



## Underground Operations Manual



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Department of  
**Agriculture and  
Rural Development**  
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## Foreword

This new Rivers Agency Underground Operations Manual replaces the previous version produced by Bullen Consultants and issued in October 2000.

The purpose of this manual is to raise the awareness of all staff involved in confined spaces work as well as those who have management responsibility for this work. The manual is also intended to clearly prescribe procedures and protocols relating to confined spaces work. This will maintain the usual high levels of health and safety for all staff when carrying out underground work and it will also improve the effectiveness and efficiency of these work activities.

The recommendations contained in this manual are set out to ensure we are statutorily compliant with all relevant health and safety regulations and, in particular, the Confined Spaces Regulations (Northern Ireland) 1999.

This manual has been developed by a sub-committee of staff within Rivers Agency, led by the Health and Safety Advisor. There has been consultation with both non-industrial and industrial staff who are involved in underground work on a regular basis.

This Underground Operations Manual will be covered in detail during all bespoke Confined Spaces Training courses currently offered to relevant staff.

It is imperative that all staff work to the guidelines set out in this manual. The safety and health of all staff is paramount and the continued excellent health and safety record relating to underground works must be maintained.

I welcome this new Underground Operations Manual and commend it to all staff.



A handwritten signature in black ink that reads "CB McCallum". The signature is written in a cursive style.

Catherine McCallum  
Chief Executive

## Introduction

This manual has been produced by Rivers Agency Health and Safety Section. Other staff across the Agency from various sections have also been involved in the development of this manual.

This manual is intended to provide guidance to staff, thus ensuring that underground work carried out by Rivers Agency is carried out safely and efficiently. The normal underground operations of Rivers Agency are specifically covered in this manual including works and inspections of culverts, underground chambers and other associated infrastructure.



The 2015 manual has considered all current legislation relating to confined spaces and in particular the Confined Spaces Regulations (Northern Ireland) 1999. Current Approved Codes of Practice (ACOP's) have also been considered in the preparation of this manual and in particular the ACOP titled "Safe Work In Confined Spaces" published by the Health and Safety Executive Northern Ireland (HSENI).

Rivers Agency may occasionally carry out other work that will fall into the category of confined space works. This manual is not intended to cover such work. This work should be covered on separate risk assessments and Health and Safety Section can provide assistance and advice on such work activities.

The intention is that this Underground Operations Manual will be used not only as a guide to safe underground working but also as a reference when information or guidance is required on a particular topic. The manual is also intended to supplement confined space training courses delivered to all staff who carry out this work.

# 1. Legal Definition of Confined Spaces

A confined space according to the Confined Spaces Regulations (Northern Ireland) 1999 is as follows;

“confined space” means any place, including any chamber, tank, vat, silo, pit, trench, pipe, sewer, flue or other similar space in which by virtue of its enclosed nature, there arises a reasonably foreseeable specified risk”

According to the ACOP a “confined space” has two defining features;

- Firstly it is a place that is substantially enclosed (but not always) **and**
- Secondly there will be a reasonably foreseeable risk of serious injury from hazardous substances or conditions within the space or nearby.

**Both conditions must be satisfied.**



**When does work to infrastructure be considered as underground works and then covered by the Confined Spaces Regulations?**

## 2.1 Examples of Works on Infrastructure Considered NOT to be Confined Spaces



### **Maintenance to chamber behind sea-wall / flood defence.**

Substantiality enclosed but no foreseeable risk of serious injury from hazardous substances. Open and vented to atmosphere.

**Not considered confined spaces works for normal maintenance works.**

### **Installation of Culverts / Pipes.**

Limited flow of water during installation of pipes. No risk of serious injury from hazardous substances during normal installation work.

**Not considered confined spaces works during installation of pipes.**



### **Working within a coffer-dam.**

Sheet piles forming an enclosed space where excavation is being carried out. The area is not substantially enclosed and open to the atmosphere.

**Not considered confined spaces works.**



## 2.1 (continued). Further Examples of Works on Infrastructure Considered NOT to be Confined Spaces



**Plastering wall directly under or next to inlet grille (not entering the culvert or going down culvert).**

Substantially enclosed but no foreseeable risk of serious injury from hazardous substances. Open and vented to atmosphere.

**Not considered confined spaces works for plastering operation.**

**Clearing large road box culvert using mini-digger.**

The box culvert is well vented due to the size of the culvert (large enough for a mini digger) and is reasonably short in length.

The risk assessment should include the use of a gas detector if any concerns exist regarding exhaust fumes from machinery or any likelihood of hazardous substances.

**Not considered confined space works for a road culvert large enough to operate a mini-digger inside.**



Hazardous substances can come in several forms including:

1. **Naturally occurring substances** including bacteria, viruses and fungi. This covers leptospirosis, hepatitis for example.
2. **Substances generated by work processes** including dust, welding fumes, lack of oxygen, oxygen enrichment.
3. **Substances used directly in work processes** including solvents and admixtures for example.



## 2.2 Examples of Work on Infrastructure Considered to be Confined Spaces



### **Walkthrough of Culverts.**

Substantiality enclosed with a foreseeable risk of serious injury from hazardous substances.

**Considered confined spaces works.**

### **Lamping surveys.**

If staff have to physically enter manholes to visually inspect upstream and downstream.

**To be treated as confined space works.**



### **Work within culverts.**

Substantiality enclosed with a foreseeable risk of serious injury from hazardous substances.

**Considered confined spaces works.**

### 3. Hazard Identification and Assessing Risk for Underground Works



It is an absolute legal duty for the employer to assess the occupational risks that workers may be exposed to. A risk assessment must be completed for all underground works and the risk assessment must identify any significant hazards and the relevant control measures. The type of risk assessment used is a qualitative risk assessment with a risk rating of H, M or L (High, Medium or Low). This qualitative approach will facilitate the dynamic nature of our work. It is in the same style as other risk assessment forms used in Rivers Agency.

#### **Staff carrying out risk assessments receive the necessary in-house training.**

The risk assessment has listed potential generic hazards which are encountered on most underground work scenarios. These are listed to assist the competent person carrying out the risk assessment to ensure these normally encountered hazards are considered. A blank risk assessment follows on page 14. Staff carrying out underground works must be informed of the significant findings of the risk assessment. The yellow coloured section of the risk assessment form identifies hazards and control measures and this is the relevant information which must be communicated to staff carrying out the works. The risk assessment form also has a tool-box talk section at the bottom where staff carrying out the works must sign to acknowledge the fact that they have received and understood the findings of the risk assessment.

#### **Risk assessment triplicate books are available from Health and Safety Section on request.**

There are **two** levels of risk category regarding underground works.

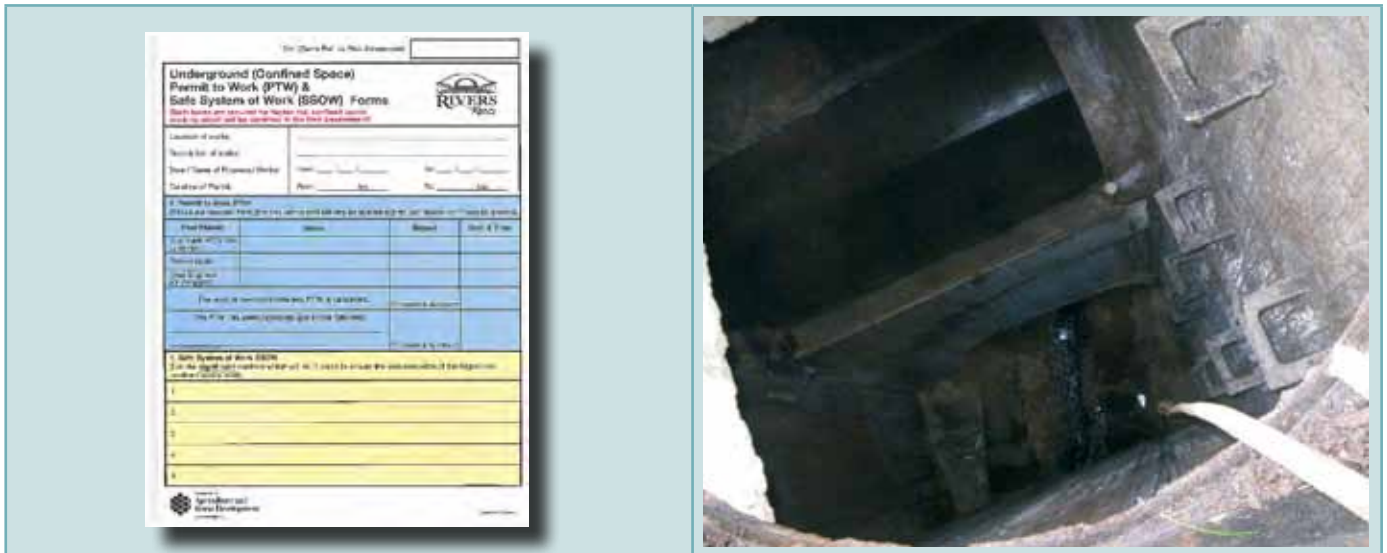
The risk category is a subjective question answered by the competent person supervising underground works for that day. The risk assessment asks this question. "Does this risk assessment indicate this work must be covered by a Permit to Work PTW? (PTW is only required for HIGHER risk works)".

