



Mapping Exercise

Technical Surveyor

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Introduction

This document has been produced to examine how statements within the National Occupational Standards (NOS) can be used to develop the content that could form a common training standard for Mining Surveyors across the UK mining sector. The following standards have been considered as part of developing this approach.

Module Title	Original NOS Reference	UK Standards Reference
Design and Layout of the Mine Extraction Process.	MM6	PROMS7
Produce Plans of a Mine Layout.	MM7	PROMS9
Manage Mine Surface Facilities.	MM8	PROMS9
Manage Physical Resources.	MM10	PROMS10
Provide Leadership for your Organisation.	MM11	PROMS11
Gain Permission for Mine Extraction.	MM15	PROMS12
Plan the Mineral Extraction Process.	MM16	PROMS13
Establish Mine Ground Control/ Support Activities.	MM17	PROMS14
Develop and Implement Mine Emergency Procedure.	MM21	PROMS16
Monitor Method of Mine Working.	MM22	PROMS17
Setout Secondary Dimensional Work Control.	MG17	MPQMG17
Measure and Setout Dimension Control for Mining Requirements.	MM27/MG37	MPQMG37

The tables contained within this document have aimed to:

1. Use the knowledge statements from the NOS to inform a wider content for any training programme.
2. Use the performance statements to start to inform a structured approach to assessment.

Disclaimer

The **Mining Qualification Committee** (MQC) has developed and reviewed the training and assessment material.

MPQC have provided the accreditation for the training and assessment material.

MAUK have published the training and assessment material and provided access for the underground mining sector.

It remains the responsibility of the **mine operator** to verify the training and assessment material is suitable for their circumstances and application.

Pre-Entry Qualification

MPQVG01 (MT17) – Operate Safely in the Mine Environment

This module can be satisfied by the common induction module (working safely and efficiently in the underground environment).

MPQVG02 (MT18) – Conform to Efficient Work Practices

This module can be satisfied by the common induction module (working safely and efficiently in the underground environment).

Potential Qualifications

The National Occupational Standards identified on page three of this document cover two main areas:

1. Measurement of mineral resources and planning.
2. The measurement of mine workings, and the setting out of operational activities.

It is therefore proposed that the mapping exercise be used to produce two separate qualifications for the mines:

1. Technical Surveyor.
2. Mine surveyor.

Portfolio Area	Technical Surveyor / Lines Person	Mine Surveyor
MG1	✓	✓
MG2	✓	✓
Design and Layout of the Mine Extraction Process.		✓
Produce Plans of a Mine Layout.	✓	✓
Manage Mine Surface Facilities.		✓
Manage Physical Resources.		✓
Provide Leadership for your Organisation.		✓
Gain Permission for Mine Extraction.		✓
Plan the Mineral Extraction Process.		✓
Establish Mine Ground Control/ Support Activities.		✓
Develop and Implement Mine Emergency Procedure.		✓
Monitor Method of Mine Working.	✓	✓
Setout Secondary Dimensional Work Control.	✓	
Measure and Setout Dimension Control for Mining Requirements.	✓	✓

Mapping Exercise

PROMS7 – Design the Layout of the Mine Extraction Process (Mine Surveyor Only)

Design

PROMS7 – Design the Layout of the Mine Extraction Process		
Knowledge Statement		Elements
K1	The main principles of health and safety legislation and regulations relevant to mine design, work planning and layout, inspection, access and egress, ventilation, and systems requirements to ensure health, safety, and welfare.	
K2	Organisational procedures for establishing the need for and the desired objectives/ outcomes of the design.	
K3	Mine and geological plans.	
K4	Alternative formats for mine designs.	
K5	The types and uses of mine plans.	
K6	The limits of the mine, boundaries/ districts/ seams within it.	
K7	The circumstances where additional or specialised plans may be required.	
K8	Organisational system for identifying/ filing plans.	
K9	Survey data.	
K10	Factors and data which are likely to influence the detailed design solution.	
K11	Techniques for design production.	

K12	How to present alternative design solutions.	
K13	How and why, you analyse and weigh the factors which will influence the detailed design.	
K14	How to include the installation of equipment into the design concept.	
K15	Methods of calculating output resulting from implementation of a design.	
K16	How to calculate the relative effectiveness of different design solutions.	
K17	How to check that the design meets the desired objectives/ outcomes.	
K18	Specifications and data to support design/s.	
K19	Methods and procedures for presenting designs to appropriate persons.	
K20	Procedures for obtaining approval to proceed with design, project development requirements, and the degree of detail required.	
K21	Procedures for amending designs.	
K22	How to include salvage of equipment and abandonment of the workings into the design concept.	
K23	Records.	
K24	The records to be completed under legislation and organisational procedures.	
K25	When records must be completed.	
K26	The importance of accurately completing, signing, and dating.	

Records

PROMS7 – Design the Layout of the Mine Extraction Process		
Knowledge Statement		Elements
K27	Organisational procedures, methods, and systems for controlling storage and retrieval of all completed organisational and statutory records.	

Working with Others

PROMS7 – Design the Layout of the Mine Extraction Process		
Knowledge Statement		Elements
K28	Your own responsibilities regarding plans and records, and the limitations of your responsibility.	
K29	The responsibilities of others in respect of the completion, amendment, maintenance, storage and retrieval of mine plans and records.	
K30	The importance of effective communications, written and verbal, to those in the reporting chain.	
K31	The benefits of teamwork, and how to achieve it.	

Operations

PROMS7 – Design the Layout of the Mine Extraction Process		
Knowledge Statement		Elements
K32	Sources of information in relation to mining operations, including historical information relevant to the proposed work.	
K33	Relevant approved codes of practice and guidance for working safely.	
K34	Technical information/ industrial standards/ specifications in	

	relation to mining plant and equipment.	
K35	The principal activities involved in mining operations and mineral winning.	
K36	The main functions within the operational cycle.	
K37	Mine logistics procedures and systems for the delivery of supplies.	
K38	The mine geological/ environmental factors that may affect the choice and performance of operational systems.	
K39	Statutory and organisational requirements for the provision of appropriate access and egress (including in emergency situations).	
K40	Statutory and organisational requirements for the provision of adequate ventilation.	
K41	Requirements for the provision of support services/ utilities as appropriate (e.g. electricity, water, compressed air).	
K42	Statutory and organisational requirements for the provision of systems and equipment to maintain the health, safety, and welfare of persons within the mine, in routine and emergency situations.	

PROMS8 – Produce Plans of a Mine Layout

Mine Plans

PROMS8 – Produce Plans of a Mine Layout		
Knowledge Statement		Elements
K1	The reasons why accurate mine plans are required (legislative and operational).	Outline the requirement of the Mines Regulations 2014 (Part 7) (Surveyors and Plans).
		Outline examples of what significant excavations could be under the Mines Regulations 2014, and Guidance.
		Outline under the Mines Regulations 2014 and Guidance what plans must be produced and kept at a mine.
		Outline the requirements in relation to tips and tipping and any specific requirements of the Mines Regulation 2014, and how these relate to the duties of the surveyor.
		Outline the type of information that would be kept on a section plan, and why it is important to the mine operation to have an accurate section of the seam, vein-systems, and the surrounding strata.
		Outline why it is important that an accurate plan for the ventilation of the mine is maintained, and how this plan may be used during normal operations and emergency situations.
		Outline why it is important that a working plan is maintained, how often this is updated and the detail that would be included within a typical working plan at your mine.
K2	The main principles of health and safety legislation and regulations relevant to mine plans.	Outline the key requirements of the Health and Safety at Work Act 1974 when it comes to providing information to employees.
		Consider the requirements of the Mines Regulations 2014 (Part 3 – Control of Major Hazards) and consider the contribution of the surveyor and mine plans to: • Fire protection. • Explosive atmospheres. • Use and storage of explosives. • Ground movement. • Inrushes (and mines working in potentially hazardous areas). • Mine transport systems.
		Consider the requirements of the Mines Regulations 2014 (Part 4 – Ventilation) and consider the contribution of the surveyor and mine plans in effectively planning and managing the ventilation in the mine.

