Procedure

Flow Isolation / Flow Management (FIFM) Procedure

1. Purpose

This procedure defines Sydney Water's minimum controls for planning and implementing Flow Isolation / Flow Management (FIFM) to allow for the protection of people exposed to the risk of hydraulic engulfment, preventing environmental harm and customer water supply impacts as far as reasonably practicable during any works.

2. Scope

This procedure applies to people who manage or work with Sydney Water's hydraulic assets where flow could cause engulfment to a person working in, on or near the asset. This procedure does not apply if there is no risk of hydraulic engulfment, or to assets not relevant to controlling the risk of engulfment, such as mixers, chemical dosing units, scrapers, or cathodic protection.

3. Minimum requirements

- People requesting FIFM must follow one of the four attachments relevant to the hydraulic system they are working with, namely:
  - Water
  - Wastewater
  - Treatment
  - Stormwater
- A FIFM Plan Coordinator must be nominated to oversee the work. They must not allow FIFM to be implemented until they:
  - have allocated roles and responsibilities for the FIFM.
  - have facilitated a FIFM Hazard Identification and Risk Assessment (HIDRA) involving key people involved in the FIFM Plan.
  - have prepared a FIFM Plan, including a trial FIFM schedule (if required).

  Note: FIFM relating to Water, the Person Requesting FIFM, acknowledge the FIFM plan, including a trial (if required).
- The Responsible Manager or their nominated representative has approved the FIFM plan, including a trial (if required).
- The Responsible Person Implementation for FIFM has accepted the FIFM plan.

The FIFM Plan Coordinator must not let work commence on the asset until confirming that:

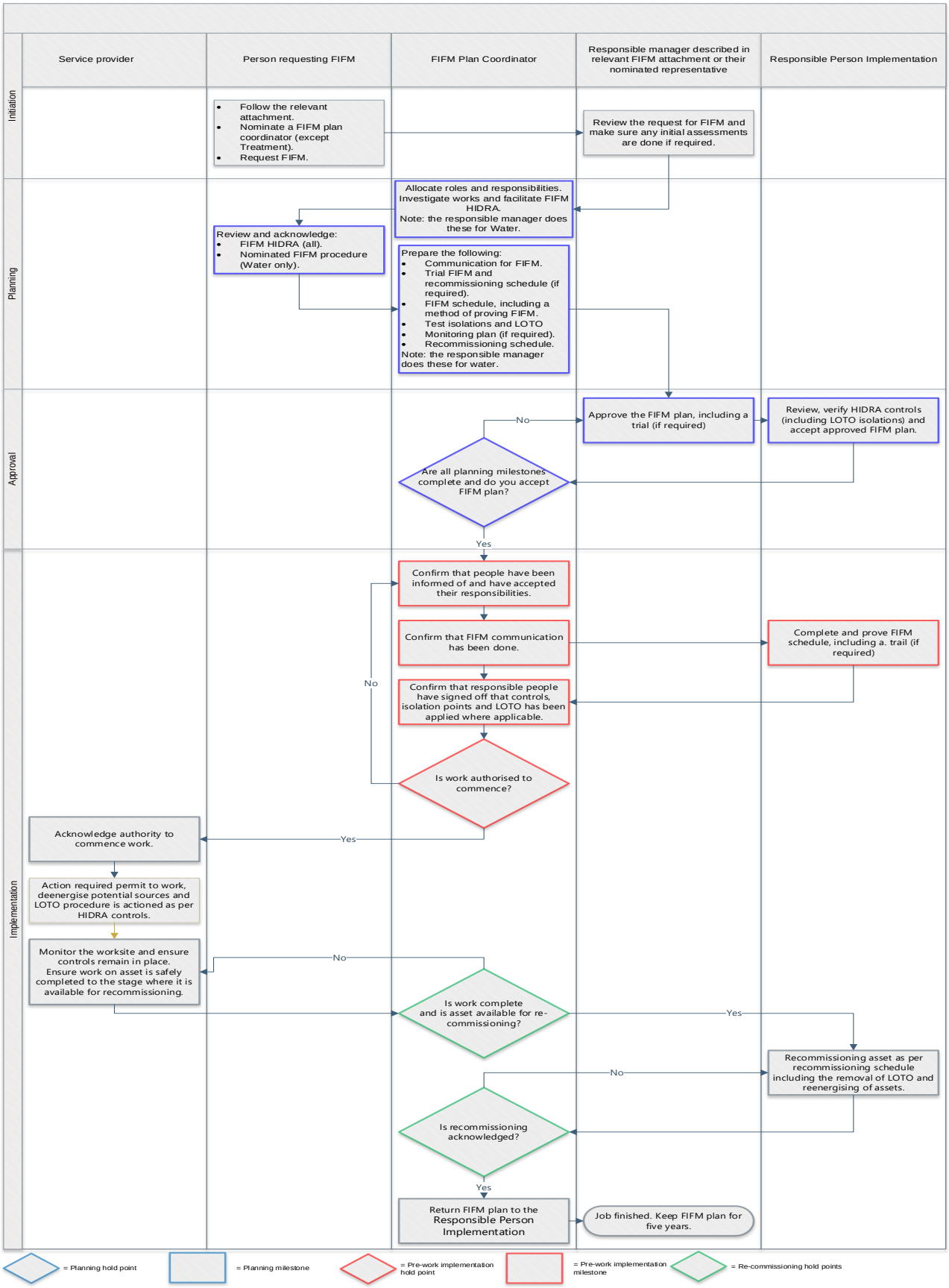
- Persons have accepted their responsibilities.
- FIFM communication has been done and known by those involved with the FIFM.
- The Responsible Person Implementation for FIFM has completed and proven the FIFM schedule and isolation.
- All controls have been signed off, are still applicable and there are no new hazards have been introduced.

