SA Water

Engineering

Technical Standard

TS 0101 – Safety in design

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Issue and version number

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Documents superseded by this standard

The following documents are superseded by this standard:

a. TS 0101, Version 3.0.

Significant/major changes incorporated in this edition

Updates in this version of the Technical Standard include:

a. Updated and alignment with CPMM 3.0 including hazard identification, tier requirements, Project Needs and alignment of terminology.
b. Change of SiD Specialist to Lead SiD due SA Water position change.
c. Clarification of SiD workshop attendees.
d. Inclusion of requirement when projects are delayed or put on hold.
e. Include reference to Major Land Development safe design management plan.
f. Include section on relevant WHS Legislation.
g. Facilitator endorsement and inclusion in facilitator register.
h. Inclusion of use of digital technologies to enhance hazard identification and safety.

Updates throughout this document have been highlighted yellow.

Document controls

Version history

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1.0	23-03-2015	L Donisthorpe	Issued for Use
2.0	20-01-2020	L. Haigh	Major update of process steps and inclusion of supporting documentation.
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1 Introduction

SA Water is responsible for the introduction and management of the asset lifecycle across an extensive amount of infrastructure.

This standard has been developed to assist in the safe design for modification or the building of new assets, including constructability across the asset lifecycle.

Safety in Design is defined as:

> "The integration of hazard identification and control measures early in the design process to eliminate or, if this is not reasonably practicable, minimise risk to health and safety throughout the life of the structure being design."
>
> - *Adapted from the model code of practice safe design of structures*

1.1 Purpose

The purpose of this standard is to specify the minimum mandatory requirements of the SA Water Safety in Design process.

This Standard specifies the process and minimum requirements that SA Water considers necessary to ensure that:

a. SA Water delivers on its key corporate value of "Putting Safety Above All Else".

b. SA Water meets its WHS legislative obligations as a "Person Conducting a business or undertaking" (PCBU) under the WHS legislation.

c. Consideration of WHS Legislative requirements for PCBU, Designer, manufacturer, and supplier.

This Standard is to allow key stakeholders to collectively identify and reduce health and safety risks associated with the design of assets for the whole of life, including construction, installation, commissioning, operation, maintenance, repair, demolition, and recycling.

1.2 Glossary

Terms and Abbreviations utilised in this Standard are included in the following sections. The definitions presented below are to be used when interpreting this Standard and actions undertaken in relation to this Standard. Where a conflict exists, clarification is to be sought from SA Water.

1.2.1 Terms and Definitions

The following is a list of Terms applicable to this document:

Term	Description
Accepted	Determined to be satisfactory by SA Water's Representative.
Asset	Structure, facility, plant, operating system/equipment.
Asset Planner	A position at SAW that contribute to the development of and planning for Asset Approaches, Business Cases and Asset Management Plans for SA Water's Assets. They support their implementation to ensure agreed levels of service are provided that optimise risk, performance and life-cycle costs, while providing customer-centric outcomes.
Concept Design	The initial level of design undertaken to identify and address the major and/or critical elements of the asset being designed.

Term	Description
Constructor	The organisation responsible for constructing and installing infrastructure for SA Water whether it be a third party under contract to SA Water or an in-house entity.
Contract	A set of documents supplied to Constructor as the basis for construction; these documents contain contract forms, contract conditions, specifications, drawings, addenda, and contract changes.
Contract Documents	A set of documents supplied to Constructor as the basis for construction; these documents contain contract forms, contract conditions, specifications, drawings, addenda, and contract changes.
Design	The development of ideas and concepts to a suitable level of detail and production of documentation that can be used to construct or modify items or assets. The WHS Act defines design as follows: "Design, in relation to plant, a substance or a structure, includes: a. design of part of the plant, substance, or structure b. redesign or modify a design."
Designer	The organisation and individual responsible for designing infrastructure for SA Water whether it be a third party under contract to SA Water or, a Constructor, or an in-house entity. A Designer is a person who effects design, produces designs or undertakes design activities as defined in the *Work Health and Safety Act 2012 (SA)*.
Detailed Design	The level of design undertaken to develop a concept design to a level of detail necessary to allow construction, modification or installation of the work.
Ergonomics	The scientific discipline concerned with the understanding of the interactions among humans and other elements of a system, and the profession that applies theory, principles, data and methods to design in order to optimise human well-being and overall system performance.
Guideword/s	Prompt/s to assist brainstorming processes/stimulate discussion.
Hazard	A situation or thing that has the potential to harm.
SA Water Lead SuiD/SiD	Previously known a SiD Specialist, a SA Water position responsible for overseeing the Sustainability in Design (SuiD) and Safety in Design (SiD) teams.
Lifecycle	All phases in the life of an asset. The specific phases present in an assets lifecycle will depend upon the type of asset but may include design, development, manufacture, construction, assembly, import, supply, distribution, sale, hire, lease, storage, transport, installation, erection, commissioning, use or operation, consumption, maintenance, servicing, cleaning, adjustment, inspection, repair, modification, refurbishment, renovation, recycling, resale, decommissioning, dismantling, demolition, discontinuance, disposal.
Manufacturer	A person, group, or company that owns and operates a manufacturing facility that provides materials for use in SA Water infrastructure.
Must	See Shall.
Needs	A need is a systems engineering artefact which is used to define a success criterion for a project. The total register of needs represents the minimum success criteria for a project.
Person/s	Each word implying a person, or persons shall, where appropriate, also be construed as including corporations.
Project	Any engineering development work (including creation, expansion or modification to assets) for which an expenditure proposal is required.

Term	Description
Project Manager	An appropriately qualified person who has been given the responsibility to manage an asset design or modification on behalf of the client. The Project Manager may delegate these activities however remain responsible, i.e., Mr Bigg on behalf of Mrs Strong.
Reasonably Practicable	Subdivision 2 section 18 of the WHS Act 2012 SA – What is reasonably practicable. Additional guidance is available in the Safe Work Australia publication: ISBN 978-1-74361-065-7 How to determine what is reasonably practicable to meet a Health and Safety duty
Residual Risk	Residual risk is the risk remaining after risk treatment.
Responsible Discipline Lead	The engineering discipline expert identified in the 'Approvers' table (via SA Water's Representative).
Risk	Risk is the effect of uncertainty on objectives. Risk is often expressed in terms of the consequences of the event and the likelihood of its occurrence.
Risk Assessment	Risk assessment is the overall process of risk identification, risk analysis and risk evaluation.
Risk Control	Taking action to eliminate health and safety risks so far as is reasonably practicable and, if that is not possible, minimising the risks so far as is reasonably practicable. Eliminating a hazard will also eliminate any risks associated with that hazard.
SA Water Representative	The SA Water representative with delegated authority under a Contract or engagement, including (as applicable): a. Superintendent's Representative (e.g. AS 4300 and AS 2124 etc.) b. SA Water Project Manager c. SA Water nominated contact person
Safe Design	Safe design means the integration of control measures early in the design process to eliminate or, if this is not reasonably practicable, to minimise risks to health and safety throughout the life of the structure being designed.
Shall and Should	The word "should" indicates practices which are advised or recommended.
Shall	A requirement that is to be adopted in order to comply with the Standard.
Should	Practices which are advised or recommended, but is not required
SiD Facilitator	A person trained or experienced person who will lead Safety in Design Review workshops.
SiD Hazard Register	Register of hazards, and means to address them, per hierarchy of controls.
SiD Lead	The person identified as responsible for the SiD process. They will have experience in line with the scale, scope and complexity of the package of work to be carried out. E.g. Connection and extensions – Customer Technical Services co-ordinator Small designs – Designer /Project Manager, Design Lead Larger projects – Senior Designer, Principal Designer, Design Manager, Head Designer
Standard Design	A standard design is a pre-existing design that is intended to be used without modification, except for site-specific hazards or new hazards introduced at the site.
Supplier	A person, group or company that provides goods for use in SA Water infrastructure.

Term	Description
Sustainability	Sustainability refers to the development that meets the needs of the present without compromising the ability of future generations to meet their own needs. Sustainability at SA Water builds on our history of environmental action, customer and community care and responsible operations. By integrating sustainability across all aspects of our operations, including our partners and supply chain, SA Water seeks to create a lasting and positive legacy of a resilient, thriving, and equitable water future for South Australia.
Sustainability by Design	Sustainability by Design aims to embed sustainable principles throughout the asset lifecycle to unlock innovative solutions that advance environmental stewardship, economic and social prosperity and drive a more resilient and sustainable future.
Systematic Coverage (relating to SiD hazard review workshops)	Mapping the prompts for the workshops by noting the life cycle phases and activities being carried out in those phases. Can be mapped out in a list format or matrix model, and a copy should be included in the Hazard Register for record.
Technical Dispensation Request Form	This form is part of SA Water's Technical Dispensation Request Procedure which details the process by which those required to comply, or ensure compliance, with SA Water's technical requirements may seek dispensation from those requirements.
Typical Design	Typical drawings inform the Designer of SA Water engineering standards, which may be one acceptable method, or our preferred method of complying with engineering standards. There is a SiD Hazard Register (SiD1 level) associated with each typical design that should be used with the associated design. Typical drawings are generally specific to types of infrastructure. They may be used by Designers as a base to develop their own designs. They are not to be used as construction documents and must be reviewed and modified, as required, by Designers to produce project specific design drawings for construction.
Value Management	A process designed to maximise the value delivered over the asset lifecycle across all capital projects. Through systematic analysis and stakeholder collaboration, value management ensures asset projects align with business needs, reduce unnecessary scope, and improve outcomes across the asset lifecycle including safety.
WHS Act	Work Health and Safety Act 2012 (SA) Revision 1.07.2017
WHS Reg.	Work Health and Safety Regulations 2012 (SA) Revision 1.07.2017
Work	Elements of a project which require design and/or construction.

1.2.2 Abbreviations

The following is a list of Abbreviations, Acronyms and Initialisms used in this document:

Abbreviation	Description
CHAZOP	Control System Hazards and Operability Study – A HAZOP study specifically on Control Systems
CPMM	Corporate Project Management Methodology – a system used to manage and control capital project delivery at SA Water.
HAZID	A guideword process to review preliminary hazards associated with a project
HAZOP	Hazard and Operability Study – A series of hazard studies at various stages throughout the design process with a focus on the process operation and what occurs when operating outside of design intent.
IFC	Issued For Construction
OE	Owners Engineer
PC	Practical Completions
PCBU	A Person Conducting a Business or Undertaking – SA Water, including contractors SA Water, engages to operate, maintain or construct infrastructure for SA Water
PPE	Personal Protective Equipment
RIVER	SA Water SharePoint® based document management system
SA Water	South Australian Water Corporation
SFAIRP	So far as is reasonably practicable
SiD	Safety in Design
TDRF	Technical Dispensation Request Form
TG	SA Water Technical Guideline
TOTEX	Total Expenditure
TS	SA Water Technical Standard
VM	Value Management
WOL	Whole of life

1.2.3 Terminology

The following is a list of specific interpretations for Terminology used in this standard.

- Where an obligation is given and it is not stated who is to undertake these obligations, they are to be undertaken by the Constructor.
- Directions, instructions and the like, whether or not they include the expression "the Constructor shall" or equivalent, shall be directions to the Constructor, unless otherwise specifically stated.
- Where a submission, request, proposal is required and it is not stated who the recipient should be, it is to be provided to SA Water's Representative for review.
- Each word imparting the plural shall be construed as if the said word were preceded by the word "all".
- "Authorised", "approval", "approved", "selected", "directed" and similar words shall be construed as referring to the authorisation, approval, selection or direction of SA Water's Representative in writing.
- "Submit" mean "submit to the SA Water Representative or their nominated delegate".

- Unless noted otherwise, submissions, requests, proposals are to be provided at least 10 business days prior to work commencing or material ordering (unless noted otherwise).

1.3 References

1.3.1 Australian and international

The following table identifies Australian and International standards and other similar documents referenced in this document:

Reference	Title
-	Work Health and Safety Act 2012 (SA) Revision 1.07.2017
-	Work Health and Safety Regulations 2012 (SA) Revision 1.07.2017
-	Code of Practice "Safe Design of Structures", Safe Work Australia Revision 2018
-	How to manage health and safety risks code of practice
ISBN 978-1-74361-065-7	How to determine what is reasonably practicable to meet a health and safety duty
Engineer Australia – resources/files	ESM Consulting – Safe Design 10 steps
TAPPI Journal, 80 (11), 69–74)	Construction Project Safety Planning. TAPPI Journal, 80 (11), 69–74)

1.3.2 SA Water documents

The following table identifies the SA Water standards and other similar documents referenced in this document:

Reference	Title
SAWF-ENG-0007	Safety in design assessment template (**short**)
SAWG-RM-0001	SA Water corporate risk management methodology
SAWL-ENG-0005	SiD prompt list
SAWL-ENG-004	SiD facilitator register
SAWT-ENG-0001	Safety in design hazard identification workshop template
SAWT-ENG-0003	Safety in design report template
SAWT-ENG-0004	Safety in design hazard register template
SAWT-ENG-0006	SA Water SiD assessment plan
SAWT-SEC-0001	Security Risk Assessment
TG 110	Safety in design guideline
SAWG-PM-0111	Lessons Learned Management Plan
SAWG-ENG-0521	Major Land Developments Safety in Design Management Plan

2 Scope

2.1 Scope and application of this Technical Standard

This Technical Standard specifies the minimum mandatory requirements of SA Water Safety in Design process to eliminate hazards and, where this is not reasonably practicable, to minimise so far as is reasonably practicable the risk to the health and safety of workers and those in the vicinity of the design.

