

**SAFETY IN DESIGN
HAZARD IDENTIFICATION AND WORKSHOP
PARTICIPANT DETAILS**

Site:	Typical Design for the electrical switchboards		
Details:	<i>Typical design is applied as a starting point for detailed design of specific sites</i>		
Project Number (if applicable):	Refer to the Technical Standards change register for history of items reviewed		
Change Register:	Location: https://sawater.sharepoint.com/:x:/r/teams/engs/Engg%20Tech/Technical%20Standards%20and%20Guidelines/_Standards%20Change%20Register/Standards%20Change%20Register%20-%20Electrical.xlsx?d=w9e6c7b64a0fb4930882db209c48d778b&csf=1&web=1&e=adLG9I		
Date	Phase	Project Details (If Applicable)	Attendees
1/02/2018	Lessons Learned	Lessons learned from previous generations of design schematics and switchboard layouts received from all parts of the business and feedback from contractors (installers and designers).	Entire SA Water Engineering Electrical Team
20/01/2019	Lessons Learned	Lessons learned from previous generations of design schematics and switchboard layouts received from all parts of the business and feedback from contractors (installers and designers).	Entire SA Water Engineering Electrical Team
21/07/2020	Lessons Learned	Lessons learned from previous generations of design schematics and switchboard layouts received from all parts of the business and feedback from contractors (installers and designers).	Entire SA Water Engineering Electrical Team
6/07/2023	Lessons Learned	Lessons learned from previous generations of design schematics and switchboard layouts received from all parts of the business and feedback from contractors (installers and designers).	Entire SA Water Engineering Electrical Team

HAZARD DETAILS										Hazard Elimination / Reduction SFAIRP				Action Required							
Hazard ID	Reference Information (e.g. Drawing)	Date Identified	Source (SID Review)	Life Cycle Phase	Activity / Task	Routine / Non-routine	Hazard Category	Details of Hazard Exposure	Do credible cause and consequence exist for this hazard? (Yes/No)	Current Controls	Proposed Controls	Control Method (Hierarchy)	Reasonably Practicable Category	Action Details / Options Considered / Status	Date Last Reviewed/ Updated	Responsible Company	Responsible Individual (or Role)	Due For Completion	Action Status (not started, open, closed)	Hazard Reduced SFAIRP (Y/N)	Responsible Authority
Hazard Identification (HAZID, Lessons Learned etc.)																					
0.01	TYP-03-00001-set TYP-03-00002-set TYP-03-00112-set TYP-03-00113-set	27-Nov-20	Design Review	Construction	Installing switchboard	Routine	SIZE	Insufficient space to install new board (new board is larger than old designs) which could result in insufficient clearances.	Yes	Site Visit to determine new SWB location based on site layout		Eliminate	a) Just do It								
0.02	TYP-03-00001-set TYP-03-00002-set TYP-03-00112-set TYP-03-00113-set	27-Nov-20	Design Review	Operations	Installing switchboard	Routine	SIZE	larger board could result in restricted access for installation and construction. This may require a different configuration to standard design (e.g. back to back)	Yes			Engineering	a) Just do It								
0.03	TYP-03-00001-set TYP-03-00002-set TYP-03-00112-set TYP-03-00113-set	27-Nov-20	Design Review	Operations	Operation of controls	Routine	POSITION	Height of controls could exceed maximum acceptable. Especially important if concrete plinth is installed (board designed for 100 mm plinth).	Yes	Operator apron level to be matched to switchboard plinth level if required	Detailed design to ensure switchboard design does not exceed acceptable heights	Eliminate	a) Just do It								
0.04	TYP-03-00001-set TYP-03-00002-set TYP-03-00112-set TYP-03-00113-set	27-Nov-20	Design Review	Operations	Operation of controls	Routine	POSITION	Risk of injury due to location of pump isolator enclosure being too low (adjacent to sump).	Yes	Minimum heights adhered to Greater than 500mm	Detailed design to ensure minimum heights are achieved	Engineering	a) Just do It								
0.05	TYP-03-00001-set TYP-03-00002-set TYP-03-00112-set TYP-03-00113-set	27-Nov-20	Design Review	Maintenance	Maintaining asset	Routine	ERGONOMICS	Risk of injury when removing batteries from SWBD.	Yes	battery sizes to be of small capacity <13kg		Engineering	a) Just do It								
0.06	TYP-03-00001-set TYP-03-00002-set TYP-03-00112-set TYP-03-00113-set	27-Nov-20	Design Review	Operations	Operation of controls	Routine	ACCESS	Risk of trips if plinth required to allow correct access/operational height of equipment/controls in board.	Yes	At least 1200mm concrete apron in front of Main Switchboard	concrete apron to provide landing in front of Switchboard	Eliminate	a) Just do It								