		Consider the requirements of the Mines Regulations 2014 (Part 6 – Escape and Rescue) and consider the contribution of the surveyor and mine plans in: - Defining ways out from place of work. - Defining and designating emergency routes. - The arrangements for escape. - The arrangements for rescue.
		Outline the responsibilities of surveyors at your mine when it comes to preparing and planning for major infrastructure installations, and how these duties might be essential to complying with regulations such as PUWER and LOLER.
K3	Standards relevant to mine plans.	Outline any standards that may be used by your organisation when developing and maintaining mine plans.
		The production of mine plans to be produced in accordance with National Coal Board, Surveying Practice, CR/1, 1982.
		Plans will include: - Title. - North Arrow. - Line of Horizontal Stress. - Date. - Reference number. - Scale.
K4	Approved codes of practice and guidance relating to mine plans.	The production of mine plans to be produced in accordance to; National Coal Board, Surveying Practice CR/1, 1982.
K5	The types and uses of mine plans.	Identify the types of mine plans that are used by your organisation.
		For each of the mine plans, define: - What the plan is used for? - Where the plans are located? - The frequency at which they are updated. - The scale, and why that scale has been chosen. - The type of information and features that appears on the plan.
		Statutory Mine Plans Sketch Plan, Rescue Plan, Pumping Plan, Electrical Plan, Surface Plan, Authorisation Plan. Recommended Plans Hazard Plan
		All the above are to be produced in adherence with the standards defined in

		National Coal Board, Surveying Practice CR/1, 1982 and with reference to the Precautions Against Inrush Regulations 1979.
K6	The limits of the mine boundaries/ districts/ seams within it.	Define how the limits of working boundaries are established at your mine. Define how these boundaries are identified on the mine plans. Outline how underground operations are monitored and plotted to ensure boundaries and other features are not breached. Outline the importance of working with boundaries and ensuring that accurate plans are retained. Define the potential risk and implication for the organisation and underground operation if areas are worked outside of the boundary, either deliberately or accidentally. Outline how the boundaries are used and influence that these have on the layout and operation of your mine. Providing clear demarcations according to National Coal Board, Surveying Practice CR/1, 1982 for; Precautionary Zones, Lease/ wayleave and Easement boundaries reference to the Precautions Against Inrush Regulations is advisable.
K7	Range and location of mine plans pertinent to your area of responsibility, for routine work and for special/ unusual circumstances.	See K5 of PROM8 (Produce Plans of the Mine Layout). Outline the types of plans that the survey department may be involved in producing to support mining activities. Consideration should be given to: • Installation plans, and general layout drawings. • Plans covering sequence of mineral extraction. • Plans detailing sequence of support installation (or support extraction). • Plans detailing local ventilation requirements. • Loading plans. • Transport plans. Unusual mining designs include but are not exhaustive to; Back ripping, dinting/ milling, roadway repair, re-entry and Thirling.
K8		Outline how plans are stored and secured at your mine (this to include electronic and paper plans).

	Organisational procedures for obtaining access to relevant plans.	Outline how access is controlled to the plans used at your mine (to include paper and electronic).
		Define how version control and updates of electronic (and paper) plans is restricted to those with the authority to make changes or modify.
		Describe why it is important that changes are restricted to only competent authorised people.
K9	How to use mine plans to discharge your responsibilities.	See K5 of PROM8 (Produce Plans of the Mine Layout).
		Knowledge of historic mining disasters is paramount here, the importance of what has happened in the past can prevent it re-occurring. Disasters such as Redding, Huskar Main, Knochshinnoch, and Montagu all demonstrate issues with planning and utilisation of mine plans and use of records. Clear knowledge of events like these and their route causes is paramount.
K10	The circumstances where additional or specialised plans may be required.	See K7 of PROM8 (Produce Plans of the Mine Layout).
		Managers Schemes of Work will be required when entering into a Precautionary Zone. What constitutes a precautionary zone is clearly defined in the Mines Regs 2014.
K11	Information contained on mine plans.	See K5 of PROM8 (Produce Plans of the Mine Layout).
		The components and building blocks for mine planning is demonstrated in National Coal Board, Surveying Practice CR/1, 1982.
K12	The meaning of plan symbols.	Provide a summary of the types of symbols that are typically used on mine plans within your organisation.
		Outline where your organisation uses symbols that are not aligned with recognised standards, but are widely recognised within your own organisation.
		The production of mine plans have been a legal requirement since 1850 and standards have developed since then into what is covered in; National Coal Board, Surveying Practice CR/1, 1982 National adherence to these standards is paramount in the prevention of Inrush.

K13	Organisational reporting procedures for instigating changes to mine plans.	See K5 of PROM8 (Produce Plans of the Mine Layout).
		Identify how changes to plans are communicated or updated mine plans are distributed within your organisation.
		Where changes are required to mine plans, identify who is involved in agreeing and signing off any changes.
K14	Organisational system for identifying/ filing plans.	Where plans have been superseded, identify how the old plans and records are archived.
		Outline where previously worked areas, previously worked seams are archived within your organisation.
		Define why it is important that these types of archives are maintained.
		Within your organisation, who has control and access to this archived material.

Surveying

PROMS8 – Produce Plans of a Mine Layout		
Knowledge Statement		Elements
K15	How to arrange for suitable equipment to be brought to the site and kept safely and securely.	Outline the type of equipment that is retained at the mine for the purpose of carrying out underground surveys or other survey department activities.
		Describe how and where the equipment is housed to ensure the integrity of the equipment.
		Candidates will be required to gain an understanding of surveying equipment including but not exhaustive to, line lasers, automatic levels, total stations, laser scanners, and gyros.
K16	How to check, calibrate, and adjust equipment.	Describe how the equipment retained at the mine for the purpose of carrying out underground surveys or other survey department activities is checked and calibrated prior to use.
		Describe how the equipment retained at the mine for the purpose of carrying out underground surveys or other survey department activities is adjusted after any checks.
K17		NA

	How to check and confirm that signs, arrangements for personal safety, equipment and site access conform to good practice, legislation, and regulations.	
K18	How to conduct a survey.	Outline the different types of survey techniques, their limitations, and when they are appropriate to use.
		Understanding of how a centre line and chainage check is undertaken.
		Knowledge and understanding of how to conduct a precise traverse in the dark is essential. With use of both face left and face right.
		Understanding of how level is controlled underground using both traditional levelling techniques and modern equivalents.
K19	How to consult with experts when specialist information is needed which is relevant to the survey.	Knowledge of when specialist survey work is required is pertinent in the mining industry, due to the wide variety of tasks that must be completed prior to mining commencing. These could include, but are not limited to, coastal erosion surveys, gyro surveys, subsidence surveys, or seismic surveys.
K20	The use of datum referencing.	Explanation of Ordnance Datum Newlyn and importance that mine workings are relative to it, and ensuring its relevance to inrush is thoroughly covered.
K21	How to set and record horizontal and vertical controls.	Describe OS control network including both the traditional and modern control network.
		Describe how GPS works and the importance of including time in the calculations as the celestial sphere is in motion.
		Further knowledge will include GPS, GNSS and Galileo. Coverage of sites where best to set a surface baseline and the limitations of site topography and structures on GPS data.
		Explain how shaft plumbing is undertaken, and accuracy is maintained.
K22	How to take accurate observations.	Knowledge of the limitations of the equipment available is a vital part of becoming a competent Mine Surveyor. Introducing secondary and tertiary independent checks on data sets is critical to maintain precision and accuracy in the position of the workings both relative to the

		mine itself, surface, geological features, bore holes, and other mine workings.
K23	How to record and store survey data.	Outline traditional booking techniques and the importance of keeping them neat and legible and how to do so in a dirty and damp mine environment.
		Outline how data is now readily stored in instruments and the pros and cons of this. Data kept solely on the instrument is fragile from a security point of view. Survey data must be stored on a hard drive and backed up on an independent server.
		However, all data is fragile and traditionally a fireproof room was required to store the survey data to mitigate the possibility of data loss. As loss of survey data could lead to an inrush event in the future.
K24	How to keep a clear and accurate record of the time spent on the survey and of any problems that come up which may affect cost or accuracy.	Mine survey is a continuum as the mine develops. Going back from the working face the survey control improves in quality as you get to the surface. As due to convergence of the workings more and more checks are implemented on the outbye baselines. This can become problematic e.g. if conveyor installations are completed under survey baselines or should an area become abandoned.
		Roadway convergence becomes a major issue in terms of survey as stations are continually moving therefore check angles and independent checks are imperative to ensure quality data is being produced. Ultimately, this will lead to surface re-correlation surveys and gyro checks which are costly.
K25	How to comply with safe working practices when on the site.	
K26	How to change work procedures and practices to allow for different circumstances and conditions.	
K27	How to maintain the equipment in operating condition and store the equipment securely.	See K15 of PROM8 (Produce Plans of the Mine Layout).
		See K16 of PROM8 (Produce Plans of the Mine Layout).
		Define the procedures that are used to store the equipment used at your mine for

		underground surveys to reduce the risk of damage and preserve the overall condition of the equipment.
		Mines are typically harsh environments where dust and damp can readily penetrate an instruments housing causing damage. The importance of regularly cleaning an instrument cannot be stressed enough. This keeps the instrument in best conditions.
		Describe how to perform checks like the 2-peg test, checking level bubbles, Plummets and horizontal and vertical angle checks.
K28	How to collect together enough survey data to allow an accurate analysis to be made.	Describe the importance of having a clear scope of works before starting a survey, this ensures time utilised in the areas required rather than collecting unneeded/ not enough data.
K29	How to check, verify, and adjust the survey data to maintain accuracy and integrity.	Describe how to perform a transformation and the rule of one or four or more.
		Outline how to perform and close a traditional level.
		Outline how to complete a Bowditch correction or least squares adjustment.
		Explain how these methods are still important when looking at modern sources of data i.e. point clouds that can create the illusion that the data is of higher quality than it is.
		Explanation of drift and how it can be improved.
K30	How and why, you analyse the survey data.	Explain how error is managed and mitigated.
		Understanding of checks and what can be done to improve the data sets.
		Explanation of drift and how it can be improved.
K31	How and why, you advise people who will be using the survey data on how to interpret it.	Explain how to understand the limitations of your own knowledge and what you are competent to advise upon.
		Ensuring that data presented to a client is clear/ concise and that they have an understanding on how the data is organised.
		Explain the risks involved with poorly communicated survey data paying

		particular attention to safety, cost, and linking back to the inrush hazard.
K32	How to present the data analysis, the commentary, and any support information accurately, clearly and in a format which is suitable for those who need to use it.	Understanding the final users' needs is important and tailoring data to their needs is beneficial to both parties as is taking the time to explain how to read and interpret it.
		Explain the importance of drafting standards outlined in National Coal Board, Surveying Practice CR/1, 1982.