This standard is applicable to all design projects including those delivered in the capital or operations space. It is applicable for infrastructure designed, constructed, modified, decommissioned or demolished by or for SA Water, for example, design activities performed by operations, design activities carried out for an external party, etc. and applies to project delivery, either internal or external to SA Water and infrastructure including structures, plant and equipment, permanent, temporary, fixed or mobile.

Figure 1: Typical life cycle of an asset

There is a duty of care for anyone involved in any of the phases of the lifecycle of an asset with regard to Whole of Life (WOL) safety and Safety in Design.

SA Water personnel, contractors, subcontractors, developers and their employees who perform work on behalf of SA Water shall comply with the requirements of this standard.

Compliance with this Standard (and other SA Water Safety in Design (SiD) documents) will not, in itself, ensure compliance with WHS legislation or SA Water corporate WHS objectives. It is the designer's responsibility to ensure that designs comply with the South Australian WHS legislation.

2.1.1 Simple designs and capitalised maintenance

SiD Process is to be applied to all designs. For designs that meet the following criteria, the SiD Short Form process can be used:

a. The design has been assessed as low-risk.

   And

b. Is single discipline.

   Or

c. Has OPEX value under $10,000.

   Or

d. Capitalise Maintenance, where SiD is used to identify the stakeholders and as a method of identifying and transferring hazard information.

The "Short Form" is to be completed by the SiD Lead. It documents the lessons learned and known hazards, stakeholder consultation, communication and cooperation, the activities being carried out to ensure a safe design SFAIRP, and the transfer of information to the relevant parties.

Independent of the delivery method there is a requirement to carry out the SiD process and ensure the design is free of hazards SFAIRP for whole of life.

2.1.2 Program approach designs

The SiD process is equally applicable to designs resulting from programs of work outputs. Programs are typically groups of related projects. In these circumstances, a SiD Assessment Plan can be carried out at the program level, identifying the approach to Safe Design for the

program. Where commonalities apply e.g. common design to apply across different sites or group of works to apply to one section of a site. The SiD process can be carried out for the common element, then for the repeated component/s, apply the findings and review by difference. Note findings of any subsequent reviews need to be fed back to the program level and into outputs currently in progress and review. The decision-making process of any variations needs to be recorded in the project approach documents. A specific SiD Report is required for each output.

The SA Water Lead SuiD/SiD or their delegate must be involved in the development of the SiD Program Approach. The Program Approach is to be mapped out and described in section 1.03 of the SiD Assessment Plan.

An important aspect of the program level approach to SiD is how lessons learned are to be captured and fed back into the program works.

Where designs within a program are one off and don't contain the common element, the complete SiD process is to be followed for that design.

2.2 Works not in scope

N/A

2.3 Technical dispensation

Departure from any requirement of this Technical Standard shall require the submission of Technical Dispensation Request Form (TDRF) for the review and approval (or otherwise) of the Responsible Discipline Lead, on a case-by-case basis.

The Designer shall not proceed to document/incorporate the non-conforming work before the Responsible Discipline Lead has approved of the proposed action in writing via the Technical Dispensation Request Form (TDRF).

SA Water requires sufficient information to assess dispensation requests and their potential impact. The onus is, therefore, on the proponent to justify dispensation request submissions and provide suitable evidence to support them.

Design works that are carried out without being appropriately sanctioned by SA Water shall be liable to rejection by SA Water and retrospective rectification by the Designer/Constructor.

3 WHS Legislation

In the state of South Australia SA Water is regulatory governed by the:

- Work Health and Safety Act 2012 (SA)
- Work Health and Safety Regulations 2012 (SA)

Where SA Water workers and infrastructure are in other states, for example New South Wales and Victoria, care should be taken to ensure the requirements of the corresponding state legislations are addressed. These include but not limited to:

- Work Health and Safety Act 2011 (NSW).
- Work Health and Safety Regulations 2017 (NSW).
- Occupational Health and Safety Act 2004 (Vic).
- Occupational Health and Safety Regulations 2017 (Vic).

SA Water SiD Process aligns with model code of practice safe design of structures and is considered standard practice.

'*Structures*' defined under the WHS Act to mean anything that is constructed, whether fixed or moveable, temporary or permanent.

Under the South Australian Work Health and Safety (WHS) Act 2012, duty holders, including persons conducting a business or undertaking (PCBUs), have a primary duty of care (WHS Act 2012 (SA) section 19) summarised below:

- Identify hazards that are reasonably foreseeable.
- Eliminate risks to health and safety so far as is reasonably practicable.
- Where it's determined that it's not reasonably practicable to eliminate the risk to health and safety, risk must be minimised so far as is reasonably practicable.
- Apply the hierarchy of control measures.
- Ensure consultation, co-operation and coordination with other duty holders.

In addition, there are specific duties noted in the WHS Act and Regulations 2012 (SA) for:

- PCBU management of control of workplaces (section 20).
- PCBU management or control of fixtures, fittings or plant at workplace (Section 21).
- PCBU that design plant, substance or structures (section 22).
- PCBU that manufacture plant, substance or structures (section 23).
- PCBU that import plant, substance or structure (section 24).
- PCBU that supply plant, substance or structure (section 25).
- PCBU that install, construct or commission plant or structures (section 26).

That include and not limited to:

- ensure so far as is reasonably practicable that the plant, substance or structure is designed without risk to the health and safety of persons for all reasonably foreseeable use/misuse and activities relating to and including construction installation, maintenance operation, storage, decommissioning or other and anyone in the vicinity of the plant or structure.
- Carry out or arrange necessary calculations, analysis, testing, or examination to verify the safety of the design.
- Supply adequate information to those receiving the design, including its intended purpose, testing results, and conditions for safe use. Without risk to the health and safety.

- On request, provide current and relevant safety information to anyone involved in activities such as construction, operation, maintenance, or disposal of the designed item.

Refer to relevant Act and Regulations for full obligations.

4 SiD key principles overview

4.1 Design for whole of life

The most effective time to eliminate hazards or minimise risk is early in the design step of an asset.

The activities in different phases of an asset lifecycle will have different interfaces and, therefore, different hazards. Identification of the hazards during early design gives the greatest scope to design out these hazards. Where it is not reasonably practicable to eliminate the hazard, controls are to be used to reduce the risk SFAIRP.

Consideration is to be given to all phases of an asset's life cycle, including but not limited to construction, commissioning, testing, operation, maintenance (including major maintenance to remove assets), future uses or upgrades, refurbishing, decommissioning, mothballing, dismantling and reuse, recycling and disposal.

Whole of life design considerations include:

- The designs and their intended purpose.
- Materials to be used.
- Possible methods of construction maintenance, operation, end of life.
- What legislation, codes of practice, and standards, need to be considered and complied with.

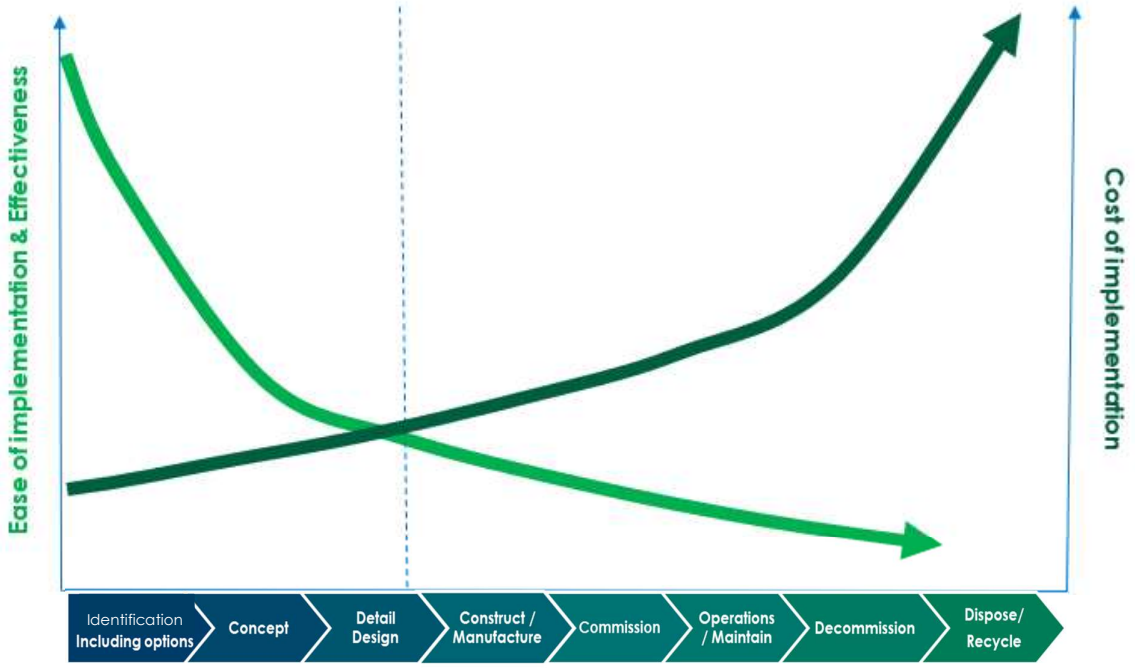

Figure 2: Impact of early engagement

Influence over product lifecycle (adapted from Symberszki, R, (1997) Construction Project Safety Planning. TAPPI Journal, 80 (11), 69–74)

4.2 Consultation communication and co-operation

The consultation, communication and cooperation with stakeholders to identify and eliminate hazards contribute to the development of a safer asset for the whole of life. The legislative requirement for consultation with stakeholders includes user groups, constructors, subcontractors, and other duty holders. Through early engagement of stakeholders, their experience and knowledge can be drawn upon to identify hazards and produce informed decisions on how best to effectively eliminate hazards and reduce risks SFAIRP.

Consultation, communication, and cooperation also aid in the identification of hazards introduced or as a result of different group activities or simultaneous work.

The WHS legislation requires Duty Holders to work together to identify and eliminate hazards.

These include and are not limited to:

a. PCBUs.

b. Designers, manufacturers, importers and suppliers of plant, substances or structures.

c. Officers.

d. Workers.

e. Subject matter experts and others.

Clear lines of communication for SiD matters shall be established (and recorded in the SiD Assessment Plan) by the Designer to ensure that this information is transferred at the appropriate time and decisions that have been made by the responsible parties are documented and communicated.

The duty for consultation, communication and cooperation is also important in the construction step, where different PCBUs may be working in the vicinity and may introduce hazards not known to other PCBUs.

4.3 Information transfer

Information relating to identified hazards, lessons learned, control measures, action taken or required to control risks, are to be recorded and transferred through all phases to those involved in later stages of the lifecycle. Communicating this information makes other duty-holders aware of residual risks and minimise the likelihood of safety features incorporated into a design being altered or removed by those engaged in subsequent work.

When requesting design work, providing Designers with information relating to the hazards and risks of the site and vicinity where the work is to be carried out commences the information transfer flow. The design information relating to SiD is to be transferred from one phase to the next.

Transfer of information between parties is one of the duties of the Designer, as stated in the WHS Act Section 22.

4.4 Knowledge and capability

In addition to core design capabilities relevant to the Designer's role, a Designer is required to have:

a. Knowledge of work health and safety legislation, codes of practice and other regulatory requirements, and/or seek information from subject matter experts.

b. An understanding of the intended purpose/s of the structure.

c. Knowledge of hazard identification and risk management processes.

d. Knowledge of technical design standards.

e. An appreciation of construction methods and their impact on the design.

f. The ability to source and apply relevant data on human dimensions, capacities and behaviours (human factors).

Many design projects are too large and complex to be fully understood by one person. Various persons with specific skills and expertise may need to be included in the design team or consulted during the design process to fill any knowledge gaps, such as ergonomists, engineers, and occupational hygienists.

4.5 Risk management approach

The only level of safety risk that is considered acceptable to SA Water is one which satisfies the so SFAIRP principle in accordance with the WHS Act.