Examples of higher risk works are outlined in the simple guide to underground works and are also listed in the table below.

<b>Risk Category (Normal / High)</b>	
<b>NORMAL RISK</b>	All routine underground works that are considered to fall within the Confined Spaces Regulations (for examples see page 8).
<b>HIGH RISK</b>	<p>Works that are identified as higher risk works by the competent person carrying out the risk assessment.</p> <p>Examples of higher risk works are outlined below:</p> <ul style="list-style-type: none"> <li>• Small culverts, either 900mm &amp; 1050mm in diameter.</li> <li>• Work in tidal situations.</li> <li>• Work in proximity to SWO or WWTW discharge outlets.</li> <li>• Deep culvert systems where deep chambers have to be accessed.</li> <li>• Culverts where detritus or serious biological hazards may be present.</li> <li>• In structurally compromised culvert systems such as grade 4's or 5's.</li> <li>• Culvert systems which are not familiar to staff.</li> </ul>

Higher risk works require the additional Permit to Work (PTW) and Safe System of Work (SSOW) forms completed and is covered in the next section. Normal risk works require the risk assessment forms **only**.

## 4. Permit to Work (PTW) & Safe System of Work (SSOW)



If the risk assessment or the conditions prescribed in the “simple guide to underground works” indicate that the works are higher risk then there is an additional requirement for Permit to Work (PTW) and Safe System of Work (SSOW) forms.

The **Permit to Work** (PTW) form is designed to ensure that:

- Senior staff, namely the Area Engineer or Assistant Area Engineer, are aware that higher risk work is being carried out within his or her area of responsibility.
- Senior staff ensure, by whatever means necessary, that this work is carried out safely and all staff as well as those who may be affected by our works, such as members of the public, are not exposed to unnecessary hazards.
- Senior staff are also aware of the time constraints of this higher risk work and must satisfy themselves that the work is carried out within agreed time limits.
- There is a formal mechanism whereby staff carrying out the works inform senior Area staff that this has been identified as higher risk work and will require a higher duty of care by all involved and the work will be time bound.

The permit to work (PTW) process is a straight forward process to ensure underground work activities which are considered higher risk are formalised. The PTW is signed off by staff supervising the works as well as senior staff who must be satisfied that the work is carried out safely and by trained and competent staff.

The **Safe System of Work (SSOW)** form is designed to ensure that:

- The significant controls required to cover higher risk underground work are identified and recorded.
- The most important information identified in the risk assessment is also recorded in this SSOW.
- Staff managing this work will have a raised awareness on how to control higher risk work.
- Senior staff signing this PTW and SSOW will be aware of how this higher risk work will be controlled and it will give them an opportunity to ensure this work is adequately managed.

This safe system of work (SSOW) process is a straight forward process to extract the important control measures from the risk assessment process and present them in a simple way for staff managing the work. The SSOW will also let senior staff know how this higher risk work will be controlled satisfactorily.

**PTW & SSOW triplicate books are available from Health and Safety Section on request.**



## Simple guide to underground working

<b>SIMPLE GUIDE TO UNDERGROUND WORKING</b>	
<b>Step 1</b>	<b>Identify the Objective of the Operation</b> (i.e what underground works are planned for that day)
<b>Step 2</b>	<p style="color: red;">Make a final judgement determining if the work can be carried out using alternative means such as jetter.???</p> <p style="color: red;">Is the risk acceptable for DLO staff to carry out this work?</p>
<b>Step 3</b>	Refer to : <ol style="list-style-type: none"> <li>1. Drawings of the relevant culverts and manholes.</li> <li>2. Previous relevant Risk Assessments.</li> <li>3. Records of previous relevant entries.</li> <li>4. Local knowledge and previous personal experience.</li> </ol>
<b>Step 4</b>	Carry out a risk assessment using the supplied triplicate book.
<b>Step 5</b>	If the risk assessment identifies this as higher risk work then the Permit to Work PTW and Safe system of Work SSOW must be completed. <p style="color: red;">Examples of higher risk works will include such works as:</p> <ul style="list-style-type: none"> <li>• Small culverts, either 900mm &amp; 1050mm in diameter.</li> <li>• Work in tidal situations.</li> <li>• Work in proximity to SWO or WWTW discharge outlets.</li> <li>• Deep culvert systems where deep access chambers have to be accessed.</li> <li>• Culverts where detritus or serious biological hazards may be present.</li> <li>• In structurally compromised culvert systems such as grade 4's or 5's.</li> <li>• Culvert systems which are not familiar to staff.</li> </ul>
<b>Step 6</b>	If the work is not high risk then the control measures identified in the Risk Assessment must be communicated to all staff involved in the work and all staff must sign the toolbox element of the Risk Assessment.
<b>Step 7</b>	If the work is higher risk then the PTW and SSOW (supplied as a separate triplicate book) must be completed and the additional control measures identified in the SSOW also communicated to the relevant staff. The PTW must be signed both before works commence and at the end of the works.
<b>Step 8</b>	<b>Effect Entry / Carry Out Works / Clear Site / Cancel PTW (high risk work only).</b>
<b>NOTE:</b> <b>It is anticipated that most works will be routine and not considered to be higher risk necessitating the additional requirements for PTW and SSOW.</b>	



Ref:

## Underground (Confined Space) Risk Assessments

Name of assessor: \_\_\_\_\_ Location of the works: \_\_\_\_\_

Date of Assessment: \_\_\_\_ // \_\_\_\_ \_\_\_\_\_ Description of works: \_\_\_\_\_

Significant <b>Generic</b> Hazards Associated with Underground Working	Risk rating H/M/L	Control Measures	Residual Risk rating H/M/L
Dangerous atmospheres.			
Manhole cover. Insecure / damaged step irons or access ladder.			
Structural Deterioration.			
Plant / Traffic / Pedestrians.			
Flooding / Tidal Influence.			
Working in a restricted / crouched position & twisting.			
Exposure to sewage, corrosive or dangerous liquids.			
Protruding pipes, services or other obstructions.			
Manual Handling.			
Slips / Trips / Falls.			
Site Specific Hazards	Risk rating H/M/L	Additional Control Measures	Residual Risk rating H/M/L

Does this risk assessment indicate that this work must be covered by a Permit to Work PTW?  
(PTW is only required for HIGHER risk work. Not normal confined space works)

Is there any member of staff involved in the underground work who has a physical / medical /  
historical condition that may affect their ability to carry out this work?  
*(if the answer is yes then this person must not participate in this work on this occasion)*

In your opinion do you consider the control measures above sufficient to allow the works to  
proceed? **(In the opinion of the assessor i.e. the person carrying out the risk assessment)**

Signed: \_\_\_\_\_  
  
Date: \_\_\_\_ // \_\_\_\_ \_\_\_\_\_

**TOOLBOX TALK** Date of Talk: \_\_\_\_ // \_\_\_\_ \_\_\_\_\_  
Site staff present at Toolbox talk (all staff to sign)

Ref: (Same Ref. as Risk Assessment)

## Underground (Confined Space) Permit to Work (PTW) & Safe System of Work (SSOW) Forms



**(Both forms are required for higher risk confined space working which will be identified in the Risk Assessment)**

Location of works:

---

Description of works:

---

Date / Dates of Proposed Works:

From: \_\_\_ // \_\_\_

To: \_\_\_ // \_\_\_

Duration of Permit:

From: h \_\_\_\_\_ rs

To: h \_\_\_\_\_ rs

### 1. Permit to Work PTW

(PTW's are required for higher risk works and will require special signed permission from Area Engineers).

Post Holder	Name	Signed	Date & Time
Applicant (PTO/TG1 or similar)			
Team Leader			
Area Engineer (or delegate)			
The work is now complete and PTW is cancelled.		(T / leader & Applicant)	
The PTW has been cancelled due to the following:		(T / leader & Applicant)	

### 1. Safe System of Work SSOW

(List the **significant** controls which will be in place to ensure the safe execution of this higher risk confined space work).

1

2

3

4

5



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## 5. Medical and Physical Requirements for Staff

Rivers Agency staff who are required to enter a confined space during underground operations must undergo an occupational health assessment. Occupational Health Service (OHS) carry out the necessary health assessments.



Departmental Human Resources (DHR) coordinate all medicals and liaise with OHS as required. DHR maintain a database for existing staff who have already attended medicals and use this to determine when medicals are next due. Further to this DHR should be notified, by management, of staff new to underground works so that medicals can be arranged. All staff attending a medical will be sent a “Health Questionnaire” and must have this completed prior to attending the OHS medical.