Records

PROMS8 – Produce Plans of a Mine Layout		
Knowledge Statement		Elements
K33	The records to be completed under legislation and organisational procedures.	Provide a thorough explanation of the Mines Regs 2014, Regulation 59.
		Give an overview of MASHAM part 6.
		National Coal Board, Surveying Practice CR/1, 1982.
K34	When records must be completed.	The Mines Regulations 2014 stipulate that plans are to be updated at 'suitable intervals' the old mining regulations provide more prescriptive intervals for plan and survey updates. However, the frequency of these needs to be determined by the Mine's Chief Surveyor.
K35	The purpose and importance of the various sections/ categories of records.	Provide an overview of how if records had been fully utilised in the past major catastrophes such as Montagu Colliery Disaster and Redding Colliery disaster could have been avoided.
K36	The importance of accurately completing, signing, and dating records.	A thorough explanation of the Knochshinnoch, Montague, and Lofthouse disasters should be provided so that candidates have a thorough understanding of why Mine Plans are the primary control measure in the prevention of Inrush hazards.
K37	Organisational procedures, methods, and systems for controlling storage and retrieval of all completed organisational	The Mines Regs 2014 – Part 7 Surveyors and Plans.

	and statutory records relevant to your area of responsibility.	
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Working with Others

PROMS8 – Produce Plans of a Mine Layout		
Knowledge Statement		Elements
K38	Your own responsibilities regarding plans and records, and the limitations of your responsibility.	The Mines Regs 2014 – Part 7 Surveyors and Plans.
K39	The responsibilities of others in respect of the completion, amendment, maintenance, storage and retrieval of mine plans and records.	See K8 of PROM8 (Produce Plans of the Mine Layout).
K40	The importance of effective communications, written and verbal, to those in the reporting chain.	Define the implications of poor communications within the survey team at your mine.
		Define the implications of poor communications across the departments with which the survey team need to work with (you should consider efficiency and safety implication of poor communications).
K41	The benefits of teamwork, and how to achieve it.	Outline the way your organisation is structured and the advantages and disadvantages of that structure in promoting teamwork.
		Outline why teamwork is important within any organisation.
		Briefly describe the things that your department or your organisation does to promote team work.

PROMS9 – Manage Mine Surface Facilities (Mine Surveyor Only)

Surface Activities

PROMS9 – Manage Mine Surface Facilities		
Knowledge Statement		Elements
K1	Statutory requirements in relation to surface area/ buildings/ facilities constituting part of the mine.	
K2	The layout and function of the site/ your area of responsibility and relevant adjoining areas affected by it.	
K3	Location of plant/ equipment for use in emergency situations.	
K4	Safe working practices for yourself and those working under your direction and control to include all systems, procedures, equipment, and materials in use.	
K5	Organisational/ site rules and operating procedures in relation to transport and pedestrian routes.	
K6	Specific regulatory requirements and organisational procedures for the monitoring and/ or auditing and/ or inspection of plant/ machinery/ equipment/ services in area of responsibility (including, if applicable, inspection and control of tips and/ or stockpiles, winders and/ or haulage systems, transportation, confined spaces, work at height, pressure vessels).	
K7	Organisational site security procedures and actions to be taken in the event of a breach of security (unauthorised person/s, theft, damage).	

Health, Safety, and the Environment

PROMS9 – Manage Mine Surface Facilities		
Knowledge Statement		Elements
K8		

	Definitions of hazard, risk, accident, danger, accident rate, environmental aspect, impact, danger, incident, incident rate, frequency, severity, and pollution.	
K9	Workplace monitoring and hazard identification (health, safety and/ or environmental) methods, e.g. formal and informal inspections, surveys, and audits.	
K10	Key aspects of health, safety, and environmental legislation applicable to the workplace under your control and your personal responsibilities under that legislation.	
K11	Organisational policies and procedures in relation to health, safety, welfare, and maintaining the environment.	
K12	In-house information in relation to health, safety, and the environment: internal accidents, incidents, near misses, cases of occupational illnesses.	
K13	Basic knowledge of the main types of occupational health risk – chemical (toxic, corrosive, dermatotic), physical (noise, dust, temperature, light, vibration, repetitive strain) and ergonomic.	
K14	How the incorporation of commonly used protective devices and correct plant maintenance contribute to the reduction of health, safety, and environmental risks, and the improvement in control and reliability.	
K15	Statutory requirements and organisational arrangements for safe systems of work and permits to work.	
K16	Organisational procedures in relation to accidents, incidents, and first aid.	
K17		

	The scope and limitations of your own responsibilities relating to health, safety, and environmental incidents, hazards, and risks.	
K18	Organisational procedures and personal responsibilities in the event of an emergency situation (above or below ground).	
K19	Role and responsibilities of emergency services and regulatory authorities in the event of an emergency situation at the mine.	
K20	Organisational procedures to deal with unfit persons present (e.g. ill health, violent, affected by drugs/ alcohol).	
K21	Basic knowledge of the main types of environmental impact – emissions to air, releases to water, and contamination to ground.	
K22	Planning consents and environmental conditions applicable to the site.	
K23	Practical aspects of good water management.	
K24	Practical aspects relating to control of environmentally hazardous substances.	
K25	Principles and practical aspects of waste management and reduction	
K26	Principles of good housekeeping.	
K27	The benefits of improved environmental performance.	
K28	Organisational procedures for, and the importance of maintaining good community relations.	

Working with Others

PROMS9 – Manage Mine Surface Facilities		
	Knowledge Statement	Elements
K29		

	The organisational management structure.	
K30	Your own responsibilities and the limits of those responsibilities.	
K31	Methods to confirm competence of personnel involved in surface activities.	
K32	The allocation of tasks and duties.	
K33	The benefits of team working and methods to achieve this.	
K34	Statutory and organisational reporting and recording procedures in your area of responsibility.	
K35	The benefits of effective communication, involvement of personnel, and motivation.	
K36	Communications systems/ procedures in area of responsibility.	
K37	Organisational reporting structures and the duties of relevant personnel.	
K38	The dangers of working in isolation.	
K39	Organisational requirements for recording/ monitoring personnel in your area of responsibility.	
K40	Organisational procedures in relation to non-employees on site (e.g. contractors, visitors).	
K41	Organisational induction schemes.	
K42	Organisational training arrangements.	
K43	Interviewing and questioning techniques.	

PROMS10 – Manage Physical Resource

General Knowledge and Understanding

PROMS10 – Manage Physical Resource		
Knowledge Statement		Elements
K1	Why it is important to involve those who use resources in identifying, planning, and monitoring resources, and how to do so.	
K2	How to identify the range and calculate the quantity of resources required to carry out planned activities.	
K3	The importance of using sustainable resources, and how to identify such resources and ensure their effectiveness and efficiency.	
K4	How to carry out a cost-benefit analysis.	
K5	How to make a business case.	
K6	How to develop an operational plan and make adjustments to the plan if required resources cannot be obtained in full.	
K7	How to make arrangements with suppliers to ensure resources are available when required.	
K8	The potential impact of resource use on the environment and actions you can take to minimise any adverse impact.	
K9	Risks associated with the types of resources used and actions you can take to ensure resources are secure and used safely.	
K10	The importance of monitoring the quality and use of resources continuously, and how to do so.	
K11	The types of corrective actions (e.g. changing planned activities, changing the ways in which resources are used for activities, renegotiating the	

	availability of resources) you can take in case of significant discrepancies between actual and planned resource use.	
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Industry/ Sector Specific Knowledge and Understanding

PROMS10 – Manage Physical Resource		
Knowledge Statement		Elements
K12	Industry/ sector requirements for managing physical resources.	

Context, Specific Knowledge, and Understanding

PROMS10 – Manage Physical Resource		
Knowledge Statement		Elements
K13	Past patterns of resource use in your area of responsibility and how to access this information.	
K14	Trends and developments that affect future demand for resources in your area of responsibility and how to evaluate the likely impact of these.	
K15	The planned activities in your area of activity and possible contingencies.	
K16	Actual and potential suppliers of the resources you need.	

PROMS11 – Provide Leadership for your Organisation (Mine Surveyor Only)

General Knowledge and Understanding

PROMS11 – Provide Leadership for Your Organisation		
Knowledge Statement		Elements
K1	The differences between management and leadership.	
K2	How to develop a compelling vision for an organisation.	
K3	The importance of and what is meant by organisational values.	
K4	Ways of ensuring that organisational plans support the organisation's purpose, values, and vision.	
K5	How to select and successfully apply different methods and techniques for communicating with people across an organisation.	
K6	Types of challenges and difficulties that may arise, including conflict, diversity, and inclusion issues within the organisation, and ways of identifying and overcoming them.	
K7	Different theories, models, and styles of leadership and how to select and successfully apply these to different people and situations.	
K8	The effect that different leadership styles can have on organisations.	
K9	How to select and successfully apply different methods and techniques for motivating, rewarding, influencing, and persuading people.	
K10	How to empower people effectively.	
K11		

	How to get and make use of feedback on your leadership performance.	
K12	The organisational benefits of and how to create a culture which encourages and recognises creativity and innovation.	
K13	How to recognise and develop the leadership capability of other people and follow their lead.	

Industry/ Sector Specific Knowledge and Understanding

PROMS11 – Provide Leadership for Your Organisation		
Knowledge Statement		Elements
K14	Leadership styles common in the industry/ sector and their strengths and limitations.	
K15	Legal, regulatory, and ethical requirements in the industry/ sector.	