The SiD process is not intended to reduce safety risks to a particular risk level but rather one that satisfies the 'so far as is reasonably practicable' (SFAIRP) principles and requirements of the WHS Legislation.

There are three broad sources of hazards:

a. Hazards relating to the design.

b. Hazard relating to the way the design is used.

c. Hazards relating to the environment where the design will be used.

Where it is not reasonably practicable to eliminate the hazard, the risk, therefore, is minimised SFAIRP.

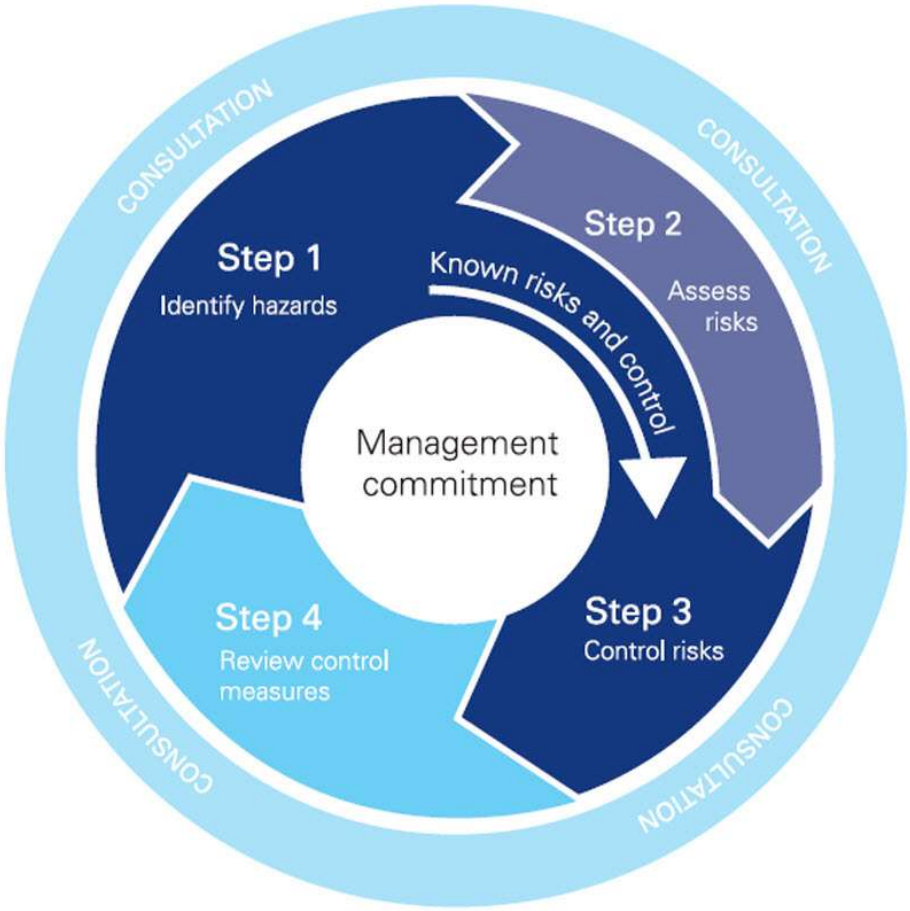

Figure 3: Risk management approach

Image from Safe Work NSW "A risk management approach to work-related stress: Tip sheet 2"

The elimination of the hazard is always the most effective control. Where it is not reasonably practicable to eliminate the hazard, the method of controls will be determined by reference to the hierarchy of controls below:

a. Elimination of the hazard, removal of the hazard removes the risks.

b. Substitution of the hazard with a less hazardous plant, process, or substance.

c. Reduction of the risk through isolation (separate the hazard from the person).

d. Reduction of the risk through engineering controls, for example, automation, guarding, design and ventilation.

e. Reduction of the risk through administrative controls, such as training, instruction, supervision, and work systems.

f. Reduction of the risk through personal protective equipment (PPE). The use of PPE is a last resort.

Where reasonably practicable, SA Water require hazard control measures to be "above the line" This philosophy minimises reliance on human behaviours to reduce exposure to hazards using administrative controls and PPE. Administrative controls and PPE can be used to support control measures further above the pyramid. The first choice should be the obvious choice when interfacing with assets.

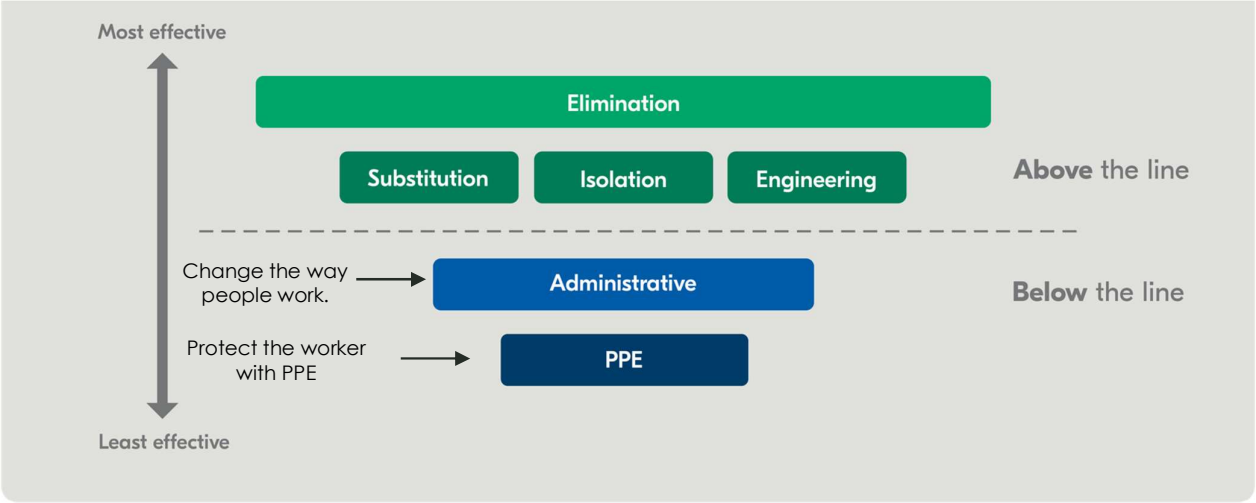

Figure 4: Hierarchy of controls

4.6 Reasonably practicable

Reasonably practicable, in relation to a duty to ensure health and safety, means that which is, or was at a particular time, reasonably able to be done in relation to ensuring health and safety, considering and weighing up all relevant matters, including:

a. The likelihood of the hazard or the risk concerned occurring.

b. The degree of harm that might result from the hazard or the risk.

c. What the person concerned knows, or ought reasonably to know, about:

   i. The hazard or the risk.

   ii. Ways of eliminating or minimising the risk.

d. The availability and suitability of ways to eliminate or minimise the risk.

e. After assessing the extent of the risk and the available ways of eliminating or minimising the risk, the cost associated with available ways of eliminating or minimising the risk, including whether the cost is grossly disproportionate to the risk."

Source: South Australia Work Health and Safety Act 2012

Further information on so far as is reasonably practicable can be found on the Safe Work Australia Website including the document "How to determine what is reasonably practicable to meet a health and safety duty".

During a SiD workshop the benefits against the cost of implementation can be broken into three categories. These are:

a. "Just do it" – when it is inexpensive/easy and provides safety benefits. This also applies to low-risk hazards where control measures can be further improved.

b. "Further analysis required" - additional analysis is required to make a judgement. This can be carried out through a combination of tools and methods, including, as far as is reasonably practicable, assessment, multi-criteria analysis, fault tree analysis, and Whole-of-Life cost-benefit analysis. The decision process is to be recorded along with the outcome.

c. "Check for gross disproportionality" - the safety benefit throughout the life of the asset does not justify the cost/complexity of implementation of the nominated control. Alternative controls, using the hierarchy of controls to minimise the risk SFAIRP need to be identified and implemented. The decision process is to be recorded along with the outcome.

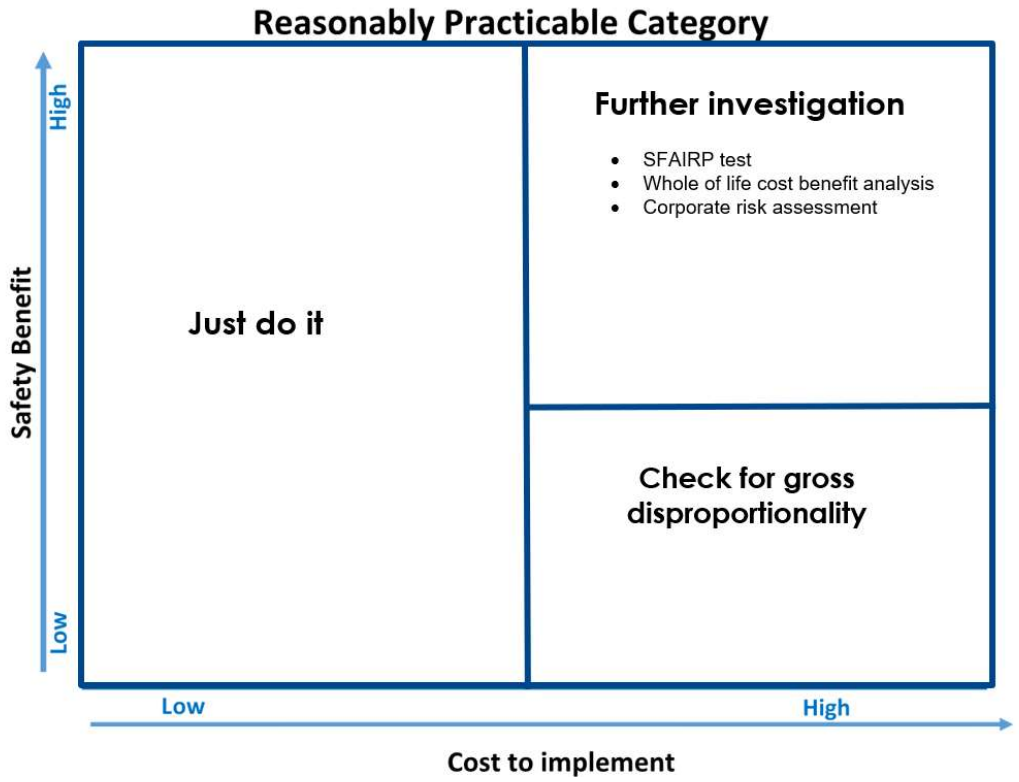

Figure 5: Reasonably practicable category

– *ESM Consulting – Safe Design 10 steps*

4.6.1 Benefits

In addition to increased safety, Safety in Design delivers benefits that align with SA Water's corporate strategy:

Safe

a. Prevents injury, illness and disease.
b. Supports obvious action, the safe action to take.
c. Supports compliance with legislation.

Smart

a. Promotes innovation, build upon, not recreate.
b. Useability of products, systems and facilities.
c. Better predict and manage production and operational.

Reliable

a. Get it right first time.
b. Stakeholders involved to get their buy in.
c. Increased designer reputation and credibility.

Affordable

a. Reduces costs.
b. Improved efficiency and productivity.
c. Minimises redesign and retrofitting.

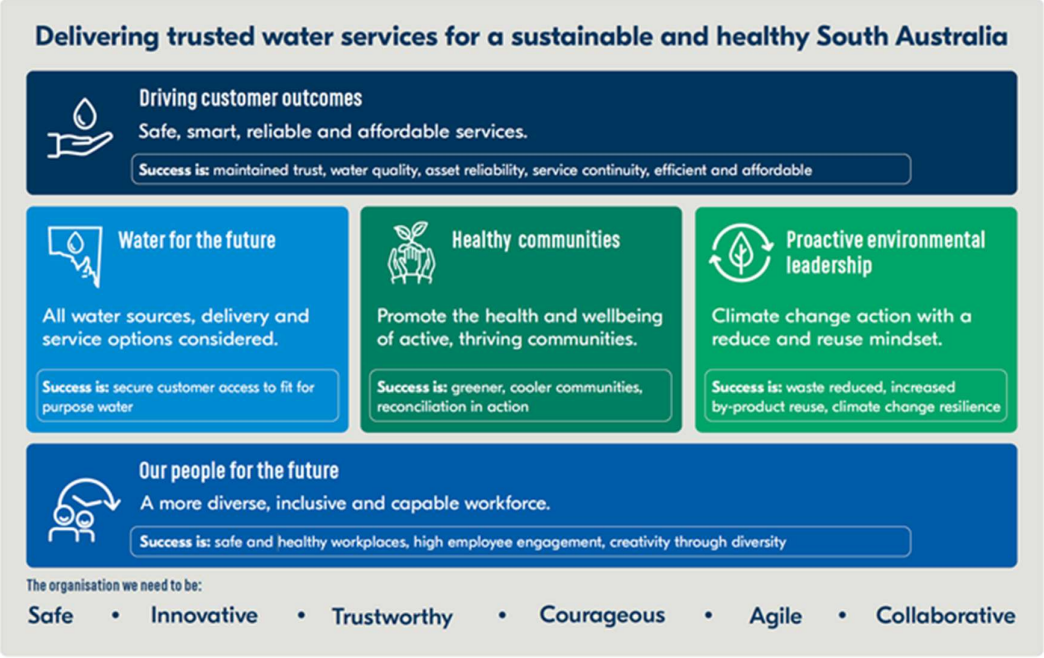

Figure 6: Our Strategy on a page, SA Water

5 Safety in design process

5.1 General

The following are parts of project delivery related to this Standard and the related sections of the SA Water CPMM 3.0 system and covers whole of life:

Figure 7: Typical life cycle of an asset

This section provides an overview of the activities to be undertaken to support the delivery of a safe asset SFAIRP through safe design. SiD activities are sequential and commence in the Initiation phase and are built on through options, design, construction and the life of asset. In the event the SiD Process has not been activated it is the duty of the designer to bring it to the current level, including any activities that should have occurred prior to the given point.