- All key points of isolation have been Locked Out / Tagged Out.
- Appropriate controls have been developed and implemented for monitoring the works to ensure the site remains safe.

The FIFM Plan Coordinator must not allow the Responsible Person Implementation for the FIFM to recommission an asset until the Service Provider has signed off that they have safely completed the work. The Responsible Person Implementation can then return the system to normal operation and notify the FIFM Plan Co-ordinator.

4. Procedure in detail

4.1 Process overview



4.2 Roles and Accountabilities

The following provides a high-level overview of the key roles and the accountability to ensure the risk of engulfment for planned works is proactively managed.

Note: The same person may do more than one role depending on the type of planned work.

Role	Accountabilities
Flow Isolation / Flow Management Plan (FIFM plan) Coordinator	The person preparing the FIFM plan and / or coordinating the FIFM plan preparation and / or implementation, such as: – Maintenance Supervisor or Team Leader for reactive work – Maintenance Supervisor or Team Manager, or Treatment Operations Production Officer, for planned work – Delivery partner's Project Manager, or a contractor for project work – Water Services Coordinator for developer work. – Network Operations for some work
Nominated Representative	A person competent in FIFM nominated to do tasks, but not delegated responsibility, for one or more of the following people when it is not practicable for them to be on site: – Person Requesting FIFM – FIFM Plan Coordinator – Responsible Manager.
Person Requesting FIFM	The person managing the work for which flow isolation / flow management is required, for example: – Team Leader Maintenance for Sydney Water work – Mechanical /electrical maintenance partner – Project manager for project work – Water Service Coordinators for developer work.
Responsible Person Implementation	The Responsible Person Implementation (RPI) for FIFM from the area that will complete and prove the FIFM schedule before any work can commence. The RPI needs to review and accept the Plan before it can be implemented. This person is responsible for the physical, mechanical or electrical isolation and recommissioning of the system. Wastewater FIFM Plans may be implemented by delivery partners. Generally, water FIFM Plans are implemented by Sydney Water. In certain circumstances for Water FIFM Plans, responsibility may be delegated to an approved delivery partner(s) to implement the Water FIFM Plans and act as the relevant Responsible Person Implementation. If this is the case, Sydney Water shall communicate this via the relevant FIFM Plan initiation and define the key responsibilities of this obligation.
Responsible Manager	The person with the authority to approve FIFM plans depending on their level of risk, complexity or urgency, for example: – Planned work on water mains > 250mm diameter: Networks Area Operations Leader and Delegated Managers within Engineering Services – Reactive work, or planned work on water mains < 250mm: Team Manager/ Maintenance Leader - Network Maintenance. – The Responsible Manager also has the authority to designate nominated representatives for Water FIFM roles
Service provider	The construction, operation or maintenance team who require FIFM to work in, on or near asset safely.

