

**ESSENTIAL
STANDARD
no.31**

Entry into sewers behind a point of isolation



KEY MESSAGES

- All works must be carried out in accordance with Thames Water's procedure HSP46 to ensure the safety of employees' and other stakeholders. For further information on the contents of the essential standard or HSP46, please contact your Thames Water representative.
- All sewer confined space entry work must go through the **Confined Space Authority, (CSA)**, (formerly known as the *Independent Authorising Body (IAB)*) and be validated with the **Waste Operations Control Centre(WOCC)**
- Any works behind a point of isolation must be fully validated and authorised by CSA.
- Understand the integrity of both physical and procedural controls that are in place.

1. Introduction

This essential standard has been developed from Thames Water's internal procedure HSP46 to ensure the safety of employees and other stakeholders working on tasks that require isolation and entry into confined spaces. This standard sets out a range of criteria and controls that must be followed to ensure safe and secure isolation for the protection of people. Thames Water's Water and Wastewater system was built mostly in the Victorian era with the health and safety practices available at the time.

Entry into our networks can be complex due to the nature of working within confined spaces and:

- The size and scale of the system
- Original design constraints
- Volume and changing sewage/water level controls
- Varying asset conditions
- Aggressive substances and environment
- Tidal water, rainfall, surface water and other unplanned ingress
- Unexpected failures of controls and assets like penstocks, pumps and valves

We must always try to avoid confined space entry if possible; if we can't, then we must ensure the right controls are in place and we understand the consequences if they were to fail, to ensure that robust emergency procedures are put in place.



Key Contacts

Confined Space Authority (CSA) - [click here to email](#) – (NOTE - no phone contact)

Waste Ops Control Centre - [click here to email](#) – or phone 0800 0093908 then follow option for relevant area of works.

2. Key principles of Safe and Secure Isolation

- Ask yourself: “Can we eliminate the need for confined space entry?”
- Prevent significant heads of water building up in the system behind a point of isolation.
- Where possible, use a combination of independent control measures or points of isolation that can be secured to prevent them from being interfered with, defeated, or overridden.
- Identify the likelihood and potential consequences of failure / breach of an isolation point or management controls so that measures can be put in place to minimise the risks.
- Ensure that physical points of isolation or control measures are in good condition to prevent other points of isolation / controls failing further down in the system.
- Identify the likelihood and potential consequence of failure, so that suitable emergency procedures (*warning systems and evacuation time etc.*) for the entrants are built into the Safe System of Work.
- You must be able to prove the effectiveness of the controls and the overall isolation arrangement. All safe and secure isolations must minimise the risk to an acceptable and safe level.
- Ensure that both up and downstream influences have been considered within the Safe system of works.
- Use modelling data or carry out a trial wet run to prove the effectiveness of an isolation arrangement.
- Always ask yourself: “What if this were to fail?”

3. Role of the CSA and WOCC

All system entries involving safe and secure isolation or work that will change the way a Network operates must be independently authorised and coordinated by the Thames Water CSA before work starts.

Proposed changes in the wastewater system must be raised as a diversion/isolation request to the CSA. For example, changing the way the system operates could be part of operational or maintenance activities (e.g. electrical works) which could affect flow levels, pressures or control measures (pumps etc.).

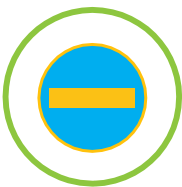
The CSA independently reviews all Safe Systems of Work to ensure all confined space entries have been properly assessed and planned, that all isolations and controls in place are effective and that there are no other works in the area that could impact the activity.

The CSA will not be responsible for reviewing the Safe System of Work for the actual physical tasks being undertaken inside the confined space.

Emergency accesses will need to be assessed, documented, and communicated and follow this procedure



Once approved by the CSA, the work is passed onto the Waste Operations Control Centre (WOCC). Immediately before entry, entry controllers should contact the WOCC to ensure that controls are in place and no other factors, like rain, will influence the work. Safe exit and status updates must also be communicated to the WOCC.