In the event a step of design is expedited, the expedited step SiD activities are still required to occur at the earliest time. The approach is to be noted in the design SiD Assessment Plan.

A SiD Assessment Plan is to be completed at the initial stage of the technical Investigation step with the establishment of a SiD Hazard Register if it hasn't been created prior.

The SiD Hazard Register, along with the SiD Report for the phase, is to be carried through the project as a live document updated with new hazards and control methods throughout the project cycle and asset life cycle.

Where a design meets the requirements in section 2.1.1 the SiD Short Form is to be completed in lieu of the SiD Assessment plan to establish the approach to SiD.

The following process has been developed, to not only be more likely to deliver a safe design SFAIRP, but also to address requirements of the WHS Legislation in South Australia. Where projects or designs are applied outside the state of South Australia different legislative requirements may be required and should be reviewed. Contact SiD support for further information.

5.1.1 SiD Process and project tier alignment

The scale scope and complexity of a project will determine the activities that sit under the SiD umbrella. Appendix E1 - SiD Tier Alignment give guidance on possible SiD approach for the project tier.

Clarification on Project Tiering and Safety Risk

Project tiering does not indicate the level of safety risk associated with a project. For instance, a Tier 4 project, such as replacing a flow meter, may still involve complex and high-risk site conditions, including challenging isolation procedures, restricted access, aging electrical infrastructure, proximity to hazardous assets, limited shutdown windows, and the need to maintain continuous operations.

The Safety in Design (SiD) process must be tailored to reflect the specific complexity, scope, and operational context of each project, regardless of its tier. While project tiers can help identify opportunities to streamline the SiD process or reuse existing information, they should not be used as a proxy for risk level.

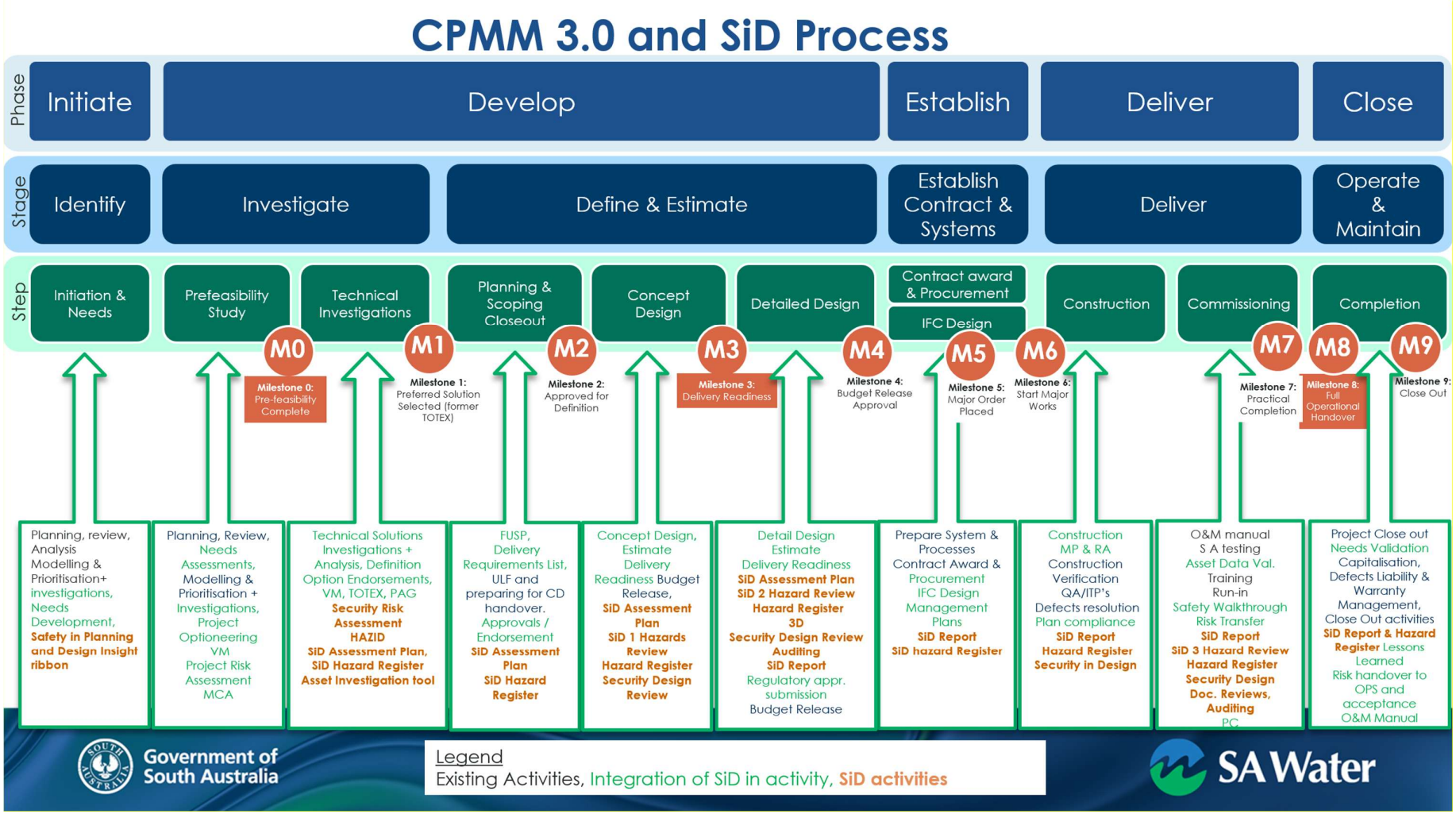

Figure 8: CPMM 3.0 and SiD Process

5.1.2 Programs of work

Programs of work generally follow the same structure as a project; however, there is a level of commonality that results in the outputs being delivered through the program process. The SiD Process applies equally to programs of work, with the SiD Assessment Plan playing a pivotal role in identifying the approach to the development of a safe design and other legislative requirements.

When developing a program approach, it can be beneficial to develop program-specific documents or templates to ensure the best efficiencies. Section 2.1.2 Program Approach details more considerations for programs of work

5.1.3 MLD Process.

For Major Land Development (MLD) projects, the MLD Safe Design Management Plan (Appendix X) sets out the minimum mandatory requirements and outlines the specific activities each party must undertake in the Safe Design (SiD) process, including the method for engaging the SA Water SiD Team to conduct a SiD workshop. Please refer to SAWG-ENG-0521 Major Land Developments Safety in Design Management Plan on SAWater - Consultant engineers webpage, for further details.

5.1.4 Operational single discipline designs

A "SiD Short form" can be used where:

a. The design is low risk.

   And

b. Single Discipline or OPEX value under $10,000 or Capitalised Maintenance.

5.1.5 Typical and standard designs

During the development of Typical and Standard designs, they are to undergo a SiD1 Hazard Review, and for Standard Designs a SiD 2 also, prior to finalising the design pack. The corresponding SiD register must be referenced in the notes section of the design pack and issued with the design pack to those to whom the designs are issued.

All designs, whether using standard, typical or bespoke design, must go through the SiD process.

Typical Designs the SiD Hazard Register is to be reviewed, and in a SiD1 any impact to changes to the typical design, site-specific hazards that are introduced either from the local environment or from the design to the local environment are to be recorded in a project/design specific SiD Hazard Register building on the SiD Register issued with the Typical Design.

Standard designs should undergo a minimum of a SiD2 for identification, control and record of site-specific hazards that are introduced either from the local environment or from the design to the local environment. Hazards are to be recorded in a project/design-specific SiD Hazard Register building on the Register issued with the Standard Design.

5.1.6 Delayed or On-hold project review requirements

Any project that has been delayed or on-hold for six months or more must undergo a change management review. This review should consider, but is not limited to, the following areas:

- Changes to the installation environment or surrounding vicinity.
- Updates to operational and maintenance methodologies.
- Revisions to project needs, including require.

- Review of SID hazard register

5.2 Preliminary hazard identification and lessons learned transfer

Asset Sponsor

Preliminary Hazard Identification and identification of lessons learned shall be undertaken following the initiation and prior to project endorsement and Totex calculations (Milestone1). A list of preliminary hazard and lessons learned sources can be found in Appendix A. This information is to be captured in the Insight, Safety in Planning and Design ribbon.

To support SA Water meeting its obligations to identify and transfer known Atypical Hazards associated with a design, location or vicinity a HAZID workshop may be the best means to succinctly identify and record hazards and A-typical features for consideration of the designer/s. Information captured in the Hazard Identification (HAZID) Workshop can be transferred in the SiD Hazard Register under the HAZID section. Instances that have known effective control measures can also be recorded.

Another tool available for reviewing of safety in formation are the Site Scans and Asset Investigation Tool data. To confirm if information is available, please refer to SA Water Engineering 3D Site Scan Library available through the Engineering AquaNet page.

During the Prefeasibility and technical options steps, hazards and safety considerations must be captured and where appropriate included in Risk Assessment and analysis of the different options and options report. Any hazards identified or additional studies required during this stage of the project shall be carried forward to the Concept design where they shall be addressed in more detail.

5.3 Project Needs

During the initiation and Needs step of a project, the safety requirements shall be captured in the needs register. There are pre-populated safety needs included, which are to be reviewed and updated as required. Any specific project safety needs are to be captured in addition to the pre-populated needs e.g. Hazardous Area Dossier.

5.4 Options considerations

SiD Lead

During options analysis, considerations for whole of life safety are to be included in options assessment and evaluations and recorded in the options report.

5.5 Identification of SiD lead

Project Manager and design team

At the commencement of any steps (prefeasibility, technical options, concept, detail design, program initiation, construction) a SiD Lead is allocated and is accountable for ensuring the SiD Process and associated activities are carried out. The design group will agree upon the SiD Lead prior to commencing the SiD process. The SiD Lead is typically the most senior designer and maybe the Project Engineer or Design Manager. For smaller, more simple designs, the Engineer or, in some cases, where the Project Manager is also the Designer, the Project Manager will take on this role. The role holder will depend on the scale, scope and complexity and is to be the most senior designer.

For programs of work, a program-level SiD Lead is identified, and then the deliverable-level SiD Lead is identified, documenting the role and responsibilities in relation to Safety in the Design in a program of work in the SiD Assessment Plan (5.5).

5.6 Owners Engineering (OE) SiD Role

While performing their role, OE must review safety in design as part of project requirements. If further information is required seek SME support or approach SA Water SiD Team.

5.7 SiD assessment plan

SiD Lead

Following selection of the go forward options/design and prior to options/project endorsement and TOTEX at Milestone 1, the identification of activities that will contribute to SiD will occur through the completion of the SiD Assessment Plan, SAWT-ENG-0006. This timing will allow for the inclusion of SiD activities in any project costing or quotes.

The SiD Assessment Plan records the applicable considerations and activities that will contribute toward the whole of life safe design for the given designs' scope, scale and complexity. The SiD Assessment Plans identify which activities sit under the "SiD Umbrella".

Specific designs or site environments will require additional SiD activities. The appropriate departments and subject matter experts are to be consulted when identifying applicable activities.

Specific requirements apply when designing a plant containing: chemical dosing systems, biogas, safety-critical systems, security or other speciality areas. These include:

a. Consulting relevant business partners

b. Carrying out a:

   i. HAZOP

   ii. CHAZOP (if a control system is present)

c. Reviewing the chemical licensing and hazardous area requirements.

A control system hazard review (CHAZOP or equivalent) is to occur on any control system, local or connected to SCADA, following the HAZOP and the development of the process logic unit (PLU) functional descriptions.

Where available technology should be used to advance the safety of design, such as clash detection, clearance measurements and construction modelling. These are encouraged for Tier 1 and 2 projects and where multiple disciplines or integration with existing plant occurs.

