A1

INSTRUCTION NOTES FOR USE OF DEEMED TO COMPLY (DTC) DRAWINGS FOR EMERGENCY RELIEF STRUCTURES (ERS)

DESIGN PHILOSOPHY

D1. A VARIETY OF STRATEGIES THAT CAN BE ADOPTED TO REMEDIATE OR INTRODUCE AN ERS IN A WASTEWATER SYSTEM HAVE BEEN DEVELOPED AND CAN BE SUMMARISED INTO FOUR CATEGORIES:
CATEGORY A: INSTALLING AN INLINE CHECK VALVE INTO AN EXISTING OR NEW STRUCTURE.
CATEGORY B: INSTALLING A DUCKBILL CHECK VALVE IN A NEW CHAMBER ALONG THE EXISTING RELIEF PIPE.
CATEGORY C: CONSTRUCTING A NEW ERS OR RELOCATING AN EXISTING ERS. THIS OPTION REQUIRES A NEW WEIR TO BE CONSTRUCTED AS WELL AS A DUCKBILL VALVE CHAMBER. THIS OPTION MAY ALSO REQUIRE DECOMMISSIONING AN EXISTING ERS.
CATEGORY D: SOLUTION AT THE DISCHARGE POINT OF OVERFLOW INTO A NATURAL ENVIRONMENT. THIS OPTION REQUIRES A HEADWALL STRUCTURE AND A DUCKBILL VALVE SOLUTION TO PROTECT AND AVOID SILTATION OF THE RELIEF PIPE.

D2. THE DTC DRAWINGS LISTED IN THE DRAWING INDEX PROVIDE A DESIGN SOLUTION FOR THE ABOVE CATEGORIES A, B AND C.

D3. DUE TO SITE VARIABILITY, A DTC SOLUTION IS NOT AVAILABLE FOR CATEGORY D, A GUIDANCE DOCUMENT INCLUDING SKETCHES HAS BEEN DEVELOPED TO PROVIDE THE DESIGN PHILOSOPHY FOR A HEADWALL AND DUCKBILL CONSTRUCTED WITHIN OR ADJACENT TO A WATERWAY. REFER TO SYDNEY WATER GUIDELINE TITLED 'EMERGENCY RELIEF STRUCTURE - HEADWALL & DUCKBILL CHECK VALVE ARRANGEMENT' FOR DESIGN REQUIREMENTS.

D4. IN ORDER TO IDENTIFY THE PREFERRED ERS STRATEGY FOR A SITE (THE MOST ECONOMICAL SOLUTION WITH ACCEPTABLE RISK), AN ERS DESIGN PHILOSOPHY HAS BEEN ESTABLISHED AND IS SUMMARISED IN TABLE 1.
THE FOLLOWING SITE SPECIFIC ASSESSMENTS MUST BE CARRIED OUT TO IDENTIFY AN APPROPRIATE STRATEGY (FOR ALL WORKS INCLUDING DECOMMISSION OR DEMOLITION WORK):
a. HYDRAULIC MODELLING ASSESSMENT TO CONFIRM WEIR LEVEL, RELIEF PIPE SIZE, AND OVERFLOW FREQUENCY AND VOLUME. UNDERTAKEN BY SYDNEY WATER PLANNING AND REQUIRED INFORMATION PROVIDED TO DTC USER.
b. SPECIALIST ENGINEERING ASSESSMENT FOR EXISTING STRUCTURES
c. SITE SPECIFIC CONSTRAINTS TO BE CONSIDERED, THAT IS, ENVIRONMENTAL ASSESSMENT AND GEOTECHNICAL INVESTIGATIONS TO BE CARRIED OUT.

D5. PROJECT SPECIFIC DESIGN DOCUMENTATION MUST BE PREPARED NOMINATING THE REQUIRED DTC DRAWINGS APPLICABLE FOR EACH CATEGORY. ADOPTED ERS STRATEGY TO BE APPROVED BY SYDNEY WATER.

D6. IF ANY OF THE VALVE SELECTION CRITERIA IN TABLE 1 CANNOT BE ACHIEVED, THE DTC DRAWINGS SHALL NOT BE USED. A SITE SPECIFIC DETAILED DESIGN WILL BE REQUIRED FOR APPROVAL BY SYDNEY WATER.