4.3 Initiating FIFM

4.3.1 Hazard Identification and Risk Assessment (HIDRA)

Managers are to make sure this procedure is followed where hydraulic engulfment hazards are identified in their area of work. A HIDRA is to:

- Be conducted and documented in all instances where a FIFM is to be initiated.
- Involve those key people initiating, planning, approving, implementing, monitoring and project managing the proposed FIFM to ensure the risks and controls are known by all applicable stakeholders.
- Identify risk mitigation measures to be incorporated in the Plan.

4.3.2 Emergency response plan and protocols - relevant to the FIFM attachment

The person requesting FIFM must initiate FIFM plan by following the attachment relevant to the hydraulic system they are working with, if the work involves entering or opening an asset that conveys or stores flow, as follows:

- Attachment 1: Water (potable and recycled networks) including reservoir diving and boat work.
- Attachment 2: Wastewater.
- Attachment 3: Treatment.
- Attachment 4: Stormwater.

4.3.3 Nominate a FIFM Plan Coordinator and submit a request for FIFM

A FIFM Plan Coordinator:

- Must be nominated by the person described in the relevant attachment.
- Can be the same or a different person as the project manager for the overall job that the FIFM is part of.

The person requesting FIFM must submit a formal request for FIFM to the Responsible Manager (or a nominated representative) described in the relevant attachment, for planned work, or by other means described in the attachment, for reactive work.

The Responsible Manager (or their nominated representative) must review the request for FIFM and make sure any initial assessments are done (where required), such as a preliminary FIFM HIDRA or determining if special conditions exist.

4.4 Planning FIFM

4.4.1 Developing the FIFM plan

The FIFM Plan Coordinator must allocate roles, responsibilities and facilitate FIFM HIDRA for Wastewater, Treatment and Stormwater FIFM.

The Responsible Manager or their nominated representative will do these for Water FIFM, before handing over to the nominated FIFM Plan Coordinator to implement the plan.

The Person Requesting FIFM must review and acknowledge the FIFM HIDRA and the chosen FIFM procedure, for a Water FIFM. The FIFM Plan Coordinator must be satisfied that key FIFM HIDRA participants have reviewed and acknowledge the HIDRA, for FIFM on other systems.

The FIFM Plan Coordinator, and Responsible Manager or the nominated representative for the FIFM, will then prepare and / or coordinate the following, making sure it is consistent with the deliverables of the overall job, such as:

- Communication for FIFM.
- The FIFM schedule (see section 4.3.2 for details) including a method of proving FIFM
- A monitoring plan (if required).
- The recommissioning schedule.
- A trial FIFM plan (if required).
- Ensuring the people affected by the FIFM plan are consulted, informed, and all people with responsibilities in the plan are to provide information for the plan that is accurate to the best of their knowledge.