CSA will provide a list of pre-approved works to the WOCC, works not on the pre-approved list will not be allowed to proceed.

4. Procedures

When planning entry to wastewater operations, follow the process flow below. When planning any entry, you **must understand / identify** who your key contacts are for project / activity and their roles and responsibilities *e.g. designers, modelling teams etc.*

1		Identify the entry / activity that requires isolation	6		TWUL responsible person engages the Confined Space Authority (CSA)
2		Contact and enlist the help of the relevant TWUL Operations Lead Person for the area being worked on.	7		Set up review sessions with CSA for any entry / isolation assessed to of medium / high complexity, See ES 40 for complexity table
3		Identify the complexity of the entry / isolation. You must confirm that the relevant information has been provided by TWUL e.g. modelling info, condition assessment etc	8		The entry / isolation will be reviewed and accepted or rejected by the CSA. If rejected, recommendations are needed; if accepted /approved, the task will receive a safe sewer access control form and entry number. Contractors must request TWOSA from TWUL Ops lead
		Note: for high complex entries where criteria are not met, or further information is required, the activity may be subject to a TWUL independent senior engineer and H&S review.	9		On day of the task, the responsible person(s) for the entry / isolation as identified in the CSA approval will confirm all controls / permits are in place and speak to the WOCC, if no entry is to be made then the responsible person should call the WOCC to confirm this
4		If required, select competent contractors and complete RAMs / SSoW / TW Documents for entry / isolation	10		Once the task is complete: the responsible person(s) will: • Confirm with the WOCC • Sign off with the Thames Water Operational Safety Authority (TWOSA) • Email CSA <Independent.AuthorisingTeam@thameswater.co.uk>
5		Review the entry / isolation with the relevant technical expert.			

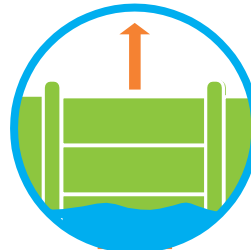
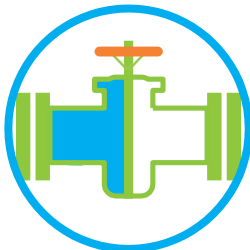
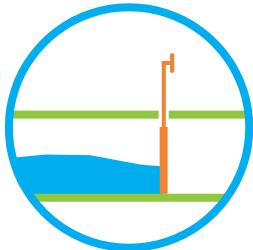
5. Controls

Controls should be unique to the environment, entry and activity taking place. Risk Assessments (HSP46) and / or structural calculations and temporary works designs must be used to prove that flow control devices (penstocks, cloughs, weirs, dams) are effective.

6.1 Physical Controls

Physical controls can stop or divert flow for a certain period of time.

When planning for entry, all control equipment, such as penstocks, valves, stop-logs etc. must be assessed. You must



ensure they provide a safe, secure and isolated environment for confined space entry.

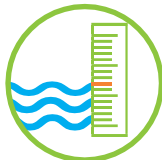
When assessing physical controls, you must confirm that the equipment:

- Can't be over-topped or by-passed by tides, rainwater or other unexpected ingress. Where over topping is possible this must be captured and mitigated using additional controls.
- Is robust and reliable
- Is in good condition
- Is adequate for the task
- Will not fail during entry
- Has an in-date Penstock risk assessment where consequence of failure is deemed to be High

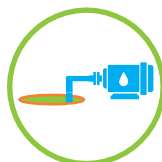
If you can't confirm the above points, then the task must not proceed, or additional controls must be put in place. All additional measures should be designed and implemented for every individual situation.