Context, Specific Knowledge and Understanding

PROMS11 – Provide Leadership for Your Organisation		
Knowledge Statement		Elements
K16	Your own values, motivations and emotions, and the effect these have on your own actions and on other people.	
K17	Your own strengths and limitations in the leadership role.	
K18	The strengths, limitations, and potential of people that you lead.	
K19	Your own role, responsibilities, and level of power.	
K20	The purpose and values of and vision for your organisation.	
K21	The leadership culture and capability of your organisation.	
K22	The plans of your organisation.	

K23	The types of support and advice that people are likely to need and how to respond to these.	
K24	External stakeholders whom you may need to communicate and work with.	

PROMS12 – Gain Permission for Mine Extraction

PROMS12 – Gain Permission for Extraction		
Knowledge Statement		Elements
K1	Within the limits of your responsibility, you will need to demonstrate that you know and understand:	
K2	How and why, you manage negotiations with the authorities to secure consent.	
K3	Aspects of projects which are subject to statutory controls and will need consent.	
K4	How to check and confirm with the relevant authorities the requirements, current procedures, and likely timescale for statutory approvals and other consents.	
K5	How to provide the consent authorities with additional clear, relevant, and accurate information when it is requested.	
K6	How to prepare and assemble the information that will be needed for the application.	
K7	How to prepare and submit a clear and valid application for consent.	
K8	How and why, you forecast how long the submission and approval of applications for consent will take and how this will fit in with the project schedule.	
K9	How to circulate information about the implications of delays, failure to apply for and achieve consent to the stakeholders.	
K10	The implications of delays.	
K11	How and why, you plan and agree actions and alternatives in anticipation of approval being refused.	

K12	Grounds for a formal appeal against a refusal to grant consent.	
K13	How to submit an appropriate appeal based on clearly specified grounds.	
K14	How to present a justifiable case supporting the appeal.	
K15	How to prepare an appropriate appeal based on clearly specified grounds.	
K16	How to evaluate the strengths and weaknesses of the application.	

PROMS13 – Plan the Mineral Extraction Process (Mine Surveyor Only)

Legislative

PROMS13 – Plan the Mineral Extraction Process		
Knowledge Statement		Elements
K1	The legislative framework (Acts, Regulations, Approved Codes of Practice, Guidance).	
K2	The legislative definition of a mine, and the classification of mines.	
K3	Legislation applicable to mining operations in general.	
K4	Legislation in relation to the specific hazards applicable to the mine (e.g. in relation to hazardous gasses, ground control, intrushes, outbursts).	
K5	Statutory requirements and organisational procedures for the operation of the mine (e.g. surface facilities, mine access/ egress, ventilation, transportation, roadways, development areas, mineral production faces, storage areas, abandoned areas, as appropriate to the mine).	
K6	Statutory requirements and operational procedures for strata support.	
K7	Statutory requirements and organisational procedures for the installation, commissioning, inspection, examination, testing and maintenance of plant and equipment.	
K8	Personal statutory duties and responsibilities, and the limits of that responsibility.	
K9	Responsibilities of mine employees.	
K10		

	Personal area/ district of responsibility.	
K11	Statutory requirements for a safe system of work.	
K12	Statutory and organisational requirements for personal protective equipment (routine and emergency).	
K13	Duties, powers, and responsibilities in the event of an emergency situation (e.g. fire, inrush, evacuation, mine rescue).	
K14	Statutory requirements and organisational procedures for the prevention of emergencies.	
K15	Definitions of hazard, risk, accident, danger, accident rate, frequency and severity, environmental aspect, and environmental incident.	
K16	Recording procedures in relation to statutory requirements.	

Condition of the Mine

PROMS13 – Plan the Mineral Extraction Process		
Knowledge Statement		Elements
K17	The major hazards and risks associated with mining in general and the specific mine/ mining operations.	
K18	The scope and limitations of the mine, its design and layout, including current areas of use, abandoned areas and future developments as appropriate.	
K19	Geological features (e.g. faults, spark inducing mineral) that may affect the safe operation of the mine.	
K20	Geological and/ or physical indications of potentially deteriorating/ unsafe conditions (that might lead to e.g. inrush, outburst, collapse, spontaneous combustion).	

K21	Hazardous gasses (noxious/flammable); range of gasses, how these arise in the mine, where these might accumulate, inspection method, acceptable levels, affects if not addressed.	
K22	Hazardous dusts (respirable/flammable): range of dusts, how these arise in the mine, where these might accumulate, inspection method, acceptable levels, affects if not addressed.	
K23	Actions to be taken in the event of identifying an aspect of the condition of the mine that may lead to a hazardous situation or unsafe working.	
K24	The type and purpose of environmental monitoring activities.	
K25	The effect that activities in one area can have on the activity, health, and safety of others.	
K26	How emergency situations can arise in your area of responsibility.	
K27	Operational policies and procedures for the maintenance of a safe mine environment e.g. dust suppression, degassing.	
K28	The terms; quantity, flow, pressure, resistance, volume, and cross-sectional area of airways.	
K29	Regulatory requirements and organisational procedures for reporting and recording shortfalls in the quality of the mine environment.	

Working with Others

PROMS13 – Plan the Mineral Extraction Process		
Knowledge Statement		Elements
K30	Your own responsibilities and the limits of those responsibilities.	
K31		

	Roles and responsibilities of others involved in the planning process, or with a vested interest in the outcome of the plan.	
K32	The allocation of tasks and duties.	
K33	The benefits of team working and methods to achieve this.	
K34	Organisational reporting and recording procedures.	
K35	The importance of effective communications.	
K36	Communications systems/ procedures in area of responsibility.	
K37	Arrangements for first aid, health, and welfare of personnel.	
K38	Methods used for briefing, supporting, encouraging, and providing information to any project team members.	
K39	Processes and resources put in place to manage potential risks and deal with contingencies.	
K40	Specific project management tools and techniques used to monitor, control and review progress.	
K41	Processes in place for communicating information on progress of the mineral development plan.	
K42	The importance of agreeing the plan, and any changes to the plan.	
K43	Methods used for recognising the contributions of any project team members to successful projects.	

Mine operations

PROMS13 – Plan the Mineral Extraction Process		
Knowledge Statement		Elements
K44		

	The essential elements/ contents of any mine extraction plan.	
K45	Sources of information in relation to mining operations.	
K46	Mine plans/ maps/ designs/ technical information.	
K47	Relevant approved codes of practice and guidance for working safely.	
K48	Industrial standards/ specifications in relation to mining plant and equipment.	
K49	The principal activities involved in mining operations and mineral winning.	
K50	Organisational requirements for roadways and working faces.	
K51	Organisational requirements for ventilation.	
K52	Mine logistics procedures and systems for the delivery of supplies.	
K53	The mine geological/ environmental factors that may affect the choice and performance of operational systems.	
K54	How to develop and draft an operational plan and/ or method of working.	
K55	How to check that the operational plan/ method of working is compatible with mine design and operational constraints.	
K56	Procedures for obtaining approval to proceed with operational plan/s.	
K57	Processes for confirming satisfactory completion of the project.	
K58	Processes for evaluating the success of the mineral development plan and any lessons which have been	

	learned from undertaking the project.	
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PROMS14 – Establish Ground Control and Support Methods (Mine Surveyor Only)

Legislative

PROMS14 – Establish Ground Control and Support Methods		
Knowledge Statement		Elements
K1	The legislative framework (Acts, Regulations, Approved Codes of Practice, Guidance).	
K2	The legislative definition of a mine, and the classification of mines.	
K3	The management and administration control structure and its purpose (including accountability and ultimate authority).	
K4	The statutory duties, role and responsibilities of mine owner, management, and supervision.	
K5	Statutory requirements and organisational procedures for the operation of the mine (e.g. surface facilities, mine access/ egress, ventilation, transportation, roadways, development areas, mineral production faces, storage areas, abandoned areas, as appropriate to the mine).	
K6	Personal area/ district of responsibility.	
K7	Responsibilities of mine employees.	
K8	Legislation and statutory requirements in relation to ground control and support of strata.	
K9	Statutory requirements for a safe system of work.	
K10	Definitions of hazard, risk, accident, danger, accident rate, frequency and severity,	

	environmental aspect, environmental incident.	
K11	Duties, powers, and responsibilities in the event of an emergency situation.	
K12	Statutory requirements and organisational procedures for the installation, commissioning, inspection, examination, testing and maintenance of plant and equipment.	
K13	Statutory and organisational requirements for personal protective equipment (routine and emergency).	
K14	Recording procedures in relation to statutory requirements.	
K15	Statutory requirements and organisational procedures for the operation of the mine.	

Condition of the Mine

PROMS14 – Establish Ground Control and Support Methods		
Knowledge Statement		Elements
K16	The major hazards and risks associated with mining in general and the specific mine/ mining operations.	
K17	The scope and limitations of the mine, its design and layout, including current areas of use, abandoned areas, and future developments as appropriate.	
K18	Areas of the mine where ground control is required, and areas where it is no longer essential.	
K19	Geological features that may affect the safe operation of the mine.	
K20	Geological and/ or physical indications of potentially deteriorating/ unsafe conditions.	
K21	Acceptable condition of roadways profile (including roof and sides and if applicable working face/s).	