A summary of some of the available tools, techniques and guidance on when they are to be applied for the identification of hazards, risk assessment and risk control is in Appendix B, and Security Risk Assessment details in appendix D. This is to be referred to when completing the SiD Assessment Plan. Designers are to prepare the SiD Assessment plan using the template SAWT-ENG-006.

5.7.1 Security risk assessment and requirements

SA Water, as a supplier of an essential service, operator of critical infrastructure, holder of sensitive information and part of the South Australian Government, has a responsibility to ensure appropriate security arrangements are in place.

SA Water also has external requirements including whole-of-government security policy and legislation that must be met, including the South Australian Protective Security Framework and the Security of Critical Infrastructure Act 2018 (Cth).

To ensure appropriate security arrangements are in place for all SA Water assets, and policy and legislative requirements are met, a security risk assessment must be undertaken by the SA Water Security Team in conjunction with the Project Lead (equivalent to PM) prior to finalising options / endorsement and for inclusion in TOTEX costing for:

- new assets.
- new facilities.

- major upgrades to facilities or assets.
- other projects that create or increase a security risk.

A security risk assessment will generally not be required for component upgrades or component refurbishments, however if unsure if a security risk assessment is required contact the SA Water Security Team at security@sawater.com.au.

A security risk assessment will determine the security risk and specify security and design requirements to minimise security risks SFAIRP.

In the SiD Assessment Plan, the Security Risk Assessment is identified in Section 1.06 Disciplines involved and/or affected, and again in Section 4.0 SiD activities and other stakeholder. Further guidance is available in Appendix D and provides the steps for completing a security risk assessment. Where a security risk assessment is required and has not been completed prior to concept design it must be requested from the SA Water Project Manager who is responsible for engaging the SA Water Security Team to complete the assessment.

5.7.2 SiD assessment plan sign-off and confirmation of funding

Sign-off and confirmation of available funding for the SiD activities occurs by the SiD Lead, PM, Asset Sponsor and other relevant parties as identified and is reviewed at each following steps, concept and detail design steps (or equivalent). A copy of the signed document or email is to be filed with the SiD documents.

Where a program approach is being taken, a program-level SID Assessment Plan is to be developed. See section 2.1.2 and 0 Program Approach for SiD Program Approach.

Version control of the SiD Assessment Plan is recorded on the document, with major versions issued following development and signoff in the concept design step and review and sign off in detail design step.

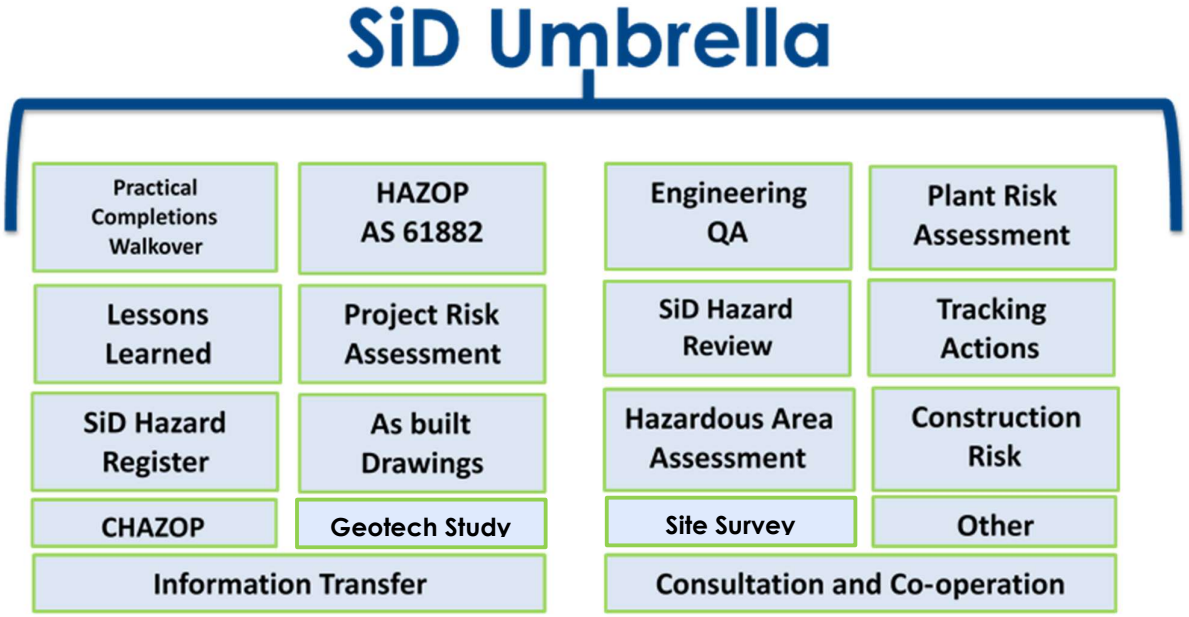

Figure 9: SiD Umbrella

Graphic adapted from ESM Consulting

5.8 SiD meeting

SiD Lead

The communication of the agreed approach and activities contributing to a safe design is to take place with the design and project team during a minuted meeting at kick-off or shortly after.

The SiD Assessment Plan is distributed and discussed. The team members are responsible for familiarising themselves with the content.

Subsequent project meetings are to include SiD agenda items to raise:

a. Major scope changes or design changes that will require revisiting the SiD Assessment Plan.

b. Track identified hazards and how they are being controlled.

c. Monitor the progress of action items relating to Safe Design.

5.9 SiD hazard review 1 – SiD1 (operations and maintenance)

SiD Lead

SiD1 hazard identification review workshop draws upon participants experience to identify and eliminate SFAIRP hazards associated with the interfaces of the design over whole of life, including construction, commissioning, operations and maintenance, shutdown, future works, decommissioning, demolition recycle disposal, etc.

Through reviewing the tasks/activities, to be carried out during the life phases, the hazards can be identified and eliminated. Where it is not reasonably practicable to eliminate a hazard, using the hierarchy of control, the risk is to be minimised SFAIRP.

Any WHS issues and hazards identified during the project initiation and options stage that have not been eliminated shall be reviewed at the SiD1 hazard review and shall be expanded to a higher level of detail, if necessary, to thoroughly identify all hazards that may occur throughout the life of the asset.

The SiD Lead is responsible for organising the SiD hazard review workshop, engaging an independent SiD facilitator and a scribe and using the SAWT-ENG-0004 SA Water SiD Hazard Register template.

The Concept Design Review must have occurred prior to SiD1 review taking place.

SiD Workshops are to be facilitated by a party independent of the design and a by someone on the SA Water SiD Facilitator Register. See appendix C1.2 Workshop facilitator for details.

To ensure the effectiveness of our Safety in Design (SiD) workshops, attendance will be limited to essential participants only. This includes representatives from Operations and Maintenance, as well as key project stakeholders. While broader interest is appreciated, large groups often dilute engagement and reduce the quality of outcomes. Focused participation enables more meaningful discussion and decision-making. Please ensure only essential personnel attend.

SiD 1 Workshop: Attendees must include the following stakeholders:

- SiD Lead.
- Designer (Design Manager/Design Lead or representative and, where required, specific discipline designers).
- SA Water/Asset Operations.
- SA Water/Asset maintenance and service providers.
- Owners Engineer (when an owner engineer is allocated to the work).
- Technical Experts where required.

The following are to be invited and strongly recommended their attendance:

a. Asset Planner/Project Sponsor.
b. Project PM.
c. Constructor/commissioning – person/s with relevant and suitable experience.
d. WHS Business Partner/Advisor.
e. sidworkshops@sawater.com.au
f. Maintenance Reliability.
g. security@sawater.com.au
h. Additional attendees may include the Environment Team, or others.

A SiD1 review **cannot go ahead** without participation from:

1. Operations and /or maintainers.
2. Project design team (DM or other).

The facilitator shall lead a pre-mapped systematic coverage, "brainstorming" process to reduce the likelihood of overlooking any hazards within the design. SAWT-ENG-0001 SiD Hazard Review Workshop Introduction Template is to be used at the beginning of the workshop to align participants' understanding of the workshop scope, project overview, interfaces, and the workshop process.

For large or complex designs, multiple SiD review workshops may be needed to address different packages of deliverables, nodes or portions/disciplines of the design.

SiD2 review takes place following the first design review in the detail design (or equivalent) step with SiD Hazard Register actions and changes closed out prior to issue for construction.

Where available, 3D designs and VR are to be used to aid workshop participants in understanding the interfaces and identify hazards or opportunities for improvement as per the following:

- Hazard ID Workshops – 360° imagery site scans.
- SiD 1 Workshops – 360° imagery site scans and 3D designs and augmentation where the design has multiple disciplines (generally Tier 1 and 2 projects).
- SiD 2 Workshops – More focus on 3D designs and augmentation, and VR immersive virtual reality for multiple disciplines where workers are able to visualise and "perform" the tasks to gain spatial understanding to identify potential hazards.

Appendix B captures digital technologies available to enhance hazard identification and safety. Appendix C SiD Hazard Review details more information relating to requirements for SiD Hazard Review Workshops.

5.10 Other Safety in Design activities

SiD Lead

Other safety in-design activities identified in the SiD Assessment Plan are to be carried out as soon as the level of design is sufficient to complete the activity, including the use of digital technologies to support hazard identification and enhance safety of workers and those in the vicinity.

Appropriate stakeholders are to be identified and engaged.

A review of the SiD Assessment Plan, including activities, should occur for any changes in the design or site conditions or considerations with the SiD Assessment Plan being updated accordingly, including the record of revision.

5.11 SiD hazard review 2 – SiD2 construction and commissioning

SiD Lead

SiD2 review takes place following the completion of the first design review in the detail design (or equivalent) step. SiD2 shall be timed so that the equipment selections are finalised and the design captures applicable changes as a result of the design review.

The process of SiD2 is the same as SiD1, with a focus on the interface hazards during construction and commissioning. The object is again to identify any engineering safeguards or features that can be incorporated into the design to eliminate hazards and minimise risk to construction and commission personnel.

Where possible 3D designs and VR are to be used to aid workshop participants to understand the interfaces and identify hazards or opportunities for improvement.

The SiD Hazard register is to be tracked, updated and monitored throughout the design. The SiD Hazard Register will be used to feed into the construction and commissioning risk registers and operational risks.

SiD Workshops are to be facilitated by a party independent of the design and a by someone on the SA Water SiD Facilitator Register. See appendix C1.2 Workshop facilitator for details.

To ensure the effectiveness of our Safety in Design (SiD) workshops, attendance will be limited to essential participants only. This includes representatives from Operations and Maintenance, as well as key project stakeholders. While broader interest is appreciated, large groups often dilute engagement and reduce the quality of outcomes. Focused participation enables more meaningful discussion and decision-making. Please ensure only essential personnel attend.

SiD 2 Workshop: Attendees must include the following stakeholders:

a. SiD Lead.
b. Constructor and Commissioner – person/s with relevant and suitable experience.
c. Designer (Design Manager/Design Lead or representative and, where required, specific discipline designers).
d. SA Water/Asset Operations.
e. SA Water/Asset maintenance and service providers.
f. Owners Engineer.
g. Technical Experts where required.

The following are to be invited and strongly recommended their attendance:

a. Asset Planner/Project Sponsor.
a. Project PM.
b. WHS Business Partner/Advisor.
c. sidworkshops@sawater.com.au.
d. security@sawater.com.au.
e. Additional attendees may include the Environment Team, or others.

A SiD2 review **cannot go ahead** without participation from:

a. Operations and or maintainers.
b. Construction representative – person/s with relevant and suitable experience.

c. Design team's representative.

Workshops are encouraged to use 3D designs, augmentation, and VR immersive virtual reality for multiple disciplines where workers are able to visualise and "perform" the tasks to gain spatial understanding to identify potential hazards.

Appendix C SiD Hazard Review details more information relating to requirements for SiD Hazard Review Workshops.

5.12 SiD audit

Project Manager

Section 7.0 of the SiD Impact Assessment form, SiD Audit, is completed to identify the status of the SiD activities identified to produce a Safe Design (SFAIRP), confirm they are completed and closed out. This will include a review of the SiD Hazard Register and other actions (e.g. HAZOP) for the design step that are closed out. This activity is carried out by the Project Manager or where the Project Manager is also the SiD Lead, a peer Project Manager, prior to the completion of the SiD Report.

5.13 SiD report

SiD Lead

The SiD Report is to be completed following final design review, completion of the SiD Audit and prior to issue for construction. It is the responsibility of the SiD Lead to complete the SiD report with the current updated SID Hazard Register, an important component of the report where controls SFAIRP have been applied and the status of any residual hazards noted. The SiD Report Template SAWT-ENG-0003 is to be used for SA Water SiD reports.

The SiD Report, and associated SiD register, is to be included in the Issued for Construction (IFC) package of documents.