4.4.2 FIFM schedule

The FIFM schedule must use the following control method(s), where applicable:

- Double isolation for confined space work with a risk of engulfment. If this is not reasonably practicable, the reason why is to be documented in the HIDRA, and alternative safety measures developed if possible.
- Single isolation with an additional control as described in Table 1 and / or flow management with flow monitoring, as described in Table 2, for:
  - Confined space work with a risk of engulfment, where double isolation is not reasonably practicable
  - Non – confined space work with a risk of engulfment.
- Re-scope the work if none of these methods can be achieved.
- Isolation is to be restrained so that cannot move, such as anchoring a valve or calculating the safe distance of ground cover between the valve and the work area. Assets to be Locked Out/ Tagged Out (LOTO) should be clearly defined in the FIFM schedule.
- The FIFM schedule shall include a method for proving the success of FIFM and for monitoring during the work.

Table 1: Single isolation with an additional control

Control	Description
Single Isolation	Closing one barrier between the work area and the live flow, on every hydraulic source into the work site. It can be achieved by one of the following but not limited to: • Closing a valve or penstock. • Inserting a stop board, spade, or plug. • Electrical isolation of a pump, as long as gravity feeds are also isolated and there is no hydraulic pressure in the system. **AND:** An open bleed or drain, such as a scour valve, or hydrant in the isolated section (where available) to prove the FIFM. Tagging the closed barrier an open drain valve, as per Lock Out Tag Out procedure.
With one of the following additional controls where applicable:	
Double isolation	For work with a risk of engulfment, another isolation as described above, on the same hydraulic source, with the open bleed, drain or hydrant in the section between the two isolations to prove FIFM.
Lock out	Lock the barrier as per Lock Out Tag Out procedure, so it cannot be operated/ or moved e.g. Valve, penstock or pump.
Prevent access	Prevent access to the barrier so it cannot be operated, e.g. covering a stop valve in the street.
Monitor the isolation	Visually monitor the open drain(s) from the isolation for leakage, ensuring enough notice can be given to the Service Provider for evacuation during the work.
Guard the isolation	Visually monitor the barrier and prevent it being opened/ inadvertently operated or moved.

Table 2: Flow management with flow monitoring	
Control	**Description**
Flow management	Working in low flow conditions, such as: • Outside of peak wastewater system demand times • No rainfall in the catchment during and for a defined period before work • Temporary damming and / or by-passing flow around the work area • Pumping down wet wells before entry to a wastewater main. • Isolate pumping into the wastewater network
Flow monitoring	Monitoring changes in flow conditions, such as: • Levels in wet wells and tanks • Flow and rainfall in stormwater / wastewater catchments • Tidal flow • Discharges from open pipework And alerting the service provider for evacuation if flow conditions do or are forecast to worsen.

4.5 Approval of the FIFM plan

Sydney Water has the responsibility to approve the specific FIFM Plan(s) for Water and Wastewater work. FIFM Plans that are defined as high-risk will require a higher-level manager to review and endorse the FIFM.

The Responsible Manager (or delegated representative) is to review the FIFM plan. If it is acceptable they can approve it, including a trial (if required).

Hold point: the FIFM Plan Coordinator must not accept the FIFM plan and allow it to be implemented until all planning milestones are complete.

4.6 Implementing the FIFM plan

4.6.1 Confirm responsibilities and communication

The FIFM Plan Coordinator is to confirm that people have been informed of and have accepted their responsibilities and that communication of FIFM has been done, before the FIFM schedule commences.

4.6.2 Complete and prove FIFM schedule

The Responsible Person Implementation for FIFM is to complete and prove the FIFM schedule. They must stop the isolation and report to their manager and / or FIFM Plan Coordinator if there are any discrepancies between the FIFM plan and the actual work conditions.