K22	Acceptable condition of ground support system/s and indications of a hazardous situation or unsafe working deterioration.	
K23	Actions to be taken in the event of identifying an aspect of the condition of the mine that may lead to a hazardous situation or unsafe working.	
K24	The effect that activities in one area can have on the activity, health, and safety of others.	
K25	Responsibilities of self and others and procedures to follow in event of an emergency situation.	
K26	Operational policies and procedures for the maintenance of a safe mine environment.	
K27	Regulatory requirements and organisational procedures for reporting and recording failure or problems with ground control and support.	

Working with Others

PROMS14 – Establish Ground Control and Support Methods		
Knowledge Statement		Elements
K28	Procedures for ensuring activities are carried out by competent personnel.	
K29	Arrangements for first aid, health, and welfare of personnel.	
K30	Your own responsibilities and the limits of those responsibilities.	
K31	The allocation of tasks and duties.	
K32	The benefits of team working and methods to achieve this.	
K33	Organisational reporting and recording procedures.	
K34		

	The importance of effective communications.	
K35	Communications systems/ procedures in area of responsibility.	
K36	The dangers of working in isolation.	
K37	Organisational requirements for recording/ monitoring personnel in your area of responsibility.	

Mine Operations

PROMS14 – Establish Ground Control and Support Methods		
Knowledge Statement		Elements
K38	Operational procedures for ground control and support	
K39	Types, features, advantages, and limitations of methods of ground control and support.	
K40	The mine geological/ environmental factors that may affect the choice and performance of ground control and support operational systems.	
K41	Cost/ benefit analysis of implementing methods of ground control and support.	
K42	Sources of information in relation to ground control and support methods.	
K43	Mine plans/ maps/ designs/ technical information.	
K44	How to develop and draft an operational plan.	
K45	Procedures for obtaining approvals to proceed with operational plans.	
K46	How to check that the method of ground control and support is compatible with mine design and operational constraints.	
K47		

	Business planning cycle and budget preparation.	
K48	Relevant approved codes of practice and guidance for working safely.	
K49	Industrial standards/ specifications in relation to ground control and support plant and equipment.	
K50	The principal activities involved in mining operations and mineral winning.	
K51	The main functions within the operational cycle.	
K52	Mine logistics procedures and systems for the delivery of supplies.	

PROMS16 – Develop and Implement the Mine Emergency Procedure (Mine Surveyor Only)

Legislative

PROMS16 – Develop and Implement the Mine Emergency Procedure		
Knowledge Statement		Elements
K1	The legislative framework (Acts, Regulations, Approved Codes of Practice, Guidance).	
K2	The legislative definition of a mine, and the classification of mines.	
K3	Legislation applicable to mining operations in general.	
K4	Legislation in relation to the specific hazards applicable to the mine.	
K5	Statutory requirements and organisational procedures for emergency planning.	
K6	Statutory requirements and organisational procedures for addressing emergency situations.	
K7	Statutory requirements and operational procedures for strata support.	
K8	Statutory requirements and organisational procedures for the installation, commissioning, inspection, examination, testing and maintenance of plant and equipment.	
K9	Personal statutory duties and responsibilities, and the limits of that responsibility.	
K10	Personal area/ district of responsibility.	
K11	Responsibilities of mine employees.	
K12	Statutory requirements for a safe system of work.	

K13	Statutory and organisational requirements for personal protective equipment (routine and emergency).	
K14	Duties, powers, and responsibilities in the event of an emergency situation.	
K15	Definitions of hazard, risk, accident, danger, accident rate, frequency and severity, environmental aspect, environmental incident.	
K16	Recording procedures in relation to statutory requirements.	

Condition of the Mine

PROMS16 – Develop and Implement the Mine Emergency Procedure		
Knowledge Statement		Elements
K17	The major hazards and risks associated with mining in general and the specific mine/ mining operations.	
K18	The scope and limitations of the mine, its design and layout, including current areas of use, abandoned areas and future developments as appropriate.	
K19	Geological features that may affect the safe operation of the mine.	
K20	Geological and/ or physical indications of potentially deteriorating/ unsafe conditions.	
K21	Acceptable condition of roadways (and if applicable working face/s).	
K22	Acceptable condition of roof and side walls.	
K23	Acceptable condition of ground support system/s and indications of deterioration.	
K24		

	Acceptable atmospheric conditions and functioning of ventilation system/s.	
K25	Hazardous gasses (noxious/flammable); range of gasses, how these arise in the mine, where these might accumulate, inspection method, acceptable levels, affects if not addressed.	
K26	Hazardous dusts (respirable/flammable); range of dusts, how these arise in the mine, where these might accumulate, inspection method, acceptable levels, affects if not addressed.	
K27	Range/ type of acceptable condition of facilities identified for use in emergency situations.	
K28	Range/ type of acceptable condition of additional safety/ hazard prevention systems/ equipment (e.g. barriers, dust suppression systems, fire-fighting equipment).	
K29	Actions to be taken in the event of identifying an aspect of the condition of the mine that may lead to a hazardous situation or unsafe working.	
K30	The type and purpose of environmental monitoring activities.	
K31	The effect that activities in one area can have on the activity, health, and safety of others.	
K32	How emergency situations can arise in your area of responsibility.	
K33	Responsibilities of self and others and procedures to follow in event of an emergency situation.	
K34	Operational policies and procedures for the maintenance of a safe mine environment e.g. dust suppression, degassing.	
K35	The terms; quantity, flow, pressure, resistance, volume, and cross-sectional area of airways.	
K36		

	Regulatory requirements and organisational procedures for reporting and recording shortfalls in the quality of the mine environment.	
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Working with Others

PROMS16 – Develop and Implement the Mine Emergency Procedure		
Knowledge Statement		Elements
K37	Procedures for ensuring activities are carried out by competent personnel.	
K38	Arrangements for first aid, health, and welfare of personnel.	
K39	Your own responsibilities and the limits of those responsibilities.	
K40	The allocation of tasks and duties.	
K41	The benefits of team working and methods to achieve this.	
K42	Organisational reporting and recording procedures.	
K43	The importance of effective communications.	
K44	Communications systems/ procedures in area of responsibility.	
K45	The dangers of working in isolation.	
K46	Organisational requirements for recording/ monitoring personnel in your area of responsibility.	
K47	Training requirements for emergency situations.	

Mine operations

PROMS16 – Develop and Implement the Mine Emergency Procedure	
Knowledge Statement	Elements

K48	Sources of information in relation to mining operations.	
K49	Mine plans/ maps/ designs/ technical information.	
K50	Types, features, advantages, and limitations of alternative systems for emergency prevention and/ or control in relation to the mine.	
K51	The mine geological/ environmental factors that may affect the choice and performance of emergency prevention/ control/ response systems/ equipment/ facilities.	
K52	Organisational procedures in the event of problems/ repairs occurring that are not immediately rectifiable.	
K53	The possible consequences arising from mine emergencies.	
K54	Conditions that would influence the decision to either control the emergency or evacuate the mine.	

PROMS17 – Monitor the Method of Mine Working

Legislative

PROMS17 – Monitor the Method of Mine Working		
Knowledge Statement		Elements
K1	The legislative framework (Acts, Regulations, Approved Codes of Practice, Guidance).	Outline the main principles of the Health and Safety at Work Act 1974.
		Describe how the Health and Safety at Work Act 1974 allows for the development of Regulations, Approved Codes of Practice, and Guidance.
		List the regulations that may have relevance to mine operations.
		List any guidance that is relevant to surveying and underground surveying.
K2	The legislative definition of a mine, and the classification of mines.	Outline what the Mines Regulations 2014 say in relation to when operations become a mine.
		Define the various classifications of the mine (you should consider the types of minerals produced and whether the mine is in operation or not).
		Outline what the Mines Regulations 2014 say in relation to the notification of mining operations.
K3	The management and administration control structure and its purpose (including accountability and ultimate authority).	Outline what the Mines Regulations 2014 require in relation the development and implementation of a management structure.
K4	The statutory duties, role, and responsibilities of mine owner, management, and supervision.	Outline the duties of the Mine Owner under the Mines Regulations 2014.
		Outline the duties of the Mine Operator under the Mines Regulations 2014.
		Outline what is required by the Mines Regulations 2014, in relation to the provision of supervision.
K5	Personal statutory duties and responsibilities, and the limits of that responsibility.	Outline the requirement of the Mines Regulations 2014, in relation to establishing competence and defining the roles, responsibilities, and any limitations on those responsibilities.
		Outline the key roles and responsibilities within the survey department at your mine.

K6	Personal area/ district of responsibility.	When planning a mine, outline the requirements of the Mine Regulations 2014 in establishing the various areas of the mine (districts). When planning a mine, outline the requirements of the Mine Regulations 2014 in ensuring that the area of the mine can be inspected.
K7	Responsibilities of mine employees.	Outline the responsibility of employees under the Health and Safety Work Act 1974. Define any specific responsibilities that are placed on the employees at your mine, and how those responsibilities are communicated and controlled.
K8	Legislation in relation to the specific hazards applicable to the mine (e.g. in relation to fire, ground control and ventilation).	Outline the key hazard identified by Part 3 of the Mines Regulations 2014. For each of the hazards identified by Part 3 of the Mines Regulations 2014, outline the key requirements placed on the mine operators and a summary of what the Guidance requires in relation to the control of those major mining hazards. Outline the key requirements of the Mines Regulations 2014, and the requirement to secure adequate ventilation and the key requirements of the guidance. Outline the key requirements of the Mines Regulations 2014, and the requirement to have in place emergency arrangements and the key requirements of the guidance.
K9	Legislation applicable to mining operations in general.	List any other regulation that is applicable to mining within the UK, and briefly outline what elements are applicable (for example PUWER/ LOLER etc.).
K10	Statutory requirements for a safe system of work.	Outline the requirements of the Health and Safety at Work Act 1974, and the requirements to ensure that a safe system of work is available. Outline the requirements of the Management of Health and Safety at Work Regulations 1999, and the key requirements to ensure that risks are considered, and a safe system of work developed.