<b>Category ‘A’ (Industrial Staff)</b>	Staff who are required to carry out the full range of underground duties – including FBA and carry out rescue.
<b>Category ‘A’ (P&amp;T Staff)</b>	This is the preferred option for P&T staff who directly supervise underground works.
<b>Category ‘B’ (Industrial Staff)</b>	Staff who are required to carry out the full range of UG duties – excluding working with FBA and carrying out rescue.
<b>Category ‘B’ (P&amp;T Staff)</b>	Minimum requirement for P&T staff who need to enter underground.
<b>Unfit</b>	P&T and industrial staff assessed unfit to carry out underground works.

The OHS occupational health assessment will determine which category staff will fall into (Category 'A', 'B' or Unfit). Staff deemed to be "Unfit" can be reassessed at 3, 6 or 12 month intervals depending on the reasons for not meeting the necessary category.

The frequency of medicals for underground staff is 3 years for most staff carrying out UG work. If OHS identify an existing health condition or have concerns regarding an individual OHS may then increase the frequency of the medical and staff may be required to attend annually or every 2 years. Staff who carry out underground works and are over 59 years must receive an annual medical assessment.

It would be preferable that training and medicals are synchronised but in reality this is impractical and difficult to maintain.

The site specific risk assessment is designed to identify staff who have developed a physical / medical / historical health condition that may affect their ability to carry out underground works that particular day and they should not participate in this work in the short term and possibly long term. Line managers should monitor this and refer staff to OHS if necessary, or if a pattern of ill-health has emerged.



There is a weight limit for staff involved in underground working which has been imposed due to the Safe Working Load (SWL) of the winch. This weight limit takes account of the necessary equipment UG workers may carry with them.

The weight limits for staff are as follows:

<b>Category A</b>	<b>Max 100 kg (15 stone and 11 pounds)</b>
<b>Category B</b>	<b>Max 111 kg (17 stone and 7 pounds)</b>

**Weights are taken without shoes.**

## 6. Training Requirements

Four training courses are typically available for staff involved in underground works:

- **Confined Space Training (full)** – 4 day course for staff new to underground works or staff whose training has lapsed significantly more than the recommended 3 years refresher period.
- **Confined Space Refresher Training** – 2 day course. Staff require this training every 3 years. If 3 years has lapsed the H&S Advisor can be contacted for advice.
- **Confined Space Awareness Training** – 1 day course for staff who do not carry out underground works but have a management responsibility for those carrying out this work.
- **Confined Spaces Equipment Inspection** – 1 day course for staff who carry out the necessary regulatory and manufacturer's monthly inspection checks on all equipment.



Training requests must be sent to Corporate Support Branch (CSB) using the T&D2 form which is available on the Rivers Agency intranet site.

CSB record all training on the Rivers Agency training database. Training certificates are copied by CSB and the original certificate sent out, via line management, to the individual concerned.

The PTO responsible for coordinating underground works in each Area **MUST** maintain a separate record from the training data-base to ensure that all relevant staff are trained in line with the 3 year refresher period.



Training is procured and carried out by an external training provider.

Other issues that should be considered during training:

- ✓ Where possible teams / squads could be trained together. This is not essential but preferable to improve the effectiveness of the training.
- ✓ The training provider supplies all the necessary equipment. Sometimes the trainer's equipment may vary from our equipment in brand and model. If necessary the underground van could be brought to the training and Rivers Agency equipment used during the training.
- ✗ Staff should not attend training courses without the necessary medical examination by Occupational Health Service (OHS).



**A PTO must be nominated in each area to be responsible for all underground record keeping.**

**This PTO must keep a “local” record of training dates & medical results to ensure the 3 year refresher training period is adhered to.**

## 7. Practice Exercises

Underground practice exercises **MUST** happen in all Areas twice per year. Actual underground works will count as practice exercises.

Practice exercises are designed to raise and maintain competence levels for staff who carry out underground works and also manage this work.



**Practice twice per year.  
(Practice is covered by work activities).**

- Rotate work activities during practice exercises.
- Each Area should involve underground staff, who are available, in the practice exercise.
- Underground practice exercises would normally include mock rescue and the use of both escape BA and full rescue BA.

**Check training records and medical certificates before the practice exercises.**



## 8. Equipment Requirements

The following details the main equipment used during underground works. This section sets out specifications, testing requirements, maintenance issues, storage and other good practice recommendations.



**Underground Equipment must be stored in the underground store or underground van.**

**To reduce the risk of contamination from biological contaminants this equipment must not be stored elsewhere including departmental vehicles.**

(Equipment may be taken out for lamping surveys but must be returned ONCE the survey is complete. Equipment removed from the UG van or store should be carefully stored with due care to avoid damage and/or contamination).

## 8.1 Dräger Saver PP15 Escape Set



This escape set is classified as breathing apparatus and is intended for use only by those carrying out underground works to escape to a safe environment. The escape set has a limited amount of breathable air depending on the demand of the user. It is anticipated in most situations that on average 15 minutes duration will be afforded to the wearer and this should be factored into planned work activities.

- ✓ The escape set, including stripping the valve down, must be thoroughly cleaned and checked monthly by the competent person trained to maintain underground equipment. This inspection must be recorded on the relevant inspection sheet.
- ✓ There must be an annual inspection and test carried out by a Dräger approved test centre. These inspection records must also be kept in the local underground store.
- ✓ Every 5 years the full escape set must be sent to a Dräger approved centre. This approved centre will test and recertify the bottle and also send reducer valves direct to Dräger for reconditioning.
- ✓ Each bag should carry an identification mark. The escape set above is marked “No 6”. A particular escape set will be issued to an individual carrying out underground works and he or she must use this individual set until the time of the next local clean and inspection (also covered below regarding face masks).

- ✓ Hygiene tags are used after checks and cleaning. Escape sets must not be issued without the tag in place. This lets the user know the set has been cleaned and checked and is currently safe to use.
- ✓ It is the responsibility of the user to clean and inspect their allocated set daily.

The escape set **pre-use inspection** is as follows:

1. Open the protective bag / cover carefully while disconnecting the plastic retainer from the valve safety pin. This will ensure air is not released to the face mask on opening the bag.
2. Check all valves and hoses are secure and hand tight. Check also the gauge reads at least 200 bar.
3. Put the lung demand valve to positive pressure.
4. Remove the valve safety pin.
5. Place the face mask on the face.
6. Take one or two short breaths to check air flow.
7. Put lung demand valve back to positive pressure and remove mask from face.
8. Replace the safety pin.
9. Carefully close the protective bag / cover and ensure the plastic retainer is reattached to the safety pin thus ensuring when the bag is ripped open in an emergency air flow will be guaranteed.

**The escape set is now ready for use.**

- ✗ Each air bottle is filled to 220 bar and the escape set should not be used if the pressure falls below 200 bar. i.e. if it falls outside the green on the pressure gauge.





## 8.2 Dräger 3 Litre Steel Cylinder



This steel cylinder is the main component of the escape set. This cylinder is steel due to the necessity for the cylinder to resist impact that may occur during work procedures and general underground works. It is pressurised to 220 bar and is 3 litres in size. The bottles are black and white on top to indicate that they contain breathable air. The bottle weighs 3.7 kg when full.

- ✓ Air purity testing is a requirement of COSHH Regulations and local Areas should satisfy themselves that these tests are being carried out and records kept by whoever fills the cylinders.
- ✓ The bottles must be checked monthly by the competent person trained to maintain underground equipment. This inspection must be recorded on the relevant inspection sheet.
- ✓ There must be an annual inspection and test carried out by an a Dräger approved company. These inspection records must also be kept in the local underground store.
- ✓ The cylinders must be pressure tested every 5 years and re-certified by a Dräger approved and accredited company. The cylinders must be stamped with the date of test.
- ✓ The valve assembly along, with the bottle, must be cleaned with wipes (not submerged) during the monthly inspection to ensure control of contaminants.

## 8.3 Dräger Panorama Nova Escape Mask



This escape mask forms part of the escape set which is classified as breathing apparatus and is intended for use only by those carrying out underground works to escape to a safe environment. There are only 2 strap adjustments when putting on the mask. The escape masks have straps that are made from elasticated material and will not last as long as the rescue sets which have rubber straps. Elasticated straps are used in the escape sets due to the necessity of donning the mask quickly in an emergency. In time the straps can get stressed and must be replaced as necessary.

- ✓ The escape mask must be examined and tested each month by the competent person trained to maintain underground equipment. This inspection must be recorded on the relevant inspection sheet.
- ✓ The escape mask must be stripped down and cleaned thoroughly each month with lukewarm water & anti bacterial wipes. The wipes must be light duty wipes. Light duty wipes are required due to the sensitive and delicate rubber and plastics used in some components of underground equipment.

**3 items are used for cleaning masks. Hygiene bucket, disinfectant and disinfectant wipes.**

**Metal components such as the spring should not be submerged in the bucket of disinfectant.**

**Items should be drip dried.**



- ✓ When cleaned and examined the escape mask must be placed in the escape set bag and sealed as shown.



- ✓ Masks should be stored at a constant temperature. The sensitive rubber in the mask is vulnerable to extremes of temperature and may crack. The sets are numbered locally and issued and allocated to a particular member of staff involved in underground works for that month.
- ✓ Escape sets are intensively cleaned and should not be a personal issue to staff (including the escape mask).