TABLE 1 - ERS DESIGN PHILOSOPHY

CRITERIA	CATEGORY A	CATEGORY B	CATEGORY C
REFERENCE DTC DRAWINGS/ DOCUMENT	DTC/2407 (SEE NOTES D2 & D6)	DTC/2402 (SEE NOTES D2 & D6)	DTC/2403 DTC/2404 (SEE NOTES D2 & D6)
EXISTING ERS OR HEADWALL STRUCTURE	IF THE EXISTING GAS CHECK CHAMBER IS BURIED - RAISE IT TO SURFACE TO ENABLE EXISTING FLAP VALVE REMOVAL AND/OR NEW INLINE CHECK VALVE INSTALLATION, REFER TO DTC/2408	-	FOR DECOMMISSIONING AN EXISTING ERS, REFER TO DTC/2405 (FOR BURIED ERS) DTC/2406 (FOR STANDARD ERS)
CHECK VALVE SELECTION	STANDARD WAPRO WASTOP INLINE CHECK VALVE OR APPROVED EQUIVALENT. SIZE UP TO DN450. ALLOWABLE MAXIMUM BACK PRESSURE 5m HEAD (SEE NOTE D6)	TIDEFLEX DUCKBILL CHECK VALVE - SERIES TF-1 OR APPROVED EQUIVALENT. SIZE UP TO DN600. ALLOWABLE MAXIMUM BACK PRESSURE 5m HEAD (SEE NOTE D6)	
H_2S CONCENTRATION	UP TO 10PPM	UP TO 10PPM	
STATUS OF THE EXISTING RELIEF PIPE	IF BLOCKED OR SILT PRESENT, INLINE CHECK VALVE MUST BE LOCATED AT (OR AS CLOSE AS POSSIBLE) TO THE DISCHARGE POINT	IF BLOCKED OR SILT PRESENT, DUCKBILL CHECK VALVE MUST BE LOCATED AT (OR AS CLOSE AS POSSIBLE) TO THE DISCHARGE POINT	
STATUS OF RECEIVING ENVIRONMENT	IF BLOCKED AT DISCHARGE POINT, DISCHARGE POINT MUST BE RAISED OR RELOCATED (TO BE CONFIRMED WITH SYDNEY WATER PLANNING)	IF BLOCKED AT DISCHARGE POINT, DISCHARGE POINT MUST BE RAISED OR RELOCATED (TO BE CONFIRMED WITH SYDNEY WATER PLANNING)	
OUTFLOW FREQUENCY	UP TO 40/10 YEARS	NO LIMIT	
ERS VALVE CHAMBER OR HEADWALL	MAINTAINABLE INLINE CHECK VALVE MUST BE ACCESSIBLE AND EASY TO MAINTAIN (NOT REQUIRE ANY CHAMBER MODIFICATIONS)	MAINTAINABLE DUCKBILL CHECK VALVE MUST BE ACCESSIBLE AND EASY TO MAINTAIN (NOT REQUIRE ANY CHAMBER MODIFICATIONS)	
NEW STRUCTURE LOCATION	AVOID TRAFFICABLE AREAS WHERE PRACTICAL. AVOID PRIVATE PROPERTY. CONSIDER ACCESS FOR MAINTENANCE	AVOID TRAFFICABLE AREAS WHERE PRACTICAL. AVOID PRIVATE PROPERTY. CONSIDER ACCESS FOR MAINTENANCE	
HEAD OPTIMISATION	AREAS WHERE AN INCREASE IN HEAD POSES A RISK THE VALVE LOCATION IS TO BE OPTIMISED FOR HYDRAULIC PURPOSES	AREAS WHERE AN INCREASE IN HEAD POSES A RISK THE VALVE LOCATION IS TO BE OPTIMISED FOR HYDRAULIC PURPOSES	

GENERAL

G1. THESE DTC DRAWINGS SHALL BE READ IN CONJUNCTION WITH THE LATEST VERSION OF THE FOLLOWING DOCUMENTS:
a. SYDNEY WATER TECHNICAL SPECIFICATION - CIVIL: DOCUMENT No. CPDMS0023
b. SEWERAGE CODE OF AUSTRALIA WSA 02-2002-2.2 SYDNEY WATER EDITION
c. EPS 500 ENGINEERING PRODUCT SPECIFICATION FOR STANDARD PIPES AND FITTINGS FOR NETWORKS
d. WSA 201 MANUAL FOR SELECTION AND APPLICATION OF PROTECTIVE COATINGS
e. SYDNEY WATER ENGINEERING COMPETENCY STANDARD: DOCUMENT No. D0000833
f. SYDNEY WATER SPECIALIST ENGINEERING ASSESSMENT PROCEDURE: DOCUMENT No. D0001870
g. SYDNEY WATER EMERGENCY RELIEF STRUCTURE - HEADWALL & DUCKBILL CHECK VALVE ARRANGEMENT GUIDANCE DOCUMENT

G2. THESE DTC DRAWINGS ARE NOT SUITABLE FOR UNSTABLE GROUND (INCLUDING SOFT SOIL, REACTIVE CLAY AND UNCONTROLLED FILL), CONTAMINATED GROUND OR MINE SUBSIDENCE AREAS. INVESTIGATIONS TO CONFIRM SUITABILITY MUST OCCUR PRIOR TO USING THESE DTC DRAWINGS.