6.2 Non-Physical

Non-physical controls do not hold back flows. They include processes such as:



- Monitoring flow levels to ensure they stay in safe parameters or so an early warning can be made



- Pumping stations to reduce or remove flow levels from the work area



- Weather monitoring and forecasts used to provide advanced warnings and allow better planning



- Wet/Live testing can be used to prove flow levels and consequences where modelling data is not available



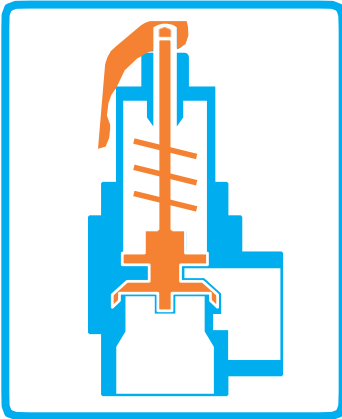
- Tide times used to calculate the best periods for safe entry

6. Penstocks, Actuated Valves and River Flaps

7.1 Penstocks

When using penstocks, you must ensure that:

- A penstock Risk assessment is in place where consequence of failure is deemed to be High.
- A penstock risk assessment produced by a third party must be approved by suitably trained and experienced TW person and the CSA prior to being used as part of a safe system of works.
- Temporary solutions / modifications are explored and independently designed and implemented if the penstock is not able to pass the Risk Assessment
- Only use a penstock for water levels greater than 40% of maximum level if there are appropriate temporary / permanent works designs



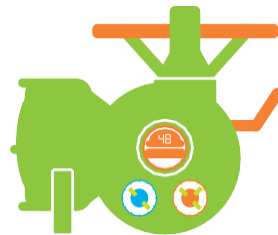
When using high-consequence valves or penstocks for a single isolation above 40%, ensure:

- You complete a structural and mechanical assessment
- An independent inspection and validation has been completed
- You receive sign off that penstock/high-consequence valves are the correct method of isolation for this activity

6.3 Actuated Valves

Actuated valves fitted to penstocks must be:

- 1 Tested and calibrated prior to use
- 2 Limited specifically for the individual penstock
- 3 Inspected annually
- 4 Used within specified date

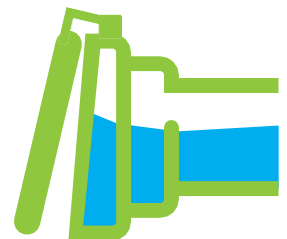


7.2 River Flaps

River flaps should only be used as part of an overall safe and secure isolation when combined with additional protective measures.

It's best to work in safe windows where the tidal flows don't reach the level of the river flap. To work outside of safe windows, you must prove that the flows will not present any danger to entrants.

Use modelling data to support your decision to work outside of safe windows or to help you identify additional measures of effective alternatives.



Note: Where Flaps have been specifically designed to be used as a point of isolation for the protection of people they may be considered as part of the overall safe system of works.

7. Flows and Water Pressure

Investigations and analysis must be done as part of planning for entry. This ensures full understanding and documentation of the flows and water pressure that could have an impact on the site while workers are in the confined space.

The investigations and analysis must include:

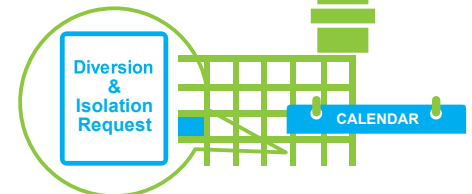
- the maximum hydraulic height the water could rise to
- the maximum static water pressures that structures and controls could be exerted to
- the quantities and dynamic pressures, such as unintended increase in flows, pressures and surges, which could affect the control locations



8. Diversion and Isolation Requests

A member of the Trunk Sewers/Strategic Pumping Team must send a Diversion and Isolation Request Form to the Isolation and Diversion Coordinator (IDC) at least four weeks before the work starts.

Both Diversion notices and approvals are a 4 week strict process to allow for authorisation, coordination and validation of works. Requests outside of this process will require justification and agreement from responsible C grade manager or above to proceed.



9. Modelling

The modelling team uses a series of high-tech modelling tools to provide us with information on the safety conditions surrounding the work area.