The Responsible Person Implementation must prove the isolation before handing the site to the FIFM Plan Co-ordinator for the work

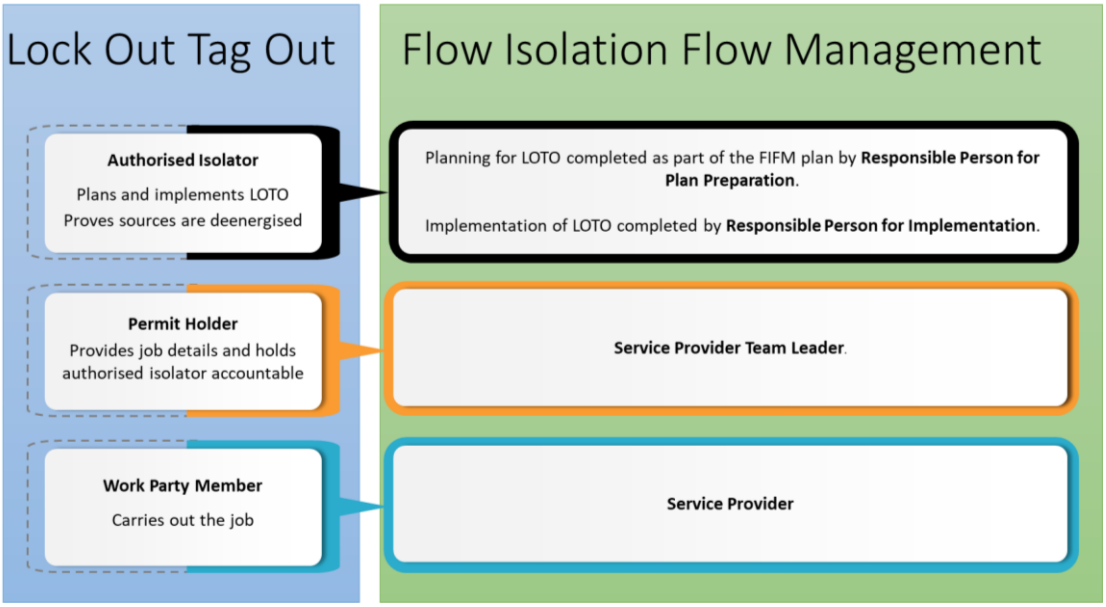
4.6.3 Confirm controls

The FIFM Plan Coordinator must confirm that responsible people have signed off that the controls have been applied, are still applicable at the start of the job, and that there are no new hazards.

The FIFM Plan Coordinator must confirm that FIFM has been proven whereby flow has stopped or has been controlled to the worksite, thereby controlling the risk of hydraulic engulfment. Confirmation is achieved by the FIFM Plan Coordinator formally agreeing with the Responsible Person Implementation for FIFM that the FIFM plan has been effective.

Hold point: the FIFM Plan Coordinator must not authorise work to commence until responsibilities and communication are confirmed, the FIFM schedule has been completed, and controls are confirmed.

4.6.4 LOTO and FIFM Relationship



4.6.5 Acknowledge authority to commence work and safely complete work

The Service Provider is to acknowledge authority to commence work on the asset, prior to starting.

They are to ensure work is safely completed to the stage where the asset is available for recommissioning and sign off when this work is done/ completed, before handing over to the FIFM Plan Coordinator for recommissioning.

The site shall be monitored by the Responsible Person Implementation or Service Provider during the work to ensure the FIFM Plan remains effective, and workers remain safe.

4.6.6 Recommissioning schedule

Hold point: the FIFM Plan Coordinator must not permit recommissioning until work on the asset is completed to the stage where it is available for recommissioning.

This is not to be before the responsible person for entry completes the entry permit, if the work is in a confined space.

The Responsible Person Implementation for FIFM must complete the re-commissioning schedule following instruction from the FIFM Plan Co-ordinator. Once complete and the system is back to normal, the Responsible Person Implementation shall notify the FIFM Plan Co-ordinator

Hold point: the FIFM Plan Coordinator is not to return the FIFM plan to the Responsible Manager until they acknowledge that recommissioning is complete.

4.7 Review of FIFM plans

In most circumstances FIFM Plans are of a short duration (e.g.<6 weeks) to allow the safe delivery of specific works to be undertaken. In some circumstances FIFM Plans remain in place for ongoing / long term works (e.g. sewer rehabilitation, upgrades, complex repairs/ maintenance etc) and therefore are subject to a specific review cycle to ensure the plan remains up to date and effective.

