. **Safety equipment** may include as necessary:
   (a) adequate range of signing, lighting and guarding equipment (including signs, cones, signals, lamps, footway boards, barriers, portable traffic signals)
   (b) high visibility safety equipment
   (c) suitable materials to construct ramps.

6. **Types of roads include (AC 2.1 & AC4.1)**

(a) modular surfaced carriageways and footways
(b) high duty footways
(c) high amenity footways.

7. Factors that affect selection of materials and equipment include (AC2.2)

(a) requirement to match materials with existing modular surface
(b) suitable bedding materials
(c) suitable grouting materials

8. Factors that affect modular surface include (AC2.7)

(a) moisture content of bedding sand
(b) thickness of surcharge and compactive effort
(c) treatment of joints
(d) matching of and bonding with existing modules

9. Quality checks for finished surface include (AC 2.8 & AC 4.7)

(a) visual inspection – surface defects, edge depression, surface crowning, surface regularity, jointing
(b) measurement of surface profile

10. Factors that affect selection of materials include (AC 4.2)

(a) matching and bonding modules with existing modules
(b) suitable bedding materials
(c) suitable grouting materials
(d) replacement of damaged modules
(e) treatment of joints

11. Types of footway include (AC 6.1):
(a) concrete surfaced footways
(b) high duty footways
(c) high amenity footways

12. Procedures for reinstating compacting concrete include (quality control of site-mixed and ready–mix concrete) AC 6.4

13. Quality Checks for finished surface include (AC 6.6)
(a) visual inspection for transverse, longitudinal and random cracking
(b) profile checks on finished level in respect of surrounding surface and surface fixture

116: Assessment Requirements
Assessment for this unit consists of practical observations and a multiple-choice knowledge examination to cover the requirements of the learning outcomes. Current requirements for practical observations, including Assessor and Internal Quality Assurer qualifications and facilities requirements are provided in the HAUC (UK) The Street Works Assessment Strategy

Appendix 1 Sources of general information

The following documents contain essential information for centres delivering City & Guilds qualifications. They should be referred to in conjunction with this handbook. To download the documents and to find other useful documents, go to the **Centres and Training Providers homepage** on **www.cityandguilds.com**.

City & Guilds Centre Manual contains detailed information about the processes which must be followed and requirements which must be met for a centre to achieve 'approved centre' status, or to offer a particular qualification, as well as updates and good practice exemplars for City & Guilds assessment and policy issues. Specifically, the document includes sections on:

- The centre and qualification approval process
- Assessment, internal quality assurance and examination roles at the centre
- Registration and certification of candidates
- Non-compliance
- Complaints and appeals
- Equal opportunities
- Data protection
- Management systems
- Maintaining records
- Assessment
- Internal quality assurance
- External quality assurance.

Our Quality Assurance Requirements encompasses all of the relevant requirements of key regulatory documents such as:

- Regulatory Arrangements for the Qualifications and Credit Framework (2008)
- SQA Awarding Body Criteria (2007)
- NVQ Code of Practice (2006)

and sets out the criteria that centres should adhere to pre and post centre and qualification approval.

Access to Assessment & Qualifications provides full details of the arrangements that may be made to facilitate access to assessments and qualifications for candidates who are eligible for adjustments in assessment.

The centre homepage section of the City & Guilds website also contains useful information on such things as:

- Walled Garden: how to register and certificate candidates on line
- Events: dates and information on the latest Centre events
- Online assessment: how to register for e-assessments.

Centre Guide – Delivering International Qualifications contains detailed information about the processes which must be followed and requirements which must be met for a centre to achieve 'approved centre' status, or to offer a particular qualification. Specifically, the document includes sections on:

- The centre and qualification approval process and forms
- Assessment, verification and examination roles at the centre
- Registration and certification of candidates
- Non-compliance
- Complaints and appeals
- Equal opportunities
- Data protection
- Frequently asked questions.

Linking to this document from web pages

We regularly update the name of documents on our website, therefore in order to prevent broken links we recommend that you link to our web page that the document resides upon, rather than linking to the document itself.

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Useful contacts

UK learners General qualification information	E: learnersupport@cityandguilds.com
International learners General qualification information	E: intcg@cityandguilds.com
Centres Exam entries, Certificates, Registrations/enrolment, Invoices, Missing or late exam materials, Nominal roll reports, Results	E: centresupport@cityandguilds.com
Single subject qualifications Exam entries, Results, Certification, Missing or late exam materials, Incorrect exam papers, Forms request (BB, results entry), Exam date and time change	E: singlesubjects@cityandguilds.com
International awards Results, Entries, Enrolments, Invoices, Missing or late exam materials, Nominal roll reports	E: intops@cityandguilds.com
Walled Garden Re-issue of password or username, Technical problems, Entries, Results, e-assessment, Navigation, User/menu option, Problems	E: walledgarden@cityandguilds.com
Employer Employer solutions including, Employer Recognition: Endorsement, Accreditation and Quality Mark, Consultancy, Mapping and Specialist Training Delivery	E: business@cityandguilds.com

If you have a complaint, or any suggestions for improvement about any of the services that we provide, email: **feedbackandcomplaints@cityandguilds.com**

About City & Guilds

As the UK's leading vocational education organisation, City & Guilds is leading the talent revolution by inspiring people to unlock their potential and develop their skills. We offer over 500 qualifications across 28 industries through 8500 centres worldwide and award around two million certificates every year. City & Guilds is recognised and respected by employers across the world as a sign of quality and exceptional training.

City & Guilds Group

Our vision is for a world in which everyone has the skills and opportunities to succeed. We support over 4 million people each year to develop skills that help them into a job, develop on that job and to prepare for their next job. As a charity, we're proud that everything we do is focused on achieving this purpose. Whether that's through delivering work-based learning programmes that build competency, providing flexible pathways that support lifelong employability or through the City & Guilds Foundation funding initiatives that help remove barriers to work and learning.

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