Where stage-wise approach to design and construction is applied, each stage will need to have a safety report associated with the packages. This can be a document that is built on as the construction progresses; however, prior to construction, each stage must have a safety report issued to SA Water and others who give the design effect, such as constructors and design approvers.

5.14 Issue for construction – SiD report handover and distribution

SiD Lead and Project Manager

The SiD Lead is responsible for the handover of the SiD report to the PM with the Issue for Construction (IFC) package of work. The PM conveys the SiD Report and other relevant information to the PM Construction, Operations, Maintenance and others that will give effect to the design as identified in the SiD Assessment Plan.

The SiD Report is an important document in the development of the construction management plan, the constructability hazards inform the construction risk assessment and likewise, if applicable, for the commissioning management plan and the commissioning risk assessment.

5.15 SiD hazard review 3 (SiD3) – SiD validation and verification

SiD Lead

SiD3 is the verification and validation that the items on the SiD Hazard Register have been incorporated into the design as actioned. Where operational, maintenance or other residual

hazards and corresponding control strategies have been incorporated as part handover, these are to be documented in the appropriate work instructions and O&M Manuals.

SiD3 will be performed following project construction and prior to operational handover to ensure that the completed asset is safe to operate and maintain SFAIRP. This can be achieved by incorporation into the Practical Completions (PC) Safety Walk.

Depending on the size and complexity of the design, a post-construction design review could be performed by a small team with:

a. Knowledge of the final design and the operating and maintenance requirements of the design.

b. A thorough understanding of the function of the completed asset.

Any new hazards are, so far as is reasonably practicable, eliminated or the risk reduced. Updates are to be made to the SiD Hazard register.

The SiD documents will form part of the O&M Manual, a requirement for project practical completion sign-off. Without the relevant up-to-date SiD documents Practical Completions Certification will not be received.

5.16 Capturing lessons learned and continuous improvement

Project Manager

Capturing of lessons learned will be through the project Lessons Learned process, Lessons Learned Management Plan - Doc ID: SAWG-PM-0111. This is to reflect both positive and opportunities for improvement of the project.

A SiD Review, including the SiD Hazard Register, should occur following construction (SiD3) to identify safety-related design issues that were addressed and improvements made as part of the SiD process with the view to incorporate these improvements into future project designs, common or standard designs and SA Water technical standards.

This information is to be transferred as part of the lessons learnt sessions conducted during the completion step of the project and shall be documented in the lessons learnt report.

Where a design is part of a program of works, relevant lessons shall be communicated to the design team as documented in the Program Level SiD Assessment Plan.

The safety issues identified as part of this review shall also be communicated by the project manager via the lessons learned report for the project, which shall be distributed to the following:

a. SA Water's Asset Management team for incorporating into project briefs for new or modified assets.

b. SA Water's Senior Manager Engineering Services for incorporation into the design of new projects, technical specifications and standards.

5.17 Changes and change management

SiD Lead and Project Manager

Any changes made to the design or operation outside of design specifications, are to be managed such that there is systematic identification of the impact of the change, identification of hazards and control of the hazards using the SFAIRP principle.

This is applicable at any phase of an asset life cycle. The SiD Principles are to be applied to all changes and will require reviewing or revisiting SiD activities to fully identify and control hazards.

5.18 Live hazard tracking

Asset Manager

The SiD process applies for the whole life of an asset. The live tracking of hazards is an integrated component of the construction, commissioning, and operations through to decommissioning, demolition, recycling and disposal.

Where an atypical hazard is newly identified (at any time in the whole of life) the hazard is to be entered into the SiD Hazard register and hierarchy of control employed to ensure the interface is safe so far as is reasonably practicable. Where the hazard is identified in any phase following handover, the hazard is to be entered into SAAM.

Where deviation from design, including change of use or work methods, are applied, the duty holder for that task or step needs to establish if the change presents new hazards as per 4.16 changes and change management.

Any design shortcomings identified during the operation and maintenance of an asset that affect the safe operation or maintenance of that asset shall be recorded in SAAM and communicated by operations staff at any time to the following:

a. SA Water's respective Asset Manager for incorporating into project briefs for new or modified assets.

b. SA Water's Senior Manager Engineering Services for incorporation into the design of new projects and technical specifications, standard and guideline reviews and updates.

5.19 SiD process overview for a design process

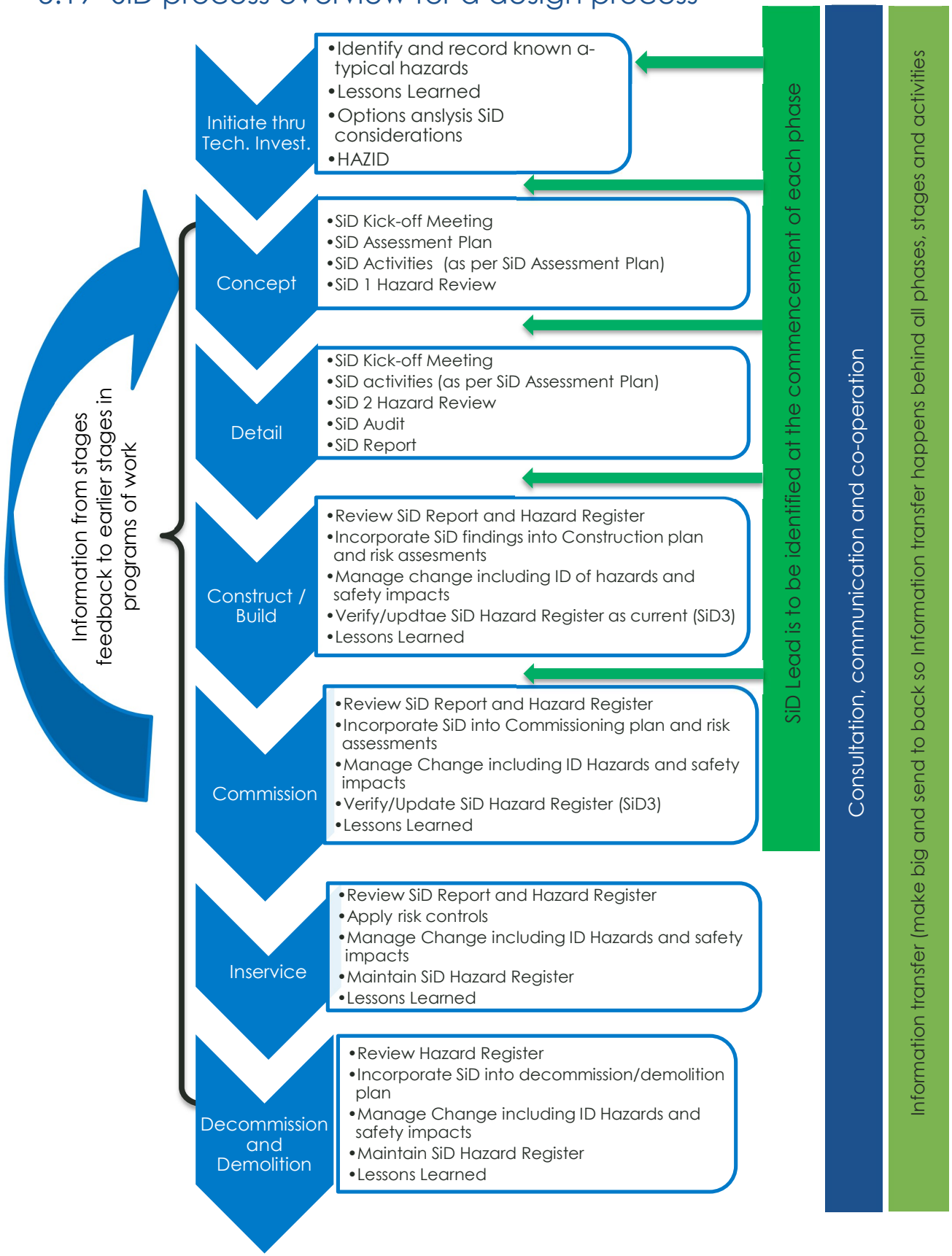

Figure 10: High level SiD process

6 Documentation and records

6.1 General

SiD records may include (but are not limited to):

a. SiD Assessment Plan.

b. SiD Hazard Register.

c. Options analysis.

d. Risk assessments, including risk ratings and actions.

e. Risk reduction/control methods considered in the SFAIRP process.

f. Reasons for selection of any risk reduction/control method (i.e. document the SFAIRP decision process).

g. Options investigations and findings.

h. SiD (in) meeting minutes (record of design decisions, change management, SiD discussions, etc.).

i. SiD and safety changes identified in the lessons learnt process (refer to clause 5.16 Capturing lessons learned and continuous improvement).

j. Change management reviews.

All SiD records shall be maintained in accordance with this clause.

Requirements apply to records created by or on behalf of SA Water, as well as documents returned to SA Water from the partner or third-party designer.

6.2 Design carried out by designers external to SA Water

All designs carried out by external parties, as a minimum, shall comply with this Standard and the requirements of the WHS Legislation.

SiD documents will be transferred back to SA Water with the corresponding design packages at the following stages where the PM will transfer the documents to the relevant fling storage systems.

6.3 Safety in design templates

The following templates are provided by SA Water for use in support of the SiD process:

Table 1: Safety in Design templates

Number	Title
SAWF-ENG-0007	Safety in Design Assessment Template (short)
SAWT-ENG-0001	Safety in Design Hazard Identification Workshop Template
SAWT-ENG-0003	Safety in Design Report Template
SAWT-ENG-0004	Safety in Design Hazard Register template
SAWT-ENG-0006	SA Water SiD Assessment Plan Template

Design and delivery partners should request the most recent templates from the PM or OE. who can access them from the hyperlinks or through the SiD BMS Page, which is available through the Engineering BMS page.

6.4 Record format

The SA Water templates are available and are to be used where applicable.

Native versions of the files are to be saved and transferred to the next step of design. Due to the live, whole of life nature of Safety in Design, the documents are not to be transferred solely as PDFs.

6.5 Identification of SiD hazard register records

All SiD Hazard documents shall be identified using the following naming convention:

- "xxxx -XXX-MUL– SiD YYYY - ZZZZZ".

Where:

a. xxxxx-XXX = Maximo Asset ID number when known or Unique output identifier during the project.

b. YYYY = Unique SiD document number.

c. ZZZZZ = Document description, e.g., Hazard Register, Assessment Plan, SiD Report
Examples:

- A0028-1234-MUL-SID-0301 SiD Assessment Plan.
- A0028-1234-MUL-SID-0302 SiD Register.
- A0028-1234-MUL-SID-0303 SiD Report.
- A0028-1234-MUL-SID-0304 Risk Assessment.
- A0028-1234-MUL-SID-0305 HAZOP.
- MA3235 – A0028-1234-MUL SiD 0302 SiD Hazard Register.

6.6 Location of records

SiD records for all SA Water assets shall be filed, in the project locker under Manage > Safety in the Planning and Design folder.

A library of SiD Hazard Registers at Practical Completions can be accessed via http://river.sawater.sa.gov.au/workspaces/wsr/ws0099 or SA Water River > Workspaces > Workspace Register > Safety in Deign. Under Libraries on the left side of the page, select Workspace documents and add documents using the "add document" function.

At the handover of Practical Completions, the SiD documents (in native format) shall be included in the O&M Manual Appendix G WHS.

6.7 Documents modified external to SA Water

An additional version of the SiD Hazard Register shall be produced whenever the SiD Hazard Register document is developed or reviewed by parties external to SA Water. Details of who has custody of the live version of the document are to be recorded on the document History Tab prior to it being checked out.

At each design milestone, the current, updated SiD documents are to be issued and uploaded into RIVER.

This is required to allow SA Water to record the status of the SiD documents issued to the third-party designer for review and the status of modified documents returned to SA Water by the third-party designer. The SiD documents returned to SA Water supersede the document issued for development by the third-party designer.

The SA Water Project Manager for each contract shall be responsible for managing these documents in accordance with the SA Water CPMM system, with assistance from SiD support in Engineering Services as required.

6.8 Documents modified internal to SA Water

The current version of the SiD documents shall be used as the basis for all SiD Reviews undertaken and modified by SA Water for that asset.

Appendix A - Hazard information sources

Consider the following sources of lessons learned.