		Outline the requirements of the Mines Regulation 2014, and where there are requirements to assess the risks specific to work activity and provide safe system of work (for example ground control).
K11	Definitions of hazard, risk, accident, danger, accident rate, frequency and severity, environmental aspect, and environmental incident.	Take the requirements straight from the knowledge statement.
K12	Duties, powers, and responsibilities in the event of an emergency situation (e.g. fire, inrush, evacuation, mine rescue).	Briefly outline the emergency arrangements at your mine.
		Briefly outline the duties and key responsibilities of those that may be involved in an emergency at your mine.
		Describe the role of the surveyor (technical surveyor) at your mine in the event of an emergency.
K13	Statutory requirements and organisational procedures for the installation, commissioning, inspection, examination, testing and maintenance of plant and equipment.	Outline the requirements of the Health and Safety at Work Act when it comes to the installation, inspection, maintenance, testing and commissioning of plant.
		Outline the requirements of the Mines Regulations 2014 when it comes to ensuring there are systems in place to examine, test, maintain and commission plant installed at a mine.
		List any other regulations that relate to mining where there are specific requirements for the maintenance of plant and equipment (for example PUWER/ LOLER etc.).
K14	Statutory and organisational requirements for personal protective equipment (routine and emergency).	Briefly outline the hierarchy of measures that can be taken to reduce and control risk, and where PPE is within that hierarchy
		Define the minimum requirements for PPE within your organisation for routine operations within your mine.
		Outline the key requirements of the Personal Protective Equipment Regulations.
		Define any additional personal protective equipment that may be provided at your mine to assist with escape (or rescue) in the event of an emergency at your mine.
K15	Recording procedures in relation to statutory requirements	Outline your organisation's process for recording information required to ensure compliance with statutory instruments.

K16	Statutory requirements and organisational procedures for the operation of the mine (e.g. surface facilities, mine access/ egress, ventilation, transportation, roadways, development areas, mineral production faces, storage areas, abandoned areas; as appropriate to the mine).	Take questions directly from the statement (reference to the requirements of the Mines Regulations 2014).
K17	Statutory requirements and operational procedures for strata support.	Take questions directly from the statement (reference to the requirements of the Mines Regulations 2014).

Condition of the Mine

PROMS17 – Monitor the Method of Mine Working		
Knowledge Statement		Elements
K18	The major hazards and risks associated with mining in general and the specific mine/ mining operations.	Outline the major mining hazards that are identified with the Mines Regulations 2014. Outline the major mining hazards that are present underground at your mine.
K19	The scope and limitations of the mine, its design and layout, including current areas of use, abandoned areas and future developments as appropriate.	Take questions directly from the statement.
K20	Geological features (e.g. faults, spark inducing mineral) that may affect the safe operation of the mine.	Define how presence of faults at your mine are detected. Define how faults influence the way the mine is operated, the additional risks that a faulted area may introduce and any additional precautions that may be required if working within faulted areas. Define how faults are plotted on the mine and other operational plans. Outline any other geological features that may be present within your operation, and define how these are identified, recorded and the impact that they can have on the productivity/ product produced.
K21	Geological and/or physical indications of potentially	Outline the process that is used to identify potential areas of working that may be affected by inrush or outburst.

	deteriorating/ unsafe conditions (that might lead to e.g. inrush, outburst, collapse, spontaneous combustion).	In the event that these types of features are identified, outline the process that is used to verify the presence or other wise.
		Define how such features change the way the mine is operated within your organisation, and the precautions that are taken as the workings approach these areas.
		Outline the types of checks that are required to be made as these areas are approached (you should consider checks made by the survey departments, and those made by those with responsibility for managing and supervising mining activities).
		Define how geological areas of risk are identified, and how these risks are recorded on plans (or other media).
		How is this information used to as you approach these areas of risk.
K22	Acceptable condition of roadways profile (including roof and sides and if applicable working face/s).	Define your organisation standards when it comes to changes in roadway profile.
		How is the profile of the roadway monitored by those with responsibility.
		How is change monitored and recorded in your organisation.
		Outline any specific action/ trigger levels that relate to the condition and profile of the roadway (including roof and sides).
K23	Acceptable condition of ground support system/s and indications of deterioration.	Outline how support systems are designed within your organisation.
		Define how the support design is translated to support plans within your organisation.
		See K22 of PROMS17 (Monitor the Condition of the Mine).
K24	Acceptable atmospheric conditions and functioning of ventilation system/s.	Outline the minimum requirements for operating the mine from a ventilation perspective.
		Within your mine what are the typical minimum quantities of ventilation that are required, and why is that quantity selected, and what hazards is it designed to control.
		How is the information presented on the plans that the mine is required to keep.
		Within legislative and within your organisation what are the minimum and maximum standards when it comes to controlling hazards (e.g., minimum oxygen

		levels, maximum levels of flammable gas etc.).
		How is this information captured and recorded within your organisation.
K25	Hazardous gasses (noxious/ flammable); range of gasses, how these arise in the mine, where these might accumulate, inspection method, acceptable levels, affects if not addressed.	See K24 of PROMS17 (Monitor the Condition of the Mine).
		Where in you mine are noxious/ flammable gasses likely to accumulate?
		Outline how those with the responsibility for managing and supervising mining operations inspect the mine to identify the presence of or otherwise of noxious/ flammable gasses.
K26	Hazardous dusts (respirable/ flammable): range of dusts, how these arise in the mine, where these might accumulate, inspection method, acceptable levels, affects if not addressed.	See K24 of PROMS17 (Monitor the Condition of the Mine).
		Outline how hazardous dusts may be formed within your mine.
		Outline the methods that are used to detect the presence of hazardous dusts in your mine, and how these are sampled and detected.
		Identify the types of controls that are in place to ensure that the risks from hazardous dusts are minimised.
		Outline how those with the responsibility for managing and supervising mining operations inspect the mine to identify the presence of or otherwise of hazardous dusts.
K27	Acceptable condition of additional safety/ hazard prevention systems/ equipment (e.g. barriers, dust suppression systems, fire-fighting equipment).	Take questions directly from the statement.
K28	Actions to be taken in the event of identifying an aspect of the condition of the mine that may lead to a hazardous situation or unsafe working.	Take questions directly from the statement.
K29	The type and purpose of environmental monitoring activities.	See K24 of PROMS17 (Monitor the Condition of the Mine).
		See K25 of PROMS17 (Monitor the Condition of the Mine).
		See K26 of PROMS17 (Monitor the Condition of the Mine).
		Briefly describe the types of monitoring systems that are used in your mine to

		indicate the condition of the mine environment, what are: • The trigger levels for any alarm. • The actions to be taken in the event of any alarm.
K30	The effect that activities in one area can have on the activity, health, and safety of others.	Take questions directly from the statement.
K31	How emergency situations can arise in your area of responsibility.	Take questions directly from the statement.
K32	Responsibilities of self and others and procedures to follow in event of an emergency situation.	See K12 of PROMS17 (Monitor the Condition of the Mine).
K33	Operational policies and procedures for the maintenance of a safe mine environment e.g. dust suppression, degassing.	See K24 of PROMS17 (Monitor the Condition of the Mine). See K25 of PROMS17 (Monitor the Condition of the Mine). See K26 of PROMS17 (Monitor the Condition of the Mine). List any operational procedures/ policies that are in place within your organisation that define the way that the mine is managed, supervised and operated to ensure a safe mine environment.
K34	Legislative requirements for coal/combustible dust/stone dust ratios (if applicable).	NA
K35	The terms; quantity, flow, pressure, resistance, volume, and cross-sectional area of airways.	When considering mine ventilation, and ventilation plans, outline what is meant by the terms: • Quantity. • Flow. • Pressure. • Resistance. • Volume. • Cross sectional area. How is this type of information relating to the above recorded on ventilation or working ventilation plans.
K36	Regulatory requirements and organisational procedures for reporting and recording shortfalls in the quality of the mine environment.	Take questions directly from the statement.

Working with Others

PROMS16 – Develop and Implement the Mine Emergency Procedure		
Knowledge Statement		Elements
K37	Procedures for ensuring activities are carried out by competent personnel.	Outline how the required competencies to carry out certain tasks/ roles are defined within your organisation.
		Outline the process for refreshing or reviewing competencies within your organisation.
K38	Arrangements for first aid, health, and welfare of personnel.	Outline the legislative requirement under the First Aid at Work Regulations to have first aid arrangements available at your site.
		Briefly outline the arrangements for first aid that exists at your mine.
		Briefly outline the arrangements that exist for monitoring or screening the health of the team at your mine.
		Briefly outline the arrangements that are in place to ensure the welfare of the team at your mine.
K39	Your own responsibilities and the limits of those responsibilities.	As the mine surveyor or technical surveyor briefly outline your roles and responsibilities.
		Outline the limits of any responsibilities that you have in your role as mine surveyor or technical surveyor.
		The procedures to be followed should there be a requirement to vary those levels of responsibility.
K40	The allocation of tasks and duties.	Outline how tasks are allocated to the survey department.
		Outline how tasks and work activity is allocated to those within the survey department.
K41	The benefits of team working and methods to achieve this.	In your own words define the benefits that you feel that you get from working as part of a team.
		Outline what your department does to promote teamwork.
		Outline what your organisation does to promote teamwork.
K42	Organisational reporting and recording procedures.	Take questions directly from the statement.