**Light duty wipes must be used when cleaning underground equipment to protect the integrity of the various delicate components.**

## 8.4 Dräger PA90 Series Full Breathing Apparatus (Full BA)



Full Breathing Apparatus (FBA) is used where the safety of entry to underground, without full BA, cannot be assured and maintained. An example is the rescue of people from underground in an emergency. Full BA's are also known as "rescue sets". There is approximately 30 minutes of air in each bottle. A whistle sounds once the air capacity is down to 10 minutes remaining. This will approximate to 20 minutes working time or rescue time and 10 further minutes for escape. These times are approximate as the demand of the user may vary at times.

- ✓ The full BA must be thoroughly cleaned and checked monthly by the competent person trained to maintain underground equipment. This inspection must be recorded on the relevant inspection sheet.
- ✓ There must be an annual inspection and test carried out by an approved and accredited company. These inspection records must also be kept in the local underground store.
- ✓ Every 5 years the full escape set must be pressure tested and recertified by a Dräger approved company. This company will also send the reducer valves to Dräger for reconditioning.

The full BA **pre-use inspection** is as follows:

1. Lay the complete full BA on a flat surface and open the straps.
2. Check the bottle is properly attached to the back plate.
3. Put the “lung demand valve” to positive.
4. Turn the cylinder valve on.
5. Take the air gauge reading which must be 200 bar or greater.
6. Listen for air leaks.
7. Turn the cylinder valve off for 1 minute.
8. During this 1 minute time check, by touch, all the hoses down each side for obvious damage.
9. After this 1 minute hold the pressure gauge in one hand and then turn the air back on to pressurise the system.
10. Check if there has been any drop in pressure and if so do not use the BA.
11. Turn the cylinder valve back off and push the lung demand valve into the palm of your hand to create a seal against the skin.
12. Press the centre of the lung demand valve to release the air pressure in a controlled fashion and the whistle must sound at 60 bar.
13. Place the lung demand valve to positive pressure and turn the air back on.
14. Check the mask straps are fully open.
15. Don the BA and adjust the straps to suit the wearer.
16. Connect the lung demand valve to the mask.
17. Place mask over face.
18. Gently tighten each buckle ensuring that the mask is centre on your face.
19. Take deep breath to release the flow of air.
20. Place finger inside mask to break seal and release air. Remove finger and the mask must seal as positive pressure is restored.
21. Hold mask to face and loosen buckles. Put the lung demand valve back to positive and remove the mask from face.

**The full BA is now ready for use.**

## 8.5 Dräger 9 Litre Carbon Composite Cylinder



The cylinders used now in the FBA's are carbon composite.

They are not required to be as robust as the steel escape sets and have the additional benefit of reduced weight.

The original composite cylinders had a 15 year life span. The latest composite cylinders have an indefinite life expectancy but must be recertified every 5 years.

- ✓ The cylinders must have the protective cover in place at all times except during inspection and cleaning.
- ✓ As well as an annual inspection the cylinders must be pressure tested every 5 years compared to 3 years previously recommended and recertified.
- ✓ Air purity testing is a requirement of COSHH Regulations and local Areas should satisfy themselves that these tests are being carried out and records kept by the company filling the cylinders.

## 8.6 Dräger Panorama Nova Rescue Face Mask



This rescue face mask forms part of the rescue set. The face mask for the rescue set is different from the escape set with 5 strap adjustments as opposed to 2 on the escape set. The head harness is also different as can be seen from the photograph above. The straps are rubber and more durable than the straps in the escape sets. There is a speech diaphragm in the rescue mask but not in the escape set.

- ✓ The escape set must be thoroughly cleaned and checked monthly by the competent person trained to maintain underground equipment. This inspection must be recorded on the relevant inspection sheet.
- ✓ The escape face mask must be cleaned using the same procedure described for the escape face mask.
- ✓ Face fit testing was carried out in the past for both escape and rescue face masks and the current models of face mask now used were found to be suitable. Face fit testing, which is a requirement for Respiratory Protective Equipment (RPE) under COSHH regulations, will be considered by H&S Section if the model of face mask changes in future. Also staff who, during training, have problems securing a face-seal may be referred for face fit testing. H&S Section can advise.



**Face masks should be stored in purpose made canvas bags.**

## 8.7 Gas Monitoring Equipment



Gas detectors are capable of measuring the concentrations of 4 separate gases:

- Oxygen.
- Carbon monoxide.
- Carbon dioxide.
- Hydrogen sulphide.

The detector shown has a separate sensor for each gas concentration. The sensors are often individually changed during routine service.

The current model of gas detector used in Rivers Agency is the BW Gas Alert Quattro.

- ✓ Gas detectors should be fully charged and fitted with approved batteries.
- ✓ Gas detectors must be calibrated every 6 months by an approved agent.

- ✓ Gas detectors must also be cleaned and checked on a monthly basis by the competent person trained to maintain underground equipment.
- ✓ Every day the gas detector is to be used bump gas must be used to “wake the detector up”. It is possible that individual sensors may “sleep” and it is essential that bump gas is used.

**Gas detectors must be set to “Bump Test Locked”.**

This will ensure that the detector will not switch on until the bump test is performed.





## 8.8 Safe Use of Winch

The model of tripod and winch used in the Agency for many years is Didsbury. This brand of winch continues to be the preferred winch for all underground works.



The tripod is constructed from aluminium and is designed for rapid set up. The tripod is adjustable in height from 1.4 to 2.42m and the legs can be set up with a diameter range from 0.99 to 1.55m. The length of the wire rope in the winch is approximately 4.5m long. The winch has a gearing mechanism which allows controlled descent of both persons and materials. The winch is also used for the removal of debris in buckets.

- ✓ As required by the Lifting Operations and Lifting Equipment Regulations NI 1998 (LOLER) the full winch, including all its components, must be examined and recertified every 6 months by an approved and accredited company.
- ✓ It is easy to check if the winch has an up to date lifting test certificate as there will also be a label on the winch (see below indicating when the next service is due).



- ✓ The Didsbury Winch must be visually checked every 3 months by the competent person trained to maintain underground equipment. This inspection must be recorded on the relevant inspection sheet.
- ✓ The winch legs must be set to a suitable pitch and the safety restraint chains set correctly.
- ✓ A protective grid (see photograph below) can be placed over the open chamber / manhole prior to setting up the Didsbury winch.



- ✗ Due to the winch's unbalanced weight and size care should be taken when lifting the winch in and out of the van as well as setting up the winch.

## 8.9 Full Body Rescue Harness



Lifting ring used for pulling person in an emergency.

Lifting ring used to attach carabiner clip attached to Didsbury winch for lifting person in and out of underground.



**The 2 models of rescue harness shown have a slightly different lifting arrangement and staff must be aware of this.**

There are currently several models of safety harness used in the Agency. This harness is classified as a rescue harness and not a working harness.

- ✓ The date of expiry for safety harnesses is 5 years from first use or 7 years from the date of manufacture, whichever comes first.
- ✓ As required by the Lifting Operations and Lifting Equipment Regulations NI 1998 (LOLER) the rescue harness must be examined and recertified every 6 months by an approved and accredited company.
- ✓ The harness must be checked every 3 months by the competent person trained to maintain underground equipment. This inspection must be recorded on the relevant inspection sheet.
- ✓ To control the growth of micro-organisms the harness must be washed down and disinfected every 6 months. Harnesses that have not been used during that period must also be washed down and disinfected.

- ✓ If the harness is being used during that period then it should be washed down after a 3 month period.
- ✓ The competent person carrying out the above procedure must also visually inspect the harness for damage and record this inspection.
- ✓ It is good practice that the harness is “self-checked” each day by the person wearing the harness and any defects reported immediately.
- ✓ A safety harness must be cut up “there and then” once a fault has been identified by the competent person or the individual wearing the harness. It must be cut up in a way that it can no longer be used. Only the competent person in charge of equipment inspection and maintenance should cut up the harness.



Do **NOT** write directly on the harness fabric. This may compromise the harness as the fabric may decompose.

## 8.10 Safety Ropes

3 types of safety rope are used during underground operations.



### Personal Life Line.

The personal life line is short (around 1m long).

It is intended for use when the individual is being pulled or rescued in an emergency situation.

### Life Lines.

Life lines are longer than the personal lines and are intended for use in a “man to man” situation.

For example, they are intended for use when going in and out of manholes and are strong enough to carry the full weight of someone and their equipment.



**The above lines have serial numbers and are checked by the competent person. Safety lines that are not satisfactory may then be used as working ropes (see below).**



### Working Ropes.

Working ropes are generally old life lines and the serial numbers cannot be read. This means the history of the rope cannot be verified and the rope can no longer be used as a life line.

Working ropes are used for lifting buckets, tools and equipment in and out of confined spaces.

Working ropes are only visually checked.