0.07	TYP-03-00001-set TYP-03-00002-set TYP-03-00112-set TYP-03-00113-set	27-Nov-20	Design Review	Operations	Operation of controls	Routine	ACCESS	Risk of slipping on ground when accessing/operating SWBD if ground not stable.	Yes	Consider installation of concrete apron in front/around board to provide safe work area.	concrete apron to provide landing in front of Switchboard	Eliminate	a) Just do It								
0.08	TYP-03-00001-set TYP-03-00002-set TYP-03-00112-set TYP-03-00113-set	27-Nov-20	Design Review	Operations	Operation of controls	Routine	ACCESS	Risk of injury resulting from restricted access/egress when SWBD doors are open	Yes	Consider door swing/hinge positions. Consider location of SWBD to avoid restrictions.	Locations have been reviewed to ensure adequate clearances	Engineering	a) Just do It								
0.09	TYP-03-00001-set TYP-03-00002-set TYP-03-00112-set TYP-03-00113-set	27-Nov-20	Design Review	Operations	Operation of controls	Routine	ACCESS	Risk of creating access/egress issues from site when a temporary generator is located on site.	Yes	Temporary generator location to be marked on site layout drawings	Locations have been reviewed to ensure adequate clearances	Engineering	a) Just do It								
0.10	TYP-03-00001-set TYP-03-00002-set TYP-03-00112-set TYP-03-00113-set	27-Nov-20	Design Review	Construction	Locating switchboard	Routine	ACCESS	Risk of injury to public for sites where SWBD located on footpaths or roads during construction works	Yes	Switchboard to be located within the site boundary away from footpaths. Ensure MSB door openings do not encroach foot paths.	Locations have been reviewed to ensure within site boundary	Engineering	a) Just do It								
0.11	TYP-03-00001-set TYP-03-00002-set TYP-03-00112-set TYP-03-00113-set	27-Nov-20	Design Review	Operations	Non-attended operation	Non-Routine	ENVIRONMENTAL	Risk of exposure to H2S gas from gases entering SWBD	Yes	Use of wet well junction box to prevent H2S gas from entering SWB. Conduit entry into Wet Well Junction Box to be sealed, conduits capped and sealed.		Engineering	a) Just do It								
0.12	TYP-03-00001-set TYP-03-00002-set TYP-03-00112-set TYP-03-00113-set	27-Nov-20	Design Review	Construction	Non-attended operation	Non-Routine	ENVIRONMENTAL	Risk of injury due to flooding	Yes	Consider 100 year flood level and level of SWBD to be above.		Administrative	a) Just do It								
0.13	TYP-03-00001-set TYP-03-00002-set TYP-03-00112-set TYP-03-00113-set	27-Nov-20	Design Review	Operations	Non-attended operation	Non-Routine	ISOLATION	Failure of control power supply, creating overflow with environmental impact	Yes	Independent Control and RTU Power Supplies. Comms heartbeat between system will create alarm. Pump Control Power supplies are independent from each other.		Engineering	a) Just do It								
0.14	TYP-03-00001-set TYP-03-00002-set TYP-03-00112-set TYP-03-00113-set	27-Nov-20	Design Review	Operations	Non-attended operation	Non-Routine	CONDITIONS	Failure of ventilation fan causing overheating of Common Control Panel	Yes	High Temperature thermostat alarm reported to the PLC / SCADA		Engineering	a) Just do It								
0.15	TYP-03-00001-set TYP-03-00002-set TYP-03-00112-set TYP-03-00113-set	27-Nov-20	Design Review	Operations	Non-attended operation	Non-Routine	ENVIRONMENTAL	Wet well overflow	Yes	AC Power Failure Alarms, Redundant Pumps, Level Transmitter, Backup High level and High High Level float switches, independent pump power supplies. Control System initiates Pump to run by default until Wet Well Level reaches low level stop setpoint. Temporary Generator connection facilities		Engineering	a) Just do It								
0.16	TYP-03-00001-set TYP-03-00002-set TYP-03-00112-set TYP-03-00113-set	27-Nov-20	Design Review	Maintenance	Operation of controls	Routine	MOVEMENT	Reversing of Pumps for excessive periods	Yes	Maximum Reverse Run cut-out Timer		Engineering	a) Just do It								
0.17	TYP-03-00001-set TYP-03-00002-set TYP-03-00112-set TYP-03-00113-set	27-Nov-20	Design Review	Maintenance	Maintaining asset	Routine	POSITION	Location of telemetry equipment and DOL/soft starters are at a height which may cause access issues during maintenance especially in lack of daylight	Yes	Compliance to TS0300 and minimum/maximum heights of equipment		Engineering	a) Just do It								
0.18	TYP-03-00001-set TYP-03-00002-set TYP-03-00112-set TYP-03-00113-set	27-Nov-20	Design Review	Maintenance	Maintaining asset	Routine	POSITION	Location of DOL and soft starters results in LV and ELV voltages in tier	Yes	SA Water design and require soft starters to be in control area, segregation and identification of 240V wiring in line with TS0300. Use of Perspex covers with DANGER labels to identify LV in ELV zones. Double insulate LV in ELV or Operator accessible zones.		Administrative	a) Just do It								