Table 2: Sources for lessons learned or hazards identification

Sources for Lessons Learned/Hazard Identification	
• Incident Information (SAAM/IMS other) For changes to existing designs: reported (of that design) • Operational Issues Register • Similar designs or design changes • Talk to O&M (field) staff and Asset Owner • Environment and Heritage • Internal Design/Construction standards • Ergonomic assessments Internal Safety Bulletins • Design guidelines • Safe Work SA Bulletins/Safety Alerts • State regulators Bulletins/Safety Alerts • Bulletins/Safety Alerts from other utilities • Bulletins/Safety Alerts from industry • Industry Forums • Technical Networks • Supplier Notifications	• Site visit • Existing drawings of the 'standard' or "common" design • Previous works/Lessons Learned database (CPMM, Engineering Other) • Observations from stores, e.g. material compliance issues • What other water or service network organisations are doing for this type of design • Suppliers' history • Client's Design/Construction Manuals • Manufacturers' histories: product changes • Historical SiD Registers • Lessons learned with respect to land usage: site clearance lessons, landowners lessons, lessons from trying to build on another person's land

Appendix B - Hazard and risk management tools

EC 31030 is a good source for further information on the tools and techniques available for the identification of hazards and analysis of risk and controls.

Table 3: Example hazard and risk assessment tools

Method/tool	Description of tool
360° imagery -site scans	360° imagery and site scans capture detailed visual records of existing environments, allowing teams to virtually explore site conditions during design and planning. They support early hazard identification, improve spatial awareness, and help prevent design conflicts. These scans also serve as valuable reference tools for designers and others, providing ongoing access to site layouts and conditions throughout the project lifecycle. SA Water maintains a comprehensive library of 360° site imagery, providing accessible visual references for many of its locations.
Bow Tie Analysis	A diagrammatic way of describing and analysing the pathways of a risk/event from hazards to outcomes with the ability to review controls. The event represents the knot in the bow tie, and the left side of the bow represents the causes and indicates prevention and escalation controls. The right side of the bow(event) represents the consequences and indicates the mitigation and recovery controls The focus of the bow tie is on the barriers between the causes, risks and consequences. This method is used to analyse risk, analyse controls or describe risk. Often used in Safety Cases. The method can be applied to assess existing controls or identify required controls for an event throughout the life of an asset.
Chemical licensing	Where chemicals are incorporated in a design, or changes made to existing chemical dosing or storage system a review of the licensing requirements is to occur. Contact the SA Water Environmental Management Officer for further information or assistance in determining requirements. Changed or new licences can take up to 6 months to process including applications/notification to SafeWork SA. This should occur as soon in the process as possible to identify any additional requirements.
Clash detection	Clash detection is a digital tool that identifies conflicts between different building systems before construction begins, helping to avoid costly mistakes, safety issues and delays by identifying issues in the design phase.
Control Hazard and Operability Study (CHAZOP)	The purpose of CHAZOP is to find possible causes of process upset due to control system failure. Similar to a HAZOP the output of this study is a detailed list of all possible consequences of control system failure, optionally including assessment of the frequencies and severities of the outcomes and further actions where required. A systematic review of the system is carried out following the HAZOP study principles. The review is to cover the hardware and configuration, including instrumentation, as well as any control logic or PLUs (process logic units). Where there are multiple systems or critical systems involved CHAZOP study is to occur. When instrumentation is used a review of the instrument and control logic is to take place. CHAZOP is to come after a HAZOP study in the project timeline. HAZOPS must occur for designs involving the creation or modification of operational or chemical processes. E.g. water, sewage and wastewater treatment plants, chemical injection/dosing systems/processes and other systems.

Method/tool	Description of tool
Construction modelling	Construction modelling is a process of creating digital representations of physical structures to simulate and analyse construction activities. It integrates design, scheduling, cost, and logistics data into a unified model, often using Building Information Modelling (BIM). This approach enhances safety through collaboration, reducing errors, and improves decision-making throughout a project's lifecycle. By visualising construction sequences and resource needs, teams can optimize workflows, anticipate challenges, and ensure more efficient, sustainable building practices
Immersive virtual reality (IVR)	Immersive Virtual Reality (IVR) is an interactive simulation technology that replicates real-world scenarios. Used during the design phase, it allows teams to visualise spaces and workflows before construction, enabling early hazard identification, risk assessment, and testing of safety measures, improving design quality and reducing rework. IVR also supports realistic, risk-free training, enhancing hazard recognition, procedural accuracy, and confidence in managing complex situations.
Ergonomic and Human Factors Assessments	Ergonomic and Human Factors Assessment examines the 'fit' between people and their work. It puts people first, taking account of their capabilities and limitations. Ergonomics aims to make sure that tasks, equipment, information and the environment fit the worker. Where there is a common design established or where the design will be repeated an ergonomic review is to occur during detail design when activities and interfaces are understood.
Event Tree	Event tree analysis can be used qualitatively or quantitatively to help analyse potential scenarios and sequence of events following an initiating event and to explore how potential outcomes are affected by various controls. It can be applied at any level of an organisation and at any time of initiating an event.
Failure mode effect analysis (FMEA) **Failure mode effect and criticality analysis (FMECA)**	FMEA (Failure Mode and Effect Analysis) is a technique that identifies failure modes and mechanisms, and their effects. There are several types of FMEA: Design (or product) FMEA, which is used for components and products. System FMEA, which is used for systems, Process FMEA, which is used for manufacturing and assembly processes; service FMEA; and Software FMEA. FMEA may be followed by a criticality analysis which defines the significance of each failure mode qualitatively, semi-qualitatively, or quantitatively (FMECA). The criticality analysis may be based on the probability that the failure mode will result in system failure, the level of risk associated with the failure mode, or a risk priority. FMEA should be used when required to understand the impact of component failure. *From AS IEC60812*
Fault Tree Analysis	An undesirable state is defined, and the fault tree shows graphically the logical relationship between the particular system failure (undesirable state) and all its contributing causes. The fault tree process aids in determining all possible ways in which the undesirable event can occur.

Method/tool	Description of tool
Hazard and Operability study (HAZOP)	The purpose of HAZOPs is to systematically evaluate each part of a system to identify any hazards or obstacles to operability that could arise, particularly through deviations from the design intent. The consequences of deviations are identified, and where necessary, appropriate corrective actions are initiated. As per AS IEC 61882:2017. HAZOPS must occur for designs involving the creation or modification of operational or chemical processes. E.g. water, sewage and wastewater treatment plants, chemical injection/dosing systems/processes and other systems. HAZOPs will be based on mature diagrams/process and instrumentation drawings (P&IDs) that have undergone design review and on proposed operating strategies/procedures.
Hazard Identification (HAZID)	The HAZID review shall identify hazards that may exist or occur during all or specific phases of the project or may influence the preferred option selected. Identifying and understanding these risks at the earliest possible time in the project lifecycle will make it easier to eliminate or control them in further stages of the design process. All hazards identified during this HAZID process shall be documented and carried into the SiD Reviews that will be undertaken during all future stages of the project development, including design, construction, operations and demolition steps. It is a requirement for SA Water to provide to designers (either internal or other) the reasonably known hazards and lessons learned applicable to the design. Safety in Design Hazard Review Workshop. Hazard identification shall be undertaken during the development of the project brief and/or options investigations/analysis or at the earliest opportunity.
Hazardous area review/report	Refer to SA Water Technical Standard Hazardous areas TS 0376 for hazardous area requirements. Where it is suspected a hazardous area may be present a hazardous area review is to be instigated. Identification of hazard areas is to occur at the earliest opportunity either in initiation or early concept steps. Applying the hierarchy of controls, the most effective way to manage hazardous zones is by eliminating the hazardous area through design.
Human Reliability Analysis (HRA)	The concept of Human Reliability Analysis (HRA) reflects an understanding that people and systems are not error-proof and that improved reliability requires an understanding of error problems, leading to improved mitigation strategies. Essentially, HRA aims to quantify the likelihood of human error for a given task. These methods allow us to identify weak areas and implement targeted, data-driven interventions that will ultimately reduce accident and injury rates. HRA is used for the elimination of historical events or to identify reoccurring trends in human performance and system deficiencies. The process can be used at any phase of the life cycle with the greatest benefits when changes can be incorporated into the design steps.

Method/tool	Description of tool
Layer of Protection Analysis (LOPA)	Layers of Protection Analysis (LOPA) Allows controls and their effectiveness to be evaluated. Layer of Protection can provide a more detailed, semi-quantitative assessment of the risks and layers of protection associated with hazard scenarios. LOPA allows the safety review team an opportunity to discover weaknesses and strengths in the safety systems used to protect employees, the plant, and the public. LOPA is a means to identify the scenarios that present the most significant risk and determine if the consequences could be reduced by the application of inherently safer design principles. LOPA can also be used to identify the need for safety instrumented systems (SIS) or other protection layers to improve process safety. LOPA occurs in the detail design phase and is a semi-quantitative process.
Major Hazard Facility	Specific duties are placed on operators of Major Hazard Facilities to manage the risk of a major incident. Specific duties under the WHS Regulations including but not limited to the development of a Safety Case and: • identification of all major incidents that could occur. • identification of major incident hazards. • preparation of a safety assessment. Identification of changes to chemical/reagent manifest should occur in the concept step and understanding of impact and requirements is to occur. Reagent and chemicals relating to a new design should not be considered in isolation. See WHS Regulations Division 2, 535 – A major hazard facility must be licensed, for further details.
Risk Assessment	A systematic process of evaluating the potential risks that may be involved in a projected activity or undertaking. A given risk ranking does not indicate if a hazard has been reduced so far as is reasonably practicable. (risk is two of the considerations in determining if something is reasonably practicable in relation to WHS) however, it can be used as one of the tools to analyse the whole of life cost benefit analysis or as a comparison. Refer to SAWG-RG-0001 SA Water corporate risk management methodology. Risk management "helps decision makers make informed choices, prioritize actions and distinguish among alternative courses of action." (ISO 31000:2009).
Security Risk Assessment	An assessment to determine appropriate SAW Security requirements for a specific project relating to determined risk and SA Water security requirements.

Appendix C - SiD hazard review workshop

C1 SiD hazard review workshop

The SiD Lead is responsible for the SiD Hazard Review Workshops and documenting the outcomes.

The SA Water SiD Hazard Register is to be used for the capture of accurate records of the SiD Hazard Review workshops.

The outcomes shall include details of attendees, methodology, guidewords used, hazards identified and eliminated, control measures implemented, and findings documented.

Where a SiD Hazard Register exists for the project, group of assets or asset the existing document is to be built onto, updated and maintained.

For large or complex designs, multiple SiD review workshops may be needed to address different nodes, packages of deliverables, or portions/disciplines of the design. When a design is divided into packages for review, the interfaces between the packages must be identified and reviewed.

Workshop must not go ahead unless the corresponding step design review has occurred. All discipline designs must partake in the design review.

C1.1 Workshop structure

A SID workshop for a given design can span between four (4) hours through to three (3) days or more depending on the scope, scale and complexity of the design.

The order of priority for assessing the safety of interfaces during the life of the asset is:

a. SiD 1 focuses on operation and maintenance for the lifetime of the asset(s) as well as constructability, future works, decommissioning and disposal.

b. SiD 2 focuses on construction and commissioning while also reviewing changes and the previous SiD register

Hazards from any lifecycle phase should be identified and managed as soon as they are picked up. If an atypical construction hazard is identified during SiD1, it should be noted, and control measures should be identified where applicable. It is not required to be left until the SiD 2 review.

Consideration should be given to the most efficient way to structure the workshop, one which is tailored to the needs of the project. SiD Hazard Reviews can be split into nodes, area or discipline-specific sessions if required.

In consultation with the DM or equivalent, the design is to be broken up into appropriate groups or nodes. Prompt words are to be pre-determined for a systematic coverage approach to support the identification of hazards. For each section/group of the design, a process similar to the one below in Figure 11: is to occur, which corresponds with the SiD Hazard Register.

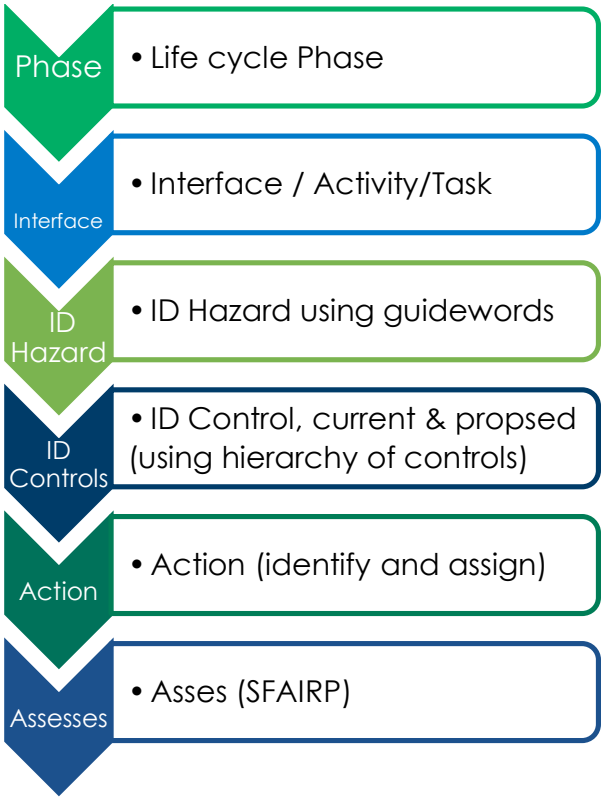

Figure 11: SiD hazard review workshop process

Support from appropriate life cycle phase personnel can be used to develop the systematic coverage prompts. For example, operators can assist in developing the activity list and corresponding prompt words for the operations step.