**Frayed / damaged ropes must not be used for underground works.**

## 8.11 Forced Ventilation Equipment

The electric air blower shown below can be used to force fresh air down into an underground working environment to provide an effective circulation of air. This will also help to displace any potential air-borne contaminants that may be present in the underground working environment.

The electric motor will sit on the surface and the ducting will hang down an open manhole forcing fresh air into the working environment.



## 8.12 Other Miscellaneous Equipment

All other miscellaneous equipment used in underground works must be kept separate from other work equipment.

This equipment should be kept, used & maintained solely for the purposes of underground works.

(While this is good practice for the control of bio-hazards and contamination it will also help to ensure that underground works are carried out “efficiently and effectively”).



## 9. Personal Protective Equipment (PPE)



The following PPE is used in most underground operations:

- **BOILER SUITS.** Must be intrinsically safe i.e. no metal fasteners. Boiler suits are sent to a local laundry as required depending on the nature and duration of underground works being carried out.
- **THIGH & CHEST WADERS.** Both types of waders are used in underground works and both are acceptable. They must have both toe and mid sole protection. Chest waders have the extra benefit of not ridding down when in a crouched position or when sitting in a work position in a culvert.





- **HARD HATS.** The most suitable hard hat for use in underground work has a shorter peak and a head torch is worn on top of the hard hat as shown below.



- **GLOVES.** Before gloves are worn barrier cream should be applied to the hand. Regardless of the type of glove to be worn the disposable gloves must be worn first next to the skin. The gloves used in underground works are PVC work gloves (see below). PVC gauntlets are also used for this work. Cloth backed gloves are not suitable for underground work due to the wet / damp environment.
- **KNEE PADS.** Knee pads could have Velcro straps (see photo on previous page) to ensure that a crouched posture can be easily achieved by quickly releasing the Velcro. The Velcro also will ensure that staff do not get caught up or stuck during underground works.



**All PPE used in underground work activities must be kept separate from all other PPE.**

**PPE used in underground works must be stored in the UG van or store.**

**(If PPE is taken out for lamping surveys it must be returned ONCE the survey is complete. PPE removed from the UG store or van should be stored with care to avoid contamination).**

## 10. Welfare Considerations

Carrying out underground works exposes staff to a range of bio-hazards including various forms of virus and bacteria.



Due to the nature of the work staff carrying out underground works receive additional allowances. Industrial staff who carry out underground works, when trained and medically assessed, are classified as Specialist A (Grade 2). They receive an additional weekly band allowance when they carry out underground works. This weekly band allowance is applied if they work on 1 day or 5 days carrying out underground work. Non-industrial staff claim a daily underground allowance on HR Connect for any day they do this work.

- ✓ Staff must ensure that high standards of welfare are maintained especially at meal times at end of shifts to ensure the effective control of all bio-hazards.
- ✓ Cuts and grazes should be covered up with plasters or dressings.
- ✓ There are several methods of hand washing available as shown in the photograph above. Hands, wrists and forearms should be washed thoroughly before meal times and at the end of each shift or on completion of underground works.
- ✓ The wipes (green top) can be used on other parts of the body including the face. They are anti-fungal, anti-viral and anti-bacterial.
- ✓ It is good practice to remove PPE at meal times to reduce contamination risk.

**Barrier creams must be applied in the morning and after all meal times. Usually 3 times per day. Disposable gloves should also be worn under all other glove types.**

## 11. Size of squads for various work activities



The three scenarios that follow indicate suggested squad sizes for different work activities. Scenarios include work in a culvert, a walkthrough with exit different from entry as well as a lamping survey.

**Site conditions and other factors will dictate the exact numbers required for various underground activities.**

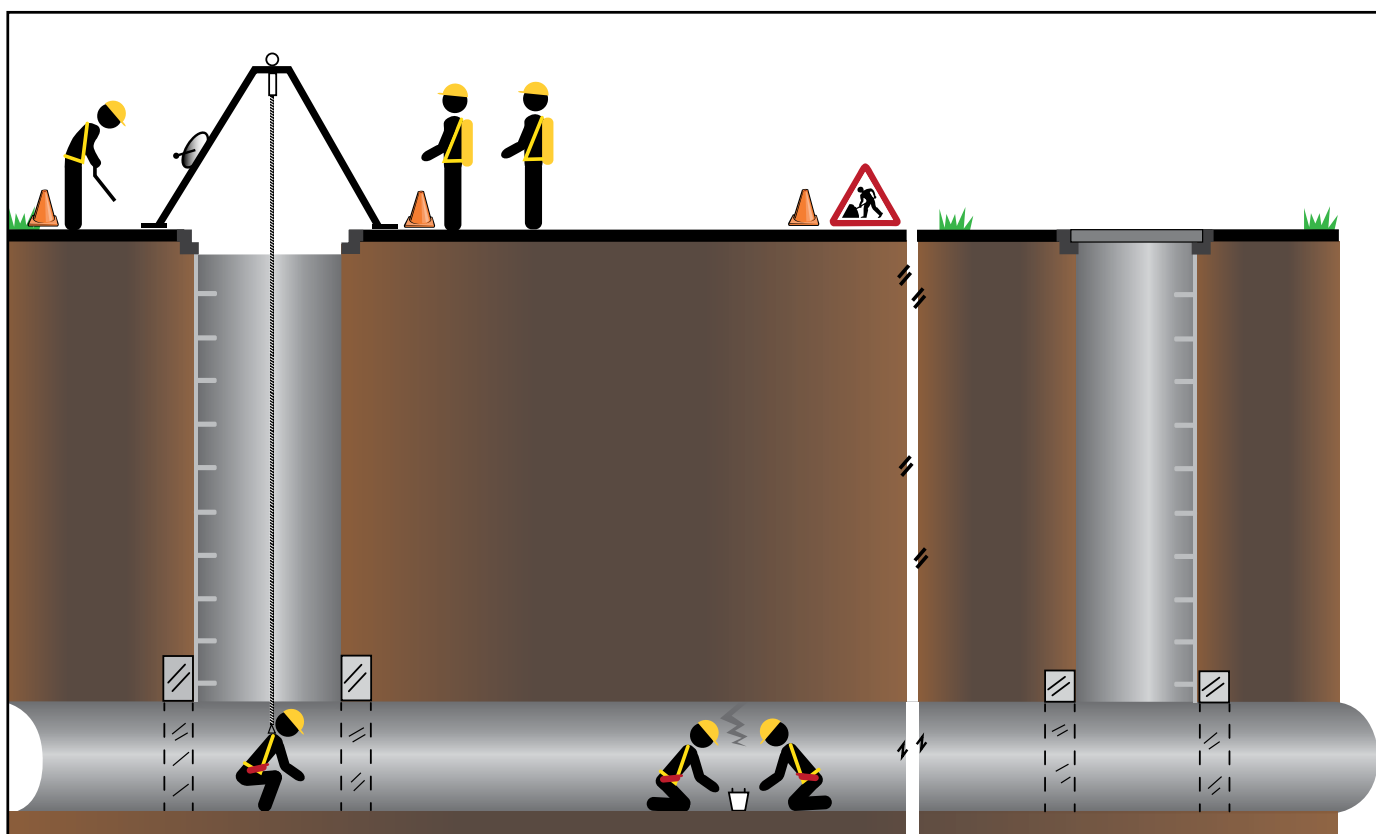
Other factors may affect numbers of staff required for underground works. This will include for example if traffic management is required, if forced ventilation is required, the nature and duration of the works involved, if job rotation is required and if materials are required for carrying out works. Staff who are not underground trained, or medically unfit, can assist in other work activities such as traffic management and getting materials ready for use in the works.



# SCENARIO 1. Repair/maintenance to culvert

Top-man operating winch and communicating with bottom man.

2 Rescuers with full BA in readiness for emergency.



Bottom man communicating with staff carrying out culvert repairs.