Where this applies, the review cycle of the plan should not exceed 12 months from the approved FIFM Plan date. The objective of the review is to ensure the plan remains valid. The review may consider the following (not limited to):

- Key stakeholders' names / contact details as defined in the FIFM Plan remain current
- Applicability of the control measures.
- Changes in FIFM Forms/ templates.
- Previous incidents / lessons learned that may need to be considered in the current plan.

Additionally, where a FIFM Plan has been developed and approved in advance of the proposed works, and those works are yet to commence for a period exceeding 12 months (e.g. due to unforeseen delays), then FIFM Plan must be reviewed and updated.

4.8 Emergency response plan

Business area managers responsible for the project work are to:

- Make sure that the Person Requesting FIFM has an emergency response plan to manage an isolation or flow management failure or be impacted by unforeseen circumstances (i.e. adverse weather event).
- Ensure the emergency response plan is known, understood by the workers and rehearsed. Any changes or improvements must be documented and communicated to those workers involved in the FIFM.

4.9 Inspection, testing and monitoring

Business area managers responsible for the project work are to:

- make sure that inspection, testing and monitoring is done according to inspection, testing and monitoring, to demonstrate compliance with their area's responsibilities in the FIFM plan.
- Address any identified non-conformances or corrective action.

4.10 Information, instruction and training

Business area managers responsible for the project work are to make sure that people with responsibilities in the FIFM plan, or their nominated representatives:

- Have received the approved Sydney Water training and are competent to do the role, as per section 4.10.1 FIFM training matrix.
- Understand the information and instruction relevant to their roles. If unsure, clarify the information or instruction to ensure FIFM plan is known.
- Ensure the validity of training of those key people involved in the initiating, planning, approving, implementing and monitoring the FIFM Plan remains current.

4.10.1 FIFM training matrix

The FIFM roles must complete the training as defined in the matrix below.

FIFM Training Matrix						
FIFM Functional Role	Type of Work Requiring FIFM					
	Awareness	Planned work on water assets	Planned work on wastewater or stormwater assets	Planned work on treatment plant assets	Service Provider work on any asset with an engulfment risk	
	Initial Training					Refresher Training (every 3 years)
	FIFM Awareness Training (online) Compass ID 00002968	**FIFM WATER Training * Compass ID TBA**	**FIFM WASTEWATER / STORMWATER Training * Compass ID TBA**	**FIFM TREATMENT Training * Compass ID 0000021880**	**FIFM SERVICE PROVIDER Training * Compass ID TBA**	*Denotes that this training includes FIFM Awareness training
Person Requesting FIFM (e.g. Maintenance Team Manager, Team Leader Civil Delivery, Project Manager. Water Services Coordinator)	**YES**					
FIFM Plan Coordinator (e.g. Maintenance Team Manager, Team Leader Civil Delivery, Treatment Operations PO, Project Manager, Water Services Coordinator)		**YES**	**YES**	**YES**		
Responsible Person Plan Preparation (e.g. Maintenance Team Manager, Team Leader Civil Delivery, Treatment Operations PO, Project Manager, Water Services Coordinator)		**YES**	**YES**	**YES**		**Online refresher training** **FIFM WATER** Compass ID 00009040 And / or **FIFM WASTEWATER / STORMWATER** Compass ID 00009039 And / or **FIFM TREATMENT** Compass ID 00008918
Responsible Manager / Nominated person. The person with the authority to approve FIFM plans depending on their level of risk, complexity, or urgency.		**YES**	**YES**	**YES**		
Responsible Person Implementation The person who does/leads the physical, mechanical or electrical isolation and recommissioning to enable the work to be completed safely		**YES**	**YES**	**YES**		
Service Provider Construction, operations or maintenance crew who require FIFM to work in, on or near the asset					**YES**	**Online Refresher Training** FIFM Service Provider Compass ID TBA
Managers with indirect involvement or other who require understanding of FIFM process	**YES**					