G3. USE OF STANDARD DESIGN MAY INTRODUCE UNINTENDED SAFETY RISK FOR SITE SPECIFIC APPLICATION. SAFETY RISKS THROUGH SITE SPECIFIC ASSESSMENT MUST BE ADDRESSED AND A SAFETY IN DESIGN ASSESSMENT MUST BE CONDUCTED PRIOR TO CONSTRUCTION.

G4. WEIR CREST LEVEL (WCL) SHOWN ON DTC DRAWINGS SHALL BE APPROVED BY SYDNEY WATER ON A PROJECT CASE BY CASE BASIS PRIOR TO DETAILED DESIGN.

G5. WHERE PROPRIETARY ITEMS HAVE BEEN SPECIFIED, A SUITABLE EQUIVALENT MAY BE USED IF APPROVED BY SYDNEY WATER. PROPRIETARY ITEMS SHALL BE INSTALLED STRICTLY IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS.

G6. DIMENSIONS ARE IN MILLIMETRES U.N.O. DIMENSIONS SHALL NOT BE OBTAINED BY SCALING THE DRAWINGS.

BACKFLOW PREVENTION VALVE

V1. AS APPLICABLE TO CHOSEN ERS STRATEGY, EITHER OF THE FOLLOWING BACKFLOW PREVENTION VALVES ARE TO BE USED:
a. TIDEFLEX DUCKBILL CHECK VALVE - SERIES TF-1 OR APPROVED EQUIVALENT
b. WAPRO WASTOP INLINE CHECK VALVE (STANDARD VERSION ONLY) OR APPROVED EQUIVALENT

V2. BACKFLOW PREVENTION VALVE MUST BE INSTALLED IN ACCORDANCE WITH MANUFACTURER REQUIREMENTS.

V3. PRIOR TO PROCURING THE BACKFLOW PREVENTION VALVE, THE MINIMUM BACK PRESSURE THE VALVE IS REQUIRED TO WITHSTAND MUST BE DETERMINED. VALVE SHALL BE SUITABLE TO WITHSTAND THE WATER PRESSURE AT GROUND LEVEL OR THE GROUND WATER LEVEL WITH AN ANNUAL PROBABILITY OF EXCEEDANCE OF 1 IN 100, WHICHEVER IS GREATER. NOTE THESE DTC DRAWINGS ARE DESIGNED FOR VALVES REQUIRED TO WITHSTAND A MAXIMUM OF 5m HEAD.

V4. AS APPLICABLE TO CHOSEN ERS STRATEGY, PRIOR TO PROCURING THE BACKFLOW PREVENTION VALVE (EITHER THE DUCKBILL CHECK VALVE OR WASTOP INLINE CHECK VALVE), THE FOLLOWING MEASUREMENTS SHALL BE REQUIRED:
a. OUTSIDE DIAMETER AND STUB LENGTH OF RELIEF PIPE IN WHICH THE DUCKBILL CHECK VALVE IS TO BE INSTALLED
b. INSIDE DIAMETER OF RELIEF PIPE IN WHICH THE WASTOP INLINE CHECK VALVE IS TO BE INSTALLED
c. INTERNAL DIMENSIONS OF THE EXISTING GAS CHECK CHAMBER/MAINTENANCE HOLE IN WHICH THE WASTOP INLINE CHECK VALVE IS TO BE INSTALLED
d. CONFIRM HYDROGEN SULPHIDE (H_2S) LEVEL.

V5. INSTALLATION OF THE BACKFLOW PREVENTION VALVE IS TO BE THE FINAL STEP IN CONSTRUCTION SEQUENCING. THIS WILL ENSURE VALVE CAN BE REMOVED AND REPLACED IN THE FUTURE WITHOUT ANY MODIFICATIONS TO THE RELIEF PIPE, CHAMBER OR HEADWALL (AS APPLICABLE).

V6. FOR WORK AS CONSTRUCTED DRAWINGS, THE BACKFLOW PREVENTION VALVE TECHNICAL DATA INDICATED IN THE TABLE BELOW MUST BE COMPLETED:

MANUFACTURER	
SERIAL NUMBER	
MODEL NUMBER	
DN (mm)	
OD (mm)	
RUBBER GASKET THICKNESS (mm)	

PIPEWORK

P1. PIPEWORK SHALL BE AS SHOWN AND COMPLY WITH THE FOLLOWING:
a. FOR <DN450, PVC-U SN8 RRJ PIPE IN ACCORDANCE WITH EPS 500.
b. FOR ≥DN450, GRP SN10000 IN ACCORDANCE WITH EPS 500.
c. WHERE SPECIFIED, GRP SN20000 IN ACCORDANCE WITH EPS 500.