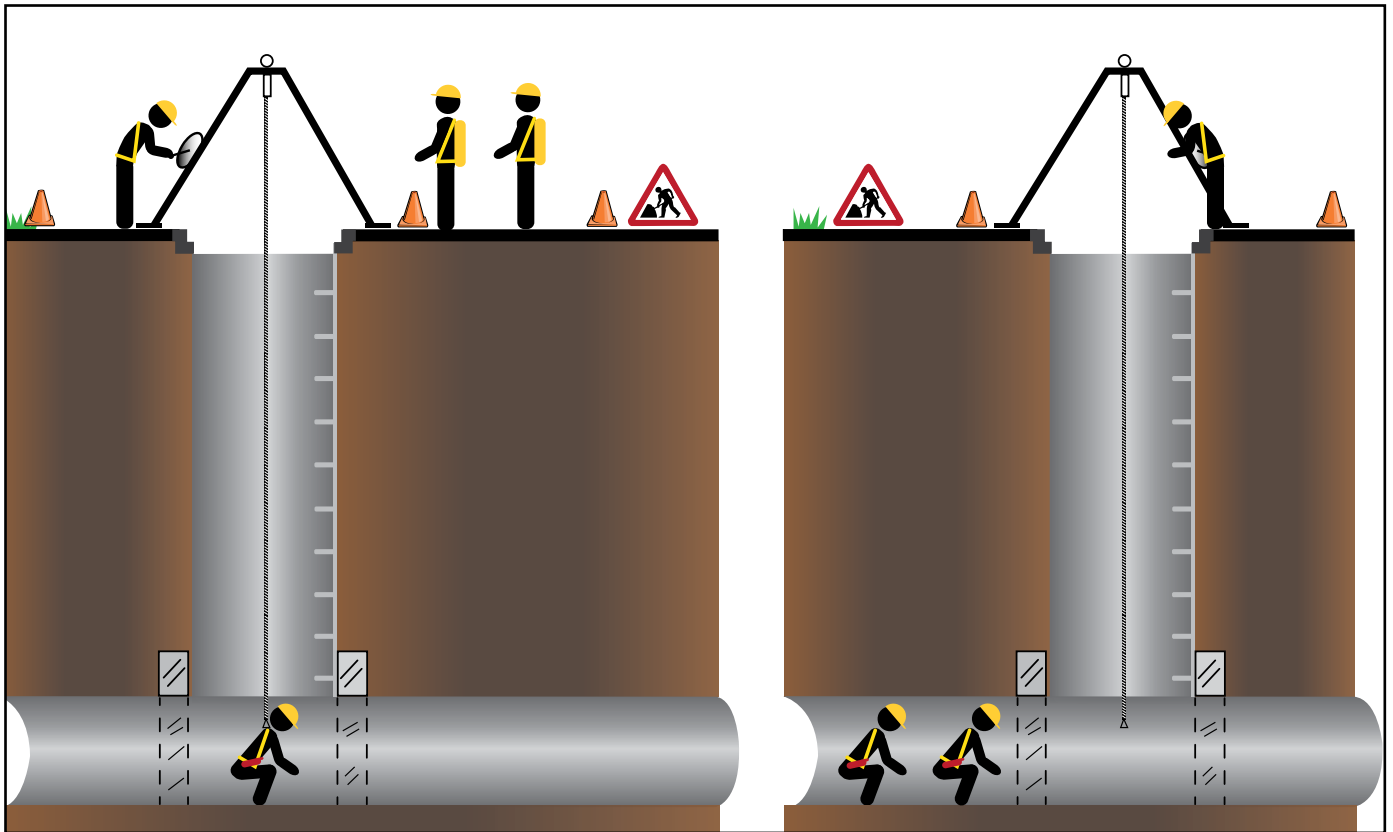
2 staff carrying out culvert repairs and communicating regularly with bottom man.

## SQUAD SIZE – MINIMUM 6

(5 if one person can safely carry out the necessary repairs)

2 rescuers + 1 top man + 1 bottom man + 2 carrying out work.

## SCENARIO 2. Walk-through and exit through separate entry

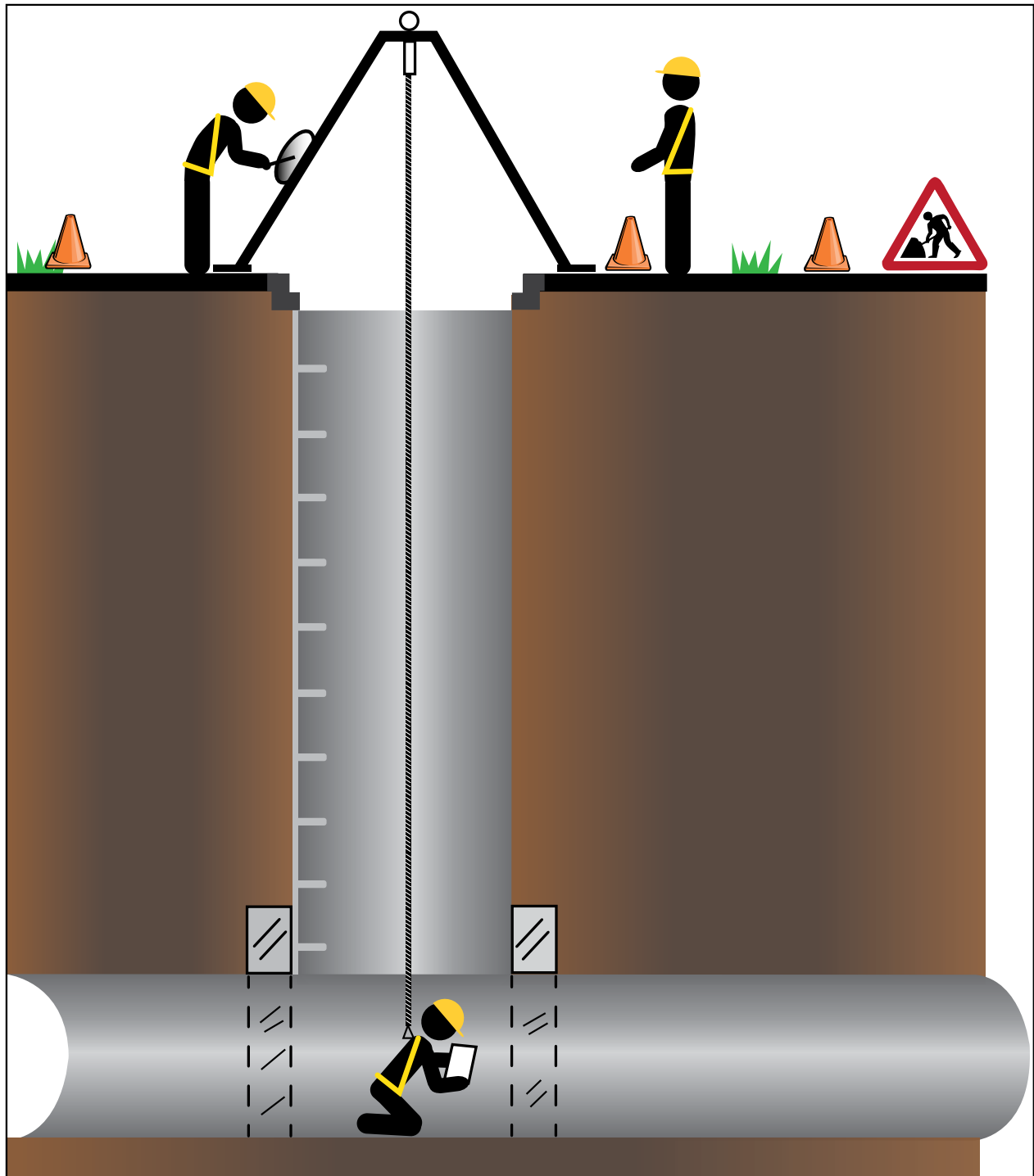


### SQUAD SIZE – MINIMUM 7

(Other factors may increase the squad size. For example, if the distance of the walkthrough was considerable, line of sight between the point of entry and exit was not straight or compromised).

2 rescuers + 2 top men + 1 bottom man + 2 walking through culvert.

## SCENARIO 3. Lamping survey



### SQUAD SIZE – RECOMMENDED 3

(Occasionally the risk assessment may indicate that 2 staff are sufficient if the manholes are shallow and access is not difficult).

2 top men + 1 bottom man carrying out survey.

## 12. Manhole Cover Lifting Procedures

Most manhole covers will be manually lifted using manhole lifters as shown below. Lifting heavy duty manholes covers, as shown below, must be a 2 person lift.



The manhole lifters should fit snugly and securely into lifting eyes. The manual lifters should be around 500mm to 600mm long and have anti-slip ends as shown below.



**Always lift with your legs and not your back.**

**All staff who are expected to lift manhole covers must receive “business specific” manual handling training from Rivers Agency’s Health & Safety Advisor. (This includes non-industrial staff).**

Lifting manhole covers is much easier when the seal between the cover and the frame is broken. A nail bar can also be used to break the seal by placing the nail bar into a recess between frame and cover and gently prising up (see photo below). This is usually sufficient to break the seal but if not the cover can be tapped with a sledge hammer before lifting. Manhole covers are cast iron and will break / shatter if banged hard with a sledge hammer. Do not use a sledge hammer and manhole lifters at the same time as shock waves will travel into the person using the lifters.



Mechanical lifters are also available for covers which are difficult to free. Proteous mechanical lifters are available for use if required (see photograph below). They are most useful when the area surrounding the manhole has blacktop or a surrounding hard surface.





## 13. Accessing Manholes and Chambers

Shallow manholes are those which staff can safely access and egress without assistance.

When accessing manholes that are not considered deep and have structurally sound step irons it is possible to climb down holding the step irons. Care must be taken to test each step iron to ensure its integrity and stability. Another person must securely hold a rope attached to the person's safety harness and maintain a reasonable tension on the rope in case the person in the manhole loses footing (rope training will form part of UG training).

All other manholes which are considered reasonably deep or carry a level of risk due to the standard or absence of sound step irons must be accessed using the Didsbury winch.