4.11 FIFM records

The Responsible Manager described in the relevant FIFM product process (e.g. water, wastewater, treatment and stormwater systems) are to ensure approved and completed FIFM plans, and associated documents are:

- Stored in a clearly labelled and accessible location, either onsite or electronically (Treatment only).
- Retained in SWConnect for Water, Wastewater and Stormwater product process.
- Retained for a minimum period of five years.

5. Definitions

Term	Definition
Double barrier isolation	Two barriers between the work area and the live hydraulic system, applied to every hydraulic source into the work site. This may include physical, mechanical and / or electrical and apply to water, wastewater, treatment and stormwater systems. It can be achieved by closing the following but not limited to: – two valves – a valve and inserting a stop board or spade/ blank flange – a valve and electrical isolation of a pump (as long as gravity feeds are also isolated) and there is no hydraulic pressure in the system – a valve and removing another valve, spool piece or expansion joint in a pipe leading to and as close as practicable to the work site and blanking or capping the open end of the pipe. Note: 1. FIFM relating to pumped systems, as well as mechanical (valve) isolation, additional consideration for electrical isolation of pumps to eliminate activation must also form part of the FIFM solution. 2. double barrier isolation for a shutdown should ensure double barriers on all offtakes/hydraulic sources leading to the site. 3. LOTO shall be applied to all valves and pumps as necessary
Entry into hydraulic asset	When a person's head or upper body is within the boundary of the asset. Inserting an arm is not entry into a hydraulic asset.
Flow Isolation	A barrier to prevent hydraulic flow into the work area so that it is safe for work to commence, applied to every hydraulic source into the work site. It should be as close as practicable to the work site while still meeting safe work distances. Examples include: Physical – stop boards, cofferdams, blanking or capping the end of a pipe, removing a valve, spool piece or length of pipe Mechanical – closed and securely anchored valves and locking / tagging these out. Pump electrical isolation This is not necessarily the same as shutdown of the flow or stopping leakage.
Flow management	A process of assessing and controlling flow to prevent engulfment or uncontrolled water pressure. It includes estimating flooding and evacuation time, by considering: – System integrity and demand – Pressure head – Flow rate – Weather reports/ forecasts (including the impact of potential rain intensity and evacuation measures relevant to the weather) – Tidal flow

Term	Definition
Flow monitoring	Monitoring changes in flow conditions, such as: – Levels in wet wells and tanks. – Flow and rainfall in stormwater / wastewater catchments. – Tidal flow – Flow from isolated pipeline sections e.g. scours, bleed valves or cut pipe open ends. Including a process for alerting the service provider(s) for evacuation if flow conditions worsen.
Flow isolation / flow management plan (FIFM plan)	The relevant forms for: initiating, planning, approving and implementing FIFM. They include: – FIFM Form A – Request for FIFM – FIFM Form B – Key Responsibilities and Contact List – Hazard Identification Risk Assessment (HIDRA) SWIM Doc no: 1008814 – FIFM Form D – Communication for FIFM – FIFM Form E – Trial Isolation and Re-commissioning Schedule – FIFM Form F – Asset Operational Status – FIFM Form G – Asset Operational Status Sheet Wet Well Levels – FIFM Form H – Schedule & Method for Proving Successful FIFM – FIFM Form I – Monitoring Plan – FIFM Form J – Recommissioning Schedule – FIFM Form K – Milestone and Hold Point Checklist – FIFM Form M – HIDRA, Authority to Work for Planned Work – FIFM Form O – Trial Isolation of <250mm & W3
Guarding the isolation	A way of making sure there is no unauthorised re-commissioning, putting persons at risk of engulfment. This may be achieved by visually watching the isolation and preventing it from being opened. This may also incorporate LOTO
Hold point	The point where work cannot progress until approval or verification of certain isolation / flow management activities.
Lock Out / Tag Out	LOTO is a process for de-energising services, such as electrical, hydraulic, pneumatic, mechanical, etc, and be physically locked out to prevent inadvertent activation during times of their intended isolation. Tag out defines the key person(s) who have placed the lock out device(s).
Hydraulic asset	Any part of a water, wastewater, treatment or stormwater network that is normally conveying or storing water-based fluid. Examples include: – Water or sewer pipes and associated structures including maintenance holes, valve chambers and reservoirs. – Stormwater canals. – Pumping station wet wells and manifolds. – Treatment plant chambers, channels or tanks. – Potentially an excavation with open or exposed pipes.
Hydraulic engulfment	To be swallowed up or immersed by water-based liquid inside a hydraulic asset, which may result in drowning. Divers in reservoirs are at risk if the flow creates a situation where the SCUBA could run out or fail, e.g. being sucked into an outlet.