K43	The importance of effective communications.	In your own words define why communication within the organisation/ department is important.
K44	Communications systems/ procedures in area of responsibility.	Outline the various types of communication that are used within your department and organisation, what are the benefits and issues with each type.
K45	The dangers of working in isolation.	What are the potential issues for an individual working in isolation.
		What are the potential issues for an organisation working in 'silos'.
K46	Organisational requirements for recording/ monitoring personnel in your area of responsibility.	Briefly outline the process within your organisation for monitoring the performance of the team, and the individual.
K47	Types, features, advantages, and limitations of methods of working the mine (for e.g. access/ egress to the mine, mineral winning, transportation, strata support as applicable to the mine and its operations).	Take questions directly from the statement.
K48	Sources of information in relation to methods of working the mine.	Take questions directly from the statement.
K49	Mine plans/ maps/ designs/ technical information (e.g. 5-year plan, layout plan, operational plan).	Outline the types of plans that are required within your organisation.
		Outline how these plans are used as part of the wider planning process for the mine or organisation.
		Identify other information that is used as part of the wider planning process, and the sources of that information.
		How is all the information consolidated, and how is that used to produce operational plans for those with the responsibility for mine operations.
K50	Relevant approved codes of practice and guidance for working safely.	See the legislation section of PROMS17 (Monitor the Condition of the Mine).
K51		See the legislation section of PROMS17 (Monitor the Condition of the Mine).

	Industrial standards/ specifications in relation to mining plant and equipment.	
K52	The principal activities involved in mining operations and mineral winning.	Outline the key process used for the: • Mineral excavation. • Support installation. • Mineral transport. • Mineral processing. • People and material transport. Within your organisation.
		Identify any limiting factors with the principal activities that impacts the overall production or quality of mineral produced.
K53	The main functions within the operational cycle.	See K52 of PROMS17 (Monitor the Condition of the Mine).
		Briefly outline the operational cycle used for mineral winning within your organisation.
K54	Mine logistics procedures and systems for the delivery of supplies	See K52 of PROMS17 (Monitor the Condition of the Mine).
K55	Organisational procedures in the event of problems/ repairs occurring that are not immediately rectifiable.	Take questions directly from the statement.

MPQMG37– Measure and Setout Dimensional Control of the Mining Requirements

MPQMG37 – Measure and Setout Dimensional Control of the Mining Requirements		
Knowledge Statement		Elements
K1	The organisational approved policies, procedures, and practices as appropriate to the work activity.	See K22 of PROMS17 (Monitor the Condition of the Mine).
		See K23 of PROMS17 (Monitor the Condition of the Mine).
		Outline how the dimensions for mining requirements are established within your organisation.
		Define how information relating to dimension is controlled through procedures and practices within your organisation.
		The role of the survey department in ensuring that works are completed to the required standard and are within the defined procedures and practices.
K2	The hazards and risks associated with the work activity, how they affect yourself, others, and the work environment, and how they are controlled.	See K22 of PROMS17 (Monitor the Condition of the Mine).
		Outline the risks that are associated with carrying out the activities to ensure that works are completed to the required standard and are within the defined procedures and practices.
		Outline the types of control that you and others put in place to minimise the risks whilst completing the activities to ensure that works are completed to the required standard and are within the defined procedures and practices.
K3	The organisational information, communications, and reporting arrangements relating to the work activity.	Define any specific communication that needs to have been completed to make persons aware that you are carrying out activities to ensure that works are completed to the required standard and are within the defined procedures and practices.
K4	How to interpret the organisational information for the work activity.	Take questions directly from the statement.
K5	The types of tools and equipment required for the work	See K15 of PROM8 (Produce Plans of the Mine Layout).
		See K16 of PROM8 (Produce Plans of the Mine Layout).

	activity, how to check and use them, and their limitations.	See K17 of PROM8 (Produce Plans of the Mine Layout). Given the range of activities to set out work areas, identify some of the tools and equipment that you would typically use to complete the task.
K6	The defects or faults that can occur with the tools and equipment required for the work activity.	See K15 of PROM8 (Produce Plans of the Mine Layout). See K16 of PROM8 (Produce Plans of the Mine Layout). See K17 of PROM8 (Produce Plans of the Mine Layout). Identify the types of defects or faults that may occur when using the tools to set out or measure work areas.
K7	The other resources required to support the work activity, their uses, how to check them, and how to secure, store, or dispose of after use.	Take questions directly from the statement.
K8	Reference points for the work activity and how to locate them.	Candidates will be educated in station management, point classification, and whole to part.
K9	How to set up, secure, measure, mark, calculate and set out for the work activity.	Covered in PROMS8 Surveying K18 .
K10	Problems that can occur with the work activity, and how to respond to them.	Additional to PROMS8 , candidates will have knowledge of sources of error and knowledge of blunders and how to trouble shoot.
K11	The limits of your own role and responsibilities.	As outlined in the Mines Regs 2014 but will be specified by the employer.
K12	The actions to be taken in the event of damage, breakdown, or unsatisfactory performance of resources.	Candidates must be aware that if a positional issue arises the Survey Department have the authority to stop mining if they believe it unsafe to proceed.
K13	Reporting procedures on completion of the work.	Company Specific.

MPQMG17 – Setout Secondary Dimensional Work Controls

MPQMG17 – Setout Secondary Dimensional Work Controls		
Knowledge Statement		Elements
K1	The organisational approved policies, procedures, and practices as appropriate to the work activity.	See K22 of PROMS17 (Monitor the Condition of the Mine).
		See K23 of PROMS17 (Monitor the Condition of the Mine).
		Define how information relating to secondary dimensional work is controlled through procedures and practices within your organisation.
K2	The organisational information, working instructions, communications and reporting arrangements relating to the work activity.	Candidates must be aware of the importance of the authorisation to mine process.
K3	The types of communication systems used in the mine.	Candidates should be aware of cap lamp signalling techniques.
K4	The hazards and risks associated with the work activity, how they can affect yourself, others, or the environment, and how they are controlled.	See K22 of PROMS17 (Monitor the Condition of the Mine).
		See K2 of MPQMG37 (Measure and Setout Dimensional Control of the Mining Requirements).
K5	The resources required to complete or support the work activity, their uses, how to check them, and how to secure, store, or dispose of them after use.	Candidates must be conversant with using total stations theodolites, laser scanners, and automatic levels. They must be aware of the need to use faces of a total station/ theodolite, the two peg test, and closed loop laser scanning.
K6	How to use tools and equipment required to set out dimensional work controls.	Candidates must be competent with the use of both traditional and modern setting out tools, e.g. total station, lasers, theodolite, and various tapping methods.
K7	Methods of calculating height, depth, angle, length, or area associated with the method or procedure to set out dimensional work control.	Covered in PROMS8 – Produce Plans of a Mine Layout.
K8		Candidates must be competent with setting out techniques and their sources of error.

	The precautions to be taken whilst setting out dimensional work controls.	
K9	The problems that can occur when setting out dimensional work controls, and how to respond to them.	The candidates must be aware of sources of error and how to spot blunders before they create an issue.
K10	The limits of your own personal responsibility.	As outlined in the Mines Regs 2014.
K11	Reporting procedures on completion of the work.	Candidates must be aware of Ceasing surveyors reports and the importance.

New Section – Using Technical Approaches to Mine Surveying

New Section – Using Technical Approaches to Mines Surveying		
Knowledge Statement		Elements
K1	Use of Drones.	Candidates must be aware of the importance of CAA (Civil Aviation Authority) training and its importance to operate.
		Candidates and tools must be registered with the CAA to operate.
		Candidates must be aware of the importance of Public Liability Insurance.
K2	Use of LIDAR.	Candidates must be aware of the limitations of LIDAR scanners and SLAM algorithms.
		Candidates must bear in mind the whole to part mentality when using LIDAR scanners.
K3	3D graphic representations of mine layout and mineral extraction.	Candidates should be aware of the 3D mine model and the benefits of its use in mine planning.
K4	Use of terrestrial Laser Scanners.	Candidates should be aware of Laser Scanning techniques and their applications/ sources of error.
K5	GPS.	Candidates should be aware of precise relative GPS and its use for determining quality surface baselines in accordance with the standards defined in: National Coal Board, Surveying Practice, CR/1, 1982.

Performance Elements

The performance elements have been captured directly into the portfolio layout, the tables in this section provide information on the performance statements listed within the National Occupational Standards.

MPQVG01 (MT17) – Operate Safely in the Mine Environment

These performance elements can be satisfied by completing the common induction module (working safely and efficiently in the underground environment).

MPQVG02 (MT18) – Conform to Efficient Work Practices

These performance elements can be satisfied by completing the common induction module (working safely and efficiently in the underground environment).

PROMS7 – Design the Layout of the Mine Extraction Process

Prepare the Design Requirements.