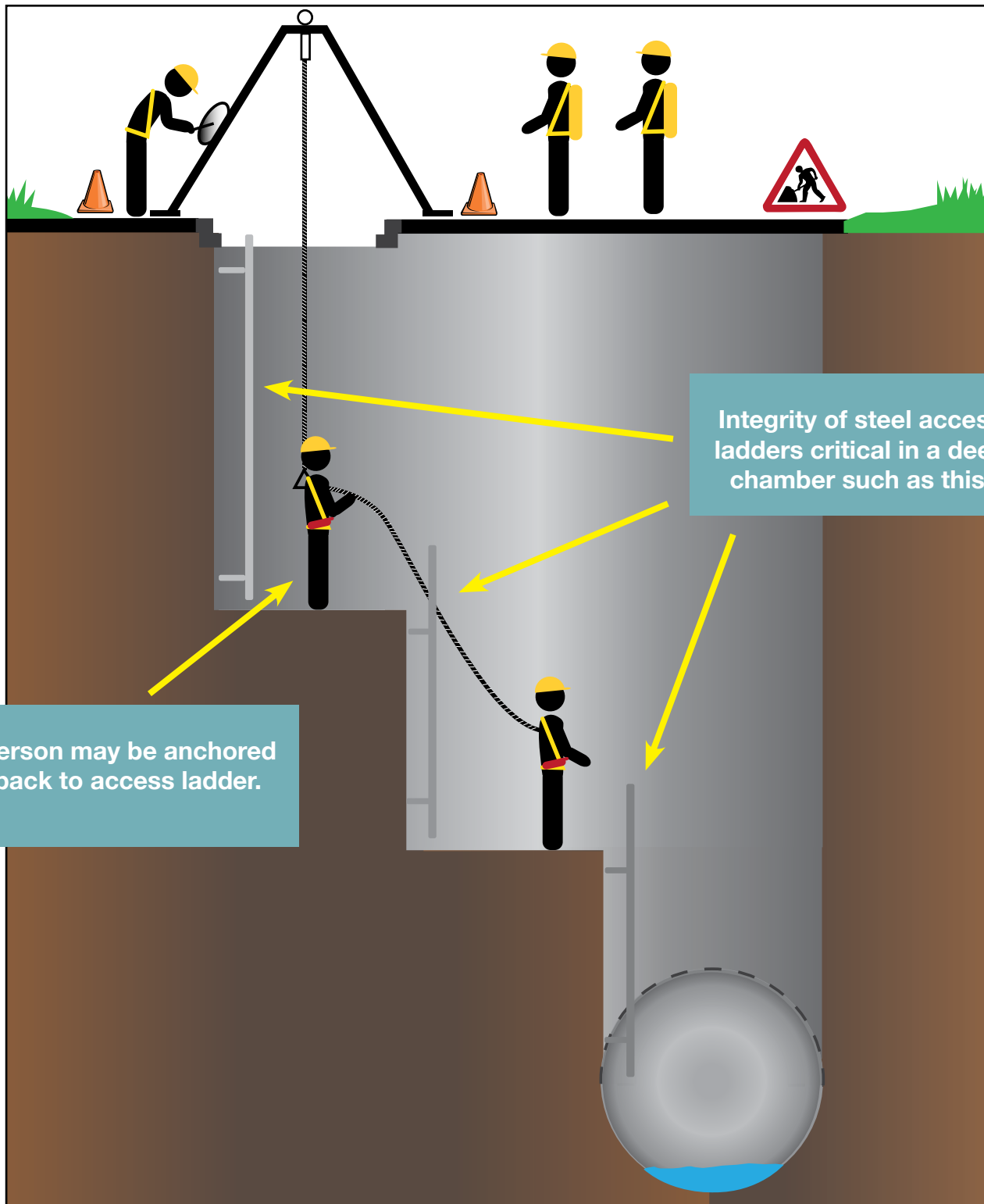


**This work is classified as “Working at Height” due to the potential of falling from a height.**

**Falls from height account for the most fatalities and serious injuries in the workplace.**

**Safe use of the Didsbury winch is covered in section 8.8, pages 32 to 33.**

# Staggered Access Scenario



**A second winch is required as back-up for ALL underground works apart from lamping surveys.**

## 14. Emergency Procedures

It would not be possible for the emergency services to guarantee immediate support in an emergency situation so it is necessary for our own rescue provision to be in place.

No operations must be carried out unless suitable and sufficient arrangements are in place for rescue of those potentially at risk if an emergency situation arises. Section 11, pages 42-45, indicates squad sizes for various work activities and indicates numbers of rescuers (if any) required for safe rescue.

The usual situation that will cause an emergency evacuation from a culvert is the detection of a hazardous gas or abnormal levels of oxygen in the underground workplace.

In relation to emergency evacuation staff must:

- ✓ Evacuate the underground workplace, culverts or manhole, as soon as an adverse change in the atmosphere is noticed. These changes may be identified by the gas detector alarms, smell or other sense or by some physiological change such as the onset of headache, nausea or breathlessness.
- ✓ The confined space must not be re-entered until an investigation has been carried out and the space deemed as being suitable to re-enter.



## 15. First Aid Provision

In relation to first aid provision for underground works please note the following:

✓ Consideration should be given to the provision of an advanced first-aid for all significant underground operations.

✓ All first aid boxes should be stocked up regularly.



## 16. Visitors to Underground Work Activities Controlled by Rivers Agency



**Rivers Agency have on occasions been asked to facilitate a visitor to an underground culvert system or chamber.**

**Examples have included media requests, photographers, contractors and consultants.**

**Any request for visitors to underground work activities must be signed off by the Principal Engineer (PPTO) or at Director level.**

In relation to visitors when Rivers Agency are in control of the work, staff should ensure the following:

- ✓ Ensure the visitor is mentally prepared and also appears to be medically fit or is in “reasonable health”. This can also be verified by the risk assessment generic question, “has anyone a physical / medical / health condition that may affect their ability to carry out this work?” The visitor must also sign the risk assessment in the tool-box talk section.
- ✓ Ensure the visitor has a “buddy” with him / her at all times.
- ✓ The buddy must go through all the standard safety checks with the visitor.

**If at any time during the underground operation the visitor fails to comply with any safety instructions the work must be immediately stopped and the visitor removed from the working area.**

## 17. Disposal of Underground Safety Equipment

**Underground safety equipment must not be disposed of in the normal way (for example auctions or in skips).**



In relation to disposal of underground safety equipment please note the following:

- ✓ A safety harness must be cut up “there and then” once a fault has been identified by the competent person or the individual wearing the harness. It must be cut up in a way that it can no longer be used. Only the competent person in charge of equipment inspection and maintenance should cut up the harness.
- ✓ All cylinders and valve assemblies must be sent to an approved centre and decommissioned at that place (this is normally a free service as part of the routine service agreement). Faults may be picked up during service and the approved centre will decommission equipment when necessary.
- ✓ “A letter of deconstruction” must be received for all safety apparatus including bottles and valves. The letter of deconstruction must be kept on file by the competent person.



# 18. Rivers Agency - Underground Stores

In total there are 3 Rivers Agency underground stores. They are located as follows.

## Lisburn



## Armagh



## Omagh






# 19. Summary of Documentation Requirements When Carrying out Underground Works



Internal documentation must be completed before **ANY** underground works start.

The one page flow chart titled “**Simple Guide to Underground Working**” sets out the step by step guide to underground working. This simple guide follows on page 57. This guide is also fixed on the inside of the triplicate books with all necessary forms (available from Health and Safety Section on request).

  Ref: <input type="text"/>			
<b>Underground (Confined Space) Risk Assessments</b>			
Name of assessor: _____		Location of the works: _____	
Date of Assessment: ___/___/___		Description of works: _____	
Significant Generic Hazards Associated with Underground Working	Risk rating H/M/L	Control Measures	Residual Risk rating H/M/L
Dangerous atmospheres.			
Manhole cover, Insecure / damaged step irons or access ladder.			
Structural Deterioration.			
Plant / Traffic / Pedestrians.			
Flooding / Tidal Influence.			
Working in a restricted / crouched position & twisting			
Exposure to sewage, corrosive or dangerous liquids.			
Protruding pipes, services or other obstructions.			
Manual Handling.			
Slips / Trips / Falls.			
Site Specific Hazards	Risk rating H/M/L	Additional Control Measures	Residual Risk rating H/M/L
Does this risk assessment indicate that this work must be covered by a Permit to Work PTW? (PTW is only required for HIGHER risk work. Not normal confined space works)			
Is there any member of staff involved in the underground work who has a physical / medical / historical condition that may affect their ability to carry out this work? (if the answer is yes then this person must not participate in this work on this occasion)			
In your opinion do you consider the control measures above sufficient to allow the works to proceed? (In the opinion of the assessor i.e. the person carrying out the risk assessment)			
Signed: _____		Date of Talk: ___/___/___	
Date: ___/___/___		TOOLBOX TALK Site staff present at Toolbox talk (all staff to sign)	