Term	Definition
Monitor for leakage	A way of making sure there is no unauthorised re-commissioning putting people at risk of engulfment. This may be achieved by monitoring flow through scours, hydrants or other proving / dewatering points such as drillings, loosened flanges, or open pipework.
Proving isolation	To confirm that the FIFM has stopped or controlled flow to the worksite and controlled the risk of hydraulic engulfment. This must be recorded on the FIFM schedule and method of proving successful FIFM form.
Reasonably practicable	That which is, or was at a particular time, reasonably able to be done to ensure health and safety, considering and weighing up all relevant matters, including: 1. The likelihood of the hazard or risk occurring 2. The degree of harm that might result from the hazard or risk 3. What the person concerned knows, or ought reasonably to know, about the hazard or risk, and ways of eliminating or minimising the risk 4. The availability and suitability of ways to eliminate or minimise the risk 5. After assessing points 1 to 4, the cost of eliminating or minimising the risk, including whether the cost is grossly disproportionate to the risk. Examples of when it may not be reasonably practicable to apply double isolation is if the second isolation will create a higher negative impact on: – Other safety hazards – Customers – The environment – Complying with the Sydney Water Operating Licence. Such risks should be considered in the HIDRA stage of the FIFM process
Restrained valve (anchored valve)	A valve that can't move in response to pressure, for example: – Valve suitably anchored (anchor block) – Valve in a continuous pipeline, i.e. no pipe or fitting removed – Valve with pipe held by soil friction – Valve with pipe held by soil friction off a bend, tee, etc.
Single barrier isolation	A single barrier between the work site and the live hydraulic system, applied to every hydraulic source into the work site. It can be physical, mechanical and / or electrical and applies to water, wastewater and stormwater systems. It should be as close as practicable to the work site while meeting safe work distances.

6. Context

References

Document type	Title
Compliance obligations	NSW Work Health and Safety Act and Regulations
Policies and procedures	Confined Space Safety - 735039 HIDRA - 1008814 Inspection, Testing and Monitoring Lock Out / Tag Out - 518200
Other documents	HSG0567 Guide for Safe Isolation of Assets or Equipment. Hazard Identification Risk Assessment (HIDRA) Template - 1008814

Attachments

Attachment	Title
1	Water
2	Wastewater
3	Treatment
4	Stormwater

7. Ownership

Role	Title
Group	Safety, Health and Wellbeing
Owner	Manager, Safety Advisory
Author	SHW Business Partner – Program Delivery

Change history

Version	Issue Date	Approved by	Brief description of change and consultation
5	01/04/2011	GM People, Leadership & Culture	Replaces HSP – 070 Flow Management and Isolation of Hydraulic Assets Version 4
6	10/10/2025	Head of Safety, Health and Wellbeing	Update to reflect changes in legislation, alignment to Corporate HIDRA template. Included the training matrix, clarification of record retention period and inclusion of the LOTO process.