0.19	TYP-03-00001-set TYP-03-00002-set TYP-03-00112-set TYP-03-00113-set	27-Nov-20	Design Review	Maintenance	Maintaining asset	Routine	ERGONOMICS	Access to filters and covers for maintenance may be difficult with a single person	Yes	Design to ensure ability to change with one maintenance personnel		Engineering	a) Just do It								
0.20	TYP-03-00001-set TYP-03-00002-set TYP-03-00112-set TYP-03-00113-set	27-Nov-20	Design Review	Maintenance	Maintaining asset	Routine	ACCESS	Potentially difficult to access behind LV chassis	Yes	No equipment to be mounted behind the LV Chassis		Engineering	a) Just do It								
0.21	TYP-03-00001-set TYP-03-00002-set TYP-03-00112-set TYP-03-00113-set	27-Nov-20	Design Review	Maintenance	Maintaining asset	Routine	ACCESS	Opening LV escutcheon will require isolation	Yes	Compliance to TS0300 and with interlocking of doors with isolators, shouldn't be opening with live bus		Engineering	a) Just do It								
0.22	TYP-03-00001-set TYP-03-00002-set TYP-03-00112-set TYP-03-00113-set	27-Nov-20	Design Review	Maintenance	Maintaining asset	Routine	SIZE	When LV circuit breakers are locked off, escutcheon will be able to be closed	Yes	Ensure all doors can be closed with locks applied		Engineering	a) Just do It								
0.23	TYP-03-00001-set TYP-03-00002-set TYP-03-00112-set TYP-03-00113-set	27-Nov-20	Design Review	Construction	Maintaining asset	Routine	MOVEMENT	Switchboard with lifting facilities in plinth required	Yes	Switchboard to be fitted to plinth using 12mm bolts. Holes in plinth to be big enough to fit lifting bars		Engineering	a) Just do It								
0.24	TYP-03-00001-set TYP-03-00002-set TYP-03-00112-set TYP-03-00113-set	27-Nov-20	Design Review	Maintenance	Maintaining asset	Routine	ISOLATION	Maintenance personnel may not be able to lock out the pumps at the main switchboard. Personnel only have a 6mm lock	Yes	Ensure Pump C/Breaker isolation point is provided with lockout devices that can have 6mm lock applied		Engineering	a) Just do It								

Hazard ID	HAZARD DETAILS									Hazard Elimination / Reduction SFAIRP				Action Required							
	Reference Information (e.g. Drawing)	Date Identified	Source (SID Review)	Life Cycle Phase	Activity / Task	Routine / Non-routine	Hazard Category	Details of Hazard Exposure	Do credible cause and consequence exist for this hazard? (Yes/No)	Current Controls	Proposed Controls	Control Method (Hierarchy)	Reasonably Practicable Category	Action Details / Options Considered / Status	Date Last Reviewed/ Updated	Responsible Company	Responsible Individual (or Role)	Due For Completion	Action Status (not started, open, closed)	Hazard Reduced SFAIRP (Y/N)	Responsible Authority
0.25	TYP-03-00001-set TYP-03-00002-set TYP-03-00112-set TYP-03-00113-set	27-Nov-20	Design Review	Maintenance	Non-attended operation	Non-Routine	CONDITIONS	Potential of switchboard flooding when wet well overflows	Yes	Use of wet well junction box to prevent overflow from entering SWB. Conduit entry into Wet Well Junction Box to be sealed, conduits capped and sealed.	Engineering	a) Just do It									
0.26	TYP-03-00001-set TYP-03-00002-set TYP-03-00112-set TYP-03-00113-set	27-Nov-20	Design Review	Design	Non-attended operation	Non-Routine	CONDITIONS	Lightning strike on antenna as antennas are mounted high	Yes	lightning protection include in design on antenna to minimise damage	Engineering	a) Just do It									
0.27	TYP-03-00001-set TYP-03-00002-set TYP-03-00112-set TYP-03-00113-set	27-Nov-20	Design Review	Operations	Locating switchboard	Routine	CONDITIONS	Some switchboards installed in coastal environments	Yes	Use of non corrosive materials in coastal locations e.g. Stainless steel	Engineering	a) Just do It									
0.28	TYP-03-00001-set TYP-03-00002-set TYP-03-00112-set TYP-03-00113-set	27-Nov-20	Design Review	Design	Operation of controls	Routine	ACCESS	If switchboard does not face wet well, operators will not be able to witness pump operation	Yes	Location of switchboard in relation to wet well is considered in the location selection. Where possible switchboard will face wet well	Engineering	a) Just do It									
0.29	TYP-03-00001-set TYP-03-00002-set TYP-03-00112-set TYP-03-00113-set	6-Jul-23	Design Review	Design	Maintaining asset	Routine	CONDITIONS	Lack of RCD protection on heater units in switchboards presenting an electrocution risk to personnel checking their operation.	Yes	Addition of RCD protection to relevant circuits	Engineering	a) Just do It									