Ref: (Same Ref. as Risk Assessment) <input type="text"/>			
<b>Underground (Confined Space) Permit to Work (PTW) &amp; Safe System of Work (SSOW) Forms</b>			
(Both forms are required for higher risk confined space working which will be identified in the Risk Assessment)			
Location of works: _____		Description of works: _____	
Date / Dates of Proposed Works: From: ___/___/___ To: ___/___/___		Duration of Permit: From: h: ___ rs: ___ To: h: ___ rs: ___	
<b>1. Permit to Work PTW</b> (PTW's are required for higher risk works and will require special signed permission from Area Engineers)			
Post Holder	Name	Signed	Date & Time
Applicant (PTO/TGT or similar)			
Team Leader			
Area Engineer (or delegate)			
The work is now complete and PTW is cancelled.		T / leader & Applicant	
The PTW has been cancelled due to the following:		T / leader & Applicant	
<b>1. Safe System of Work SSOW</b> (List the significant controls which will be in place to ensure the safe execution of this higher risk confined space work).			
1			
2			
3			
4			
5			
			



The following table sets out the relevant forms and which risk level of work will necessitate the completion of these two forms:

In-house Forms Required (available as triplicate books from H&S Section).	Work Risk Level	
	Normal Risk	High Risk
Underground (Confined Space) Risk Assessment Form.	✓	✓
Underground (confined space) Permit to work(PTW) & safe system of work(SSOW) Forms.	✗	✓

Examples of high risk work are prescribed in the simple guide and are as follows; Works in small culverts 900mm & 1050mm in diameter, tidal situations, proximity to SWO or WWTW discharge outlets, deep culvert systems or where deep chambers have to be accessed, culverts where detritus or serious biological hazards may be present or in structurally compromised culverts such as grade 4's or 5's and culvert systems which are not familiar to staff.

The above list is not exhaustive. The risk assessment will identify if the work is considered high risk by the person carrying out the risk assessment.

**Examples of higher risk work**



## Simple guide to underground working

<b>SIMPLE GUIDE TO UNDERGROUND WORKING</b>	
<b>Step 1</b>	<b>Identify the Objective of the Operation</b> (i.e what underground works are planned for that day)
<b>Step 2</b>	<p style="color: red;">Make a final judgement determining if the work can be carried out using alternative means such as jetter.???</p> <p style="color: red;">Is the risk acceptable for DLO staff to carry out this work?</p>
<b>Step 3</b>	Refer to : <ol style="list-style-type: none"> <li>1. Drawings of the relevant culverts and manholes.</li> <li>2. Previous relevant Risk Assessments.</li> <li>3. Records of previous relevant entries.</li> <li>4. Local knowledge and previous personal experience.</li> </ol>
<b>Step 4</b>	Carry out a risk assessment using the supplied triplicate book.
<b>Step 5</b>	If the risk assessment identifies this as higher risk work then the Permit to Work PTW and Safe system of Work SSOW must be completed. <p style="color: red;">Examples of higher risk works will include such works as:</p> <ul style="list-style-type: none"> <li>• Small culverts, either 900mm &amp; 1050mm in diameter.</li> <li>• Work in tidal situations.</li> <li>• Work in proximity to SWO or WWTW discharge outlets.</li> <li>• Deep culvert systems where deep access chambers have to be accessed.</li> <li>• Culverts where detritus or serious biological hazards may be present.</li> <li>• In structurally compromised culvert systems such as grade 4's or 5's.</li> <li>• Culvert systems which are not familiar to staff.</li> </ul>
<b>Step 6</b>	If the work is not high risk then the control measures identified in the Risk Assessment must be communicated to all staff involved in the work and all staff must sign the toolbox element of the Risk Assessment.
<b>Step 7</b>	If the work is higher risk then the PTW and SSOW (supplied as a separate triplicate book) must be completed and the additional control measures identified in the SSOW also communicated to the relevant staff. The PTW must be signed both before works commence and at the end of the works.
<b>Step 8</b>	<b>Effect Entry / Carry Out Works / Clear Site / Cancel PTW (high risk work only).</b>
<b>NOTE:</b> <b>It is anticipated that most works will be routine and not considered to be higher risk necessitating the additional requirements for PTW and SSOW.</b>	



Ref:

## Underground (Confined Space) Risk Assessments

Name of assessor: \_\_\_\_\_ Location of the works: \_\_\_\_\_

Date of Assessment: \_\_\_\_ // \_\_\_\_ \_\_\_\_\_ Description of works: \_\_\_\_\_

Significant <b>Generic</b> Hazards Associated with Underground Working	Risk rating H/M/L	Control Measures	Residual Risk rating H/M/L
Dangerous atmospheres.			
Manhole cover. Insecure / damaged step irons or access ladder.			
Structural Deterioration.			
Plant / Traffic / Pedestrians.			
Flooding / Tidal Influence.			
Working in a restricted / crouched position & twisting.			
Exposure to sewage, corrosive or dangerous liquids.			
Protruding pipes, services or other obstructions.			
Manual Handling.			
Slips / Trips / Falls.			
Site Specific Hazards	Risk rating H/M/L	Additional Control Measures	Residual Risk rating H/M/L

Does this risk assessment indicate that this work must be covered by a Permit to Work PTW?  
(PTW is only required for HIGHER risk work. Not normal confined space works)

Is there any member of staff involved in the underground work who has a physical / medical /  
historical condition that may affect their ability to carry out this work?  
*(if the answer is yes then this person must not participate in this work on this occasion)*

In your opinion do you consider the control measures above sufficient to allow the works to  
proceed? **(In the opinion of the assessor i.e. the person carrying out the risk assessment)**

Signed: \_\_\_\_\_

Date: \_\_\_\_ // \_\_\_\_ \_\_\_\_\_

**TOOLBOX TALK**

Site staff present at Toolbox talk (all staff to sign)

Date of Talk: \_\_\_\_ // \_\_\_\_ \_\_\_\_\_

Ref: (Same Ref. as Risk Assessment)

## Underground (Confined Space) Permit to Work (PTW) & Safe System of Work (SSOW) Forms



**(Both forms are required for higher risk confined space working which will be identified in the Risk Assessment)**

Location of works:	_____
Description of works:	_____
Date / Dates of Proposed Works:	From: ___ // ___ _____ To: ___ // ___ _____
Duration of Permit:	From:h _____ rs _____ To:h _____ rs _____

### 1. Permit to Work PTW

(PTW's are required for higher risk works and will require special signed permission from Area Engineers).

Post Holder	Name	Signed	Date & Time
Applicant (PTO/TG1 or similar)			
Team Leader			
Area Engineer (or delegate)			
The work is now complete and PTW is cancelled.			
The PTW has been cancelled due to the following:			
_____			
_____			

### 1. Safe System of Work SSOW

(List the **significant** controls which will be in place to ensure the safe execution of this higher risk confined space work).

1
2
3
4
5

## 20. Glossary

<b>ACOP</b>	Approved Code of Practice. ACOP's are published by the HSE / HSENI. They are an interpretation of H&S regulations which are written in such a way that they are more easily understood. ACOP's are considered quasi-legal and if followed will ensure statutory compliance with the relevant H&S legislation.
<b>BA</b>	Breathing Apparatus. Breathing apparatus includes both escape and rescue sets.
<b>COSHH</b>	Control of Substances Hazardous to Health regulations.
<b>CSB</b>	Corporate Support Branch is based in Hydebank. CSB process and organise confined spaces training courses as required. CSB also provide local HR support.
<b>DHR</b>	Departmental Human Resources. DHR is based in Dundonald House.
<b>DLO</b>	Direct Labour Organisation. DLO are Rivers Agency industrial staff who are employed directly.
<b>EBA</b>	Escape Breathing Apparatus. EBA's are also known as escape sets.
<b>FBA</b>	Full Breathing Apparatus. FBA is also known as the rescue set.
<b>HSE</b>	Health and Safety Executive.
<b>HSENI</b>	Health and Safety Executive for Northern Ireland.
<b>H&amp;S</b>	Health and Safety.
<b>LOLER</b>	Lifting Operations and Lifting Equipment Regulations.
<b>OHS</b>	Occupational Health Service based in Lincoln Buildings, Belfast.
<b>PPE</b>	Personal Protective Equipment.
<b>P&amp;T</b>	Professional and Technical Staff.
<b>PPTO</b>	Principal Professional and Technical Officer i.e. Grade 7 ( Principal Engineer).
<b>PTW</b>	Permit to Work.
<b>PTO</b>	Professional Technical Officer.
<b>RPE</b>	Respiratory Protective Equipment.
<b>SSOW</b>	Safe System of Work.
<b>SWL</b>	Safe Working Load.
<b>SWO</b>	Storm Water Overflow / Outlet.
<b>T&amp;D2</b>	Training and Development form to request or apply for training.
<b>TG1</b>	Technical Grade 1. District Foreperson.
<b>UG</b>	Underground.
<b>WWTW</b>	Waste Water Treatment Works.



[www.dardni.gov.uk/rivers](http://www.dardni.gov.uk/rivers)

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or email to [Rivers.registry@dardni.gov.uk](mailto:Rivers.registry@dardni.gov.uk)

or

DARD Senior Health and Safety Advisor by telephone 0300 200 7852  
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