PROMS7 – Design the Layout of the Mine Environment		
Performance Statement		Elements
P1	Confirm the purpose, specification, and requirements of the design.	
P2	Ascertain the proposed method of working/ use of the area, and proposals for eventual abandonment.	
P3	Establish the required format for the design.	
P4	Establish the priority and timescale for the design.	
P5	Identify the degree of detail and supporting information required.	
P6	Identify which parts of the overall project require detailed design.	
P7	Check for existing information (e.g. maps, plans, surveys, geological information) relevant to the work to be undertaken.	
P8	Seek additional information/ specialist advice when required.	
P9	Identify relevant factors and data which influence the detailed design and prioritise their importance.	
P10	Identify and assess whether existing design solutions containing similar design criteria might be relevant.	
P11	Identify other areas that may be affected by, or impact on the design.	
P12	Establish effective communications with all relevant persons/ departments.	

Produce the Design

PROMS7 – Design the Layout of the Mine Environment		
Performance Statement		Elements
P13	Choose techniques for developing detailed designs and associated information which conform to relevant codes of practice and organisational requirements.	
P14	Produce design/s and supporting information that meet the purpose, specification, and requirements.	
P15	The design includes appropriate divisions into districts, defined in relation to the work activity.	
P16	The design relates to a specified method of working.	
P17	Assign appropriate reference identities to design/s according to conventions and organisational requirements.	
P18	Check the design meets regulatory requirements.	
P19	Check for existing information (e.g. maps, plans, surveys, geological information) relevant to the work to be undertaken.	
P20	Check that the design meets requirements for inspections.	
P21	Evaluate the effectiveness of alternative designs.	
P22	Present design/s to relevant persons for approval/ confirmation.	
K23	Amend and/ or produce additional designs and/ or information on request.	
K24	Produce and retain complete, accurate, and current records according to regulatory requirements and organisational procedures.	

PROMS8 – Produce Plans of a Mine Layout

Prepare for Survey Operations

PROMS8 – Produce Plans of a Mine Layout		
Performance Statement		Elements
P1	Confirm the requirements of the survey and/ or plan production.	
P2	Check and confirm, before starting work, that management have given their permission.	
P3	Check for existing information (e.g. maps, plans, surveys, geological information) relevant to the work to be undertaken.	
P4	Arrange for suitable equipment to be brought to the site.	
P5	Check, calibrate, and adjust equipment so that it is accurate before it is used for taking measurements.	
P6	Brief the people who will be involved in the survey about the survey arrangements and the safety arrangements.	
P7	Contact relevant stakeholders, provide them with clear and accurate information and ask for their cooperation.	
P8	Check and confirm that signs, arrangements for personal safety, equipment, and site access conform to good practice, legislation, and regulation.	

Produce Plans for a Mine Survey

PROMS8 – Produce Plans of a Mine Layout		
Performance Statement		Elements
P9	Conduct the survey in a way which maintains the level of accuracy required, balances content and cost and keeps disruption to a minimum.	
P10		

	Conform to safe working practices when in the mine.	
P11	Consult with specialists when specialist information is needed which is relevant to the survey.	
P12	Set accurate horizontal and vertical controls and record them.	
P13	Take accurate observations and measurements using valid methods, meeting regulatory and organisational requirements.	
P14	Change work procedures and practices to allow for different circumstances and conditions.	
P15	Record survey data clearly and accurately and store it securely for later analysis.	
P16	Maintain the equipment in operating condition and store it securely.	

Analyse and Present Survey Data

PROMS8 – Produce Plans of a Mine Layout		
Performance Statement		Elements
P17	Collect enough survey data to allow an accurate analysis to be made.	
P18	Check and verify the survey data and adjust the data to maintain accuracy and integrity.	
P19	Analyse the survey data accurately.	
P20	Present the data analysis, the commentary, and any support information accurately, clearly, and in a format which is suitable for those who need to use it.	
P21	Advise people who will be using the survey data on how to interpret it.	
P22	Ensure data/ documents are stored according to regulatory requirements and organisational procedures.	

PROMS17 – Monitor Method of Mine Working

PROMS17 – Monitor Method of Mine working		
Performance Statement		Elements
P1	Ensure checks are made to confirm that workers are carrying out the work competently and as specified.	Outline the importance of the employee review and audit process.
P2	Co-ordinate activities in various locations and/ or functions.	Outline management techniques such as the Eisenhower matrix.
P3	Obtain information and regularly review the progress of the work.	Give an overview of the importance of CPD and benchmarking with your peers.
P4	Ensure checks are made to identify whether the work encounters any unforeseen hazards or aspects likely to endanger the health, safety, or welfare of persons engaged in the work.	Candidates should be trained to a safety standard of IOSH Working Safely and be proficient with the creation of RAMS
P5	Issue instructions confirming the continuation of the work, or with amendments as appropriate.	Demonstrate how to instruct mining teams so that they can best utilise the setting out.
P6	Respond to changes in circumstances or queries.	Provide an overview of the requirements of a mine and how focus can change due to geological uncertainty.
P7	Monitor and review the organisational arrangements to ensure plant and equipment is installed, commissioned, inspected, examined, tested, and maintained.	In accordance with the Mines Regs 2014.
P8	Ensure records are maintained of all persons below ground.	In accordance with the Mines Regs 2014.
P9	Ensure the work is reported/ recorded according to statutory requirements and to organisational and operational procedures.	In accordance with the Mines Regs 2014.

MPQMG37 – Measure and Setout Dimensional Control for Mining Requirements

MPQMG27 – Measure and Setout Dimensional Control for Mining Requirements		
Performance Statement		Elements
P1	Carry out the work in compliance with the organisational approved policies, procedures, and practices.	Describe the importance of having company standards and why it is necessary to operate within them.
P2	Identify the hazards and risks associated with the work activity and carry out the work minimising risks to yourself, others, plant and machinery, and the work environment.	Outline the onsite risk assessment process and its importance prior to undertaking the day's work.
P3	Communicate with others using the agreed communication method.	Surveyors control the starting point for mining ensuring that Company communication standards are adhered to is vital in ensuring unauthorised mining does not occur.
P4	Obtain and interpret information on the work activity required.	Communication is key to jobs running smoothly. Communicating with shift managers and reading the shift report is essential.
P5	Agree with others the work to be carried out.	Describe how all parties with vested interests need to be aware of the scope of work being undertaken so that it can be planned and therefore machine availability can be maximised.
		Outline how optimising the gaps in production time for underground survey work is critical for driving efficiency.
P6	Check the availability and suitability of the resources required for the operation of the work activity, and completion of the work.	Describe the process of project management and how engineering issues can unintentionally become critical paths.
P7	Locate and confirm the reference points for the work activity.	Outline how Survey Stations need to be stored in a set location and explain the point class system.
P8	Select, position, and secure measuring, setting out, and marking equipment for the work activity.	Demonstrate how survey stations, centre lines, benchmarks, and grade lines are installed.
		Explain the appropriate equipment for each task above and its limitations.

P9	Carry out the agreed work plan.	Further describe areas of responsibility and the importance of fulfilling it.
P10	Make adjustments to the work plan as required to complete the work within limits of your responsibilities, recording and reporting any variations from the specified work activity.	Outline Project Management techniques.
P11	Check and store the tools and equipment used.	Explain how the mining environment accelerates the useable life of Surveying equipment. The need to regularly clean the kit and store it in a dry environment with a constant temperature to minimise the possibility of condensation build up.
P12	Report according to organisational requirements.	Describe how uniformity in reporting techniques throughout a business is key to interdepartmental accessibility.

MPQMG17 – Setout Dimensional Work Controls

MPQMG17 – Setout Dimensional Work Controls		
Performance Statement		Elements
P1	Obtain and interpret information and work instructions on the work activity and the required dimensional control.	Outline the design process and the importance of how setting out must be within tolerance of design and useable by mining teams.
P2	Agree with others the work to be carried out.	Explain how a scheme of delegation works.
P3	Confirm sufficient resources are available to support the work activity.	Explain materials and consumables management process.
P4	Check the suitability of the available resources.	Explain the difference between Precision and Accuracy. Explain how to check equipment and ensuring it is still useable using methods like the two-peg test and performing rounds of angles on both faces.
P5	Check the work area conforms with obtained information and working instructions.	Explain the importance of doing a survey prior to planning new developments to ensure that.
P6	Organise the work to minimise risks.	Outline safe working procedures and good housekeeping.
P7	Communicate with others using organisational procedures.	Additional content from the mine surveyors
P8	Set out dimensional work control for working instructions.	Describe the accuracy of surveying to work will differ from job to job and where to acquire this information.
P9	Carry out work activity in compliance with approved policies, procedures, and practices.	Work to be carried out in accordance with National Coal Board, Surveying Practice CR/1, 1982.
P10	Adjust the work plan within limits of own responsibilities as required to complete the work.	Explain the principles of project management.
P11		Outline good checking procedure highlighting the requirements for secondary and independent checks.

	Check and confirm the work completed complies with specified work instructions.	
P12	Check and clean tools and equipment.	Explain how the mining environment accelerates the useable life of Surveying equipment. The need to regularly clean the kit and store it in a dry environment with a constant temperature to minimise the possibility of condensation build up.
P13	Store resources in accordance with approved policies, procedures, and practices.	Instruments need to be kept in an environment with a constant temperature to minimize the risk of it seizing. As the nature of the mining environment will create dust that can penetrate the casing seals causing damage.
P14	Deal with defective resources in accordance with approved policies, procedures, and practices.	Outline the calibration and renewal process and explain the importance of company standards.
P15	Report according to organisational requirements.	Outline what organisational requirements are, and explain the importance to adhering to them.