P2. ALL FASTENERS SHALL BE STAINLESS STEEL GRADE 316.

FOUNDATIONS

F1. GROUND CONDITIONS CONSIDERED IN DESIGN SHALL BE VERIFIED ON SITE DURING CONSTRUCTION IN ACCORDANCE WITH SYDNEY WATER TECHNICAL SPECIFICATION - CIVIL.

F2. EXPECTED GROUND CONDITIONS AT EACH STRUCTURE SHALL MEET THE MINIMUM REQUIREMENTS SPECIFIED BELOW.

DEPTH TO SEWER INVERT	SOIL LAYER AND CONSISTENCY	MINIMUM EQUIVALENT TESTING	REQUIRED TESTING DEPTH	MINIMUM ALLOWABLE BEARING CAPACITY AND STRENGTH REDUCTION FACTOR (Φ_g USED IN DESIGN)
0-6m	STIFF CLAY OR MEDIUM DENSE SAND	DCP = 3 BLOWS / 100mm	MINIMUM 1m BELOW BASE SLAB	100 kPA ; Φ_g = 0.5
6-10m	VERY STIFF CLAY OR DENSE SAND	DCP = 5 BLOWS / 100mm	MINIMUM 1m BELOW BASE SLAB	180 kPA ; Φ_g = 0.5

F3. ALL WEAKER MATERIAL NOT MEETING THE ABOVE MINIMUM REQUIREMENTS SHALL BE EXCAVATED AND REPLACED WITH SELECT FILL MATERIAL COMPLYING WITH SYDNEY WATER TECHNICAL SPECIFICATIONS - CIVIL.

F4. ANY OVER EXCAVATED ROCK OR CAVITIES SHALL BE BACKFILLED WITH GRADE N15 MASS CONCRETE.

DRAWING INDEX

REFERENCE DRAWINGS

DTC/2000 - MAINTENANCE HOLES, CONSTRUCTION NOTES
DTC/2200 - DN1200 MAINTENANCE HOLES, CAST IN-SITU REINFORCED CONCRETE
DTC/2201 - MAINTENANCE HOLES, CAST IN-SITU REINFORCED CONCRETE
DTC/2202 - DN1200 MAINTENANCE HOLES, CAST IN-SITU PLAIN CONCRETE WALL
DTC/2220 - MAINTENANCE HOLES, DETAILS SHEET 1
DTC/2221 - MAINTENANCE HOLES, DETAILS SHEET 2
DTC/2251 - MAINTENANCE HOLES, PRECAST DN1050 - DN1200, NOTES, INSTRUCTIONS & DRAWING LIST

TABLE 2 - DUCKBILL CHECK VALVE CHAMBER MINIMUM DIMENSIONS

TIDEFLEX DUCKBILL CHECK VALVE DN	INTERNAL LENGTH 'Y'	INTERNAL WIDTH 'X'
≤300	1500	1300
>300 & ≤600	2100	1500

TABLE 3 - DUCKBILL CHECK VALVE CHAMBER GATIC COVER SELECTION

CLASS B (AS 3996)

TIDEFLEX DUCKBILL CHECK VALVE DN	INTERNAL LENGTH 'L1'	INTERNAL LENGTH 'W1'	GATIC COVER SELECTION
≤300	1264	914	2 PART - GM302C9112B
>300 & ≤600	N/A*	N/A*	N/A*

CLASS D (AS 3996)

TIDEFLEX DUCKBILL CHECK VALVE DN	INTERNAL LENGTH 'L1'	INTERNAL LENGTH 'W1'	GATIC COVER SELECTION
≤300	1289	914	2 PART - GM302C9112D
>300 & ≤600	1817	1218	3 PART - GM303C1218D

* DUE TO THE LIMITATION OF GATIC COVER WIDTH IN CLASS B, 3 PART - GM303C1218D CLASS D COVER IS APPLIED FOR THE VALVE CHAMBER.

TABLE 4 - DIMENSION 'Z' FOR ALTERNATE PIPE ENTRY LOCATION

DN	'Z'
>225 & ≤450	750
>450 & ≤600	900

Sydney WATER

APPROVED
DINESH DINESHHARAN
MANAGER - ENGINEERING

ENGINEERING & TECHNICAL SUPPORT

LETTER	DETAILS OF ISSUE / AMENDMENT	APP'D	DATE
A	ORIGINAL ISSUE	D.D.	14/09/21

DEEMED TO COMPLY DRAWINGS

EMERGENCY RELIEF STRUCTURE INSTRUCTIONS, GENERAL NOTES AND DRAWING LIST

DTC 2401

ISSUE	DATE
A	14/09/21