C1.2 Workshop facilitator

The facilitator will impact the success of SiD Hazard Reviews by facilitating the experience and expertise of the study team to critically evaluate the design. Therefore, the selection of a trained or experienced facilitator is important. SiD Facilitation must occur by an endorsed facilitator as identified in the SiD Facilitator Register ENG-004 SiD Facilitators See section below for further detail on endorsement.

The Facilitator should encourage workshop participants to identify the activities and interfaces and the hazards associated with these interfaces and constructively challenge the design to eliminate the hazards so far as is reasonably practicable and, where elimination is not practicable, reduce the hazards by applying the hierarchy of controls.

For best results, a SiD facilitator shall be selected and engaged at least two (2) weeks prior to the SiD Hazard Review workshop.

The facilitator shall have knowledge of SA Water's SiD Review process (as per this document) and must be independent and impartial of the project to prevent influence.

In a timely manner prior to the workshop, the SiD Lead will need to provide or work with the Facilitator to provide:

a. Information regarding the project scope, including atypical hazards.
b. Workshop scope.
c. The SiD Hazard Register including any actions.
d. List of activities or tasks (interfaces) for the different phases, steps and disciplines.
e. The design drawings related to the project.

f. Information regarding workshop participants (number, disciplines and responsibilities).

g. Location and timing of the workshop.

h. Between the SiD Lead and SiD facilitator, it is to be agreed who provides any required printed materials for the day.

The SiD Facilitator, in consultation with the SiD Lead, shall develop the Systematic Coverage approach for the prompt words (SAWL-ENG-005 SiD Prompt List) of the workshop. Systematic Coverage will include all asset lifecycles and activities/interfaces.

C1.3 Workshop scribe

A Workshop Scribe also needs to be assigned. The Scribe should be proficient in the use of Microsoft Excel, familiar with the SiD Hazard Register and a fast typist.

It is beneficial to use a Scribe who has a basic knowledge of engineering terminology and processes. The Scribe will allow the Facilitator to focus on getting the best outcome from the participants.

It is the responsibility of the SiD Leads to organise the scribe.

C1.4 Workshop participants

Participants should be given three (3) weeks' notice of the workshop time, date and venue.

The minimum mandatory participants for SiD Reviews include are included in 5.9 and 5.11 above.

Consideration should be given to attendees where the asset is new to the organisation or the given work area has minimal experience in the operation/maintenance of the type of asset. In these instances. In addition to the minimum mandatory participants for a SiD Review, the following specialists are also required.

FOR SiD REVIEW 1 WORKSHOPS (O&M):

Representatives of those who will interface with the new or modified asset(s) shall attend. These are primarily operations, maintenance and networks, but could include: other utility owners, road users and the general public.

FOR SiD REVIEW 2 WORKSHOPS (Construction and Commissioning): Constructors who understand the construction methods that will be used for each discipline shall attend. If a construction organisation has not been assigned, the SiD Lead, in consultation with the SA Water Design Manager (DM) and or PM, shall organise for representative construction staff to participate.

FOR SiD REVIEW 3 (Post Construction and Pre-operation):

The post-construction SiD review is to be performed by a team (2 or more) that has detailed understanding of the existing SiD Hazard Register, knowledge of final design, operating and maintenance requirements of the project, and a thorough understanding of the completed asset(s) function.

The workshop is to be scheduled at a time when the mandatory participants can participate.

To minimise cost and maximise efficiency for larger SiD Reviews, the discipline-specific staff, that is, any SMEs and specialist detail designers, should be invited only to the sessions that they need to attend. But there must also be cross-discipline consultation for inter-disciplinary interfaces. The 'safest' approach is to ensure that all discipline SMEs attend all sessions. Another approach may be to have discipline SMEs 'on-call' to join the workshop whenever relevant interfaces are discussed.

A list of prompt words and systematic coverage examples can be found in the SiD Hazard Register. The location is listed in the SiD Hazard Register "Instructions for Use" tab at the beginning of the spreadsheet.

C1.4 Facilitator endorsement and inclusion in register

The SA Water SiD Team maintain a list of endorsed facilitators from within SA Water and from the Design Panel Partners ENG-004 SiD Facilitators. This list in updated minimum yearly.

Endorsed facilitators are familiar with SA Water SiD Process TS0101, are able to demonstrate systematic coverage approach to a SiD Hazard Review and are affective facilitators including confident to postpone workshops where essential personnel are not present.

Pannel Members are invited to nominate experienced personnel for inclusion in the SA Water SiD, HAZOP or CHAZOP Facilitators Register by sending an email to SiDWorkshops@SAWater.com.au with the subject heading: SiD Facilitator Nomination, and include the following details.

- Facilitator Name
- Facilitator Title
- Facilitator contact details
- Workshop Facilitation Register being nominated for (SiD, HAZOP, CHAZOP)
- Relevant Training and competencies (example SiD Workshop Facilitation Training, HAZOP Facilitation Training)
- Outline of safety in design experience
- Outline of workshop facilitation experience including an example of record from a workshop being nominated for
- Any relevant SA Water Project experience
- Current Resume

The SAW SiD Team will periodically review the nomination and arrange a meeting prior to finalising their inclusion in the SiD Facilitator Register.

Appendix D – SA Water security assessment

D1 - SA Water security assessment

To ensure appropriate physical security arrangements are included in designs, a security risk assessment using SAWT-SEC-0001 Security Risk Assessment must be undertaken for:

- new assets.
- new facilities.
- major upgrades to facilities or assets.
- and other projects that create or increase a security risk to SA Water assets, infrastructure or networks.

A security risk assessment is typically not required for component upgrades or component refurbishments. If unsure as to whether a security risk assessment is required, please email the security team (security@sawater.com.au) to confirm.

Any security design requirements identified in the Security Risk Assessment must be included in the scope of work.

The steps to follow for completion of Security Risk Assessment are:

1. The project manager completes section 1 of the security risk assessment template.
2. The project manager sends the risk assessment template with section 1 completed, along with relevant project information such as site plans, to security@sawater.com.au.
3. The SA Water Security team will complete the risk assessment and return it to the project manager, within 5 working days upon collation of all relevant information.
4. The Project Manager saves the Security Risk Assessment in capita project locker under the Manage/WHS/SiD section.
5. Requirements are included in the Scope of Work of a project prior to finalising options / endorsement and for inclusion in TOTEX costing.
6. Design Manager or equivalent includes the Security Team in the Design Review, and endorsement team.
7. Compulsory invite with attendance to be agreed by Security team and DM.

Where a security risk assessment has not been completed, the designer must request this from the Project Manager who is responsible for completing the process with the SA Water Security Team as soon as practicable. If budget for the security requirements has not been included, please contact security@sawater.com.au to identify alternative arrangements.

The security risk assessment must be used in conjunction with TS0120 – Electronic Security Systems and TS0121 – Installation Standards for Physical Security. A dispensation will be required where the design requirements highlighted by the Security Risk Assessment have not been achieved or there is deviation from the Technical Standards required.

D2 - Verification and validation of security requirements

As the design progresses, the SA Water Security Team are required to endorse the designs and are to be included in the design review panel and endorsement team.

Commissioning of all security alarm systems is to be completed by the SA Water Security Team and can be requested by emailing security@sawater.com.au with a minimum of two full weeks notice to allow for planning.

Verification and validation requirements to be followed will be documented in the Security Risk Assessment based on the individual requirements of a site/asset.

Appendix E – SiD Tier Alignment

E1 - SiD Tier Alignment

Project hierarchy

SA Water projects are classified into four tiers. Tier 1 and Tier 2 projects have a higher cost profile, are subject to greater scrutiny and require additional governance compared to Tier 3 and Tier 4 projects. Refer to SAWG-PM-0086 Project Tiering Framework for further details on project tiering.

All projects independent of their Tier, must apply SA Water TS0101 Safety in Design process.

Figure 3 below demonstrates the tiering hierarchy of the Project Tiering Framework.

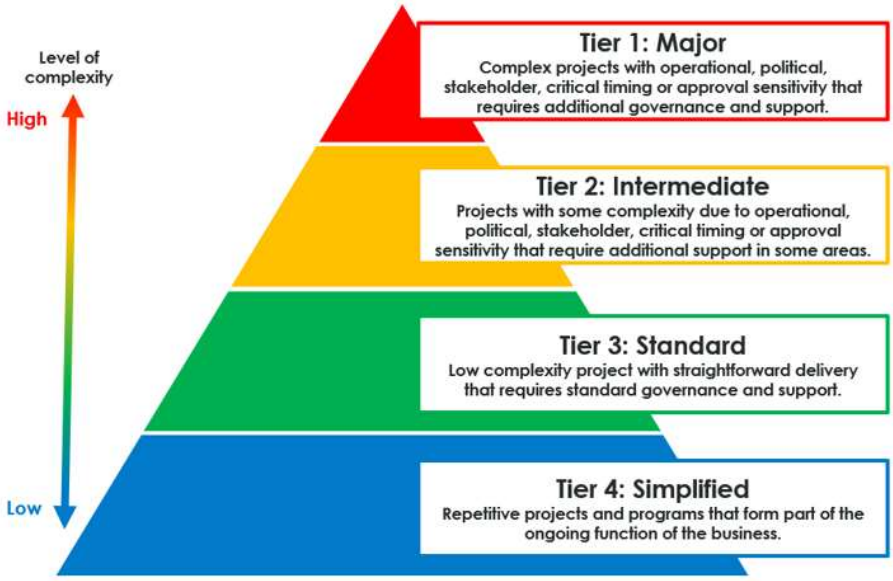

Figure 12: Project tiering hierarchy

Source: SA Water Project Tiering Framework

The scale scope and complexity of a project will determine the activities that sit under the SiD umbrella.

Clarification on Project Tiering and Safety Risk

Project tiering does not indicate the level of safety risk associated with a project. For instance, a Tier 4 project, such as replacing a flow meter, may still involve complex and high-risk site conditions, including challenging isolation procedures, restricted access, aging electrical infrastructure, proximity to hazardous assets, limited shutdown windows, and the need to maintain continuous operations.

The Safety in Design (SiD) process must be tailored to reflect the specific complexity, scope, and operational context of each project, regardless of its tier. While project tiers can help identify opportunities to streamline the SiD process or reuse existing information, they should not be used as a proxy for risk level.

Teir 4

For Teir 4 projects, identify if a program approach is applicable, ref to section XXX for guidance. These projects may incorporate Standard or Typical designs which have already undergone SiD Hazard identification based on the design. In such cases, site specific and vicinity specific hazards must still be identified. Where a standard or typical design is applied across multiple sites a by difference approach may be suitable to account for location specific variations.

Capturing and integrating lessons learned is essential for a program approach. These insights should be systematically identified and applied across relevant areas and phases of the program to enhance outcomes and support continuous improvement.

Teir 3

Teir 3 projects can vary significantly in scope and complexity. Where commonalities exist, grouping projects under a program approach may enhance efficiency. The use of standard or typical designs is encouraged, and associated SiD hazard registers should be leveraged to streamline the process. However, site-specific and vicinity-specific hazards must still be identified and assessed.

Where a Tier 3 project meets the criteria for the SiD Short (refer to Section CCC), this approach should be applied. All SiD requirements must still be fulfilled, including identification of key stakeholders and hazards, and ensuring appropriate consultation, cooperation, communication, and information transfer occur.

Site and vicinity hazards but still be assessed. Design hazards particularly relating to integration to existing assets, chemical or process hazards will still need to be managed through the SiD process.

Where a Tier 3 project is not part of a program approach and does not meet the requirements for SiD Short, the standard SiD approach must be applied.

Teir 1 and Teir 2 Projects

These are typically larger project and may include new assets, large variation to existing assets or complex works. There is opportunity to capture lessons learned either for entire projects or components of projects. While the standard SiD process typically applies, ay use of typical or standard designs should incorporate existing SiD Hazard information.

Table 4: SiD Tier Alignment

Teir	Possible program approach	Possible SiD Short	Site/design atypical hazards Identified incl. constructability	SiD Asses. Plan	Design review and SiD1	Project specific SiD activities	Design review and SiD2	SiD Safety Report	SiD 3
1			X	X	X	X	X	X	X
2	X		X	X	X	X	X	X	X
3	X	X	X	X	X	X	X	X	X
4	X	X	X	X	X	X	X	X	X