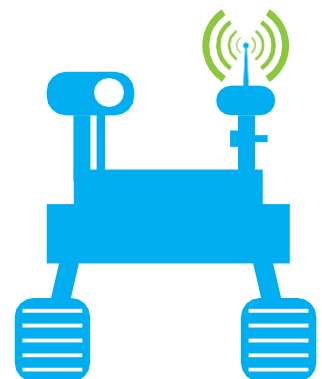
Before entry, ask the modelling team the following questions:

- Is there the potential for flooding? If so, how much time do you have?
- What are the consequences of isolation/control failure?
- Is tidal ingress going to impact the work?
- Where and when are the safe working windows?
- Are there any points that need to be critically monitored?
- Are there suitable diversions and are they effective?

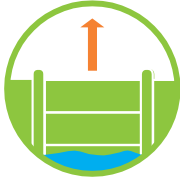
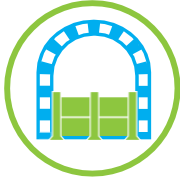
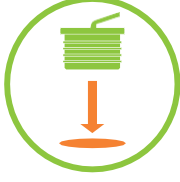
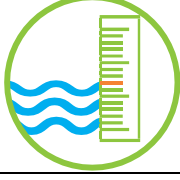


10. Remote Equipment

Before deciding on confined space entry, you must always consider whether the job can be done by remote equipment such as Light Detection and Ranging (LiDAR) Technology.



11. Aide Memoire – Selection of isolation controls

Description	Type of control	Pros	Cons
Penstocks / Valves 	Physical	- Fully isolate to dry conditions - If actuated can be quick to open or close, and can be done remotely - Can be used to limit flows not just isolate	- Requires regular maintenance - Need to investigate and understand condition - Increased risk of damage to penstock through actuation - Must have a Penstock Passport when used for protection of people
Stop Logs / Cloughs 	Physical	- Specific design for the location - Can be relatively cost effective	- Need to be purposely designed for the span required along with appropriate supports where required - Will not provide a full seal
Temporary bulkheads 	Physical	Specific design for the location	- Specific design for the location - Can take time and be difficult to fit, often requiring entry without physical isolations in place
River flaps / Flap valves 	Physical	Stop back flow into a system, for example against a tidal outfall	- Need to investigate and understand condition - Can leak if seal not maintained or is obstructed by debris - Not always visible (tidal outfall) - Subject to harsh environmental conditions
Weir Boards 	Physical	Can be left in position to control	Requires some form of monitoring to identify when weir is close to overtopping
Temporary works solutions, bungs, stoppers etc 	Physical	- Specific design for the location and requirements - Known condition and safe operating levels	- Relatively new and unfounded technology (large inflatable stoppers) - Requires bespoke design
Flow monitoring 	Non-physical	- Can be inserted to monitor remotely at upstream locations - Once installed reduces confined spaces entry to monitor levels - Can be used as an advanced confirmation of predicted flows and for live data	- Requires entry to system to install – little fixed monitoring exists - Needs maintenance requiring confined space entry - Can become unreliable unless cleaned and maintained

Description	Type of control	Pros	Cons
Weather Forecast 	Non-physical	Can be used to provide advanced understanding and warning	Forecasts whilst generally good short range, can change unexpectedly, and rainfall can lead to a deluge in system in a relatively short period of time
Tide Times 	Non-physical	Fairly reliable, tides change slowly, and timings are known	Can result in a reduced working window

12. Glossary of Terms

CSA	Confined Space Authority, formally the IAB
WOCC	Wastewater Operations Control Centre
TRC	Technical Resource Coordinator
TWOSA	Thames Water Operational Safety Authorisation
C Permit	Thames Water Confined space permit to work
G Permit	Thames Water General Permit to work
HSP46	Thames Water Health and Safety Procedure 46 Safe and Secure Isolation Includes all activities such as isolations, flow diversions and main works
SHE4	Thames Water Safe Systems of Work form
SHE13	Thames Water Safety Toolbox Talk form
SHE21	Thames Water G permit and plant release